

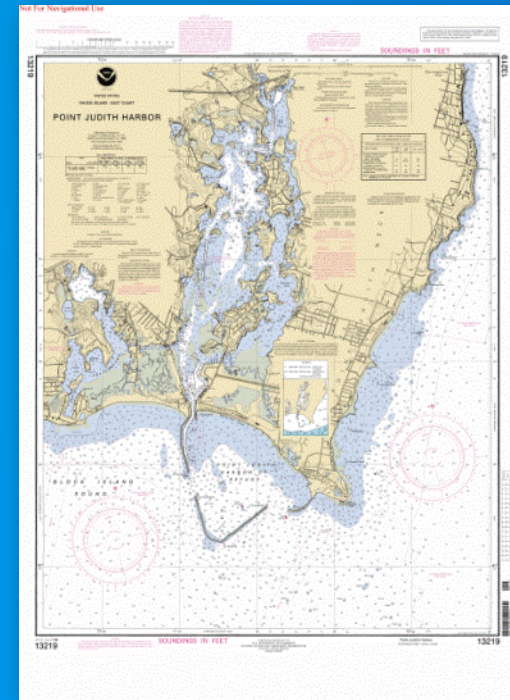
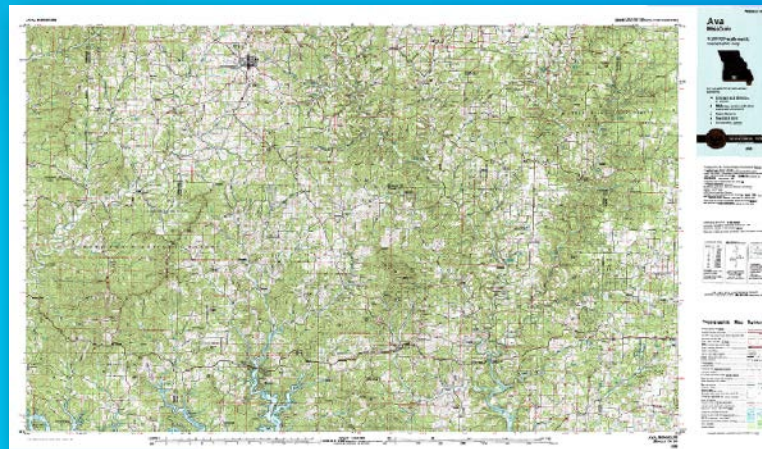


Best Practices for Managing Scanned Imagery

Peter Becker

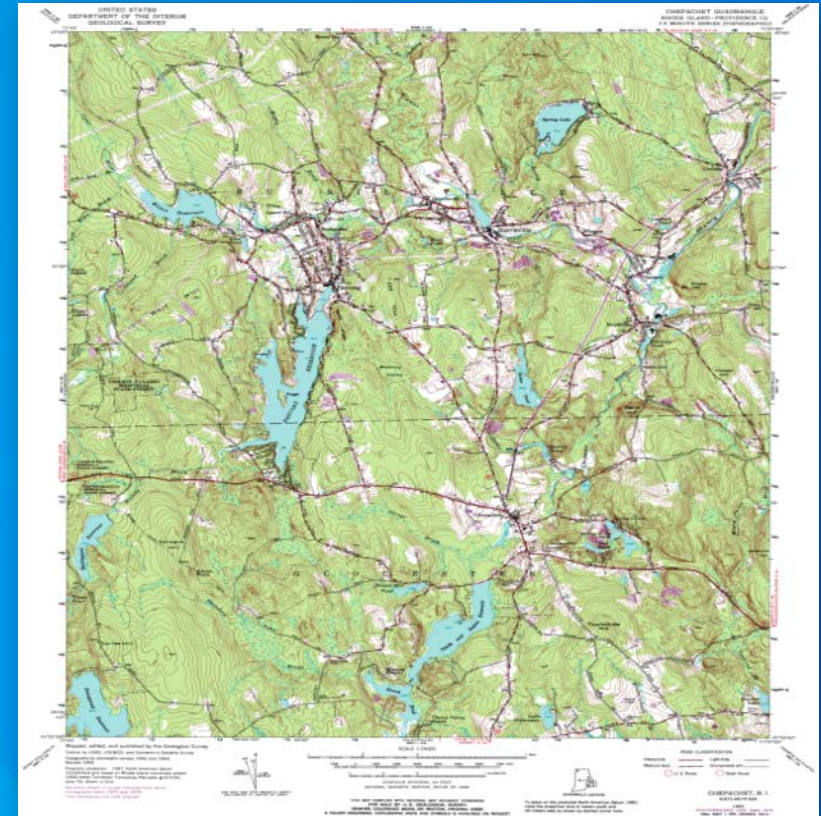
Objectives

- Making Scanned Imagery Accessible
 - Topographic maps
 - Historic scanned maps
 - Navigation maps
 - Engineering drawings



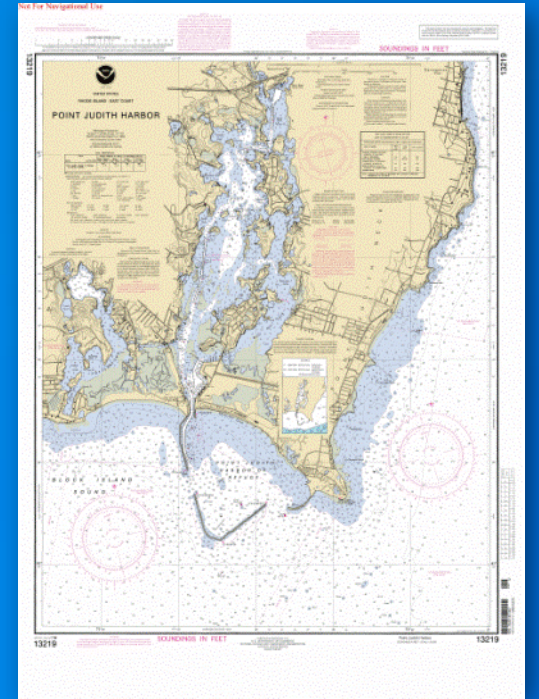
Uses of Scanned Map Collections

- An authoritative information source
- Provides a record for land resource management
 - Forest plot perimeters
 - Wetlands
 - Agriculture
 - Glaciers
 - Land/water boundaries
 - Political boundaries
- Historical analysis
- Navigation
- Adventure/exploration



Scanning - Recommendations

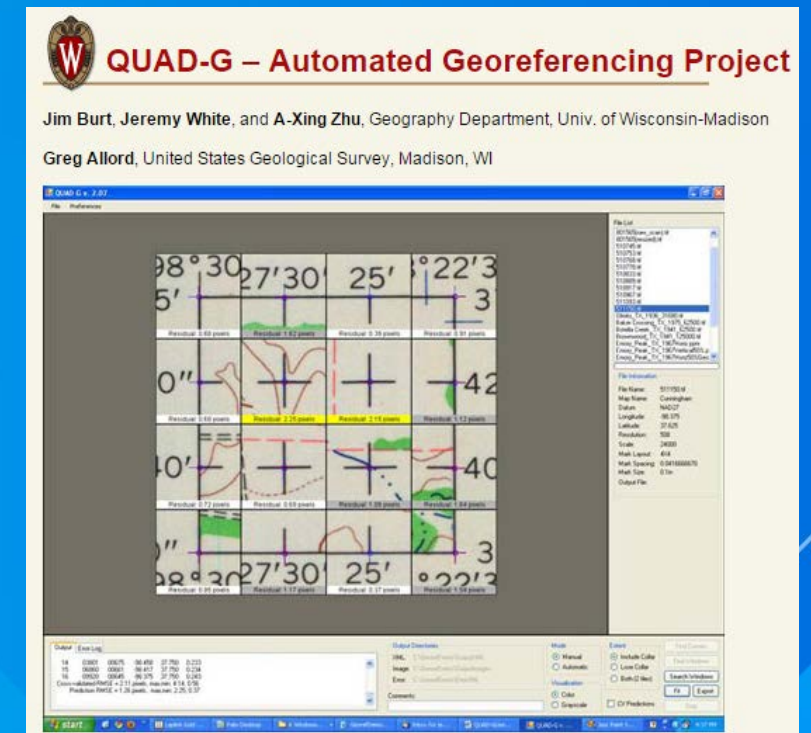
- Scan resolution 400 – 600 dpi
- 24bit rgb for color, 8bit for panchromatic
- Non-rectified
- Include Collars
- No tinting
- Use Unique Names Eg Name_Scale_Date_Version
- Format
 - Should be Tiled. Eg Tiled TIF
 - Compression – Suggest LZW or JPEG (RGB)
 - Engineering drawings of as Grayscale or 1bit: LZW
 - Generate pyramids using Average/Bilinear sampling (JPEG compression OK)
 - Stats are optional



Georeferencing

- Using ArcGIS for Desktop
 - Manually collect control points
 - More note below. (Use Update Georeferencing, Do Not Rectify)
- Using Quad-G – From University of Wisconsin-Madison
 - Good for automated batch georeferencing
 - Use option to create AUX.XML and not rectify map

Rectifying the map will reduce quality!



Define the Correct Projection and Datum

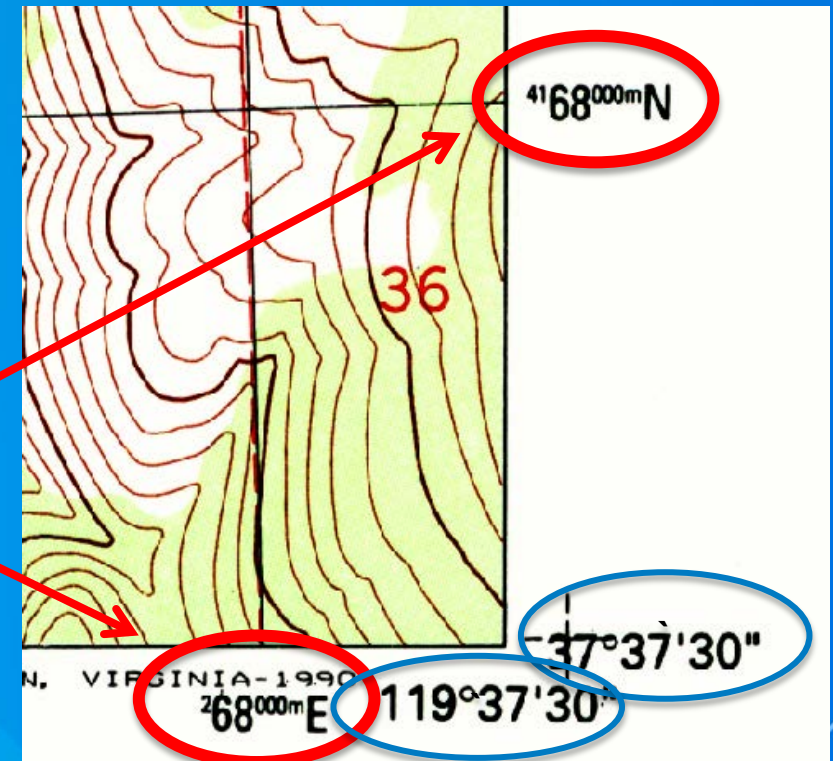
- Check Coordinate system in which the map was printed
- Not the projection of the Neatline (SheetCut)
- Georeference in Map coordinate system
- Maps are not printed in Geographic coordinates!
- Lines of longitude and latitude are not straight!

e.g.

Projection and 10,000-foot grid ticks: California coordinate system, zone 3 (Lambert conformal conic)
1000-meter Universal Transverse Mercator grid, zone 11
1927 North American Datum

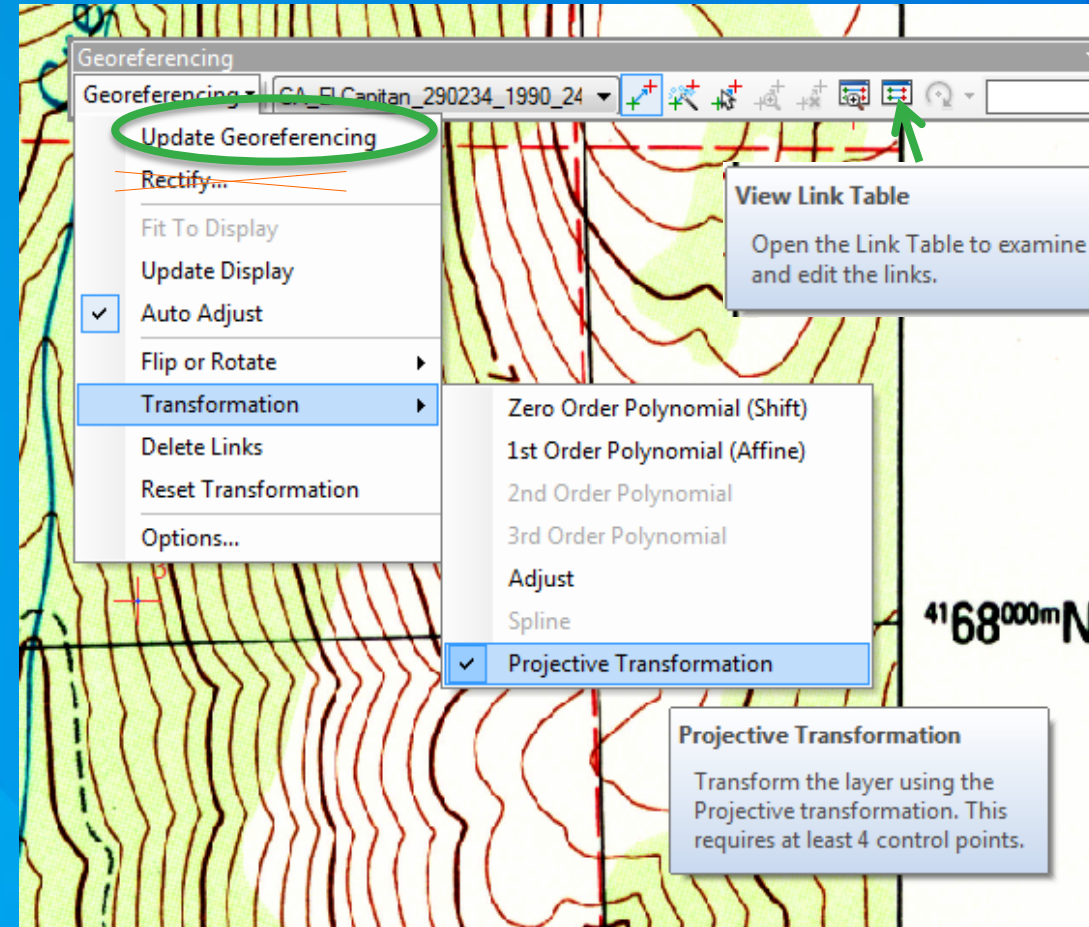
Sheet created in 

The neatline is in geographic, but same NAD 1927 datum



Manual Georeferencing Notes:

- Set Files to Read Only! (Else ArcMap will update)
- Use “Update Georeferencing”
 - Will create *file.AUX.XML*
 - Defines:
 - Image and ground coordinates
 - Transformation type
 - Projection information
 - Can always improve later
- Do Not use Rectify!
- Optimization (faster but may not be so accurate)
 - Use Sheet Cut (in map projection) as control
 - Check residuals using 1st Order (affine)
 - Set to Projective Transformation



Metadata Table

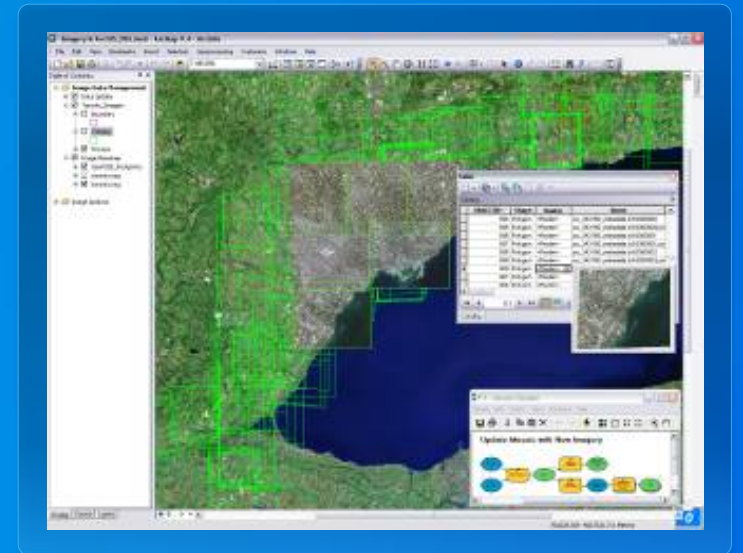
- Need Table with Metadata Fields
- Can be CSV (but check field definition when using Import Table)
- Following Fields
 - Raster – Path and name of raster (tif)
 - MapScale – Eg 24000 for 1:24,000
 - Map_Date – best of have some ‘date/time’ field
 - NameOnMap, Citation, *as required*
- If Geographic: Include map extent coords
 - N_Lat, S_Lat, W_Long, E_Long

<input type="checkbox"/>	Scan_Id_1
<input type="checkbox"/>	Folder_Name
<input checked="" type="checkbox"/>	File_Name
<input checked="" type="checkbox"/>	Name_on_Map
<input checked="" type="checkbox"/>	Year_on_Map
<input type="checkbox"/>	Year_Printed
<input checked="" type="checkbox"/>	Year_to_Display
<input checked="" type="checkbox"/>	Map_Scale
<input type="checkbox"/>	Projection
<input type="checkbox"/>	Datum
<input type="checkbox"/>	N_Lat_DMS
<input type="checkbox"/>	S_Lat_DMS
<input type="checkbox"/>	W_Long_DMS
<input type="checkbox"/>	E_Long_DMS
<input type="checkbox"/>	N_Lat
<input type="checkbox"/>	S_Lat
<input type="checkbox"/>	W_Long
<input type="checkbox"/>	E_Long
<input type="checkbox"/>	Central_Long
<input type="checkbox"/>	Scan_Resolution
<input type="checkbox"/>	Control_Mark_Spacing
<input type="checkbox"/>	Grid_Layout_Lat_Long
<input type="checkbox"/>	Notes
<input checked="" type="checkbox"/>	Citation

Mosaic Dataset

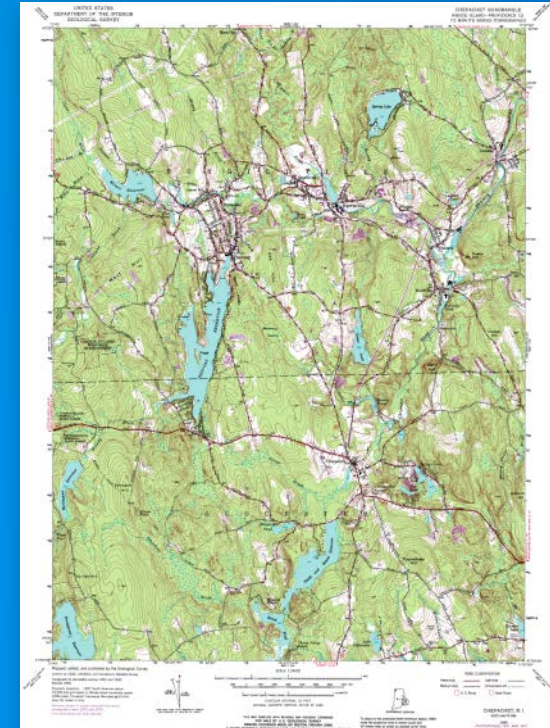
Optimum method to manage and serve collections of imagery

- **Geodatabase data model used to catalog, process, visualize and share your collections of imagery (rasters and lidar) data**
- **References source**
 - Defines metadata
 - Defines processing (including projection, clipping enhancement)
- **Provides dynamic mosaicking and on-the-fly processing**
- **Used as a catalog and an image**
- **Direct use in ArcGIS Desktop**
- **Served as an image service**



Creating Mosaic Dataset – Using Table Raster Type

- **Create Mosaic Dataset**
 - Define Projection (of MosaicDataset not maps)
- **Add Rasters**
 - Use Table Raster Type
- **Set Properties**
- **Review and control Max_PixelSize**



Defining the Order and Display Of Imagery

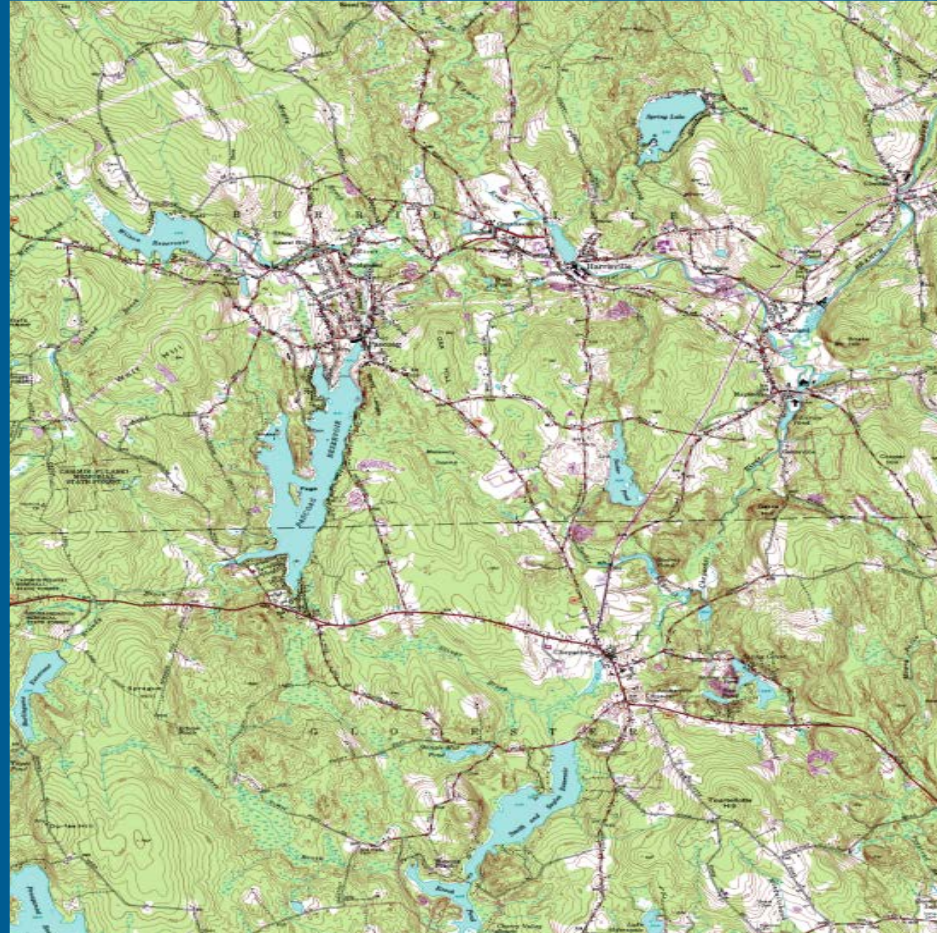
- Display controlled by Scale and Mosaic Method (eg by Attribute, date)
- Many methods to order imagery
- Also controlled by MinPS and MaxPS
 - Image displayed if screen/request pixel size is between these values
 - Can set MinPS,MaxPS to any suitable value (do run Calculate Item Visibility if changed)
- Mosaic Method is overridden by ZOrder. Lower ZOrder, higher priority
- Eg set $ZOrder = (Map_Scale * 10000) - Start_Time$
results in larger scale and latest maps having higher priority

Neatline (SheetCut)



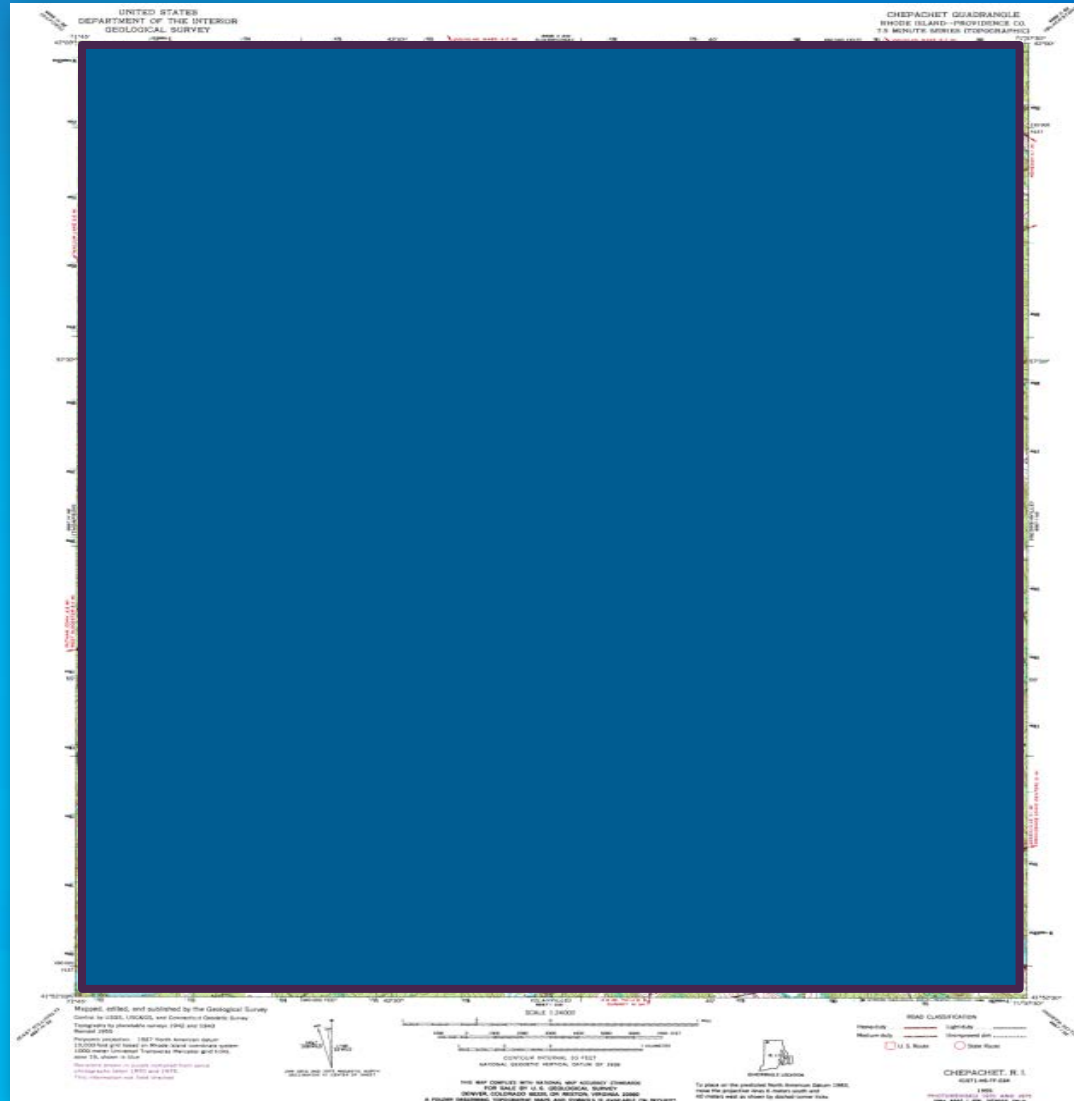
Neatline (SheetCut)

What you want see



Neatline (SheetCut)

What you want hidden
(Normally)



Creating Neatline (SheetCut)

- **Manually**

- **If Geographic:**

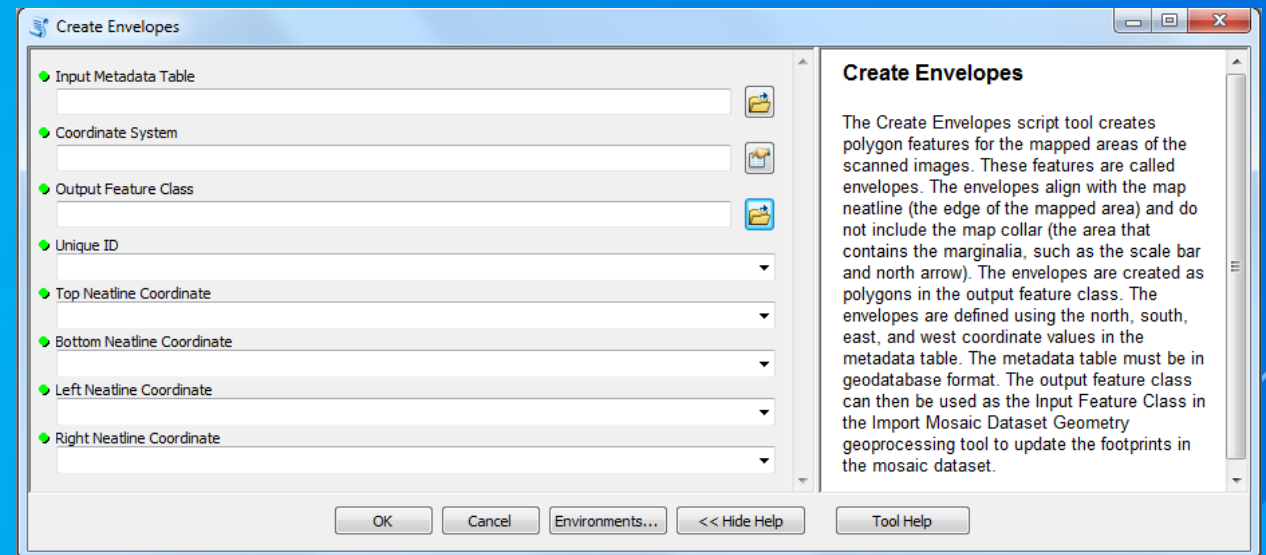
- Set Dataframe to Geographic with correct datum
- Generate sheet cut (eg using Fishnet, table, ...) using straight lines
- Will get reprojected to Map coordinate system

- **If Projected**

- Set correct projection/datum

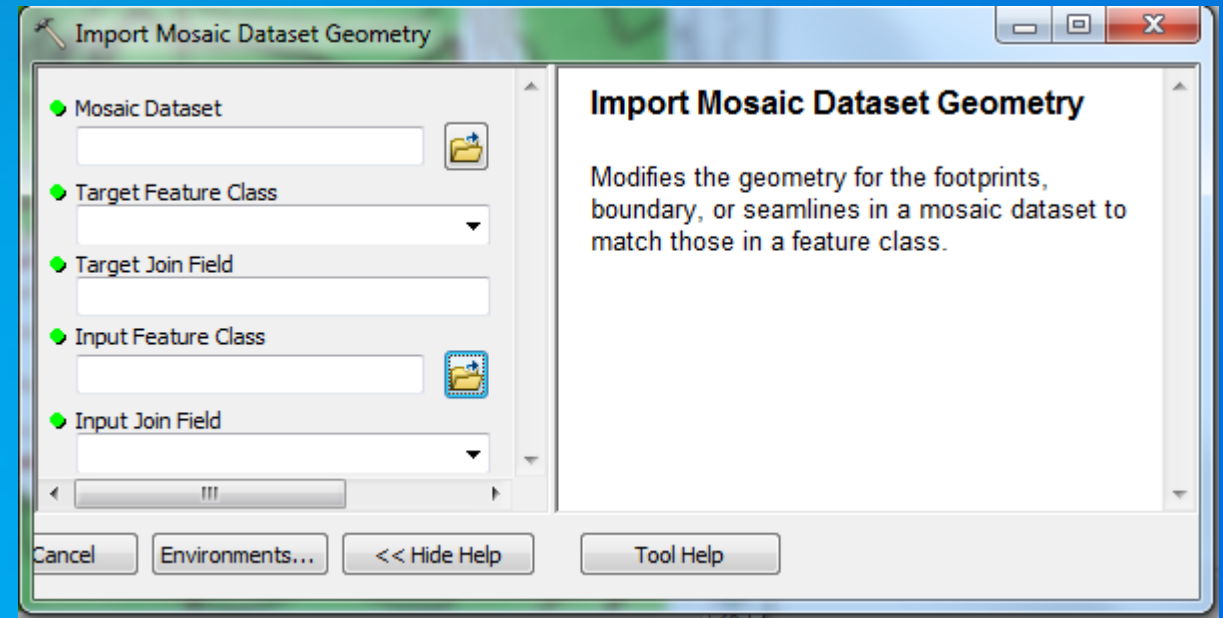
- **Automated**

- Use CreateEnvelopes (Download)



Defining Footprints

- Image spatial search use footprints
- Images get clipped to footprints
- Use Import Mosaic Dataset Geometry
 - From neatline geometries
- Now image will be clipped
- Footprints can be edited

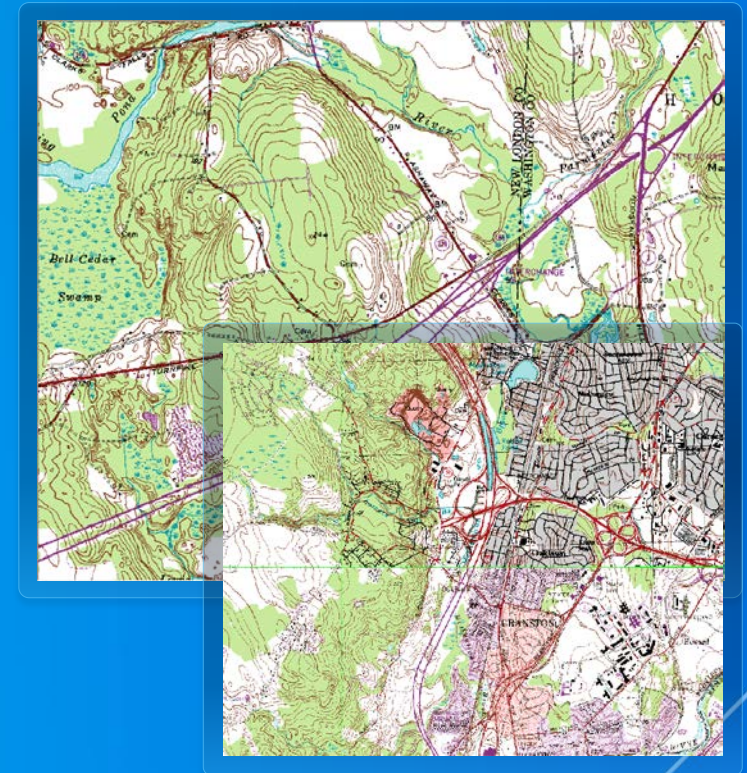


Imagery will always be clipped to footprint

Except if mosaic method is seamline, or clip to footprint is off

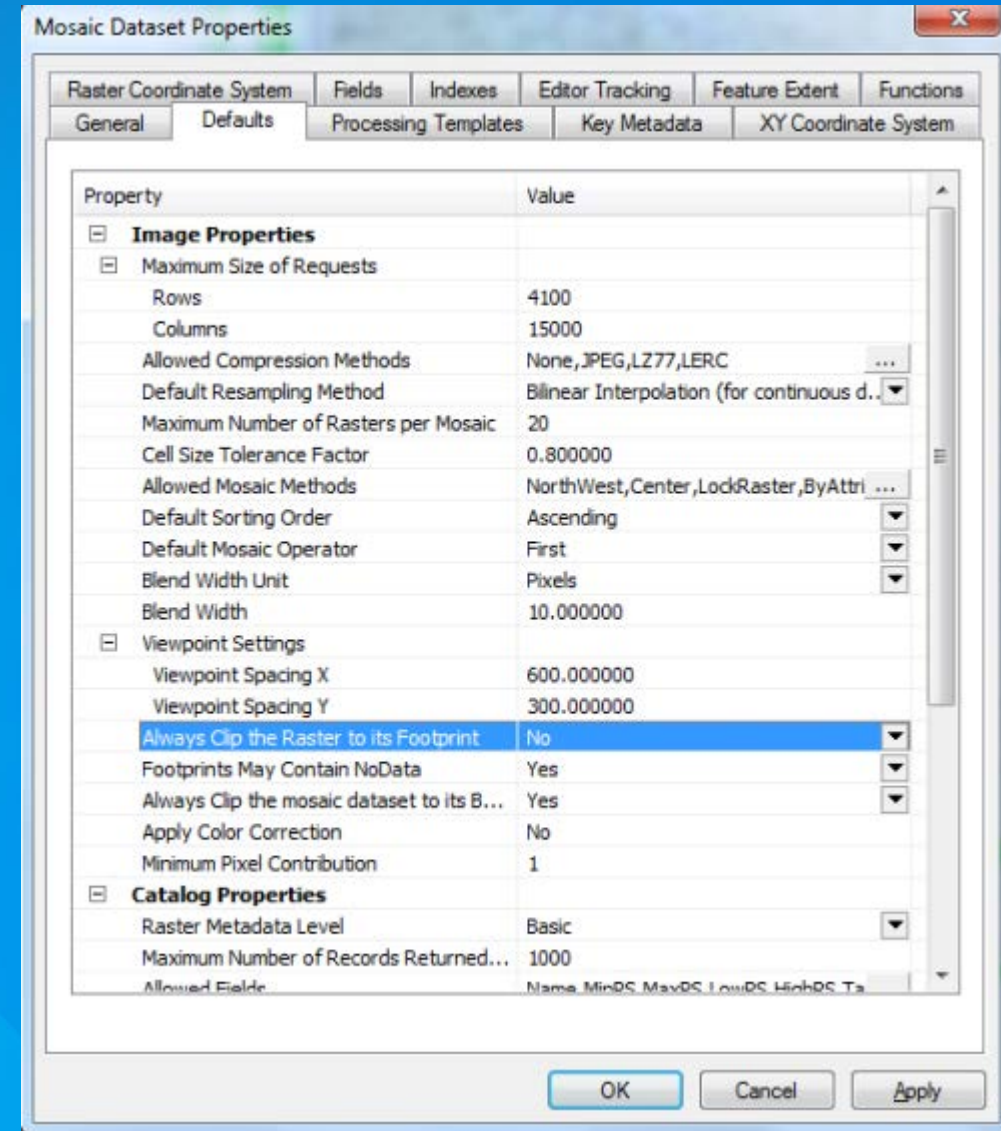
Using Seamlines to Clip Imagery

- Imagery Clipped to Seamlines if exist and Mosaic Method is Seamline
- Order of imagery then defined by SOrder
- To Build Seamlines
 - Computation Method - Copy Footprint
- Set SOrder = ZOrder
- Set Default Mosaic Method to Seamline



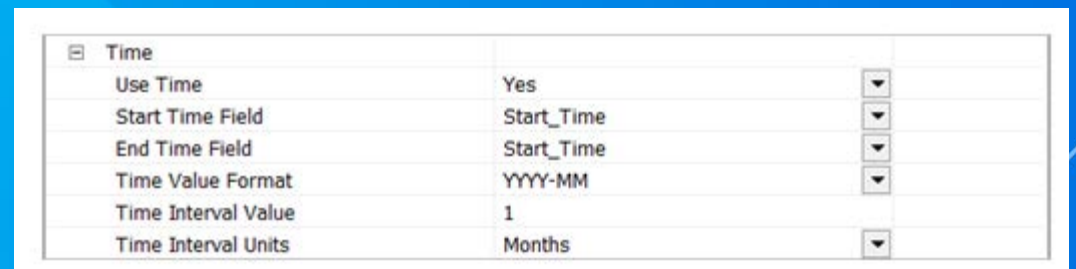
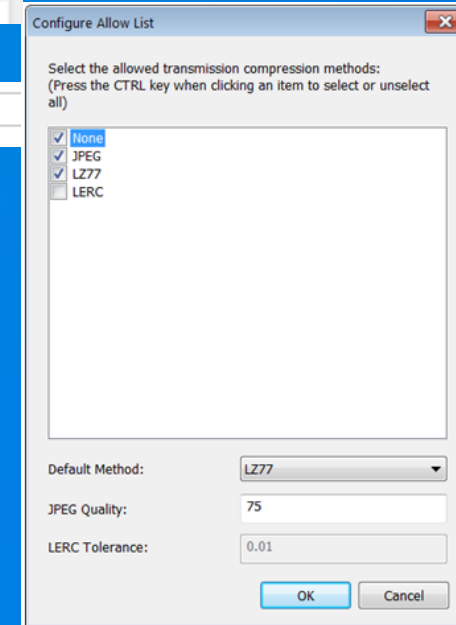
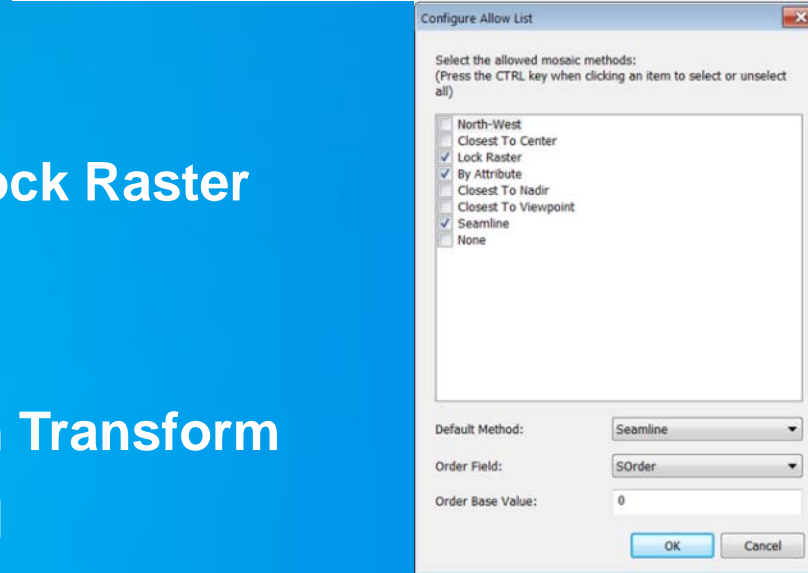
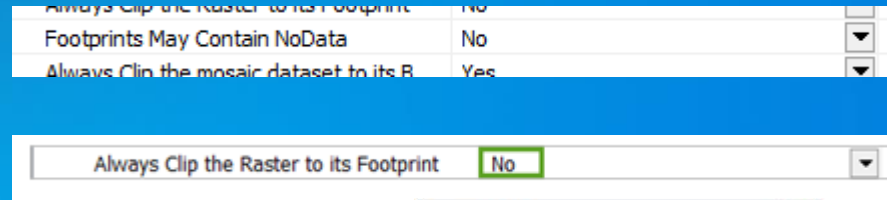
Removing Footprint Clip

- Change 'Always Clip Raster to its Footprint' to Off
- Now will search by footprint, but not clip



Mosaic Dataset Properties

- **Footprints May Contain NoData – No**
 - You don't want transparent pixels
- **Default Compression – LZW**
- **Mosaic Method - <Seamline>, Allow Lock Raster**
- **Use Time – Yes**
 - Set Start and End field
- **Check Geographic Coordinate System Transform**
 - Ensure required datums are defined

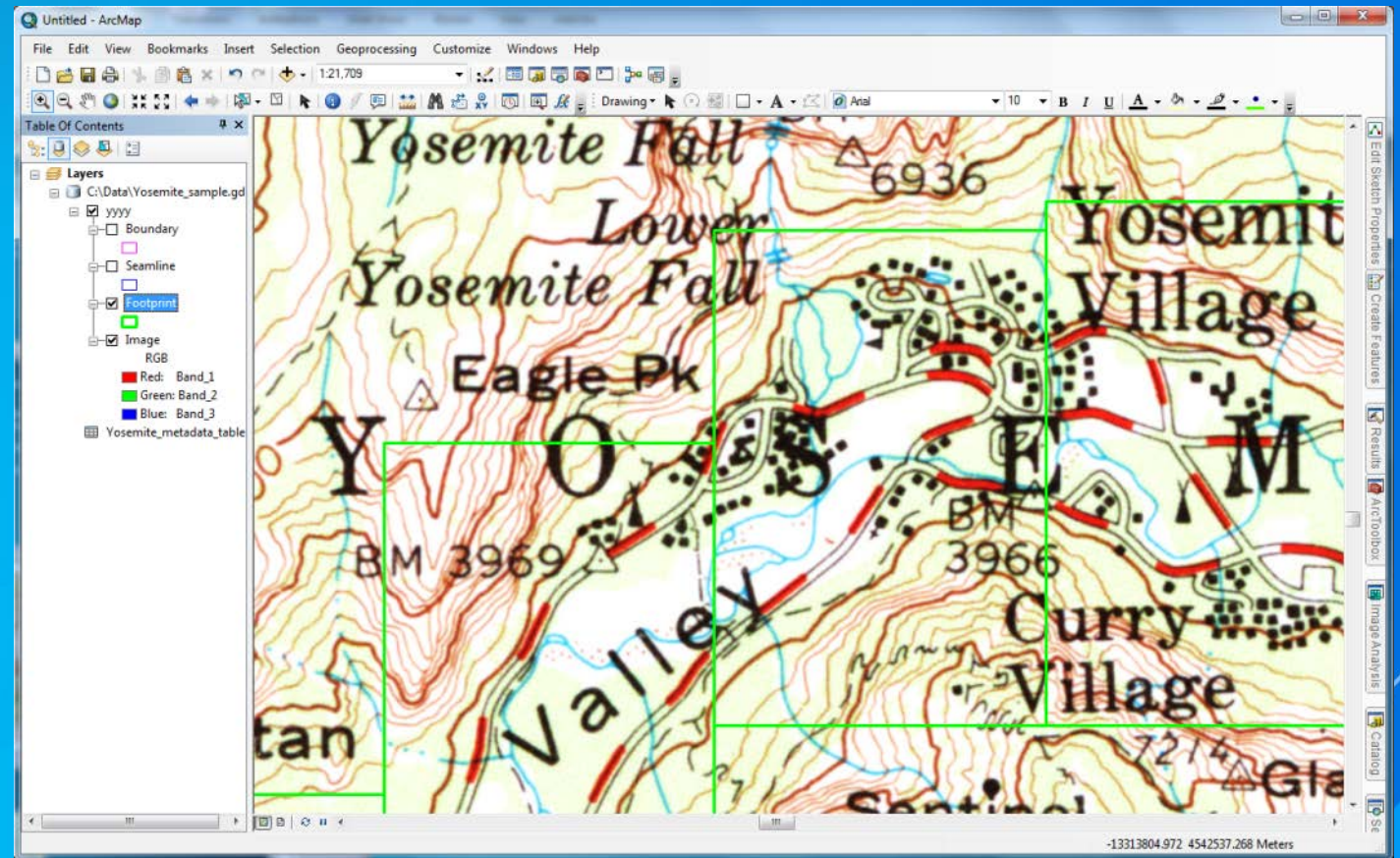


Publishing and Using Image Services

- Standard Method to Publish Image Service

- Use Image Services

- ArcGIS Desktop
- WebMaps
- WebApps



Additional Tools and Resources

- **Image management workflows**

[http://resources.arcgis.com/en/home/Imagery Image management workflow](http://resources.arcgis.com/en/home/Imagery/Image%20management%20workflow)

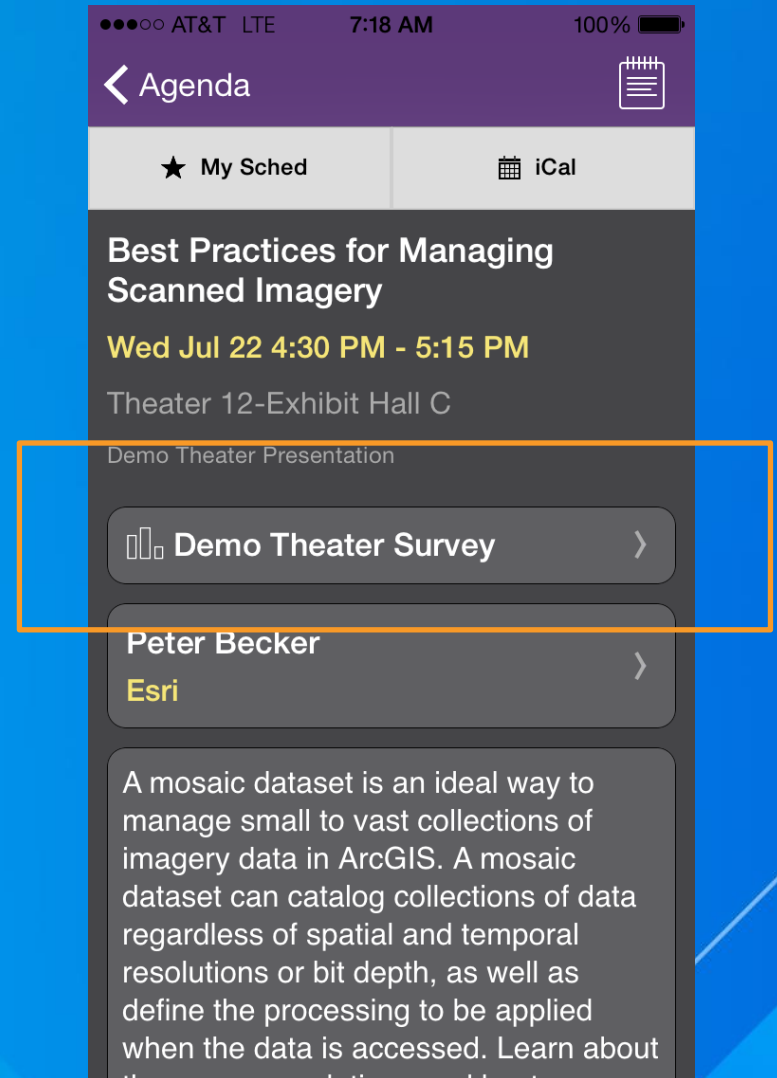
- **Automation - Mosaic Dataset Configuration Scripts**

- **Learn.arcgis.com**

- Tool to generate Envelops will be put here

Thank you...

- Please fill out the session survey in your mobile app
- Select [Best Practices for Managing Scanned Imagery] in the Mobile App
 - Use the Search Feature to quickly find this title
- Click “Technical Workshop Survey”
- Answer a few short questions and enter any comments





Understanding our world.