Advanced Cartography:

Creating Map Books
and
Using Inset Map Tools

Class Manual

Instructor:

Jason Ebersole

Intermediate GIS Specialist

Jason.Ebersole@modot.mo.gov

2217 St. Mary's Blvd.
P.O. Box 270
Jefferson City, MO 65102

Phone: (573) 526-5860
Fax: (573) 526-8052

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Advanced Cartography:
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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
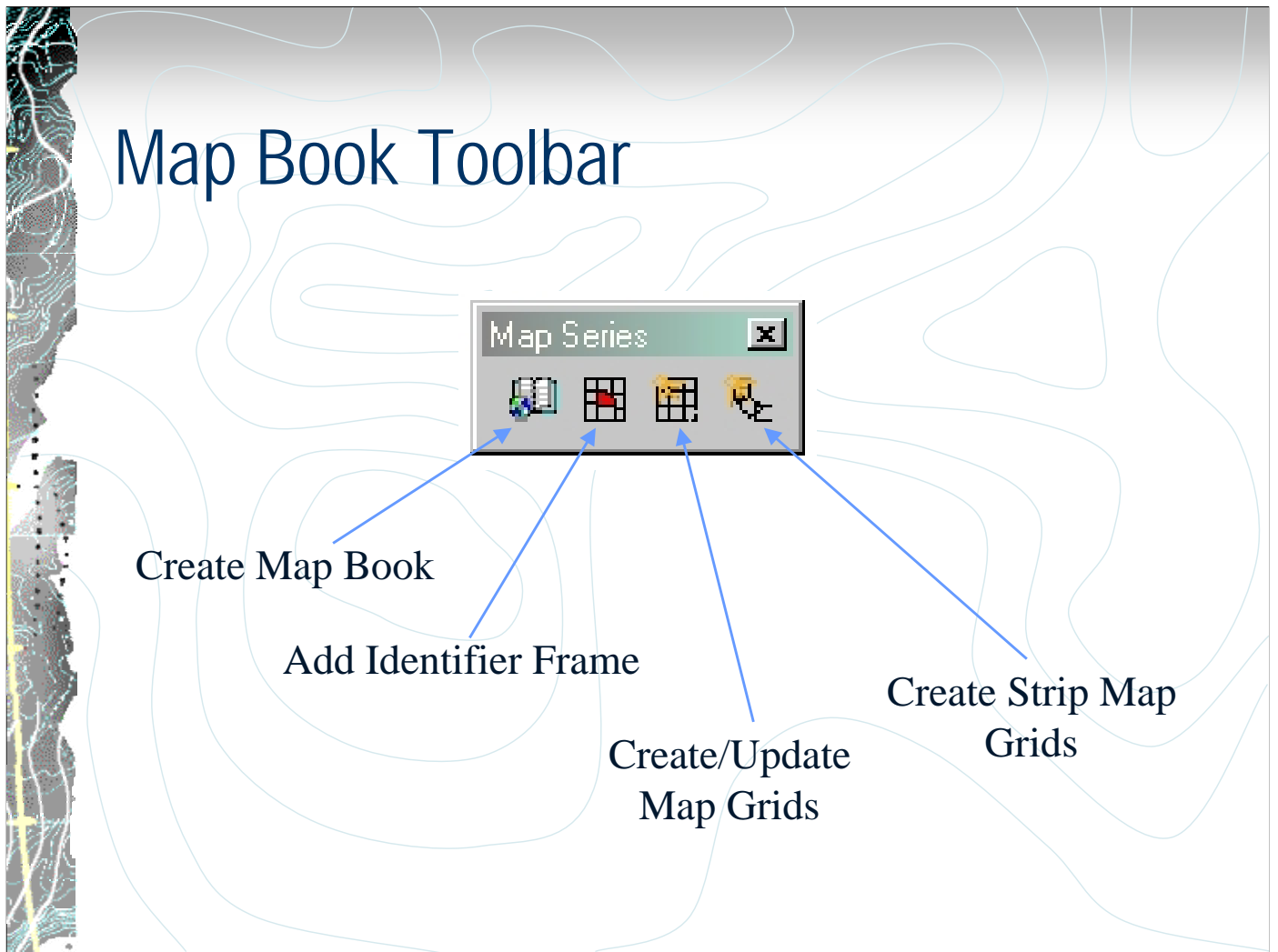 - Feature Indexes
  - Printing/Exporting

- Inset Maps
  - Overview
  - Creation & Use
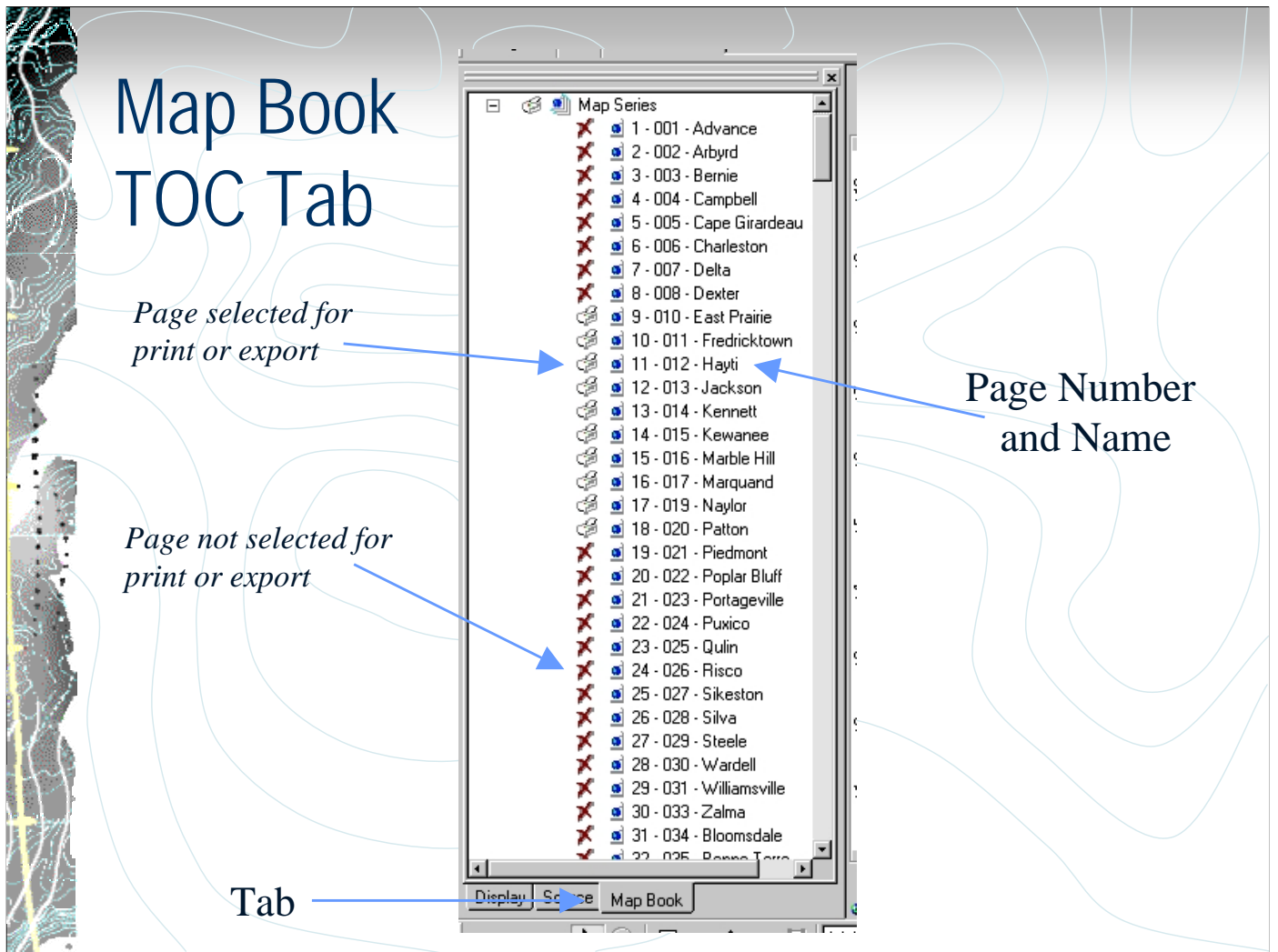
Map Book Developer Sample

- "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

Map Book TOC Tab

Page selected for print or export

Page not selected for print or export

Page Number and Name

Tab

Map Series
- 1 - 001 - Advance
- 2 - 002 - Arbyrd
- 3 - 003 - Bernie
- 4 - 004 - Campbell
- 5 - 005 - Cape Girardeau
- 6 - 006 - Charleston
- 7 - 007 - Delta
- 8 - 008 - Dexter
- 9 - 010 - East Prairie
- 10 - 011 - Fredricktown
- 11 - 012 - Hayti
- 12 - 013 - Jackson
- 13 - 014 - Kennett
- 14 - 015 - Kewanee
- 15 - 016 - Marble Hill
- 16 - 017 - Marquand
- 17 - 019 - Naylor
- 18 - 020 - Patton
- 19 - 021 - Piedmont
- 20 - 022 - Poplar Bluff
- 21 - 023 - Portageville
- 22 - 024 - Puxico
- 23 - 025 - Qulin
- 24 - 026 - Risco
- 25 - 027 - Sikeston
- 26 - 028 - Silva
- 27 - 029 - Steele
- 28 - 030 - Wardell
- 29 - 031 - Williamsville
- 30 - 033 - Zalma
- 31 - 034 - Bloomsdale
- 32 - 035 - Bonne Terre

Display | Source | Map Book

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

525 - Jefferson City

0   0.25   0.5
Miles

Locator Map* (separate frame)

Making a map book
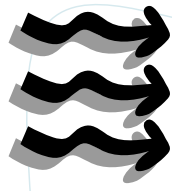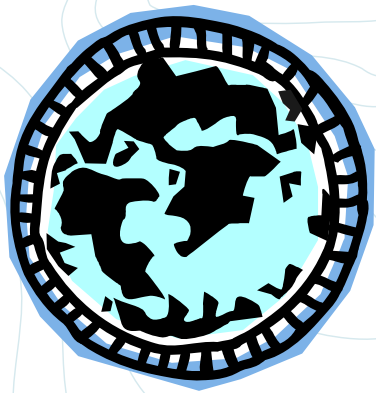
Index Layer

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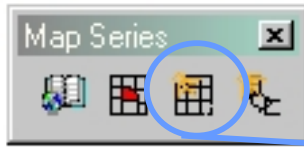
- Sets/creates index layer
- Can clear existing grids
- Can also create cells based on presence of another layer(s)
- This is NOT required if using pre-existing polygons for index layer

Grid Generator Wizard

The Map Grid creation process requires an existing polygon feature class in the Map Document. The valid extent of this layer must cover the Grid area.

- ◉ Use existing Layer:
- ○ Create a new Layer:

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

☐ Don't create empty grids. A grid is considered empty unless it contains features from at least one of the following selected layers:

< Back   Next >   Cancel

"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 <u>long integer</u> fields
  - Scale will be "double" if layer is generated from scratch by Map Book

"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
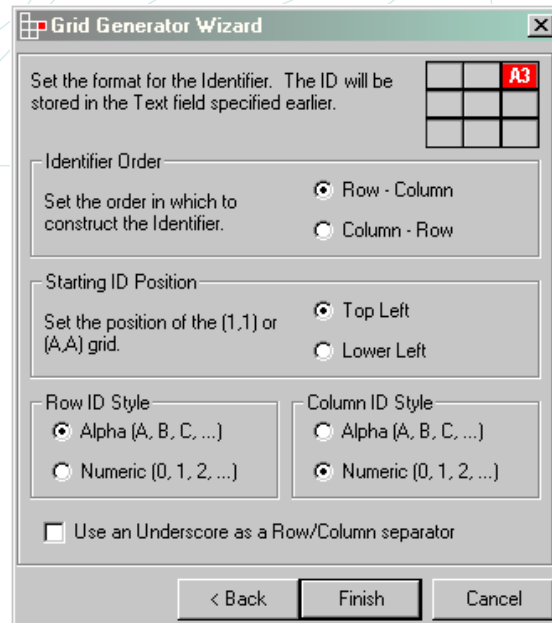

14

"Create/Update Map Grids"

③

- Sets data frame size, shape
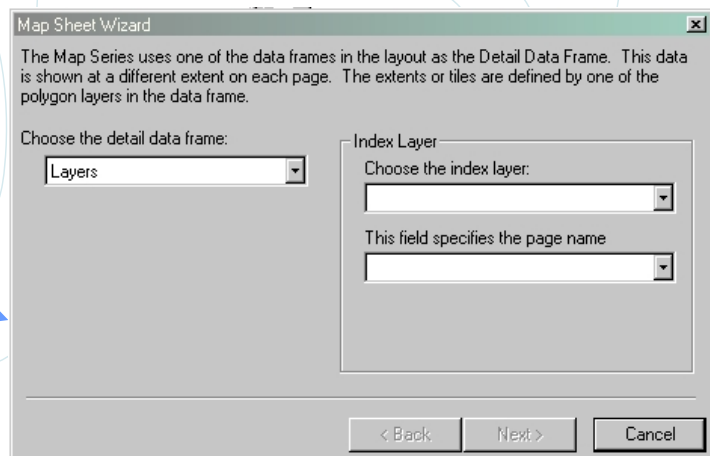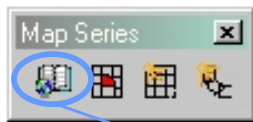- Does not have to be current data frame size
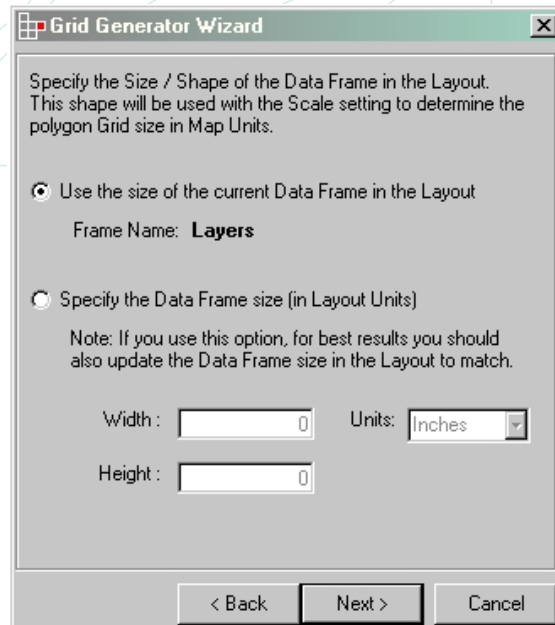
"Create/Update Map Grids"

④

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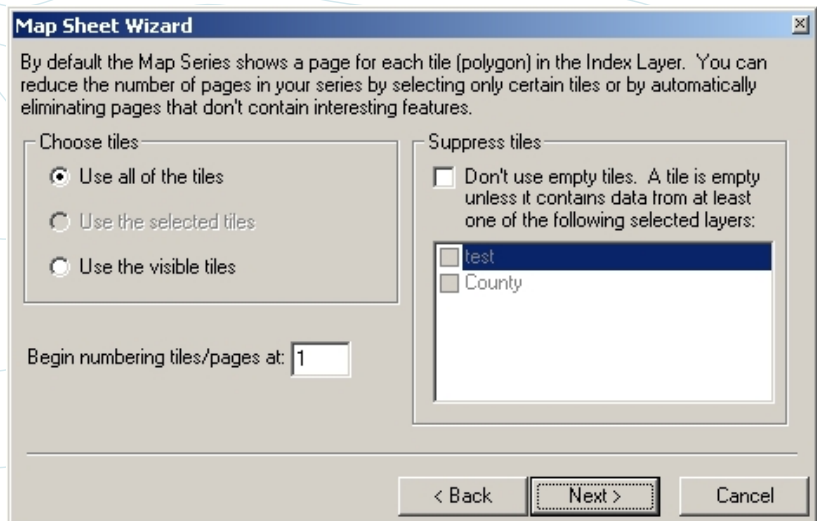- Allows cells to match existing schemes if necessary

"Create Map Series"

- 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 <u>long integer</u>
  - 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

19
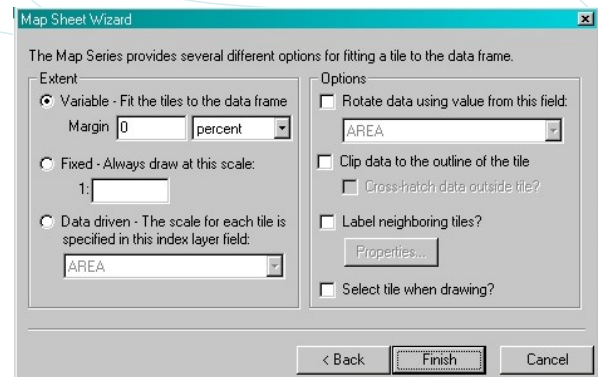
Creating Strip Maps
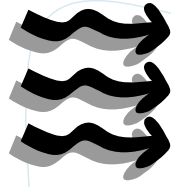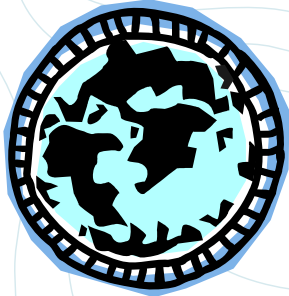
Corridor/Strip Maps

- 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
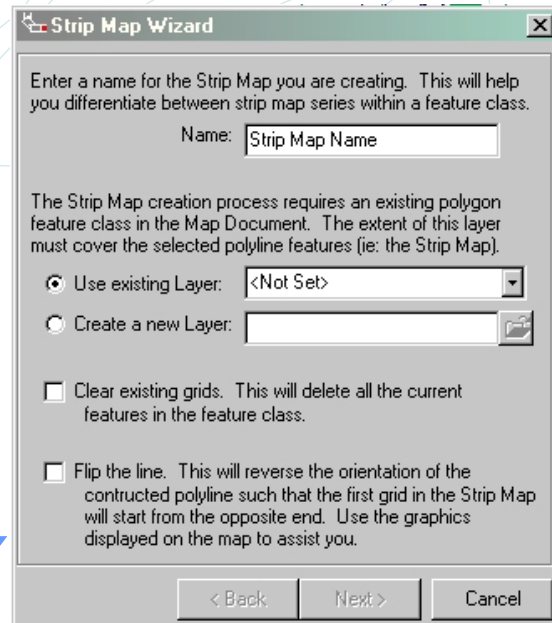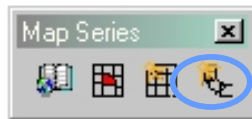
Corridor Maps

Adjacent map extents

Rotated North Arrow

(MO 465 shown)

Strip map locators
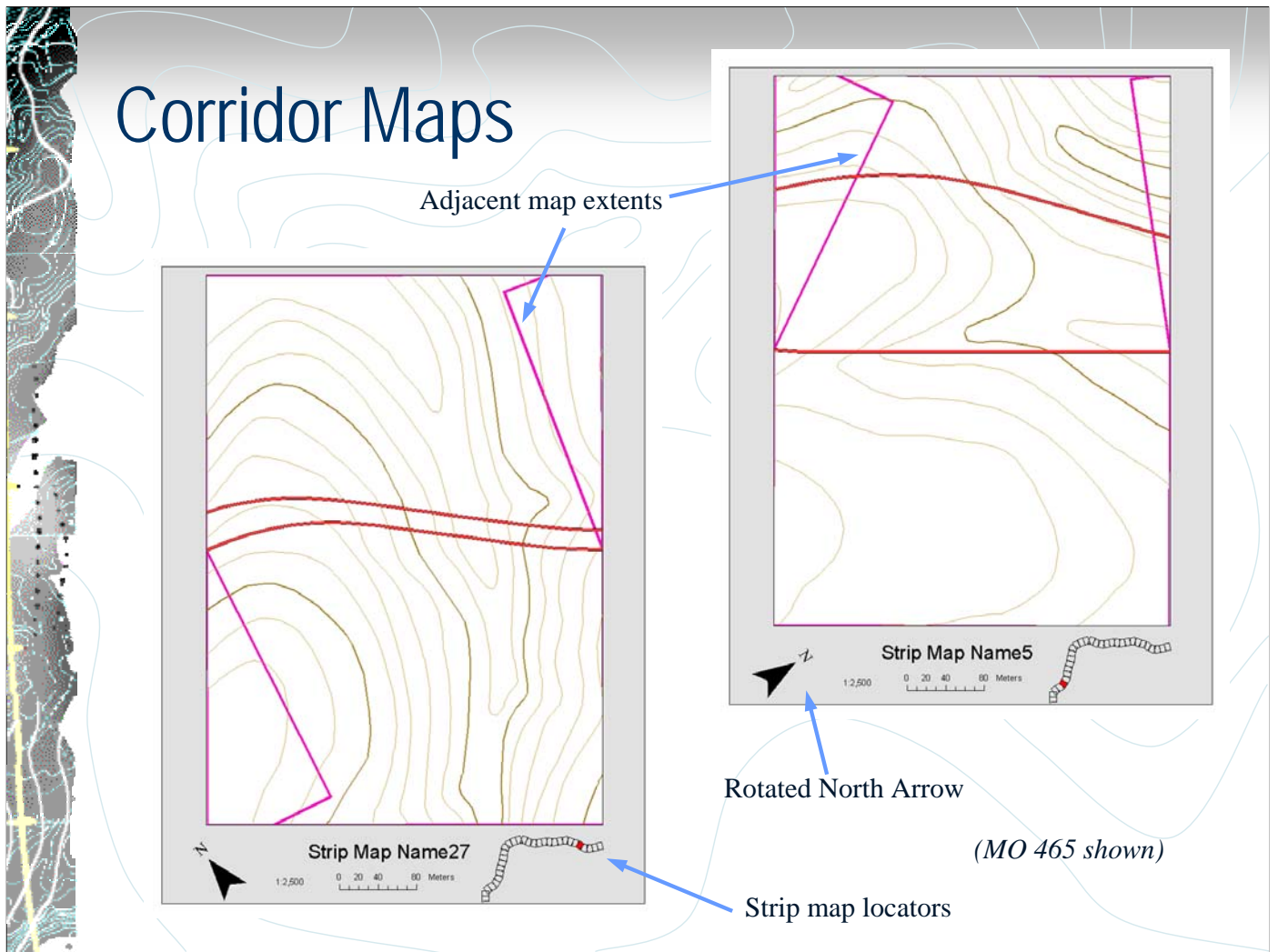
"Create StripMap Grids"

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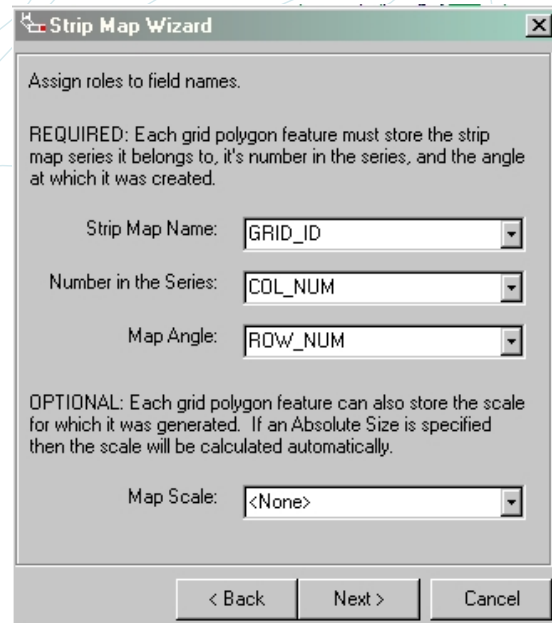 - Normally begins at start of line

"Create StripMap Grids"

1b

**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 <u>long integer</u> to work correctly
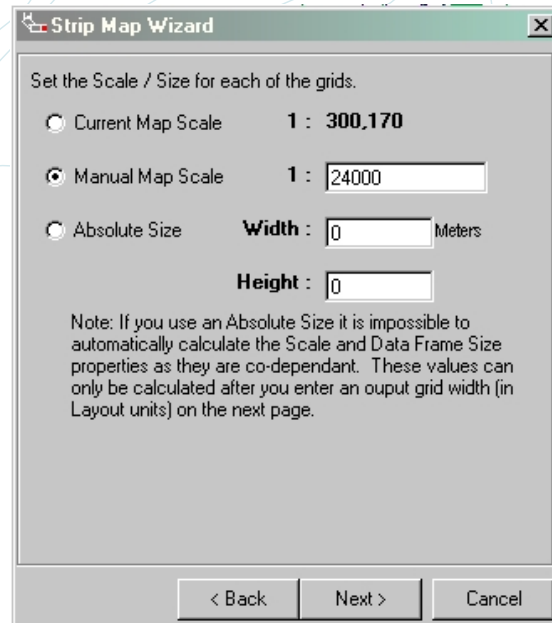- Optional to set map scale

Strip Map Wizard

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:	GRID_ID
Number in the Series:	COL_NUM
Map Angle:	ROW_NUM

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:	<None>

[< 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

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"

Define locator
data frame area
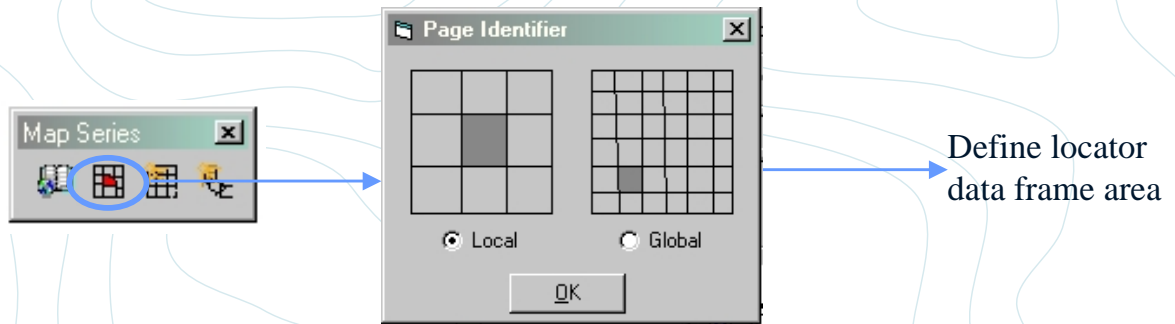
Modifying the map series

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

"Select/Enable Pages…"

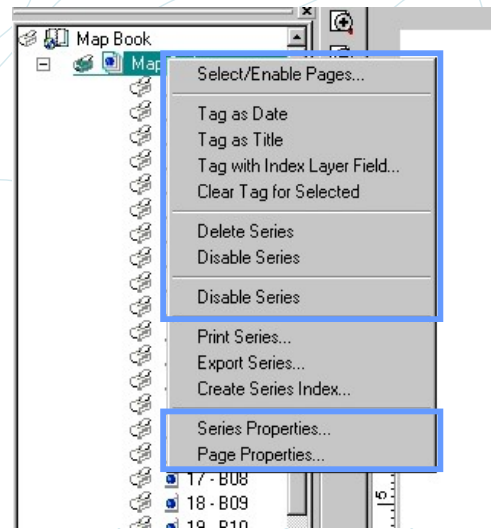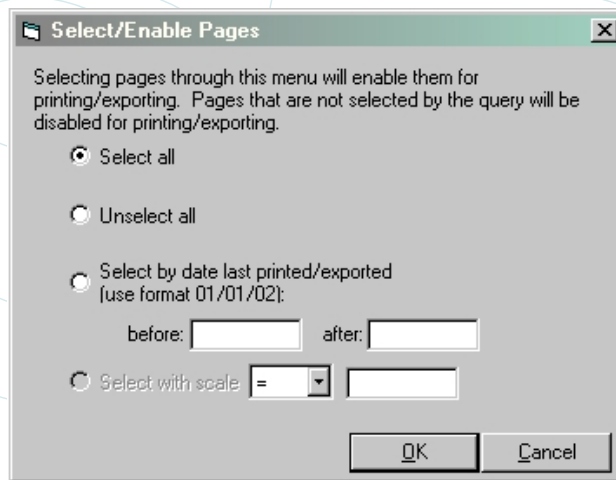- Menu allows all pages to be selected/unselected
- Pages can be selected by date last printed or exported, or by scale

"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
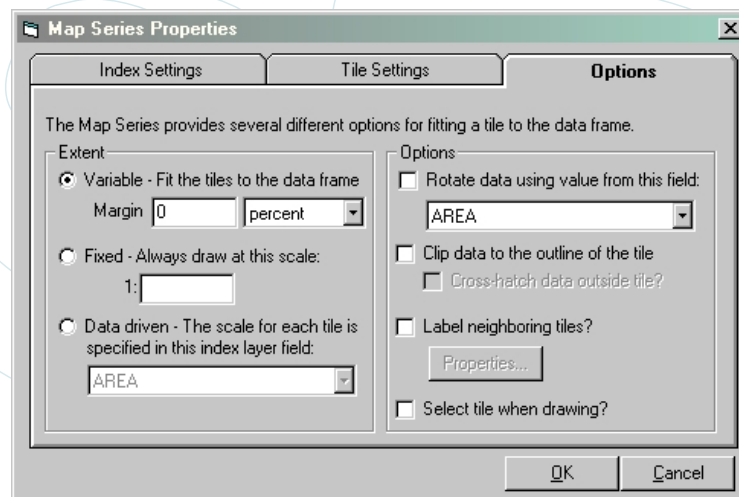
"Page Properties…"

- Pulls up page properties menu
- Name, Scale, Rotation and Output information for individual pages can be changed
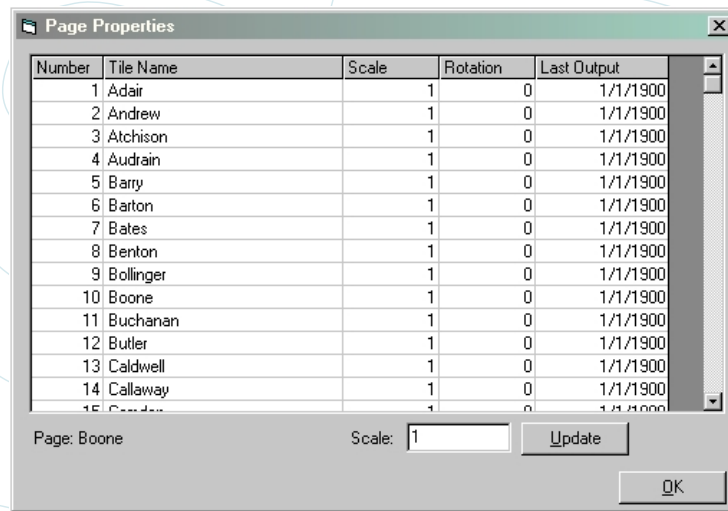
"Create Series Index…"

- 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)`

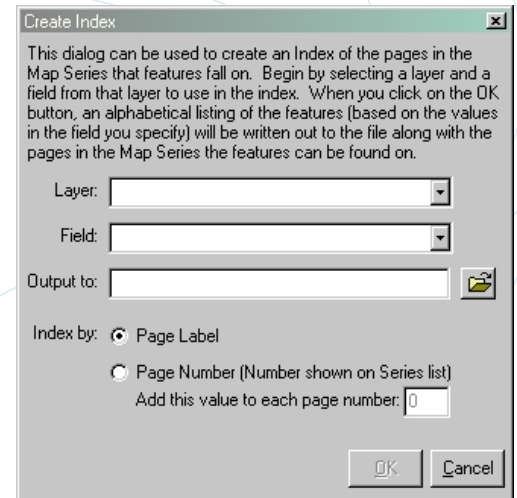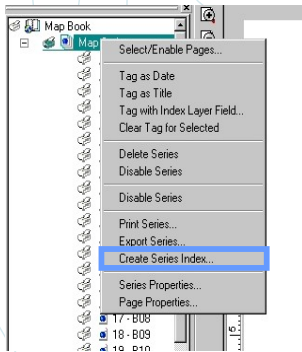# "Print Series…"

- Opens dialog box for printing
- Similar to standard print dialog
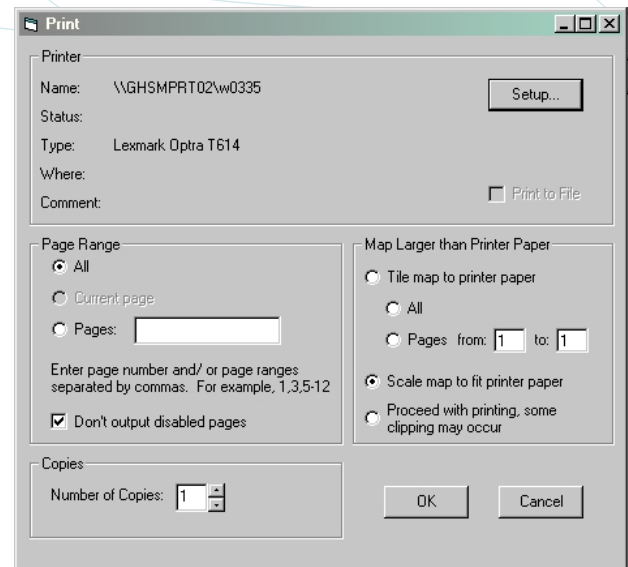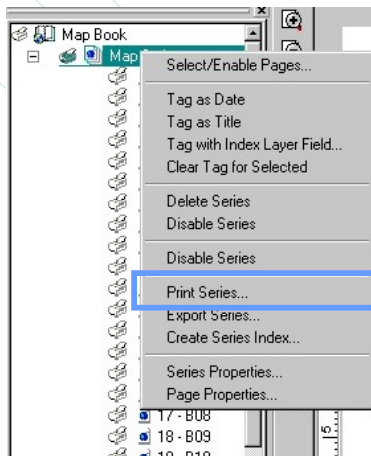
"Export Series…"

- Opens export dialog
- Each export file is appended with series name (series_pagename)
- 6 export files 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)
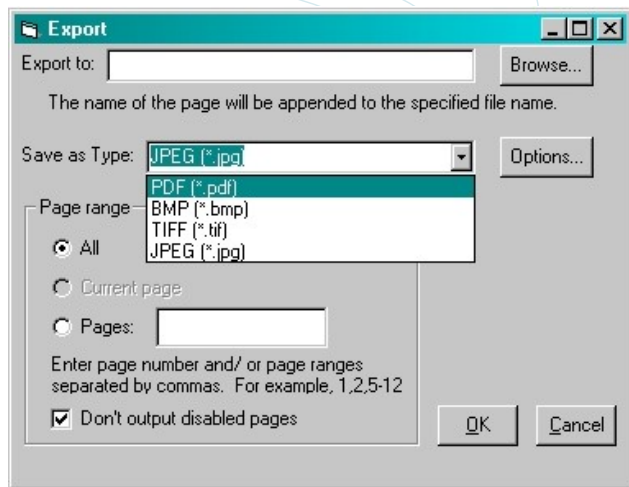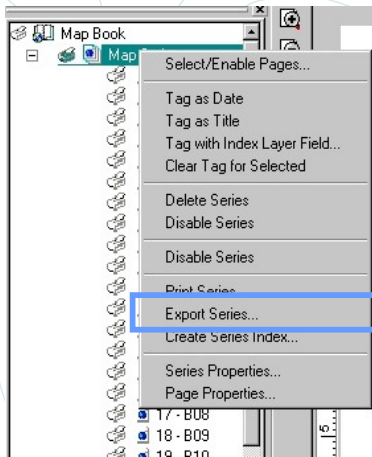
Making insets
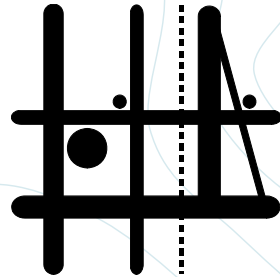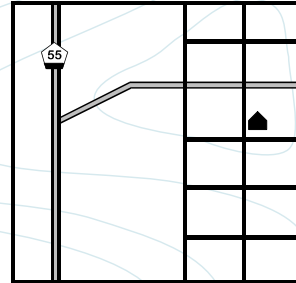
Detail Area Inset Tools

- 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

Detail Area Inset Tools (cont.)

Detail Text Graphic

Detail Zone Graphic

Clear Detail Insets

Detail Inset Properties

Create Detail Insets

Detail Template Graphic
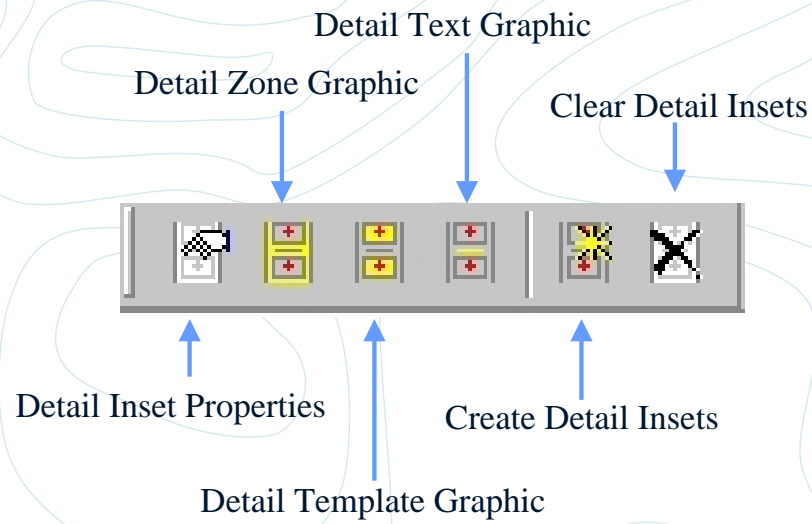
"Detail Inset Properties"

- 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)
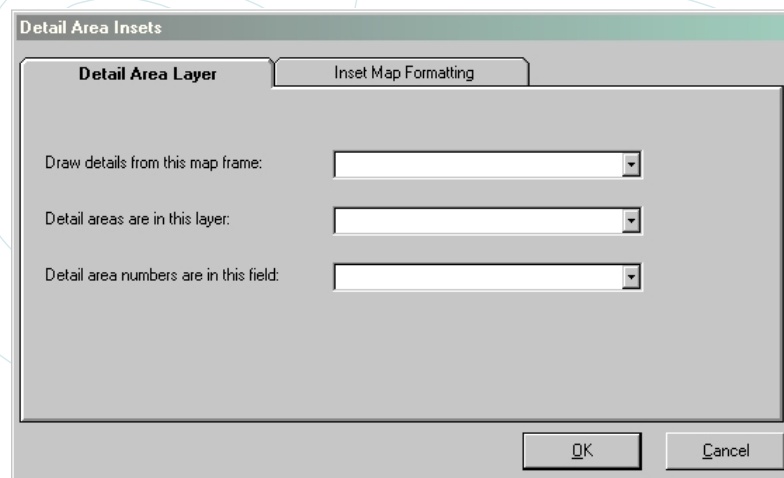
"Detail Inset Properties"

2

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

Template Graphics

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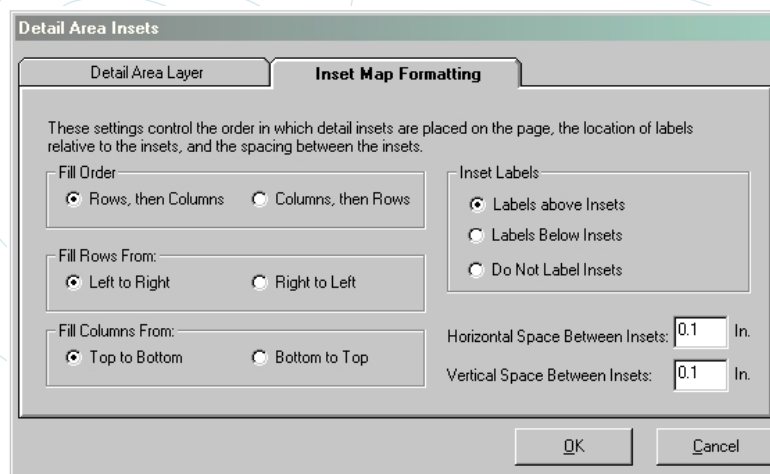
- "Detail Zone Graphic" (1)
  - Establishes area where insets will be drawn
- "Detail Template Graphic" (2) *
  - Establishes size and shape of inset data frame
- "Detail Text Graphic" (3) *
  - Establishes text formatting for labels (if insets are labeled)

* - These should not be within page limits

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…

Additional Information…
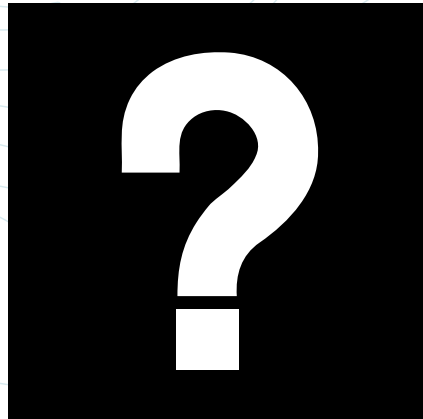
Download Paths

Map Book Developer Sample

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

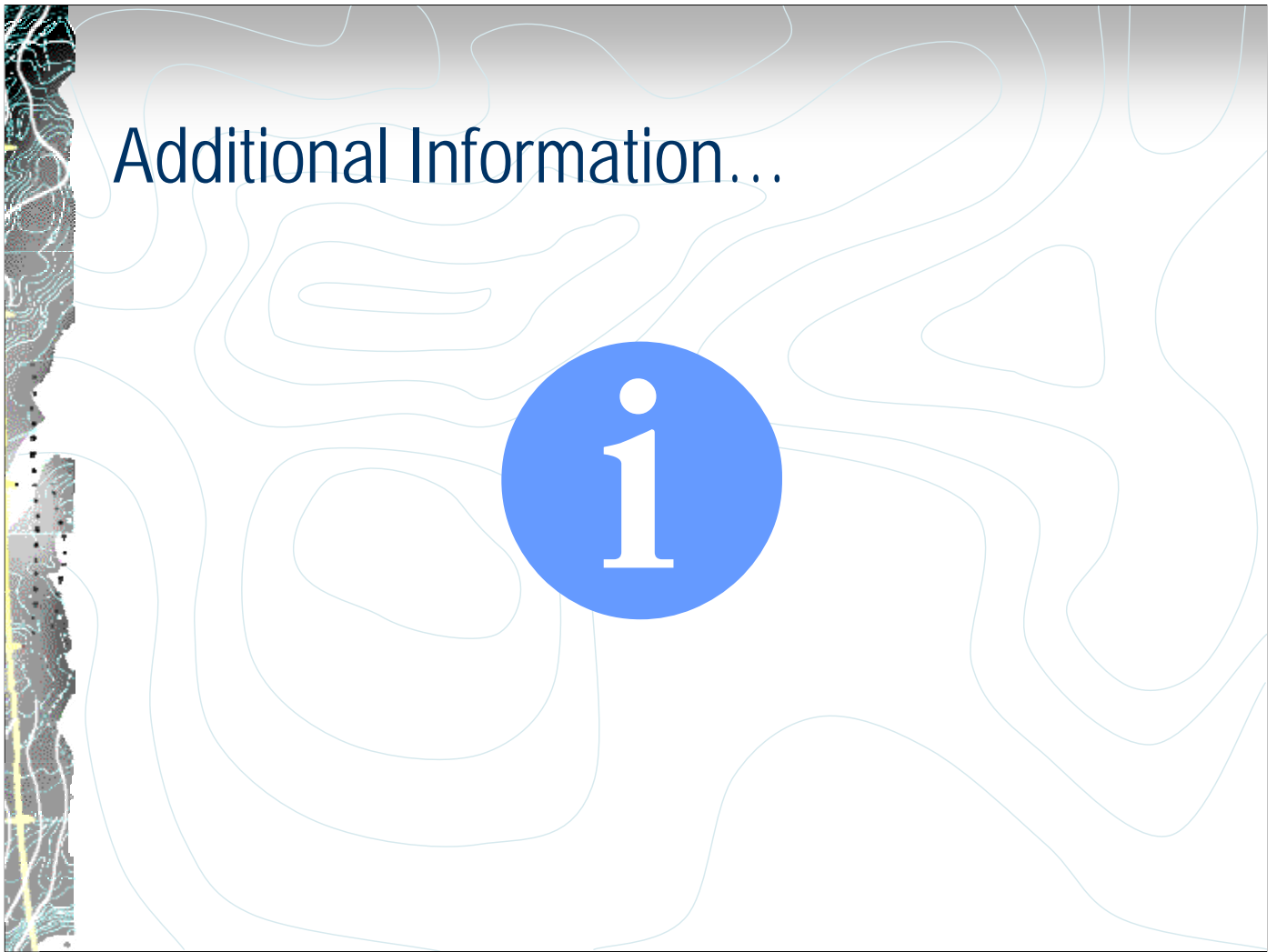http://edndoc.esri.com/arcobjects/9.1/DownloadCounter/startDownload.asp?File=/arcobjects/9.1/Samples/Cartography/Map_Production/DSMapBook/DSMapBook.zip&Size=18&Name=DSMapBook.zip

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 Project Page

http://code.google.com/p/arcmapbook/

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

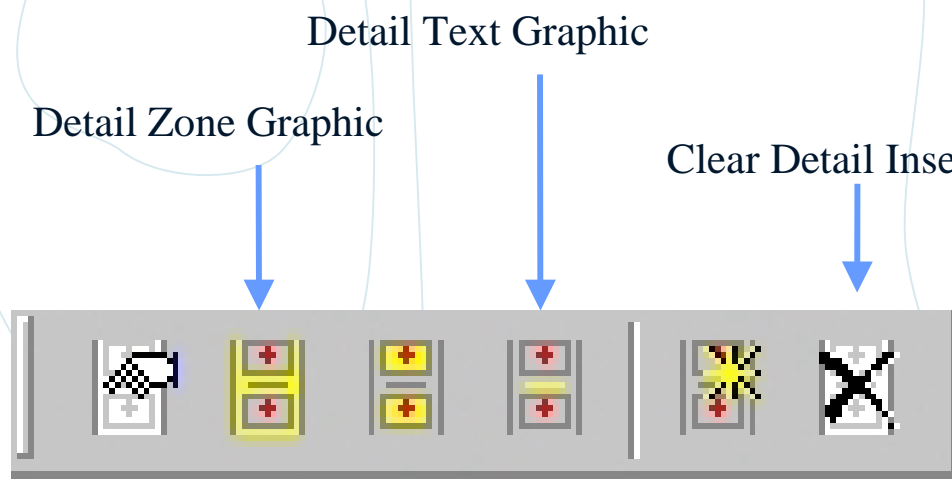# Thank you.

Toolbar Quick Reference

Map Book Toolbar

Map Series

Create Map Book

Add Identifier Frame

Create/Update
Map Grids

Create Strip Map
Grids

Detail Area Inset Tools

Detail Text Graphic

Detail Zone Graphic

Clear Detail Insets

Detail Inset Properties

Create Detail Insets

Detail Template Graphic