

EXERCISE 3

Create, Analyze & Edit Data



Introduction

In this tutorial, you'll use geoprocessing tools and working with GIS data you will create geometry, edit its attributes, metadata and calculate geometry. Creating and modifying pop-ups and charts. Executing definition queries and selecting by attributes.

Objectives

- Work with different Geoprocessing options
- Create and edit data
- Query and select data

Required Data

- Course data downloaded and unzipped



Table of Contents

| | |
|--|----|
| Part 1: Set Geoprocessing Environments | 3 |
| A. Create a Geodatabase | 3 |
| B. Set geoprocessing environments..... | 4 |
| Part 2: Geoprocessing Pane | 5 |
| A. Analysis gallery | 5 |
| B. Geoprocessing pane..... | 6 |
| Part 3: Create Point Feature Class | 9 |
| A. Create Feature Class | 9 |
| B. Edit metadata..... | 11 |
| C. Create Fields | 12 |
| D. Symbolize the layer | 14 |
| E. Configure the feature template | 15 |
| F. Create point features | 16 |
| G. View the layer in 2D map | 19 |



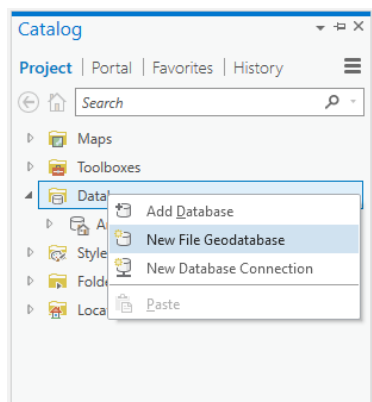
Part 1: Set Geoprocessing Environments

Geoprocessing environment settings are additional settings that affect geoprocessing tools. These settings provide a powerful way to ensure geoprocessing is performed in a controlled environment. Setting the workspace paths will save time when exporting numerous files across several processes into a single directory.

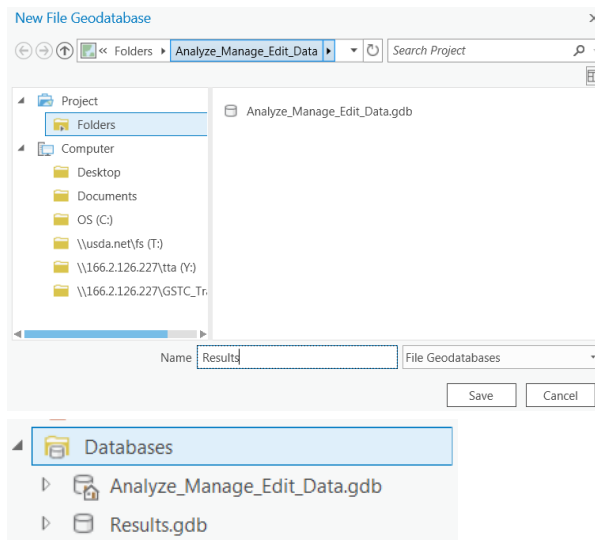
[See the geoprocessing environments reference book](#)

A. Create a Geodatabase

1. Navigate to\Exercise3\Analyze_Manage_Edit_Data and open the project titled **Analyze_Manage_Edit_Data**.
2. From the **Catalog** pane right click the **Databases** folder and select **New File Geodatabase**.



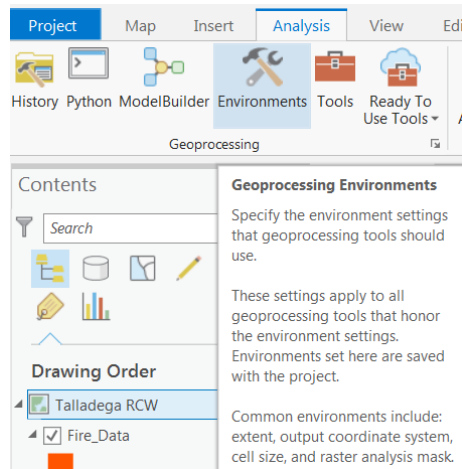
3. Name the new geodatabase **Results** and **click save** (navigate to the project folder if needed). A new geodatabase called Results is added to your Databases folder. A results geodatabase is a good place to store your geoprocessing results all in one place.




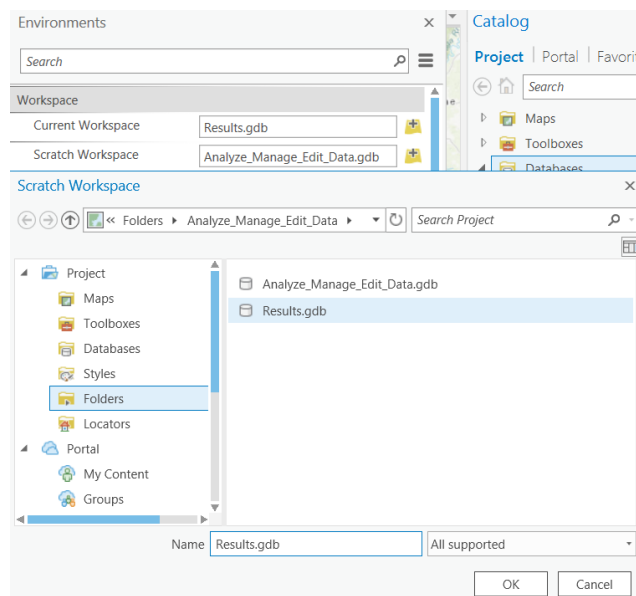
B. Set geoprocessing environments

You can specify geoprocessing environment settings once for your project using the Environments window. These settings are saved with your project and will be automatically used by all tools that honor the environments.

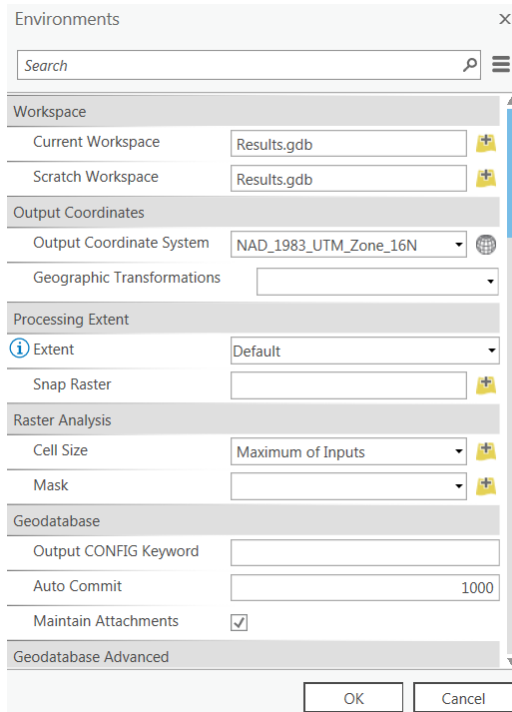
1. **Open** the geoprocessing environments window by clicking **Environments** from the **Geoprocessing** group on the **Analysis** tab.



2. Set both the **Current Workspace** and the **Scratch Workspace** to the **Results.gdb** by hitting the **browse** button  and navigating to your **Results.gdb**.



3. Click the **Output Coordinate System** dropdown and select **TalladegaNF_Boundary**. **Processing Extent** leave set as **default**. Output Coordinates and Processing Extent selections will not display the layer you selected, rather the Coordinate system and extent of the layer you selected as displayed in the screen shot below.



4. Click **OK**

5. **Save** the Project to save the settings to the project.

Part 2: Geoprocessing Pane

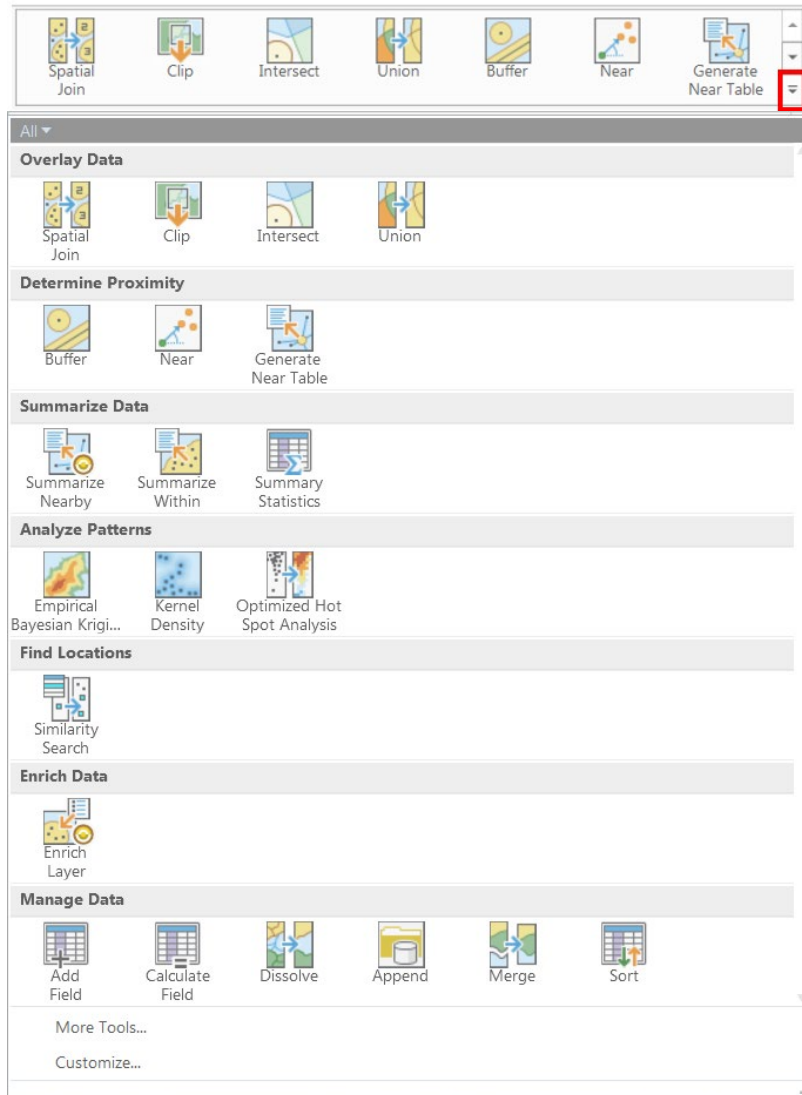
With ArcGIS Pro, you can find geoprocessing tools:

- In the Analysis gallery
- By searching in the Geoprocessing pane
- In the list of Favorites in the Geoprocessing pane
- In the list of Toolboxes in the Geoprocessing pane
- In a project toolbox in the Catalog pane, or in a toolbox in a folder or geodatabase
- In an ArcGIS Server connection in the Catalog pane.
- In the Portal group of the Analysis ribbon or the Portal tab in the Geoprocessing pane

A. Analysis gallery


This gallery gives access to a subset of the full suite of geoprocessing tools in ArcGIS. The gallery is customizable and can be saved as part of a project template.

1. Click on the **Analysis** tab.
2. Click on the **lower down arrow** at the bottom right of the **Analysis** gallery within the **tools group** to **expand** it.

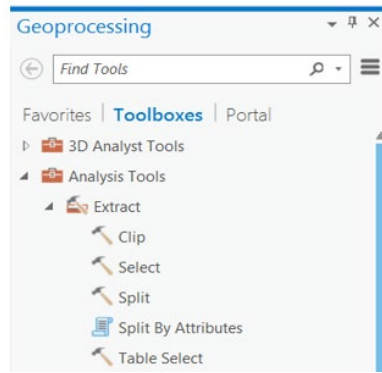


*You can save a custom set of geoprocessing tools within an ArcGIS project. The set of tools you save in a project can contain both ArcGIS tools and custom tools that you have built or that others have shared with you. To add a tool to the Analysis gallery, right-click any tool in the Geoprocessing pane and select **Add To Analysis Gallery***

B. Geoprocessing pane

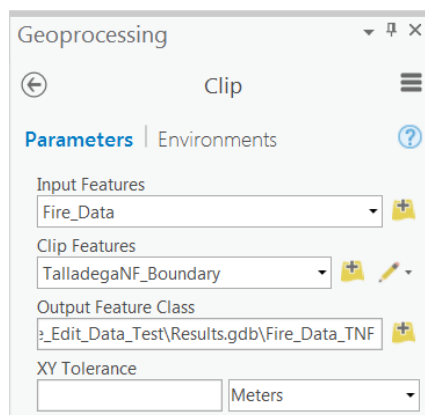
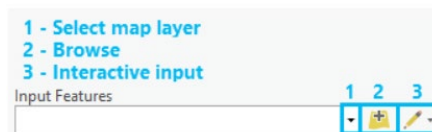
1. On the **ribbon**, click the **Analysis** tab. In the **Geoprocessing** group, click the **Ready to Use Tools**. A drop down appears with ready to use tools from ArcGIS Online hosted data and analysis capabilities.
2. **Click Tools**  next to Ready to Use Tools. The Geoprocessing pane opens. Under **Favorites**, some common geoprocessing tools are readily accessible. You can add tools to your favorites list by right clicking any tool and selecting add to Favorites. This only adds to your favorites for the current project.

3. Click the **Toolboxes** tab. The Toolbox list includes all toolboxes that are included with ArcGIS or that have been added to your project.
4. From the **Toolboxes** tab, expand the **Analysis Toolbox** then expand the **Extract Toolset** and click the **Clip** tool to open the tools parameters.



5. Set the following tool parameters:
 - i. Input Features: **Fire_Data**
 - ii. Clip Features: **TalladegaNF_Boundary**
 - iii. Output Features: **Fire_Data_TNF**
 - iv. Leave the rest as **default**.

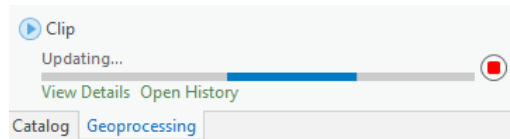
To enter layers into the tool dialog windows, (1) you can use the drop-down lists, (2) use the browse option by clicking the folder button, (3) [Create input features interactively](#) using the interactive input button (see screenshot below), (4) you can drag and drop layers directly from the Contents pane.



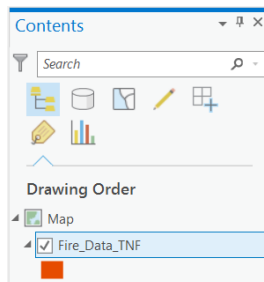
*The **Environments** tab is where Environment settings can be changed for the individual tool.*

6. Click **Run** at the bottom right of the **Geoprocessing** pane.

When a tool is running, a progress bar is displayed to show completion percentage, and a cancel button is available to stop processing.

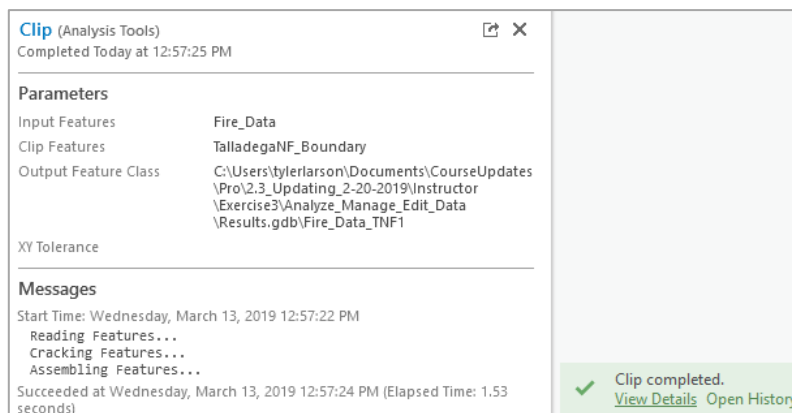


When the tool is finished running, any output layers will be added to the map and the progress bar will display Completed if the tool ran successfully. If an error occurred during execution, the progress bar will display Error. When finished clicking the back button returns to the previous Geoprocessing pane page.



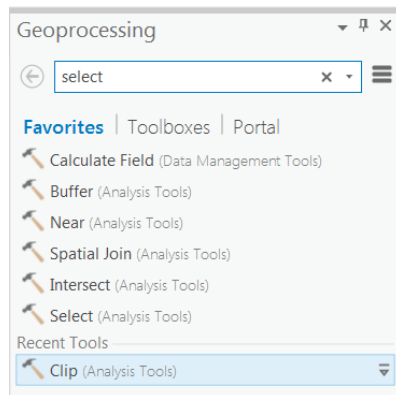
The new layer Fire_Data_TNF is added to the Catalog pane. The new layer contains fire data that was clipped down to only include what falls within the TalladegaNF_Boundary.

7. Hover your cursor over the **completed** tool or click View Details to view the **details**. Note: the Open History button opens the History tab on the Catalog pane.

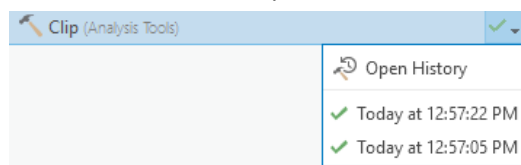


8. Click the **back** button on the **Geoprocessing** pane and **click** the **favorites** tab.

The Favorites section of the Geoprocessing pane will show the tools that you have recently run. Tools that have been recently run display an indication icon that you can hover over to open the tool with the settings you previously used



9. **Hover** or **click** the drop down icon to the right of the **clip** tool.

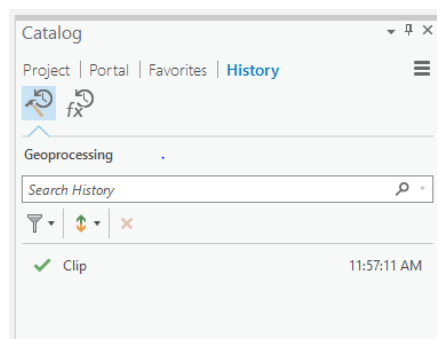


10. Click on the **most recently run instance** of the Clip tool. You are returned to the settings of the tool run at the specified time.

When a geoprocessing tool is run from the Geoprocessing pane or the Python window, an entry is added to the project [Geoprocessing History](#) with details on when the tool was run, the settings that were used, if the tool completed successfully, and any information, warning, or error messages.

11. Click on the **Catalog** pane tab to display it from the bottom of the **Geoprocessing** pane.

12. **Click** on the **History** tab in the Catalog pane.



13. Right click **Clip** to display further **options**.

14. **Save** your project and **close** it.

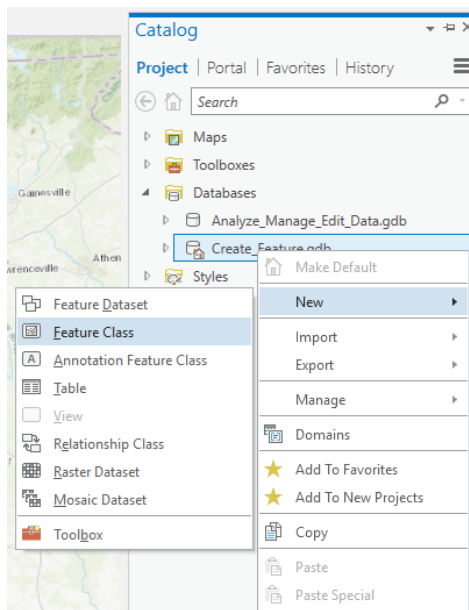
Part 3: Create Point Feature Class

You'll create a feature class in your project geodatabase to store bird sightings.

A. Create Feature Class

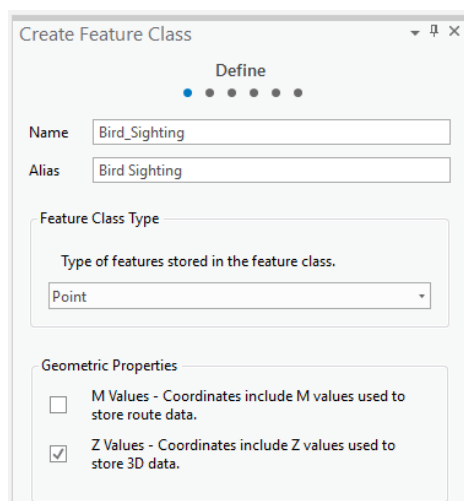
1. **Open** the project **Create_Feature** from your data download.

2. From the **Catalog** pane browse to **Databases > Create_Feature.gdb**
3. Right click **Create_Feature.gdb** and click **New > Feature Class**



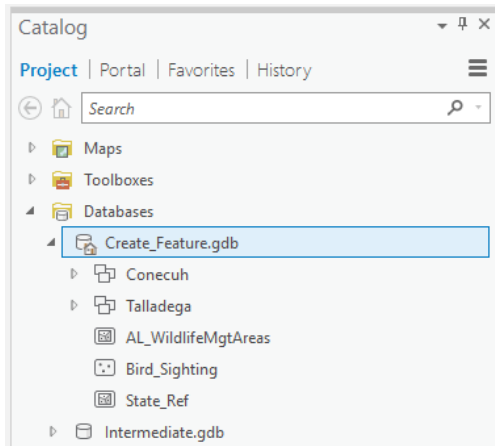
4. When the Geoprocessing pane opens to the Create Feature Class tool **enter** the following parameters:
 - i. Feature Class Name = **Bird_Sighting**
 - ii. Alias= **Bird Sighting**
 - iii. Geometry Type = **Point**
 - iv. Has Z = **Yes**

The Z Values box is checked by default. Z-values define vertical position and can be used in 3D views.



5. Click **Next**.
6. Keep the defaults for the Fields page and click **Next**.

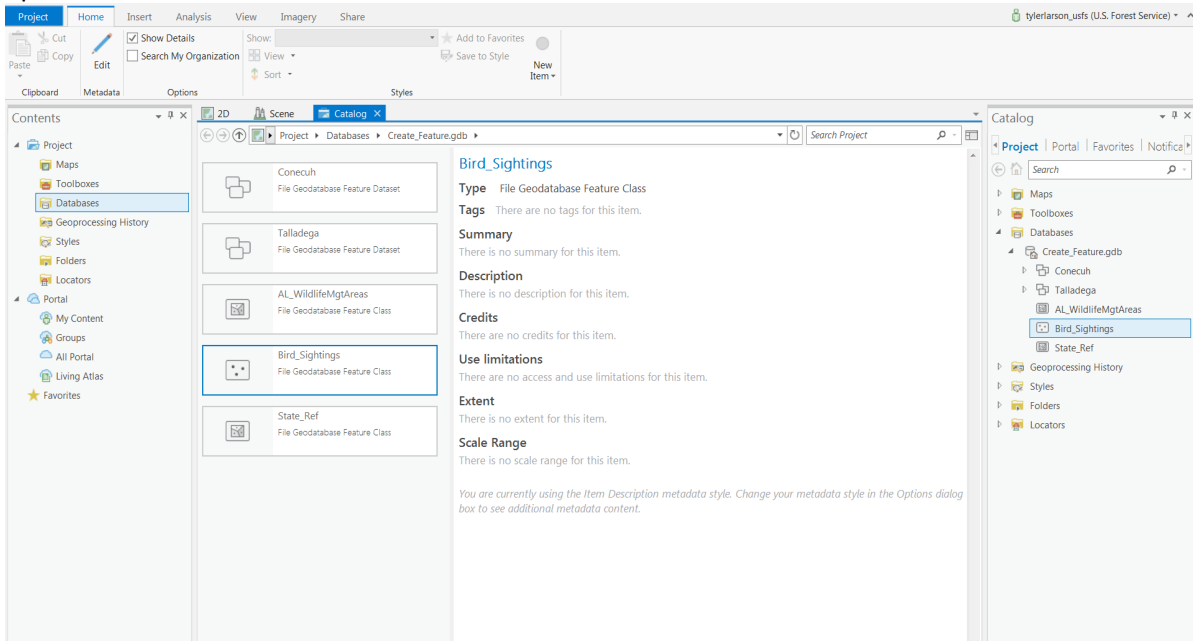
7. Keep the current coordinate system and click **Next**.
8. Keep the default for the X Y, and Z tolerances and click **Finish**.
9. Make the **Catalog** pane active. If necessary, browse to **Databases > Create_Feature.gdb**. The **Bird_Sightings** feature class has been added to the geodatabase.




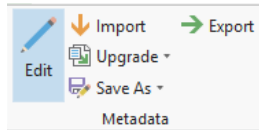
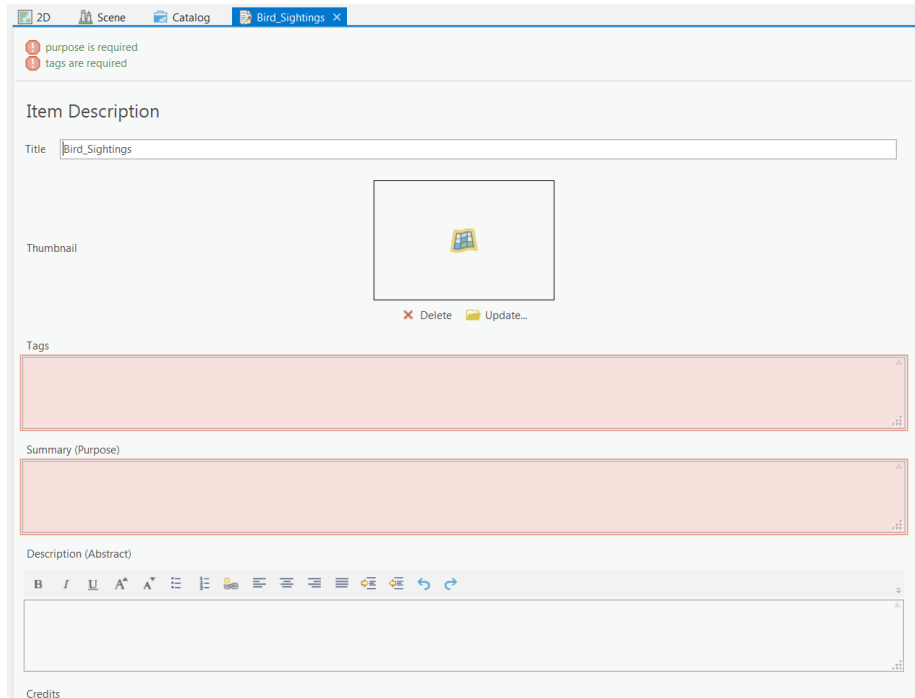
10. **Drag and drop** the new **Bird_Sighting** feature class into the scene window. It will appear in the 3D Layers section of the Contents pane because it has a z-value (note that the map view currently displayed is a Scene meaning it is in a 3D environment).

B. Edit metadata

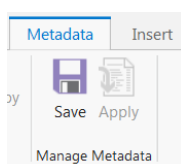
In the **Catalog** pane, right-click the **Bird_Sightings** feature class and click **View Metadata** (you may have to click on the Bird_Sighting layer once the Catalog view opens). The catalog view opens.



1. On the **ribbon**, on the **Home** tab, in the **Metadata** group, click **Edit** . The Bird_Sightings metadata **view** opens. The input boxes for tags and a summary are highlighted in pink. This information is required if the map is shared to ArcGIS Online.

2. Enter the following parameters:
 - i. Tags = **Red Cockaded Woodpecker, Sightings** (commas delineate separate tags).
 - ii. Summary (Purpose) = **Document sightings of Red Cockaded Woodpeckers.**
 - iii. Descriptions (Abstract) = **To learn editing Metadata.**
 - iv. Credits = **Yours truly.**
3. Click the **Save** button on the **Metadata** tab.

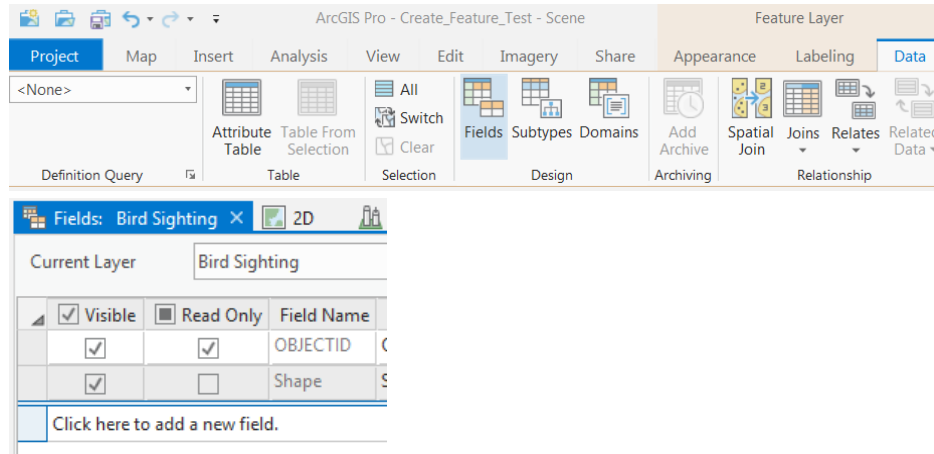


4. **Close** the **metadata** view and the **catalog** view.

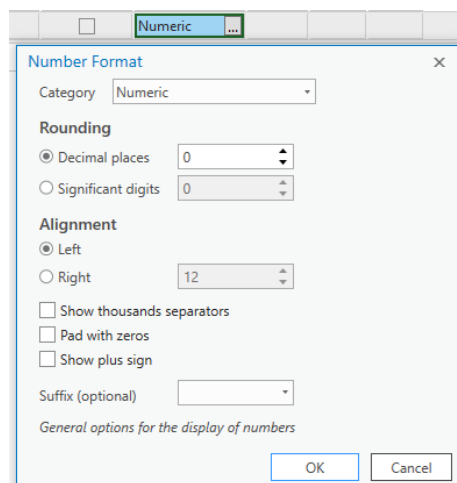
C. Create Fields

By default, a new feature class has only two attributes, ObjectID and Shape. You'll add fields for a feature name and description. Note: fields could have been added during feature class creation.

1. Select the **Bird_Sightings** layer from the **Contents** pane.
2. On the **ribbon**, under **Feature Layer**, click the **Data** tab. In the **Design** group, click **Fields** to open the **Fields view**.



3. **Click** below the existing fields to **add a new field** to the table. A new field is added.
4. In the **Field Name** column, replace the value with **NAME**. Tab to advance to the next column.
5. Enter **Name** in the **Alias** column.
6. In the **Data Type** column, click the value to display a list of data types and select **Text**.
7. In the **Length** column enter **25**.
8. **Add** another field with the following properties:
 - i. Field Name = **BIRD_COUNT**
 - ii. Alias = **Bird Count**
 - iii. Data Type = **Short**
 - iv. Number Format (double click to see the ellipse, click the ellipse) = **Numeric**
Decimal places = **0**



9. **Add another field** with the following properties:
 - i. Field Name = **RED_STRIPE**

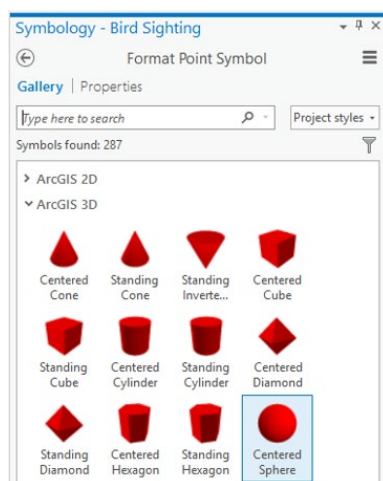
- ii. Alias = **Red Count**
- iii. Data Type = **Short**
- iv. Number Format (double click to expose ellipse, click the ellipse) = **Numeric**
 - (a) Decimal places = **0**
- 10. On the **Fields** tab, in the **Changes** group, click **Save** to save your table changes.
- 11. Close the **Fields** view.

Note: The red-cockaded woodpecker's most distinguishing feature is a black cap and nape that encircle large white cheek patches. Rarely visible, except perhaps during the breeding season and periods of territorial defense, the male has a small red streak on each side of its black cap called a cockade, hence its name. The species is listed as Near Threatened by the IUCN.



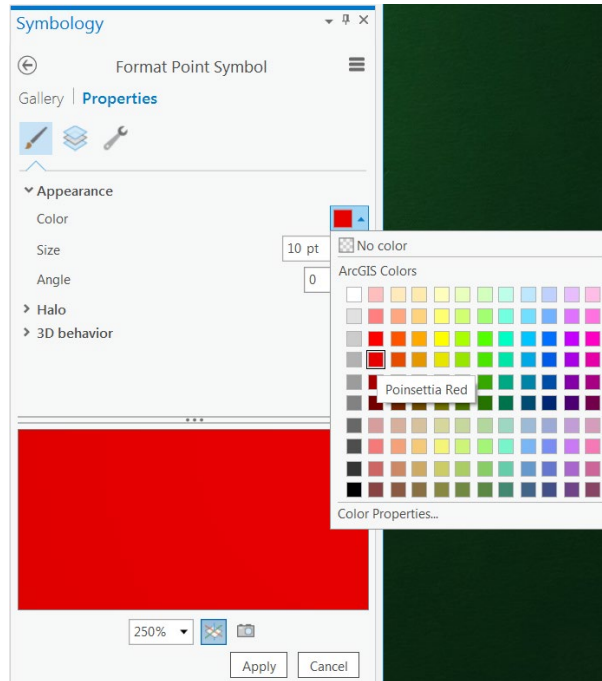
D. Symbolize the layer

- 1. From the **Contents** pane, right click the **Bird_Sightings** layer and click **Symbolology** or click on the symbol itself that's displayed below the layer in the Contents pane.
- 2. In the **Symbolology** pane, scroll to the bottom of the gallery and select **sphere** under **ArcGIS 3D**. You may also collapse the ArcGIS 2D symbols to display the 3D symbols quickly.



- 3. At the top of the **Symbolology** pane, click the **Properties** tab.

4. For color select **Poinsettia Red**.
5. **Size** select **10 pt.** (make big for tutorial display purposes).
6. Click **Apply**.



7. **Close** the **symbology** pane and save the project.

E. Configure the feature template

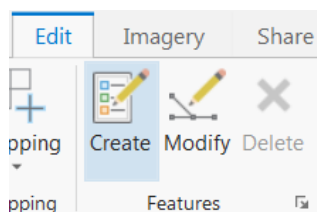
To create features, you'll first select and configure a feature template. A feature template specifies the default symbol for new features as well as default attribute values. It also specifies the editing tool used to create features. Feature templates streamline data creation.

Before configuring the feature template, you'll make Bird_Sightings the only editable layer in the scene. This will reduce the risk of accidentally editing other layers.


1. At the top of the **Contents** pane, click **List By Editing**

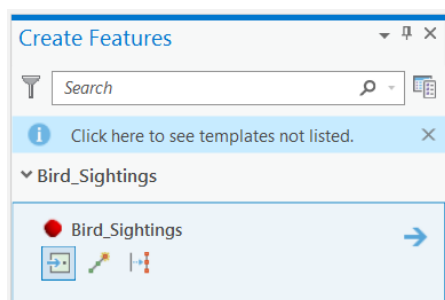
Note: The red exclamation point next to Topographic means that this layer cannot be edited.


2. **Uncheck** all layers excluding **Bird_Sightings** making it the only editable layer.
3. At the top of the **Contents** pane, click **List By Drawing Order**
4. On the **ribbon**, click the **Edit** tab. In the **Features** group, click **Create Features**.




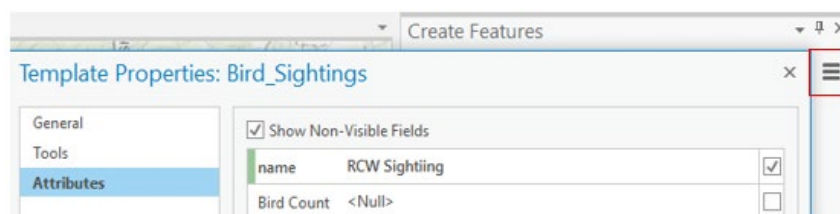
The Create Features pane opens and displays the Bird_Sightings feature template. The other feature templates aren't listed because the layers are not editable.

- Under **Bird_Sightings** heading, click **Bird_Sightings** to **expand** the template. The **Point tool**  is selected as the default tool for creating new point features.



Note: you can click the manage templates button (top right of pane)  to expose other templates.


- Click the **Open the active template pane** button  to access the **feature attributes**.
- Click the **Hamburger** menu and open the **Properties** and highlight **Attributes**.
- Enter RWC Sighting** in the **Name field** and **check** the box next to it. Each feature will automatically be named RWC Sighting and be listed as a required field.





F. Create point features

In this section, you'll create a point feature to represent the Egmont Road entrance. The Point tool for creating features is currently active. To keep the tool active as you navigate the map, you'll use a [keyboard shortcut](#).

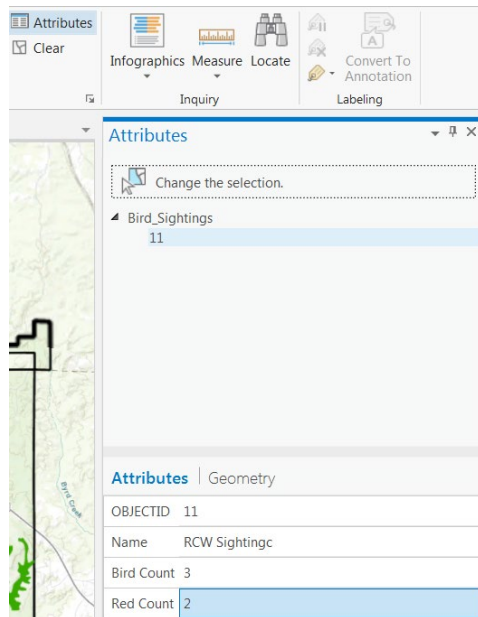
- Hover** your cursor over the **scene** view.

The pointer icon is a crosshair with a point symbol attached to it. If you click on the scene, you'll create a point feature wherever you click. If you add a feature in the wrong place, click the  Undo button on the Quick Access Toolbar to remove it.

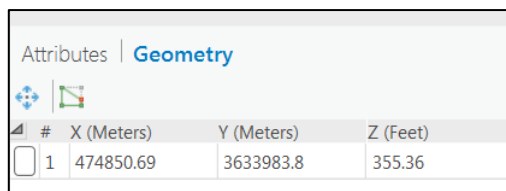
- Ensure your **scene** view is active and under **Bookmarks** select **Bibb**.
- Press and hold the **C key** on the keyboard.

The pointer icon changes to a pointing finger . As long as you hold the C key, you can click and drag to pan the map without placing a point. To zoom in and out, use the mouse wheel or hold the right mouse button and drag. You can also use the on-screen navigator  to navigate the map while the Point tool is active.

4. **Navigate** to an area in the Bookmark you would like to place a Bird Sighting, release the C key and **click** on the location on the map. The feature is added to the map.
5. On the **Map tab**, in the **Selection** group, click **Attributes**
6. In the **Attributes** pane, enter the value **3** in the **Bird Count** field and **2** in the **Red Count** field.



7. The Name field has already been added, as specified by the feature template. Next to the **Attributes** tab, in the middle of the pane, click the **Geometry** tab.



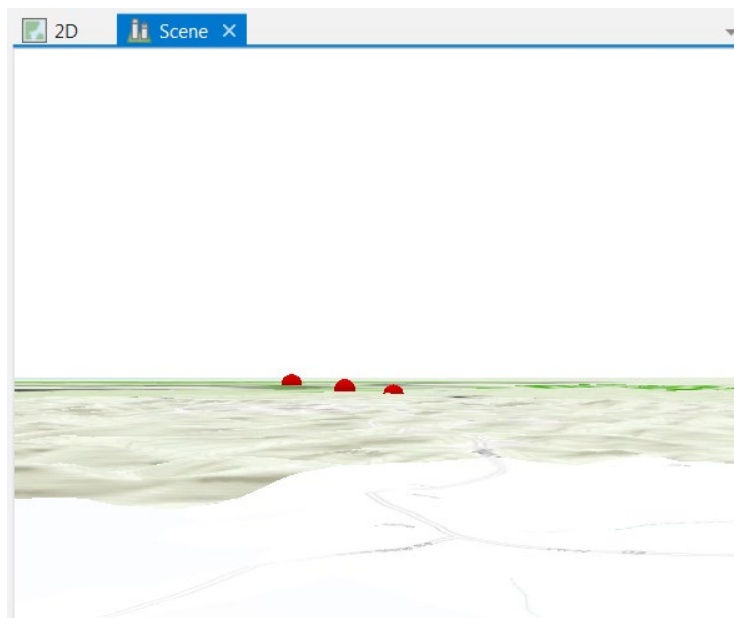
Along with the x and y values, a z-value is part of the point feature's geometry.

8. Click the **Attributes** tab to show the feature's attributes again.
9. From the **Bookmarks** navigate to **Beaverdam Creek**.
10. Pick a place and **add a point** feature to the map.
11. **Enter** varying values for **Bird count** and **Red Count** as you see fit (we will be making a chart and from these point values).
12. **Add points** anywhere within **Oakmulgee** (totaling at least 5 points). Add points and edit the Bird Count and Red Count values as you see fit.
13. When finished adding points, on the **Edit** tab, in the **Manage Edits** group, click **Save**.
14. **Close** the **Create Features** pane.
15. On the **Edit** tab, in the **Selection** group, click **Clear**.
16. In the **Contents** pane, right-click the **Bird_Sightings** layer and click **Attribute Table**.

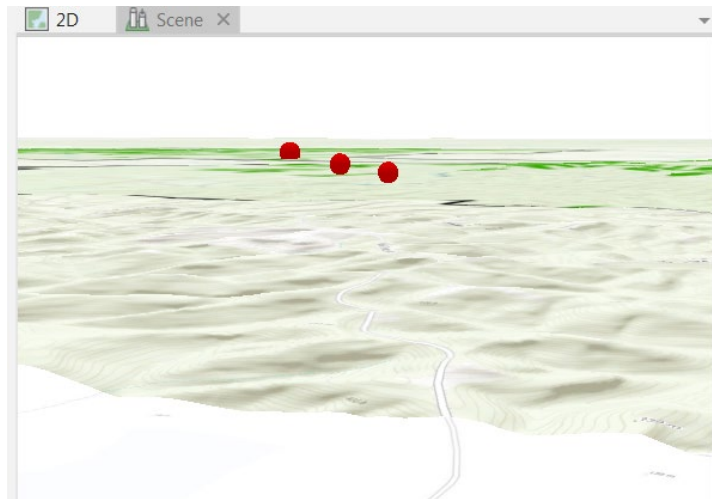
Notice that the Shape field values are Point Z, showing that the features have z-values (your values will differ from values displayed in the screen shot below).

| Bird_Sightings | | | | |
|--|---------|--------------|------------|-----------|
| Field: Add Delete Calculate Selection: Zoom To | | | | |
| OBJECTID | Shape | Name | Bird Count | Red Count |
| 2 | Point Z | RWC Sighting | 3 | 2 |
| 5 | Point Z | RWC Sighting | 5 | 4 |
| 6 | Point Z | RWC Sighting | 1 | 1 |
| 7 | Point Z | RWC Sighting | 2 | 0 |
| 9 | Point Z | RWC Sighting | 6 | 2 |
| Click to add new row. | | | | |

17. Close the **table view**.
18. **Zoom** in on a point.
19. On the **Map** tab, in the **Navigate** group, click the **Explore tool**.
20. **Navigate** the 3D scene and examine the Bird_Sightings symbols from different **perspectives**.



21. The symbols should display well. However, from certain perspectives they may appear partly submerged in the ground. You can avoid this effect with a cartographic offset. From the **Contents** pane, right-click the **Bird_Sightings** layer and click **Properties**.
22. In the **Layer Properties** dialog box, click the **Elevation** tab.
23. Set the **Cartographic offset** to **100** and click **OK**.



The points will be raised 100 meters above the ground (the current elevation units are in meters). This is a display effect only—the z-values of the features do not change.

G. View the layer in 2D map

You can display layers in 3D scenes whether or not they have z-values. For example, the Londleaf_OldGrowth_TNF layer does not have z-values. Likewise, a layer that has z-values can be added to a 2D map. You'll copy the Bird Sightings layer into the 2D map so the map and the scene have the same layers.

1. From the **Contents** pane, under **3D** Layers, right-click **Bird_Sightings** and click **Copy**.
2. Make the **2D** map view active.
3. In the **Contents** pane, right-click the **2D** map name and click **Paste**. Save the project.

Congratulations, you have completed the exercise. For additional subjects try the Exercise 3 Challenge.