



EXERCISE 3 Challenge

Objectives

- Create event layer
- Configure pop-ups
- Charts

Prerequisites

- Completion of exercise 3

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Part 1: Challenge - Create points/event layers from a table

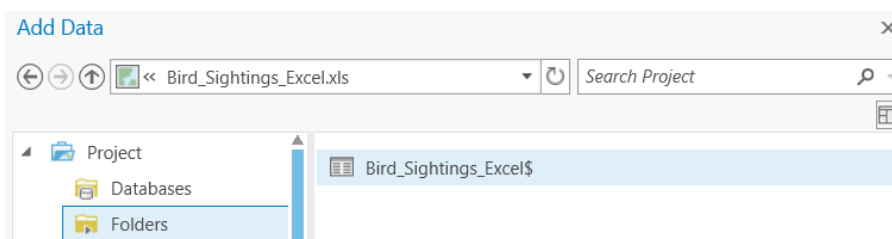
A. Prepare the map

1. From the **Bookmarks** drop down select the **South West** bookmark from the **Scene** Bookmarks.
2. Turn off the **Bird_Sightings** layer.
3. Turn off the **Longleaf_OldGrowth_TNF** layer.
4. Remove the **Bird_Sightings_Table** from the **Contents** pane.

B. Create an event layer

1. On the **Map** tab, in the **Layer** group, click **Add Data**
2. In the Add Data dialog box, under the Computer heading, **browse** to the location of the **Bird_Sightings_Excel** table you created in the previous step.

Hint: it should be stored in your Create_Feature project.Create_Feature\Bird_Sightings_Excel.xls



3. Once the table is located, highlight it and **click OK**.

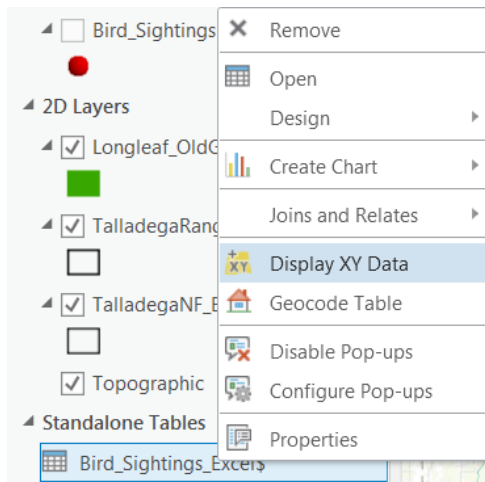
The table is added to the Contents pane.

4. From the **Contents** pane, right click the **Bird_Sightings_Excel\$** table and click **Open**

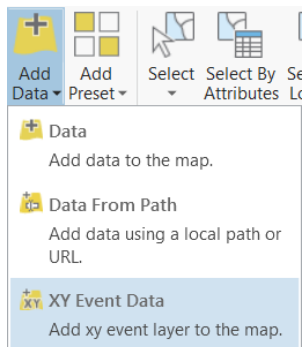
The table's attributes are displayed and its X, Y and Z coordinates in decimal degrees. You'll use the values in the X (Longitude), Y (Latitude) and Z (Elevation) fields to create points on the map (attribute details will vary from what you see displayed in the screen shot).

Bird_Sightings_Excel\$							
Field:							
Selection:							
OBJECTID	name	bird_count	RED_STRIPE	POINT_X	POINT_Y	POINT_Z	
1	RWC Sighting	3	2	474850.6879	3633983.8041	108.3149	
2	RWC Sighting	5	4	489885.4791	3630881.8322	97.1673	
3	RWC Sighting	1	1	499979.1698	3615795.4309	93.5286	
4	RWC Sighting	2	0	483665.7322	3622362.9404	85.0873	
5	RWC Sighting	6	2	482174.294	3623918.6462	121.4431	

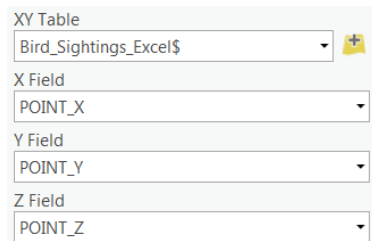
5. Close the **Bird_Sightings_Excel\$** table.
6. From the **Contents** pane, right click the **Bird_Sightings_Excel\$** table and select **Display XY Data**.



*The Geoprocessing pane opens with the Make XY Event Layer tool open.
Tip: You can open this tool directly from the Map tab by clicking the Add Data drop-down menu and clicking XY Event Data.*



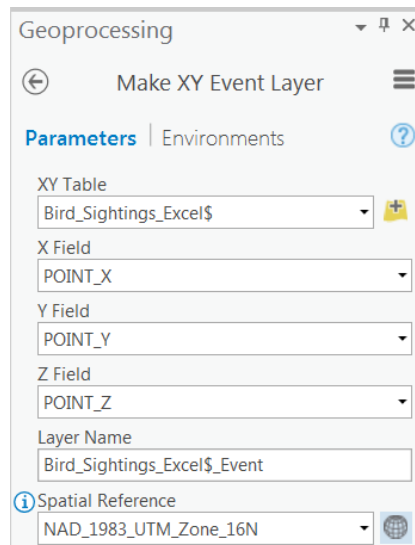
7. Fill out the **drop downs** in the tool as displayed in the screen shot below.



8. Rename the Layer in the **Layer Name** box **Bird_Sightings_Excel\$_Event**.
9. Click the drop down for Spatial Reference and select Bird_Sightings.

GCS_WGS_1984 is used as the default spatial reference because it is a common coordinate system for XY data. If your values belong to a different coordinate system, you need to select the coordinate system of the data.

10. Click the **globe/projection icon** next to the Spatial Reference drop down.



Geoprocessing

Make XY Event Layer

Parameters | Environments

XY Table
Bird_Sightings_Excel\$

X Field
POINT_X

Y Field
POINT_Y

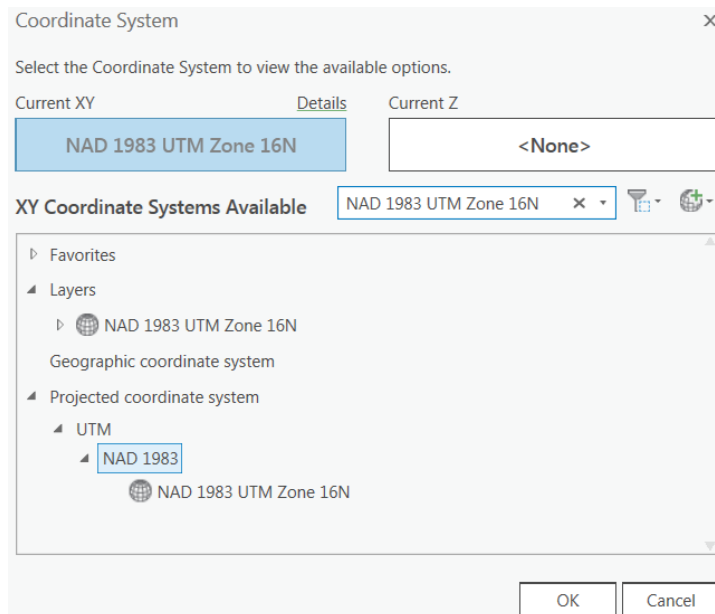
Z Field
POINT_Z

Layer Name
Bird_Sightings_Excel\$_Event

Spatial Reference
NAD_1983_UTM_Zone_16N

Here you can search for other coordinate systems and utilize the layers or favorites.

11. In the **search** bar enter **NAD 1983 UTM Zone 16N**.
12. If needed, **expand** the Layers arrow to display the coordinate system.
13. If needed, expand the **Projected coordinate system** arrow then the **UTM** arrow, then the **NAD 1983** arrow to display the coordinate system.
14. Hit **cancel** to escape the Coordinate system window without making any changes.
15. Click **Run** at the bottom of the **Geoprocessing** pane.



Coordinate System

Select the Coordinate System to view the available options.

Current XY Details Current Z

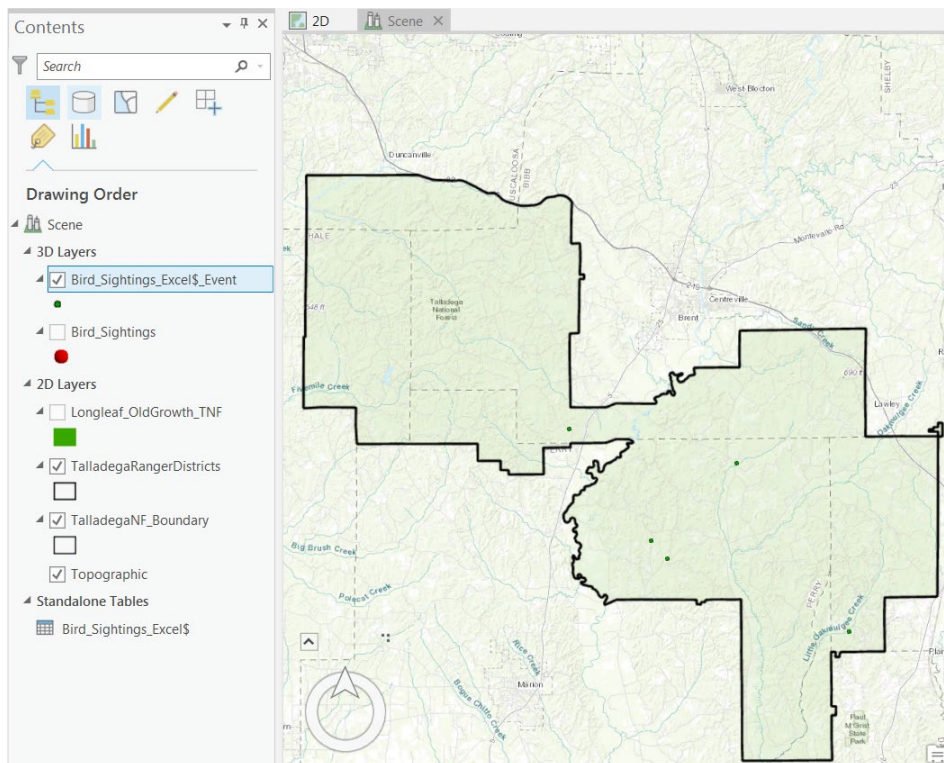
NAD 1983 UTM Zone 16N <None>

XY Coordinate Systems Available NAD 1983 UTM Zone 16N

Favorites
 Layers
 NAD 1983 UTM Zone 16N
 Geographic coordinate system
 Projected coordinate system
 UTM
 NAD 1983
 NAD 1983 UTM Zone 16N

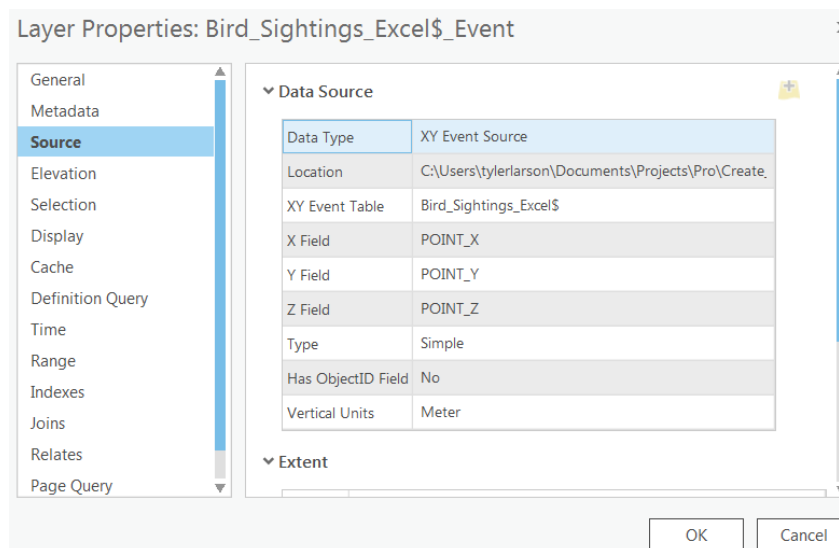
OK Cancel

The new layer is created and added to the Contents pane. Points representing the bird sighting locations display on the map.



16. In the **Contents** pane, right click **Bird_Sightings_Excel\$ _Event** and click **Properties**.

17. In the **Layer Properties** dialog box, click the **Source** tab.




The layer's data type is an XY Event Source, which means that the point locations are derived from a table. The fact that the layer does not have an ObjectID field limits its functionality—for example, it can't be used for geoprocessing. An XY event layer is useful for data display, but for analysis and data management, you need to export it to a feature class. You'll do that next.

18. On the Layer Properties dialog box, click **Cancel**.

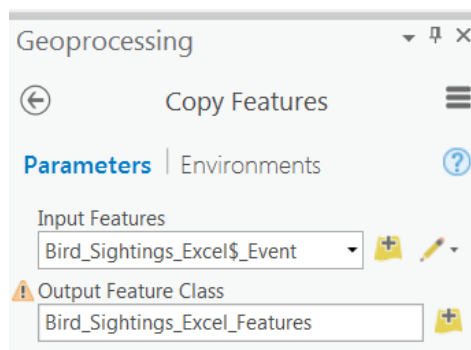
C. Export features

You'll export the layer to a geodatabase feature class. This will make it a fully functional spatial dataset for geoprocessing, spatial editing, and data management operations.

1. In the **Contents** pane, confirm that **Bird_Sightings_Excel\$ _Event** is selected.
2. On the **ribbon**, under **Feature Layer**, click the **Data** tab. In the **Export** group, click **Export Features** .

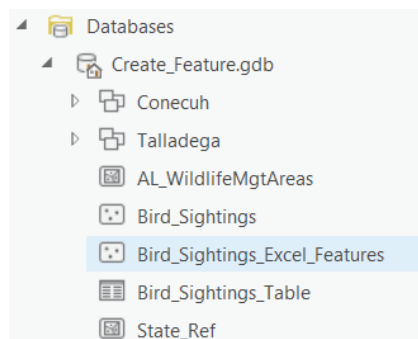
The Copy Features tool opens in the Geoprocessing pane. You can also activate this option by right clicking on the Bird_Sightings_Excel\$ _Event layer and selecting Data > Export Features.

3. Ensure the **Input** Features is the **Bird_Sightings_Excel\$ _Event** layer.
4. **Name** the new layer **Bird_Sightings_Excel_Features**.



When the tool finishes, a new feature class is created in the project geodatabase and a layer is added to the map. The map looks the same because the new layer has the same symbology as the XY event layer.

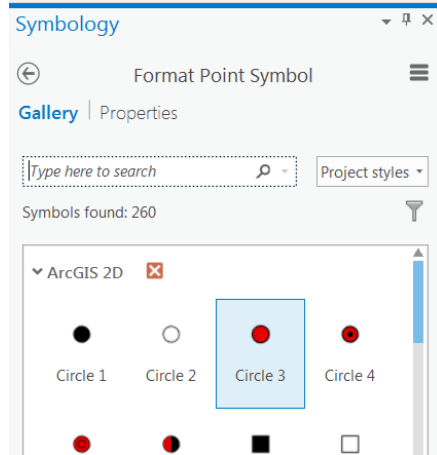
5. Turn **off** the **event layer** from the **Contents** pane.
6. In the **Catalog** pane, browse to **Databases > Create_Feature.gdb** to see the **new** feature class.




D. Symbolize the new layer.

1. Right click the **Bird_Sightings_Excel_Features** layer and **copy** it.
2. **Navigate** to the 2D map view and **paste** the **Bird_Sightings_Excel_Features** layer to the top of the **Contents** pane.
3. If necessary, click **Bookmarks** and select **South West**.

4. Right click the **Bird_Sightings_Excel_Features** layer and select **symbolology**.
5. Click on the **symbol patch** if necessary and select **Gallery**.
6. Select **Circle 3**.



7. Under **Format Point Symbol** click the **Properties** tab and confirm the **symbol** tab  is selected.
8. Check the Enable **scale-based sizing** check box.

Under Appearance, a slider appears. It has two size stops (short vertical bars) that represent the minimum and maximum map scales for which symbol sizes can be set.

9. **Hover** over the left most **size stop**.

The first stop is set at 1:100,000,000. This is the smallest scale at which the layer is visible because of your visibility range setting.

10. Click on the **right size stop**.

This stop is set at 1:1,000, the largest scale to which you can assign a symbol size. You can zoom in closer than 1:1,000 on the map, but the symbol size will not increase. The Size is currently set to 10 pt.

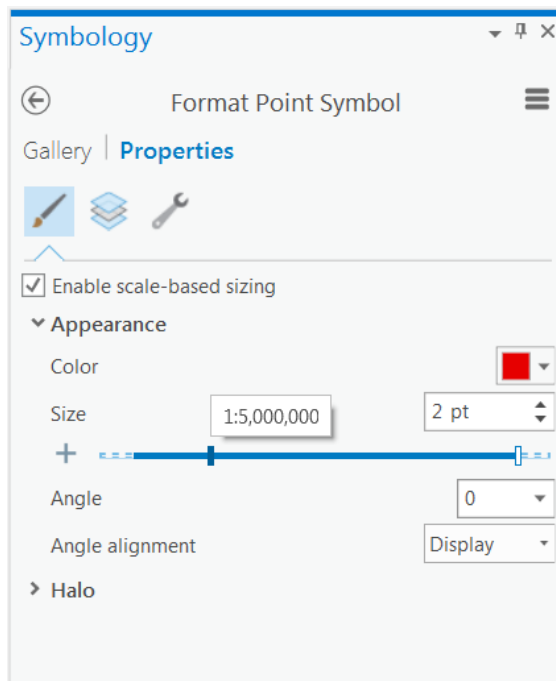
11. Change the size to **12 pt**.

This will be the maximum size of your symbol.

12. Select the **left Size stop** and adjust it to **1:5,000,000** and change the size to **2 pt**.

*When the map scale is 1:5,000,000, the **Bird_Sightings** symbol will be 2 points in size. As you zoom in, the symbol size will gradually increase until it reaches a maximum size of 12 points.*


13. Click **apply**.



14. **Zoom in and out of the map to see the symbol size adjust as the scale adjust.**

Part 2: Challenge - Configure pop-ups

When configuring pop-ups for your feature layers, you can customize the content and how the content is displayed. Pop-ups can contain custom text, and a list of fields, charts, images, and attachments.

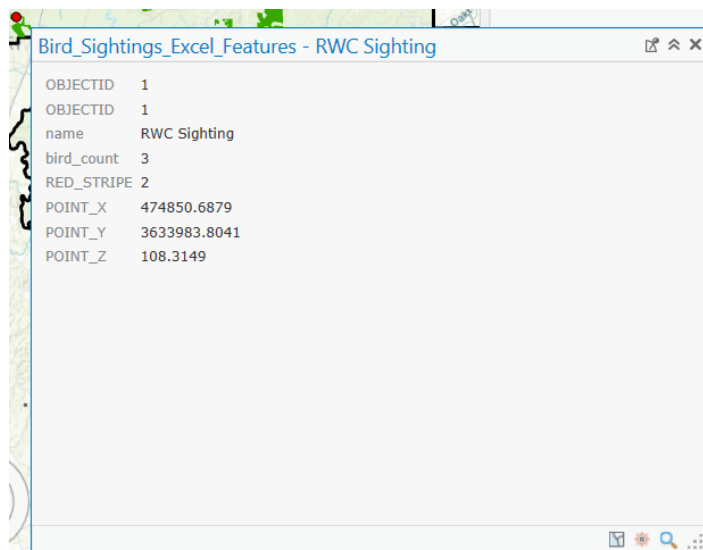
To configure a pop-up for a layer, right-click the layer in the Contents pane and click Configure Pop-ups . This opens the Pop-ups pane where you can define the content for the selected layer.

A. Pop-up elements you can customize

Element	Description
Title	These elements only allow you to include text and format that text. You can use the Field drop-down menu to add dynamic text from the layer itself.
Text	Allows you to add custom text to the pop-up.
List of Fields	Allows you to choose which fields to display in the pop-up.
Chart	Build vertical or horizontal bar charts, line graphs, or pie charts. You can only use numeric fields for the chart or for the field used to normalize the chart. Charts can have a title and a caption.
Image	Provide an image from a URL or attachment and set a custom title or caption. For attachments you will have access to the name of the file and its size from the Field drop-down menu, so that you can more easily distinguish a title/caption for multiple attachments. Images sourced from an attachment are dropped in the web map or feature layer.
Attachments	For layers with enabled attachments you can display the list of attachments within the pop-up. When a feature has attachments and you have chosen to show the list, you will see a set of hyperlinks that launch the attachment in the default file handler. Image attachments display by default. Features without attachments display a message that there are no attachments.

1. Click on **any point** on the map to **display its pop up**.

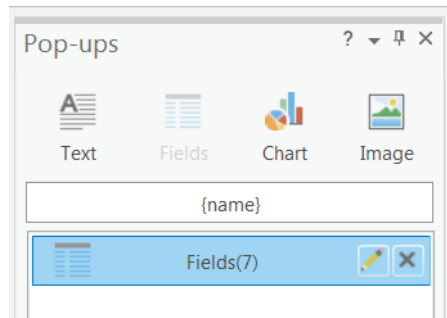
Details are pulled from the layers attribute table about the point and are displayed in a pop-up window.



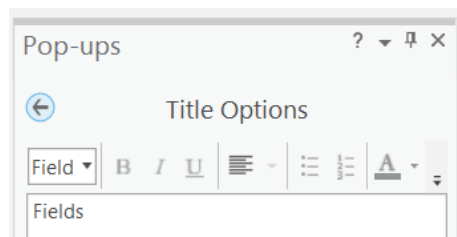
2. **Close** the **pop-up**.
3. Right click the **Bird_Sightings_Excel_Features** layer and select **Configure Pop-ups**.

The Pop-ups window appears. You can add elements to the pop-up definition by clicking the element type at the top of the pane. To edit the title, click inside the title block which appears below the other element buttons and format the text or choose another display field.

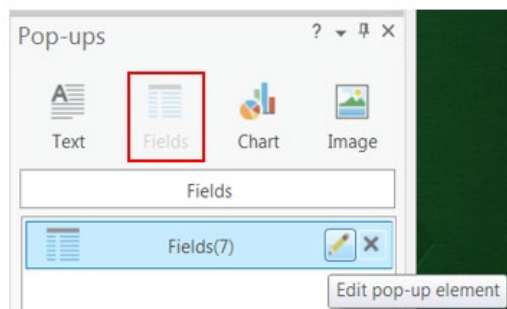
A pop-up can contain a list of attachments and support related data.



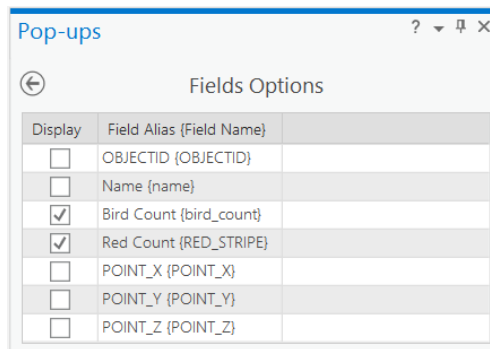
4. Click the **title bar** and enter **Fields** and click the back button.



5. Click the **edit pop-up** element button on the **fields tab**. If fields is not displayed in the box below select Fields from the pop-up menu.

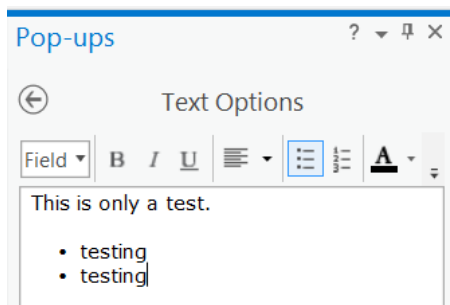


6. Leave only **Bird Count** and **Red Count** selected and hit the **back** button.




Display	Field Alias (Field Name)
<input type="checkbox"/>	OBJECTID {OBJECTID}
<input type="checkbox"/>	Name {name}
<input checked="" type="checkbox"/>	Bird Count {bird_count}
<input checked="" type="checkbox"/>	Red Count {RED_STRIPE}
<input type="checkbox"/>	POINT_X {POINT_X}
<input type="checkbox"/>	POINT_Y {POINT_Y}
<input type="checkbox"/>	POINT_Z {POINT_Z}

7. Click on the **text** option to **add text** to the pop-up.
8. Enter **This is only a test** and click on the **bullet points** from the options above and add to bullet points named **testing** and **testing**.



9. Click the **back** button.
10. Click on any point to see the **customized pop-up window**.



11. **Close the pop-up window, close the pop-up pane and save your project.**

For further information on customizing pop-up windows follow this [link](#) and this [link](#).

Note: you could try adding a chart to you pop up after learning how to create them in the follow challenges.

Part 3: Challenge - Create chart from feature layer

Charts are a graphical representation of tabular data, which helps you gain insight into the relationships, distribution, categories, trends, and patterns in data that otherwise may be difficult to see as raw numbers in a table.

To make a chart, start with the layer you want to visualize and define the chart's variables; then adjust the chart's properties and use interactive selection to explore further. You can manage the charts that are associated with the layers in your map and finally share the chart through a layer, map, or project package.

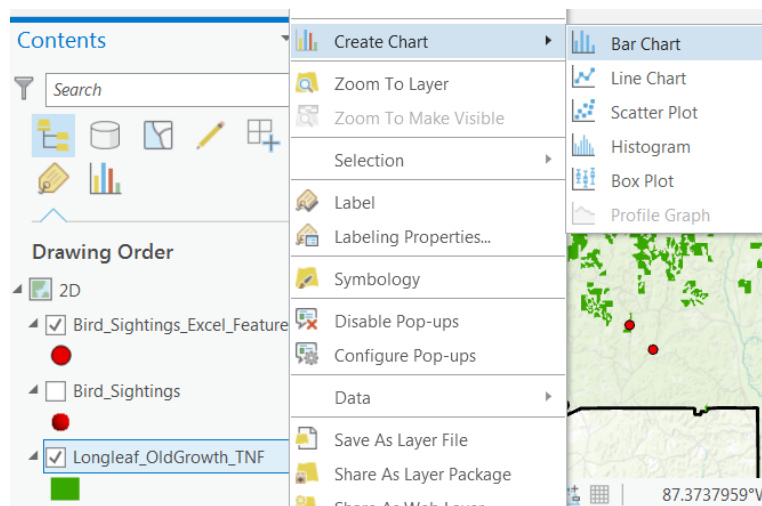
For more detailed information on charts click [here](#).

A. Choose layer and chart type

You can make a chart from any map layer that has an attribute table (including stand-alone tables). If you wish to create a chart from data that is not yet in your map, add the layer to the map so it shows in the Contents pane.

There are many types of charts to choose from. Follow [this link](#) for detailed descriptions.

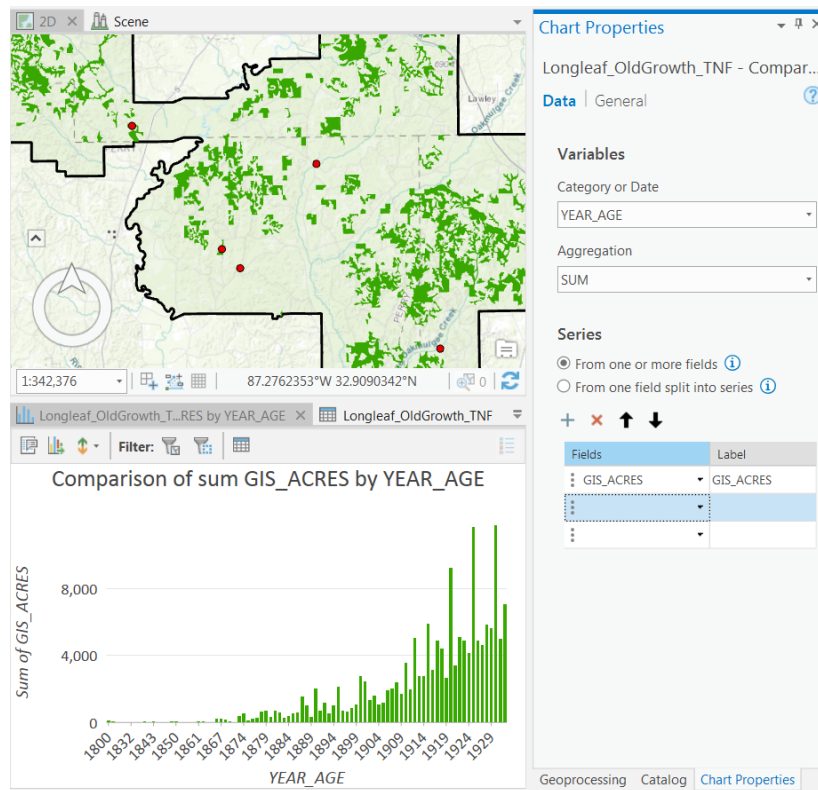
1. Right click on the **Longleaf_OldGrowth_TNF** layer and select **Create Chart > Bar Chart**.



The Chart Properties pane and chart opens. Charts are displayed in a dockable window or view. Chart windows can be moved or docked similarly to how you work with maps, layouts, or attribute tables. When you first make a chart, the chart window appears blank; no data or value labels are yet displayed in the chart window. To display data on the chart you must first define chart variables.

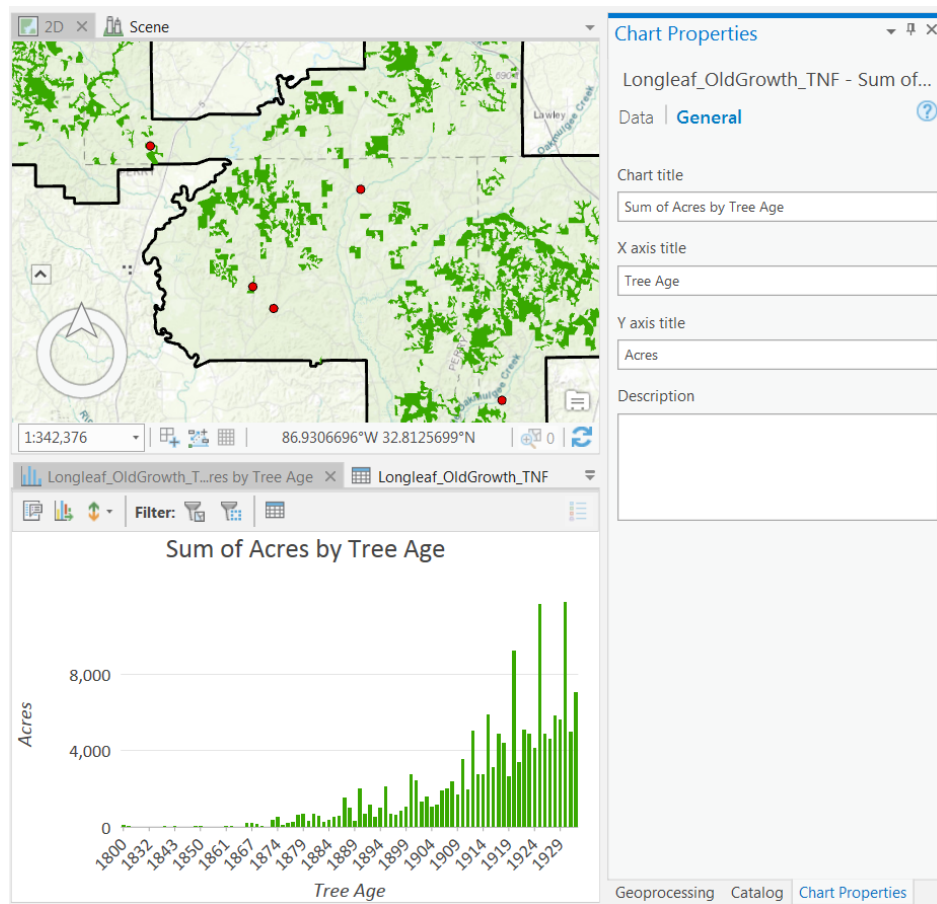
2. Under **Variables** in the **Category** or **Date** dropdown menu select **YEAR_AGE**.
3. Under **Fields** select **GIS_ACRES**.
4. For **Aggregation** set to **SUM**.

After you define chart variables, the chart window will display values on the axes and data will be drawn on the chart. Whenever possible, charts with no aggregation will use the same colors as the layer symbology.



5. Click on the **General** tab on the **Chart Properties** and rename the Chart title **Sum of Acres by Tree Age**.
6. Rename X axis title to **Tree Age**.
7. Rename Y axis title to **Acres**.



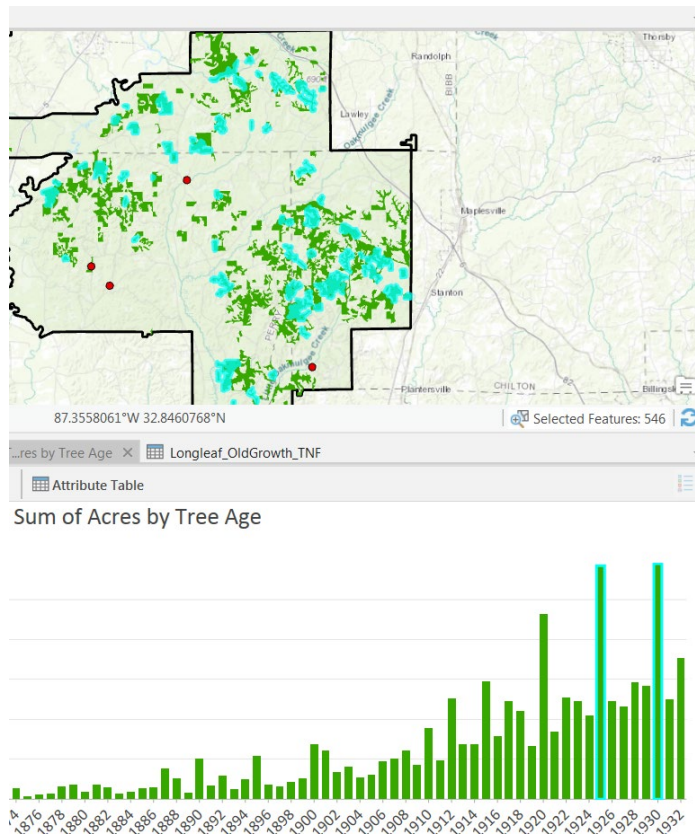


B. Selecting from a chart

Selection is dynamic between charts, maps, and attribute tables. Selecting one or more features in your chart will select the same features in your map and table. Similarly, a selection in your map or table will also be reflected in your chart.

1. **Select** one of the tall bars on your chart by clicking on it or click and drag to create a rectangle around the bars of your choice to **select multiple bars**.

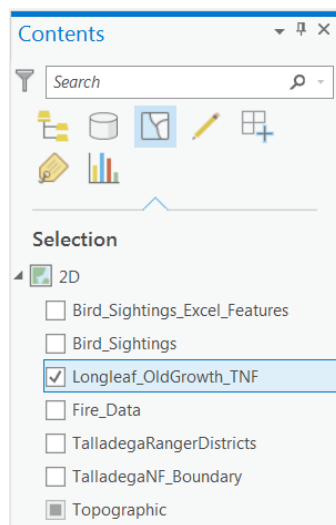
The bars are highlighted to display selection along with the corresponding map features.



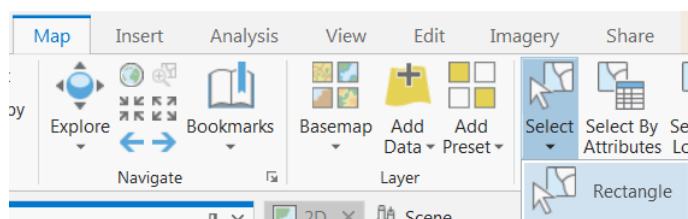
2. Click anywhere on the chart to **clear the selection** or click on **Clear** in the **Selection** group on the **Map** tab.

3. In the **Contents** pane switch to **List by Selection** .

4. **Uncheck** all boxes except the **Longleaf_OldGrowth_TNF** layer.

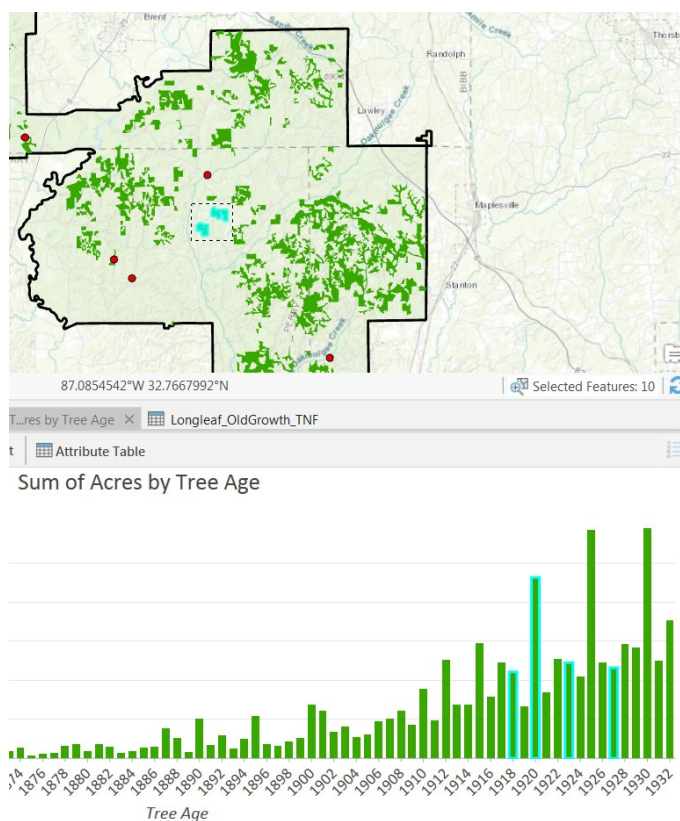


5. From the **Map** tab, in the **Selection** group click on the **Select drop down** and click on **Select by Rectangle**.



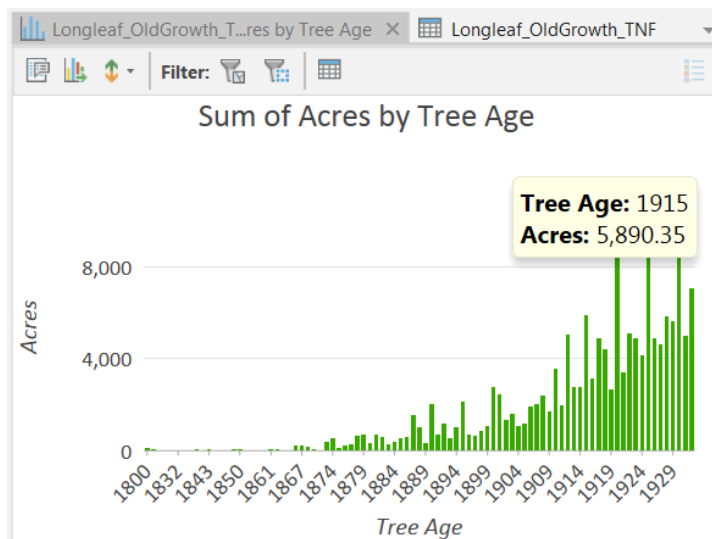
6. Draw a rectangle around a small portion of the green polygons representing the **Longleaf_OldGrowth_TNF** layer.

The features on the map are selected along with the corresponding bars on the graph.



7. Clear the selection.
8. Switch back to **List by Drawing Order** on the **Contents** pane.

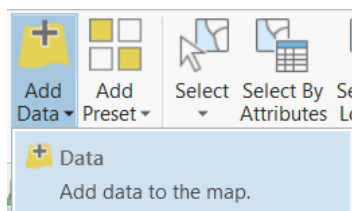
Tool tip: hover your mouse over a bar in the chart to get a pop-up displaying information.



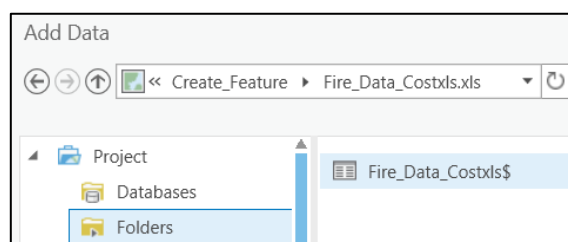
Part 4: Challenge - Create chart from table

A. Add table to Contents pane

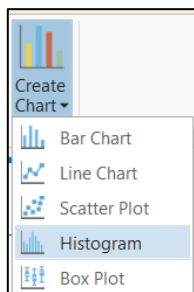
1. From the **Map** tab, in the **Layer** group click the **Add Data** drop down and select **Add Data to the Map**.



2. Navigate to your project folder and **add** the **table** titled **Fire_Data_Costxls\$**.



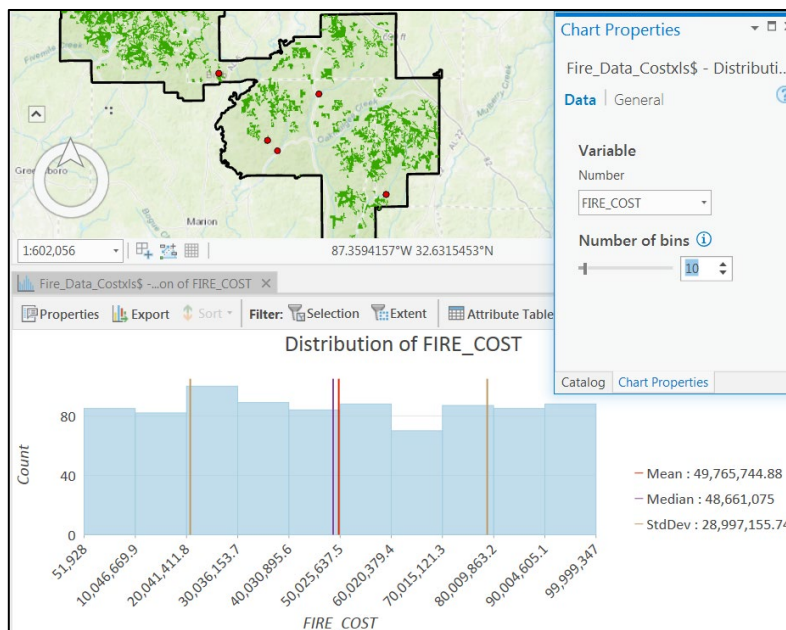
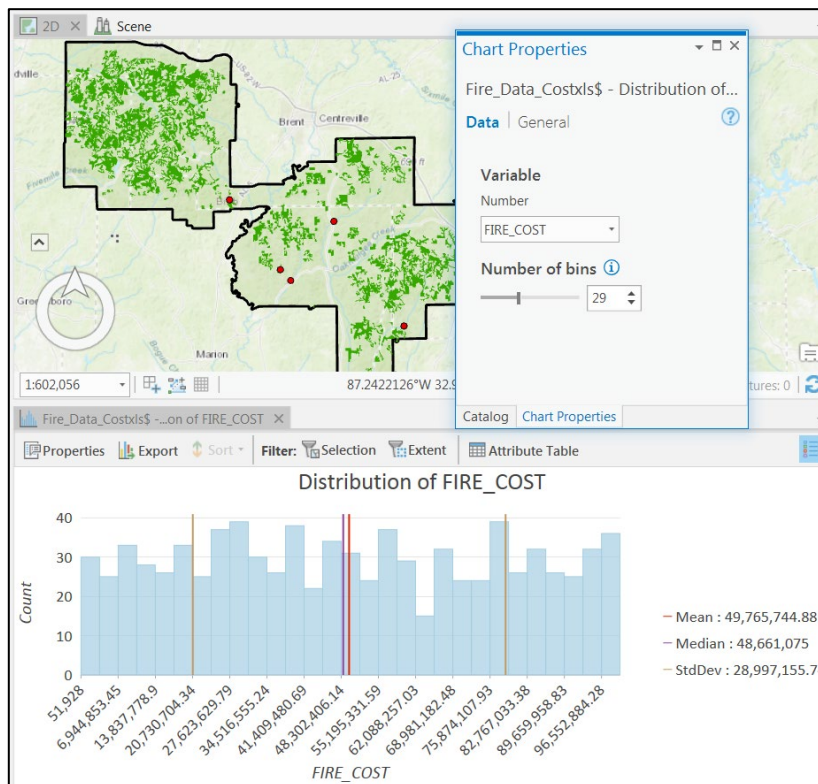
3. Highlight the **Fire_Data_Costxls\$** table and from the **Data** tab click on **Create Chart** under the **Visualize** group.
4. Select **Histogram**.



5. In the **Chart Properties** pane select **FIRE_COST** as the **Number Variable**.

The Histogram is created.

6. The Number of bins should default to **29** (for this dataset). Using the **slider** and **text box** to change the number of bins to see how your histogram changes.

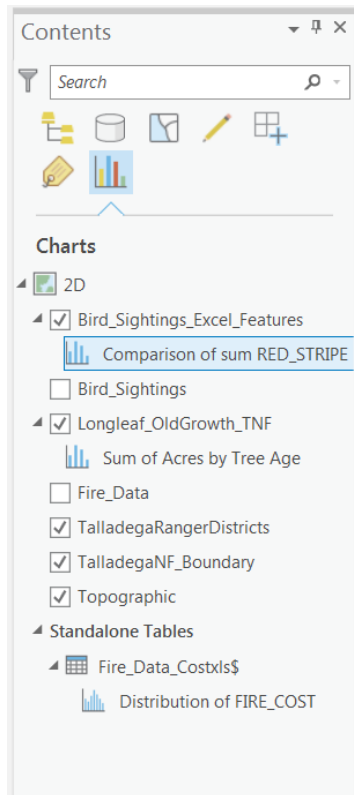


7. Feel free to play with **further editing options** available with charts.

Follow [this link](#) for more detailed information on Charts.

8. **Save** your project.

9. From the **Contents** pane, click on **List by Charts** to display the layers that contain charts.




10. Click on **list by drawing order** when done reviewing charts.

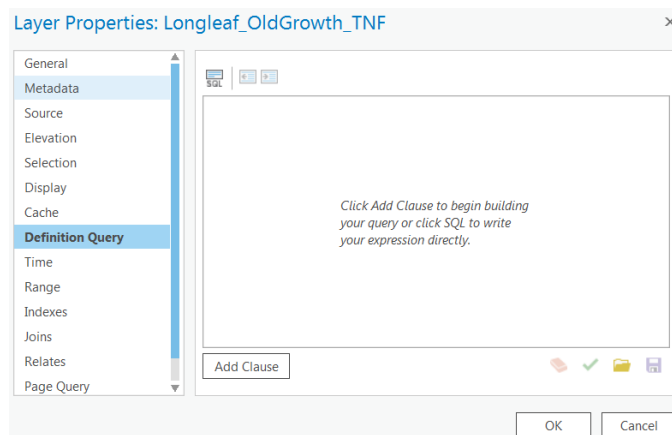
11. Leave the **Sum of Acres by Tree Age** Chart open.

Part 5: Challenge - Definition Query – Interactive Charts

A. Query data

1. Select the **Longleaf_OldGrowth_TNF** layer in the **Contents** pane.
2. On the **Data** tab, in the **Definition Query** group, click **Definition Query** . This can also be accessed by right clicking the layer, selecting properties and selecting Definition Query.

The Definition Query tab opens in the layer Properties window.



The Query Builder has two options for authoring your SQL query. You can switch between the two modes in the same dialog box (or pane, if using the Select By Attributes geoprocessing pane) depending on your preference. By default, the Query Builder opens in Clause mode which is intended to be approachable for any skill level and uses buttons to rely less on manual entry and knowledge of SQL syntax. The SQL Edit mode is for more experienced users who want to type their statement directly. It also means you will have fewer restrictions while building your statement.

Click the **Add Clause** button to add a new definition query.

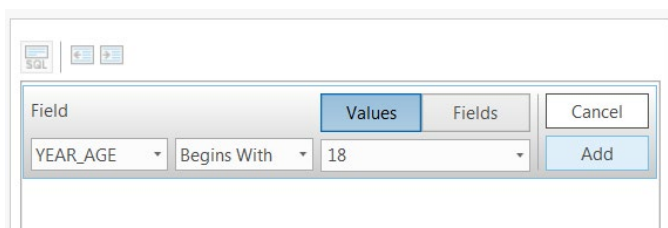
3. **Enter** the following details:

i. Field = **YEAR_AGE**

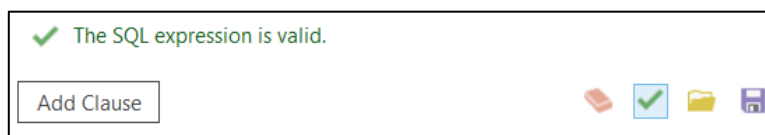
ii. **Begins With**

iii. Select the Values button and type or **18**.

4. Click **Add**.

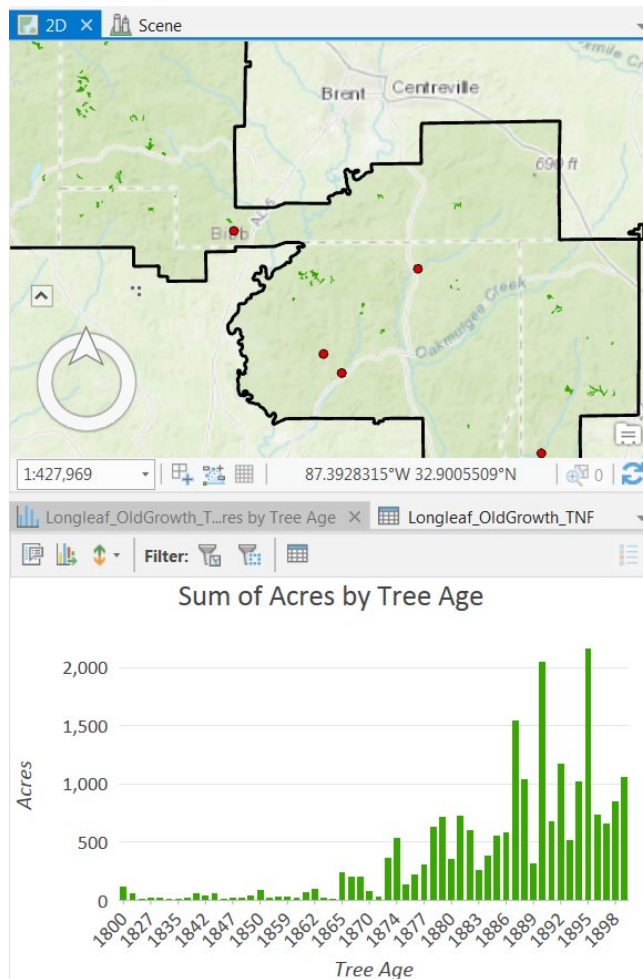


5. Click the **check mark** at the bottom of the window to **verify** your SQL statement.

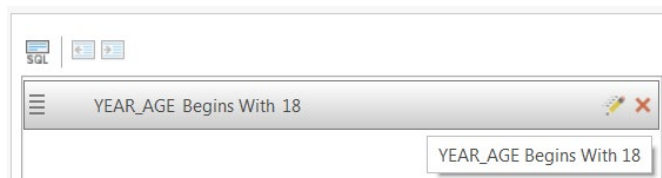


6. Click **OK** to execute the SQL statement.

The Chart and map are updated to include only data that satisfies the Definition Query. Only data containing values from the 1800's are displayed from the Longleaf_OldGrowth_TNF layer.



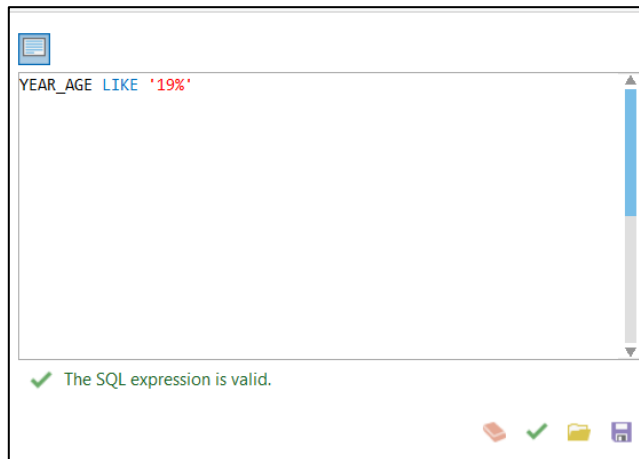
7. Right click the **Longleaf_OldGrowth_TNF** layer and select **Properties**.
8. Definition Query tab should be displaying the Query builder. If not, **select the Definition Query tab**.
9. **Hover** over the **SQL statement**. Edit and delete options appear along with a pop-up displaying the statement.



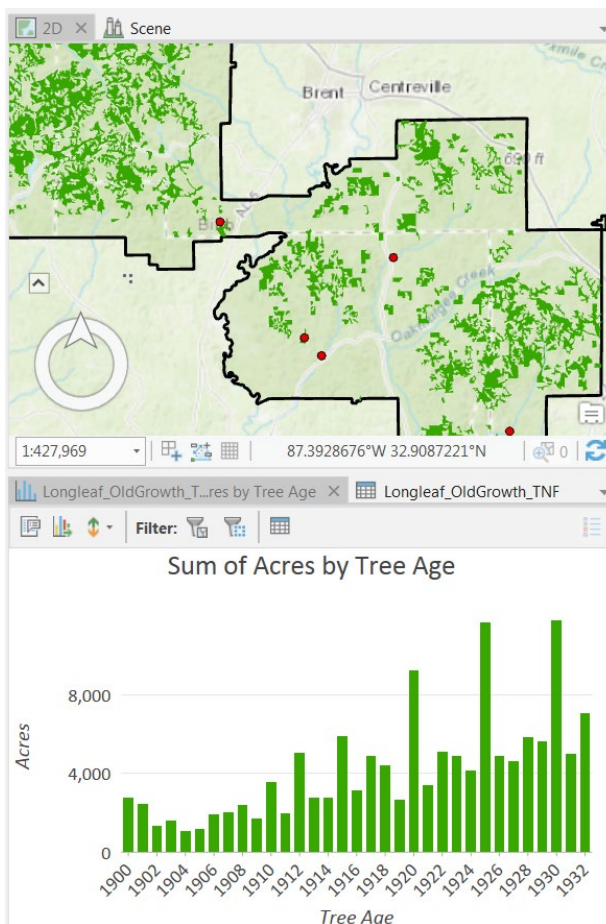
10. Click on the **SQL Edit mode** icon .

The Clause mode is displayed.

11. Edit '18%' and enter the value '19%'.
12. Click the **validate** check mark to validate the new SQL statement.



13. Click **OK** and **view results** on the map and chart.



If you are experienced with using SQL, you might be more efficient using SQL Edit mode in the Query Builder. The main benefit over Clause mode is that SQL Edit mode offers the following:

- Query authoring without restrictions.
- Support for autocomplete so you can quickly build a query— as you type, a prompt appears showing only keywords and operators supported by your data source.



• Color-coded elements to help you visually verify or modify your query.
See [Build an SQL query expression](#) for more information on how to build valid queries.

Part 6: Challenge - Select by Attributes – Interactive Charts

A. Select by attributes

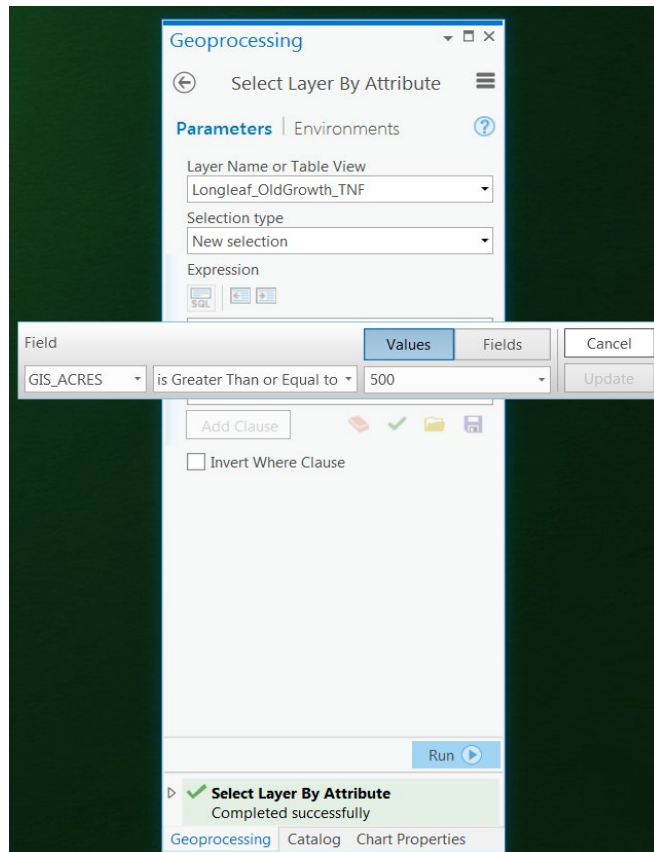
1. On the **Map** tab in the **Selection** group, click **Select By Attributes** to open the Select By Attributes geoprocessing tool.

A new Geoprocessing pane opens.

Note: If you're working in a Table View, click Select By Attributes on the Table tab in the Selection group.

2. From the Select layer By Attribute tool **select Longleaf_OldGrowth_TNF**.
3. Selection type select **New selection**.
4. Click **add Clause** and enter:
 - i. Field = **GIS_ACRES**
 - ii. **Is Greater Than or Equal to**
 - iii. Select Values and enter **500**
 - iv. Click **Add**
5. Click **Run**

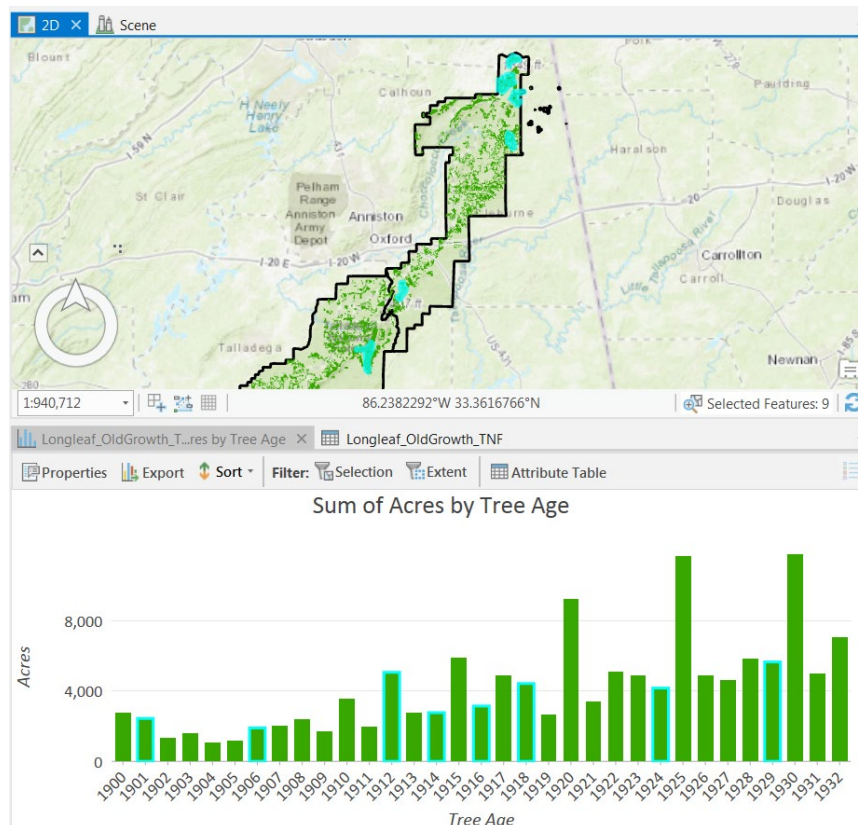




The selections that were made can be seen on the chart but likely cannot be seen on the map.

- Right click on the **Longleaf_OldGrowth_TNF** layer, highlight **Selection** and click **Zoom to Selection**.

Selection	Zoom To Selection
Label	Pan To Selection
Labeling Properties...	Clear Selection
Symbology	Switch Selection
Disable Pop-ups	Select All
Configure Pop-ups	Attribute Table Showing Selection



- From the **Select Layer By Attribute** tool click on the **Edit SQL Mode** button. You can chose to write your own SQL code here.

The screenshot shows the 'Expression' dialog box in a GIS application. The dialog box has a title bar 'Expression' and a text area containing the SQL expression 'GIS_ACRES >= 500'. Below the text area are several icons: a red eraser, a green checkmark, a yellow folder, and a purple save icon.

- Clear your selection and **save** your project.

Congratulations! You have successfully completed this exercise.