Exercise 4 – Editing and Data Management in ArcGIS Pro

As with ArcGIS Desktop, ArcGIS Pro allows you to create and modify your geographic data. Editing in ArcGIS Pro is more streamlined, and intuitive than it is in ArcGIS Desktop. The ArcGIS Pro contextual tabs using Microsoft ribbon technology takes some of the guess work out of your editing workflows. These tabs contain many of the common editing tools from ArcMap in one ribbon rather than multiple editing toolbars.

ArcGIS Pro also provides contextual menus that can be used while editing similar to the workflows you have used in ArcGIS Desktop. In this exercise you are going to explore the editing environment in ArcGIS Pro. You will use ArcGIS Pro to create and modify features and attributes, modify a geodatabase table schema and create attribute behavior properties in a geodatabase.

Topics covered:

- ArcGIS Pro editing environment
- Editing Features
- Snapping
- Creating a new feature class
- Creating Domains and Subtypes
- Editing Attributes
- Creating and modifying features

Exercise 2A: Designing a schema

In ArcGIS Pro, you can add, fields to a table, create new feature classes, domains, and use subtypes to categorize your data. In ArcGIS Pro, environments called Designers allow you to perform these tasks. The concepts of schema editing are the same as ArcMap, only the methods you will use have changes. Subtypes are still a feature class property, and domains are still a geodatabase property, but they are created in a different locations in ArcGIS Pro.

Fields: NHD_Line

Current Layer: Data Source

Field Name	Alias	Data Type	Allow NULL	Domain	Default	Length
OBJECTID	OBJECTID	Object ID				
Shape	Shape	Geometry	✓			
Permanent_Identifier		Text				
FDate		Date				
Resolution	Resolution	Long		Resolution	2	
GNIS_ID		Text	✓			
GNIS_Name		Text	✓			
LengthKM		Double	✓			
FType	FType	Long			411	
FCode	FCode	Long	✓	Tunnel FCode	41100	
Shape_Length		Double	✓			

Click here to add a new field.

Subtypes: NHD_Line

Subtype Name >		Tunnel		Bridge	
Field Name	Data Type	Domain	Default Value	Domain	Default Value
OBJECTID	Object ID				
Shape	Geometry				
Permanent_Identifier	Text				
FDate	Date				
Resolution	Long	Resolution	High	Resolution	High
GNIS_ID	Text				
GNIS_Name	Text				
LengthKM	Double				
FType	Long		478		318
FCode	Long	Tunnel FCode	Tunnel	Bridge FCode	
Shape_Length	Double				

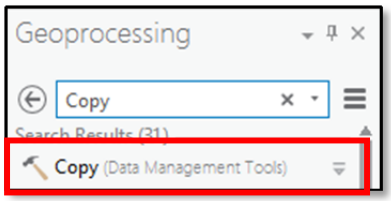
Domains: Exercise1

Domain Name	Description	Field Type	Domain Type	Split Policy	Mer
Acc_Info	Accessibility information available at trailhead.	Text	Coded Value Domain	Default	Default
Alt_Type	Alternative Use of Trail	Text	Coded Value Domain	Default	Default
ArtificialPath FCode		Long	Coded Value Domain	Duplicate	Default
Bridge FCode		Long	Coded Value Domain	Duplicate	Default
CanalDitch FCode		Long	Coded Value Domain	Duplicate	Default
Coastline FCode		Long	Coded Value Domain	Duplicate	Default
Condition	Subjective rating of trail based on Facility Condition Index (FCI)	Text	Coded Value Domain	Default	Default
Connector FCode		Long	Coded Value Domain	Duplicate	Default
DamWeir FCode		Long	Coded Value Domain	Duplicate	Default
DesType	List of Special Federal Designations	Text	Coded Value Domain	Default	Default

Step 1: Begin the project

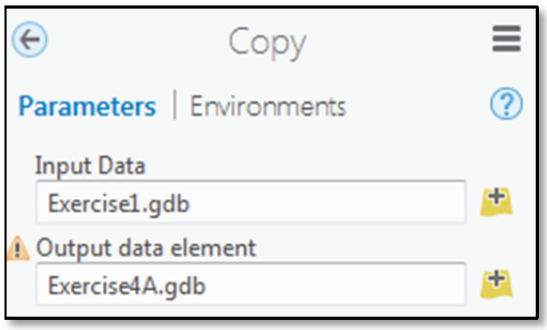
In this exercise, you are going to manage the data necessary to create a new fence boundary.

1. Open **ArcGIS Pro**
2. Create a new, blank project named ***Exercise 4***
3. Save the project in location: *C:\Esri\ArcGIS Pro\Projects*
4. On the ***Analysis*** tab, click **Tools** to open the ***Geoprocessing*** tab
5. In the search box, search for the term "***Copy***"



6. Click the **Copy** tool to copy the Exercise1 () geodatabase. Set the Parameters:
   - Input Data: ***C:\Esri\ArcGIS Pro\Data\Exercise1.gdb***
   - Output Data Element***: C:\Esri\ArcGIS Pro\Outputs Exercise4A.gdb***

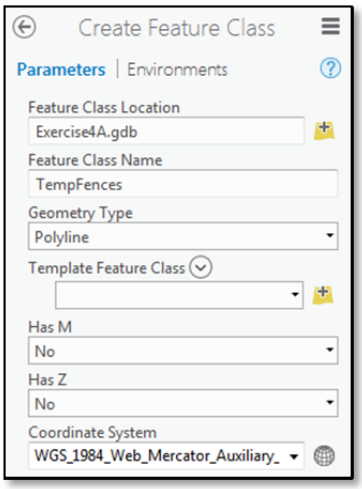
You will be importing an MXD that uses this output workspace so make certain the name and output folder are correct.



7. When the Copy finishes close the ***Geoprocessing*** Pane.
8. Open the ***Project*** Pane. Right click Folders, and then click ***Add Folder Connection***.
9. In the Add Folder Connection, browse to ***C:\Esri*** and select the ***ArcGIS Pro*** folder.
10. Click **Select** to add the folder to your project.
11. In the ***Project*** Pane, expand **Folders** > **ArcGIS Pro** > **Outputs**
12. Your new **Exercise4A** geodatabase should be present in this folder.
13. Right click on the ***Exercise4A*** geodatabase and then select ***+ Add to Project***
14. In the ***Databases*** tab of the ***Project*** Pane, you should now see the **Exercise4A** geodatabase.
15. On the ArcGIS Pro ***Insert*** tab, click ***Import*** Map, then browse *to* ***C:\Esri\ArcGIS Pro\Maps***
16. Select **Exercise4A.mxd**, and then click **Select**.

Step 2: Creating a Feature Class

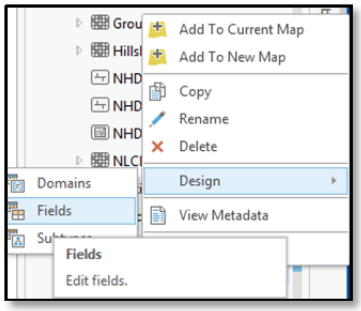
Now that you have imported the existing map into ArcGIS Pro, you will create a new feature class and then modify its schema. Later you will add some features and update attributes. The main task you will be performing is to add a new fence to the area. Before creating feature, you will create the feature class.



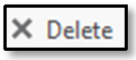
1. On the ***Analysis*** tab, click the **Tools** icon to open the ***Geoprocessing*** Pane.
2. Search for ***Create Feature Class*** tool.
3. Click the ***Create Feature Class*** tool and create a new feature class using the following parameters:
   - Feature Class Location: ***C:\Esri\ArcGIS Pro\Outputs\Exercise4A.gdb***
   - Feature Class Name: **TempFences**
   - Geometry Type: **Polyline**
   - Template Feature Class: **ExistingFences**
   - Coordinate System: **Projected** > **World** > **WGS 1984 Web Mercator (auxiliary sphere)**

The new feature class has been added to the geodatabase and to the map as a new layer. The new layer is currently empty but contains the attributes from the fence layer. Next, you are going to modify the schema to remove unnecessary fields.

4. Open the **Field Designer** for the *TempFences* layer (from the ***Project*** pane, right click the ***TempFences*** feature class in the **Exercise4A.gdb**, then click **Design** > **Fields**.



5. In the ***Fields: TempFences*** panel, select the ***Notes***, ***Data_Source***, ***FENCE***, and ***CODE*** fields.
6. Click the **Delete** button on the Fields tab.



7. The fields are now marked for deletion but they are not actually removed from the table until you Save the Map Document.

8. On the **Fields** tab, click the **Save** button.
9. On the **Fields** tab, click New Field to add a field named ***FENCE_MATERIAL*** as a short integer.

FENCE_MATERIAL		Short	☑			

10. Add another Field named ***TYPE*** as a string 100 characters in Length.

TYPE		Text	☑			100

11. Finally, add one more field named DESCRIPTION as a string 100 characters in length.

DESCRIPTION		Text	☑			100

12. On the ***Fields*** tab, click **Save** to add the new fields to the table. Close the Fields: **TempFences** tab.

You have now successfully created a feature class, deleted and added additional fields to the table. Your table should look similar to the graphic below:

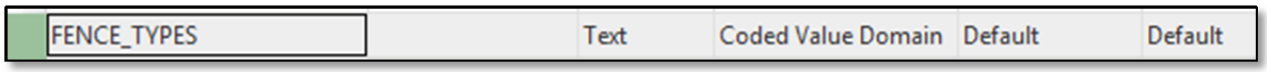
Field Name	Alias	Data Type	Allow NULL	Domain	Default	Length
OBJECTID	OBJECTID	Object ID	☐			
SHAPE	SHAPE	Geometry	☑			
FENCE	FENCE	Text	☑			50
NOTES	NOTES	Text	☑			240
DATA_SOURCE	DATA_SOURCE	Text	☑			5
SOURCE	SOURCE	Text	☑			20
CODE	CODE	Text	☑			20
SHAPE_Length		Double	☑			
DESCRIPTION		Text	☑			100

Step 3: Applying a Domain to a new Feature Class

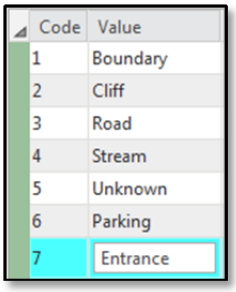
You want to create and apply an attribute domain to the ***TempFences*** feature class to aid in data entry. You will create the domain, then apply it to the feature class. Domains are the property of a Geodatabase so you will start with your Exercise4A.gdb. This geodatabase already contains numerous domains that were created with the USGS NHD data that is contain in the Exercise geodatabase.

1. In the **Project** pane, right click the ***Exercise4A*** geodatabase then click **Design** > **Domains.**
2. On the Domains tab, click New Domain.

3. Name the Domain **FENCE_TYPES**, and use the Field type ***Text***.



4. In the Code Value portion or the **Domains: Exercise4A** Tab, enter the following code/value pairs:
   - 1 Boundary
   - 2 Cliff
   - 3 Road
   - 4 Stream
   - 5 Unknown
   - 6 Parking
   - 7 Entrance



Code	Value
1	Boundary
2	Cliff
3	Road
4	Stream
5	Unknown
6	Parking
7	Entrance

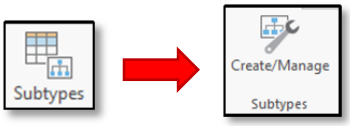
5. Click **Save** on the ***Domains*** tab to save the domain you created. Close the ***Domains: Exercise4A*** tab.
6. Next, right click the ***Exercise4A***.gdb geodatabase in the ***Project*** pane, then click **Refresh**.
7. Right click the ***TempFence*** Feature Class, and then click **Design** > **Fields**.
8. Under the ***Domain*** column on the ***Fields: Temp Fences*** tab, assign the **FENCE_TYPES** domain to the **TYPE** Field.

9. Click **Save** on the Fields tab to save the Domain Assignment.

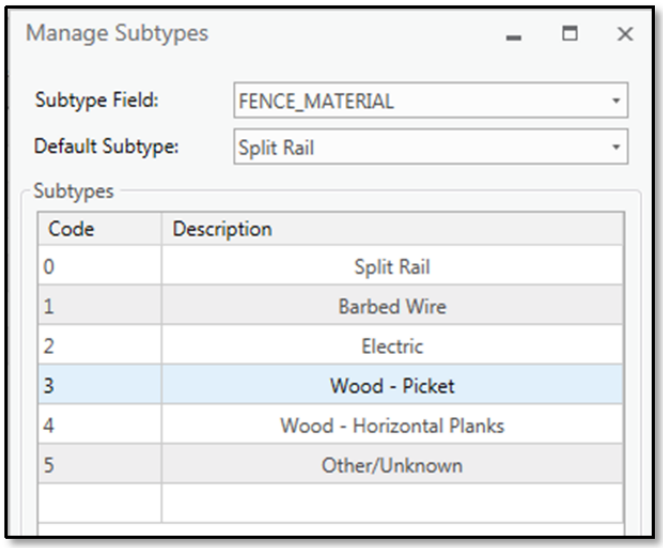
In the next step, you will create a subtype that will categorize the TempFences layer by their material.

Step 4: Creating subtypes

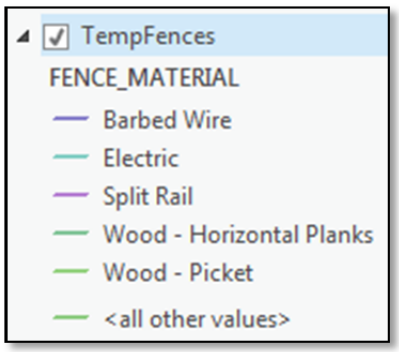
1. Right click the **TempFences** feature class in the ***Project*** tab, and then select **Design** > **Fields**
2. Click **Subtypes** button on the ***Fields*** tab., then click **Create/Manage**



3. Create a new subtype for the ***Fence_Material*** field using the following values in the ***Manage Subtypes*** dialog:



4. Click **OK** on the ***Manage Subtypes*** dialog window, then click **Save** on the ***Subtypes*** tab to apply the changes.
5. Close the ***Subtypes*** and ***Fields Designer*** tabs.
6. If necessary, remove the ***TempFences*** layer, and then add it to the map again.



The ***tempFences*** layer now displays with the subtypes as a template in the Contents pane. The ***tempFences*** layer does not contain any features, but when you edit you can chose what subtype to add. Any feature you add will automatically inherit default values from the subtype.

7. Be sure to Save your project and keep ArcGIS Pro open.

Editing features and attributes

When you are editing in ArcMap, the interface tends to get cluttered with numerous toolbars that are required for editing. In ArcGIS Pro, the same editing options that exist in ArcMap are available in a more organized, cleaner ribbon interface. All editing operations are performed on the Edit tab, in context menus and on toolbars, and in various editing-specific panes.

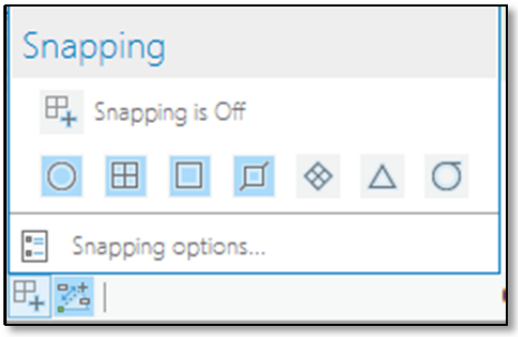
Feature templates in ArcGIS Pro set the properties that control the way layers are edited. For each feature template, you can select a default tool and symbol, and set the default attributes for that layer. When a feature is added, attributes will automatically update. One or more feature template can be configured for the same layer. Generally, feature templates are used to create features with standard attributes or unique value symbology. For example, different feature templates can be used for creating wetland polygons on a layer that uses unique value symbology for wetland types like marsh, lake, pond, riverine, emergent wetland etc.

ArcGIS Pro also provides templates called Group feature templates. Group feature templates refer to existing feature templates, and can create multiple features on one or more layers in a single tasked based operation. For example you can draw a water main feature and a fitting, gate valve, and meter all at the same time.

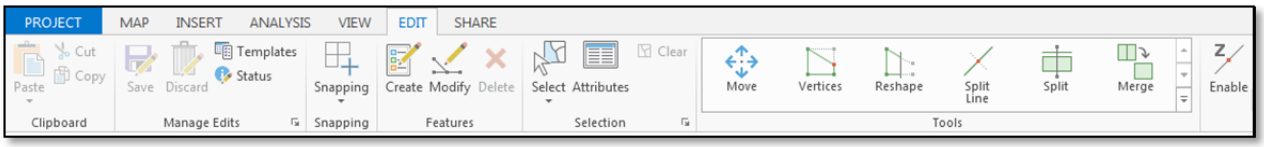
Editing Basics and Group feature templates

ArcGIS Pro allows editing tasks with the following traits:

- The ***Edit*** ribbon contains most functionality
- The Edit session is the default session, in other words editing is always “on” for all editable layers, you never need to start/stop editing or specify the edit target.
- Snapping is activated by a button at the bottom of the map display (not a toolbar). You set snapping options with the button.



- The **Create** pane contains all feature templates and tools for feature creation.
- Edits can be saved or discarded either manually or automatically.
- You can use group feature templates to create features in many layers at one time.



Exercise 2B: Editing features and attributes

Now that you have modified the schema for the ***TempFences*** layer, you will use editing tools to correct an error in the Wetland layer and add a fence. The new fence is intended to help manage the areas around the parking lot at the Woodpecker trail head.

In this exercise, you will perform the following tasks:

- Set Snapping.
- Create and modify simple features
- Edit attributes

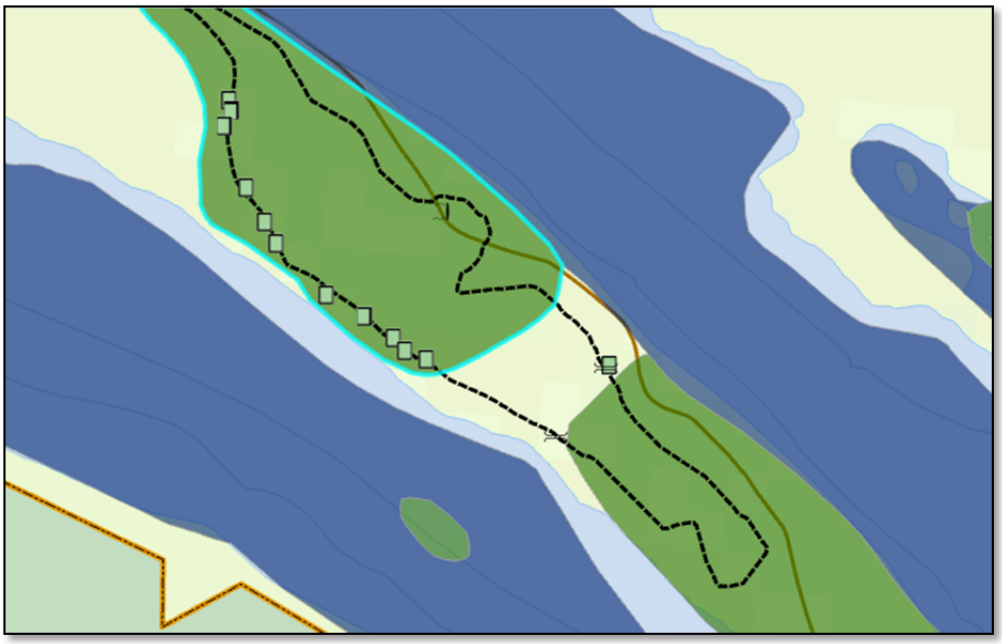
Step 1: Edit the Wetlands layer

The wetlands layer in your map was obtained from downloadable sources, for this workshop, we are not following any Agency guidelines and simply treating this content as hypothetical data that we can edit as we see fit. For this example, the wetlands polygons around the Woodpecker trail are incorrect and need to be merged. There are two Freshwater Forested/Shrub wetlands that should actually be connected in a single feature that covers the area between the two original polygons.

1. In the ***Contents*** pane, right click the *Trails* layer and then click **Zoom to Layer**.
2. Right Click **Edit** tab on the ArcGIS Pro ribbon and made sure that ***Minimize the Ribbon*** is unchecked (right click on the Edit tab). This will allow the Edit tab to stay open until you move to a different tab.
3. On the ***Contents*** pane, click on the List by Selection icon.

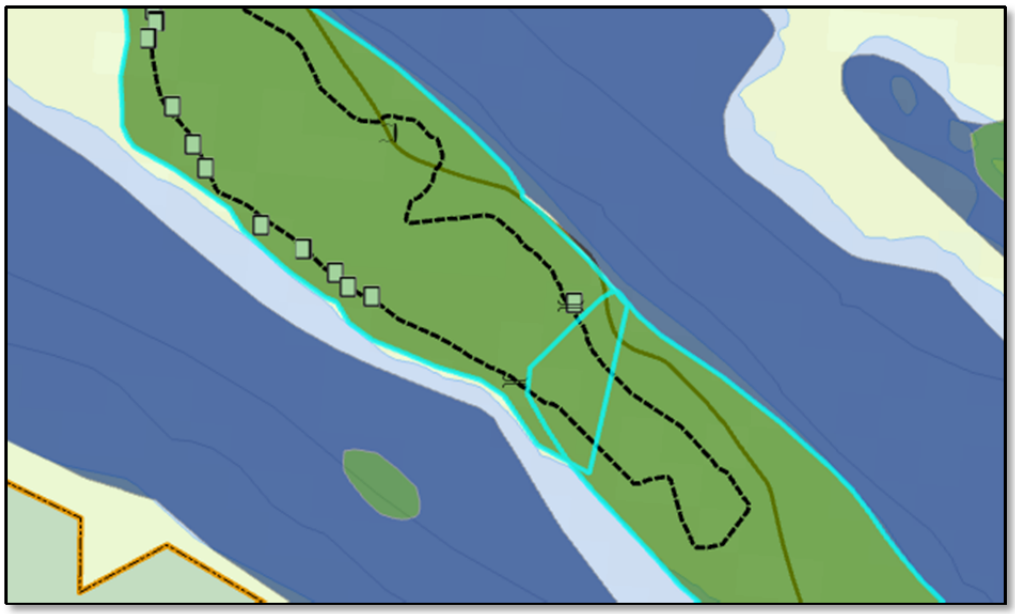
4. Right click the **Wetlands** layer and then click ***Make this the only selectable layer***.

5. On the **Edit** tab, use the ***Select Rectangle*** tool to select the Polygon on the Northern side of the Woodpecker trail.



6. Use the ***Reshape*** tool to extend the polygon to overlap the wetland polygon on the southern side of the trail.

7. Double click to finish the Reshape tool input and reshape the polygon
8. Using the Select tool while the reshaped polygon is still selected, select the southernmost wetland polygon so both (now overlapping) polygons are selected.



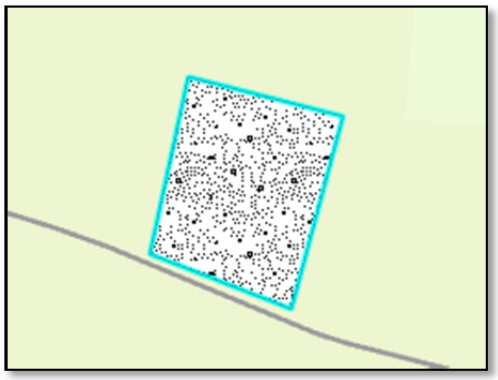
9. Click the ***Merge*** tool on the ***Edit*** tab to merge the two selected polygons into a single feature.

10. When the ***Modify Features*** pane opens, click **Merge** to run the merge process on the two polygons. You should now have a single polygon covering the area around the Woodpecker trail.
11. Click **Save** on the ***Edit*** tab to save the changes you have made to the features.

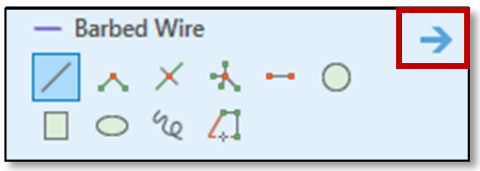
Step 2: Create a new temporary fence using measurements.

A new section of fence is needed around the parking lot for the Woodpecker trailhead. The fence lines were surveyed by a crew to get approval to build the fence.

1. If necessary, turn on the ***Parking*** and ***TempFences*** layers.
2. In the ***Contents*** pane, select the ***Parking*** layer, then on the **Map** tab, click the ***Select by Attributes*** button. This will open the Geoprocessing tab on the ***Select Layer By Attribute*** tool.
3. In the ***Geoprocessing*** tab, use the following parameters to select the desired parking lot:
    - Layer Name or Table View: **Parking**
    - Selection type: **New Selection**
    - Add Clause: ***Route_Name is Equal to Rattlesnake Hollow Parking***
4. Run the ***Geoprocessing*** tool, and then close the ***Geoprocessing*** pane.
5. Right-click the ***Parking*** layer, and then click **Selection > Zoom to Selection**. You may need to zoom back out to a slightly larger area (scale = 1:1,000)



6. Click the ***Snapping*** button at the bottom of the map and make Edge snapping the only selected snapping option.
7. From the ***Edit*** tab, click the ***Create*** button to open the ***Create Features*** pane.
8. In the ***Create Features*** pane, click the ***Barbed Wire*** subtype, then click the **right** arrow.



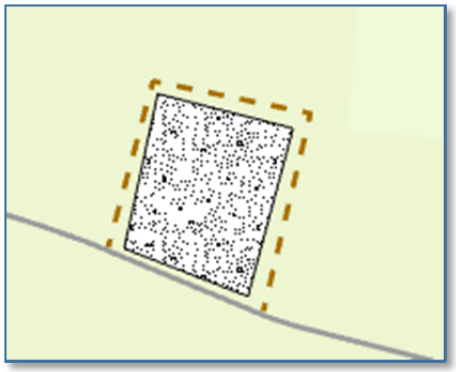
9. The arrow takes you to the Attributes form for the subtype you are creating.
10. For DESCRIPTION, enter ***Rattlesnake Hollow Parking Lot***

11. Click the arrow in the Upper left corner of the ***Create Features*** pane to close the Active Template.
12. Choose the Line construction tool to create a feature in the Barbed Wire subtype.

13. Add a start point for the new fence line using the following coordinates. With the **Line** tool selected, right click on the map and select **Absolute X,Y,Z…**
14. **Use the following coordinates:**
    - X: -9770750
    - Y: 4369655

The line is started with a vertex positioned at the coordinates you entered. Now using the survey measurements.

15. Next, add a vertex using the **Direction and Distance** input with the following measurements:
    - N 13-37-08E 93’
16. Next, hover your cursor over the northern line of the Parking lot and then right click and select **Parallel**, moving your cursor, you will see the line input is fixed to parallel to the Parking lot line
17. Right click again and select **Distance…**
    - Use a distance value of **87’**
18. Right click the map and then select **Direction and Distance**. Change the Direction type to **P** for Polar. Enter the following values:
    - **256-35-20 110’**
19. Double click the line to finish the sketch.
20. On the ***Contents*** pane, double click the Barbed wire subtype symbol to open the ***Symbology*** pane.
21. Set the line to **Burnt Umber** color (on ***Symbology*** > ***Properties*** tab), **Dashed 6:6** (on ***Symbology*** > ***Gallery***), and the line width to **2.**
22. Save your edits and Save your Project.
23. When completed your map should look like the following graphic:



Step 3: Update the attributes of the new fence

1. Select the fence line you just created if it is not already selected.
2. On the ***Edit*** tab, select **Attributes** to open the ***Attributes*** pane

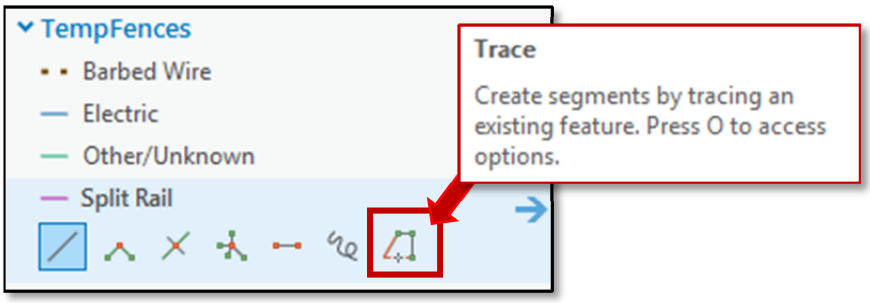
3. Click in the **TYPE** field input box to activate the Domain pull-down list. Select ***Parking*** from the list.
4. Click **Save** on the ***Edit*** tab to save your work.

Step 4: Create a new feature by tracing

The trail you want to add was built to separate trail users from the lake shoreline around the length of the Woodpecker trail. The fence runs parallel to the trail and offset by 60 feet.

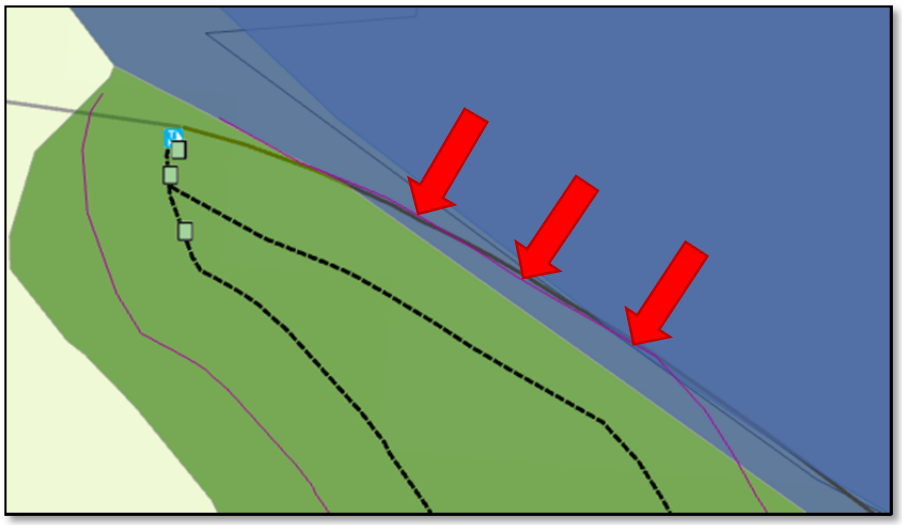
1. From the ***Contents*** pane, right click the Trails layer and select **Zoom To Layer**.
2. On the ***Edit*** tab, click **Create** to open the **Create Features** pane.
3. In the ***TempFences*** layer > ***Split Rail*** subtype enter the following attributes so they are updated automatically when you add the new fence:
    - FENCE_MATERIAL: **Split Rail**
    - TYPE: **Boundary**
    - DESCRIPTION: **Fence separating trail from wetlands**
4. Create a new Split Rail fence by tracing the south side of the trail with a 60 foot offset.

The Trace tool does not require you to select the feature before you trace it.



1. Select the **Trace** tool, then click "**O**" on your keyboard to access to Trace Options dialog box.
2. Set an Offset of **60** feet.
3. On the ***Options*** dialog boxes, also select check on the option to ***Remove self-intersecting loops***.
4. Starting at the Trailhead, begin tracing the trial along the south edge, all the way around the train until you finish near the trailhead.
5. Trace counter clockwise all the way around the trail and finish at the junction where the trail closes near the trail head.
6. Double click to finish the sketch.

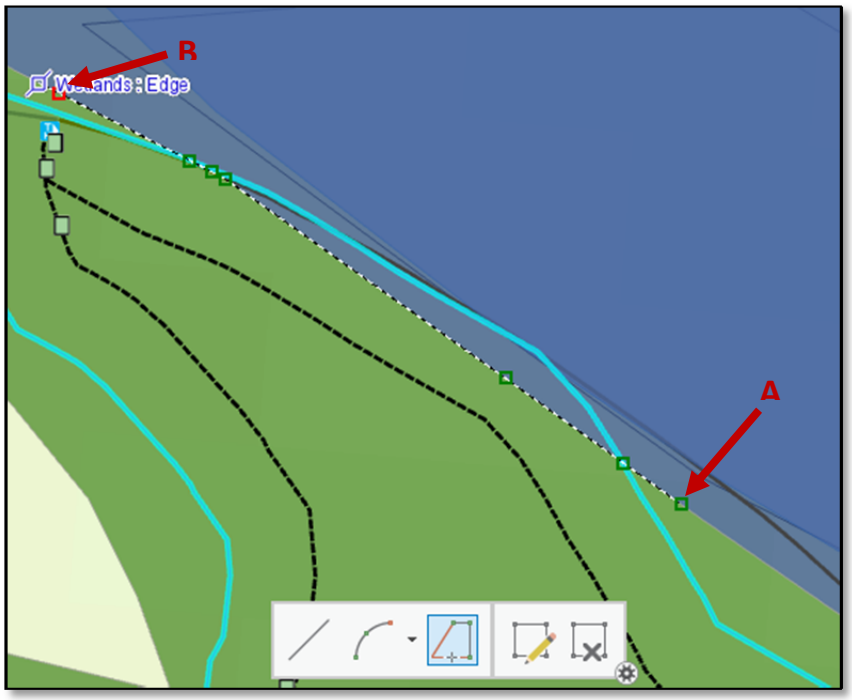
7. Once the Split Rail fence line is complete, there is an area where the 60 foot offset extended the fence into a lake/pond on the north side of the trail.



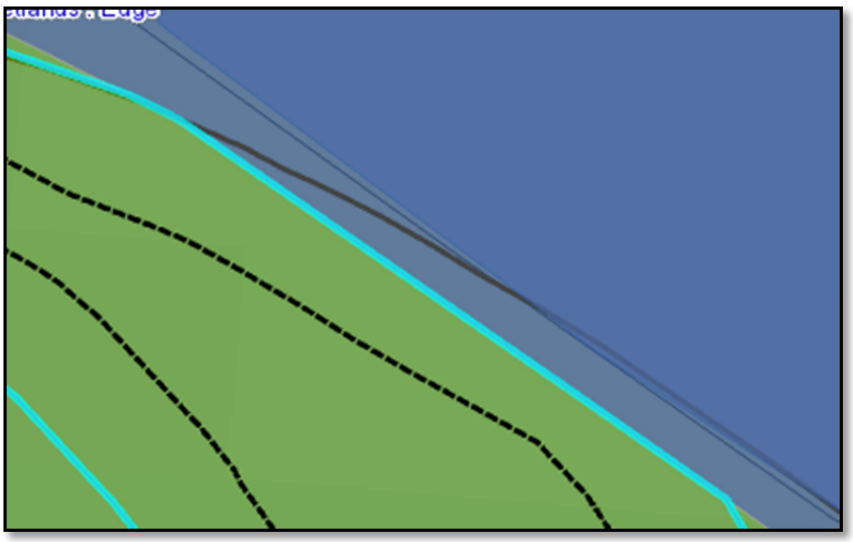
8. To fix this overlap, you will use the **Reshape** tool with the **trace** tool to follow the shoreline where the overlap exists.
9. With the **Reshape** tool active, click on the split-rail fence line you just created. This will select the feature in reshape mode.
10. From the popup tools menu, select the **Trace** tool.
11. Press the "**O**" key to open the **Trace** Tool options. Uncheck the **Trace with Offset** option.

The **Reshape** tool requires that you intersect a line feature in two places, everything you draw between the two points of intersect will replaced the existing sketch.

12. Click the cursor on the line between the two wetlands polygons on the outside of the Split-rail fence line, then trace to an area outside the Split-rail line on the other side of the overlap (start at point A, then trace to point B).



13. Double click the cursor to finish the **Reshape** operation.
14. Your line should now appear as shown below:



15. Save your edits.

For the last edit step, you need to update an attribute for both of the fence lines you have added. You have several options for editing attributes including using the Attribute pane, or calculating fields in an attribute table.

1. Right click the *tempFences* layer in the ***Contents*** pane and then click **Selection** > **Select All.**
2. On the **Edit** tab, click on the ***Attributes*** button to open the **Attributes** pane.

You should have two fence features selected and showing in the ***Attributes*** pane. The top portion of the ***Attributes*** Pane shows the selected features listed by ID. If you select any listed feature, you can then use the Attributes fields to update values. Clicking on the Feature Class name in the ***Attributes*** pane allows you to update attributes for all of the selected features.

3. Click on the TempFences feature class in the ***Attributes*** pane (not the individual feature id's)
4. In the SOURCE field, enter 5 for a value. In this exercise the value 5 represents screen digitized source.

You have now created, edited and updated attributes on a feature in ArcGIS Pro. The tools used in this exercise are only a few of the robust toolset available in ArcGIS Pro.

End Exercise 4