

Exercise 1

Working with Tables in ArcGIS Pro



Introduction

Understanding the ArcGIS Pro table structure and table property settings is a great foundation for working with your own tables in ArcGIS Pro. In this exercise you will adjust how the table look. You will also use the query function and display selected records. You'll use basic summary and statistics tools to gather information from the table. Finally, you'll prepare the data for a report.

Goals

- Update field properties and table properties
- Select and query records
- Summarize data
- Change table appearance

Prerequisites

- A basic knowledge of working in ArcGIS Pro.
- A basic knowledge of working in Windows.
- The ArcGISProTables course folder was downloaded and unzipped.



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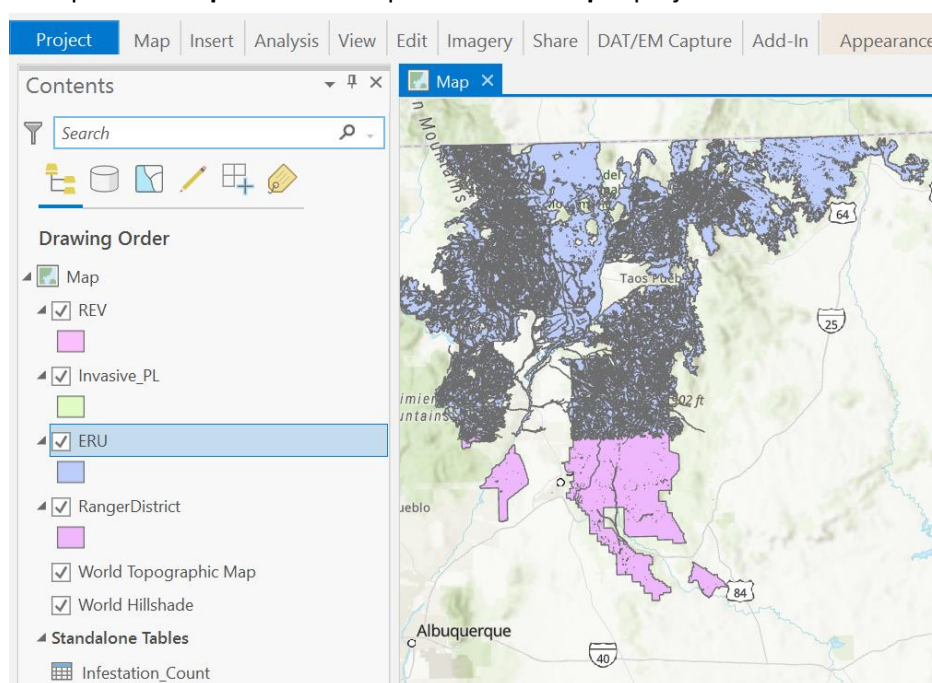
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Part 1: Field Properties

Adding a feature class (e.g., shapefile) to ArcGIS Pro automatically adds its associated attribute table to ArcGIS Pro. A layer's attribute table is also referred to as a spatial table. Non-spatial (or standalone) tables which have no links to spatial features can still be added to ArcGIS Pro the same way as you would add other data to your map.

A. Open the course project file

1. Open **Windows Explorer** and navigate to where you saved the **ArcGISProTables** course folder and open it.
 - i. Open the **Map** folder then open the **Tables.aprx** project file.

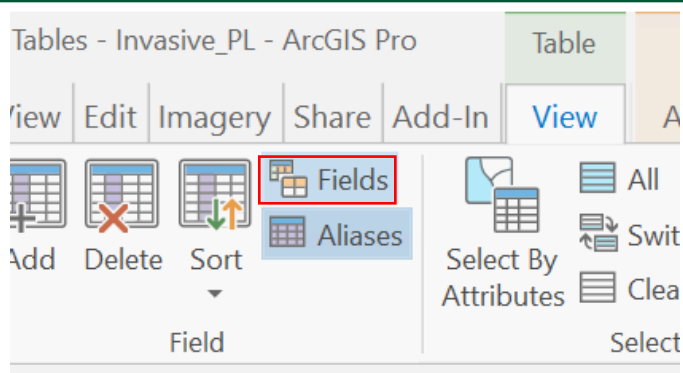


There are four polygon layers in the map document. The REV layer contains Riparian Existing Vegetation data. The ERU layer defines Ecological Response Units. The Invasive_PL layer has invasive plant and animal infestation data. Finally, the RangerDistrict layer has ranger districts in the Carson and Santa Fe National Forests. There is also a standalone table which you will use in Exercise 3.

B. Turn off a field

Sometimes you might find that a layer's attributes aren't all necessary for your analysis. In this case you can turn off unnecessary fields so they don't show in the attribute table.

1. In the Contents pane click the **Invasive_PL** layer to highlight it.
2. Go to the **Data ribbon** (Data Design group) and click **Fields**.



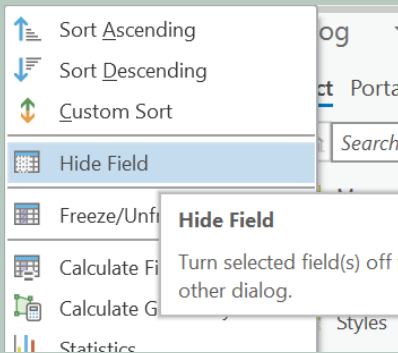
3. Uncheck the box next to **AREA_NAME** (this field has no data).

Invasive_PL					
*Fields: Invasive_PL					
Current Layer: Invasive_PL					
	Visible	Read Only	Field Name	Alias	Data Type
	<input checked="" type="checkbox"/>	<input type="checkbox"/>	INVENTORY_DATE	INVENTORY_DATE	Date
	<input checked="" type="checkbox"/>	<input type="checkbox"/>	OWNER_NAME	OWNER_NAME	Text
	<input type="checkbox"/>	<input type="checkbox"/>	AREA_NAME	AREA_NAME	Text
	<input checked="" type="checkbox"/>	<input type="checkbox"/>	REMARKS	REMARKS	Text

You can turn off/on every field by clicking the box next to **Visible**.

4. Click the **X** on the Fields tab to close it then click **Yes** when asked to save all changes.

Shortcut: When you right-click a field name within the attribute table, you can select **Hide Field** from the context menu to turn it off.



If you want to make the field visible at a later time, follow the preceding steps to turn on that field in the Fields view.

Part 2: Table Properties

Remember that a table is made up of records (rows) for each feature in the layer, and fields (columns) for each category of information. Records and fields make up the attributes of the layer.

An alias is an alternate name for the field (column). Unlike the actual field name, an alias may contain spaces, punctuation, and start with a number. For example, you could set the alias for "height_mea" to be "Height Mean"

In this part you will assign alias names to some fields so they are more intuitively named. Next you will use the **Select By Attributes** function to find tree dominant segments.

A. Edit alias names

1. In the Contents pane click the **REV** layer to highlight it.
2. Go to the **Table View** tab (Field group) and click **Fields**.
3. Change the **Canopy_Cov** alias to **Canopy Cover**.
4. Change the **height_mea** alias to **Height Mean**.
5. Change the **Leaf_Reten** alias to **Leaf Retention**.
6. Change the **Size_Class** alias to **Size Class**.
7. Feel free to change some other alias names if you want.

Field Name	Alias
Canopy_Cov	Canopy Cover

8. Close the Fields: REV table then click **Yes** to save all changes.

You can toggle between Field Names and Aliases in the Attribute table by clicking the three horizontal line button on the upper right corner of the table then checking and unchecking the **Show Field Aliases** option.

n	cover_std	Data_Sourc	FID *
8	0.338	Lidar2017	4023

B. Select records within a table

You will now create an expression that will select specific records in the attribute table.

1. Click the **Select by Attributes** button at the top of the attribute table.

REV			
Field:		Selection:	
	FID *	Height Mean	
1	1	0.692	
2	2	0.694	2.76
3	3	0.692	1.814

2. In the Select by Attributes window, click the sprocket button to view the **Field settings** menu. You can use this menu to change how field names are displayed in this window.

Select By Attributes

Input Rows
REV

Selection type
New selection

Expression

Load Save Remove

SQL ☐

Where Canopy_Cov is equal

+ Add Clause

☐ Invert Where Clause

Field settings menu:

- Original order
- Sort ascending
- Sort descending
- Show field names
- Show field aliases
- Show visible fields
- Show all fields

- i. Use the dropdown menus to create the following expression: Where **Lifeform** is equal **Tree**.

SQL ☐

Where Lifeform is equal Tree

+ Add Clause

- ii. Click **Ok**.

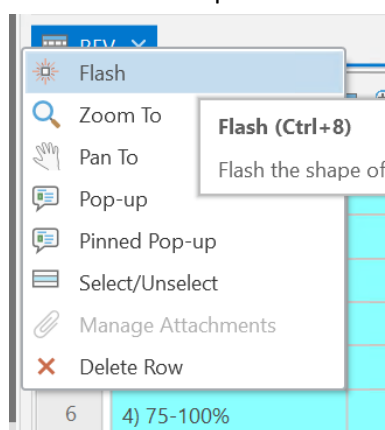
In the table, 10,881 records are now selected, which means 10,881 polygons are also selected in the Map.

3. At the bottom of the table click the **Show selected records** button so that only selected records are shown.

5	4) 75-100%	0.781
6	4) 75-100%	0.787
7	4) 75-100%	0.798

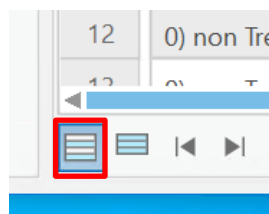
10,881 of 15,178 selected

4. Hold the **<Ctrl>** key while clicking the number at the beginning of a row to highlight that row in yellow. The corresponding polygon in the map will also be highlighted in yellow (double click the record number to zoom to it). Repeat the same step to unhighlight that record.
5. Right-click the number at the beginning of a row and select **Flash**. The selected feature flashes in the Map.



You may have to move or resize the table to see the map and the table. You should be able to see the selected point in the map view.

6. Select the **Show all records** button at the bottom of the table to show all records, both selected and not selected.



Note: To sort the record values in ascending (A-Z) / descending (Z-A) order, double click the field header name.

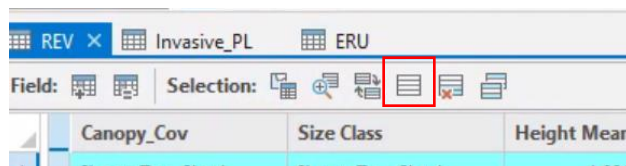
7. Double-click on the **Lifeform** header until the values are sorted in **descending** order.

FYI: You can also right-click on a field header and choose Sort Ascending or Sort Descending.

8. To add another record to the selection, left-click the number at the beginning of the row while holding down **<Ctrl>** key.
9. Unselect that record by repeating the previous step.

WARNING: If you do not hold down the <Ctrl> key when selecting additional records, the previous selection will be cleared and you will have to re-select the record.

10. Click the **Clear Selection** button.



11. Click a polygon in the map to open its Pop-up window which displays the attributes of that polygon.

Pop-up	
REV - Tree	
Canopy_Cov	2) 25-50%
cover_mean	0.453
cover_std	0.497
Data_Sourc	Lidar2017
FID	5305
Height Mean	3.848
Height Standard Deviation	5.258

Part 3: Summarize Command

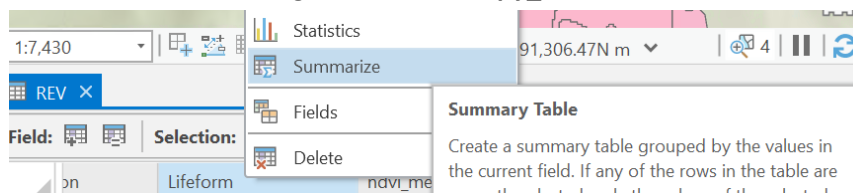
The Summarize command creates a non-spatial, summary table containing one record for each unique value of the selected field (the total number of summarized records represents the total number of unique values). Optionally, the summary table can include summary statistics from multiple fields within the same table. The statistical options include Count, Minimum, Maximum, Average, Sum, Standard Deviation, and Variance.

Statistical analysis is often used to explore your data. An example might be to examine the distribution of values for a particular attribute or to spot outliers (extreme high or low values). Having this information is useful when defining classes and ranges on a map, when reclassifying data, or when looking for data errors. Often this is done by creating spatial summaries, such as calculating the average elevation for each watershed. Summary data is useful for gaining a better understanding of conditions in a study area.

A. Summarize the data

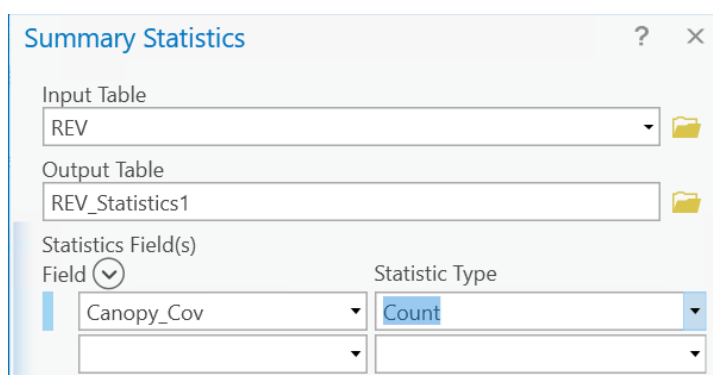
Let's use the Summarize command to find out how many times a canopy cover class repeats in the Canopy_Cov field.

1. In the attribute table, right-click on **Canopy_Cov** field header then click **Summarize**.



2. In the Summary Statistics window set the following parameters:

- i. Statistics Field: **Canopy_Cov**
- ii. Statistic type: **Count**
- iii. Leave the other fields as default and click **OK**.



3. In the Contents pane, right-click **REV_Statistics1** and select **Open**.

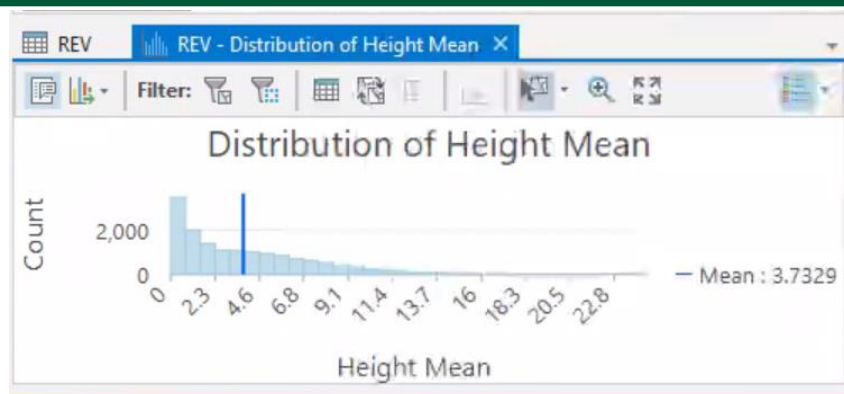
	FID *	Canopy_Cov	FREQUENCY	COUNT_Canopy_Cov
1	1	1) 10-25%	1548	1548
2	2	2) 25-50%	3092	3092
3	3	3) 50-75%	3646	3646
4	4	4) 75-100%	2595	2595

Notice the FREQUENCY and Count_Canopy_Cov fields contain the same values. The FREQUENCY field is always included in the output of the Summary Statistics tool.

B. Run statistics

1. Open the **REV** table.
2. Right-click **Height Mean** field header and select **Statistics**.

The Distribution of Height Mean window opens. With this information we know that segments which are tree-dominated have a mean tree height of 3.73 meters.



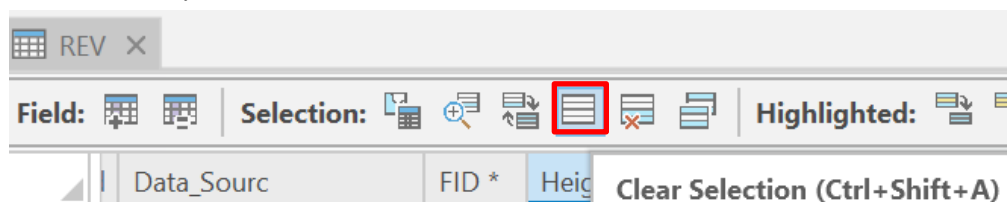
Part 4: Preparing a Table for a Report

An appealing map is always valuable; however, an analysis is often bolstered by supporting tabular data. In this part you will simplify the table to focus on tree-dominated riparian segments then add it to a layout. Then you will export the layout and a .csv file.

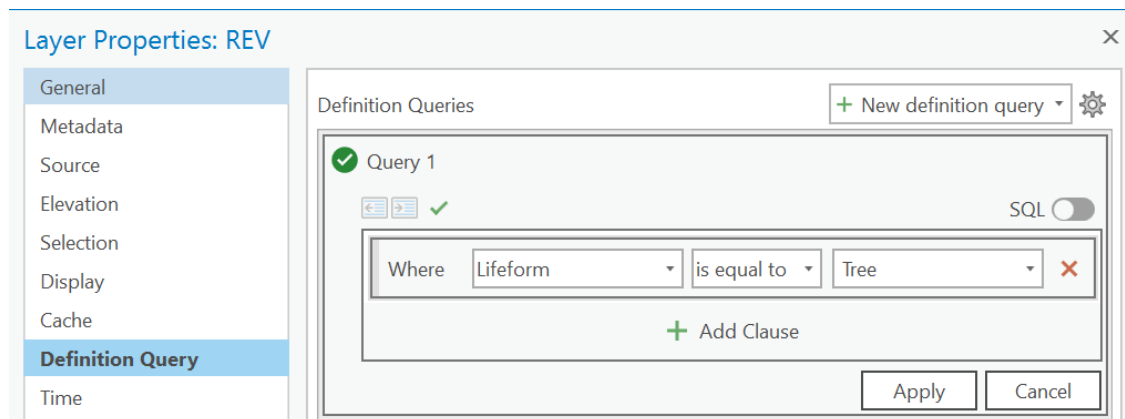
A. Setup definition query

Our first step in making the table more readable is to limit the records to only those that are tree-dominated. In other words, the record's Lifeform field must have a value of Tree. We can use the layer property setting called Definition Query to limit both a layer's features and records.

1. Turn off all layers except the **REV** layer.
2. If there are any records selected, click the **Clear Selection** button.



3. In the Contents pane, double-click the **REV** layer to open the **Layer Properties** window.
4. In the Layer Properties window, click **Definition Query**.
5. Use the dropdown menus to create the following query: Where **Lifeform** is equal to **Tree**.



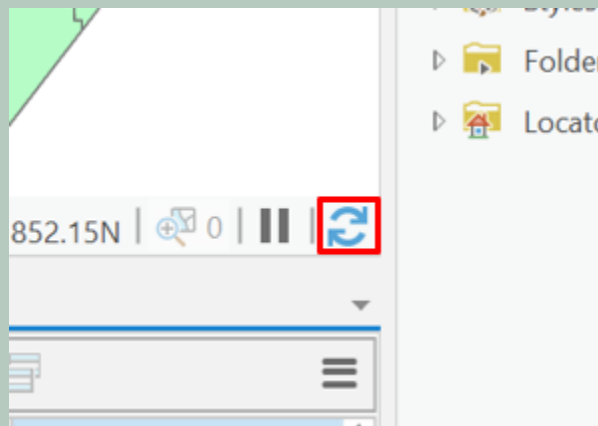
- i. Click **Apply**.
- ii. Click **OK**.

Note: A Definition Query only affects how a layer displays in ArcGIS Pro. It does not change the source layer's total number of features and records!

Notice that only segments with a Lifeform of tree are visible now. Definition Queries are a great way to show only your Forest or District when looking at a map. Now we will look at the layer's Attribute table.

6. Let's further simplify the appearance of the table. Go to the Fields view and turn off every field except the **FID**, **Leaf Retention**, **Canopy Cover**, and **Size Class** fields.
7. Close the **Fields view** and click **Yes** to save all changes.

If the table doesn't update after you save the changes, try clicking the update button on the bottom right corner of the map.



REV X				
Field:		Selection:		
	FID *	Leaf Retention	Canopy Cover	Size Class
1	6783	Deciduous	4) 75-100%	2) .5-5 meters
2	6805	Deciduous	4) 75-100%	3) 5-12 meters
3	6808	Deciduous	4) 75-100%	2) .5-5 meters
4	6864	Deciduous	4) 75-100%	3) 5-12 meters
5	6865	Deciduous	4) 75-100%	2) .5-5 meters
6	6898	Deciduous	4) 75-100%	3) 5-12 meters

Your table now displays only those attributes to be presented in your report. Note: the changes are not permanent.

You can adjust the table's font with the drop-down menu or slider on the bottom right side of the table.

6	6898	Deciduous	4) 75-100%	3) 5-12 meters
7	6912	Deciduous	4) 75-100%	2) .5-5 meters

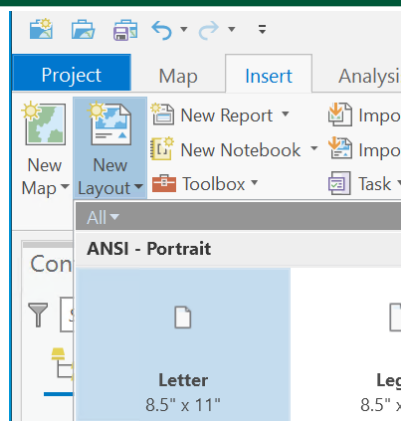
0 of *2,000 selected Load All Filters: 100%

You can also manually resize column widths by clicking the lines between the column names and dragging them.

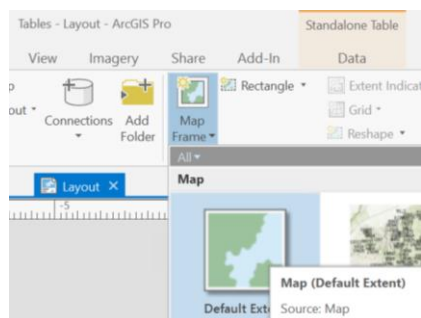
B. Add the table to a layout

We will add a new layout and then insert a map frame and a table frame in it. This table frame will be dynamic which means it will only show records visible in the map extent.

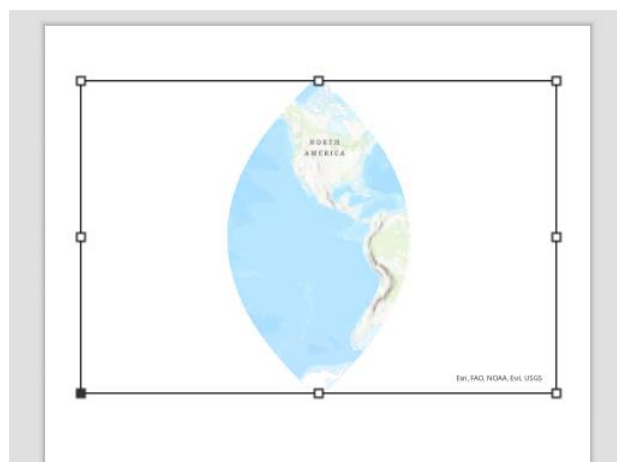
1. On the **Insert** tab (Project group) click **New Layout** then click **Letter 8.5" x 11"**.



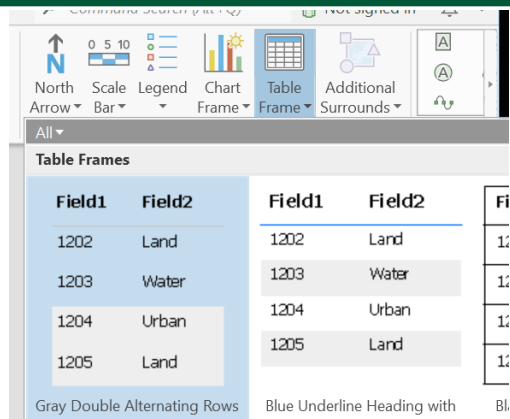
2. On the **Insert** tab (Map Frames group) click **Map Frame** then click **Default Extent**.



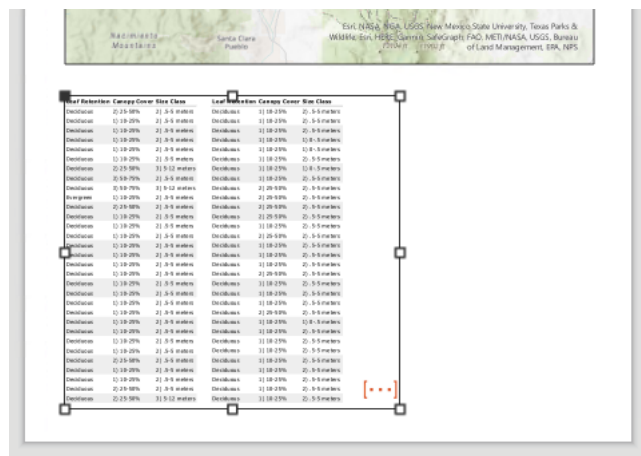
3. Click the cursor near the upper left corner of the page then drag it down and right to create a map frame on the upper half of the page.



4. In the Contents pane, right-click on the **REV** layer then click **Zoom to Layer**.
5. On the **Insert** tab (Map Surrounds group) click the **Table Frame** menu.
6. Choose the **Gray Double Alternating Rows** style.



7. Click and drag the cursor to create a table frame on the bottom half of the page.

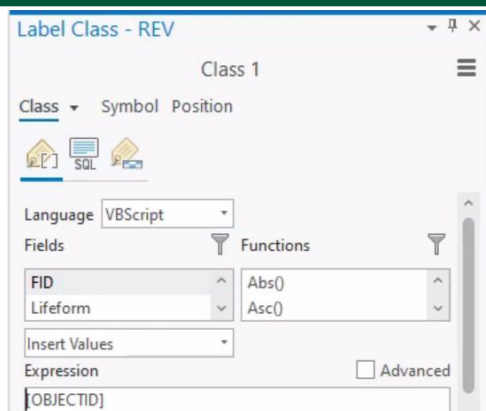


If there is not enough space on the table for all the fields to appear, fields are dropped from the table and the following icon appears.



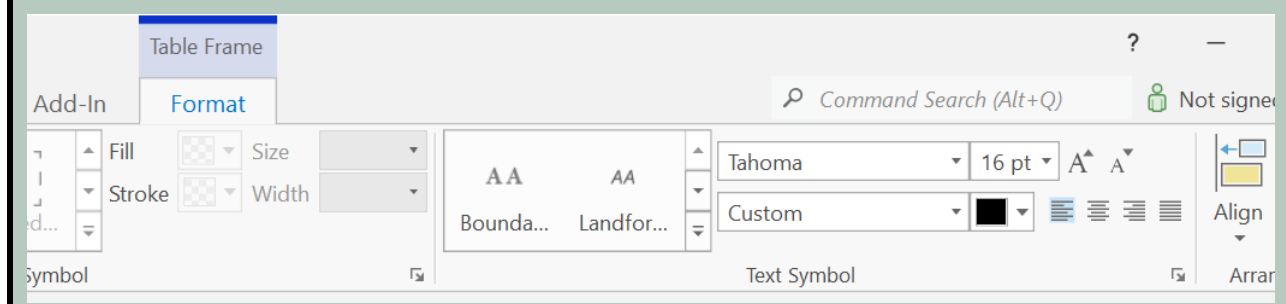
C. Format table

1. In the Contents pane, right-click **Table Frame** then move your cursor to **Add Field** and click **OBJECTID**.
 - i. Click and drag the **OBJECTID** field **above the Leaf_Reten** field.
 - ii. Right-Click the REV layer then click **Labeling Properties**.
 - (a) Set the Language to **VBScript**
 - (b) Clear the Expression then set it to **[OBJECTID]** (hint: you can add it by double clicking **FID** in the Fields menu).

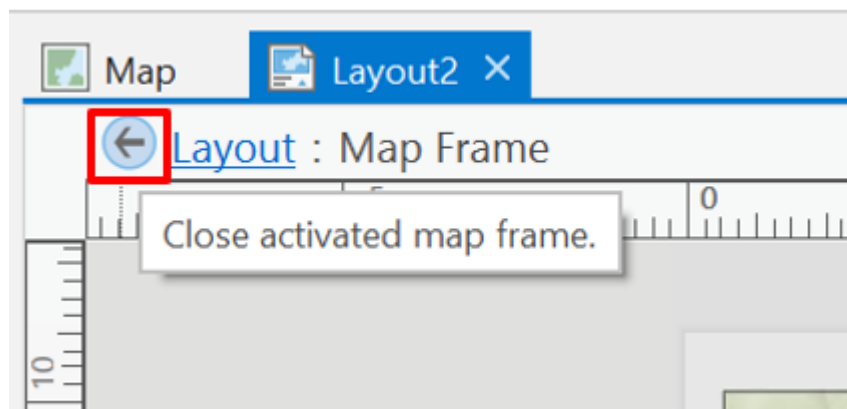


- iii. Right-click the **REV** layer then click **Label**. The features in the map will then be labeled with their FIDs (the alias for OBJECTIDs).

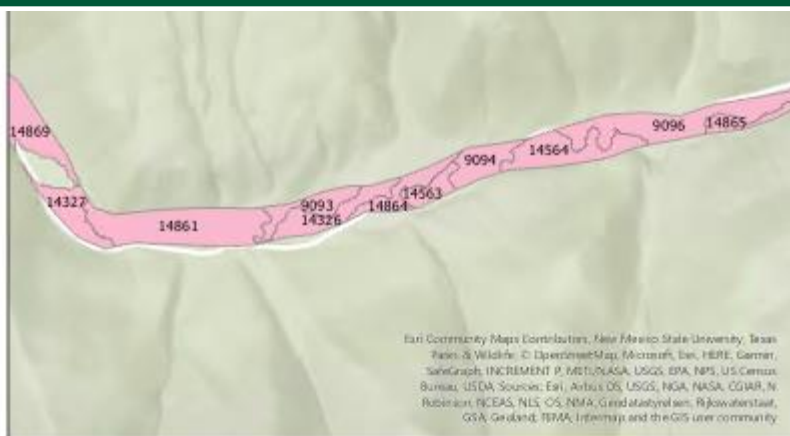
If you want to quickly adjust the table font and other text properties, make sure the table frame is selected then go to the **Table Frame Format** tab (Text Symbol group).



2. On the **Layout** tab (Map group) click **Activate**.
3. Click and drag the cursor in the map to pan and the scroll wheel to zoom in until you can read some of the feature FIDs in the map.
4. Click the arrow on the upper left corner of the layout to close the activated map frame.



5. Notice the records in the table have changed to match the features visible in the map.



FID	Leaf Retention	Canopy Cover	Size Class
9093	Deciduous	3) 50-75%	3) 5-12 meters
9094	Deciduous	4) 75-100%	3) 5-12 meters
9096	Deciduous	4) 75-100%	3) 5-12 meters
14326	Mixed Evergreen-Deciduous	3) 50-75%	3) 5-12 meters
14327	Mixed Evergreen-Deciduous	3) 50-75%	3) 5-12 meters
14563	Mixed Evergreen-Deciduous	4) 75-100%	3) 5-12 meters
14564	Mixed Evergreen-Deciduous	4) 75-100%	3) 5-12 meters
14861	Mixed Evergreen-Deciduous	4) 75-100%	3) 5-12 meters

6. Right-click the Table Frame then click **Properties**.
 - i. In the Table Frame pane, click **Show properties...**
 - ii. Change the Vertical Line color to black so it's visible in the table.

Element

↶

[multiple fields]

Field

▼

Text Symbol

▼

Appearance

☒

Auto width

1.5 in

☐

Enable word wrapping

▼

Display

Heading text

Aa

16 pt

Data text

Aa

16 pt

Background

Border

1 pt

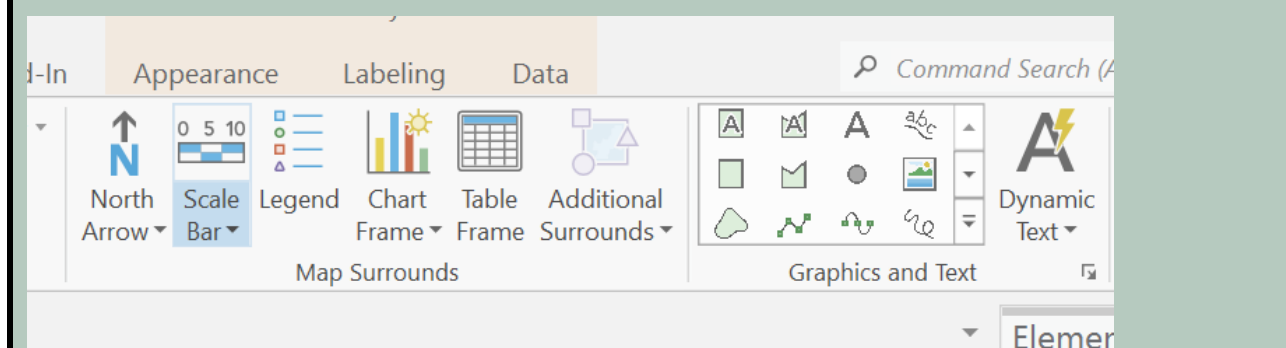
Vertical line

1 pt

FID	Leaf Retention	Canopy Cover	Size Class
4392	Deciduous	1) 10-25%	2) .5-5 meters
5411	Deciduous	2) 25-50%	2) .5-5 meters
5412	Deciduous	2) 25-50%	2) .5-5 meters
5413	Deciduous	2) 25-50%	2) .5-5 meters
6864	Deciduous	4) 75-100%	3) 5-12 meters
7618	Deciduous	2) 25-50%	2) .5-5 meters
7624	Deciduous	3) 50-75%	3) 5-12 meters
7625	Deciduous	3) 50-75%	3) 5-12 meters
7627	Deciduous	3) 50-75%	3) 5-12 meters
8764	Deciduous	4) 75-100%	3) 5-12 meters
9011	Deciduous	4) 75-100%	3) 5-12 meters
9013	Deciduous	4) 75-100%	3) 5-12 meters
9015	Deciduous	3) 50-75%	3) 5-12 meters
9768	Evergreen	1) 10-25%	2) .5-5 meters
10310	Evergreen	3) 50-75%	2) .5-5 meters
11992	Evergreen	3) 50-75%	3) 5-12 meters
14260	Mixed Evergreen-Deciduous	3) 50-75%	3) 5-12 meters
14263	Mixed Evergreen-Deciduous	3) 50-75%	2) .5-5 meters
14541	Mixed Evergreen-Deciduous	4) 75-100%	4) 12+ meters
14782	Mixed Evergreen-Deciduous	4) 75-100%	3) 5-12 meters
14792	Mixed Evergreen-Deciduous	4) 75-100%	3) 5-12 meters

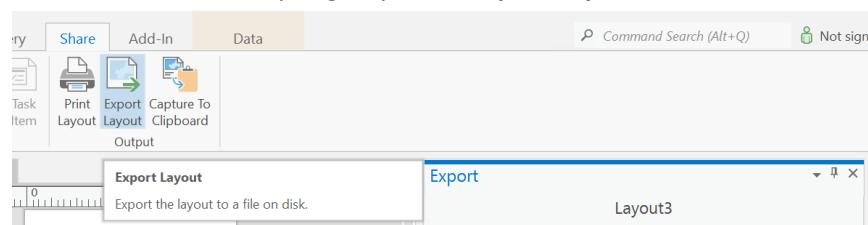
7. Feel free to explore other ways to adjust the appearance of the table.

Although unnecessary for this exercise, you can add elements to the layout such as a title and legend by going to the **Insert** tab and using tools in the **Map Surrounds** and **Graphics and Text** sections.



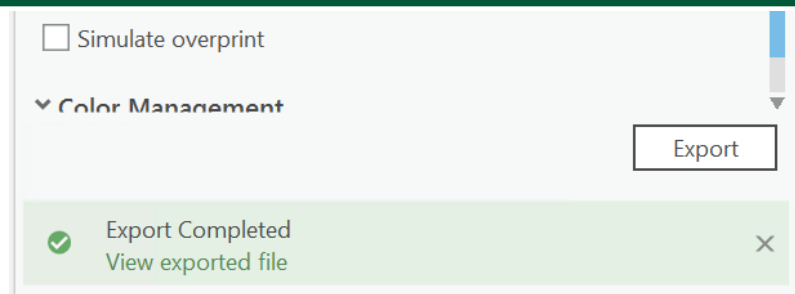
D. Export layout

1. On the **Share** tab (Output group) click **Export Layout**.



2. On the Export pane leave all fields as default and click **Export**. (Note: the map will be saved in the course folder)

3. At the bottom of the Export pane click **View exported file**.

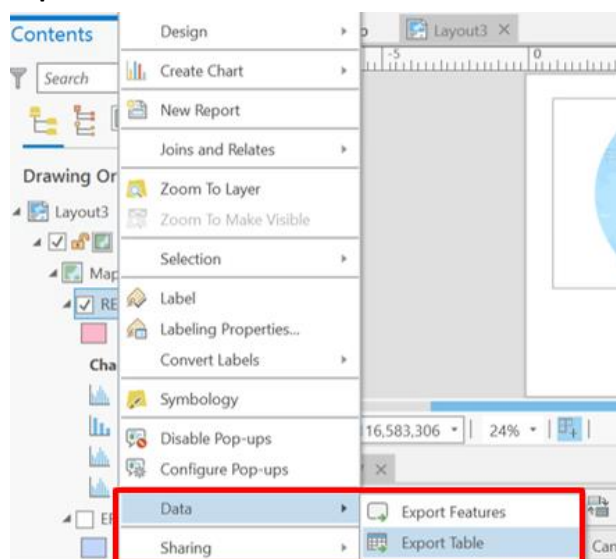


For information about how to format a map layout and efficiently create a series of maps to cover all the records in your table, refer to GTAC's [Map Series tutorial](#).

E. Export table

We will export the table in .csv format so it can be used in a program like Excel

1. In the Contents pane, right-click the **REV** layer then move your cursor over **Data** and click **Export Table**.



2. In the Export Table pane set the following parameters:
 - i. Output Location:\ArcGISProTables\Data

The output location must be a **folder**, not a geodatabase, to save the table as a .csv file.

- ii. Output Name: **REV.csv**

Export Table

Parameters

Environments

Input Rows

REV

Output Location

Data

Output Name

REV.csv

Expression

iii. Click **OK**.

Congratulations on finishing this exercise!