

Advanced Cartography:

Creating Map Books and Using Inset Map Tools

Class Manual

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Advanced Cartography: *Creating Map Books and Using Inset Map Tools*

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Course Objectives

- Implement Map Book Developer Sample and Inset Map Tools within ArcMap
- Create map books
 - Based on grids, polygons and corridors
- Utilize inset tools
 - Both in and outside of a map book

Note: Students should have a basic understanding of ArcMap before taking this class

Course Topics

■ Map Book

- Overview
- Creation/Use of Index Grids
- Creation/Use of Strip Maps
- Locator Maps
- Modifying the Series
- Feature Indexes
- Printing/Exporting

■ Inset Maps

- Overview
- Creation & Use

Map Book Developer Sample

- "This Developer Sample code is designed to allow for the creation of Map Books. A page is create (*sic*) in the book based on each feature in a grid/index layer specified by the user. Index layers must contain polygon features with a string field containing the name of each tile/page. The features in the index layer do not have to be of any particular size or shape, nor do they need to be continuous or non-overlapping." – *ArcObjects Online*

Overview of Map Book (cont.)

- Each page in series contains common layout
 - Marginalia placement remains the same
 - Scale and north arrow orientation can change
 - Symbology shared across map pages
- Map series remains in Map Document, no separate files
- Adds tab to TOC
- Installation is straightforward
 - Included bat file adds toolbars and tab
- Various controls for export and printing
 - Can limit pages printed or exported
- Allows for generation of feature index

Map Book Toolbar

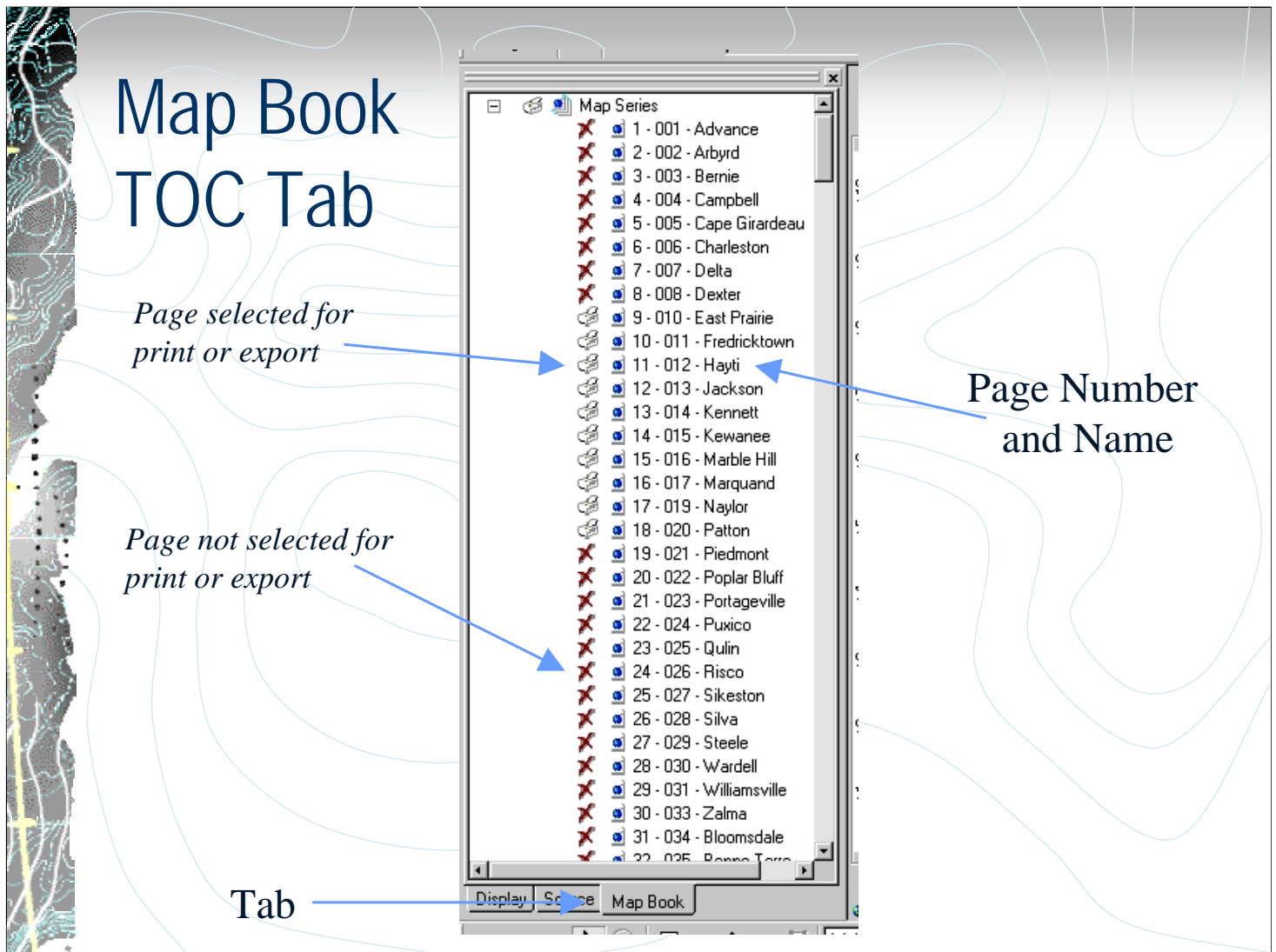


Create Map Book

Add Identifier Frame

Create/Update
Map Grids

Create Strip Map
Grids



Types of Map Series

■ Atlas

- Can be based on existing polygon features (i.e. Counties, quads, other grid systems)
- Map extent set to extent of individual polygons
- Generally all north as up, but could be changed through rotation angle

■ Corridor Maps

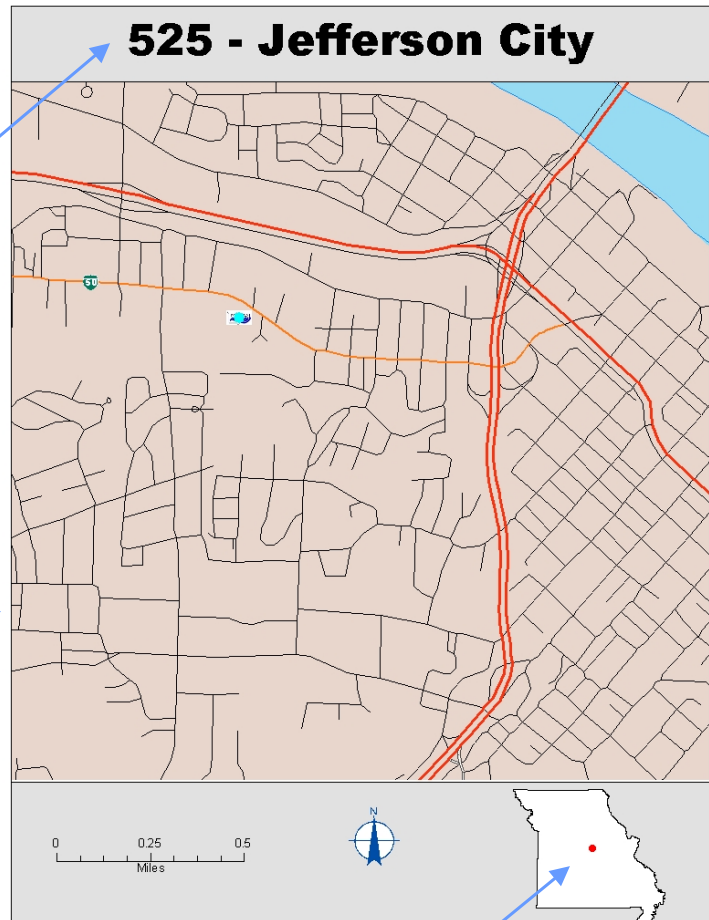
- Maps centered along central line (i.e. road, stream, etc.)
- Each map set to same scale or spatial extent
- Can be rotated to fit on page, north arrow adjusted on rotation angle

Map Page Example

Title*

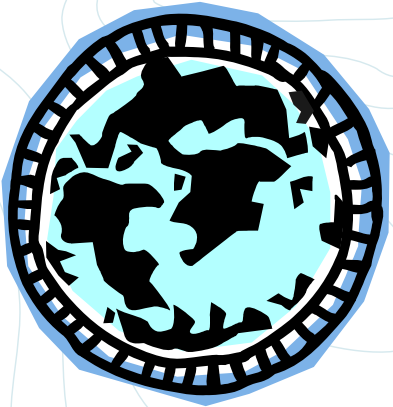
Data Frame*

* = *changes with each page*



Locator Map* (separate frame)

Making a map book



Index Layer

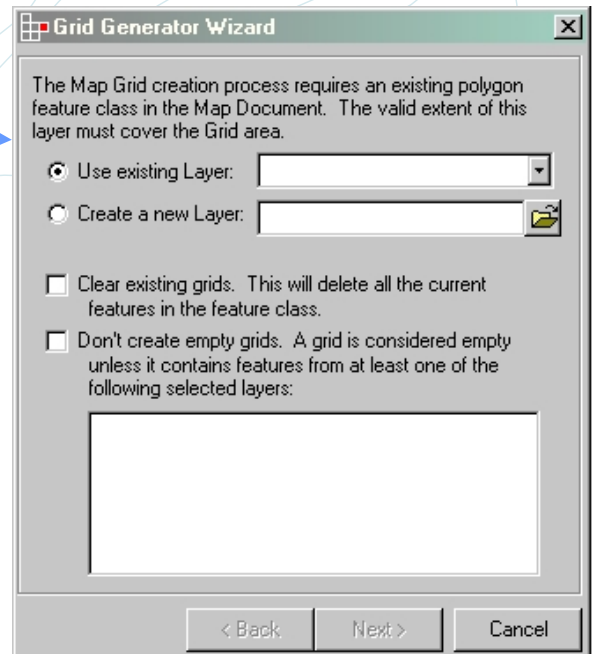
- Index layer controls map extent for each page
 - Does not need to be regular grid
 - User can use point-centered polygons, such as buffers
 - Does require some fields to be added
 - Map Book references layer by **name**
 - If layer name is changed, Map Book will error
 - Map Book can generate grid
 - User defines certain parameters
 - Strip Maps
 - Centers along selected linear feature
 - Can maintain rotation angle
 - User-definable options
 - Includes clipping data frame to index grid cell extent or cross-hatching outside grid cell

"Create/Update Map Grids"

1



- Sets/creates index layer
- Can clear existing grids
- Can also create cells based on presence of another layer(s)
- This is NOT required if using pre-existing polygons for index layer

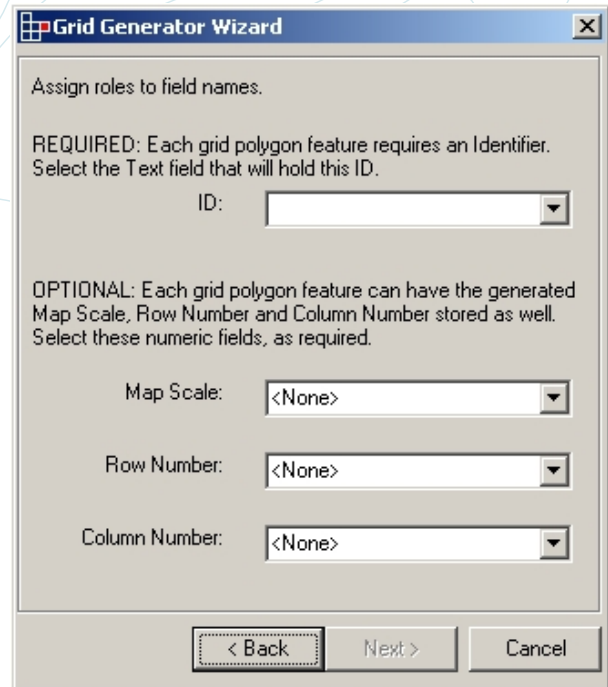


"Create/Update Map Grids"

1b

Additional Step for Existing Polygons

- Important if empty index layer was created in ArcCatalog
- ID field must be text
- Scale, Row Number and Column Number are long integer fields
 - Scale will be "double" if layer is generated from scratch by Map Book



The screenshot shows the 'Grid Generator Wizard' dialog box with the following content:

Assign roles to field names.

REQUIRED: Each grid polygon feature requires an Identifier. Select the Text field that will hold this ID.

ID:

OPTIONAL: Each grid polygon feature can have the generated Map Scale, Row Number and Column Number stored as well. Select these numeric fields, as required.

Map Scale:

Row Number:

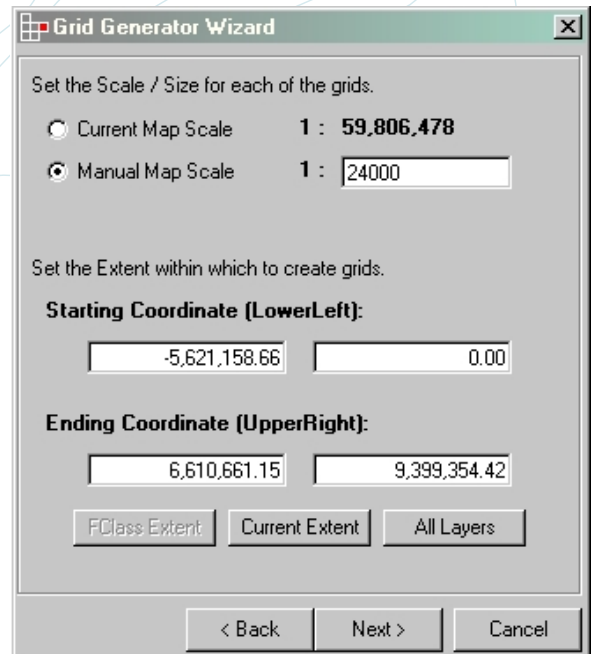
Column Number:

< Back Next > Cancel

"Create/Update Map Grids"

2

- Establishes map scale for each cell
 - Some trial and error may be necessary to find best scale
- Also sets extent for generating cells



The screenshot shows the 'Grid Generator Wizard' dialog box. It has a title bar with a grid icon and the text 'Grid Generator Wizard'. The main area contains two sections. The first section is titled 'Set the Scale / Size for each of the grids.' and has two radio buttons: 'Current Map Scale' (unselected) and 'Manual Map Scale' (selected). To the right of the 'Manual Map Scale' radio button is a text box containing '1 : 24000'. The second section is titled 'Set the Extent within which to create grids.' and contains two sub-sections. The first is 'Starting Coordinate (LowerLeft):' with two text boxes containing '-5,621,158.66' and '0.00'. The second is 'Ending Coordinate (UpperRight):' with two text boxes containing '6,610,661.15' and '9,399,354.42'. Below these text boxes are three buttons: 'FClass Extent', 'Current Extent', and 'All Layers'. At the bottom of the dialog are three buttons: '< Back', 'Next >', and 'Cancel'.

Grid Generator Wizard

Set the Scale / Size for each of the grids.

☐ Current Map Scale 1 : 59,806,478

☒ Manual Map Scale 1 : 24000

Set the Extent within which to create grids.

Starting Coordinate (LowerLeft):

-5,621,158.66 0.00

Ending Coordinate (UpperRight):

6,610,661.15 9,399,354.42

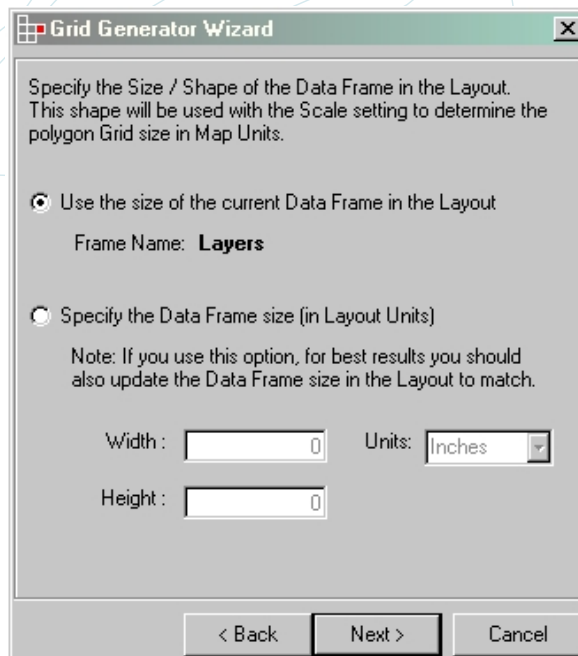
FClass Extent Current Extent All Layers

< Back Next > Cancel

"Create/Update Map Grids"

3

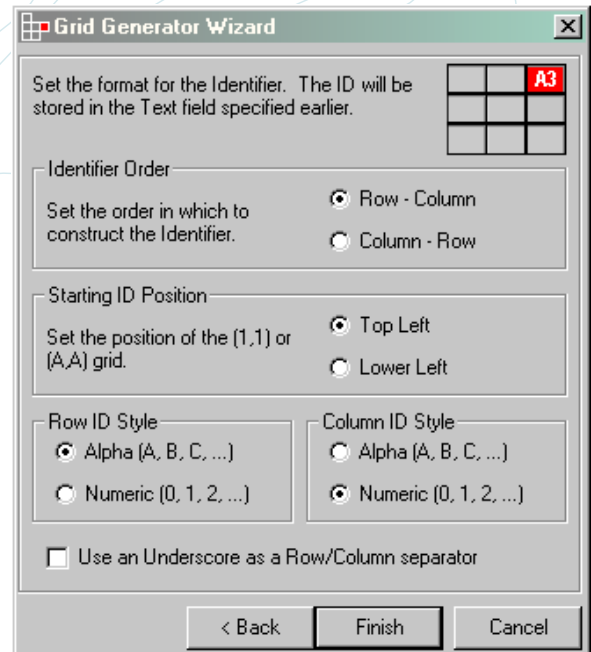
- Sets data frame size, shape
- Does not have to be current data frame size



"Create/Update Map Grids"

4

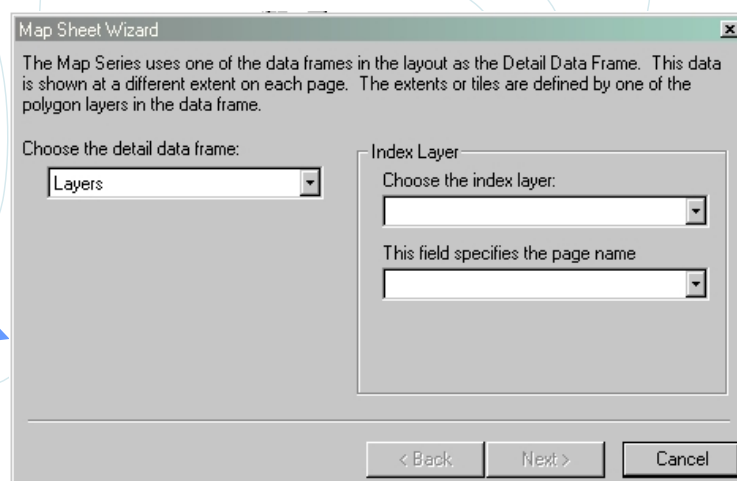
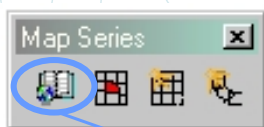
- Sets how each cell will be tagged
- Allows cells to match existing schemes if necessary



"Create Map Series"

1

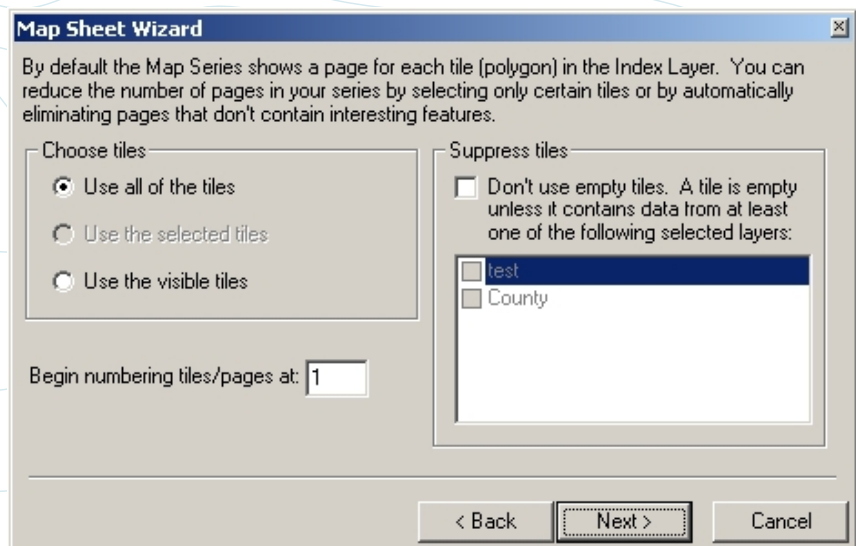
- Sets index layer and specifies page name field
 - Page name must be a text field
- This is common to both regular and strip map series



"Create Map Series"

2

- Allows user choice of using all tiles or a subset
 - Can be based on selection, visibility or presence of other layer



NOTE: *Begin numbering...* only available in 9

"Create Map Series"

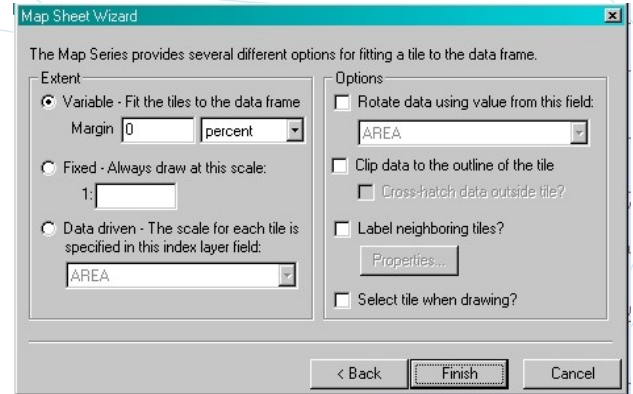
3

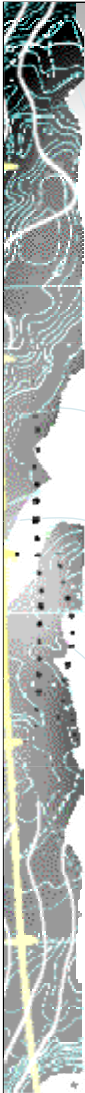
• Sets extent parameters

- Can be a margin around cell, fixed scale or driven by attribute field

• Sets options

- Rotation of cell
 - field type must be long integer
- Clip to data frame
 - Cross-hatching (symbol hardcoded)
- Label adjacent cells
- Select tile polygon within dataset (only in 9)
- These options can be changed later if desired





Exercise 1:

Create a simple map book

Exercise 1 – Create a Simple Map Book:

1. Open ArcMap
 - a. Select **mapbook.mxd**
2. Make sure the Map Series tab and toolbar are present

Creating the Grids:

1. Click the “Create/Update Map Grids” button on the Map Series toolbar
 - a. Select “Use Existing Layer”
 - b. Select **indexgrid**
 - i. This layer has already been created with a page name field, but does not contain any geometry
 - c. Click “Clear Existing Grids”
 - d. Click NEXT
2. Select “mapname” as index field
3. Check the “Don’t use empty tiles” option
 - a. Check the box next to **highways**
4. Select “Manual Map Scale”
 - a. Use 10000 as your scale denominator
 - b. Click NEXT
5. Make sure “Use the size of the current Data Frame in the Layout” is selected
 - a. Click NEXT
6. Click FINISH
7. Turn on the index grid

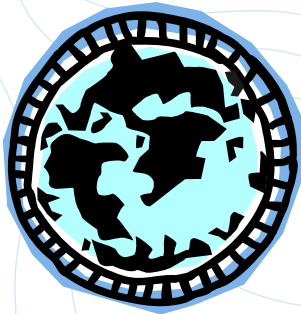
You should now have a grid overlaying the data layers. If you do not, ask the instructor.

Creating the Map Series:

1. Click the “Create Map Book” button on the toolbar
 - Make sure “Layers” is selected as the detail data frame
 - Choose **indexgrid** as the index layer
 - Select *mapname* as the page name field
 - Click NEXT
2. Make sure “Use all of the tiles” is selected
4. Click NEXT
5. Set your extent to be Fixed (third radio button) and use 10000 as your scale

6. Do not click any of the items under “Options”
7. Click FINISH
8. Click on the Map Series tab
 - a. You should have a list of map pages
 - b. Double-click one of the page
 - c. Notice how the layout reacts
 - d. Double-click another map page
 - e. Notice what changes on the page and what doesn't
9. Save your map in the current folder of the map document with your name in the file name
 - a. We will work with this MXD in Exercise 3
10. Close ArcMap

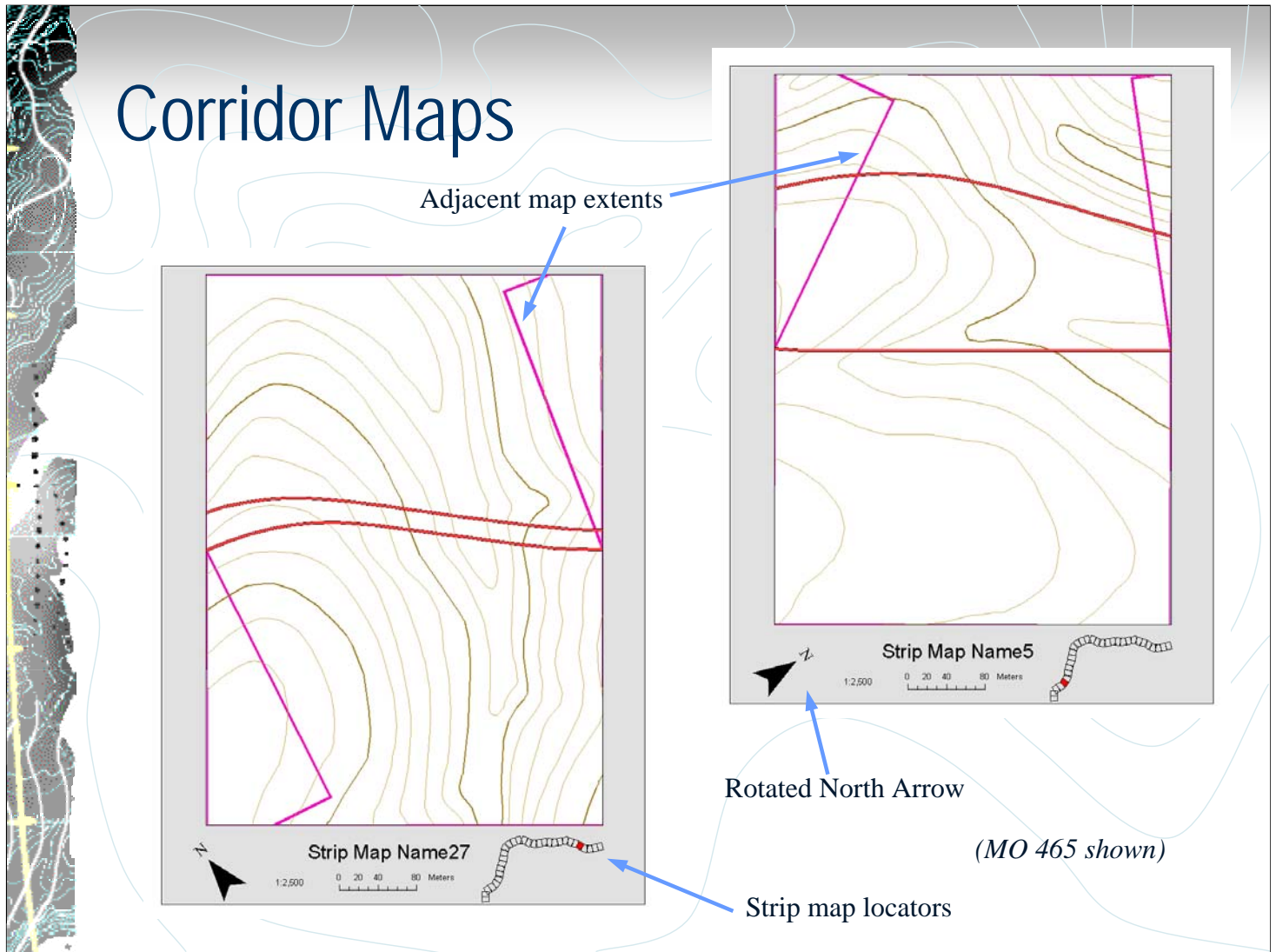
Creating Strip Maps



Corridor/Strip Maps

- Map grid centered along central linear feature
- Can use set scale or absolute area for index polygons
- Map extents can be individually rotated by map angle
 - Aligns all map extents to page
 - Not required, but provides cleaner map series
- Can clip data to map extent of each polygon
- Most features common to both grid and strip map series
- Does not deal well with circular or near-circular features

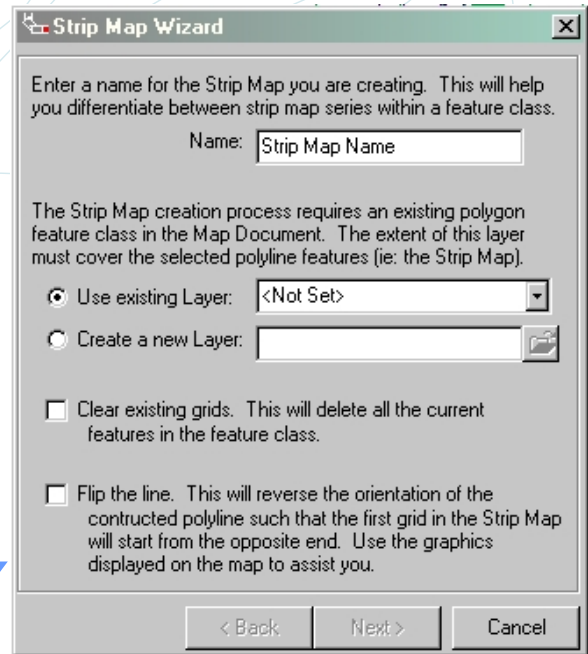
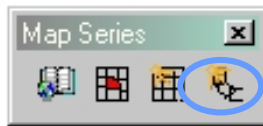
Corridor Maps



"Create StripMap Grids"

1

- Similar options to creating a grid index layer
- Added option to flip flow direction of grids
 - Normally begins at start of line

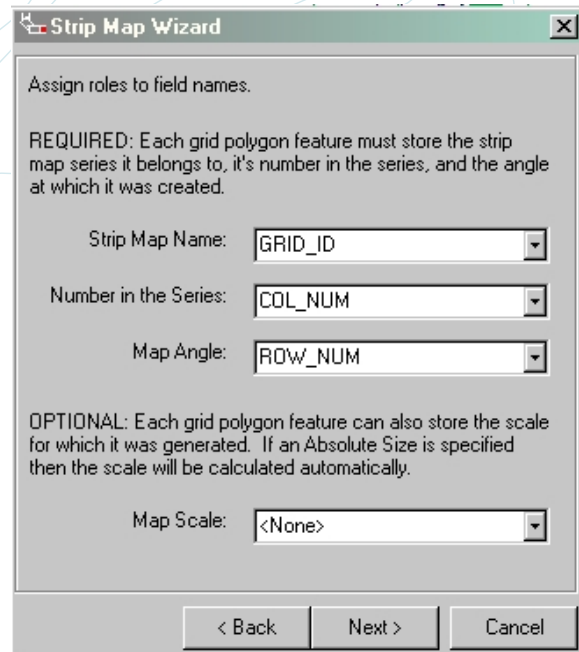


"Create StripMap Grids"

1_b

Additional Step for Existing Polygons

- Establishes fields to store strip grid name, grid number and map angle
 - Map number, angle and scale fields must be long integer to work correctly
- Optional to set map scale



The screenshot shows the 'Strip Map Wizard' dialog box with the following content:

Assign roles to field names.

REQUIRED: Each grid polygon feature must store the strip map series it belongs to, it's number in the series, and the angle at which it was created.

Strip Map Name:

Number in the Series:

Map Angle:

OPTIONAL: Each grid polygon feature can also store the scale for which it was generated. If an Absolute Size is specified then the scale will be calculated automatically.

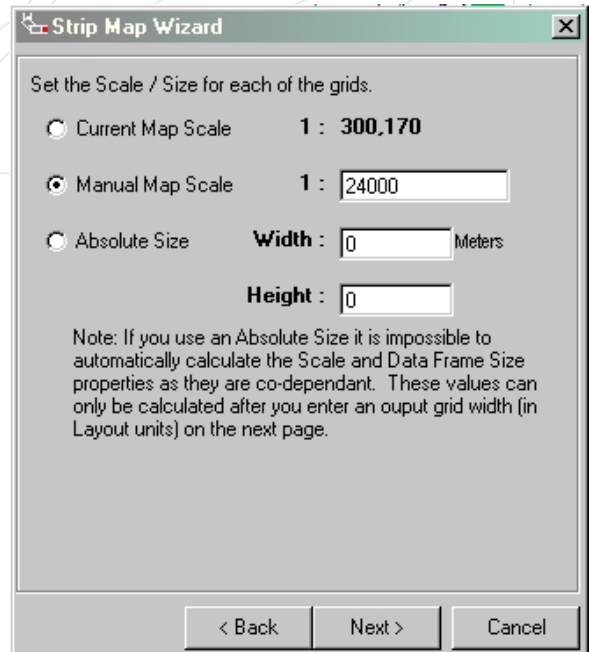
Map Scale:

< Back Next > Cancel

"Create StripMap Grids"

2

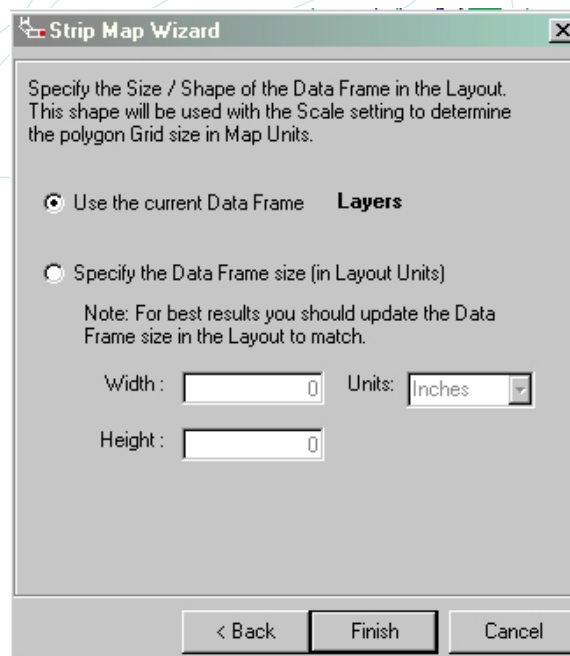
- Setting map scale for the cells is the same as a regular grid map series
- The exception is an additional option for an absolute grid cell size

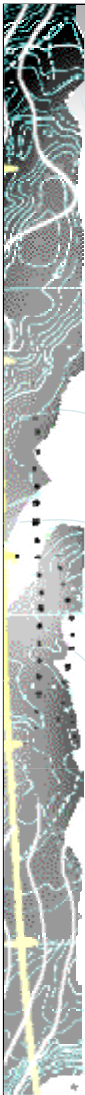


"Create StripMap Grids"

3

- Setting the data frame size and shape is the same as a regular grid layer





Exercise 2:

Create a strip map grid

Exercise 2 – Create a Strip Map Grid:

1. Open ArcMap
 - a. Select **stripmap.mxd**
2. Make sure the Map Series tab and toolbar are present

Creating the Strip Map Grids:

1. With the selection tool, select the line in **centerline** data layer (Note: you must have only ONE feature selected)
2. Click the “Create StripMap Grids” button on the Map Series toolbar
 - a. Enter “MOGIS” as the map name
 - b. Select **stripgrid**
 - i. This layer has already been created with page name, page number and rotation angle fields, but does not contain any geometry
 - c. Click “Clear Existing Grids”
 - d. Click NEXT
3. Assign roles to fields
 - a. Select “mapname” as the Strip Map Name
 - b. Select “mapnum” as the Number in the Series
 - c. Select “mapangle” as the Map Angle
 - d. Click NEXT
4. Select “Manual Map Scale”
 - a. Use 10000 as your scale denominator
 - b. Click NEXT
5. Make sure “Use the size of the current Data Frame in the Layout” is selected
 - a. Click NEXT
6. Click FINISH

What you should have now is a series of grid cells that follow along the selected linear feature. At this point, you could then use the “Create Map Series” tools to actually make your map. We will not do this, as steps are the same as a regular grid map series.

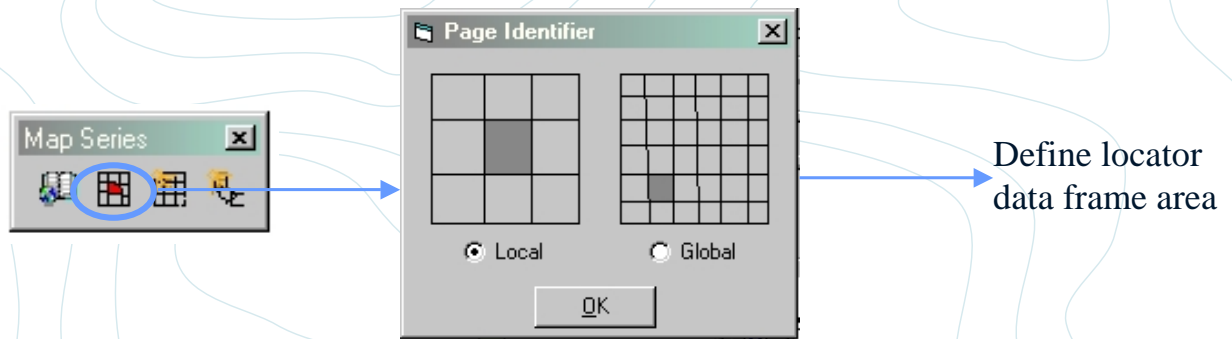
7. Close ArcMap and do NOT save

Locator Maps

- Provides a point of reference for map pages
- Works on both regular grid and strip map series
- Can be global (i.e. statewide) or can be local (i.e. adjacent cells only)
- Refreshes with map pages
- Selection symbology is user-definable
 - Edited under Layer Properties > Selection

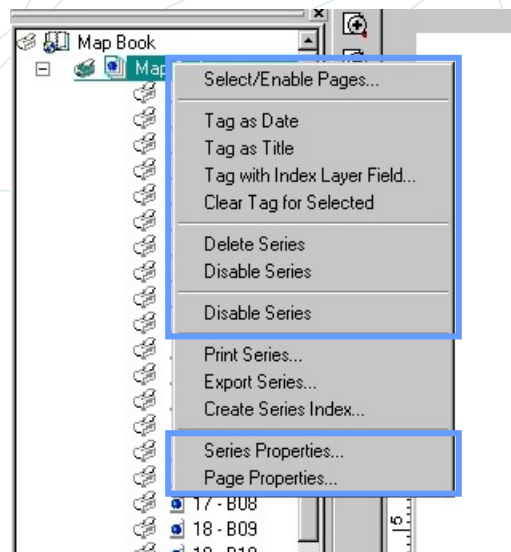


"Add Identifier Frame"



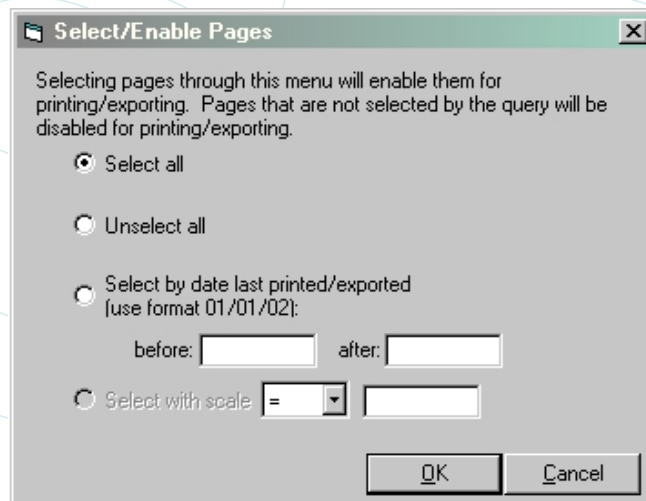
Modifying the map series

- Several aspects of a map book can be changed
- Context menu (right click) under map series & individual map pages



"Select/Enable Pages..."

- Menu allows all pages to be selected/unselected
- Pages can be selected by date last printed or exported, or by scale



"Tag as ..."

• "Tag as Date"

- Populates a selected text item with the current date

• "Tag as Title"

- Populates a selected text item with the page name

• "Tag as Index Layer Field..."

- Populates a selected text item with values from a field in the index layer

• "Clear Tag for Selected"

- Clears tagging for selected text item

"Delete " or "Disable Series"

● "Delete Series"

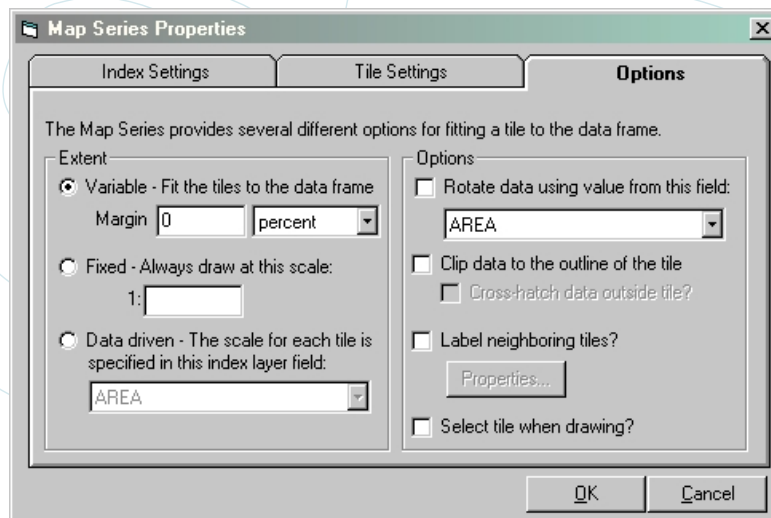
- Clears current map series

● "Disable Series"

- Turns map series off without deleting
- Series will not print or export while disabled

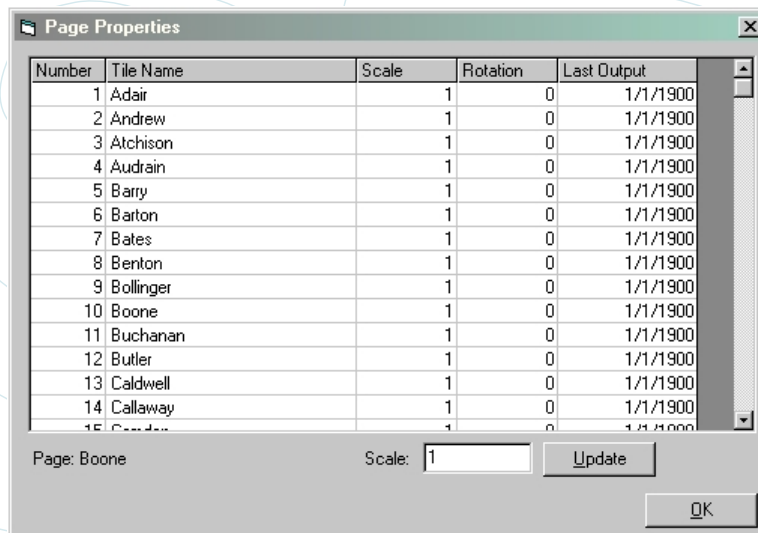
"Series Properties..."

- Pulls up series properties menu
- Similar to menu used when initially creating series
- Only items under "Options" tab can be changed



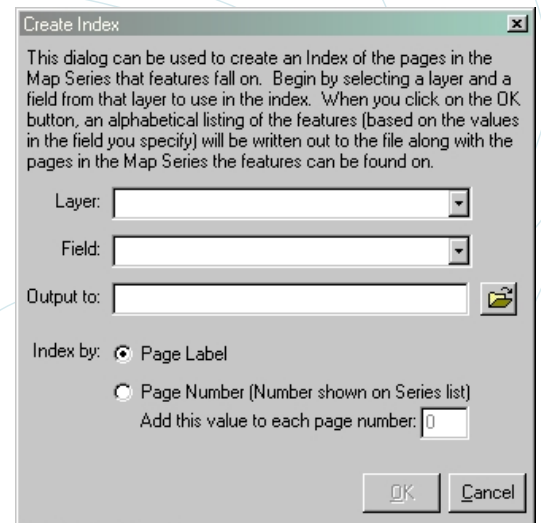
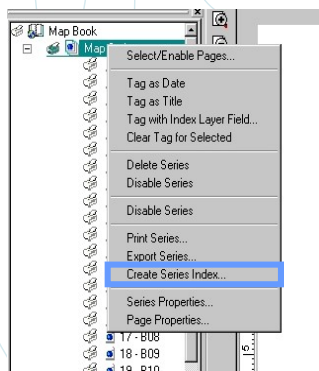
"Page Properties..."

- Pulls up page properties menu
- Name, Scale, Rotation and Output information for individual pages can be changed



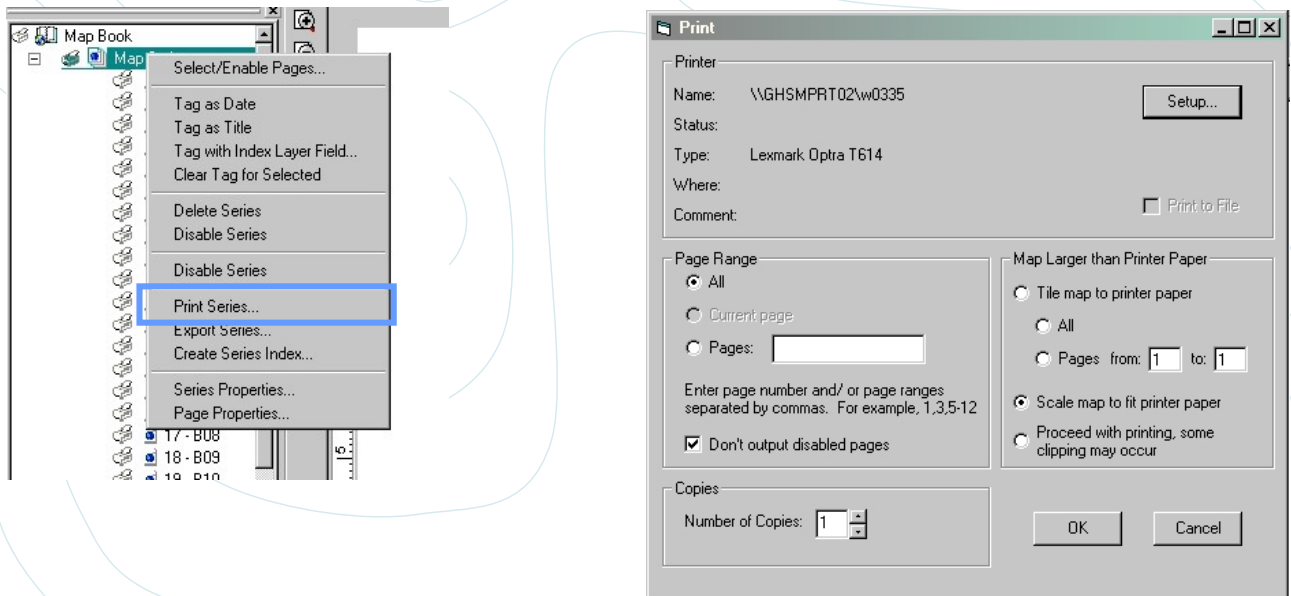
"Create Series Index..."

- Map Book can generate an index of what pages features are present in
- Outputs a text file that can be formatted in a word processor
- Format: Feature: Page(s)



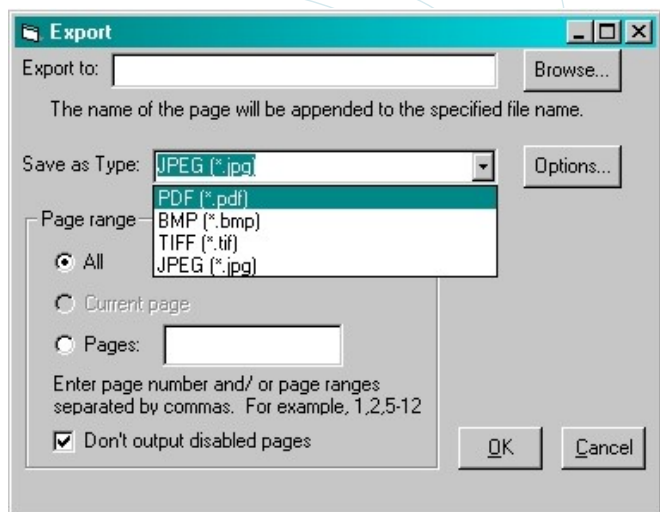
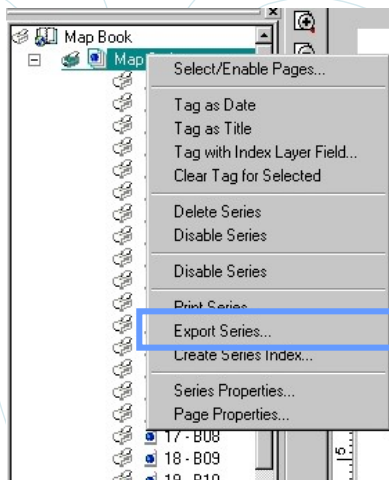
"Print Series..."

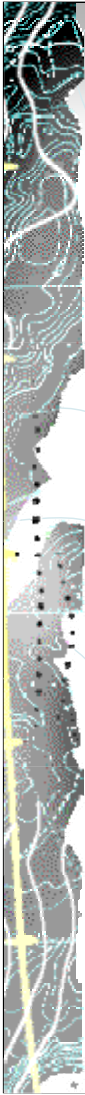
- Opens dialog box for printing
- Similar to standard print dialog



"Export Series..."

- Opens export dialog
- Each export file is appended with series name (series_pagename)
- 6 export file types are currently available (PDF, AI, EPS, BMP, TIFF, JPEG)
 - Export options can be set for each file type
 - Only 4 formats in 8.x (PDF, BMP, TIFF, JPEG)





Exercise 3:

Customizing and Exporting

Exercise 3 – Customizing and Exporting:

1. Open ArcMap
 - a. Select the MXD you saved in Exercise 1
2. Make sure the Map Series tab and toolbar are present

Adding a Locator Map:

1. Click on the “Add Identifier Frame” button
2. Select a global locator
3. Draw a frame in your layout for the locator frame
4. Double-click a map page
 - a. The locator should refresh
 - b. You may want to change the selection color properties in the locator layer properties

Customizing a Series:

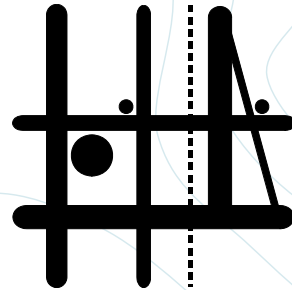
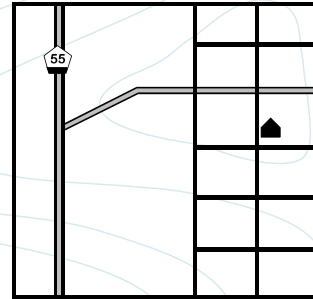
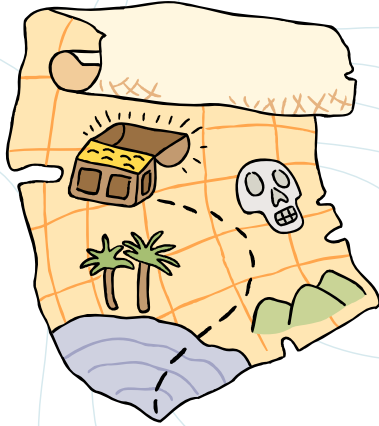
1. Click on the Map Series tab
2. Right-click on the map series
 - a. Examine the list of options
3. Click “Select/Enable Pages...”
 - a. Examine the options
 - b. Hit CANCEL
4. Right-click on the map series and look at the “Tag as ...” options
 - a. On your layout, add a text item
 - b. Go to the “Tag as ...” options
 - i. Tag the text item as date and refresh your map
 - ii. Select the text item again and tag as “...Title” and refresh your map
 - iii. Tag the same field as “...Index Layer Field”
 1. Notice the list of fields you can use
 - iv. Clear the tag using “Clear Tag for Selected”
5. Right-click the map series and select “Disable Series”
 - a. Notice the change in icon next to each map page
 - b. Right-click and enable the series
6. Right-click and go to “Series Properties...”
 - a. Notice the same tabs as on the “Create Map Series...” menu
 - b. Click “Options”
 - i. Select the Variable Extent option and set the margin to 2 percent

- i. Under the Options box, select “Clip data to the outline of the tile”
 - ii. Select “Label neighboring tiles?”
- c. Hit OK
- d. Double-click a map page and notice the changes
7. Right-click the map series and select “Page Properties...”
 - a. Examine the various options for maintaining individual page properties
 - b. Hit OK

Create Series Index:

1. Right-click the map series and select “Create Series Index...”
2. Select the highways layer
3. Select route as the field to index
4. Output the file to the same directory you saved the current MXD to
5. Select “Index by Page Label”
6. Hit OK
7. After the index is created, navigate to the folder you saved it in and open the text file
 - a. Examine the output
 - b. Close the file
8. Close ArcMap and do NOT save

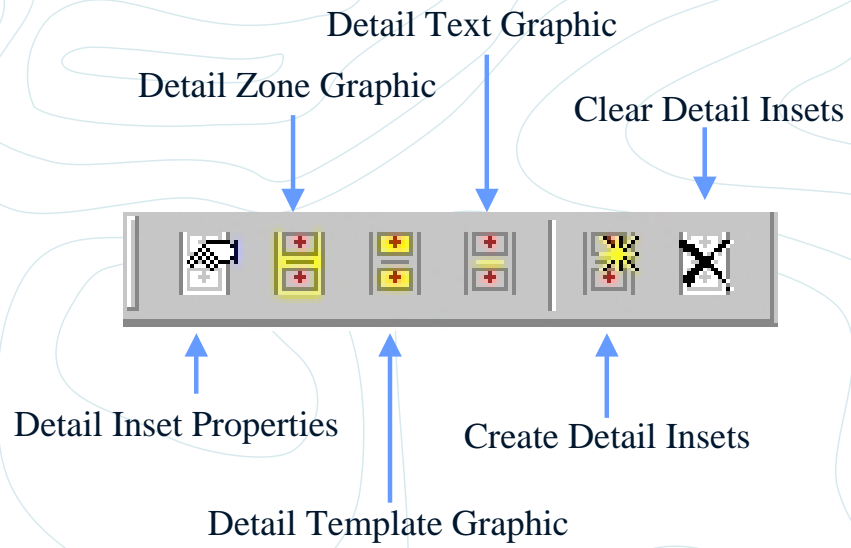
Making insets



Detail Area Inset Tools

- Generates smaller inset maps
- Works within a map book or independently
 - If using with Map Book, insets are updated as map pages are refreshed
- Can be used to show more congested areas, without increasing detail of main map book pages

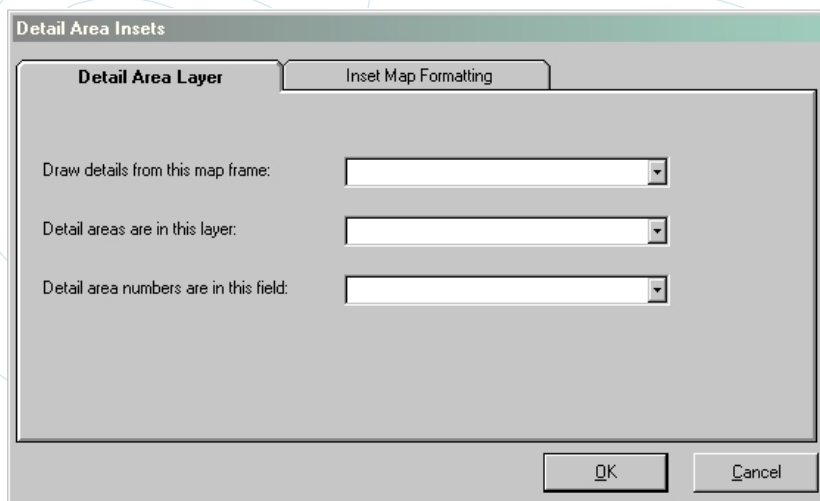
Detail Area Inset Tools (cont.)



"Detail Inset Properties"

1

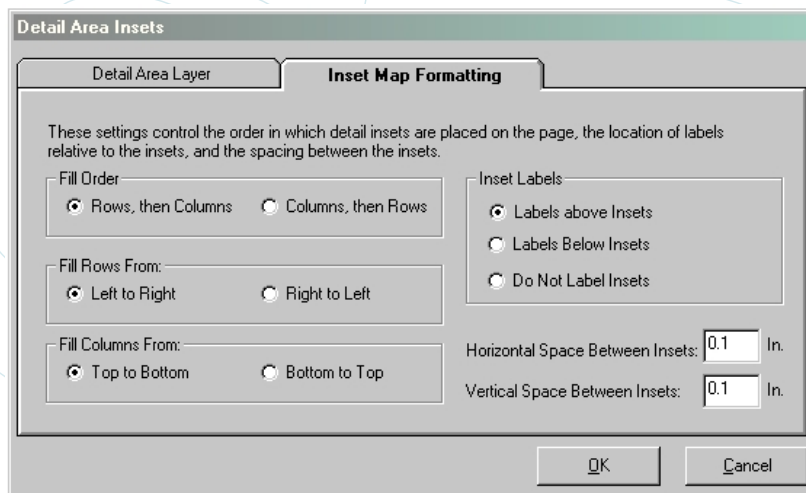
- Establishes what data frame insets will be drawn from (if multiple)
- Sets index layer and field for insets (should NOT be the same as map series index layer if present)



"Detail Inset Properties"

2

- Sets how insets will be drawn within the inset area
- Sets options for labeling insets

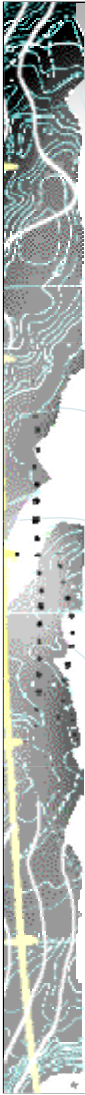


Template Graphics



- "Detail Zone Graphic" (1)
 - Establishes area where insets will be drawn
- "Detail Template Graphic" (2) *
 - Establishes size and shape of inset data frame
- "Detail Text Graphic" (3) *
 - Establishes text formatting for labels (if insets are labeled)

* - These should not be within page limits



Exercise 4:

Using Inset (Detail) Maps

Exercise 4 – Using Inset (Detail) Maps:

1. Open ArcMap
 - a. Select **insetmap.mxd**
2. Make sure the Inset Map toolbar is present and you are in layout view

Setting Detail Inset Properties:

1. Click the “Detail Inset Properties” button
2. Select “Layers” as the frame from which details will be drawn
3. Select **insetarea** as the detail inset layer
4. Select *inset_no* as the area number field
5. Click the “Inset Map Formatting” tab
 - a. We will use the defaults, but examine the options
6. Click OK

Setting the Template Graphics:

1. Detail Zone Graphic
 - a. Using the rectangle graphic tool, draw a box on your layout
 - b. With the box selected, click the “Detail Zone Graphic” button
 - c. You should get a message confirming that the zone graphic was successfully set
2. Detail Template Graphic
 - a. Off the edge of the page, draw a small rectangle
 - b. With the box selected, click the “Detail Template Graphic” button
 - c. You should get a message confirming that the template graphic was successfully set
3. Detail Text Graphic
 - a. Above the detail template graphic, place a text box
 - i. Do not type anything in it, just place it and select it
 - b. With the text element selected, click the “Detail Text Graphic” button
 - c. You should get a message confirming that the detail text label was successfully set

Generating the Insets:

1. Click the “Create Detail Insets” button
2. A series of small insets (and corresponding data frames) should show up on your layout
 - a. Depending on the number of insets, they may overflow the original template area
3. Once you have insets, click the “Clear Inset Details” button
4. Close ArcMap and do NOT save

Parting Comments...



Issues

■ Map Book Developer Sample

- Changes in index layer name (after creating series) causes errors in map book
- Some problems with exporting/printing large map series
- No support for multiple series in a single map document
 - Original developer says this could be added, but hasn't
- Difficult (or unable) to have different layouts for landscape and portrait maps
 - Rotation angle may provide some functionality

Issues

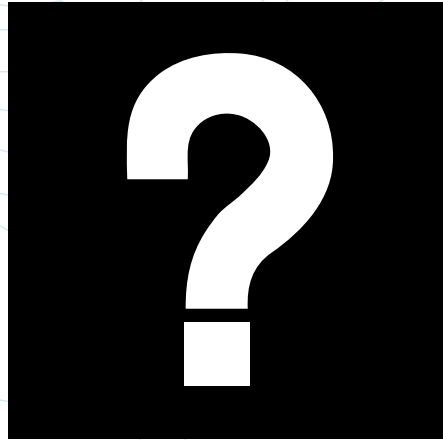
● Detail Inset Tools

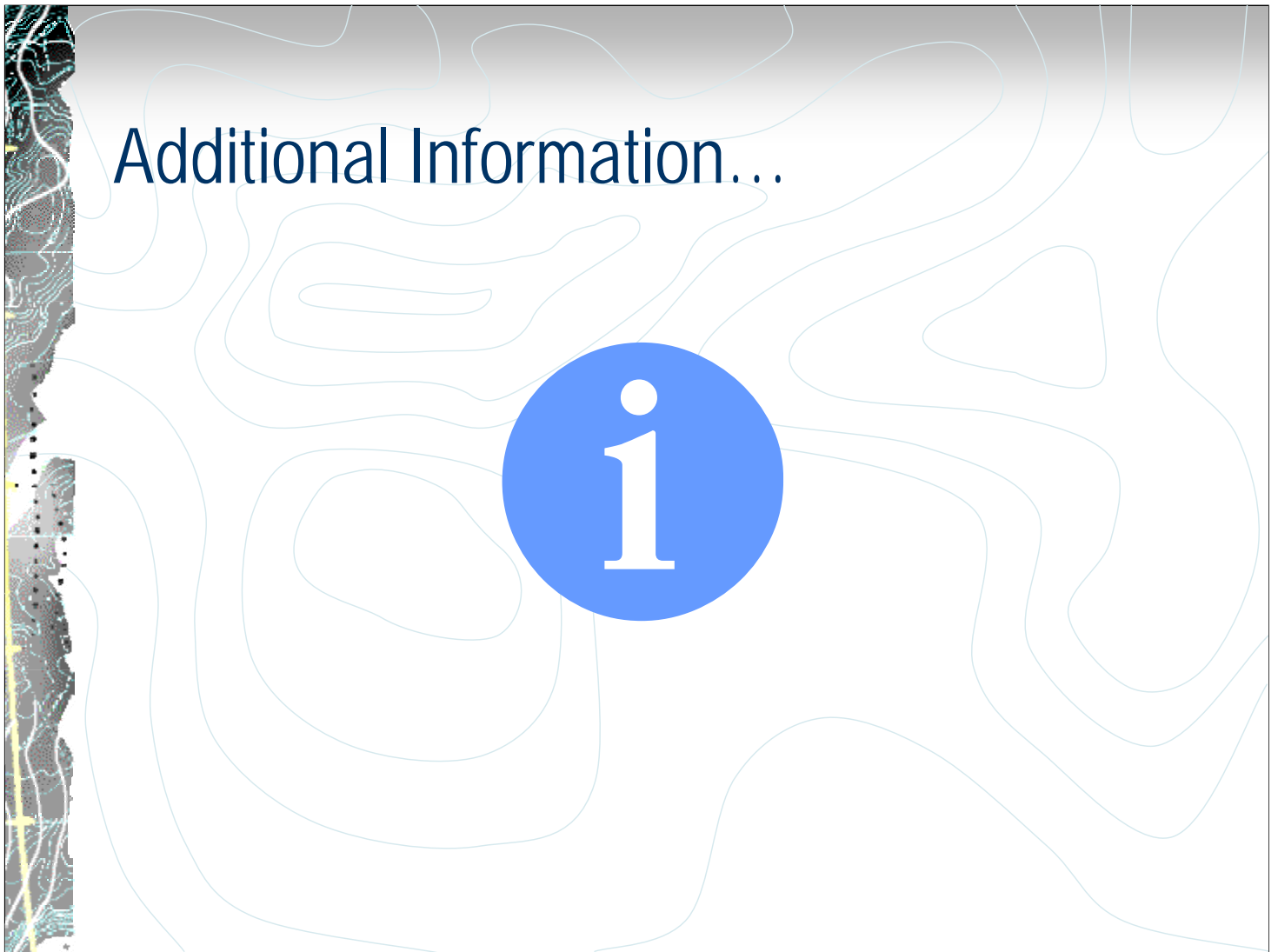
- Somewhat tedious to set up template graphics
- Insets can spill over page edge if they do not fit in original graphics area

Final Remarks

- These are developer samples
 - There are some bugs to work out
 - No warranties or guarantees on the samples
 - Slated to be included in future releases of ArcGIS (Map Book)
 - Customizable if necessary
- Map Book does provide tool for making multiple, common-format maps and using inset maps
 - Does NOT replicate multiple layout capability of ArcView 3.x

Questions, Comments...





Download Paths

■ Map Book Developer Sample

- ArcGIS Developer Online > Samples > Cartography > Map Production > DS Map Book

http://edndoc.esri.com/arcobjects/9.1/DownloadCounter/startDownload.asp?File=/arcobjects/9.1/Samples/Cartography/Map_Production/DSMapBook/DSMapBook.zip&Size=18&Name=DSMapBook.zip

NOTE: It appears that Map Book for 8 is no longer available from ESRI

■ Detail Area Inset Tools

- Developed by ESRI – Denver Tech Marketing Center
 - Unfortunately, tool must be downloaded elsewhere

<ftp://ftp.modot.gov/otms/mogis/detailinset.zip>

Note: This version of Detail Inset Tools is based on the original Map Book.

Install just Detail Inset Tools. MapBook for 9.x is already coded to work with this tool



Map Book Update 01/25/07

● New version posted on 1/25/07

All,

The enclosed new code is based on a much needed review of the export logic by a member of Map team. Thanks to that individual and the review, the new code solves the following problems:

- 1. Problems with TlbInf32.dll. The dependency for this file has been removed, so nobody should have errors related to it anymore.*
- 2. File size differences for maps exported by ArcMap and those exported through DSMapBook.*
- 3. Availability of all export formats.*

The enclosed zip contains a directory called Visual_Basic, which replaces the current Visual_Basic directory you have under the DSMapBook directory in your sample folder. I recommend you begin by running the _Uninstall batch file to uninstall your current version. Rename your current Visual_Basic directory to Visual_Basic_Old and then download and extract the new directory from the enclosed. Finally, run _Install batch file in the new directory.

Please post any issues to this thread, though i'm obviously hoping there aren't any.

Thanks.

Larry

● Files are available from the instructor or at the following URL:

- <http://forums.esri.com/Attachments/23026.zip> (ArcGIS 9.2)
- <http://forums.esri.com/Attachments/23068.zip> (ArcGIS 9.1)

Another useful tool for map series...

● Create Polygon from Point with Area Field

- Samples > Geometry > Create Polygon From A Point
Feature Class Containing An Area Field

- Can generate square polygons, not just circular buffers

<http://arcobjectsonline.esri.com/ArcObjectsOnline/Samples/Geometry/CreatePolygonFromAreaField.htm>

● NOAA Coastal Protection & Restoration Division Tools

● Map Extent Tool

- "The purpose of the Map Extent Tool is help facilitate map production or printing in ArcMap for a series of maps. The Map Extent Tool creates a polygon shapefile and captures an extent polygon, the data frame rotation, the data frame scale, and a map name."

<http://mapping.orr.noaa.gov/website/portal/cprdtools/gistools/arcgis9xtools>



Additional Help...

- Map Book and Inset Tools both come with manuals on how to install and use them
 - They also come with the original code, making customization easier (does require Visual Basic, not Visual Basic for Applications)
- Map Book is an active topic on the ESRI User Forums
 - The forums are a very useful tool for finding help



Toolbar Quick Reference

Map Book Toolbar



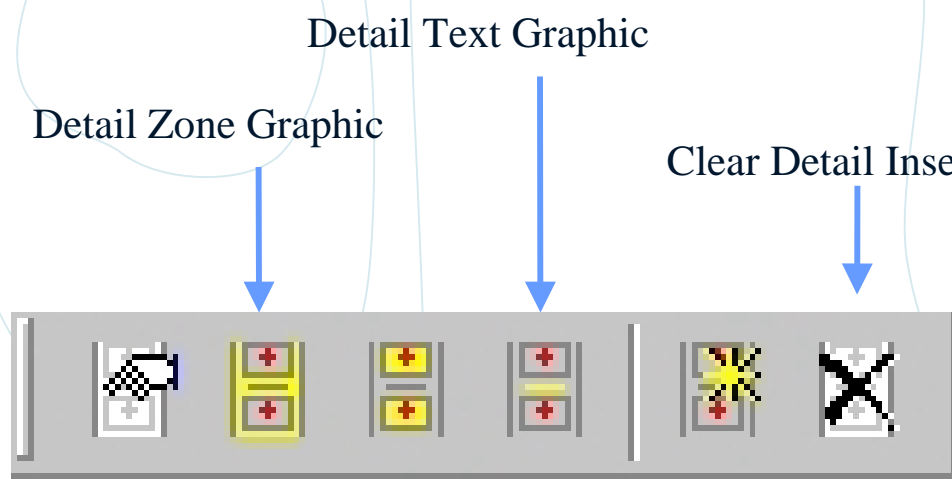
Create Map Book

Add Identifier Frame

Create/Update
Map Grids

Create Strip Map
Grids

Detail Area Inset Tools



Detail Inset Properties

Detail Template Graphic

Create Detail Insets