

EXERCISE 2

ArcGIS Pro -Map Series: Grid and Strip Map Index Layers

Introduction

In this exercise the student will learn how to build both grid and strip map index layers to be applied with Map Series.

Objectives

- Build Grid Index Layer
- Build Strip Map Index Layer
- Setup Map Series
- Function with Dynamic Text
- Export maps generated by Map Series

Required Data:

- ArcGISProMapSeries.zip downloaded and unzipped.

Prerequisites

- Install ArcGIS – Pro 2.9 or greater
- Have completed the GTAC ArcGIS Pro – Quick Start class or have equivalent experience.



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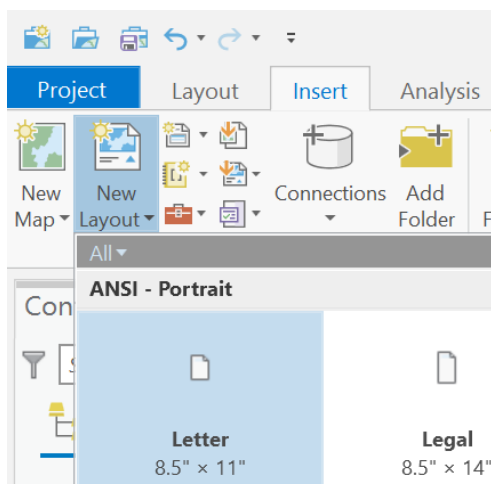
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Part 1: Setup Map Layout

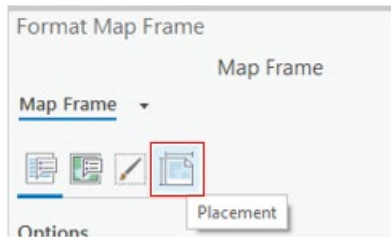
You are in charge of putting together maps for an active fire. You need to create several maps portraying different regions of the burn area. You decide to use Map Series to group out the fire polygon by a grid to create the needed map pages. Open ArcGIS Pro and the Map_Series_Project if it isn't already.

1. Open the Fire Map
 - a. In the Catalog Pane, **expand the Maps** section and **double click to open the Fire map**.
2. Create a new Layout
 - b. On the **Insert** tab (**Project** group) go to **New Layout** then select **Letter 8.5" x 11"** in the **ANSI – Portrait** group.



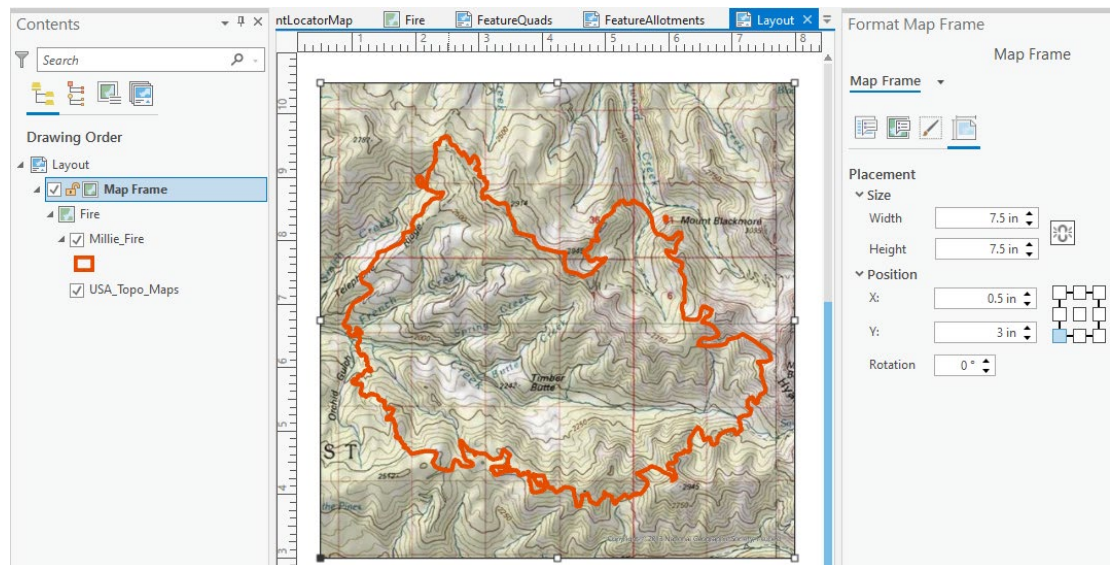
- c. On the **Insert** tab (**Map Frames** group), click the **Map Frame** menu then select the **Fire -Default Extent** map.
 - d. Left click and drag the cursor on the layout page to **create the approximate map frame**.
 - e. Right click the Millie Fire and select **Zoom to Layer**.

- f. Right click on the Map Frame and select **Properties** to open the **Format Map Frame** pane.

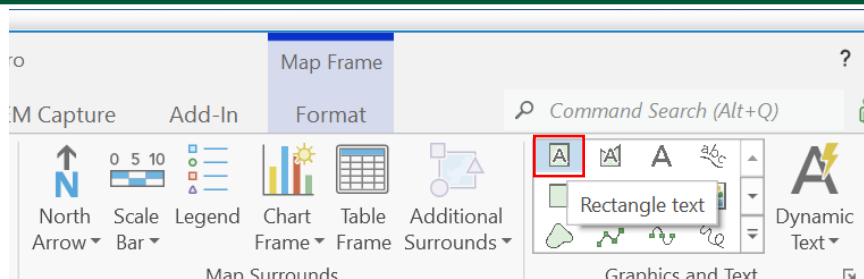


- g. Click the Placement tab and use the following settings:

- Width = **7.5 in**
- Height = **7.5 in**
- X position = **0.5 in**
- Y position = **3 in**



3. Add Map Elements from the Insert tab – Map Surrounds group
- On the **Insert** tab (**Map Surrounds** group) select a **North Arrow**. Draw a small box to add to the lower center of the layout.
 - Add a **Scale Bar**. Clicking the button gives you the default scalebar, clicking the down arrow lets you choose the scalebar style. Draw a box at the bottom center of the layout.
 - Click to add the **Legend 1**. Draw a box in the lower right side of the map.
 - On the **Insert** tab (**Graphics and Text** group) click the **Rectangle text** button.



- e. Create a text box below the map frame to **enter a title** for the map. Type “**Millie Fire**”.
- f. The Format Text pane should open automatically so you can click **Text Symbol** and **Appearance** to **make the text size 20 and centered**. Click **Apply**.
- g. You can arrange the elements on your own or use the example below.



Part 2: Setup Grid Index Layer

1. Create a grid index layer

Grid Index Layers can be used to tile an area of interest into various groups to create a map series, or to segment a map so that it can be assembled into a larger wall map. The latter would be useful if you didn't have access to a plotter and needed a larger map.

- a. On the Geoprocessing pane (Analysis tab, Tools button) search for **Grid Index Features** then open that tool.
- b. Name the output file **MillieFireGrid**. (It will save automatically to the default gdb ...\\ArcGISProMapSeries\\Data\\Pro_MapSeriesProject\\Pro_MapSeriesProject.gdb)
- c. Select **Millie_Fire** layer as the Input Feature.

HINT: You can either hit the dropdown to add a layer from the Map, or drag and drop layers from the Contents pane into a tool dialog box to enter them into the parameter fields.

- d. Number of Rows: **2**
- e. Number of Columns: **2**

The screenshot shows the 'Grid Index Features' tool in the Geoprocessing pane. The 'Parameters' tab is selected. The 'Output Feature Class' is 'MillieFireGrid'. The 'Input Features' dropdown is set to 'Millie_Fire'. The 'Generate Polygon Grid that intersects input feature layers or datasets' checkbox is checked. The 'Use Page Unit and Scale' checkbox is unchecked. The 'Polygon Width' is '4.19380004383691E-02' and the 'Polygon Height' is '0.036262985598301', both in 'Decimal Degrees'. The 'Polygon Grid Origin Coordinate' is 'X: 490537.0255, Y: 5026221.7968'. The 'Number of Rows' is '2' and the 'Number of Columns' is '2', both highlighted with a red box. The 'Starting Page Number' is '1'. The 'Start labeling from the Origin' checkbox is unchecked.

- f. Click **Run**.

2. Adjust the new grid index layer symbology

- a. In the Contents pane, right-click the **MillieFireGrid** layer then select **Symbology**.
- b. In the Format Polygon Symbol pane Properties tab, set the Outline width to **2 pt** and the Outline color to **Black**. Click Apply.

- c. Right-click the **MillieFireGrid** layer again and click **Zoom to Layer**.



Part 3: Setup Map Series

Now that you have built the grid index layer, it is time to setup the Map Series. The Map Series operation will make a different map from each cell created in the grid index layer.

1. Setup Map Series

- a. On the **Layout** tab (**Page Setup** group) select **Map Series** and then select **Spatial**.
- b. Enter the following parameters in the **Index Layer** section:
 - Map Frame: **Map Frame**
 - Layer: **MillieFireGrid**
 - Name Field: **PageName**
 - Sort Field: **PageNumber**

Layout Properties

General
Metadata
Page Setup
Map Series
Color Management

Enable ☒ [Help with map series](#)

Spatial
Define a series of pages that span a range of map extents.

▼ **Index Layer**

Map frame

Layer

Name Field

Sort Field

☒ Sort Ascending

- c. Expand the **Map Extent** section.
- d. Choose **Center and Maintain Current Scale** and set the scale to **1:26,000**

Layout Properties

General
Metadata
Page Setup
Map Series
Color Management

Enable ☒ [Help with map series](#)

Spatial
Define a series of pages that span a range of map extents.

► **Optional Fields**

▼ **Map Extent**

☐ Best Fit Extent

Margin Size

Round scale to nearest

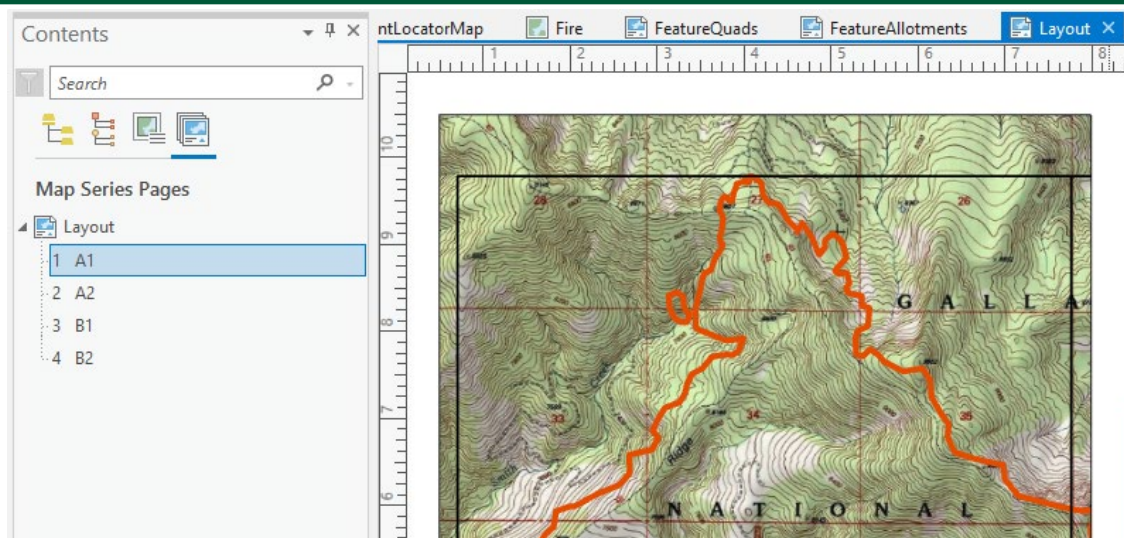
☒ Center and Maintain Scale

Scale

- e. Click **OK**.

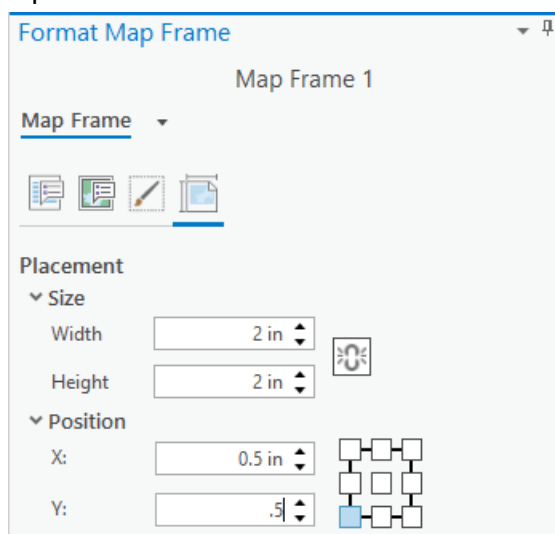
2. Examine the Map Series pages

- a. In the **Contents**, click the **List Map Series Pages** tab.
- b. Look at each of the 4 pages.



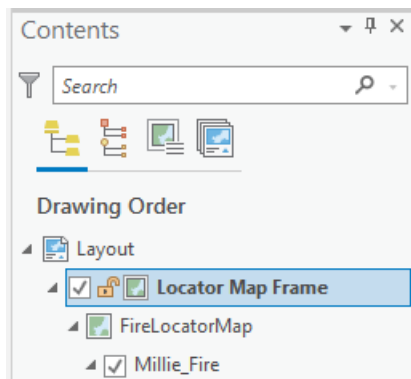
Part 4: Setup a Locator Data Frame

1. Add a locator data frame
 - a. On the Insert menu (Map Frames group) select Map Frame then choose **FireLocatorMap - Default Extent** map frame.
 - c. Create the locator data frame in the bottom left corner of the layout.
 - d. Right-click the new frame then click **Properties**.
 - e. In the **Format Map Frame** pane, placement tab, use the following settings:
 - Width = **2 in**
 - Height = **2 in**
 - X position = **0.5 in**
 - Y position = **0.5 in**



2. Format Locator Map

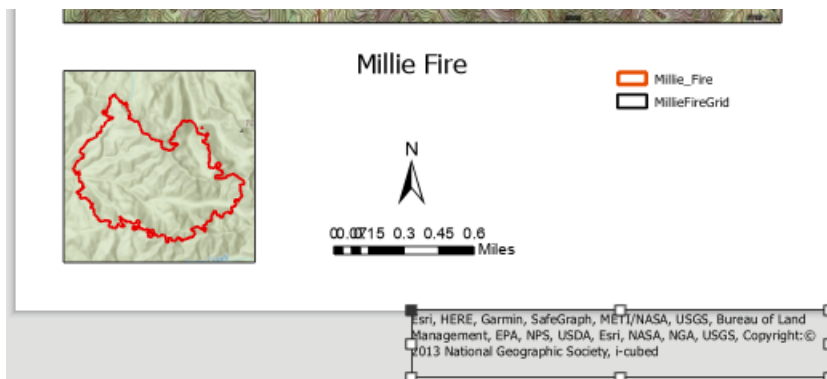
- a. Change the map frame name to **Locator Map Frame** in the Contents pane



- b. In the Contents pane, Locator Map Frame, expand the FireLocatorMap. **Right click on the MillieFire layer** and click **Zoom to Layer**.

3. Remove the Basemap credits

- a. Select the **Locator Map Frame**.
- b. Click the Insert tab and click **Dynamic Text**.
- c. Scroll down to the Layout group and **select Service Layer Credits**.
- d. Scroll down the Layout to the empty space off the Layout page and **draw a box to insert the text**.



4. Copy the MillieFireGrid to the Locator map

- a. If necessary, expand the **Map Frame** in the Contents pane. Right click the **MillieFireGrid** layer and select **Copy**.
- b. Right click on the **FireLocatorMap** in the Locator Map Frame section of the Contents pane and click **Paste**.

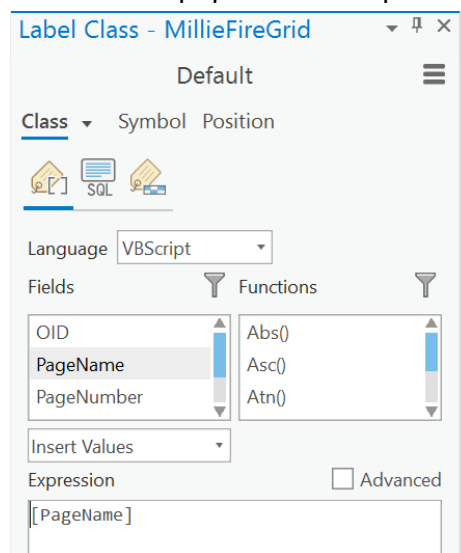
5. Add Extent Indicator.

- Make sure the **Locator Map Frame** is selected in the Contents pane.
- Click the **Insert** ribbon tab (**Map Frames** group), click **Extent Indicator** then select **Map Frame**.
- In the **Format Extent Indicator** pane that appears, change the **Symbol** color to **Solar yellow** and **2pt**.



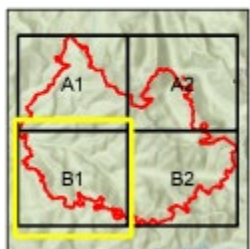
The extent indicator will add a yellow box to the Locator data frame, highlighting the part of the grid that is being shown on the current data driven page.

- Add Labels to the Grid.
 - Right click on the **MillieFireGrid** layer in the **Locator Map Frame** and select **Label**.
 - Then right click MillieFireGrid again select **Labeling Properties**.
 - In the **Label Class** pane make sure the language is **VBScript**.
 - Click in the Expression box and erase the [Id] then **double click [PageName]** in the **Fields** box to populate the Expression box.



The “PageName” is a field that is added by the Grid Index Features tool. Also, a “PageNumber” field is included, which can also be used for labeling purposes. If you don’t see these fields listed you might need to save the project, close it, then reopen.

- e. In the **Symbol** group set the font **12 pt** and colored **Black**. Click Apply.



Part 5: Add Dynamic Text (Date and Time)

1. Add dynamic text—Date

- a. On the **Insert** tab (**Graphics and Text** group) go to **Dynamic Text**, scroll down to the **System** group, then click “**Current Time**”.
- b. Create the text box underneath the Legend.



Millie_Fire

MillieFireGrid

Current Time: 5/3/2022 11:00 AM

Adding the date and time as dynamic text to maps can be very important, especially if those maps are likely to be updated often. Map Series allows for quick rebuilding of maps after updates and the dynamic text will maintain the current time and date information.

Part 6: Calculate Adjacent Fields Tool

You need to add one more set of dynamic text. In a map, such as this, where multiple pages constitute a much larger connective map, it is necessary to acknowledge which pages neighbor each other. However, fields with adjacent page data do not currently exist in the

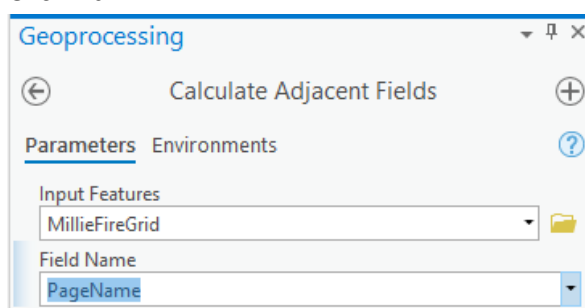
grid index layer. You will use the Calculate Adjacent Fields Tool to add fields in the grid index layer to reflect those neighboring relationships.

1. Run the Calculate Adjacent Fields Tool

- a. Open the Geoprocessing pane, search for and open the **Calculate Adjacent Fields** tool.

The Calculate Adjacent Fields Tool does not create a new layer. It only adds several fields to the attribute table of the existing grid index file.

- b. Input Features: **MillieFireGrid**
- c. Field Name: **Page Name**
- d. Click **Run**.



2. Inspect the MillieFireGrid layer attribute table

- a. In the Contents pane, main Map Frame, right-click the **MillieFireGrid** layer then click **Attribute Table**.
- b. Notice that several fields have been added (*outlined in red box below*), named with cardinal directions, showing which pages fall in various directions in respect to each page.

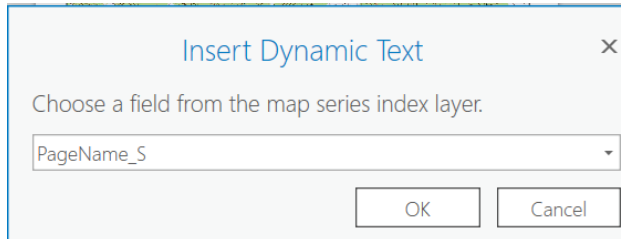
milliefiregrid					
Field:	Add	Calculate	Selection: Select By Attributes		
	Zoom To	Switch	Clear	Delete	Copy
	PageName_NW	PageName_N	PageName_NE	PageName_W	PageName_E
191					A2
311				A1	
191		A1	A2		B2
311	A1	A2		B1	

- c. **Close** the attribute table.

Part 7: Add Dynamic Text (Neighboring Pages)

1. Add dynamic text—Neighboring Pages

- On the **Insert** tab (**Graphics and Text** group) click **Dynamic Text**, scroll down to the **Map Series** group and click **Attribute**.
- Choose **PageName_S** from the menu.
- Click **OK**.



- Create the text box at the bottom center of the Fire Map frame.
- Double click on the text box to open the **Format Text** pane.
- In the **Text Symbol** group use the following settings:
 - Font: Arial, Bold, Size 18
 - Color: Ultra Blue (Hint: 10th column, 5th row in color palette)
 - Position (Horizontal Alignment): Center Justified



- Click **Apply**

2. Align the page name text to the center of the page.

- Right click the text box then go to **Align, Align to Page**, select **Align Center**.



Millie Fire



3. Add the remaining Neighboring Page Text

- Use the preceding instructions to place text boxes for **PageName_N**, **PageName_W**, and **PageName_E** on the north, west, and east sides of the map, respectively.
- Manually align the text boxes in the center of each side of the Map frame.
- Refresh** the Map Series.

The text boxes will change for each map in the series. Some of the text boxes will be empty, depending on the map and its location in the MillieFireGrid.

4. Rotate Dynamic Text

- a. In the A1 Map, right click on the East (right side) text box then go to **Rotate or Flip** and choose **Rotate Left 90**. Adjust the textbox location to fall on the inside of the MillieFireGrid.



- b. Repeat this process for the western text box except choose **Rotate Right 90**.

If one of the text boxes to be rotated is blank, you can use the Select tool to drag a box around the area where the text box resides to select it. You will see a dotted cyan line appear outlining the box. You can right click on the dotted line to get the proper context menu.

- c. **Refresh the Map Series** pages again.

Holding down the shift key while using the arrow keys to move a text box around allows for smaller, nudging, movements that are often more useful for precise positioning.

5. Scroll through Dynamic Pages

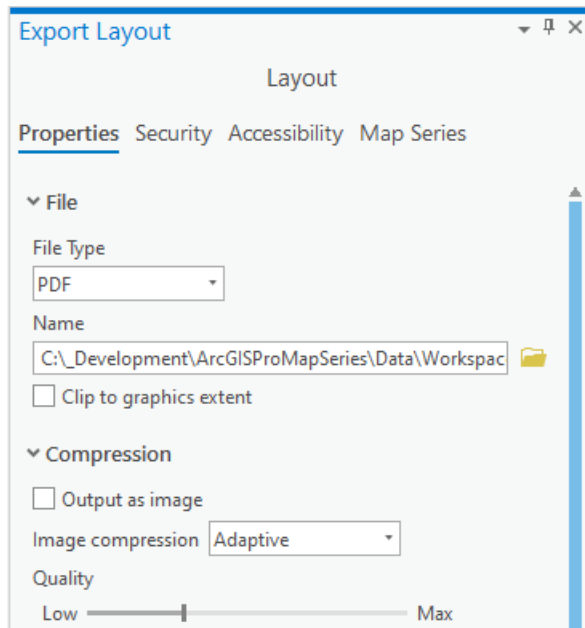
- a. On the Contents pane, go to the **List Map Series Pages** tab to examine the map pages. *(Pay attention to the changing text for the neighboring map pages and adjust the location as necessary.)*

Part 8: Export Grid Index Map Pages

1. Export All Map Pages

- a. Go to the **Share** tab (**Output** group) and click the **Export Layout** button.
- b. In the Export pane, set the File Type to **PDF**.

- c. In the Name field, navigate to your ...\\ArcGISProMapSeries\\Data\\Workspace folder then name the file **MillieFireMapbook.pdf**
- d. In the Compression group, set the **Quality** slider to **30**.



- e. Click the **Map Series** tab.
- f. Choose **All (4 pages)**.
- g. Set the Files to **Single PDF Files**.
- h. Click **Export**.
- i. **Click View Exported File** at the bottom of the Export Layout pane to examine the outputs.



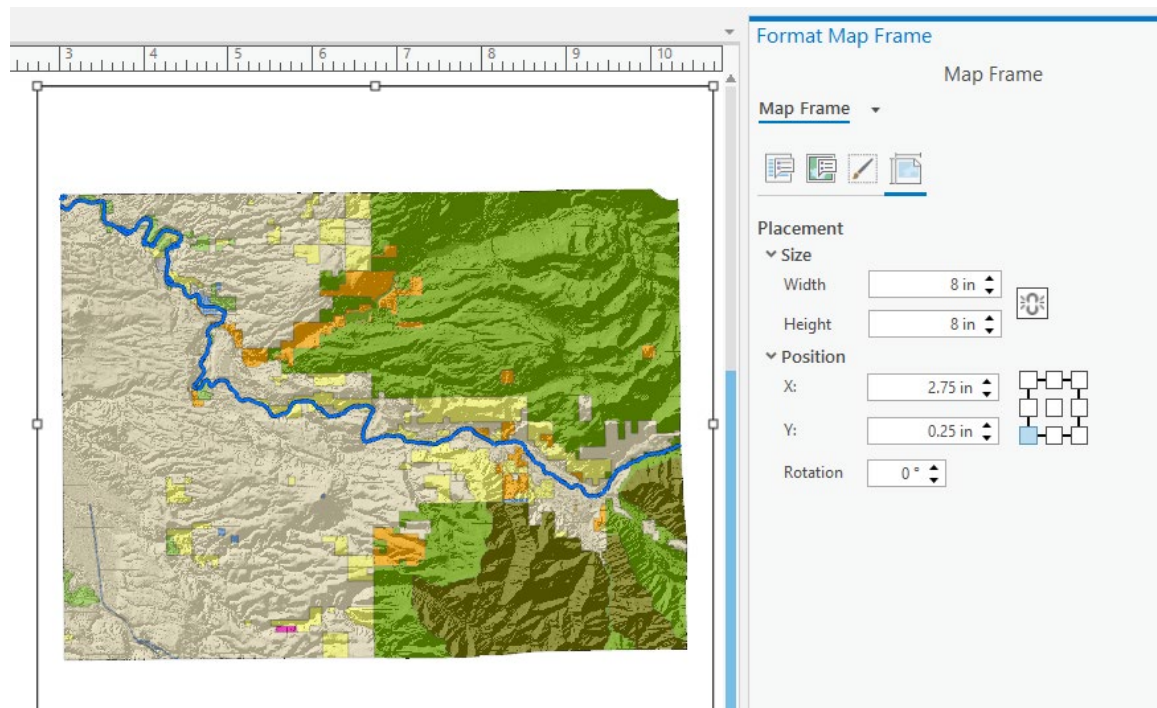
In a real project, once you get your map series exactly the way you want it, you can up the Quality of the PDF. Note that the higher the Quality, the longer it will take to generate the final product.

Part 9: Create a Strip Map Index Layer

A biologist has asked you to create detailed maps of a group of the Sandy River, including ownership information as part of the planning process of a new riparian restoration project. You will use Map Series to create a map series with map pages covering the area of interest.

1. Open the **River** map from the Maps folder in the Catalog Pane

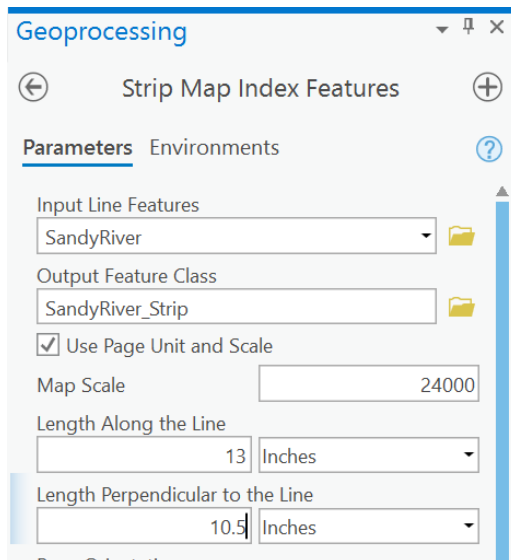
- On the **Insert** tab click **New Layout**.
- In the **ANSI – Landscape** group choose **Letter 8.5" x 11"**.
- On the **Insert** tab (**Project** group) click **Map Frame** then select the **River – Default Extent**. Draw a box on the Layout.
- If necessary, right click the Map Frame and select Properties to open the **Format Map Frame** pane. Click the Placement tab and use the following settings:
 - Width = **8 in**
 - Height = **8 in**
 - X position = **2.75 in**
 - Y position = **0.25 in**



2. Build a Strip Map Index Layer

- On the Geoprocessing pane, search for the **Strip Map Index Features Tool** and open it.
- Use the following parameters:
 - Input Line Features: **SandyRiver** layer
 - Click the file folder and navigate to create the Output Feature Class:
...\\ArcGISProMapSeries\\Data\\Workspace\\Results.gdb\\SandyRiverStrip
 - Enable **"Use Page Unit and Scale"** checkbox
 - Map Scale: **24000**
 - Length Along the Line: **13 inches**

- Length Perpendicular to the Line: **10.5 inches**
- Leave the other parameters as default.



- c. Click **Run**.

It may take a moment for the Strip Map Index Features Tool to run. Once finished, you will see the new index layer (SandyRiver_Strip) added to the Contents pane and appear in the Map.

3. Symbolize the layer

- a. In the Contents pane, right click the **SandyRiver_Strip** layer then click **Symbolology**
- b. In the Format Polygon Symbol pane (Properties tab) set the follow parameters:
 - Color: **No Color**
 - Outline Width: **1**
 - Outline Color: **Black**
- c. Click **Apply**.

Notice the overlap between the polygons that were generated along the river. The amount of overlap is another option that can be controlled within the Strip Map Index Features tool parameters.

Part 10: Setup up Map Series

1. Setup Map Series

- a. On the **Layout** tab (**Page Setup** group) click **Map Series** then click **Spatial**.
- b. Enter the following parameters:
 - Map Frame: **Map Frame**
 - Layer: **SandyRiver_Strip**
 - Name Field: **PageNumber**
 - Sort Field: **PageNumber**
 - Rotation (Optional Fields section): **Angle**

The angle field is added during the strip map index features process. It provides the proper angle of rotation to align the data frame to the page either horizontally or vertically. You can see if the rotation is working by adding a North Arrow in layout view. If the data frame is being rotated, the North arrow will be rotated to reflect true north.

- c. In the Map Extent section choose “**Center and Maintain Current Scale**” and set it to **1:35,000**.

Layout Properties

General
Metadata
Page Setup
Map Series
Color Management

Enable ☒ [Help with map series](#)

Spatial
Define a series of pages that span a range of map extents.

▼ **Index Layer**

Map frame: Map Frame ▼

Layer: SandyRiver_Strip ▼

Name Field: PageNumber ▼

Sort Field: PageNumber ▼

☒ Sort Ascending

▼ **Optional Fields**

Group By: <None> ▼

Page Number: <None> ▼

First Page: 1 ▼

Rotation: Angle ▼

Spatial Reference: <None> ▼

▼ **Map Extent**

☐ Best Fit Extent

Margin Size: 10 ▼ Percent ▼

Round scale to nearest: 1000 ▼

☒ Center and Maintain Scale

Scale: 35000 ▼

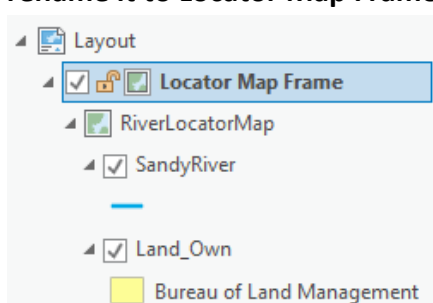
- d. Click **OK**.

Part 11: Manage the Strip Map

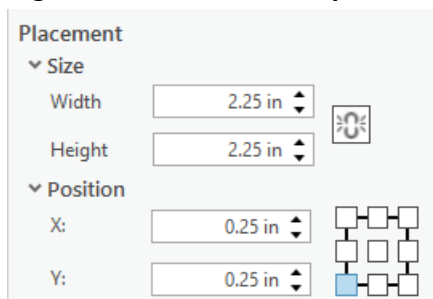
In addition to setting up Map Series, the map page layout must be set up with the proper components to meet your map requirements.

1. Add a Locator Data Frame

- On the **Insert** tab (**Map Frames** group) click **Map Frame** then select the **RiverLocatorMap – Default Extent**.
- Create the locator data frame in the bottom left corner of the Layout view and **rename it to Locator Map Frame**.



- Right click and **select Properties**. Set the size and placement as shown below.



- In the Contents pane, in the main Map Frame, right click and **Copy the SandyRiver_Strip layer**.
- Right click to **Paste the SandyRiver_Strip** to the RiverLocatorMap in the Locator Map Frame.

2. Set up extent indicators in the Locator Map Frame

- In the **Contents** pane, click the **Locator Map Frame** to select it.
- On the **Insert** ribbon (**Map Frames** group) click **Extent Indicator** then select **Map Frame**.
- In the **Format Extent Indicator** pane set the following parameters:
 - Click the box next to **Symbol** then change Outline color to **red**.
 - Change to Outline width to **2 pt**.

- Click **Apply**. (You can Activate the map frame to zoom in as desired).



3. Add a title to the map

- On the **Insert** ribbon (**Graphics and Text** group) click the **Rectangle Text** button.
- Create the text box** for the title in the upper left corner of the page.
- Enter **“Sandy River Complex”** for the title.
- In the **Format Text** pane, in the **Text Symbol** group, set following parameters:
 - Font name: **Arial**
 - Font Style: **Bold**
 - Size: **16 pt**
 - Position (Horizontal Alignment): **Center Justified**
 - Click **Apply**

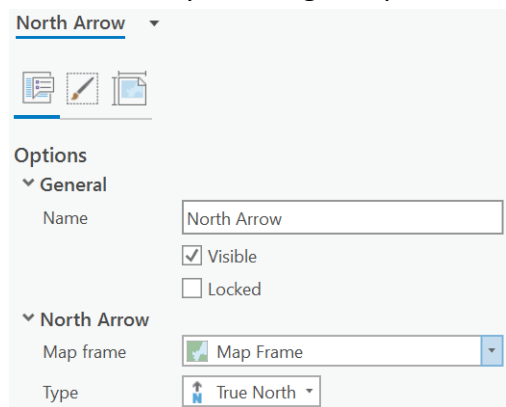
4. Add a page count dynamic text box

- On the **Insert** tab (**Graphics and Text** group), click **Dynamic Text**, then click **“Page with Count”** (**Map Series** group).
- Create the text box under the map title.
 - Font size: **14 pt**
 - Position (Horizontal Alignment): **Center Justified**

5. Add a North Arrow

- On the **Insert** tab (**Map Surrounds** group), select a **North Arrow** and place it below the page count text box.
- Right click on the North Arrow to show the Properties pane. Make sure that you are showing the properties for the main Map Frame (not the Locator Map), so that it

will rotate as you change Maps in the Series.

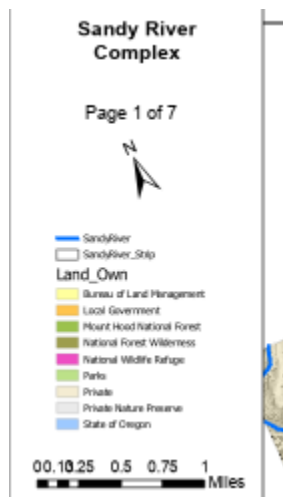


6. Add a Legend

- Click the **Legend** button and place the legend below the north arrow.
- Expand the Legend in the Contents pane and **uncheck the Hillshade layer** so that only the SandyRiver and Land_Own layers are showing in the legend.

7. Add a scalebar

- Select a **Scale Bar** and place it just below the legend.



8. Add dynamic text—adjacent page numbers

When you run the Grid Index Features tool, you still must run the Calculate Adjacent Fields tool in order to create fields with neighboring page names. However, the Strip Map Index Features tool will automatically include fields with neighboring page names.

- a. Go to **Insert tab (Graphics and Text group)** and click **Dynamic Text** then in the Map Series group select **Attribute**.
- b. Choose **LeftPage** from the Index layer field list and click **OK**.
- c. **Create the text box** in the middle of the left side of the main map (it will be blank if you are on the first map).
- d. In the Format Text pane (Text Symbol tab) set the following parameters:
 - Font: **Arial**
 - Color: **Poinsetta Red** (*Hint: 2nd column, 4th row in color palette*)
 - Size: **24**
 - In the Position section set the Horizontal Alignment to **Left**.
- e. Click **Apply**.
- f. Page 2 will look like the screengrab below.



If you are on page 1 there will be no value in this text box because there is no page to the left of page 1. Likewise, there will be no value on the right side text box of page 7.

- g. Create a text box on the right side of the map for the **RightPage** attribute using the same formatting as above except align to the right.
9. Refresh the Map Series
 - a. On the **Layout tab (Page Setup group)** click the **Refresh Map Series** button.
 10. Examine the Map Series
 - a. Go to the **List Map Series Pages** tab and examine each of the pages.
 - b. Pay close attention to how the adjacent pages and page number dynamic text boxes change.
 - c. Also, watch the extent indicator (red box) in the locator data frame as it moves with the flip to a new page.
 - d. **Save** your project.

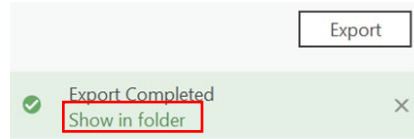
Part 12: Export Strip Map Pages

1. Export Maps

- a. Go to the **Share** tab (**Output** group) and click the **Export Layout** button.
- b. In the **Export** pane, set the File Type to **PDF**.
- c. In the **Name** field, navigate to... \ArcGISProMapSeries\Data\Workspace folder then name the file **SandyRiver_Mapbook.pdf**
- d. In the **Compression** section, set the **Quality** slider to **30**.
- e. Click the **Map Series** tab.
- f. Choose **All (7 pages)**.
- g. Set the Files to **Single PDF Files**.
- h. Click **Export**.
- i. **Save** your project.

2. View mapbook

- a. Below the Export Completed message click **Show in folder**.



-END OF EXERCISE