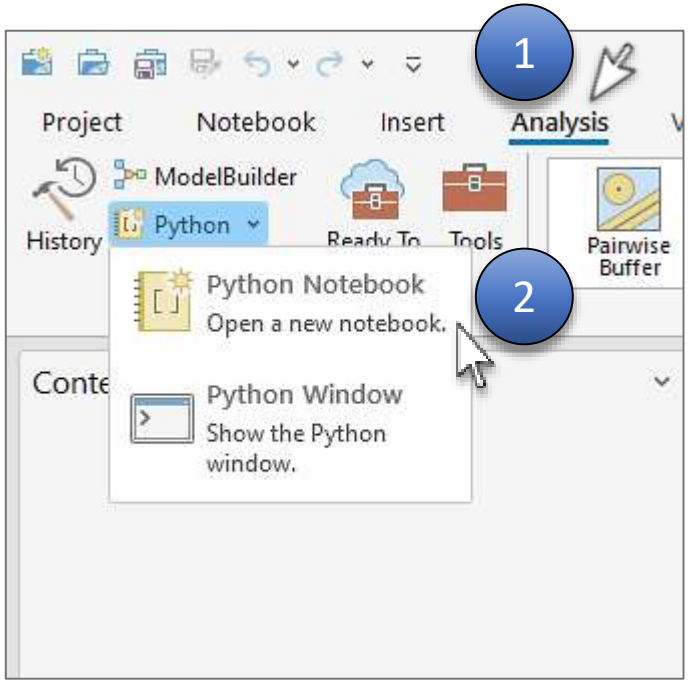
Lost in the Dark:

Prodding Your Way Through ArcPy in 'Pro with Notebooks

Or

THE TRIALS & TRIBULATIONS of David Murray, "Data Analyst/Programmer" of the ODWC Stillwater Office, in his Attemptf to drag Cartography kicking & screaming into the Century of the Concufsed Wombat.

- Identifying the Bits that **ArcPy** Recognizes
- Interacting with Those Bits
- Steering it All Towards an Intended Outcome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Python Notebook
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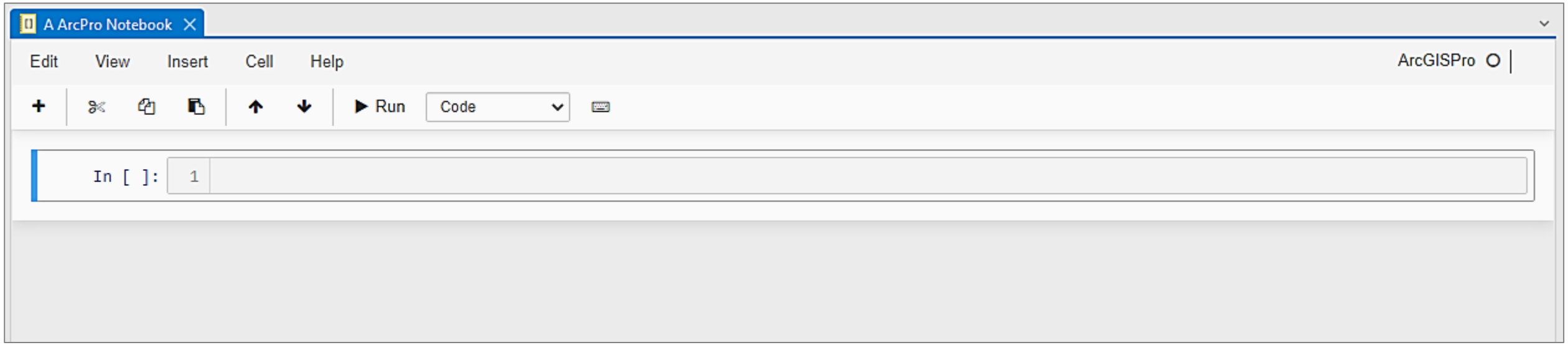
Show the Python window.


A ArcPro Notebook
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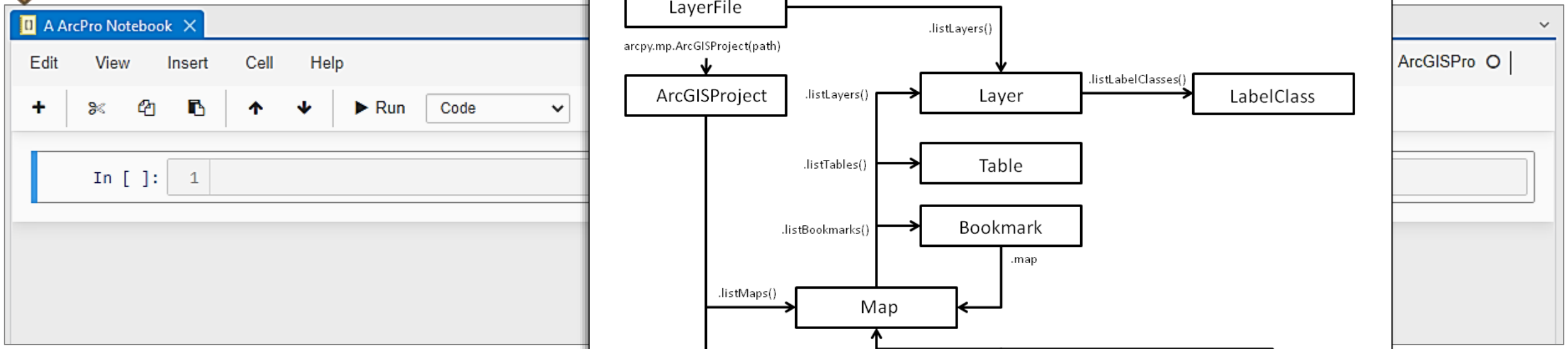
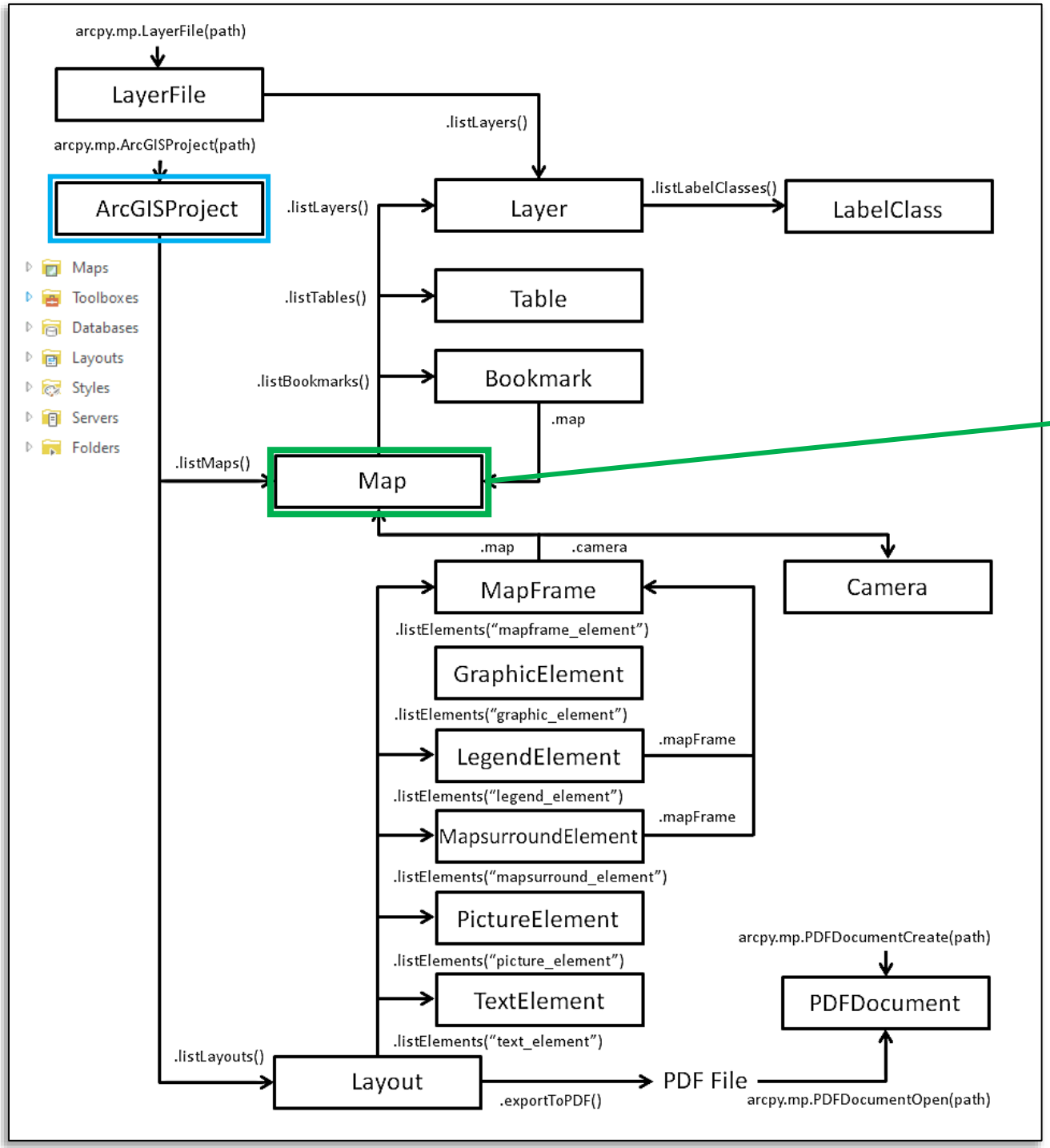
In [ ]:
1



From https://pro.arcgis.com/en/pro-app/latest/arcpy/mapping/migratingfrom10xarcpymapping.htm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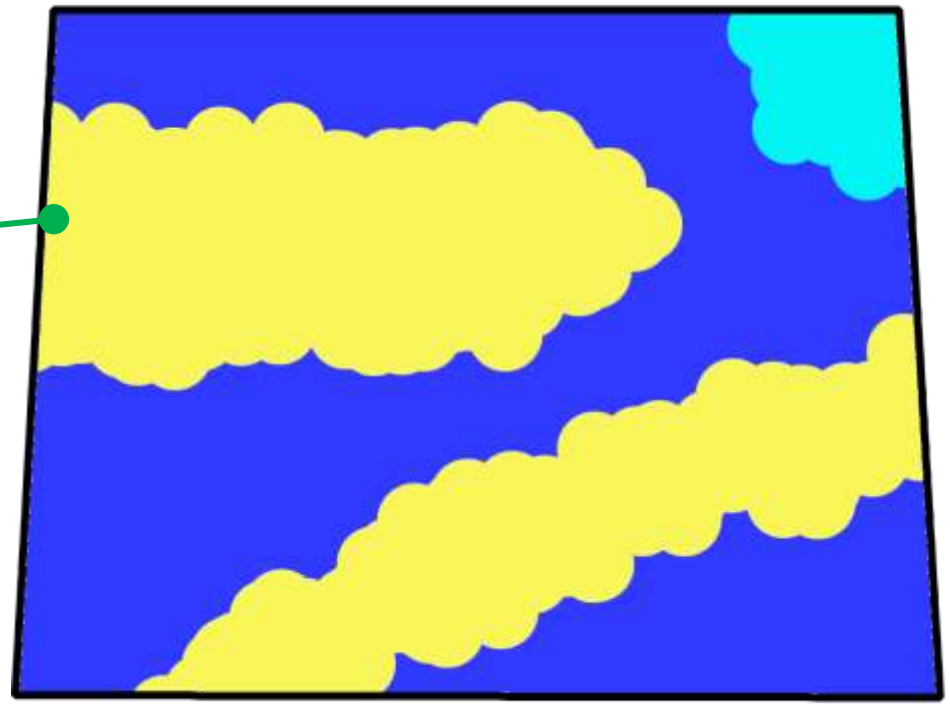

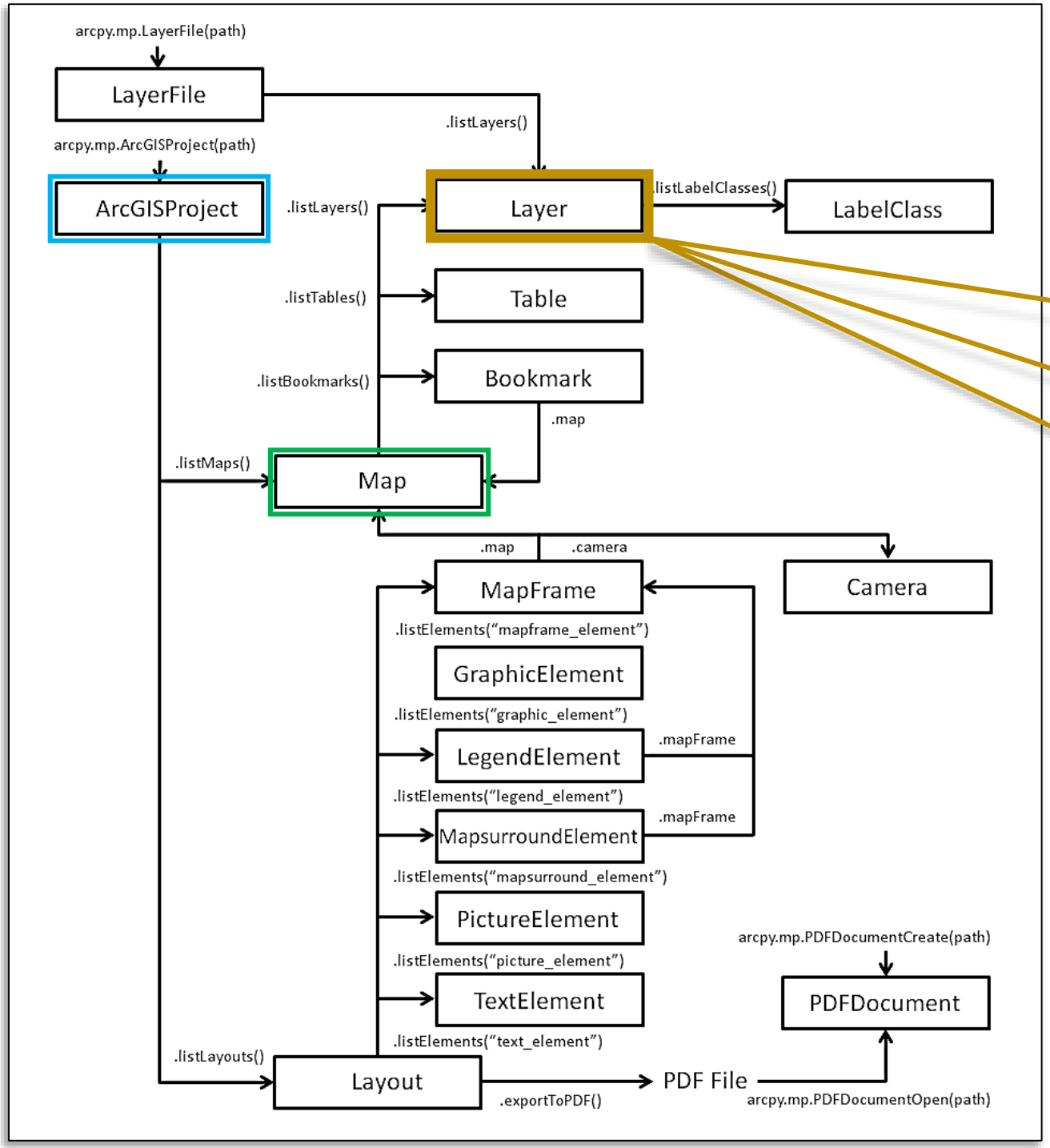
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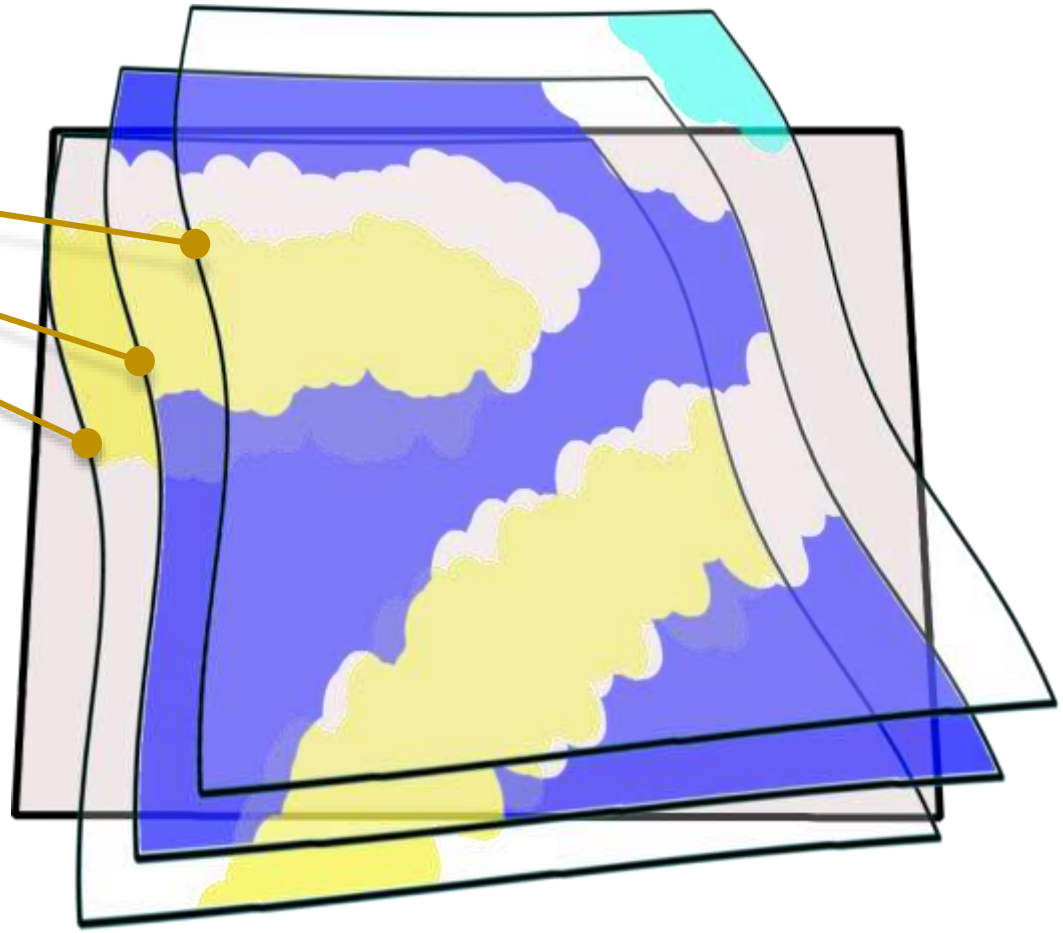

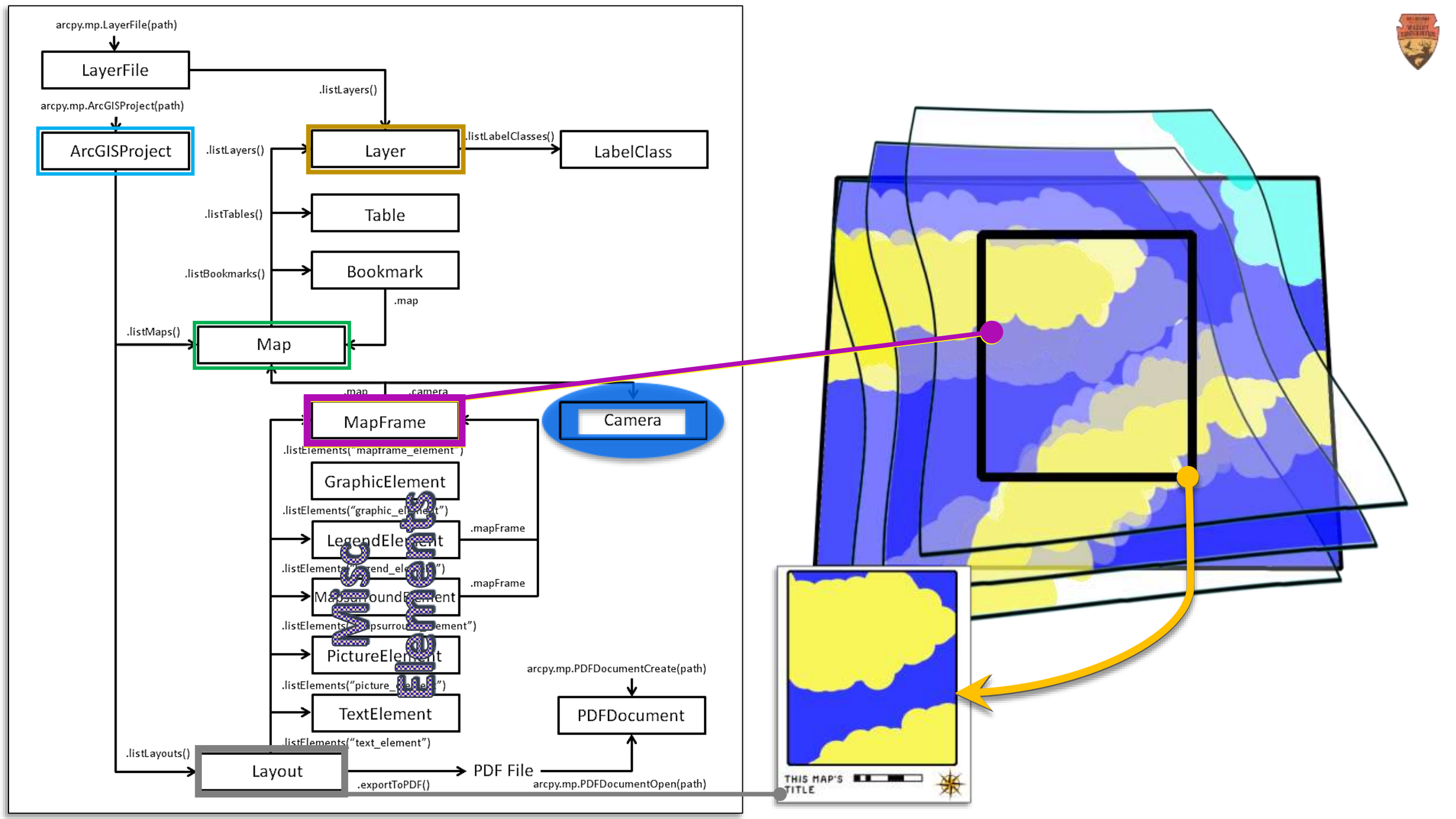
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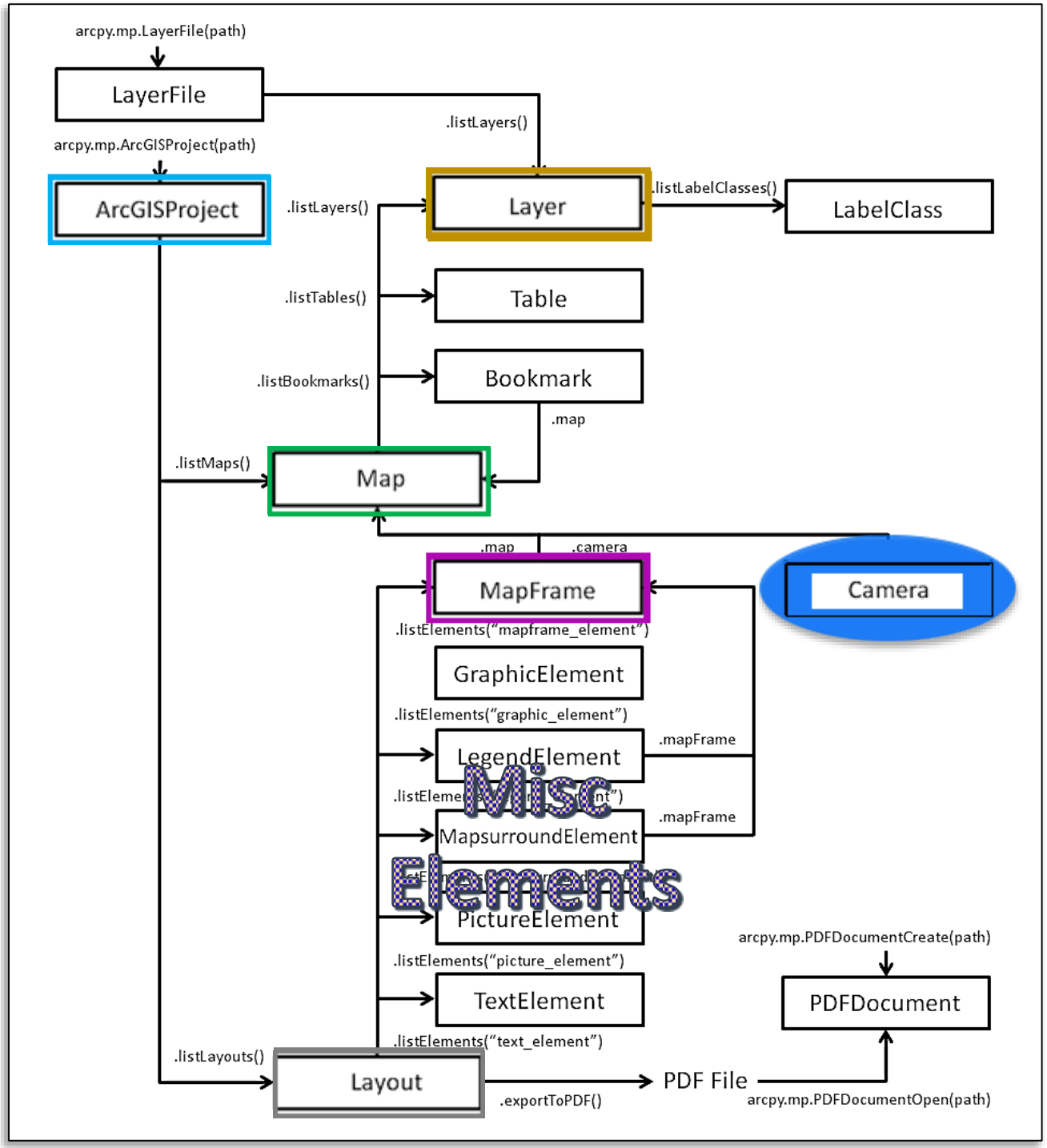
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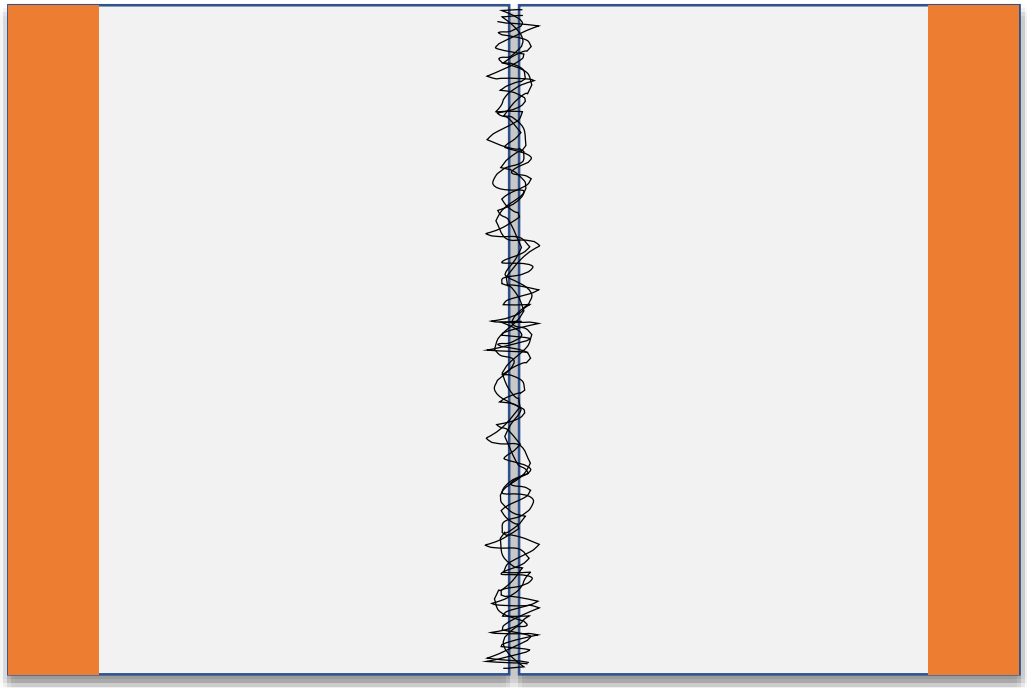

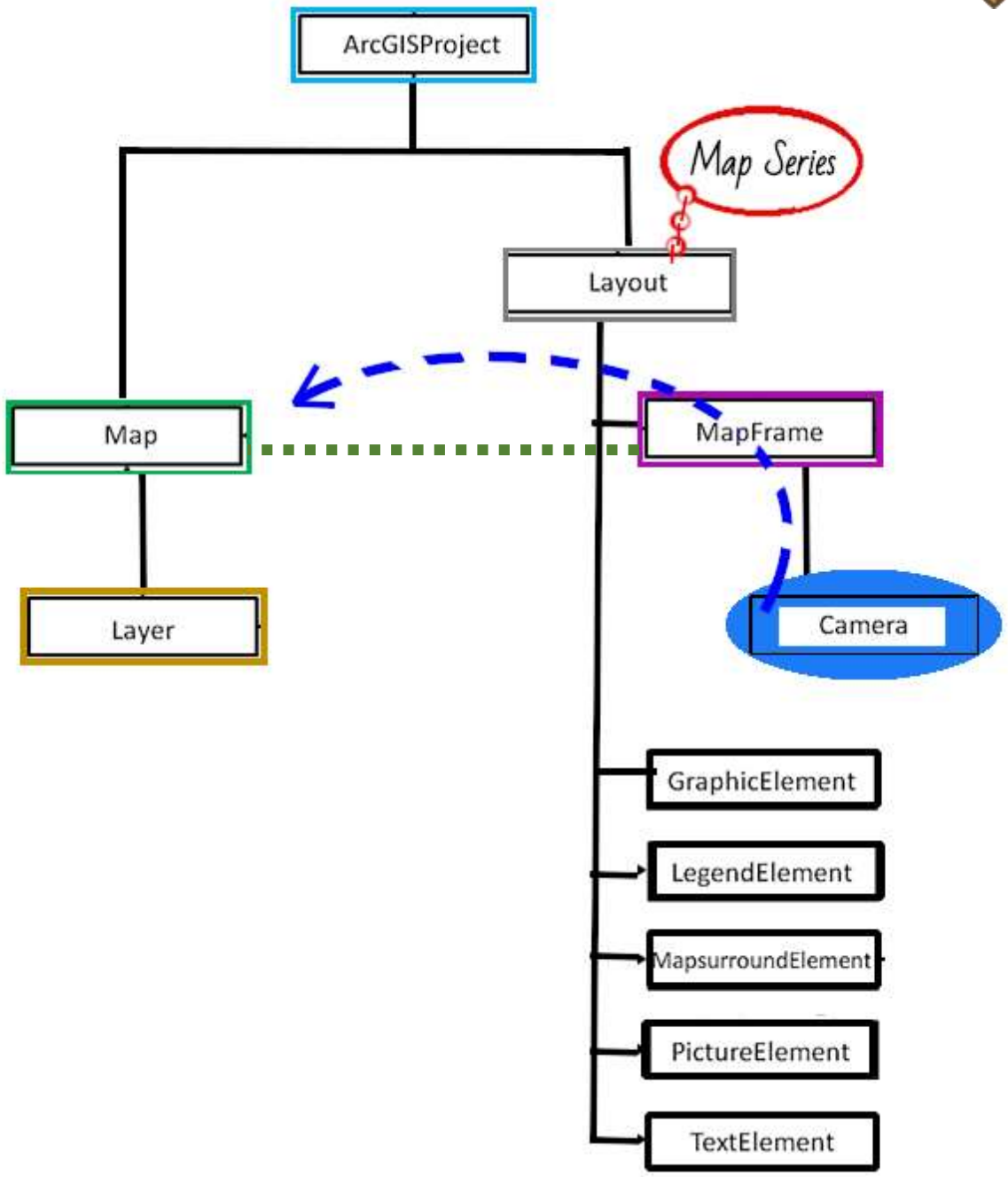
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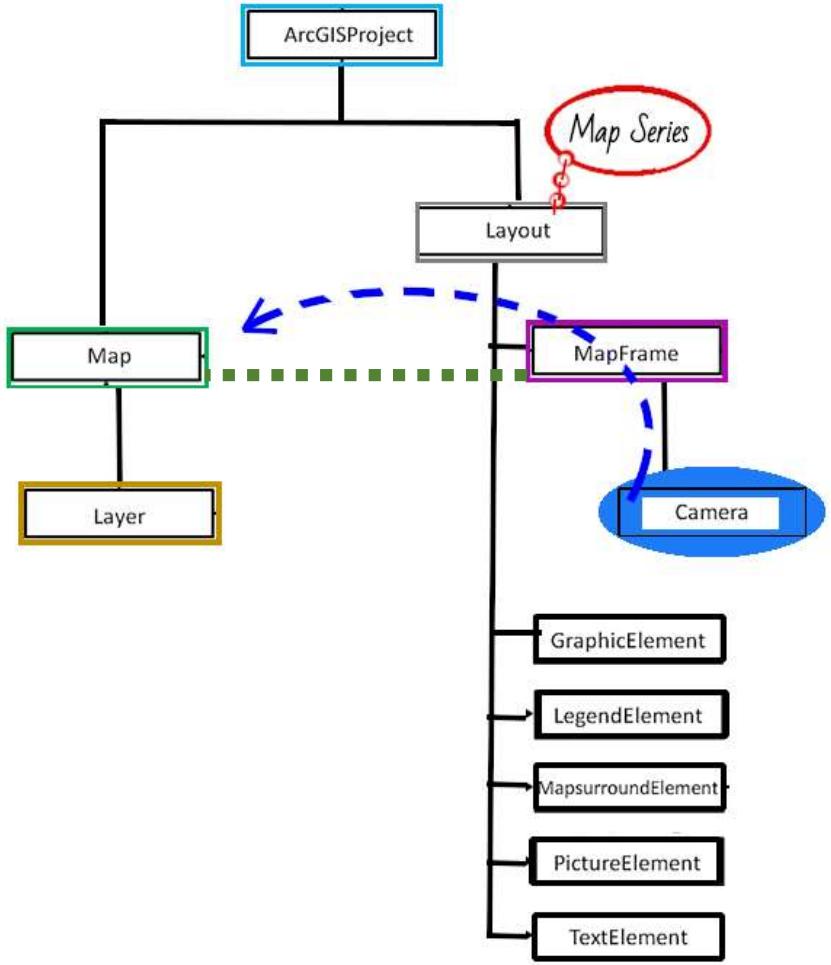
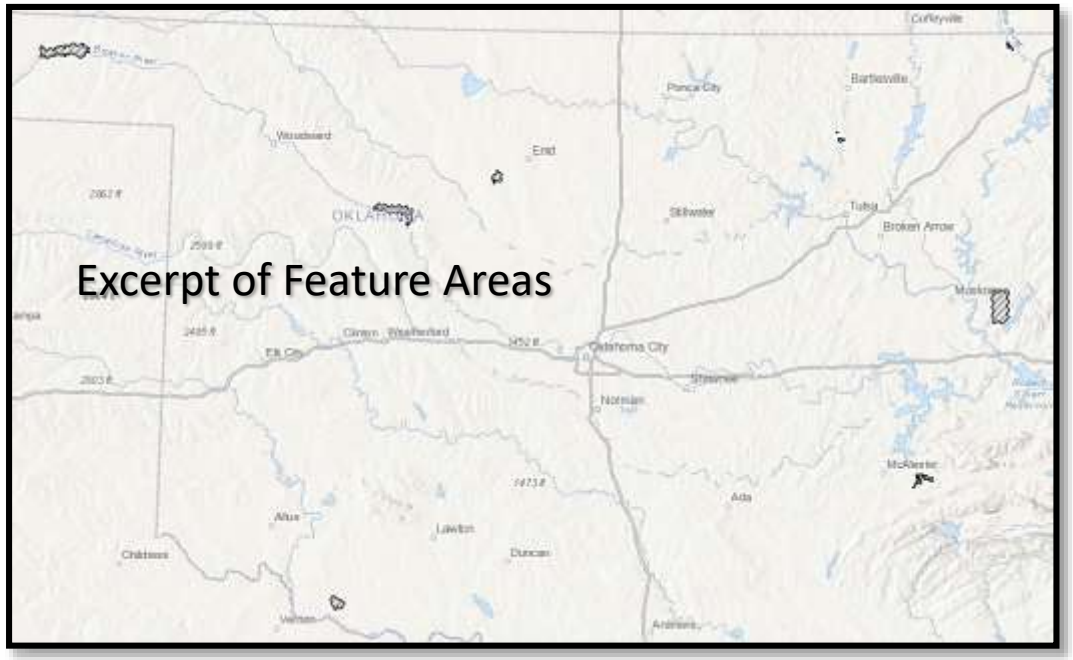
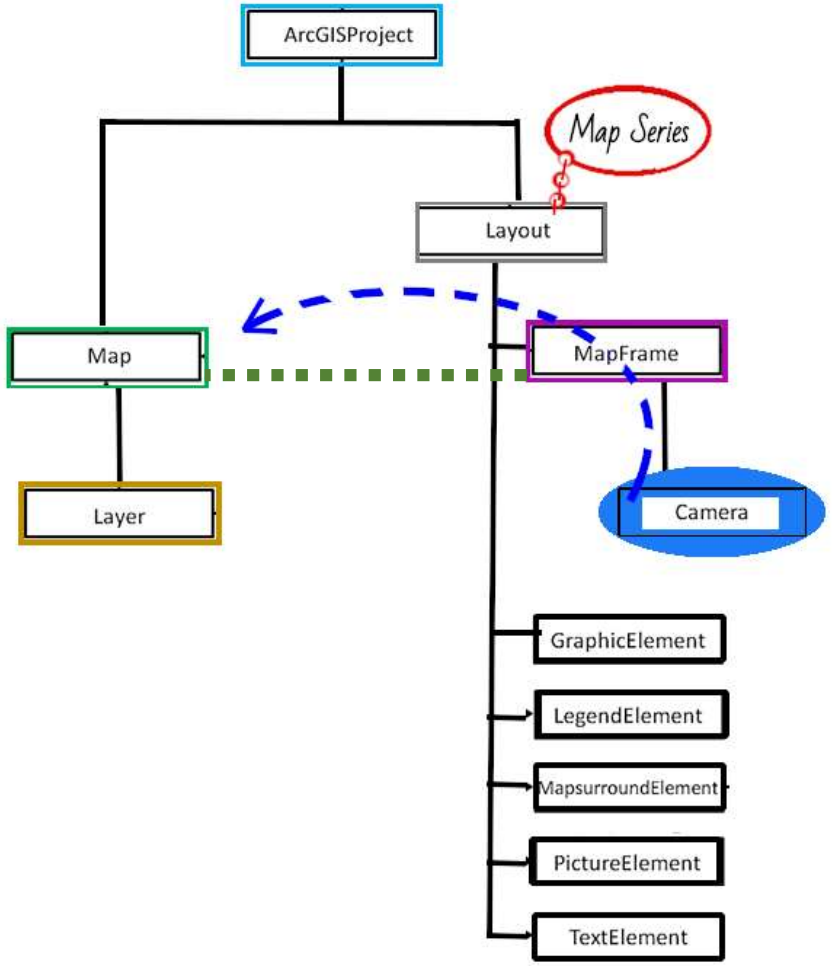


Our Map: “Example Map of Areas for SCAUG 2023”



Field: Add Calculate Selection: Select By Attributes Zoom To Switch Clear Delete Copy

	O.	Shape *	WMANAME	SHORTNAME	WMATYPE	Shape_Length	Shape_Area	Acres
1	1	Polygon	Canton Wildlife Mana...	Canton	WMA	70460.603189	71747964.912714	17729.242458
2	2	Polygon	Beaver River Wildlife...	Beaver River	WMA	82831.53729	113592432.60476	28069.187033
3	3	Polygon	Hackberry Flat Wildlife...	Hackberry Flat	WMA	28073.014008	28628643.497004	7074.263949
4	4	Polygon	Drummond Flats Wildl...	Drummond Flats	WMA	23460.751551	20110815.221094	4969.470854
5	5	Polygon	Eufaula Wildlife Mana...	Eufaula - Gaines Creek	WMA	56141.316437	19103161.866147	4720.475542
6	6	Polygon	Candy Creek Wildlife...	Candy Creek	WMA	11369.78152	2512372.819218	620.818518
7	7	Polygon	Neosho Wildlife Mana...	Neosho	WMA	13645.502478	2906320.782893	718.164443
8	8	Polygon	Cherokee Wildlife Ma...	Cherokee	WMA	48421.878726	127871886.94354	31597.79233



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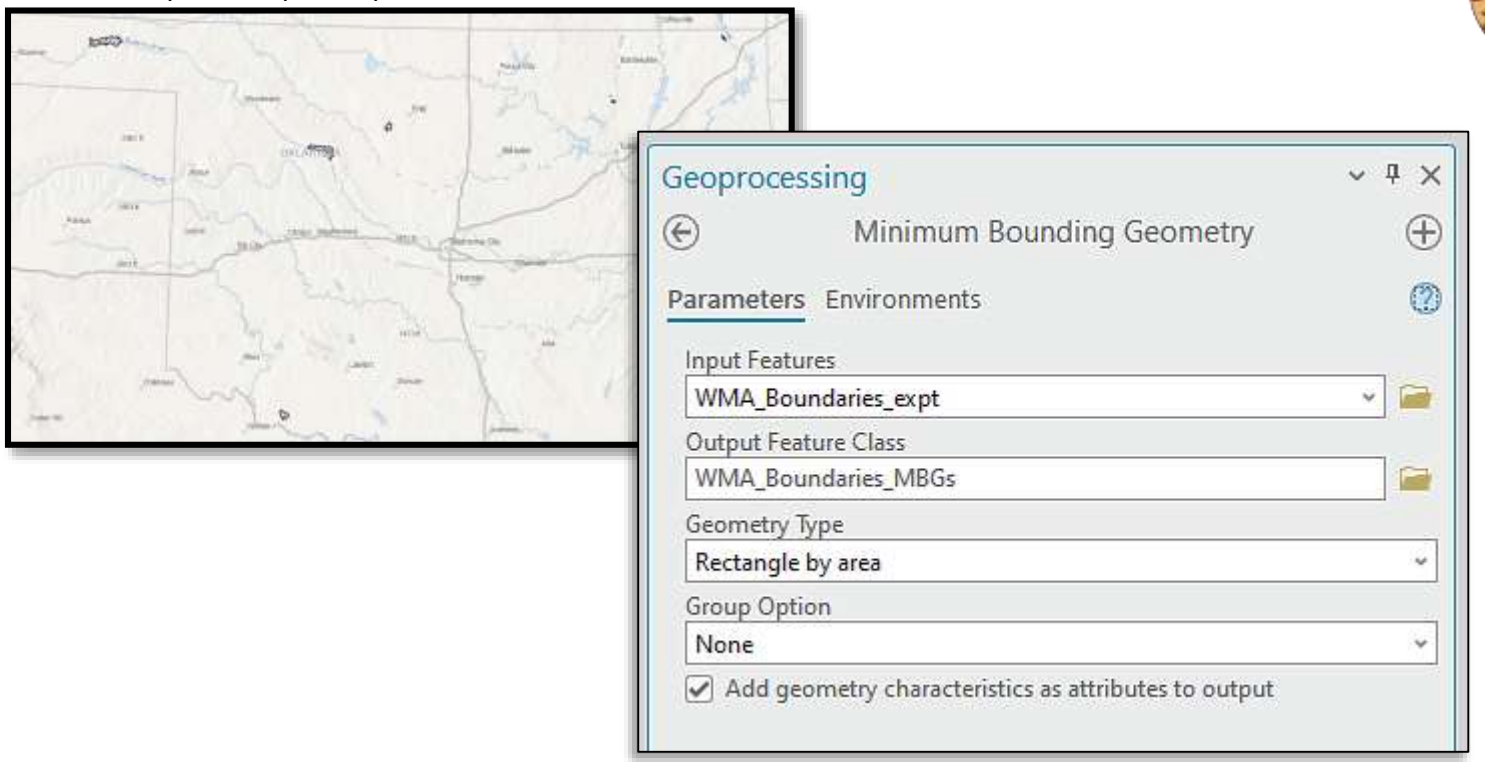
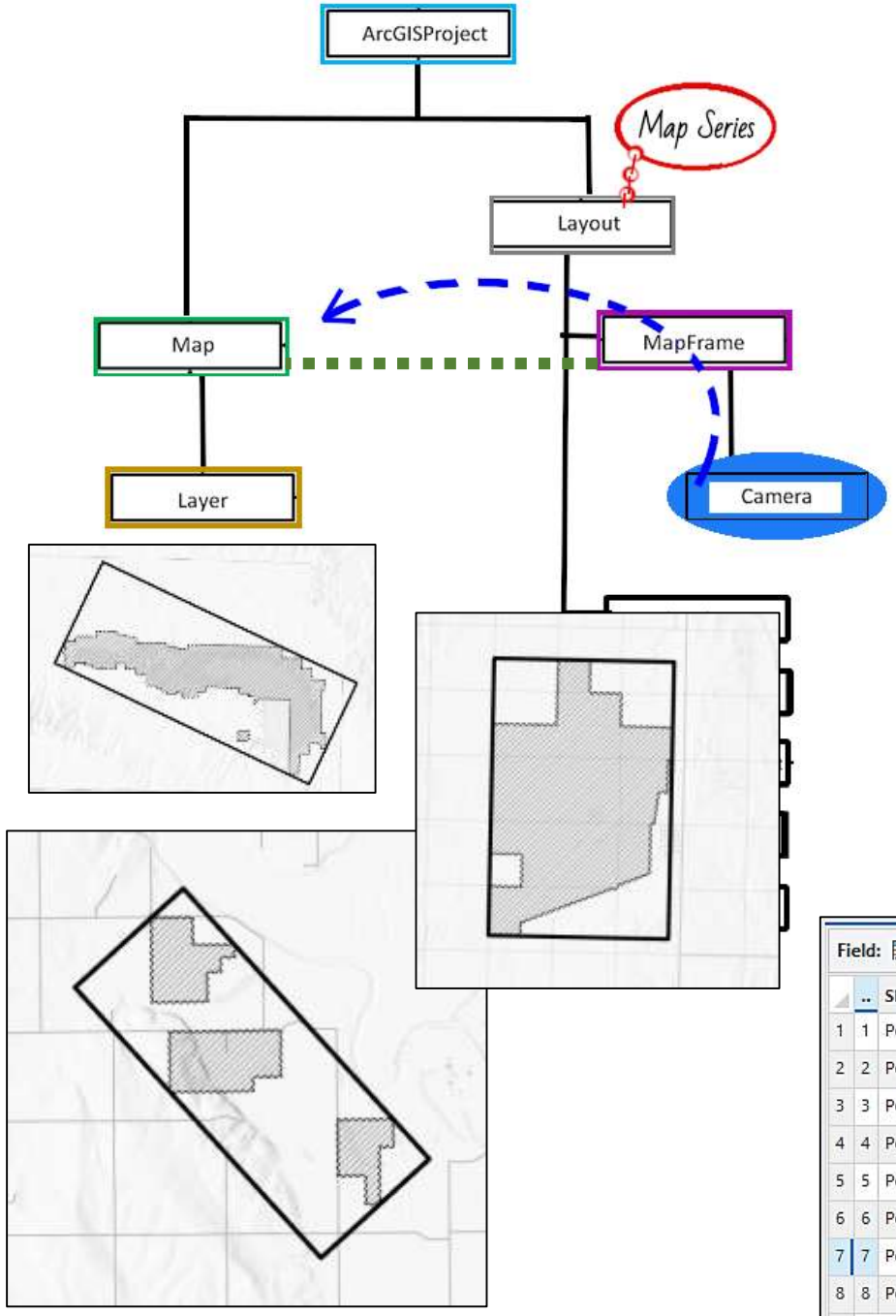


Want: Largest Scale for Each WMA

Minimum Bounding Rectangle by Area
= Basis for MapSeries



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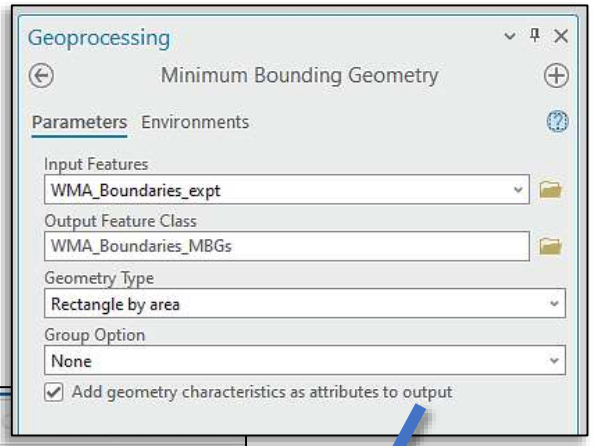

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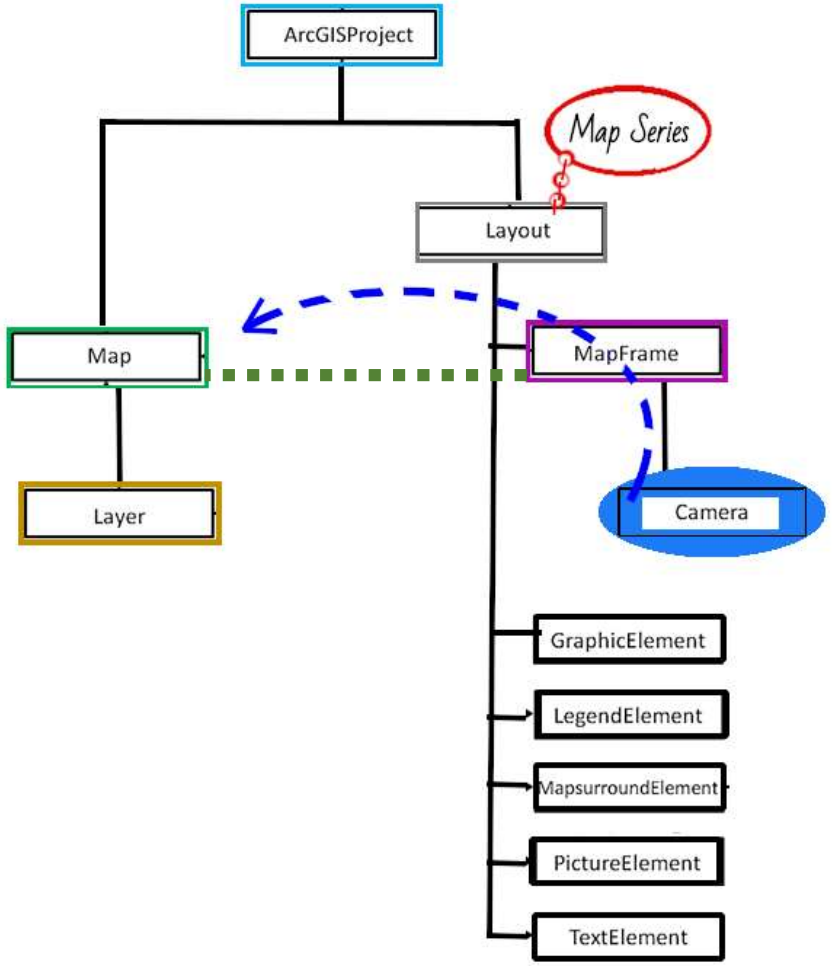
	O.	Shape *	WMANAME	SHORTNAME	WMATYPE	Shape_Length	Shape_Area	Acres
1	1	Polygon	Canton Wildlife Mana...	Canton	WMA	70460.603189	71747964.912714	17729.242458
2	2	Polygon	Beaver River Wildlife...	Beaver River	WMA	82831.53729	113592432.60476	28069.187033
3	3	Polygon	Hackberry Flat Wildlife...	Hackberry Flat	WMA	28073.014008	28628643.497004	7074.263949
4	4	Polygon	Drummond Flats Wildl...	Drummond Flats	WMA	23460.751551	20110815.221094	4969.470854
5	5	Polygon	Eufaula Wildlife Mana...	Eufaula - Gaines Creek	WMA	56141.316437	19103161.866147	4720.475542
6	6	Polygon	Candy Creek Wildlife...	Candy Creek	WMA	11369.78152	2512372.819218	620.818518
7	7	Polygon	Neosho Wildlife Mana...	Neosho	WMA	13645.502478	2906320.782893	718.164443
8	8	Polygon	Cherokee Wildlife Ma...	Cherokee	WMA	48421.878726	127871886.94354	31597.792

Field: Add Calculate Selection: Select By Attributes Zoom To Switch Clear Delete Copy

	..	Shape *	WMANAME	SHORTNAME	WMATYPE	Acres	ORIG_FID	MBG_Width	MBG_Length	MBG_Orientation	Shape_Length	Shape_Area
1	1	Polygon	Canton Wil...	Canton	WMA	17729.242458	1	8559.130478	21549.279533	115.394837	60216.819935	184443094.817178
2	2	Polygon	Beaver River...	Beaver River	WMA	28069.187033	2	6911.265433	25783.937611	90.105415	65390.405973	178199635.665158
3	3	Polygon	Hackberry Fl...	Hackberry Flat	WMA	7074.263949	3	6514.48926	7274.176721	161.244415	27577.331943	47387546.053987
4	4	Polygon	Drummond...	Drummond Flats	WMA	4969.470854	4	4489.299031	6915.784057	1.206286	22810.166191	31047022.671593
5	5	Polygon	Eufaula Wil...	Eufaula - Gaines Creek	WMA	4720.475542	5	6333.831465	12341.29661	64.69013	37350.2562	78167692.844814
6	6	Polygon	Candy Cree...	Candy Creek	WMA	620.818518	6	2531.572154	6065.226146	141.805671	17193.596727	15354557.957286
7	7	Polygon	Neosho Wil...	Neosho	WMA	718.164443	7	2090.759344	5210.963715	137.652437	14603.446179	10894871.298473
8	8	Polygon	Cherokee W...	Cherokee	WMA	31597.79233	8	7990.484299	16270.970689	179.41748	48522.910079	130012936.792877



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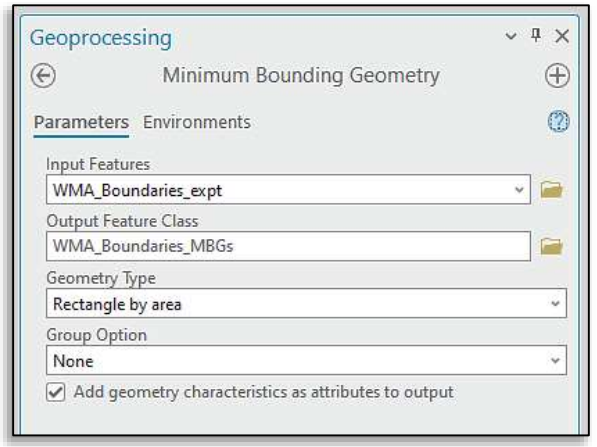
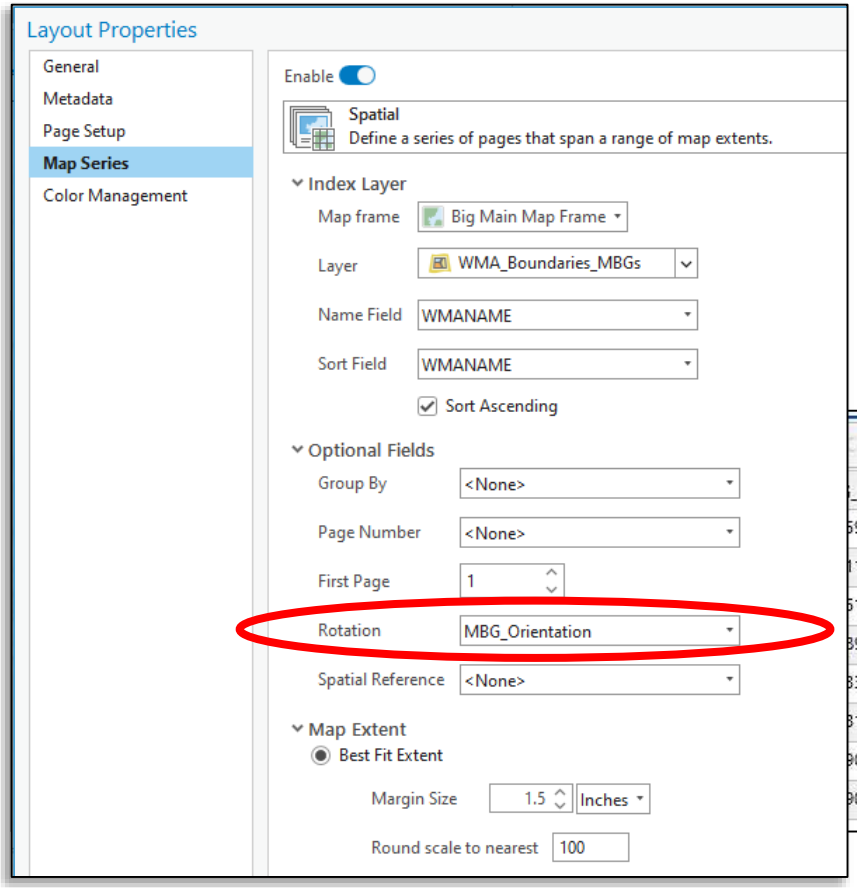
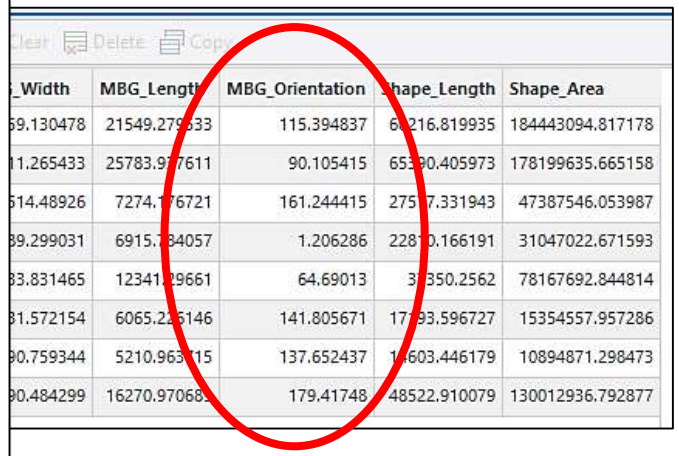
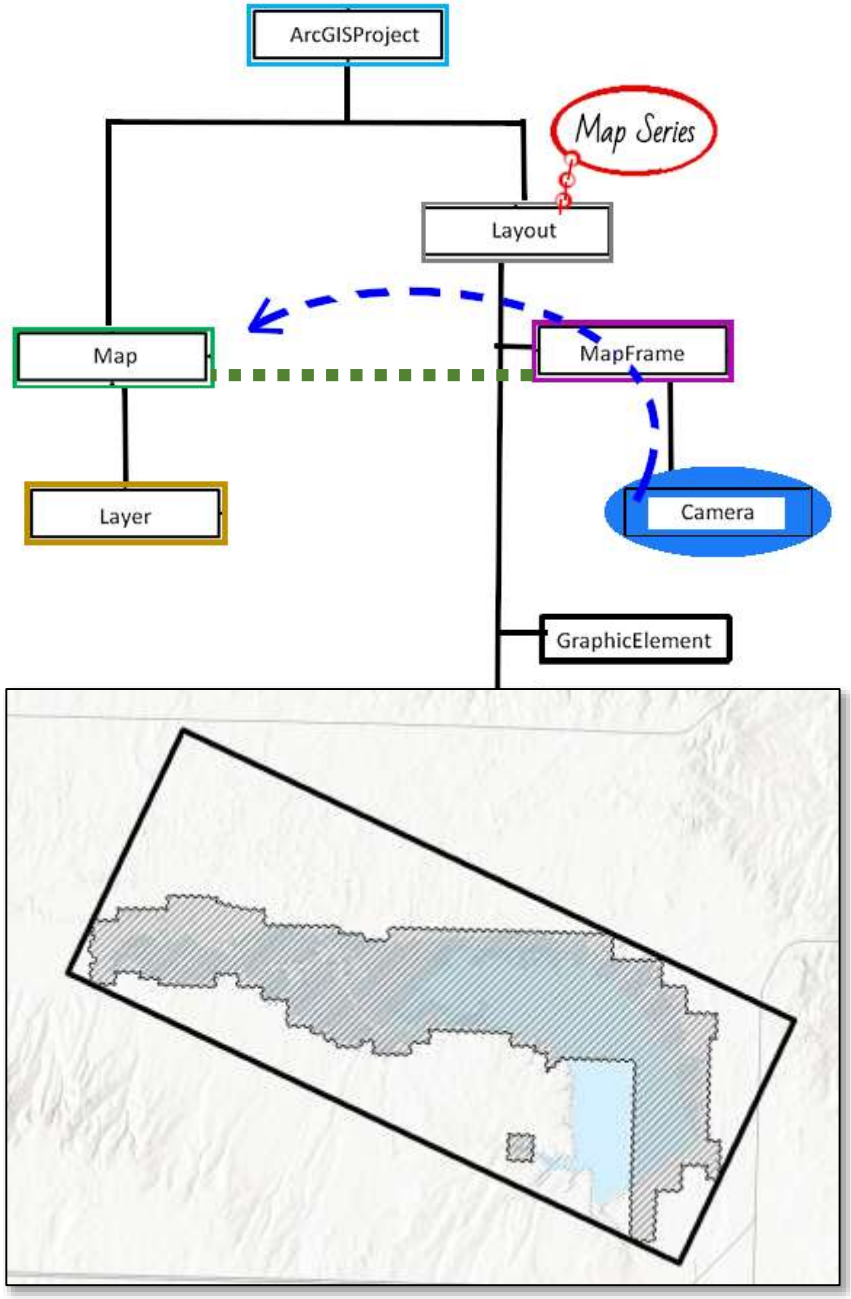






_Width	MBG_Length	MBG_Orientation	Shape_Length	Shape_Area
59.130478	21549.279533	115.394837	6[illegible]216.819935	184443094.817178
11.265433	25783.977611	90.105415	65[illegible]90.405973	178199635.665158
514.48926	7274.176721	161.244415	275[illegible]7.331943	47387546.053987
89.299031	6915.784057	1.206286	228[illegible]0.166191	31047022.671593
83.831465	12341.29661	64.69013	3[illegible]350.2562	78167692.844814
31.572154	6065.2[illegible]5146	141.805671	17[illegible]93.596727	15354557.957286
90.759344	5210.963[illegible]15	137.652437	[illegible]603.446179	10894871.298473
90.484299	16270.970685	179.41748	48522.910079	130012936.792877


ArcGISProject
Map Series
Layout
Map
MapFrame
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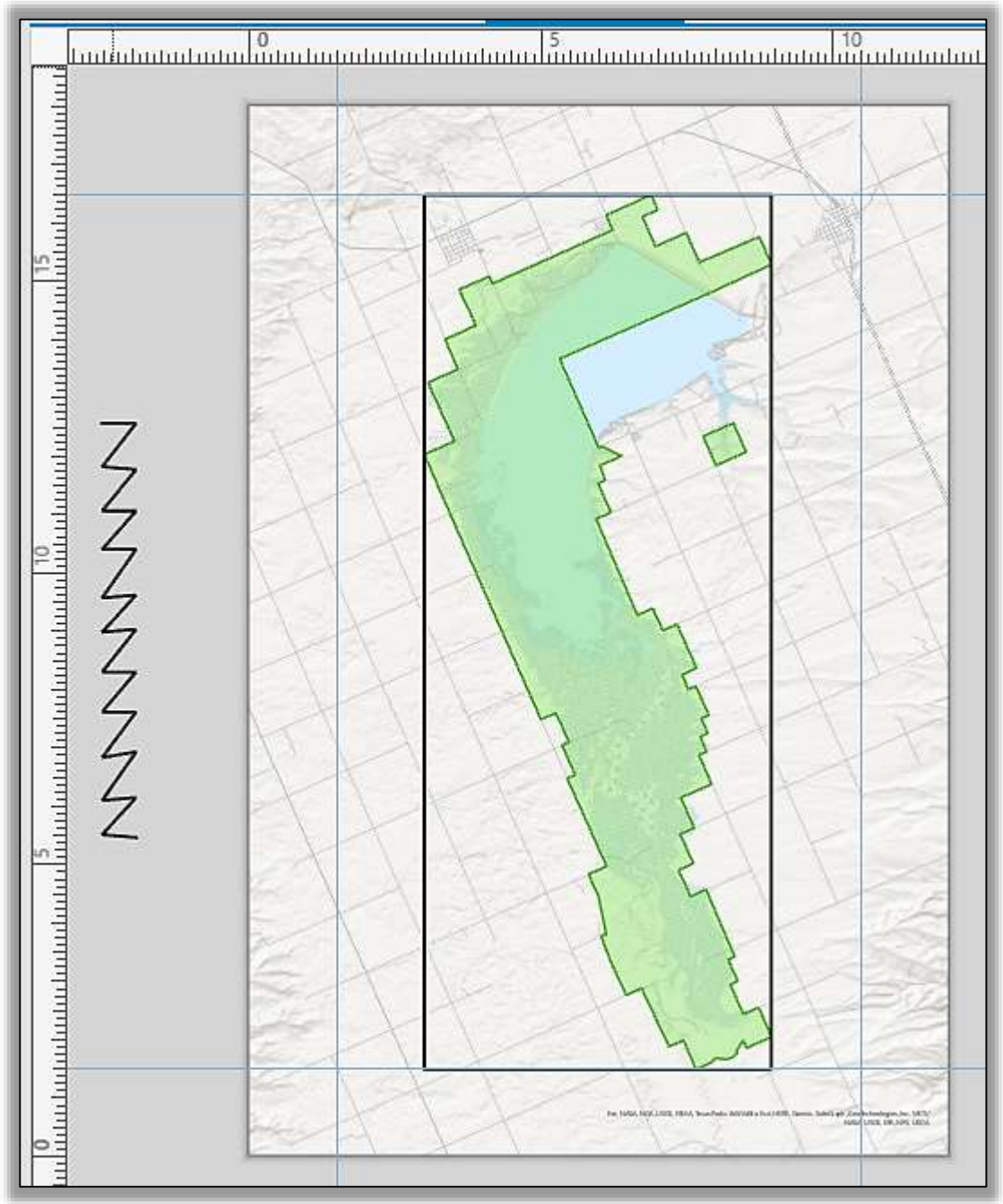
Camera
GraphicElement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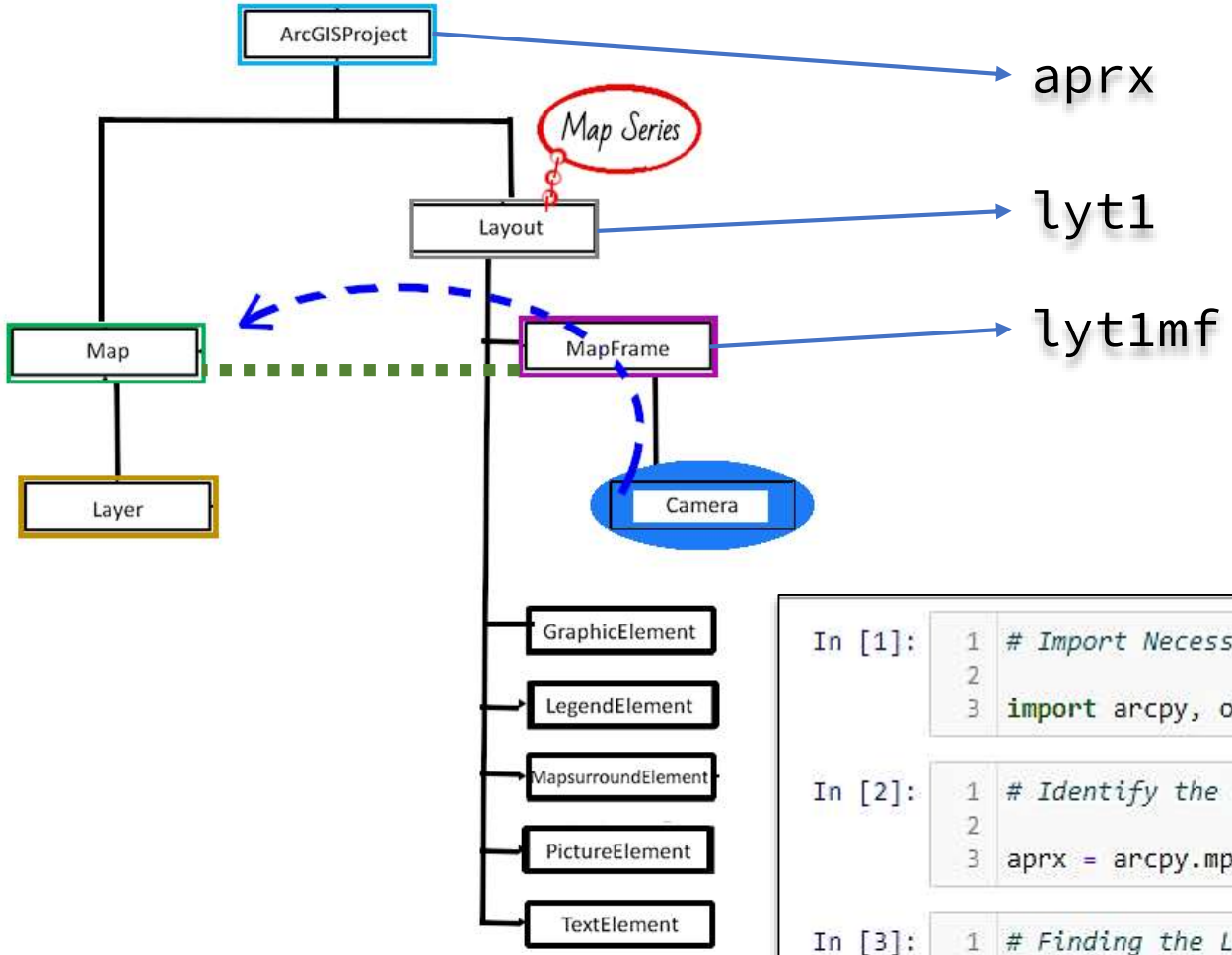
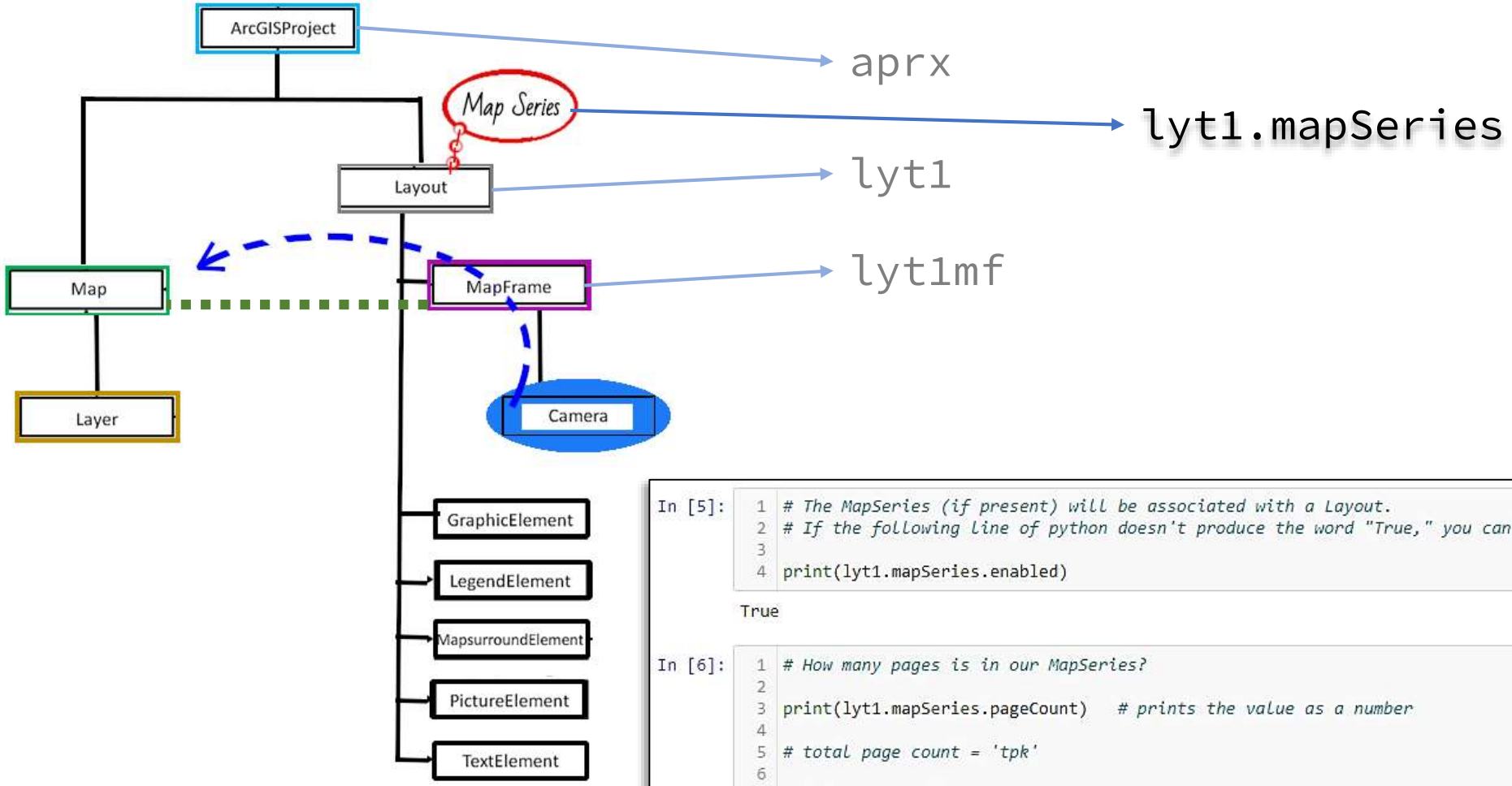


In [1]:
```
# Import Necessary (and Unnecessary-but-Useful) Modules

import arcpy, os, time, winsound, datetime
```

In [2]:
```
# Identify the current Project

aprx = arcpy.mp.ArcGISProject("CURRENT")
```

In [3]:
```
# Finding the Layout of interest "Layout ayo"

lyt1=aprx.listLayouts("Layout ayo")[0]

# The [0] indicates that we are interested in the 1st (0th place) possible search result
```

In [4]:
```
# Finding the Mapframe Element of Interest- the big, main one (titled to match)

lyt1mf=lyt1.listElements("MAPFRAME_ELEMENT", "Big Main Map Frame")[0]
```



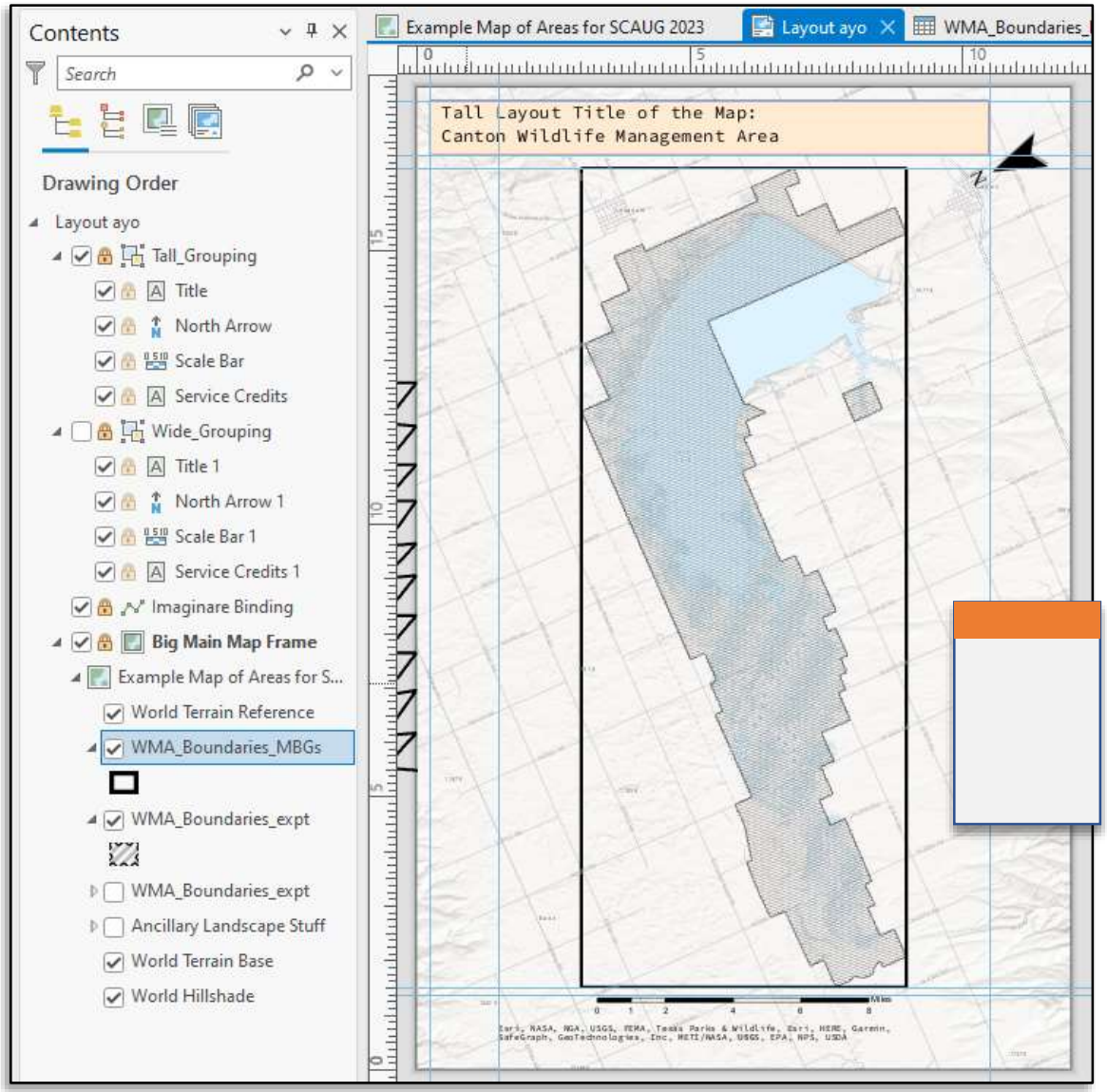
In [5]:
```
# The MapSeries (if present) will be associated with a Layout.
# If the following line of python doesn't produce the word "True," you can't go any farther without a MapSeries enabled.

print(lyt1.mapSeries.enabled)
```

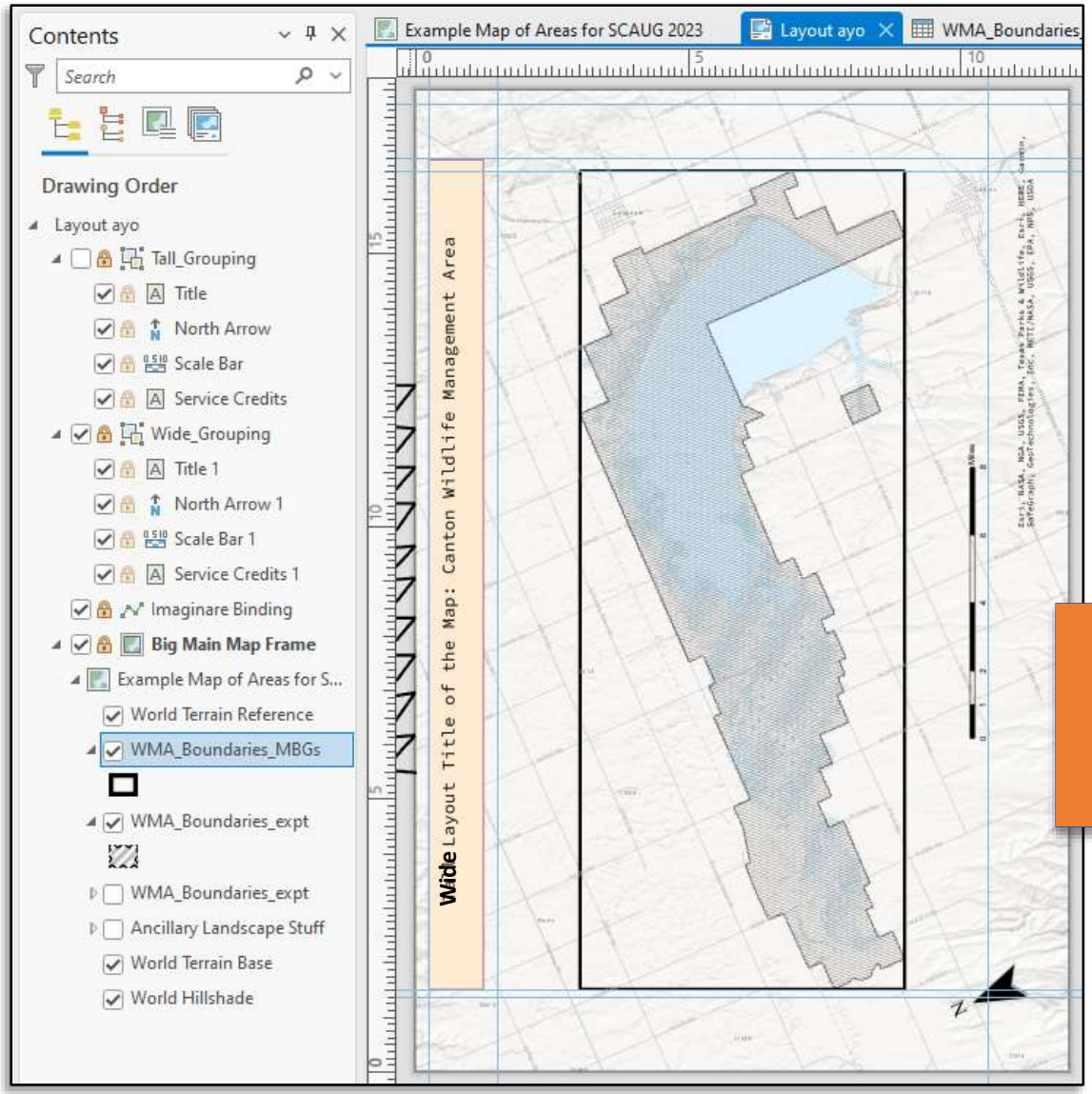
```
True
```

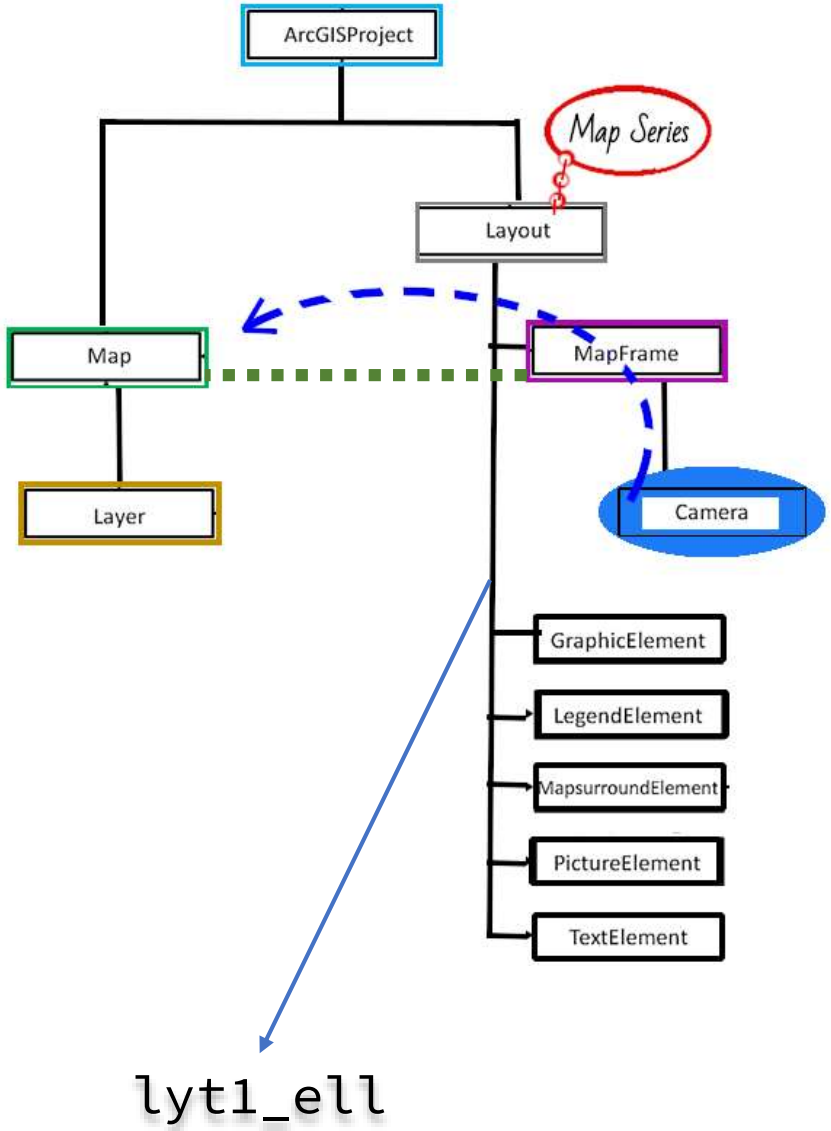
In [6]:
```
# How many pages is in our MapSeries?

print(lyt1.mapSeries.pageCount)   # prints the value as a number

# total page count = 'tpk'

tpk=lyt1.mapSeries.pageCount

# What if you want to spit out the page number as part of a string?

print("The total number of pages is "+str(tpk))   # convert a number to a string with str(###)

```

```
8
The total number of pages is 8
```

Possible Arrangements of Layout Elements: Position, Orientation, Presence, etc.








```
In [8]:
1  lyt1_ell=lyt1.listElements()
2
3  print(lyt1_ell)
4
5  ln=len(lyt1_ell)
6
7  for n in range(0,ln):
8      print(str(n)+". "+lyt1_ell[n].name)
```

```
[<arcpy._mp.GraphicElement object at 0x000002B0CA8DDDC0>, <arcpy._mp.TextElement object at 0x000002B0CA8D8E80>, <arcpy._mp.MapSurr
oundElement object at 0x000002B0CA8D8BB0>, <arcpy._mp.MapSurroundElement object at 0x000002B0CA8C6490>, <arcpy._mp.TextElement obj
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<arcpy._mp.TextElement object at 0x000002B0CA8E88E0>, <arcpy._mp.GraphicElement object at 0x000002B0CA8E89D0>, <arcpy._mp.MapFrame
object at 0x000002B0CA8E8AC0>]
0. Tall_Grouping
1. Title
2. North Arrow
3. Scale Bar
4. Service Credits
5. Wide_Grouping
6. Title 1
7. North Arrow 1
8. Scale Bar 1
9. Service Credits 1
10. Imaginare Binding
11. Big Main Map Frame
```
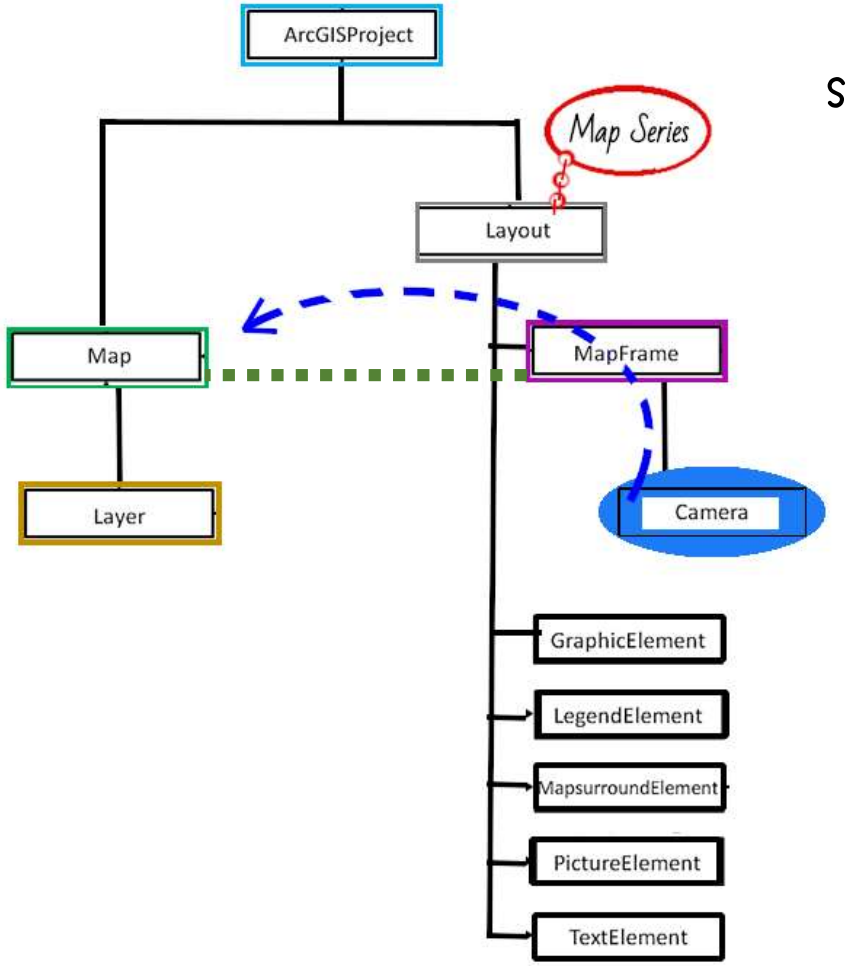
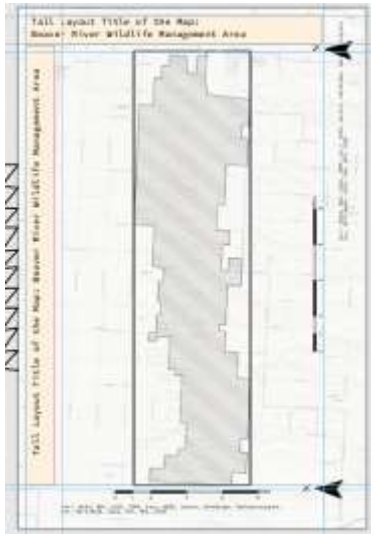



So... What's the Default Behavior of Ea. Page of the MapSeries?



In [11]:

```
# first, a counter
index=1

for index in range(1,tpk+1):
    #Each turn of the for-loop, the mapSeries page gets set to a new value
    lyt1.mapSeries.currentPageNumber=index

    #lsn is the layout sheet name
    lsn=lyt1.mapSeries.pageRow.SHORTNAME

    #scl is the scale of the camera view
    scl=str(round(lyt1mf.camera.scale))

    print(lsn+" -- "+scl+" -- "+str(round(lyt1mf.camera.heading,3))+"º"+"\n\n")
```

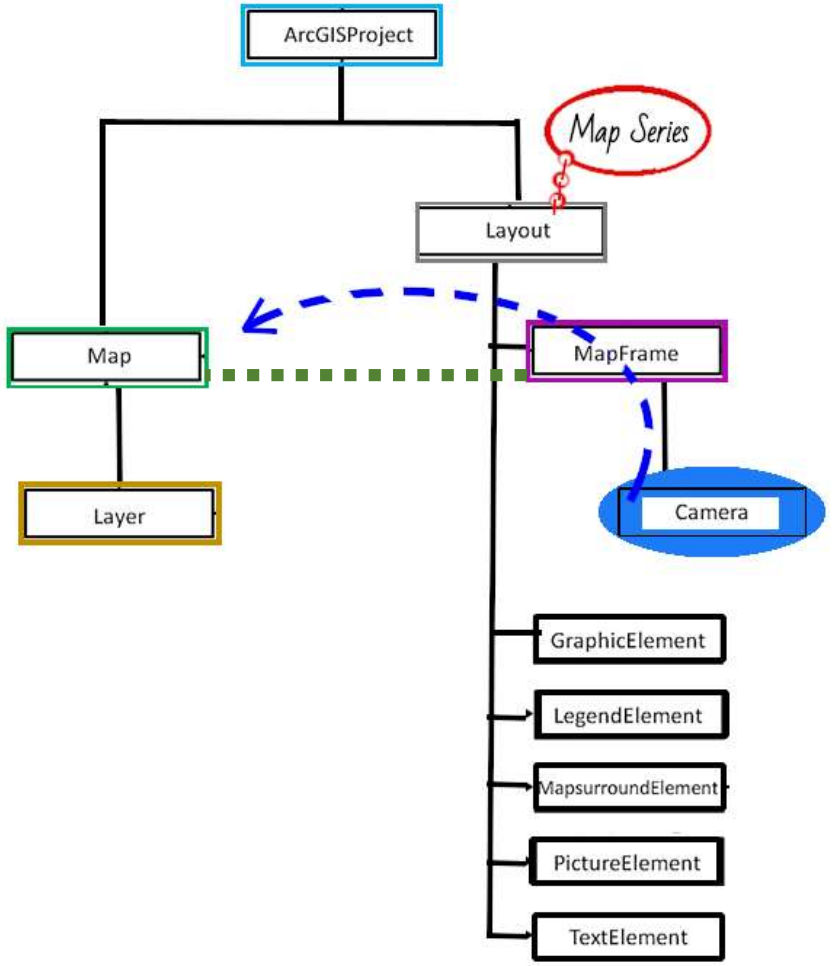
```
Beaver River -- 67700 -- 90.105º

Candy Creek -- 15900 -- 141.806º

Canton -- 56600 -- 115.395º

Cherokee -- 42700 -- 179.417º

Drummond Flats -- 18200 -- 1.206º

Eufaula - Gaines Creek -- 32400 -- 64.69º

Hackberry Flat -- 28500 -- 161.244º

Neosho -- 13700 -- 137.652º
```

lyt1.mapSeries.currentPageNumber

lyt1.mapSeries.pageRow.*fieldname*

lyt1mf.**camera**.scale

lyt1mf.**camera**.heading



Added a New Field to Minimum Bounding Geometry feature class:

New_Orientation

If MBG Orientation > 90,

New_Orientation = MBG Orientation – 180

Else, New_Orientation = MBG Orientation

If MBG Orientation > 135,

New_Orientation = MBG Orientation – 180

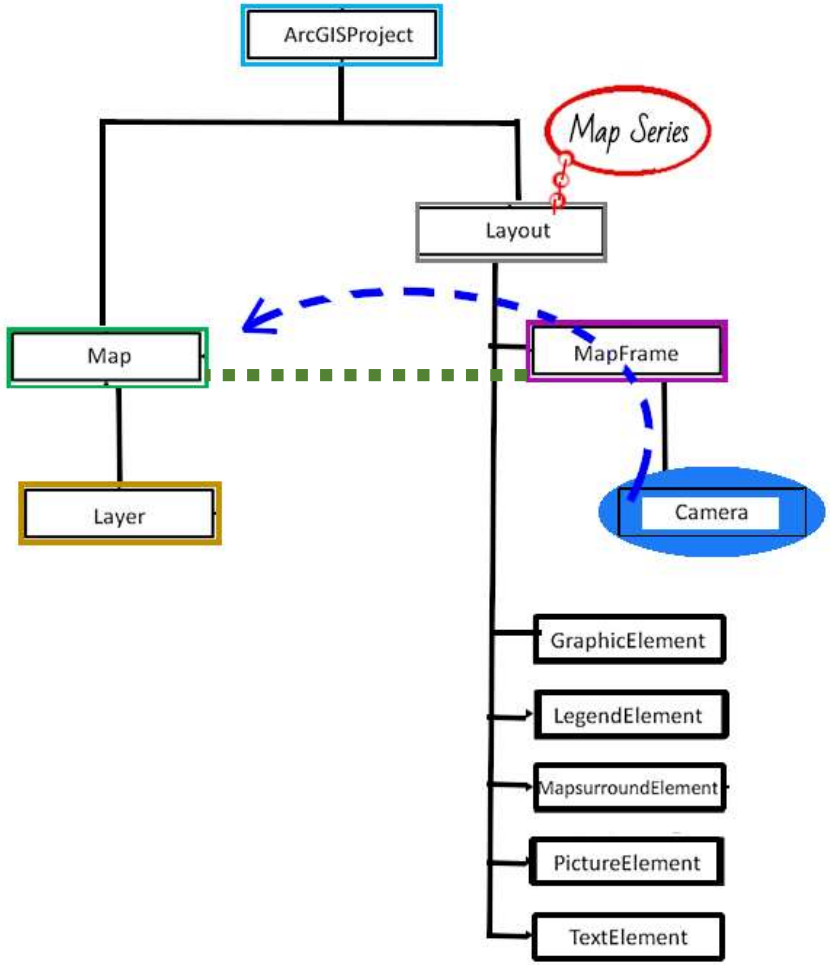
Else, New_Orientation = MBG Orientation

ARCADE:

```
var no=0.0

if ($feature.MBG_Orientation > 90){
  no=$feature.MBG_Orientation-180
}else{ no=$feature.MBG_Orientation}

if ($feature.MBG_Orientation > 135){
  no=$feature.MBG_Orientation-180
}else{ no=$feature.MBG_Orientation}

return no
```

It straightens out the Orientation of each MapSeries Page:

Unusual Orientations are nudged back towards North as “Up” or “Leftward” pointing



Creation of a Loop

Each MapSeries Page:

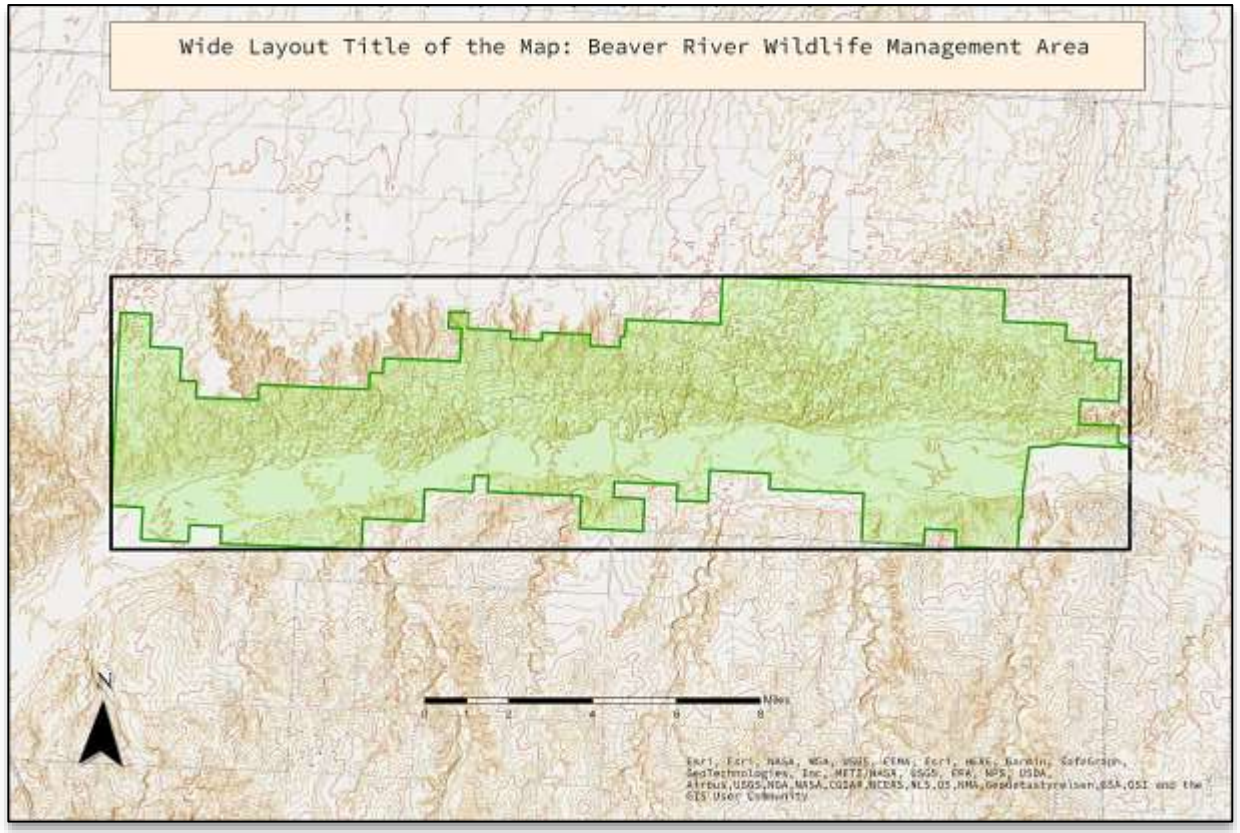
- Determine Better Orientation of Area Boundaries
  - Upward or Leftward
- Turn On/Off Visibility of Associated Layout Elements

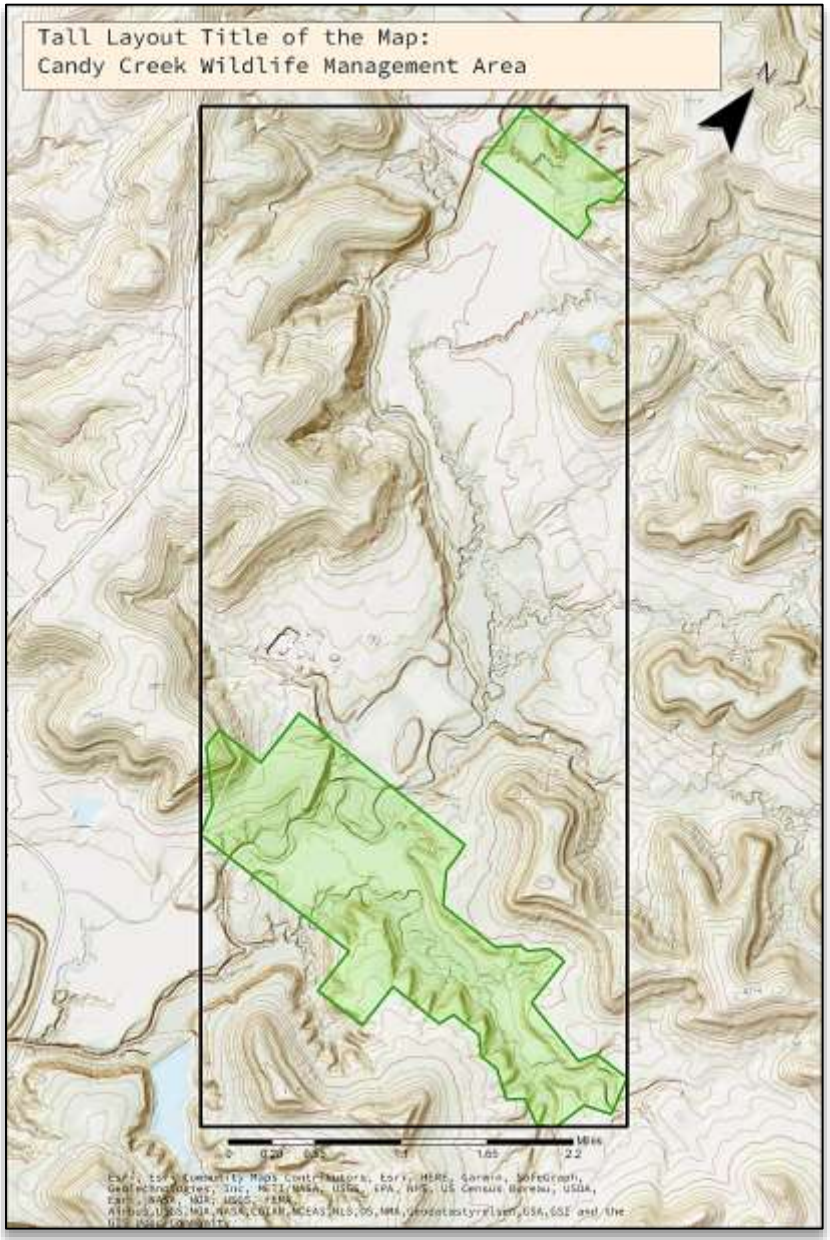
```
HoldinFolder=r"C:\Users\RhubarbRhubarb\RhubarbRhubarbRhubarb\Rhubarb\SCAUG 2023 DM\Folder of Holding"

dpi=150

for index in range(1,tpk+1):

    winsound.Beep(800,100)

    lyt1.mapSeries.currentPageNumber=index

    if (round(lyt1mf.camera.heading,0)>45):
        #Orientation will be 90
        lyt1_ell[0].visible=False       #Upright Elements
        lyt1_ell[5].visible=True       #Leftward Elements
    else:
        #Orientation will be 0
        lyt1_ell[0].visible=True       #Upright Elements
        lyt1_ell[5].visible=False       #Leftward Elements

    lsn=lyt1.mapSeries.pageRow.SHORTNAME

    print("\n"+str(index)+"  "+lsn)

    outPNG3=str(index)+" New Page of "+lsn+" _@"+str(dpi)+"dpi_.png"

    if os.path.exists(os.path.join(HoldinFolder, outPNG3)):
        os.remove(os.path.join(HoldinFolder, outPNG3))
        print("\n--Removal of Existing Document took--")

    lyt1.exportToPNG(os.path.join(HoldinFolder, outPNG3), resolution=dpi)

```

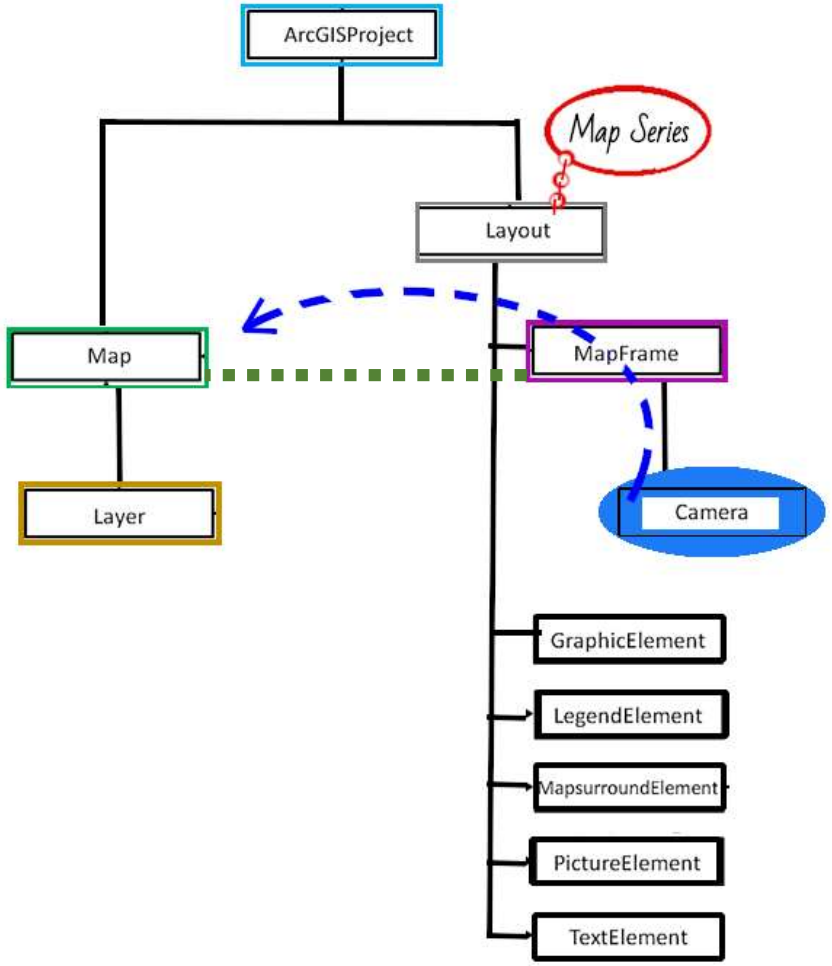
1 Beaver River

2 Candy Creek

3 Canton



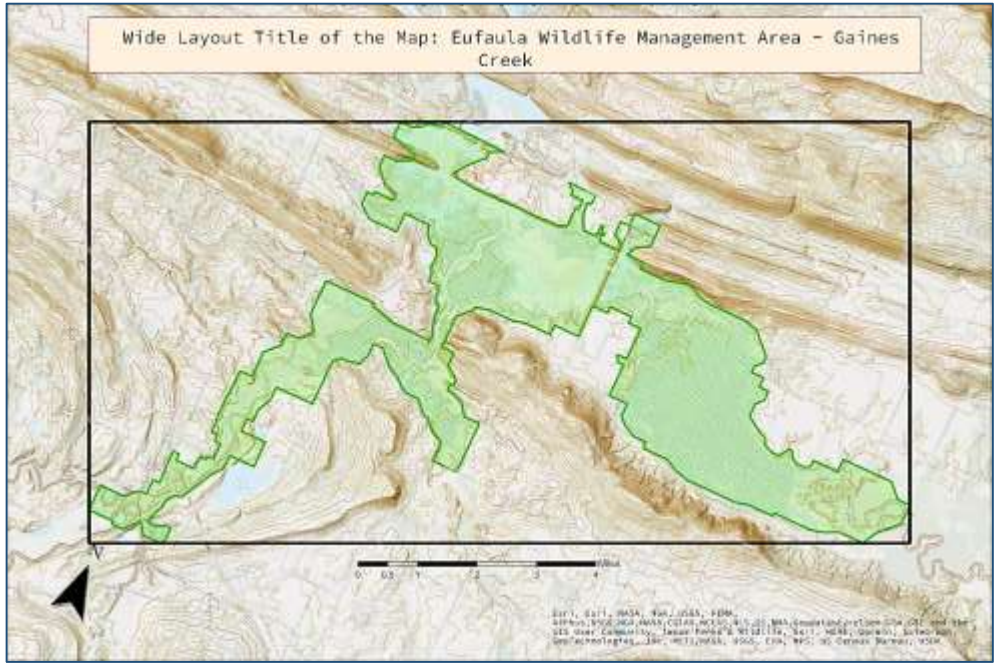




1. Create a Minimum Bounding Geometry *Feature Class* from your Areas of Interest
2. Create a Layout (w/ MapSeries) containing a Map Frame & other Elements
3. Test for Basic Default Info via the Camera object
4. Make Changes
5. Create a Folder to Hold the Outputs
6. Run through Each MapSeries Page, Turning Off/On Elements, and Exporting the Result

A Notebook Summarizing this *Confused & Rushed* Presentation will be Available for download within the Week

https://odwc.maps.arcgis.com/home/gallery.html



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