

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

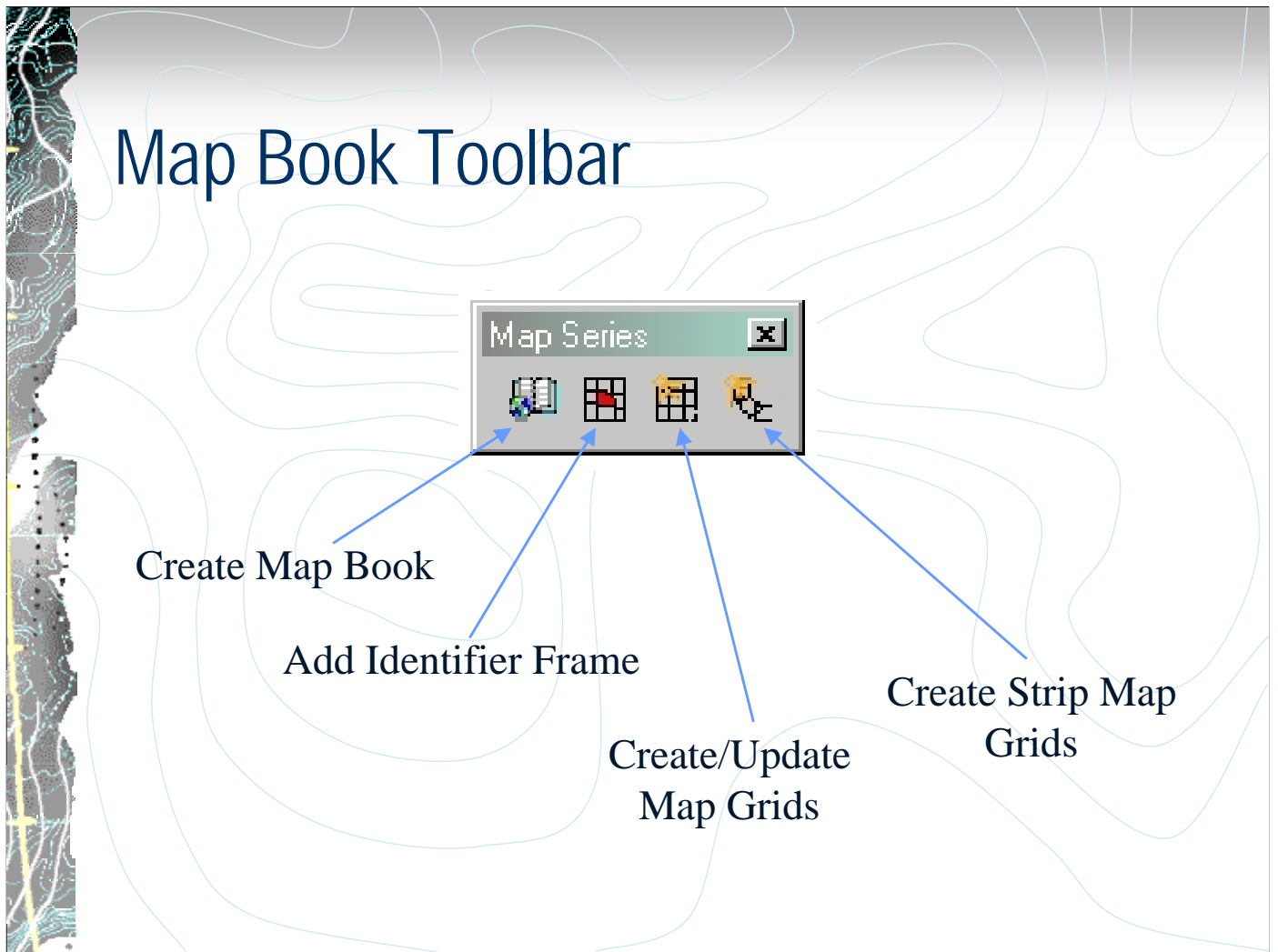
- Overview
- Creation & Use

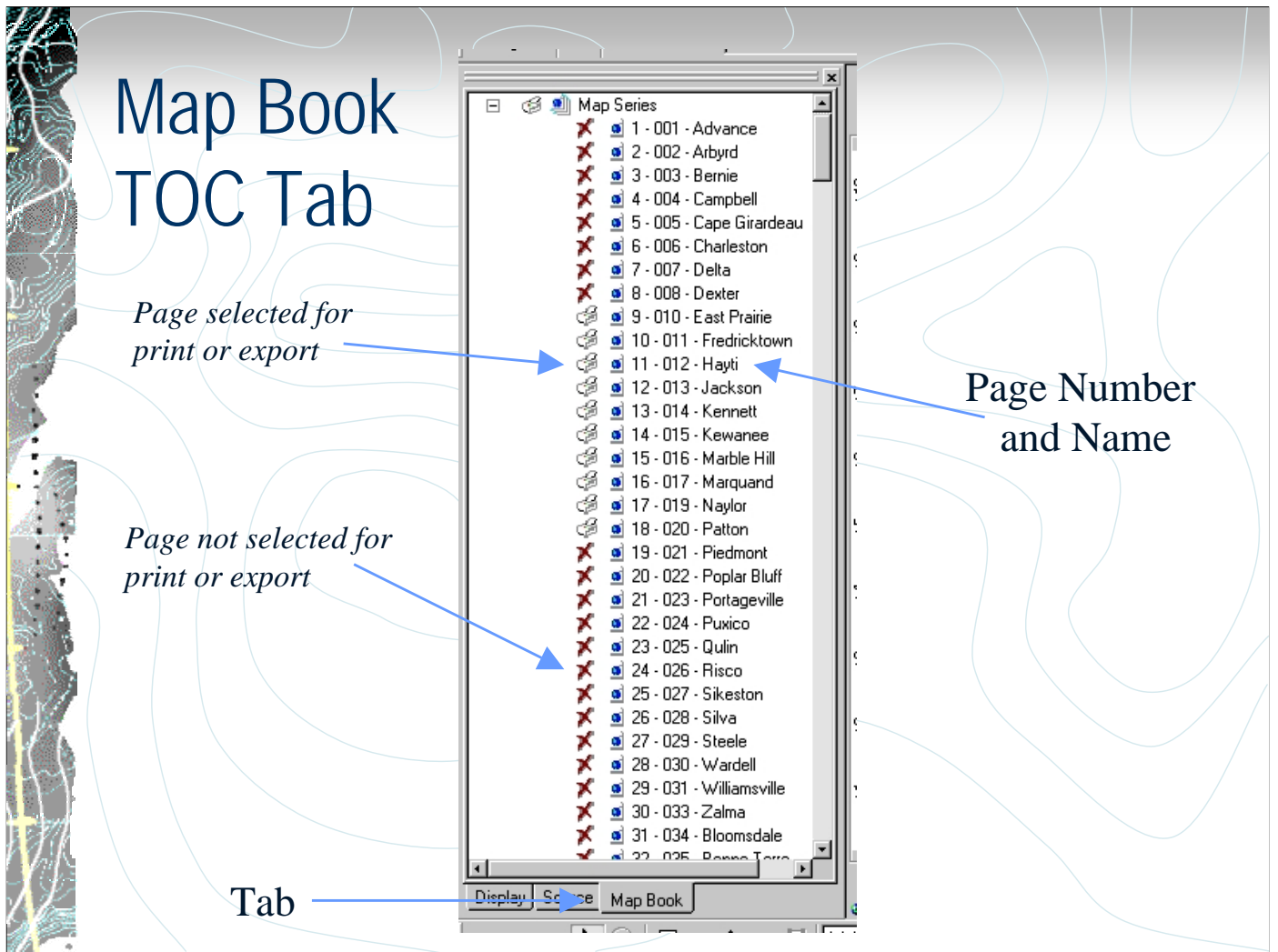
Map Book Developer Sample

- "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





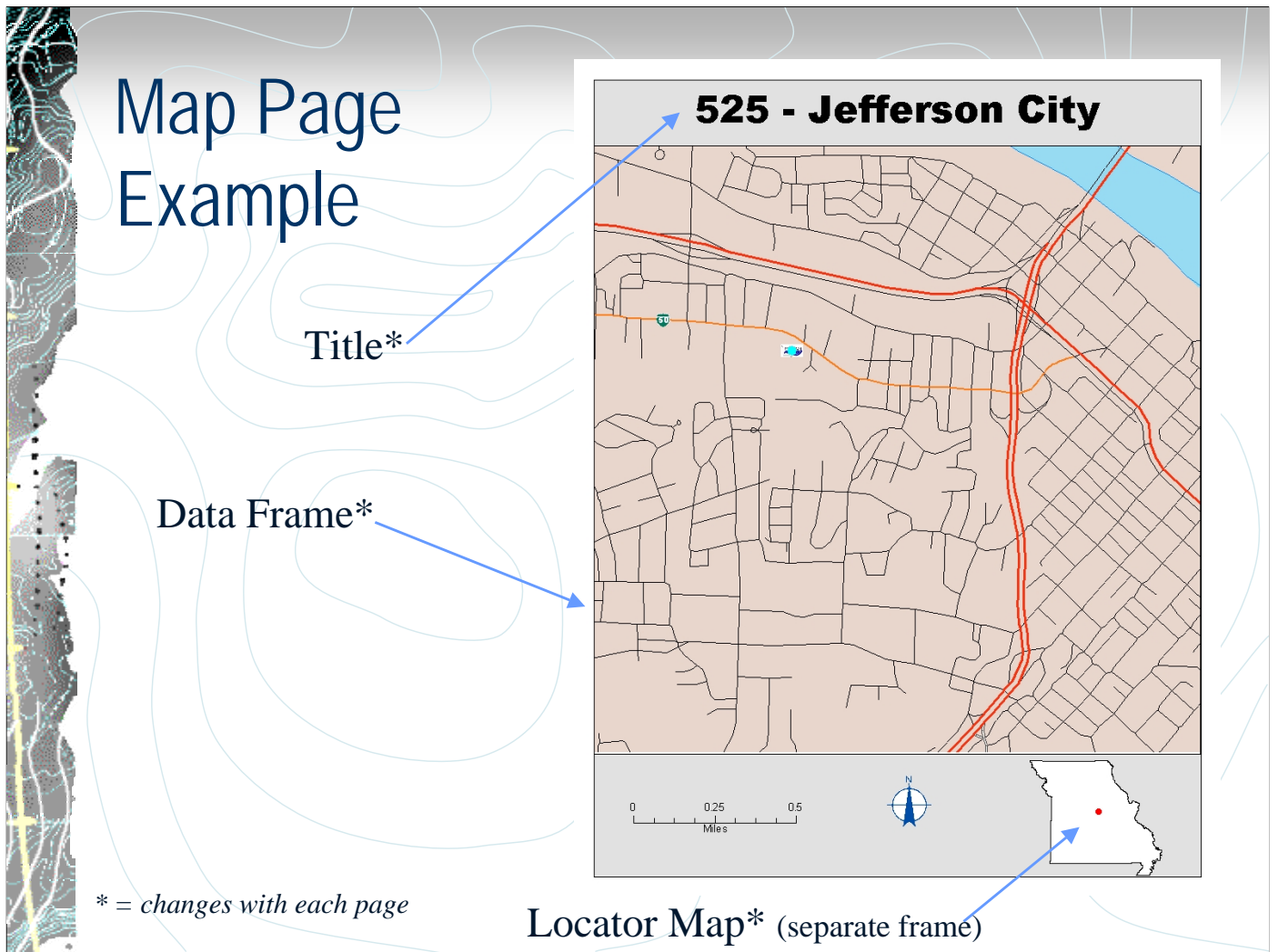
Types of Map Series

Atlas

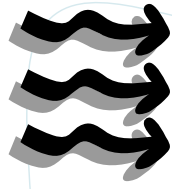
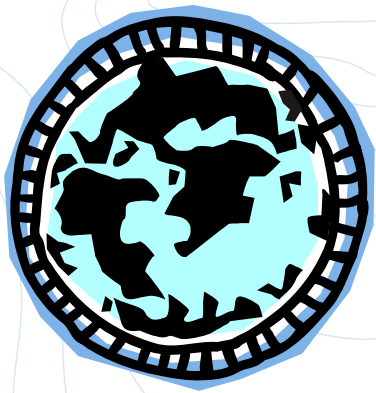
- Can be based on existing polygon features (i.e. Counties, quads, other grid systems)
- Map extent set to extent of individual polygons
- Generally all north as up, but could be changed through rotation angle

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



Making a map book

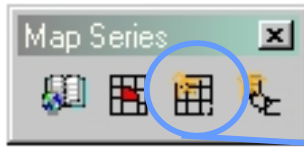


Index Layer

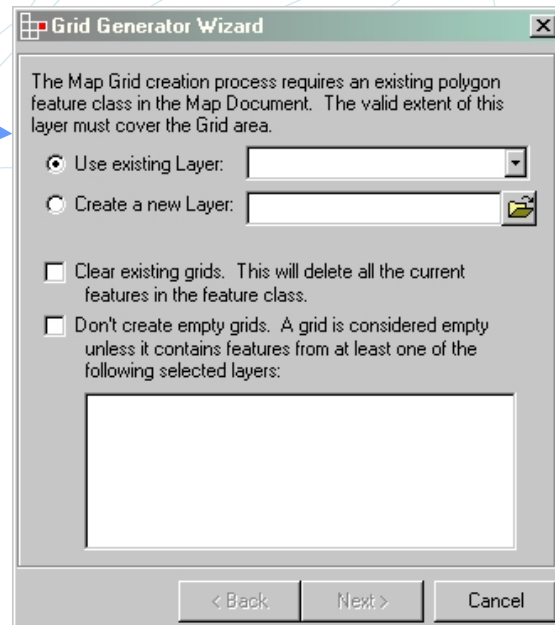
- Index layer controls map extent for each page
 - Does not need to be regular grid
 - User can use point-centered polygons, such as buffers
 - Does require some fields to be added
 - Map Book references layer by **name**
 - If layer name is changed, Map Book will error
 - Map Book can generate grid
 - 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

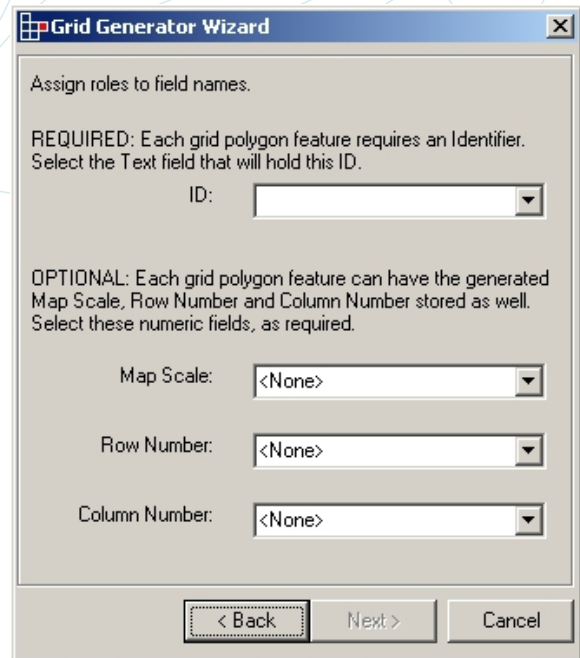


"Create/Update Map Grids"

1_b

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

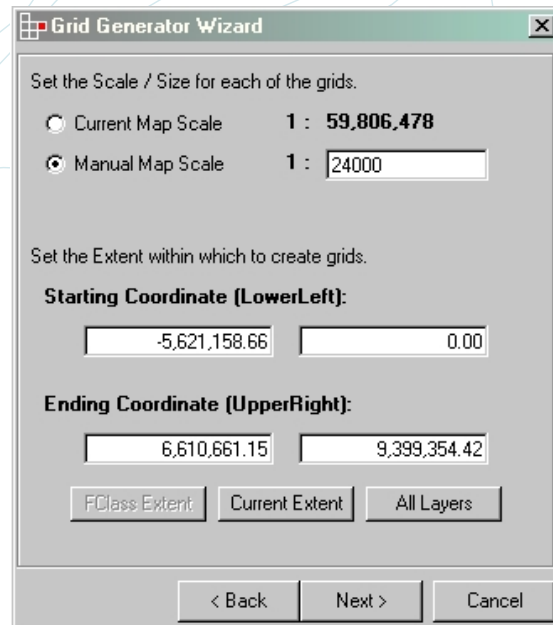


The screenshot shows the 'Grid Generator Wizard' dialog box. It has a title bar with a grid icon and the text 'Grid Generator Wizard'. The main content area is titled 'Assign roles to field names.' and contains the following text: 'REQUIRED: Each grid polygon feature requires an Identifier. Select the Text field that will hold this ID.' Below this is a dropdown menu labeled 'ID:' with a small downward arrow. Further down, it says '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.' Below this are three dropdown menus: 'Map Scale:' with '<None>' selected, 'Row Number:' with '<None>' selected, and 'Column Number:' with '<None>' selected. At the bottom of the dialog are three buttons: '< Back' (disabled), 'Next >' (disabled), and '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

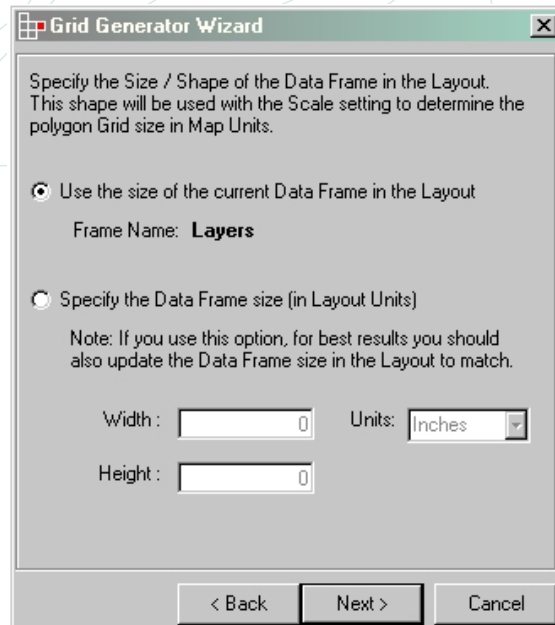


The screenshot shows the 'Grid Generator Wizard' dialog box. It has a title bar with a grid icon and the text 'Grid Generator Wizard'. The main content area is divided into two sections. The first section is titled 'Set the Scale / Size for each of the grids.' and contains two radio buttons: 'Current Map Scale' (selected) and 'Manual Map Scale'. The 'Current Map Scale' option has a value of '1 : 59,806,478'. The 'Manual Map Scale' option has a value of '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 input fields containing '-5,621,158.66' and '0.00'. The second is 'Ending Coordinate (UpperRight):' with two input fields containing '6,610,661.15' and '9,399,354.42'. Below these input fields are three buttons: 'FClass Extent', 'Current Extent', and 'All Layers'. At the bottom of the dialog box are three buttons: '< Back', 'Next >', and 'Cancel'.

"Create/Update Map Grids"

3

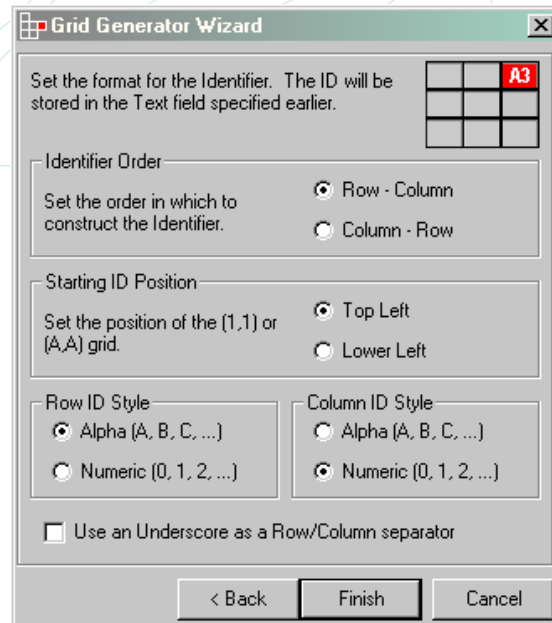
- Sets data frame size, shape
- Does not have to be current data frame size



"Create/Update Map Grids"

4

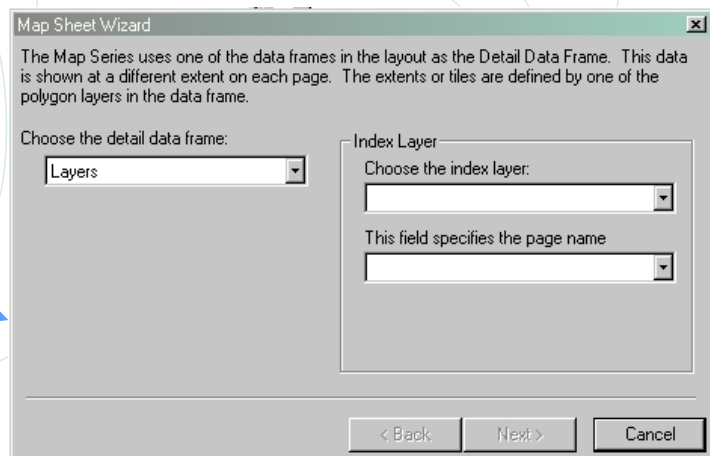
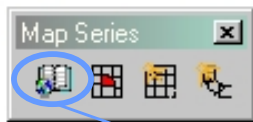
- Sets how each cell will be tagged
- Allows cells to match existing schemes if necessary



"Create Map Series"

1

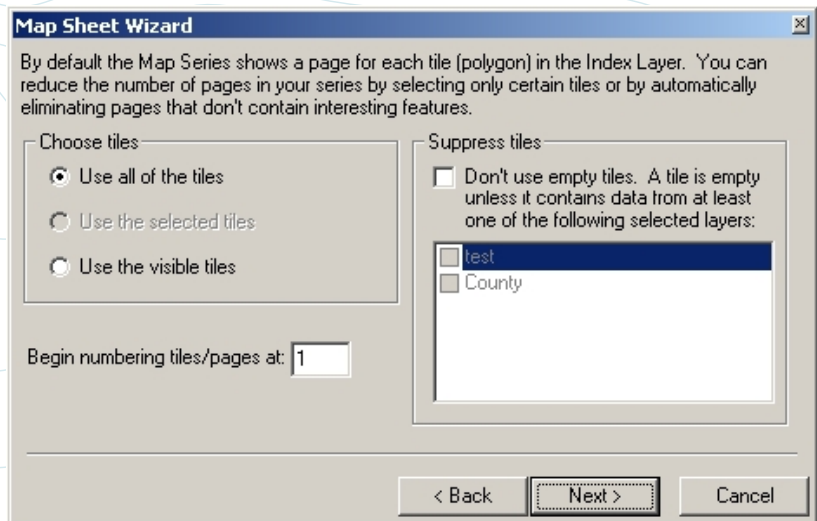
- Sets index layer and specifies page name field
 - Page name must be a text field
- This is common to both regular and strip map series



"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

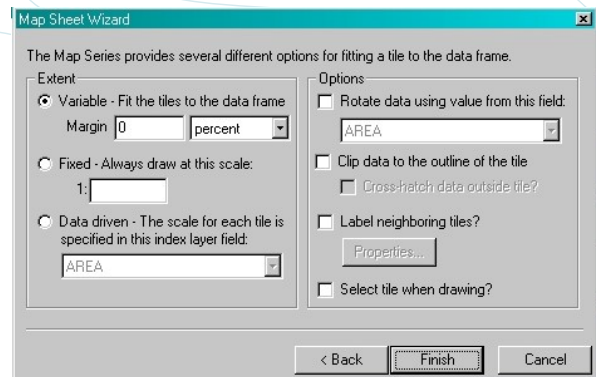


NOTE: *Begin numbering...* only available in 9

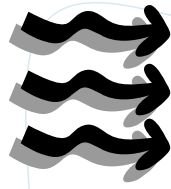
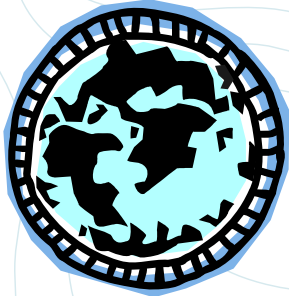
"Create Map Series"

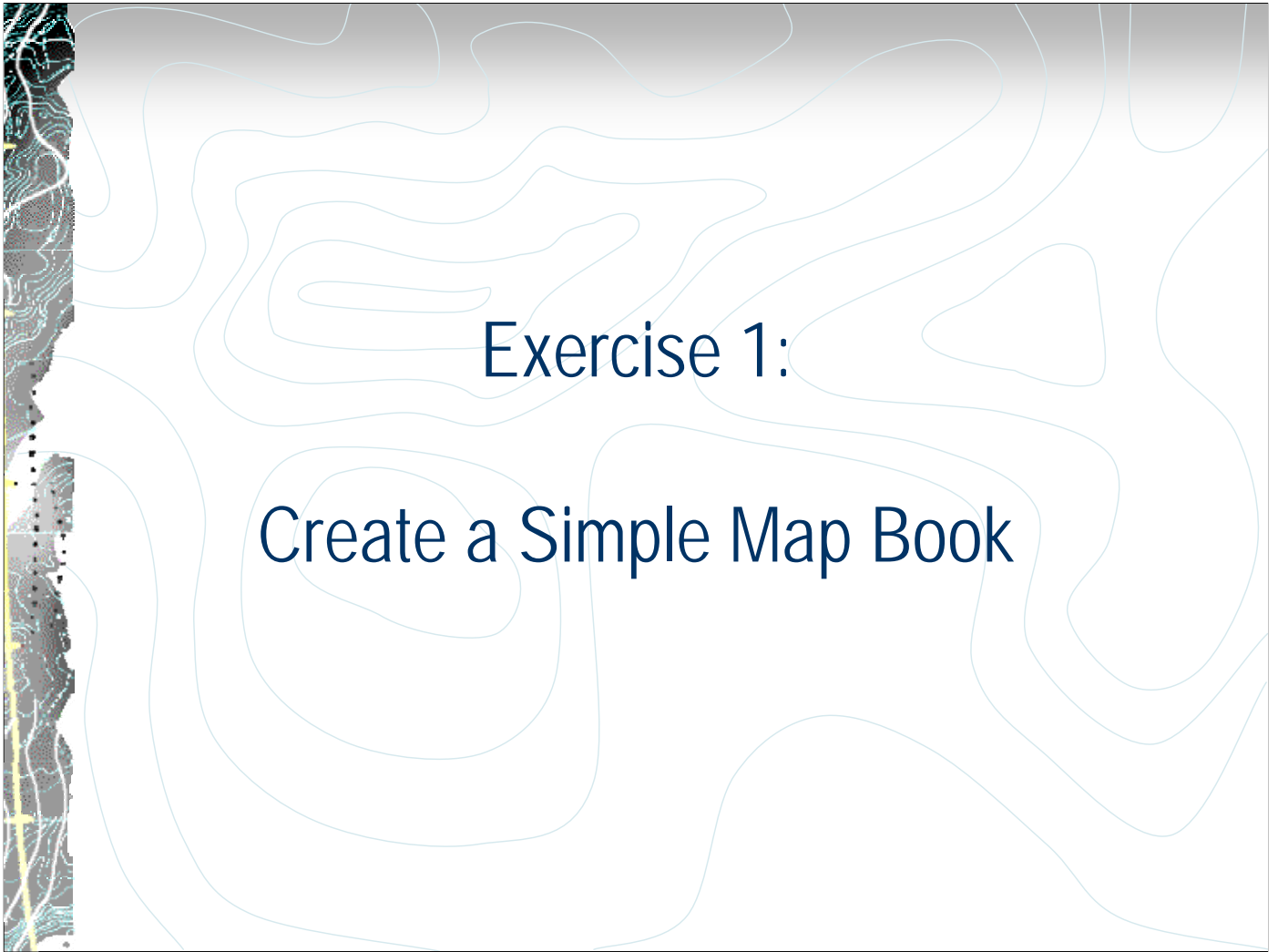
3

- 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)
 - Crosshatching is stored in current annotation target
 - Label adjacent cells
 - Select tile polygon within dataset (only in 9)
- These options can be changed later if desired



Creating Strip Maps





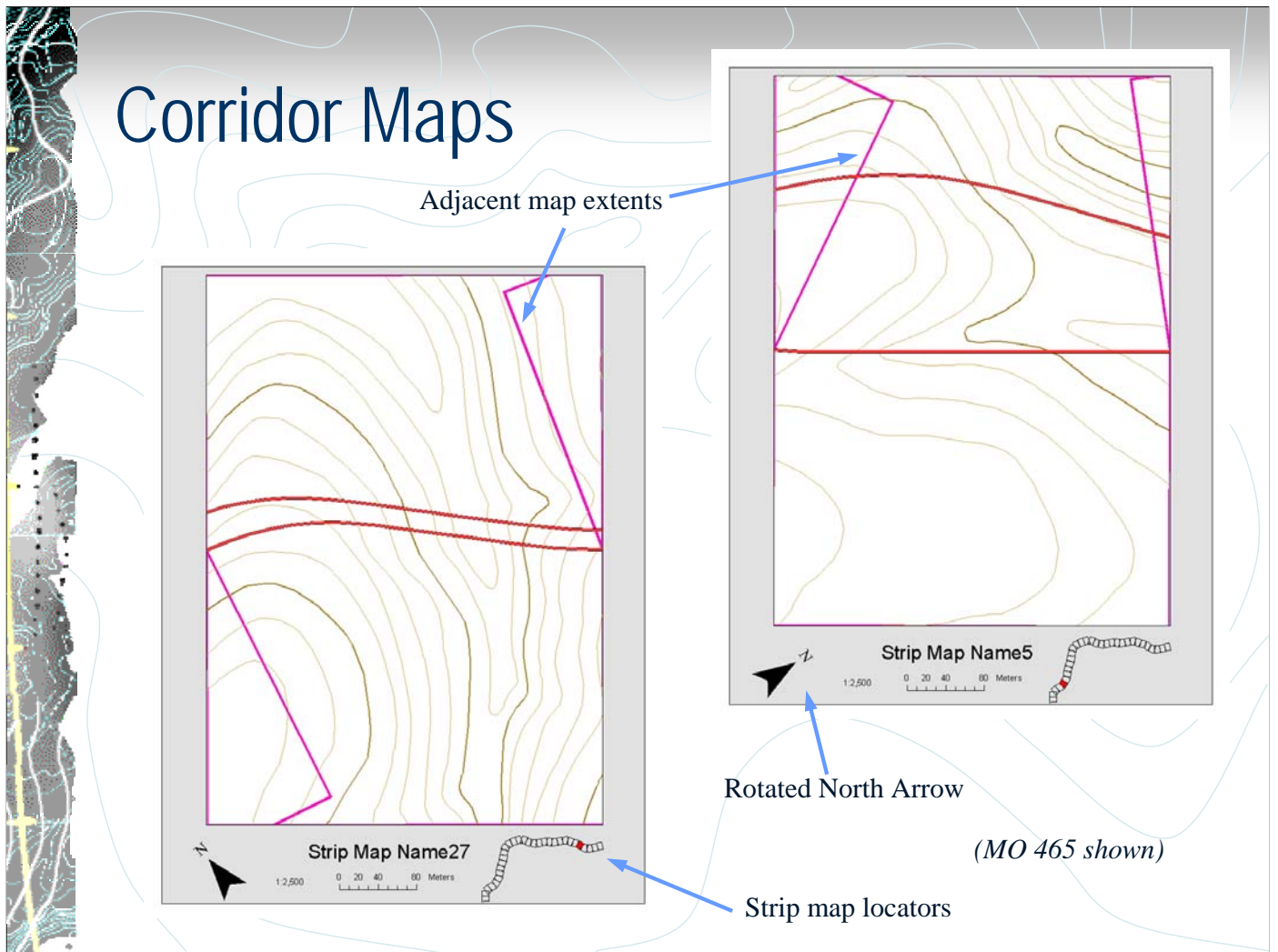
Exercise 1:

Create a Simple Map Book

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

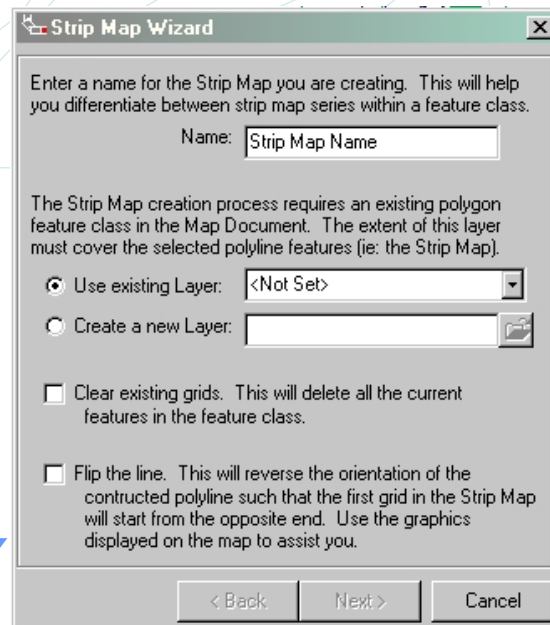
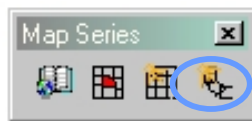
Corridor Maps



"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

A dialog box titled "Strip Map Wizard" with a close button (X). It contains the following text and controls:

Enter a name for the Strip Map you are creating. This will help you differentiate between strip map series within a feature class.

Name:

The Strip Map creation process requires an existing polygon feature class in the Map Document. The extent of this layer must cover the selected polyline features (ie: the Strip Map).

☒ Use existing Layer:

☐ Create a new Layer:

☐ Clear existing grids. This will delete all the current features in the feature class.

☐ Flip the line. This will reverse the orientation of the constructed polyline such that the first grid in the Strip Map will start from the opposite end. Use the graphics displayed on the map to assist you.

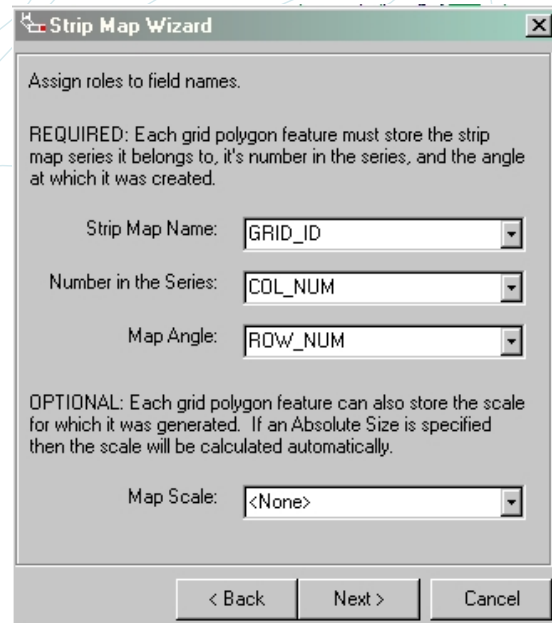
< Back Next > Cancel

"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

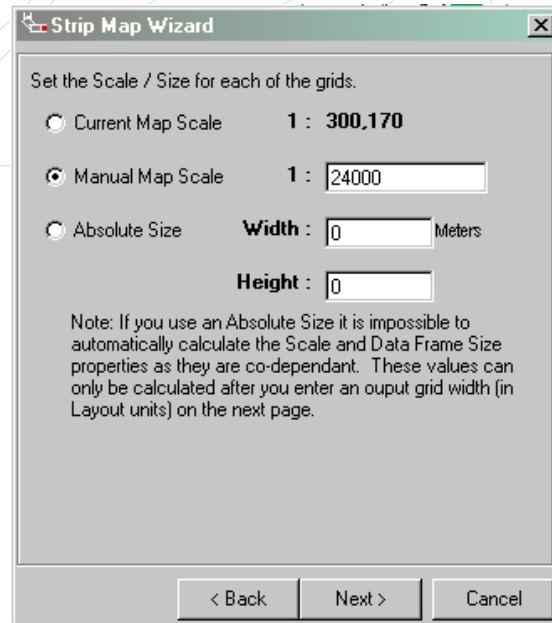


The screenshot shows the 'Strip Map Wizard' dialog box. It has a title bar with a close button. The main text says 'Assign roles to field names.' followed by a 'REQUIRED' section: 'Each grid polygon feature must store the strip map series it belongs to, it's number in the series, and the angle at which it was created.' Below this are three dropdown menus: 'Strip Map Name:' with 'GRID_ID', 'Number in the Series:' with 'COL_NUM', and 'Map Angle:' with 'ROW_NUM'. An 'OPTIONAL' section follows: '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.' Below this is a 'Map Scale:' dropdown menu with '<None>'. At the bottom are three buttons: '< Back', 'Next >', and '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

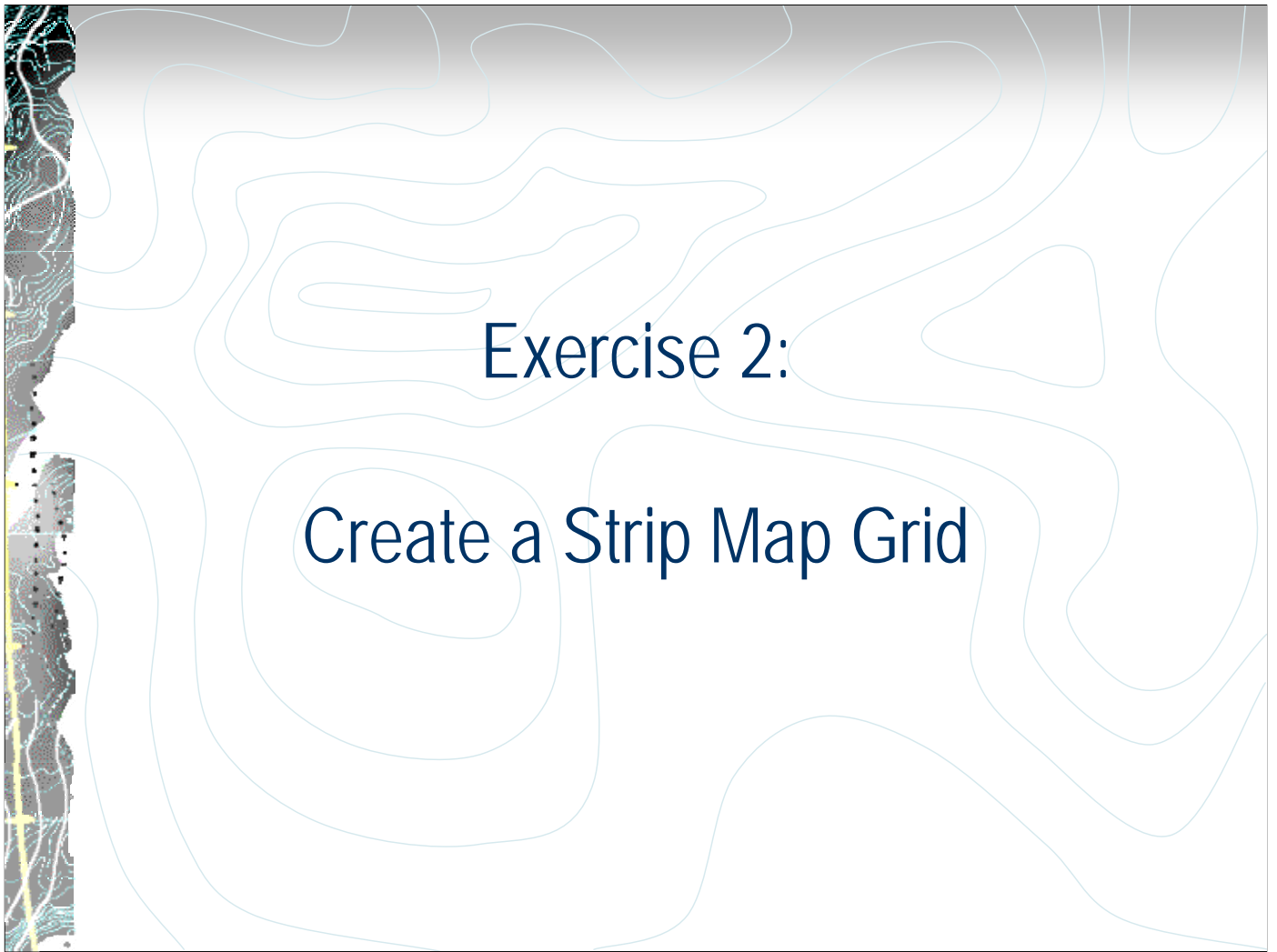


"Create StripMap Grids"

3

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





Exercise 2:

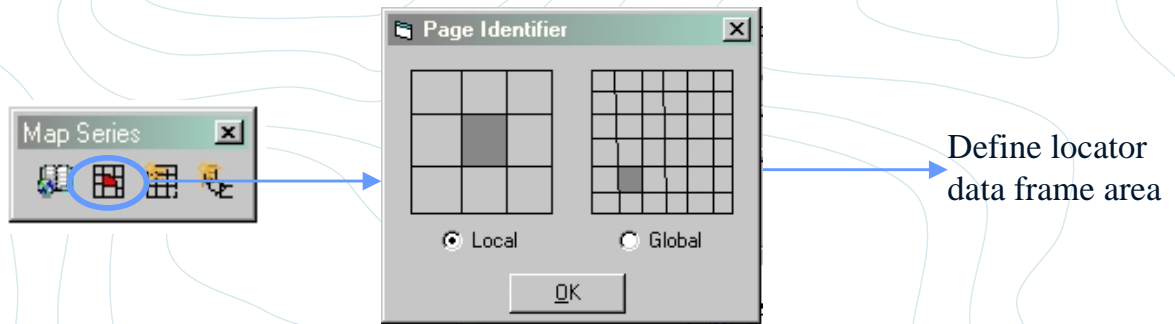
Create a Strip Map Grid

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

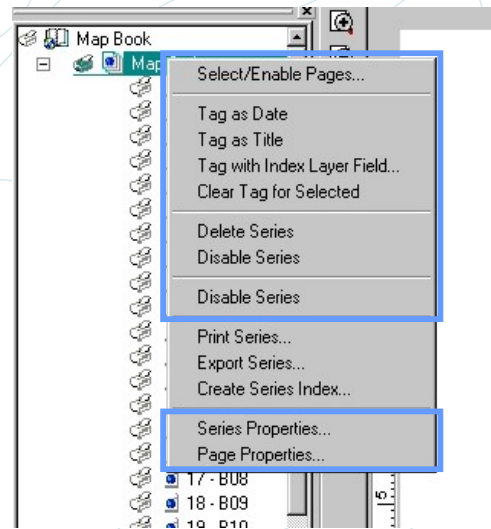


"Add Identifier Frame"



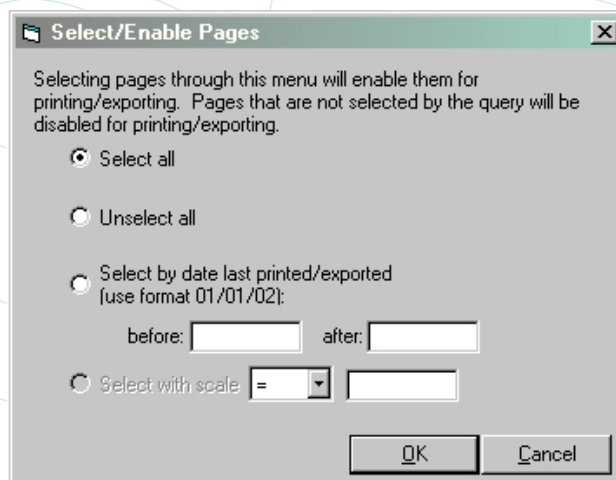
Modifying the map series

- 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"

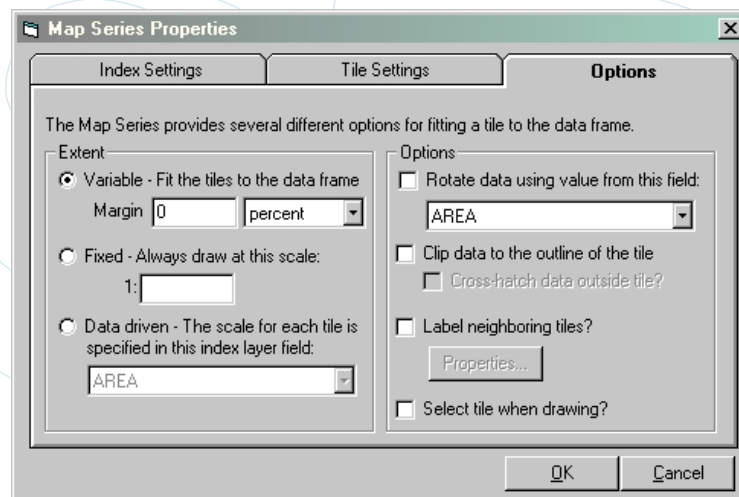
- Clears current map series

● "Disable Series"

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

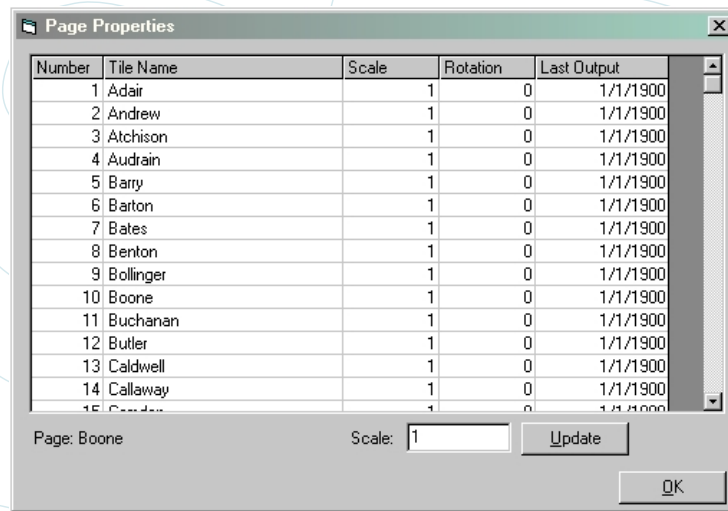
"Series Properties..."

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



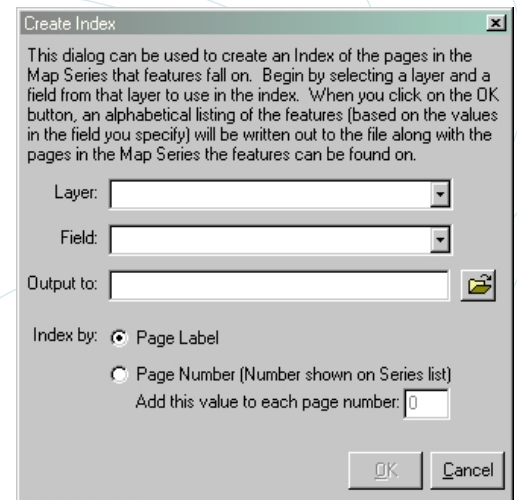
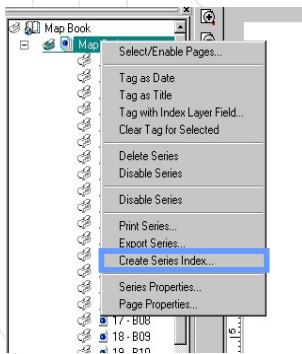
"Page Properties..."

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



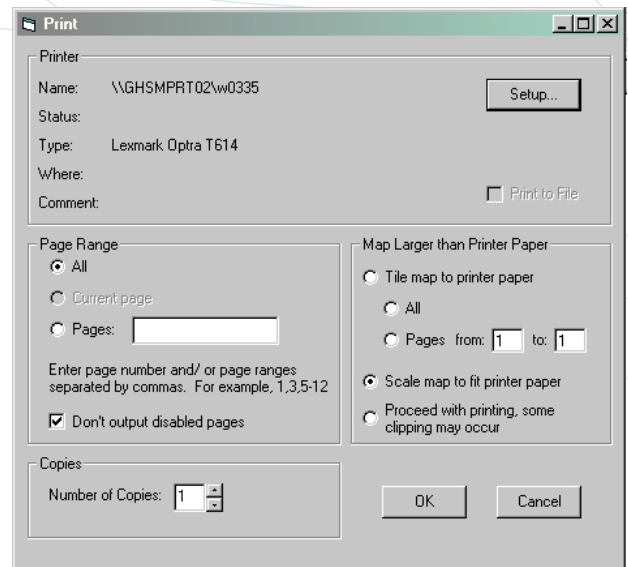
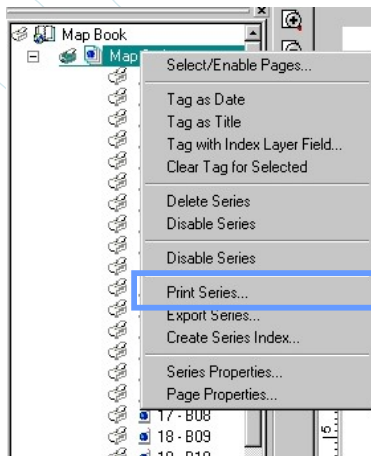
"Create Series Index..."

- 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)



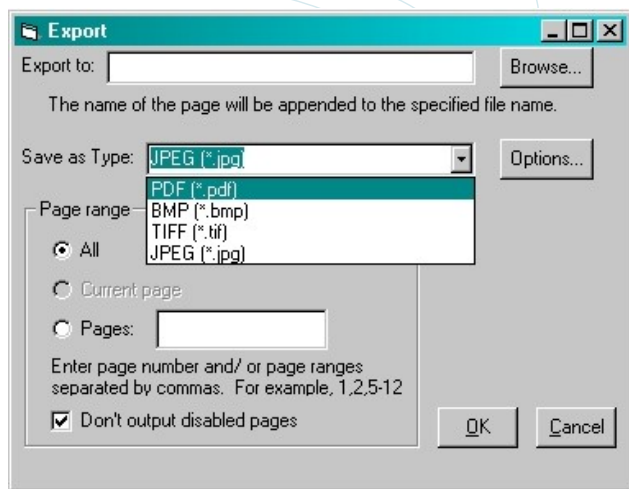
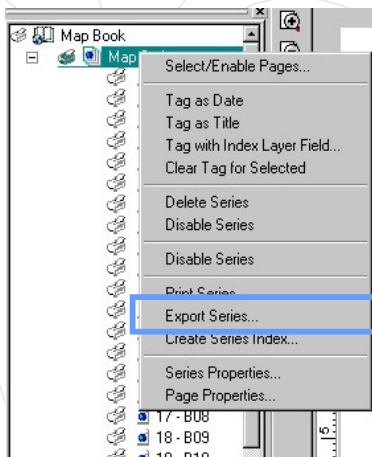
"Print Series..."

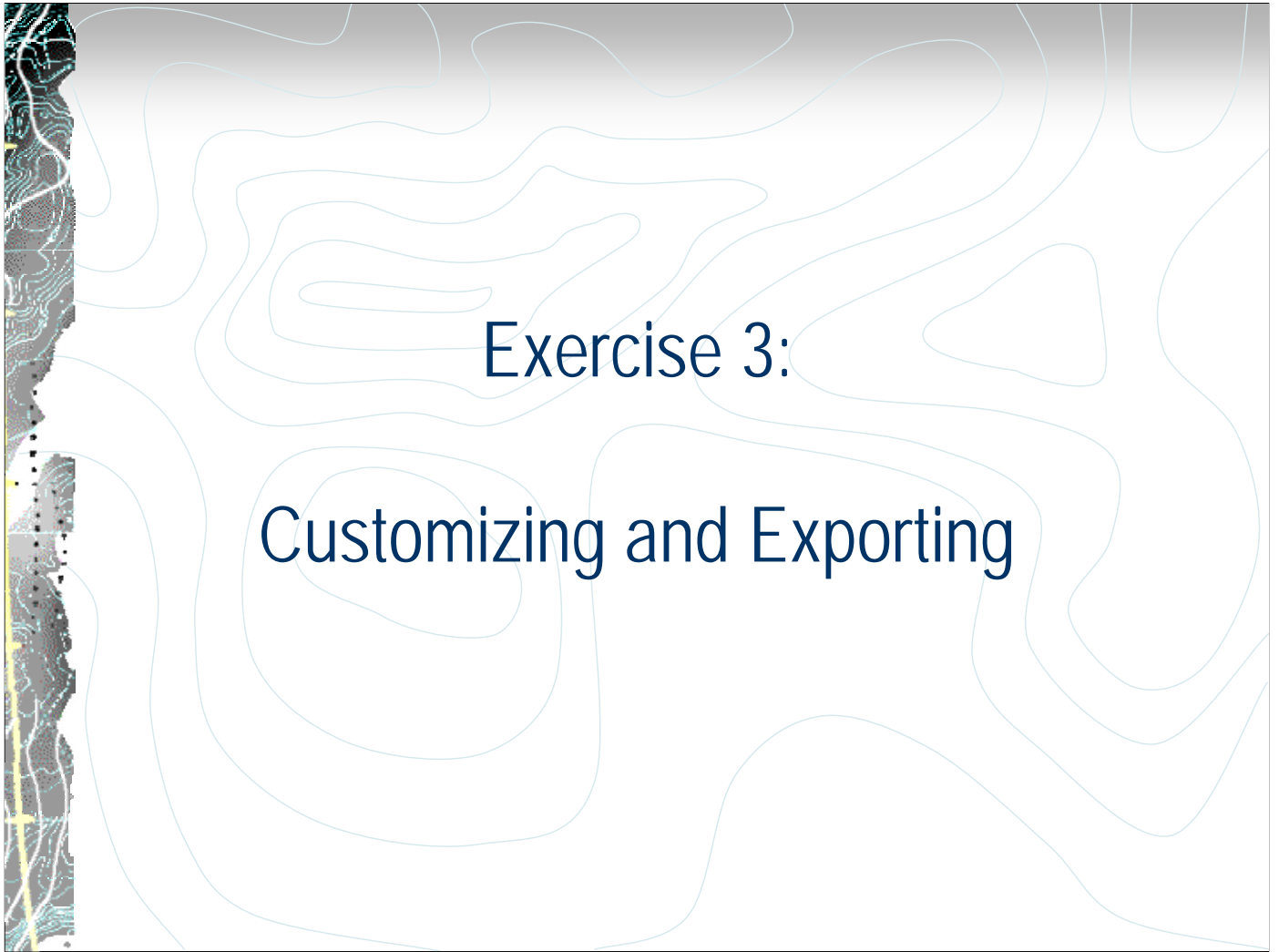
- Opens dialog box for printing
- Similar to standard print dialog



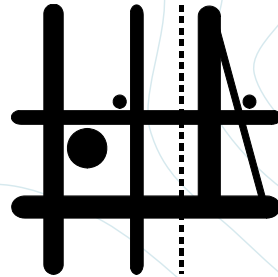
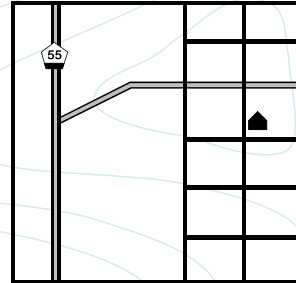
"Export Series..."

- 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)





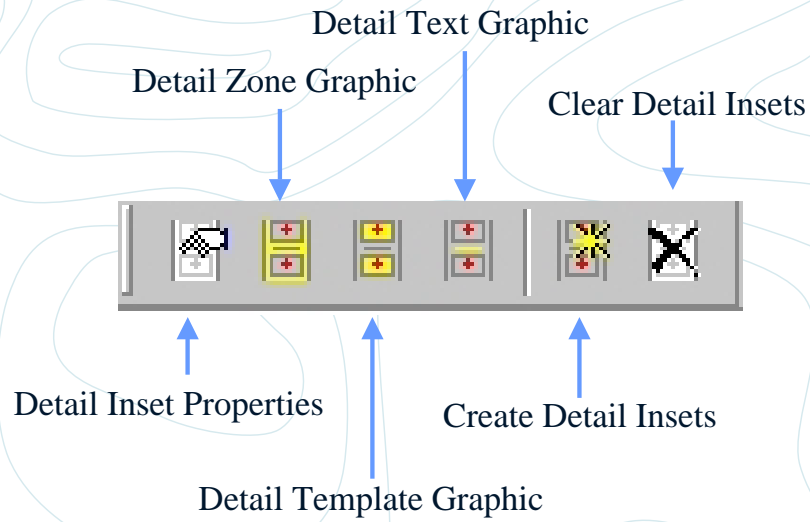
Making insets



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
- NOTE: Will NOT run on Vista!!

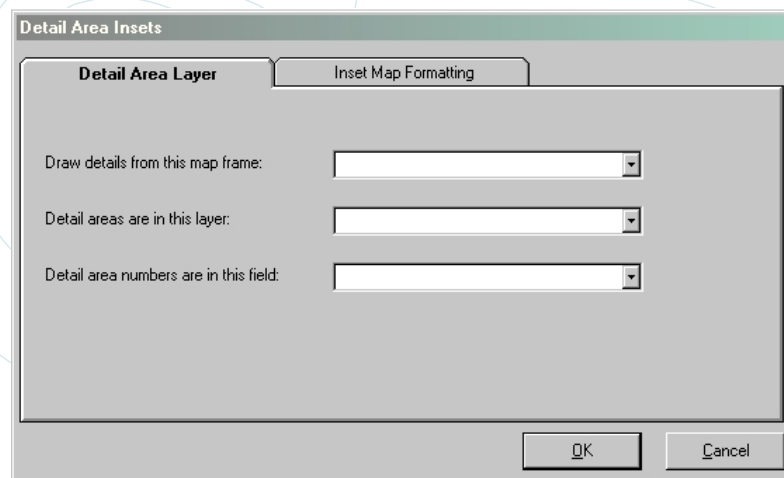
Detail Area Inset Tools (cont.)



"Detail Inset Properties"

1

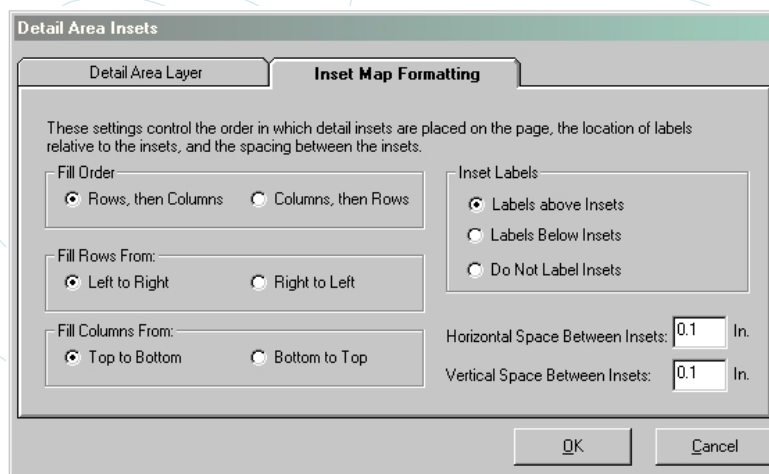
- Establishes what data frame insets will be drawn from (if multiple)
- Sets index layer and field for insets (should NOT be the same as map series index layer if present)



"Detail Inset Properties"

2

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



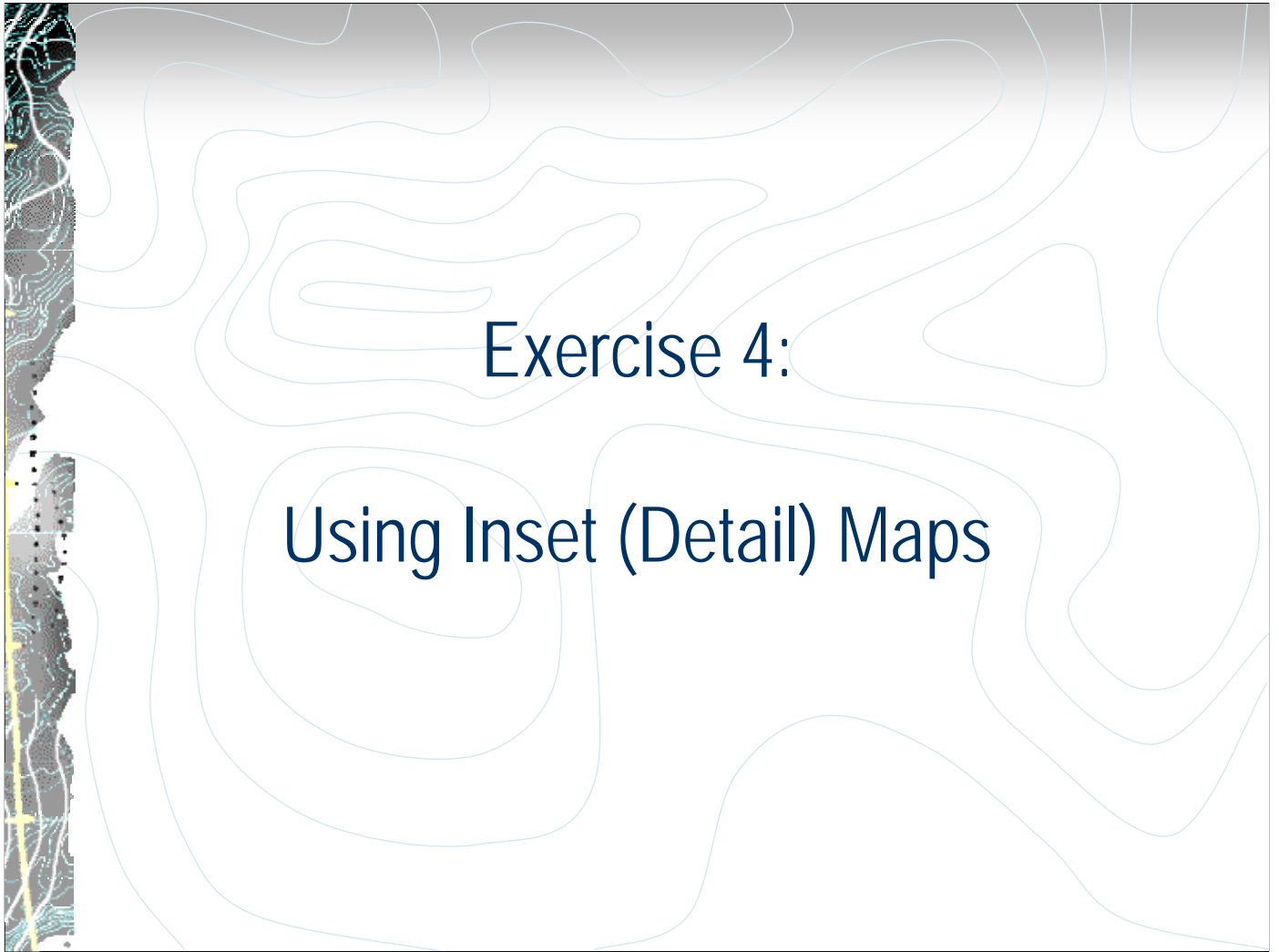
Template Graphics



① ② ③

- "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

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
- Vista Install:
 - Must hardcode the location of *regsvr32.exe* into INSTALL.bat

Issues

● Detail Inset Tools

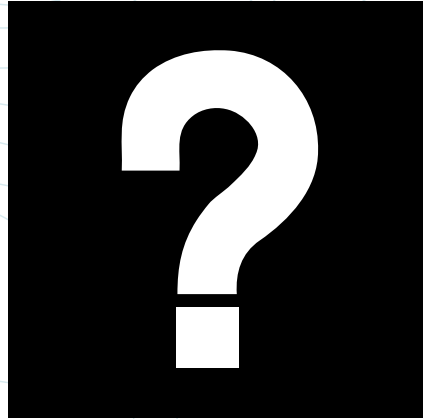
- Somewhat tedious to set up template graphics
- Insets can spill over page edge if they do not fit in original graphics area

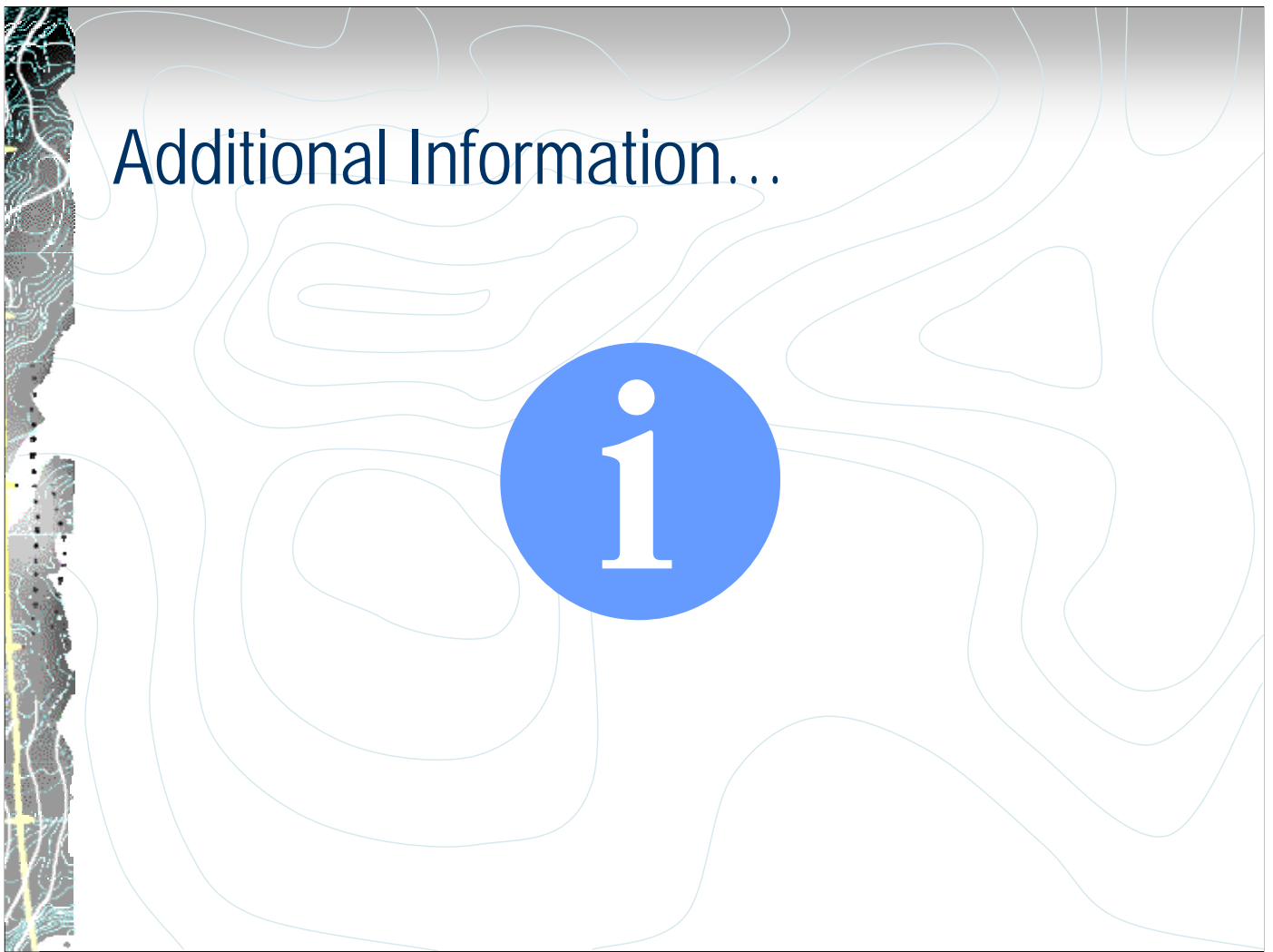
WILL NOT run on VISTA

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...





Map Book Project Page

<http://arcmappointbook.googlepages.com>

● Contains:

- latest and previous code releases
- issues database
- other documentation



NW Map Book (ESRI Northwest Professional Services)

"Highlights:

- Features inherited from DS Mapbook:
 - Ability to create a Map Series where each map pages are defined by polygons in a data layer
 - Multiple Map Pages can be printed or exported with a single command
 - Dynamic Map Text - can change for each map page based on map tile polygon attributes
 - Data driven Map Page extent and rotation
- Features shared with, or similar to MPS Atlas Features:
 - Controlling map pages where layers are made visible
 - Layout element (north arrow, legend, etc.) visibility per map page
 - Dynamic Definition Queries – definition queries are updated when map pages are loaded.
 - Multiple Data Frame Extent Control – more than 1 data frame's extent updated when map pages are loaded.
- Features unique to NW Mapbook
 - Data Driven Detail Insets – a "bubble" polygon layer tells NW Mapbook where to make detail inset data frames
 - Adjacent Map Label Symbol Control – Assign per map page your own text symbol to adjacent map labels.
 - Synchronize Data Frame Scales – other DFs can fit to a polygon with same name as main DF's current map tile "

Available:

<ftp://ftp.esri.com> login: *nwmapbook* password: *nwma1456*

Also available at: ftp://ftp.modot.gov/otms/mogis/nw_mapbook.zip



Detail Area Inset Tools

- Developed by ESRI – Denver Tech Marketing Center
 - Unfortunately, tool must be downloaded elsewhere
<ftp://ftp.modot.gov/TMSPublic/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



Other useful tools for map series...

Index Layer Tools

Create Polygon from Point with Area Field (8.3)

- Can generate square polygons, not just circular buffers

<http://edndoc.esri.com/arcobjects/8.3/Samples/Geometry/CreatePolygonFromAreaField.htm>

NOAA Coastal Protection & Restoration Division

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://mapping2.orr.noaa.gov/website/portal/cprdtools/gistools/arcgis9xtools>

NPS Midwest Region

Grid Tools

- "This extension provides a tool for creating a shapefile or coverage polygon grid within ArcMap for use in sampling or in making a map book. Options include specifying cell size, extent, number of rows and columns, rotation angle, random origin, and several cell labeling options."

http://science.nature.nps.gov/im/units/mwr/gis/grid/grid_tools.htm

Polygon Diameter Azimuth Tool

- "The purpose of the Polygon Diameter Azimuth Tool is to find the azimuth of a polygons diameter (major-axis, greatest antipodal distance...) and write the azimuth value to an 'Azimuth' field."

<http://arcscrips.esri.com/details.asp?dbid=14570>



Other useful tools for map series...

- Miscellaneous Tools

- DSMapbook Feature Layer Definitions & Scalings

- "This tool provides added functionality to manage feature layer definitions between maps pages in the Mapbook and the Mapseries."

- Note: may have been written for earlier Map Book versions (experienced some difficulties in use)

<http://arcscripts.esri.com/details.asp?dbid=15741>



Other map book/atlas tools (free)

● Map Atlas

- “Creates a map atlas for all the unique values in an attribute field, all maps with the same overall spatial extent”

<http://arcscripts.esri.com/details.asp?dbid=15741>

● Bookmark Manager – Mapbook Generator

- “This tool was developed to generate map books similar to the DSMapbook extension. However, instead of features it uses bookmarks.”

- **Requires 9.3 and .NET support**

<http://arcscripts.esri.com/details.asp?dbid=15432>

Note: Additional mapbook-type tools are provided “as-is” and have not been tested by the instructor



Additional Help...

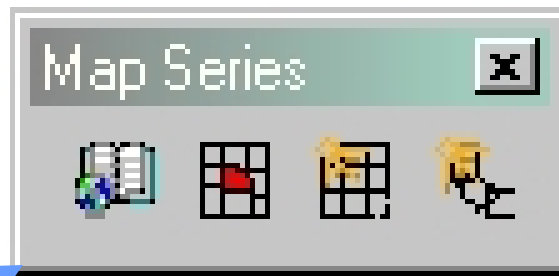
- Map Book and Inset Tools both come with manuals on how to install and use them
 - They also come with the original code, making customization easier (does require Visual Basic, not Visual Basic for Applications)
- Map Book is an active topic on the ESRI User Forums
 - The forums are a very useful tool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





Toolbar Quick Reference

Map Book Toolbar



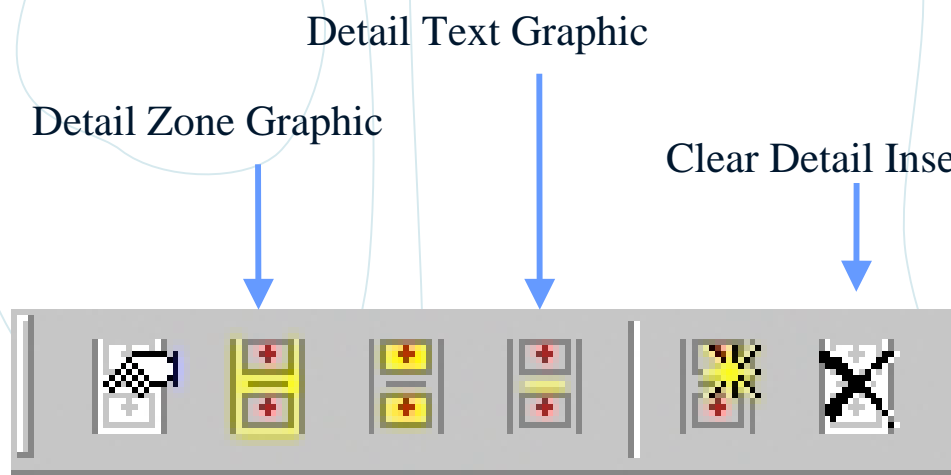
Create Map Book

Add Identifier Frame

Create/Update
Map Grids

Create Strip Map
Grids

Detail Area Inset Tools



Detail Inset Properties

Detail Template Graphic

Create Detail Insets