



Forest Service
U.S. DEPARTMENT OF AGRICULTURE

Editing Data in ArcGIS Pro



Geospatial Technology
and Applications Center

Esri - Why ArcGIS Pro?

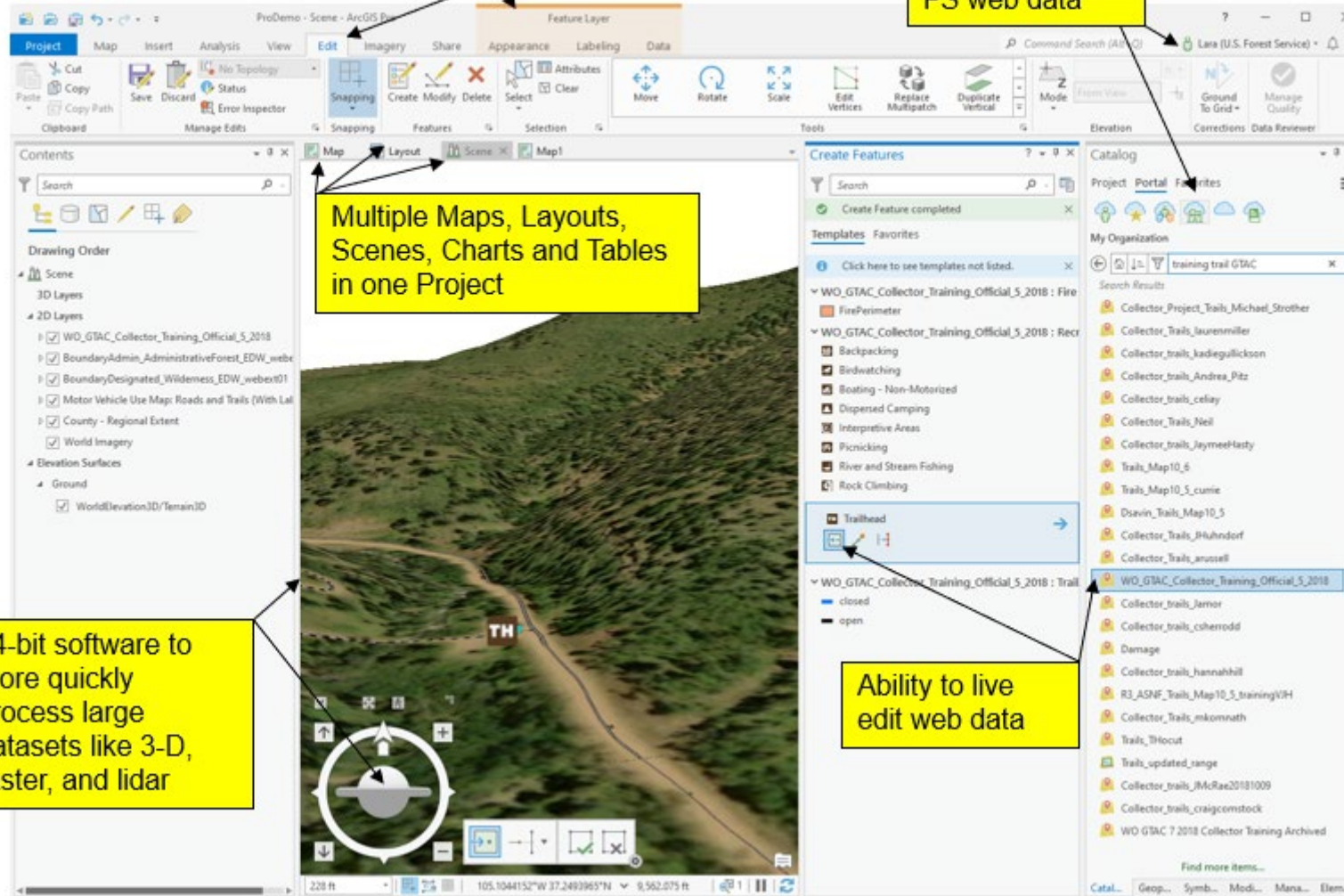
Ribbon interface like Microsoft Office 2013

Easy access to
FS web data

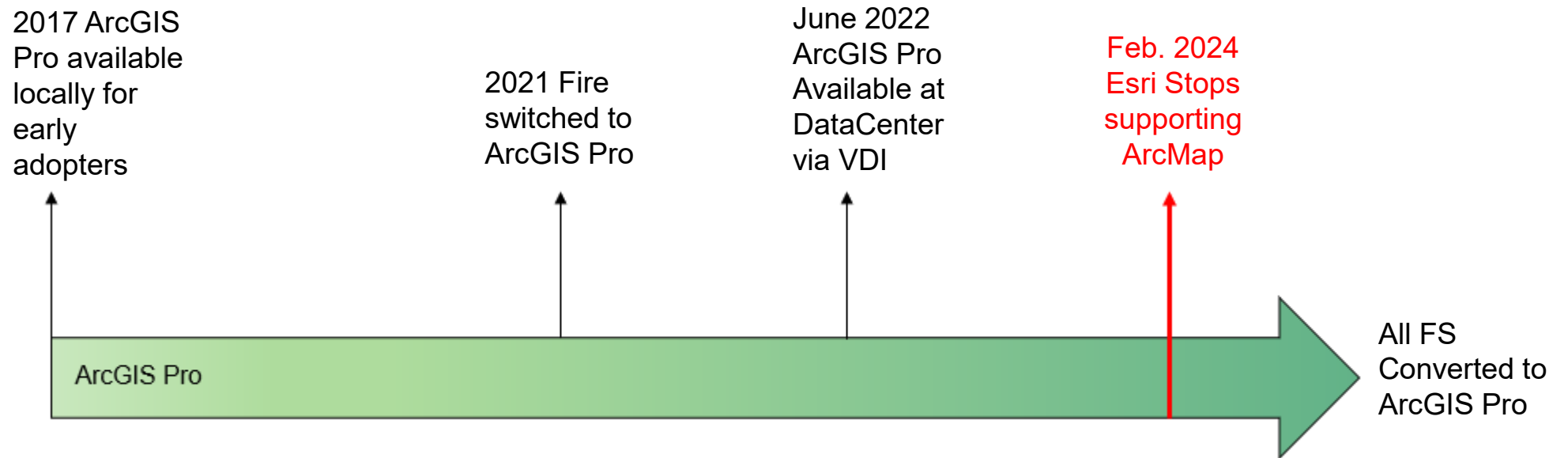
Multiple Maps, Layouts,
Scenes, Charts and Tables
in one Project

64-bit software to
more quickly
process large
datasets like 3-D,
raster, and lidar

Ability to live
edit web data

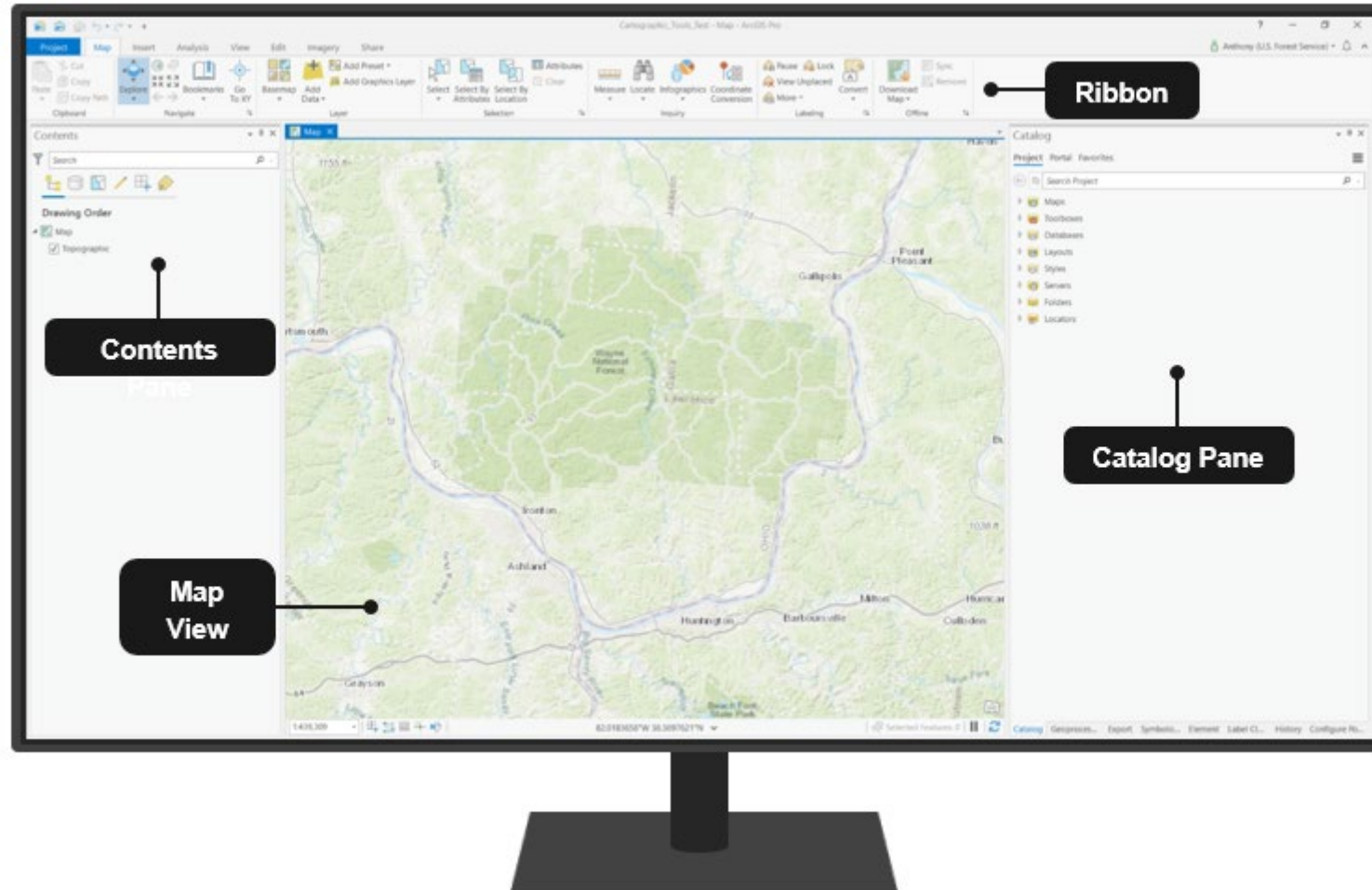


Forest Service Pro Rollout



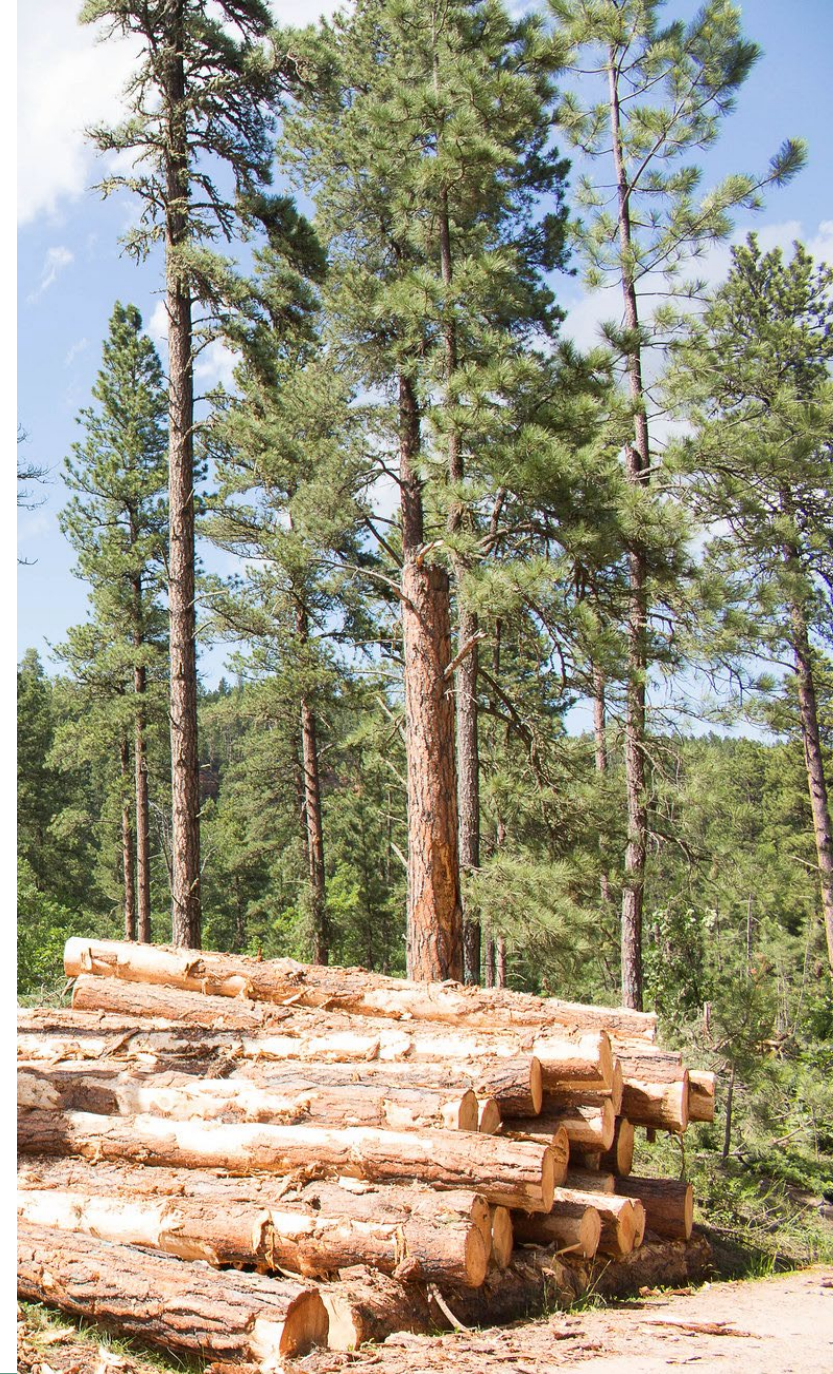
For more information visit the
[ArcGIS Pro Forest Service SharePoint](#)

ArcGIS Pro Interface



ArcGIS Pro - Editing Course Outline

- Lesson 1: Creating Spatial Data
 - Exercise
- Lesson 2: Attribute Edits
 - Exercise
 - Lunch/ extended break
- Lesson 3: Spatial Edits
 - Exercise





Lesson 1

Creating Spatial Data

Overview

- Create new feature class in Catalog
- Create new features
 - Digitize over georeferenced imagery and data
 - Copy and Paste existing features from another layer
- Data planning and preparation



What is editing?

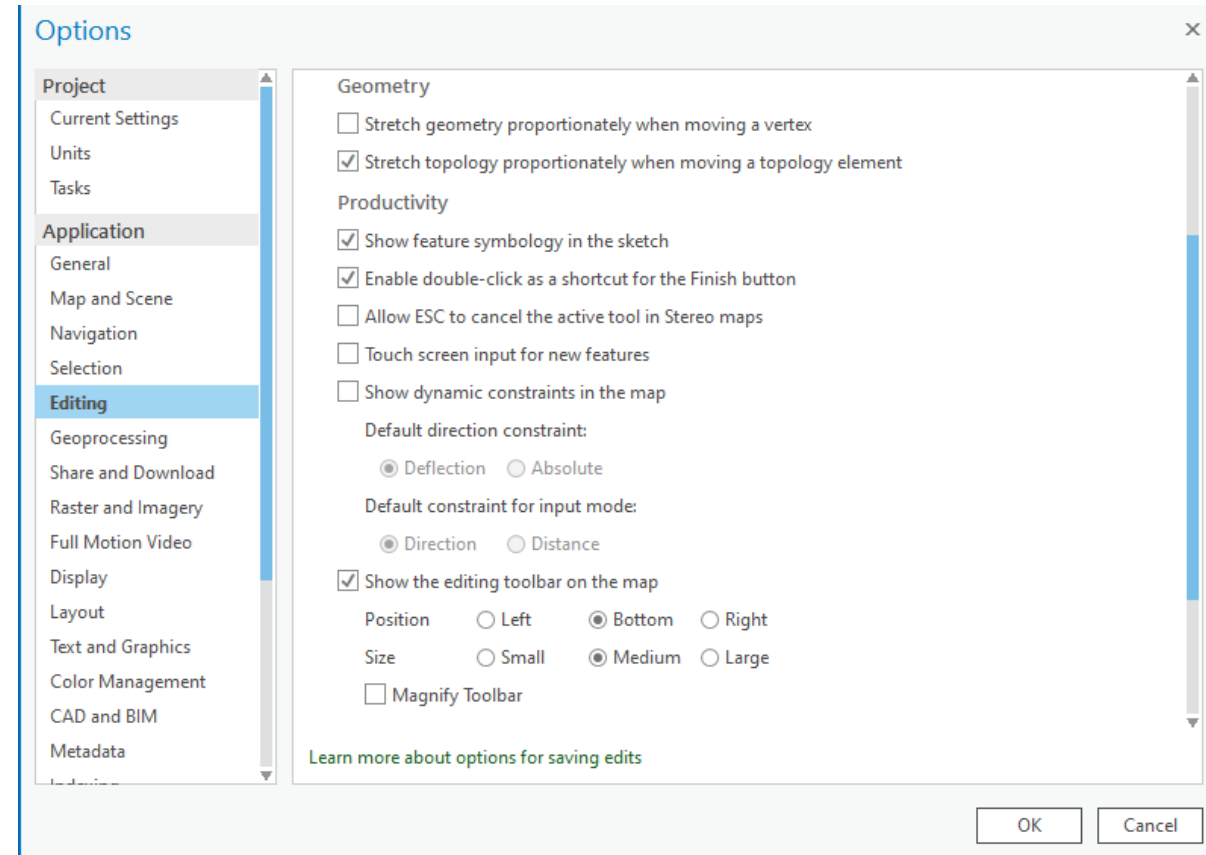
ESRI Definition:

“Editing geographic data is the process of creating, modifying, or deleting features and related data on layers in a map. Each layer is connected to a data source that defines and stores the features; this is typically a geodatabase feature class or a feature service.”



Project Edit Settings

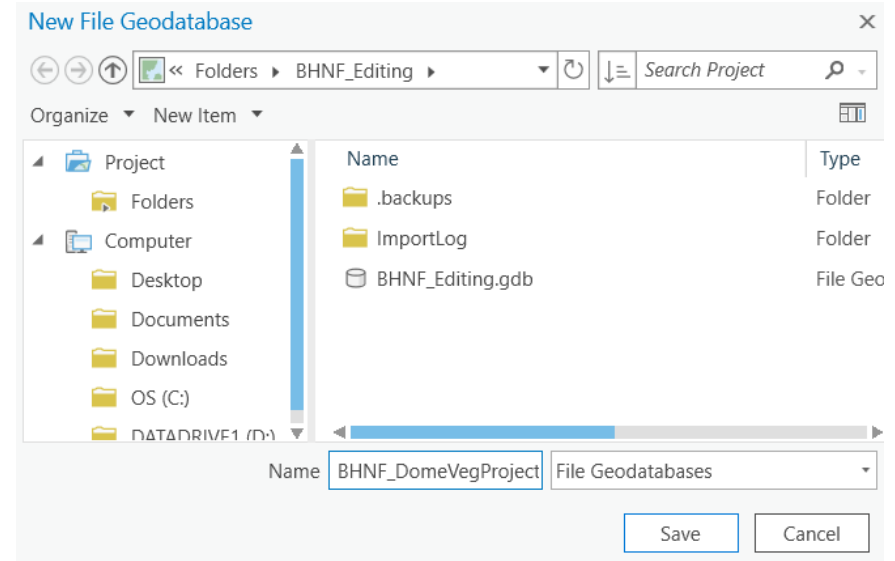
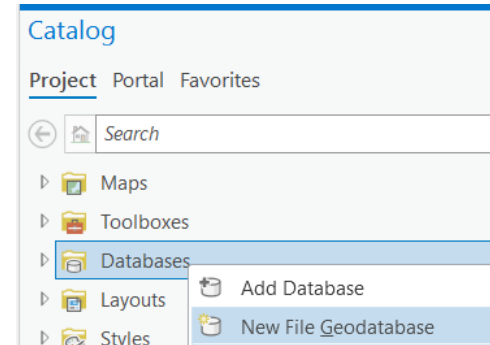
- Project >Options>Application>Settings
- Set Editing defaults for Project
 - Location of Editing toolbar
 - Editing symbology
 - Save dialogs
 - Auto save or not



In Pro, by default, you do not need to start and Edit Session to edit data. This window is where you could change the settings so that you must start and Editing Session before you can edit.

Creating New Data

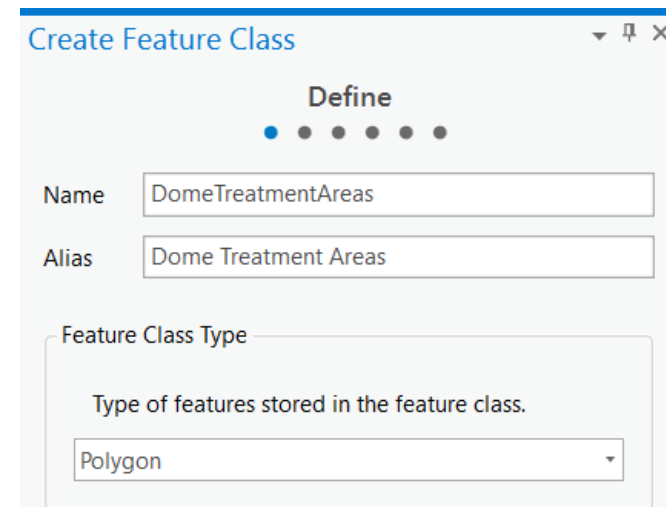
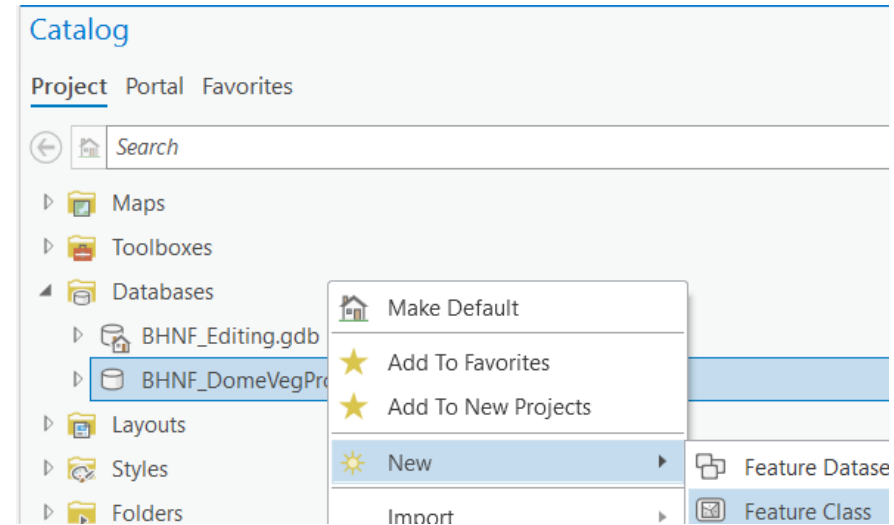
- Open the Catalog pane
- Right click on the Databases folder
- Select New File Geodatabase
- Enter Name



Be sure to use follow [FS Best Practices](#) for naming spatial data!

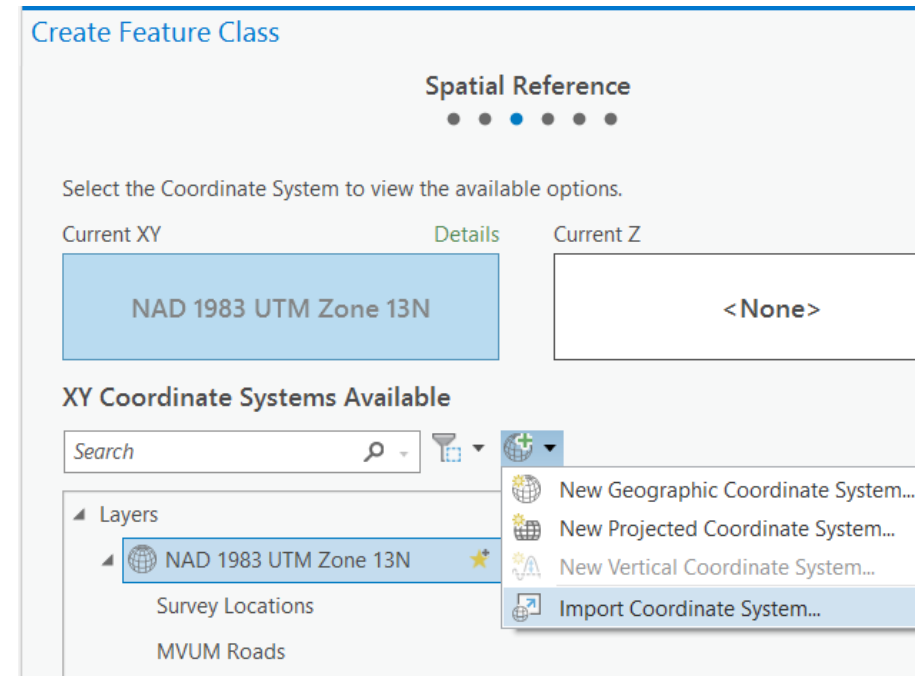
Create New Feature Class

- Right-click on the Geodatabase
- Select New
- Select Feature Class
- Minimum: Name and Type
- Click Next



Select the Spatial Reference

- Click Next twice to the Spatial Reference pane
- The default = same as the current Map tab
- May need to change defaults*
- Options: search, select layer from current map, choose from full list, or import for existing data



[ESRI Pro Help: Overview of spatial references](#)

**Always ask your GIS Specialist about data standards and Best Practices*

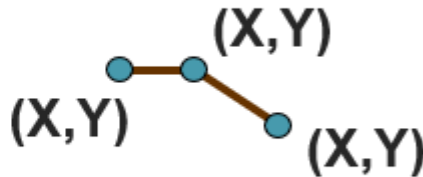
What determines a feature's shape?

- Vector data model: combination of vertices and edges
- Vertex - X,Y coordinate
- Edge - Linear connection between vertices



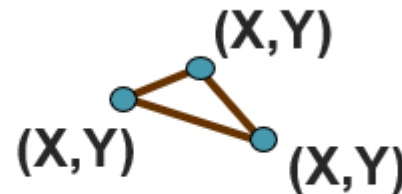
Point

single vertex



Line

connection of vertices



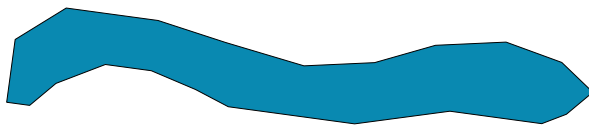


Polygon

closed connection of vertices

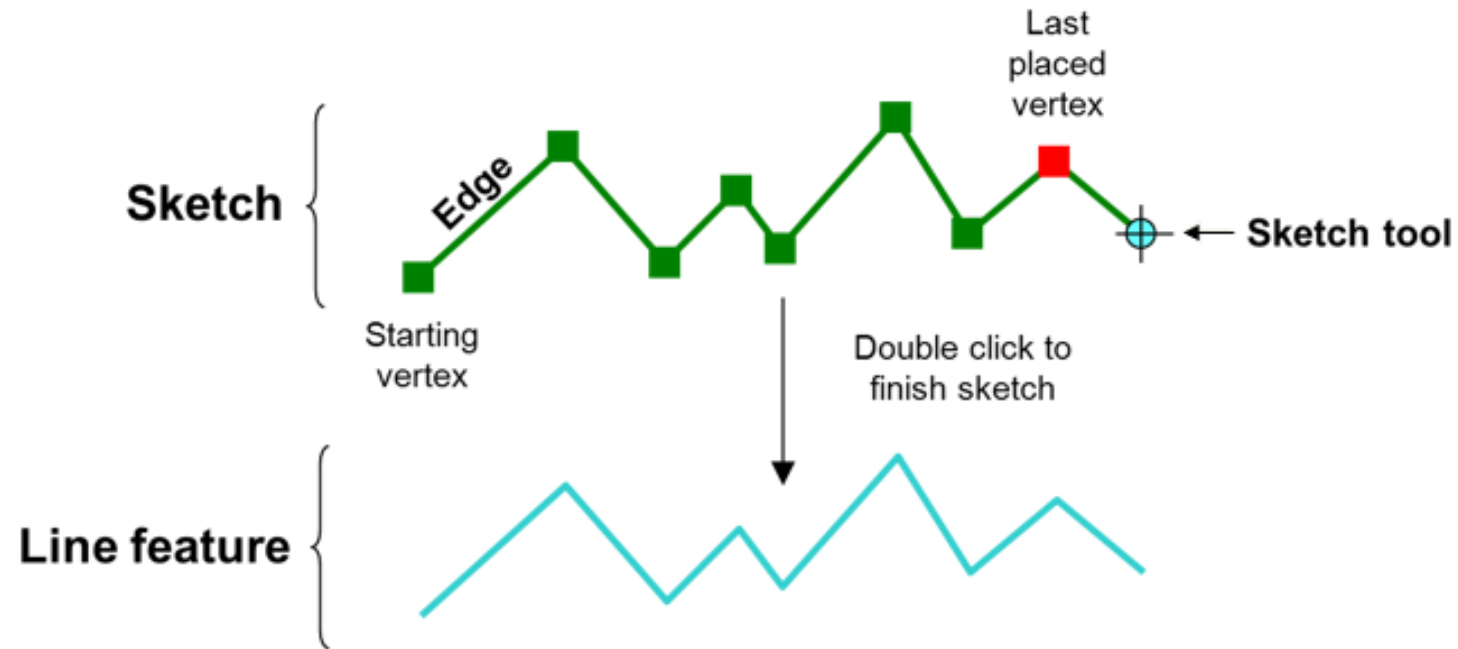


Data Creation: Digitizing

- Point: 
 - Digitize with a single-click
- Line: 
 - Endpoints (nodes) and vertices
 - Digitize each vertex using a single mouse click
- Polygon: 
 - Lines that return to their origin
 - Similar to lines; digitize each vertex with a single mouse click; double click last vertex to end polygon

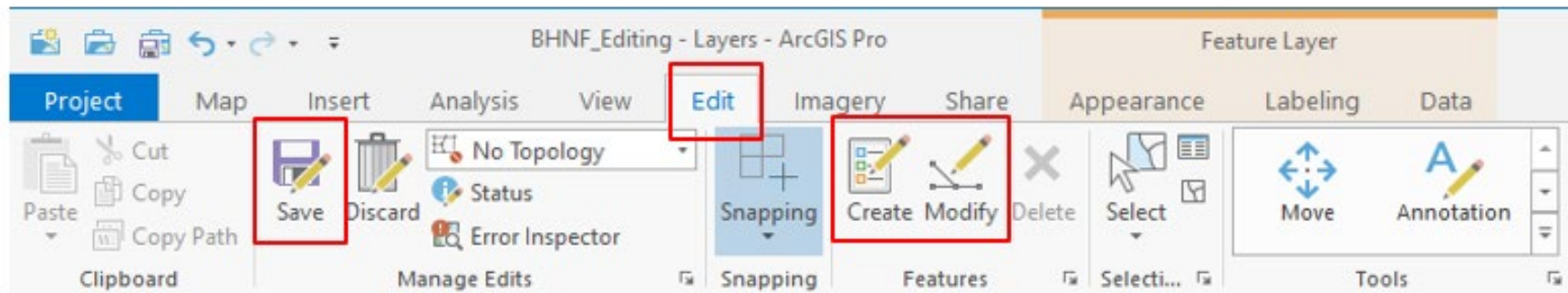
ArcGIS Pro Sketch

- Single-click to add vertex ■ Vertex
- Move mouse to determine length of edge — Edge
- Double click to finish Sketch → new feature created



Editing in ArcGIS Pro

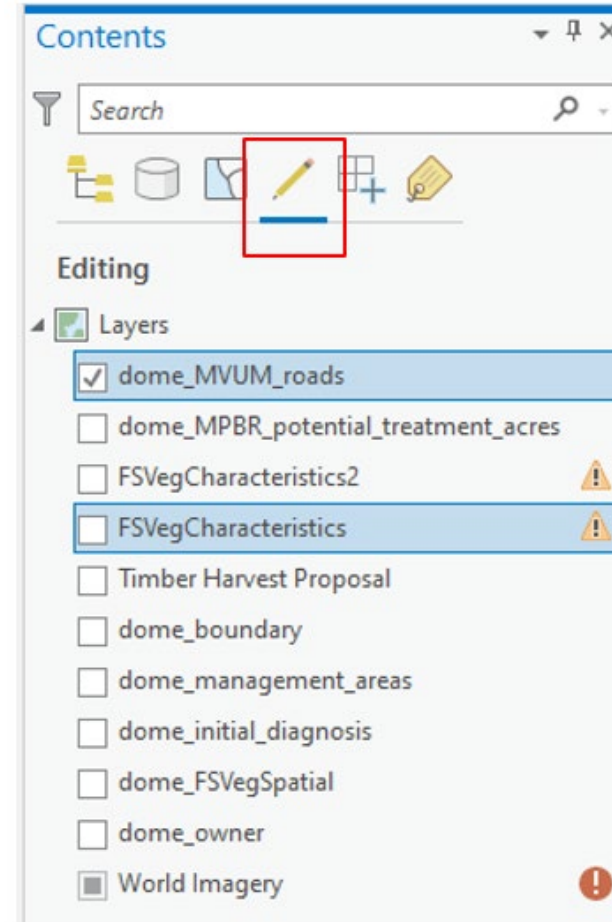
- The Editor Ribbon
 1. Click Edit tab
 2. Create / modify features
 3. Save your edits



WARNING: In ArcGIS Pro there are no buttons to start or stop an edit session, by default. You are always in an edit session, so be careful!

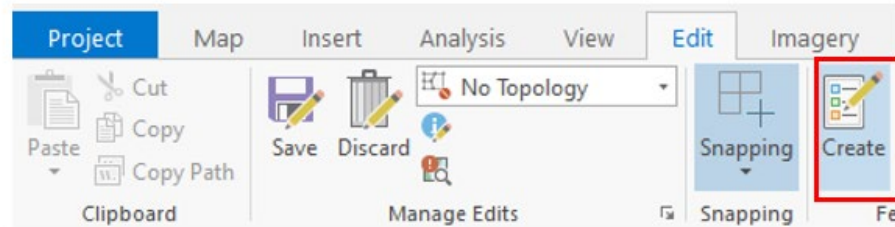
Contents Pane

- List by Editing
- Determine Editable Layers
- Enable Layer Editing



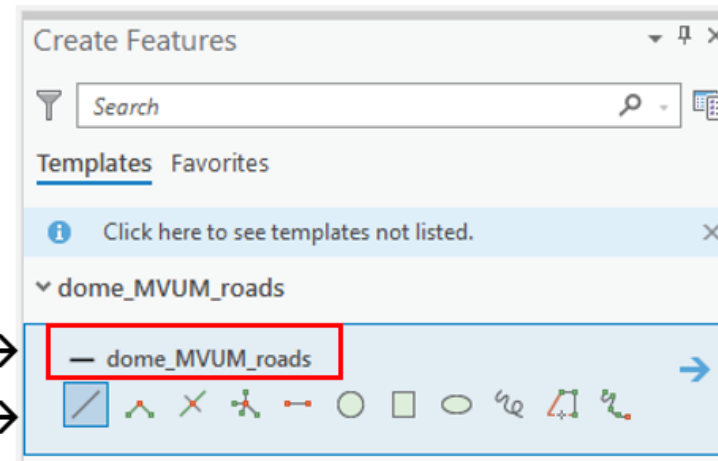
Create Features Pane

Editor ribbon → Features Group → Create



Set up the editor
selecting the target
activate a feature

Select Target Layer →
Select Construction Tool →



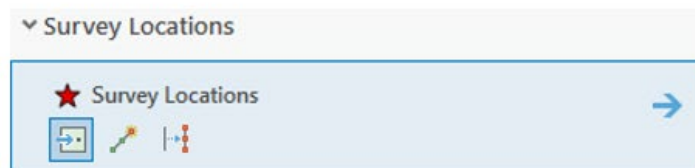
When in an edit session you can click the
undo button to undo edits, as long as you
do it before you hit Save.



Construction Tools

- The Construction Tools available depend on the features selected to edit.

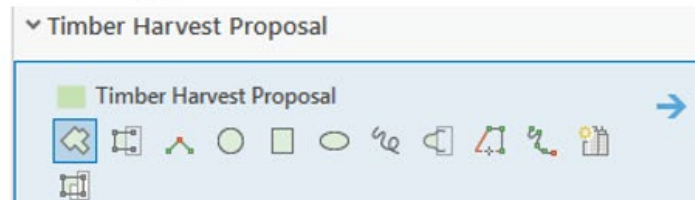
- Point



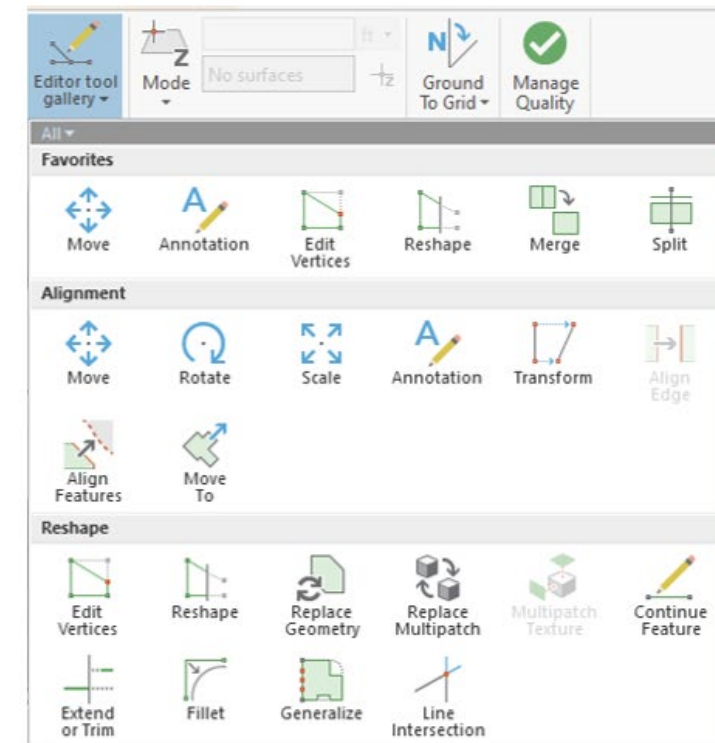
- Line



- Polygon

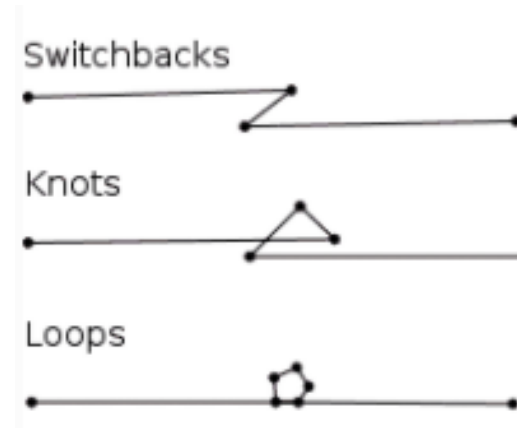


Additional tools in the gallery



Digitizing Errors

- Be careful not to allow your mouse clicks to cross each other
- If applicable, avoid misalignment errors by copying and pasting from base vector layers
- We will cover more tools to avoid other digitizing errors in Lesson 3



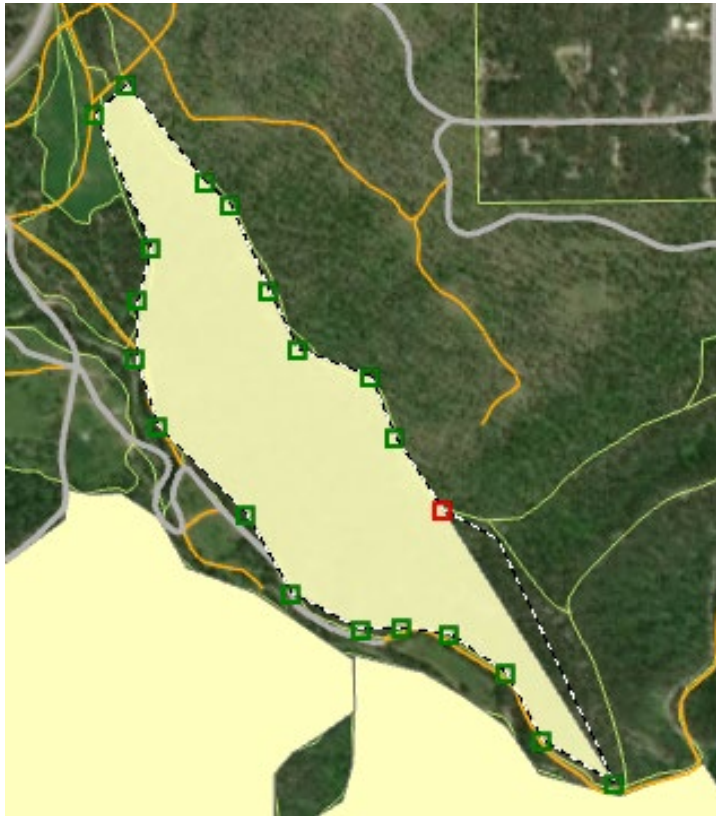
Save Your Work

Save your edits often!

- Use Save Edits command
- Saving the Project DOES NOT save your edits

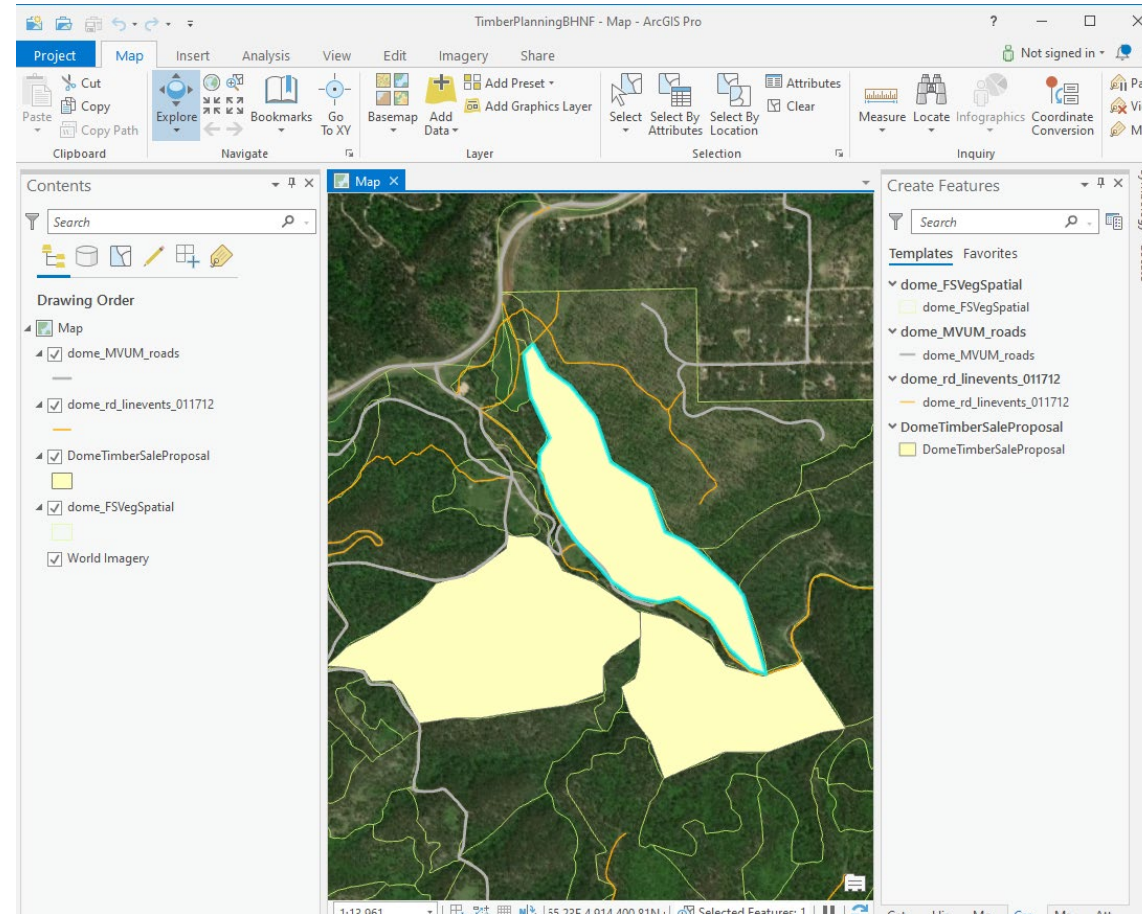


"If you fail to plan, you plan to fail"



- It is relatively easy to start clicking and create GIS vector data in Pro.
- Creating data that is integrated, accurate, consistent, and documented may take more time and effort in the beginning, but can save valuable time, money, and heartache in the future.

Demonstration



Lesson 2

Attribute Edits

Overview

Learn how to edit attribute values

- Directly from the table window
- Using the Field Calculator
- Using the Attributes dialog window



GIS Features Have Attributes

OID = 181
(Object Identifier)

Record
=
Row

Field = Column

OBJECTID *	SHAPE *	ADMIN_FOREST_CODE	ADMIN_REGION_CODE	ADMIN_FOREST_NAME	PROCLAIMED_FOREST_CODE
179	Polygon	03	02	Black Hills National Fo...	0203
180	Polygon	03	02	Black Hills National Fo...	0203
181	Polygon	03	02	Black Hills National Fo...	0203
182	Polygon	03	02	Black Hills National Fo...	0203

Tables in Pro have similarities to an Excel spreadsheet, but you will need to learn new buttons and terms.



Before Creating New Data

Work with your
local or
Regional GIS
Specialist!

- Get protocols, best practices and recommendations
- [FS Best Practices Website – Agency Data Management](#)

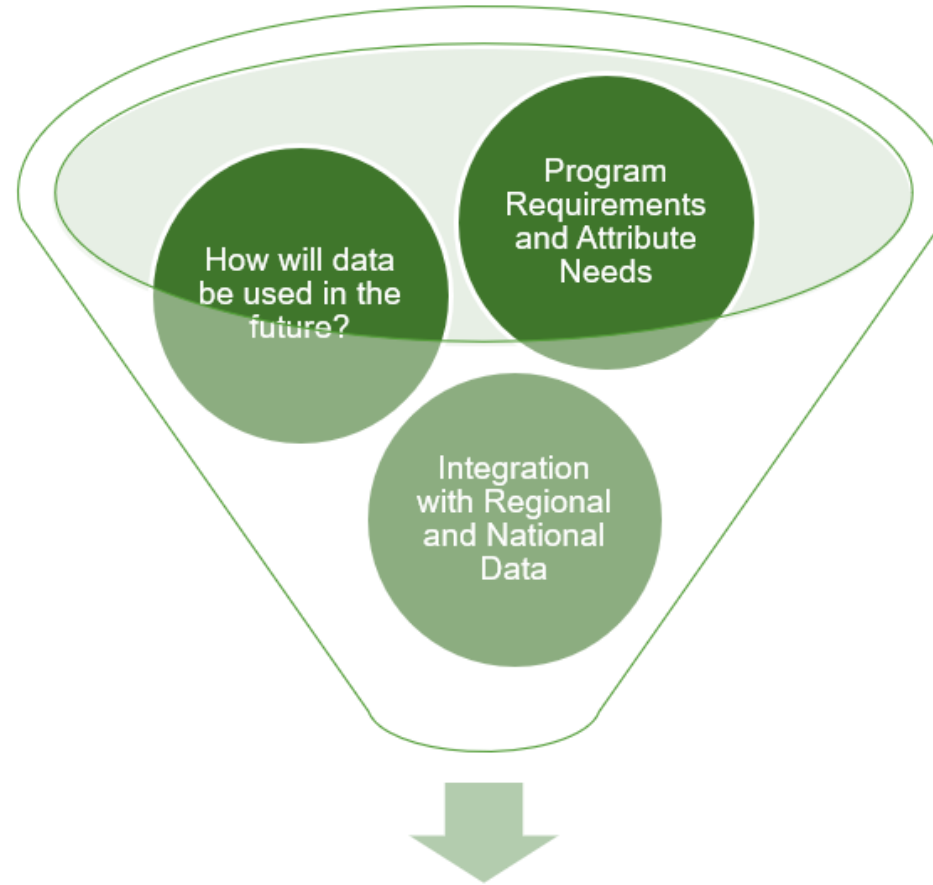
Search for
existing FS data
and schemas

- [FS National GIS Data Dictionary Standard](#)
- In the SDE and NRM
- On the T
- In AGOL

Talk to resource
specialists on
other Forests

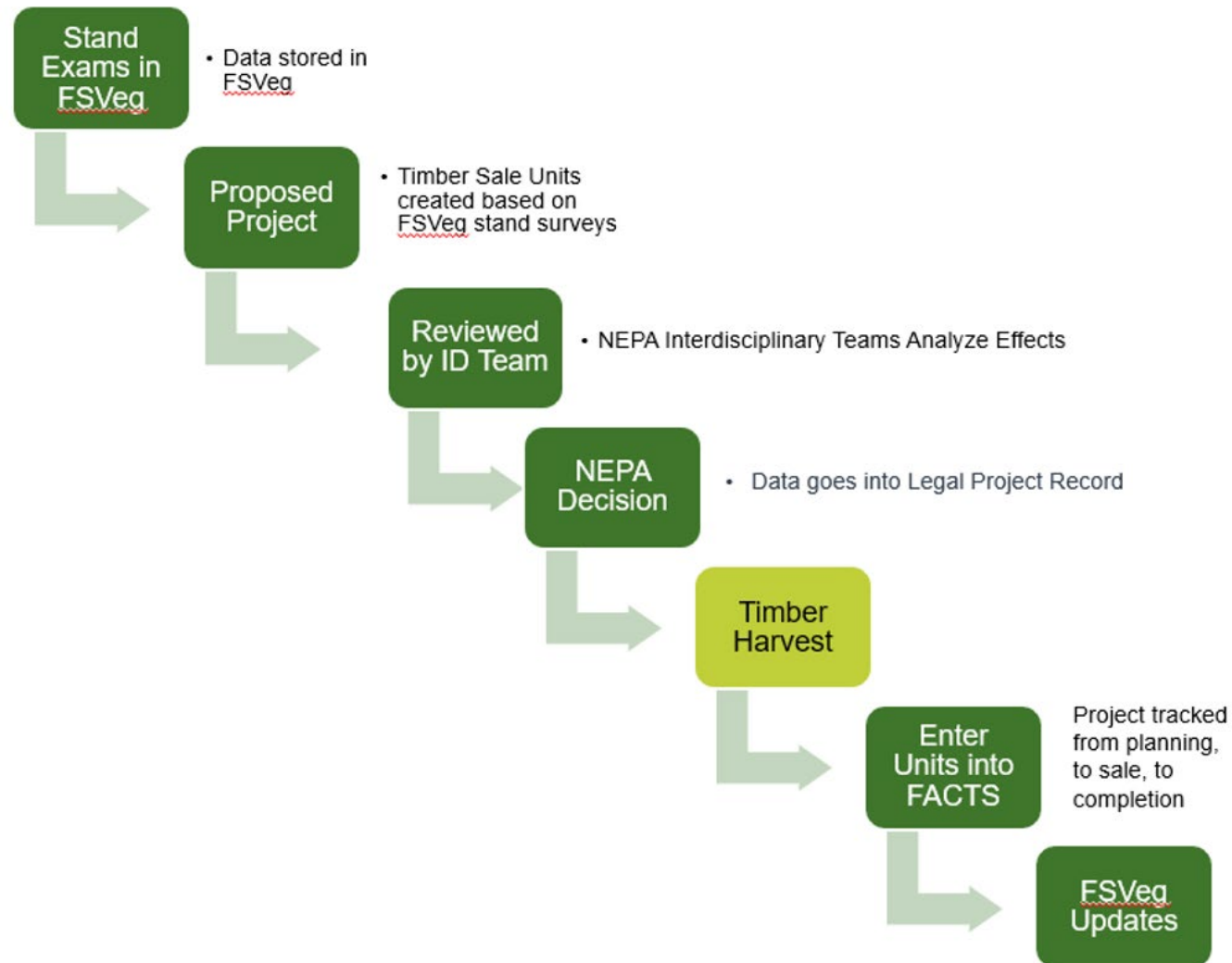
- If they have good data, why re-invent the wheel?
- Consistency between Forests allows for comparisons

When Creating New Data

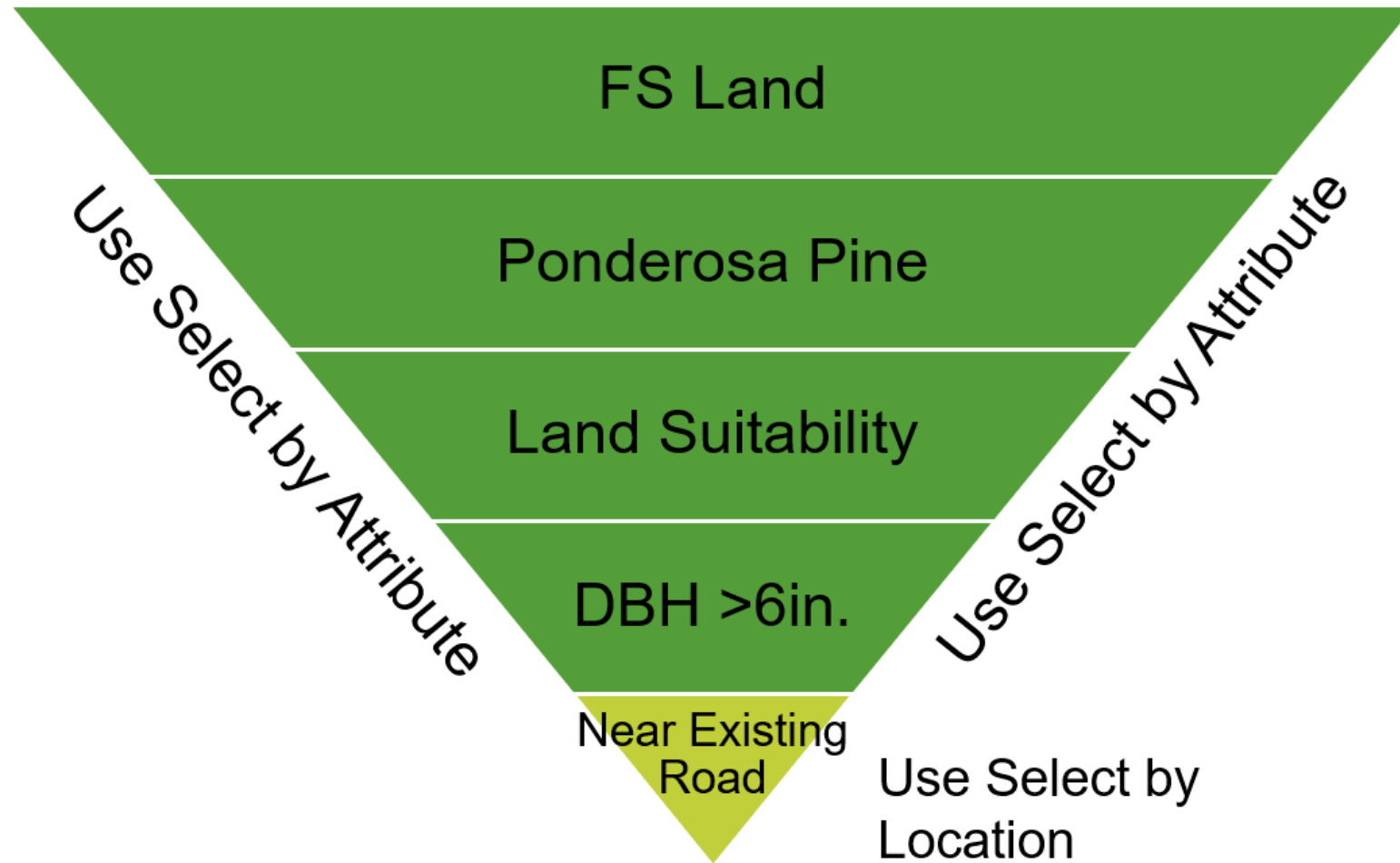


Use Pro tools such as Domains and Templates to save data entry time, improve consistency, and reduce attribute errors.

Exercise Scenario - Timber Sale Planning



Scenario: Filter FS Veg Data



Added FACTS Fields

Added some FACTS fields on the location, activity, and the methods

The screenshot shows a GIS application interface. At the top, a map displays the Black Hills National Forest area. Below the map, a toolbar includes options like 'Add', 'Calculate', 'Selection', 'Zoom To', 'Switch', 'Clear', 'Delete', and 'Copy'. A data table is displayed below the toolbar, showing fields for OBJECTID, SHAPE, ADMIN_FOREST_CODE, ADMIN_REGION_CODE, ADMIN_FOREST_NAME, PROCLAIMED_FOREST_CODE, and ADM. The table contains 8 rows of data, all representing 'Black Hills National Fo...' units. A green callout box with the text 'Added some FACTS fields on the location, activity, and the methods' has arrows pointing to the 'ADMIN_FOREST_CODE', 'ADMIN_REGION_CODE', 'ADMIN_FOREST_NAME', and 'PROCLAIMED_FOREST_CODE' columns in the table.

OBJECTID *	SHAPE *	ADMIN_FOREST_CODE	ADMIN_REGION_CODE	ADMIN_FOREST_NAME	PROCLAIMED_FOREST_CODE	ADM
1	Polygon	03	02	Black Hills National Fo...	0203	North
2	Polygon	03	02	Black Hills National Fo...	0203	North
3	Polygon	03	02	Black Hills National Fo...	0203	North
4	Polygon	03	02	Black Hills National Fo...	0203	North
5	Polygon	03	02	Black Hills National Fo...	0203	North
6	Polygon	03	02	Black Hills National Fo...	0203	North
7	Polygon	03	02	Black Hills National Fo...	0203	North
8	Polygon	03	02	Black Hills National Fo...	0203	North

Now the Timber Sale Specialist has the data to plan the treatment type and harvest method for each unit.



Fields Pane

- The Fields Pane is new in Pro
 - Shows field properties

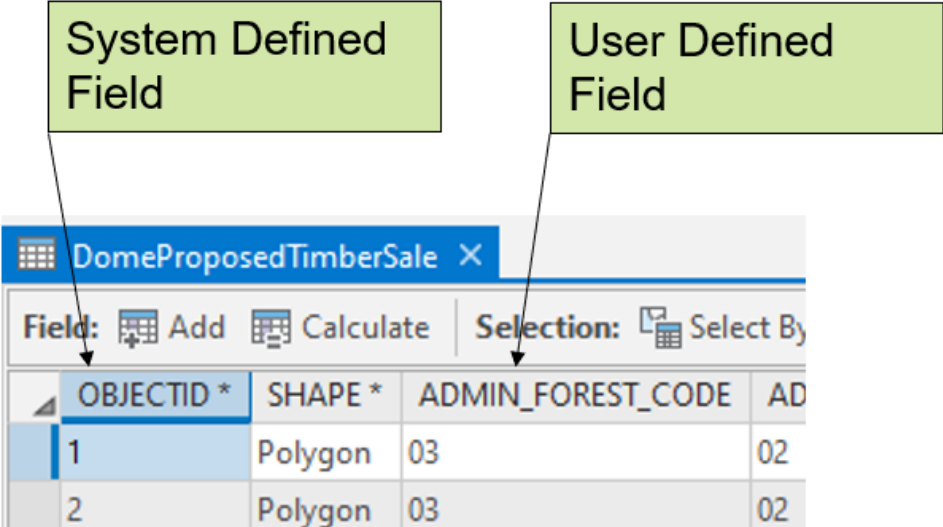
Diagram illustrating the Fields Pane interface with callouts for key features:

- Visibility Toggle:** Points to the 'Visible' checkbox in the first column.
- Alias:** Points to the 'Alias' column header.
- Domains:** Points to the 'Domain' column header.

	<input checked="" type="checkbox"/> Visible	<input type="checkbox"/> Read Only	Field Name	Alias	Data Type	<input checked="" type="checkbox"/> Allow NULL	<input type="checkbox"/> Highlight	Number Format	Domain	Default	Length
	<input checked="" type="checkbox"/>	<input type="checkbox"/>	ADMIN_FOREST_CODE	ADMIN_FOREST_CODE	Text	<input checked="" type="checkbox"/>	<input type="checkbox"/>				2
	<input checked="" type="checkbox"/>	<input type="checkbox"/>	ADMIN_REGION_CODE	ADMIN_REGION_CODE	Text	<input checked="" type="checkbox"/>	<input type="checkbox"/>				2
	<input checked="" type="checkbox"/>	<input type="checkbox"/>	ADMIN_FOREST_NAME	ADMIN_FOREST_NAME	Text	<input checked="" type="checkbox"/>	<input type="checkbox"/>				150
	<input checked="" type="checkbox"/>	<input type="checkbox"/>	PROCLAIMED_FOREST_CODE	PROCLAIMED_FOREST_CODE	Text	<input checked="" type="checkbox"/>	<input type="checkbox"/>				4
	<input checked="" type="checkbox"/>	<input type="checkbox"/>	ADMIN_DISTRICT_NAME	ADMIN_DISTRICT_NAME	Text	<input checked="" type="checkbox"/>	<input type="checkbox"/>				150
	<input checked="" type="checkbox"/>	<input type="checkbox"/>	ADMIN_DISTRICT_CODE	ADMIN_DISTRICT_CODE	Text	<input checked="" type="checkbox"/>	<input type="checkbox"/>				2
	<input checked="" type="checkbox"/>	<input type="checkbox"/>	ACTIVITY_UNIT_ORG	ACTIVITY_UNIT_ORG	Text	<input checked="" type="checkbox"/>	<input type="checkbox"/>				6

Attribute Editing Considerations

- No edit session in Pro
- Edit user-defined fields only
 - System defined fields will have an asterisk
- Values have to match Field properties (e.g. text, number, date)



The diagram illustrates the distinction between system-defined and user-defined fields in a data table. A green box labeled "System Defined Field" points to the "OBJECTID *" column header. Another green box labeled "User Defined Field" points to the "ADMIN_FOREST_CODE" column header. The table below shows data for two rows, with the first row selected.

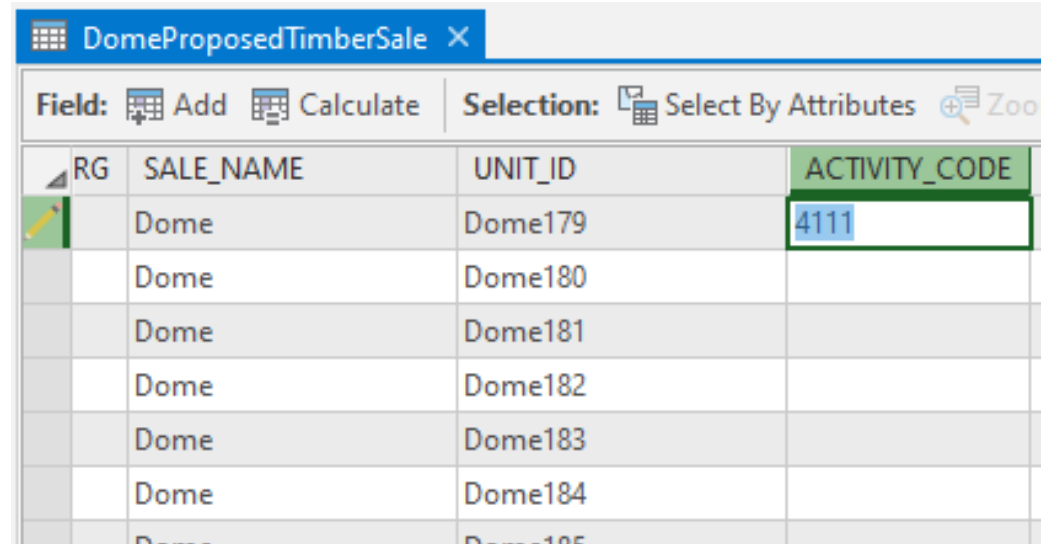
	OBJECTID *	SHAPE *	ADMIN_FOREST_CODE	AD
1		Polygon	03	02
2		Polygon	03	02

Edit Values Directly in the Table

- Click in cell
 - If no dropdown appears you can type the attribute
 - Must match field format

Important:

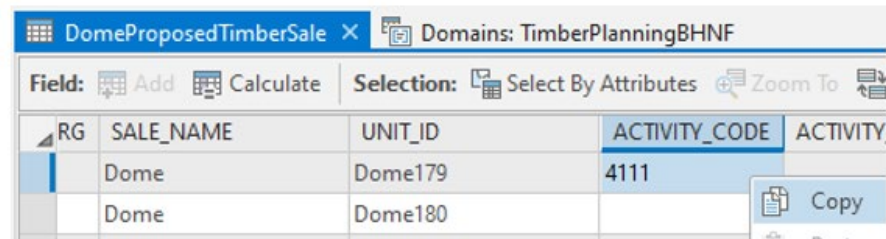
- Understand the data
- Type the correct value
- Double check for typos
- If unknown:
 - Leave blank or <Null>
 - Never guess
 - Never enter zero if it is an unknown number



RG	SALE_NAME	UNIT_ID	ACTIVITY_CODE
	Dome	Dome179	4111
	Dome	Dome180	
	Dome	Dome181	
	Dome	Dome182	
	Dome	Dome183	
	Dome	Dome184	
	Dome	Dome185	

Copy/Paste Directly in the Table

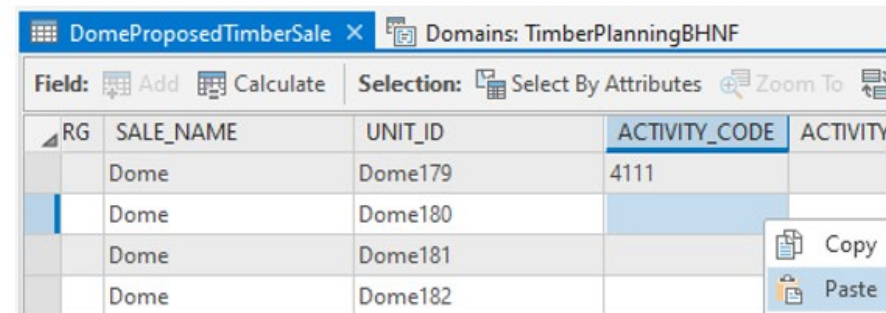
- Either right-click Copy and Paste
- Or <Ctrl>C and <Ctrl>V
- Cannot paste directly into multiple records within a field



Field: Add Calculate Selection: Select By Attributes Zoom To

RG	SALE_NAME	UNIT_ID	ACTIVITY_CODE	ACTIVITY
	Dome	Dome179	4111	
	Dome	Dome180		

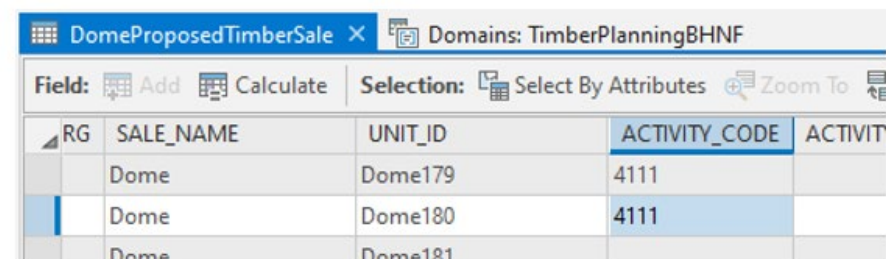
Copy



Field: Add Calculate Selection: Select By Attributes Zoom To

RG	SALE_NAME	UNIT_ID	ACTIVITY_CODE	ACTIVITY
	Dome	Dome179	4111	
	Dome	Dome180		
	Dome	Dome181		
	Dome	Dome182		

Copy
Paste



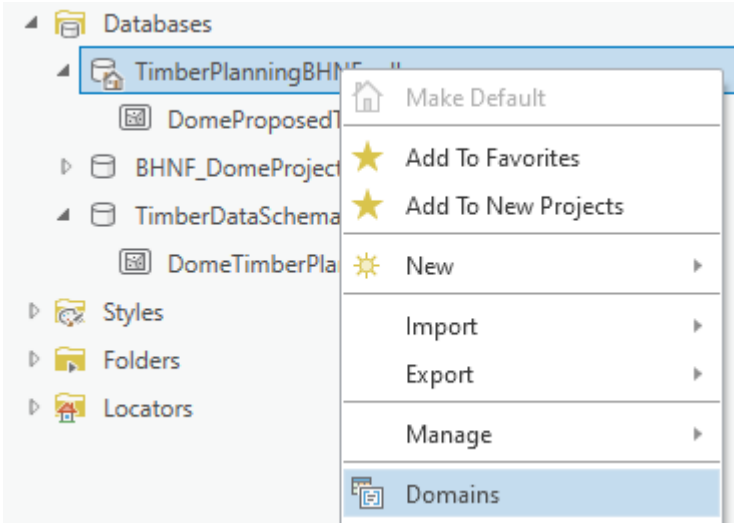
Field: Add Calculate Selection: Select By Attributes Zoom To

RG	SALE_NAME	UNIT_ID	ACTIVITY_CODE	ACTIVITY
	Dome	Dome179	4111	
	Dome	Dome180	4111	
	Dome	Dome181		



Domains Pane

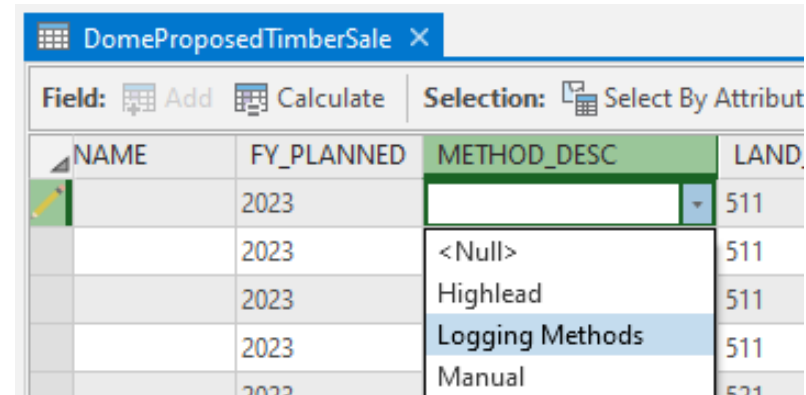
- Geodatabases manage the Lists of Values in a Geodatabase feature called a Domains
- Domains are easy to view in Pro



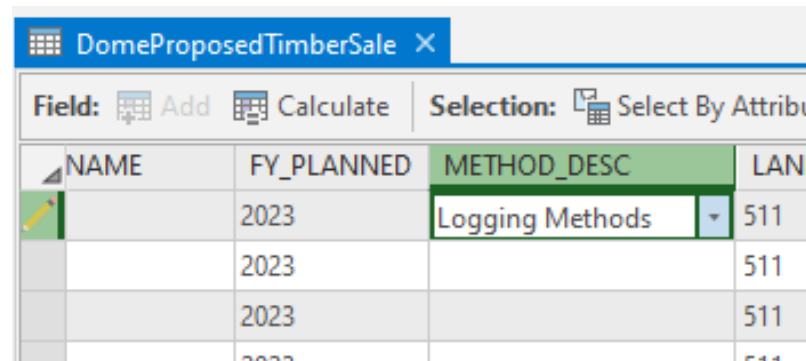
	Domain Name	Description	Field Type	Domain Type	Split Policy	Merge Policy	Code	Description
	Dom_MethodDesc	Describes planned logging method using FACTS codes.	Text	Coded Value Domain	Default	Default	1	Highlead
	Dom_TimberActivity	Describes FACTS activity for Timber projects	Text	Coded Value Domain	Default	Default	2	Logging Methods
							3	Manual
							4	Mechanical Pile
							5	Multispan Highline

When a Field is Assigned a Domain

- Click on the cell and a dropdown appears with a List of Values
- LOVs are only available with a Geodatabase Feature Class (not Shapefiles)
- The only acceptable options are in the list



NAME	FY_PLANNED	METHOD_DESC	LAND
	2023	<Null>	511
	2023	Highlead	511
	2023	Logging Methods	511
	2023	Manual	511

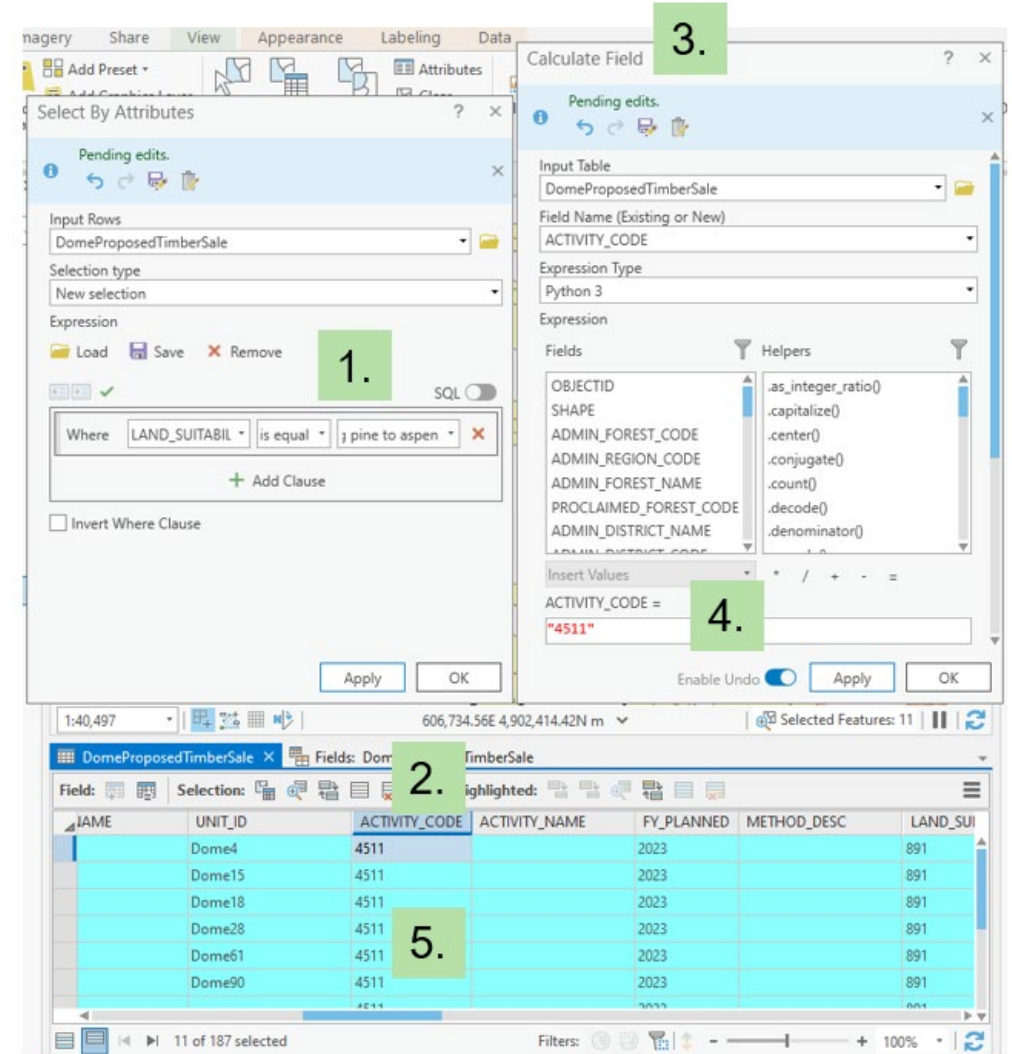


NAME	FY_PLANNED	METHOD_DESC	LAND
	2023	Logging Methods	511
	2023		511
	2023		511
	2023		511

Use the Field Calculator

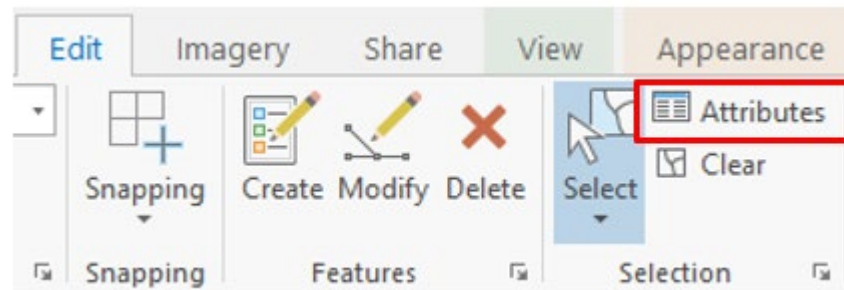
- Populates all or selected cells for the field
- Will over-write existing data
- Can Undo before save
- For example:

1. Select by attributes
2. Right click the field and select Calculate Field
3. Enter desired data in the Calculate Field dialogue window
4. Value must match Field Properties
5. Populates all selected records at once

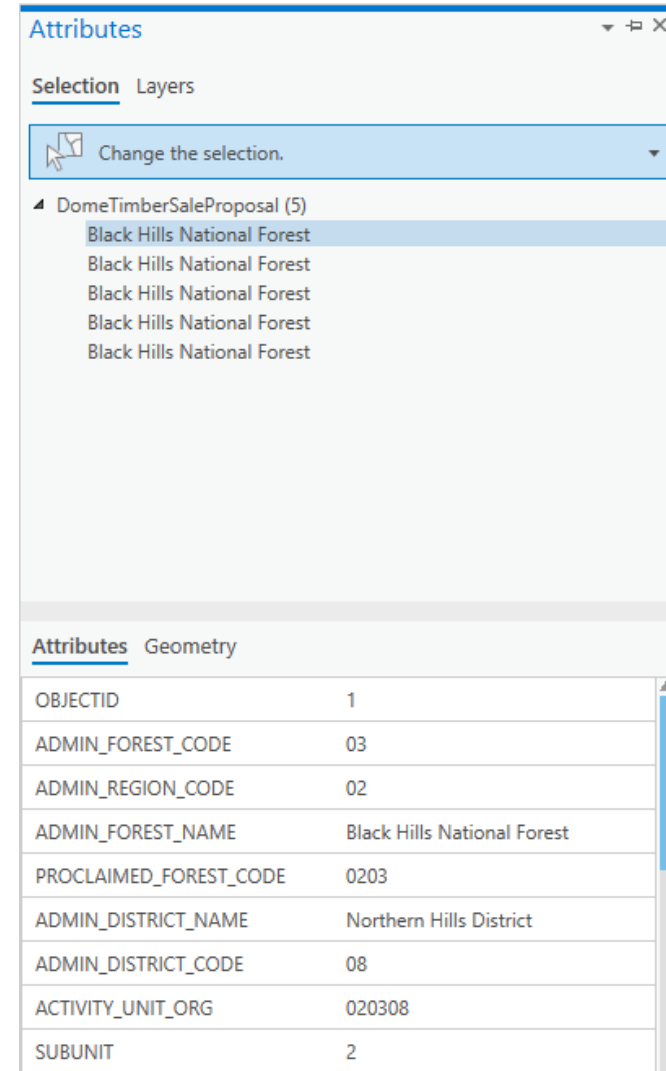


Edit Values in Attribute Pane

- Attributes Pane
 - Displays attributes of selected features and allows you to edit the values below



To open the attributes window:
ribbon click the Attributes
button in the Edit ribbon



Edit Values in the Attributes Pane

- Shows attributes in list format for the selected feature
 - The field names are on left and values on the right
- Methods for editing single features:
 - Manual data entry
 - Copy and paste value
 - Pick from list
- Edits can be undone before save

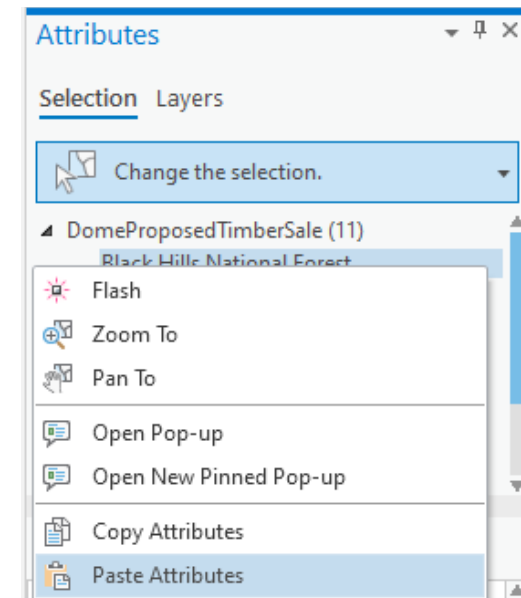
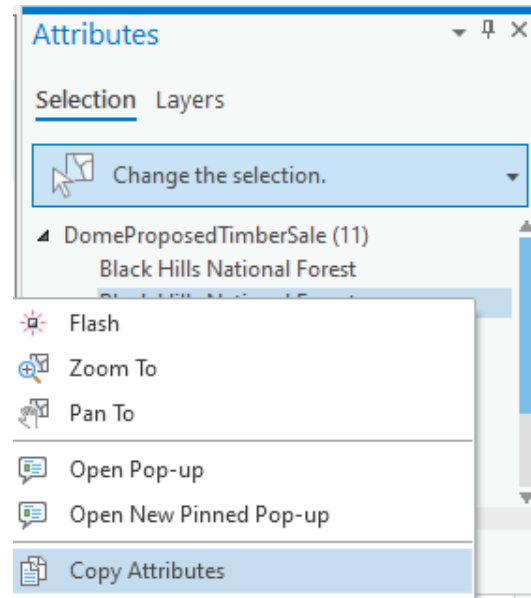
The screenshot shows the 'Attributes' pane with two tabs: 'Selection' and 'Layers'. The 'Selection' tab is active, showing a list of features under the heading 'DomeProposedTimberSale (5)'. The list contains five entries, all with the value 'Black Hills National Forest'. Below this list is a table of attributes for a selected feature. The table has two columns: field names and values. The fields listed are METHOD_DESC, LAND_SUITABILITY_CLASS_CC, LAND_SUITABILITY_CLASS_DE, PRODUCTIVITY_CLASS_CODE, PRODUCTIVITY_CLASS_DESC, OWNERSHIP_CODE, OWNERSHIP_DESC, STATE_ABBR, and STAGE. The values for these fields are: <Null>, <Null>, Logging Methods, Manual, Mechanical Pile, Multispan Highline, Single Span Highline, Tractor Logging, SD, and 1. A dropdown menu is open for the METHOD_DESC field, showing a list of logging methods: <Null>, Highlead, Logging Methods, Manual, Mechanical Pile, Multispan Highline, Single Span Highline, and Tractor Logging. At the bottom of the pane are three buttons: Auto Apply, Apply, and Cancel.

Attributes	
METHOD_DESC	<Null>
LAND_SUITABILITY_CLASS_CC	<Null>
LAND_SUITABILITY_CLASS_DE	Logging Methods
PRODUCTIVITY_CLASS_CODE	Manual
PRODUCTIVITY_CLASS_DESC	Mechanical Pile
OWNERSHIP_CODE	Multispan Highline
OWNERSHIP_DESC	Single Span Highline
STATE_ABBR	SD
STAGE	1

Copy and Paste All Attributes

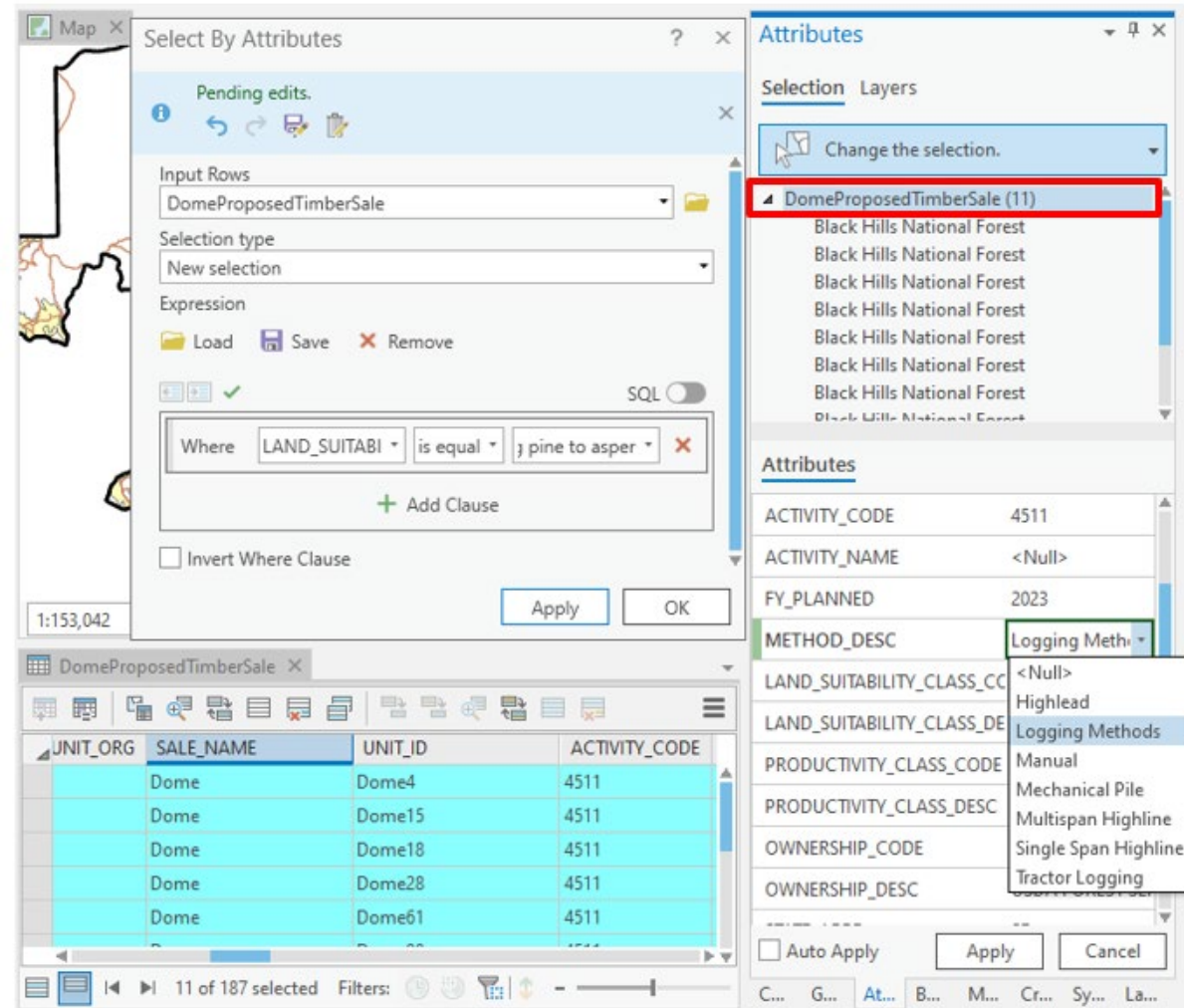
- Right-click the record you want to copy from and click Copy Attributes
- Right-click the record you want to paste all attributes into and click Paste Attributes
- Do this only if you want every value to be overwritten*

*System-generated fields remain unaltered

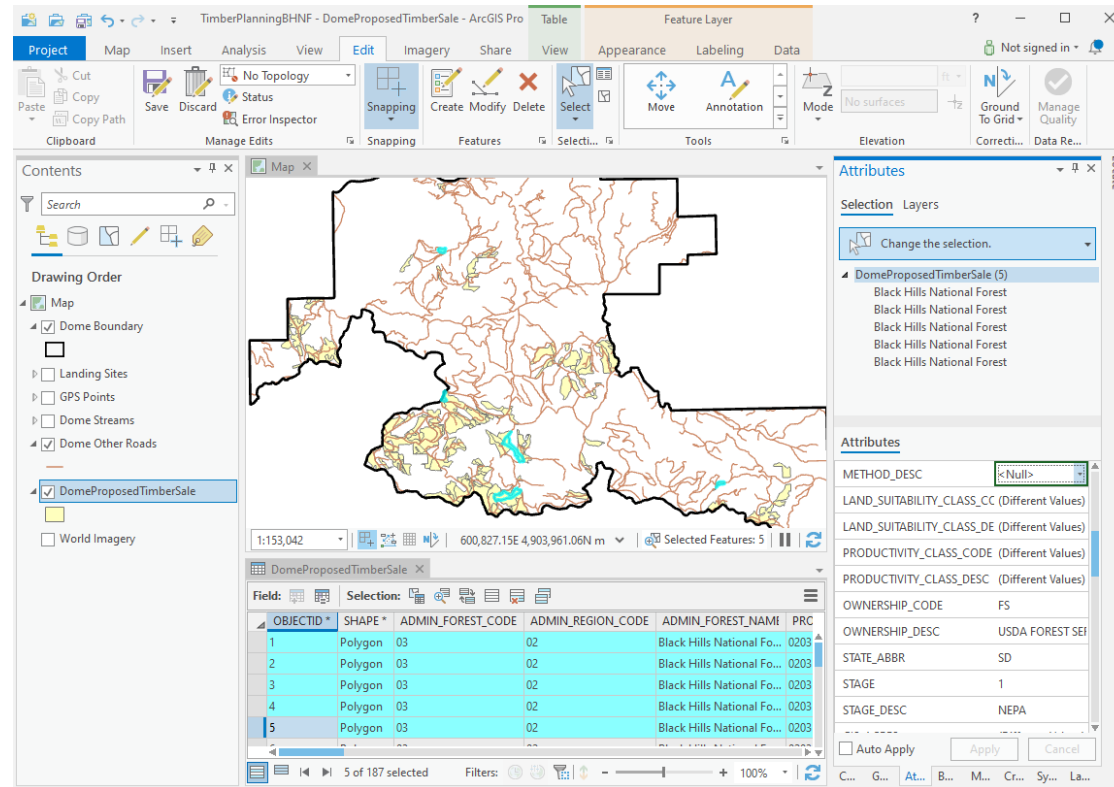


Attribute Pane Global Edits

- Or Global edit to all selected features
- Nothing gets changed until you hit Apply
- Prior Values are replaced
- Can Undo until you Save Edits



Demonstration



I will demo a few things from the exercise. Then we will break for you to complete the exercise on your own.



Lesson 3

Spatial Edits

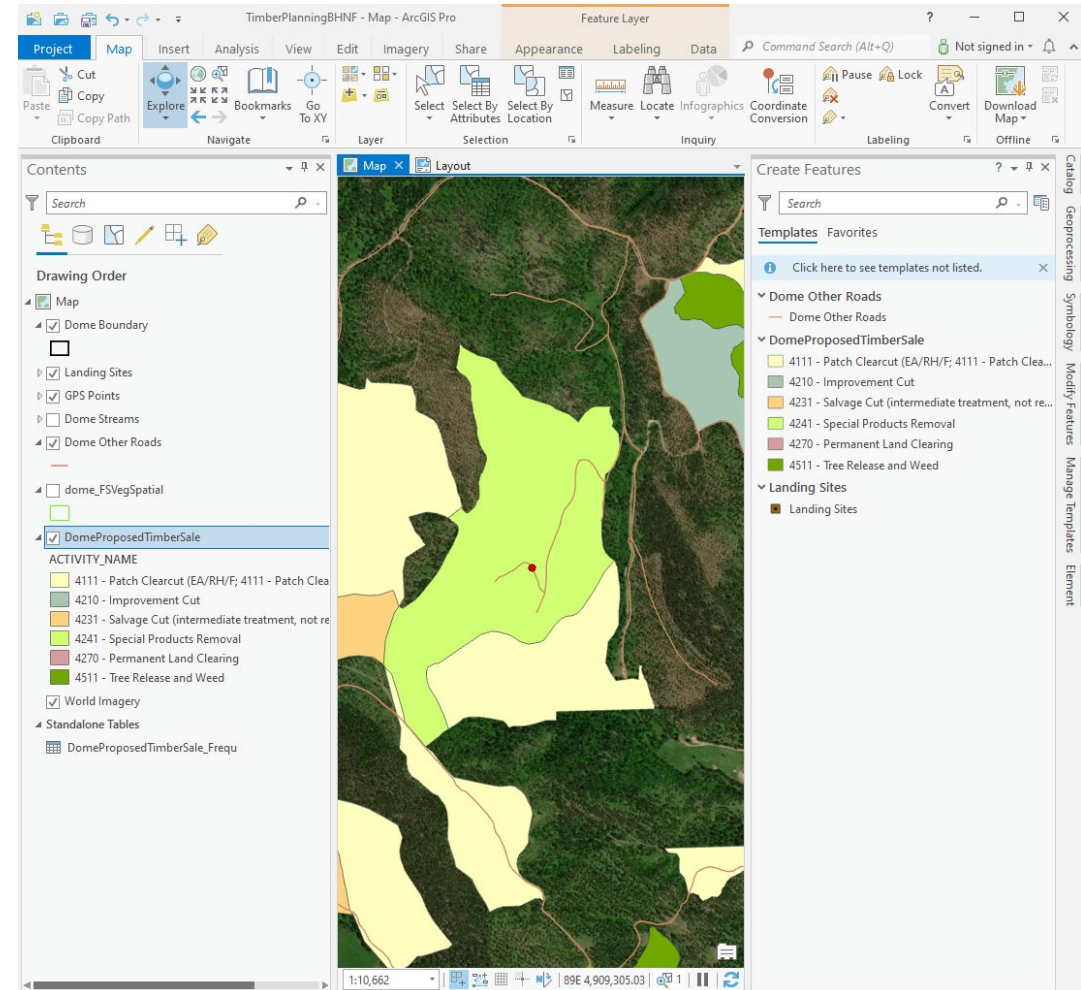
Overview

- Define edit scenario
- Edit settings
- Editing existing features
- Create new features



First Consider the Edit Scenario

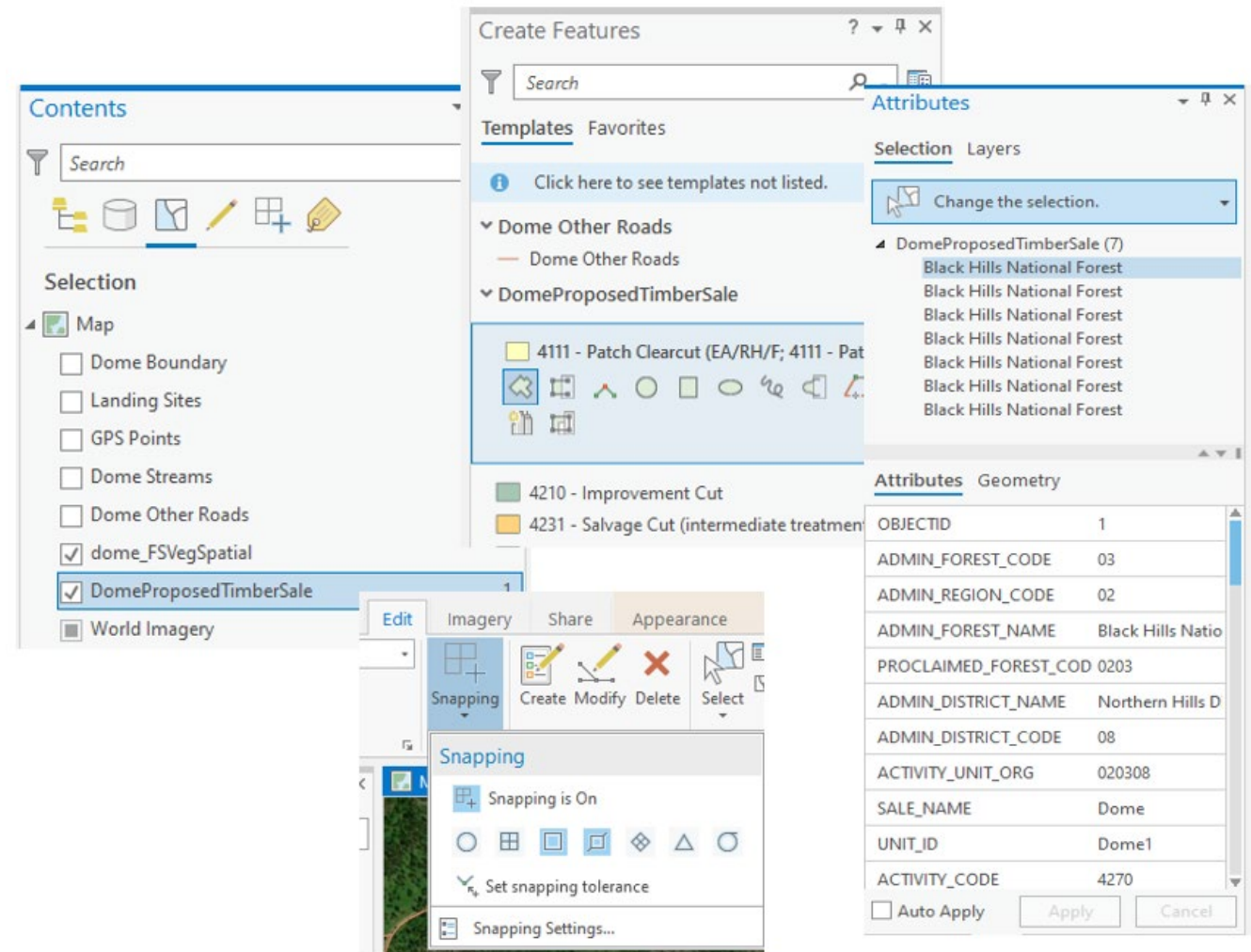
- **What is my edit scenario?**
 - Example: Expand a Timber Sale polygon so that it touches a road
- **What Spatial Reference do I need?**
 - We covered this in Exercise 1
- **What datasets will I need?**
 - Example: Add layers to edit, plus background-supportive information (e.g., aerial photos, roads, legal boundaries, etc.)



ArcGIS Pro Pre-Edit Settings Overview

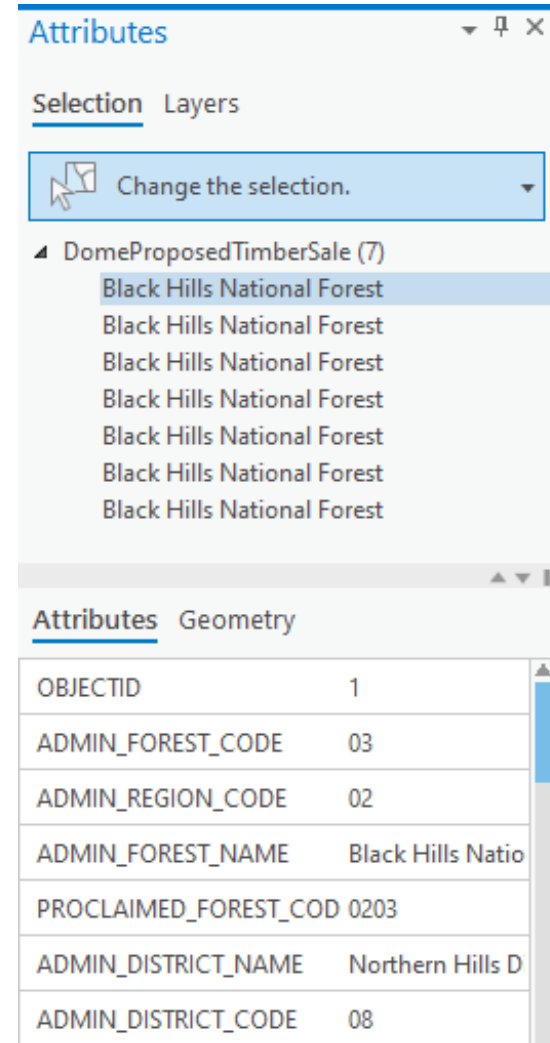
- Set Area of Interest
- Edit Settings
- Snapping Settings
- Set Selectable layers
- Set Editable layers
- Create Features Pane
- When and How to Attribute

Edit environment settings
vary between edit
scenarios, and maybe
between mouse clicks



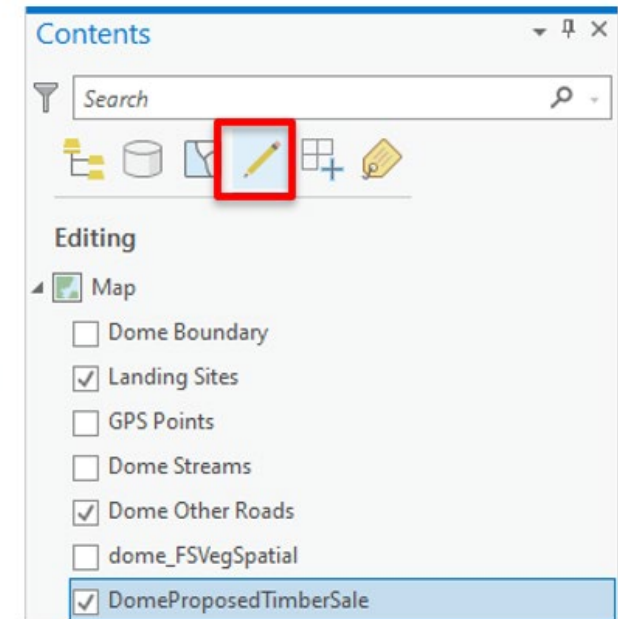
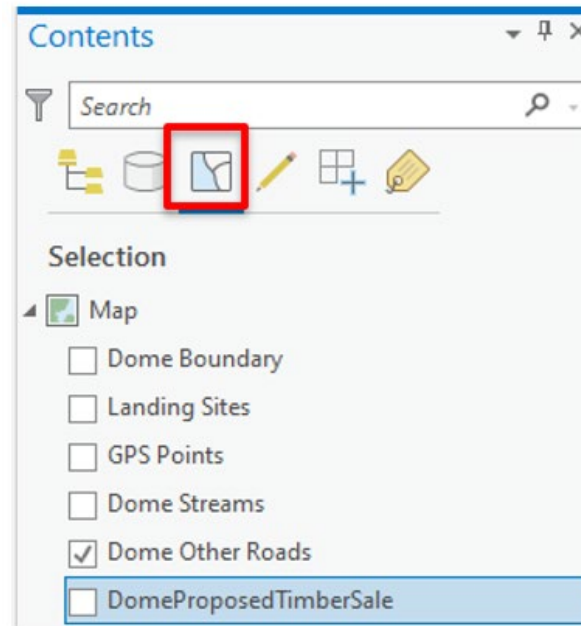
Decide When to Attribute

- Digitize all features first, then add attributes?
 - Using tools like Global edits, Calculate Field tool, Join tables, etc.
- Add Attribute after each spatial edit?
 - Keep Attributes pane open and fill in immediately after a new feature is created.



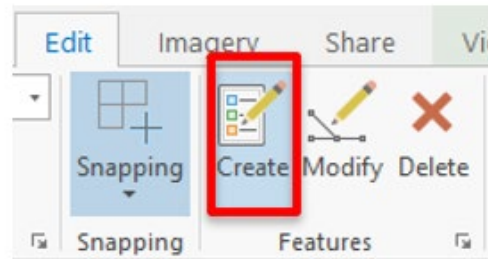
Contents Pane Settings

- Contents Pane
 - List by Selection
 - List by Editing (New to Pro)

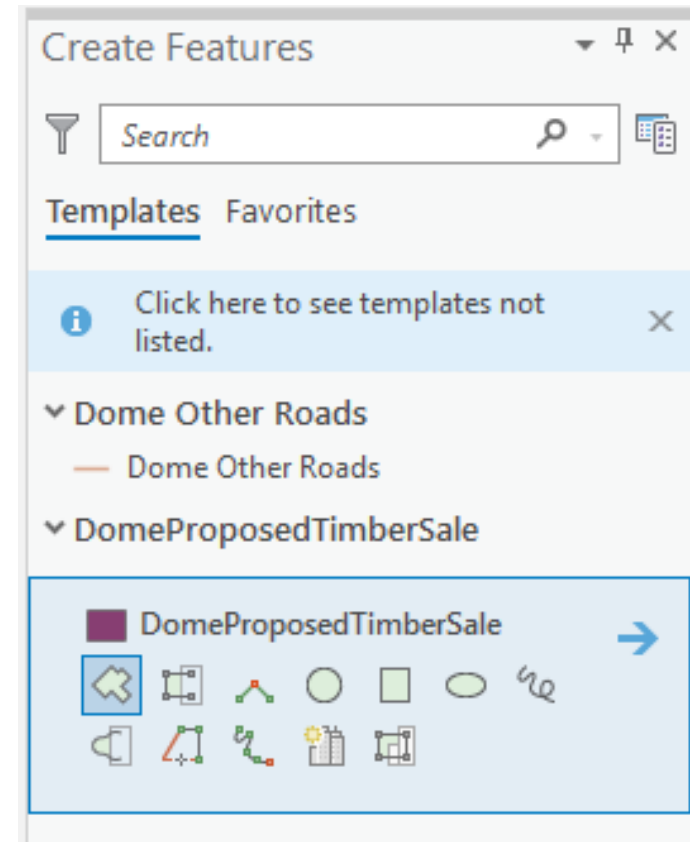


Create Features Pane

- Turn on from Edit Ribbon
 - Features Group

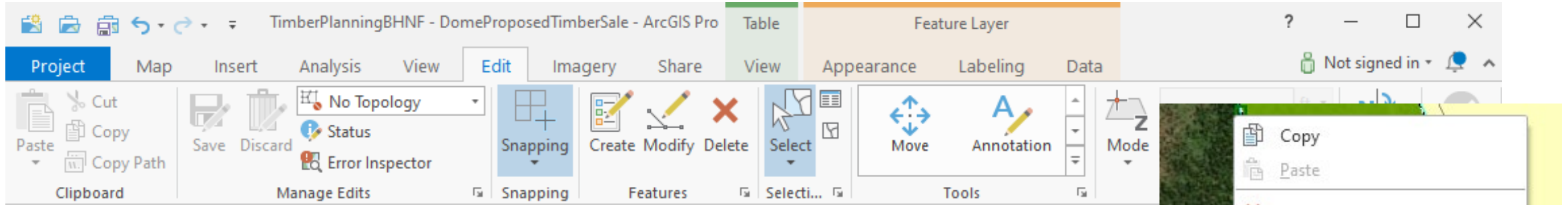


- Select Layer to Edit
- Select Construction Tool




Note: Only Layers turned on in Contents pane will show by default

ArcGIS Pro Edit Tools



The screenshot shows the ArcGIS Pro interface with the 'Edit' ribbon selected. The ribbon includes tabs for Project, Map, Insert, Analysis, View, Edit, Imagery, Share, View, Appearance, Labeling, and Data. The 'Edit' ribbon is divided into several groups: Clipboard (Paste, Cut, Copy, Copy Path), Manage Edits (Save, Discard, No Topology, Status, Error Inspector), Snapping (Snapping), Features (Create, Modify, Delete), Select (Select), Tools (Move, Annotation, Mode), and a Z Mode dropdown. A context menu is open over a map view, showing options like Copy, Paste, Delete, Explore, What's here?, Select Features, Select All In Layer, Zoom To Selection, Pan To Selection, Clear, Move, Rotate, Scale, Edit Vertices, and Attributes. The 'Move' option is highlighted.

- Edit Ribbon
- Modify Features Pane
- Editing toolbar
- Context menu

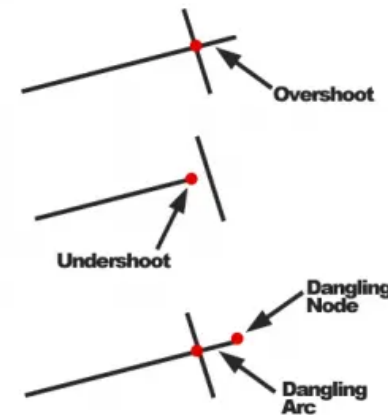


A close-up of the editing toolbar, showing icons for selecting, moving, rotating, scaling, and editing vertices.

Avoid Digitizing Errors in ArcGIS Pro

- Digitizing Errors
 - Failure of Lines to connect
 - Creation of sliver gaps or overlaps
- Avoid vertical integration errors is using Snapping tools

Dangles, overshoots and **undershoots** are examples of errors.



SLIVERS are small, spurious gap often as a result of imprecise digitization of features in GIS.



OVERLAPS are polygons or lines that are on top of each other which could result in double-counting areas.



Snapping in ArcGIS Pro

- **Snapping**

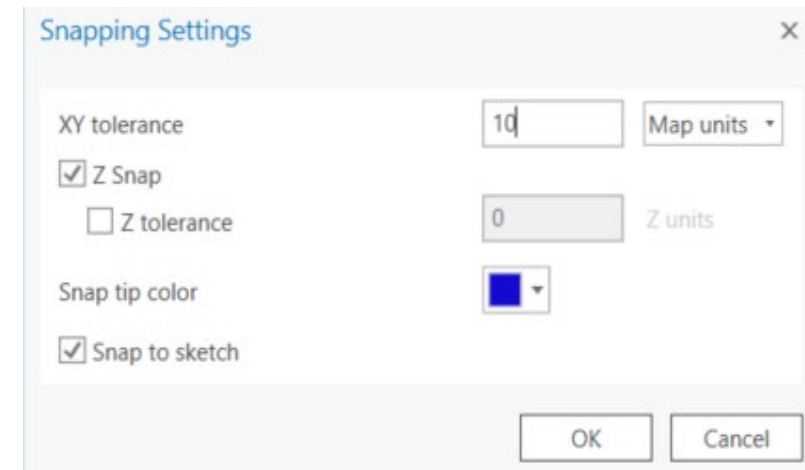
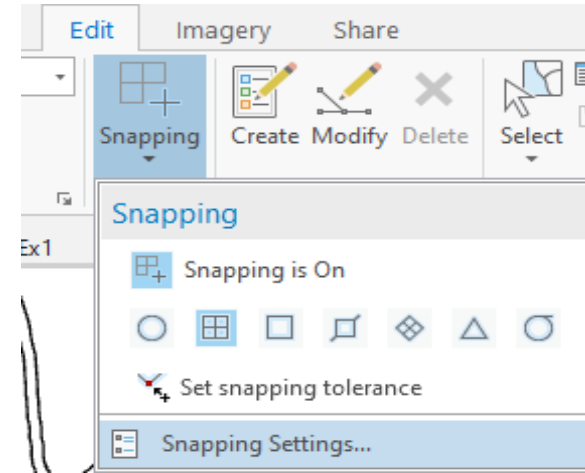
- Helps prevent digitizing errors such as gaps and slivers
- Snaps to edges, vertices, points, endpoints, and more

- **Snapping tolerance**

- When the cursor is within the set distance (in pixels or Map Units) the pointer is snapped to the feature

- **Snap Tip**

- Tells you which Layer you are snapping to and which Snap Tool you are using as you hover over a feature

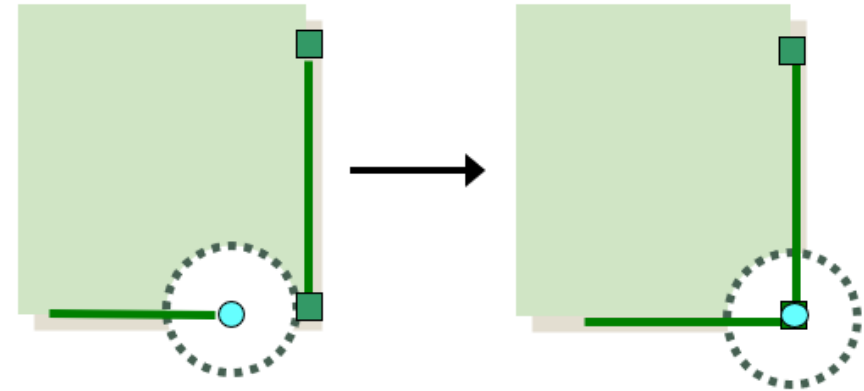


How Does Snapping Work?

- Snap editing tool to an existing feature to avoid:
 - Undershoots (gaps)
 - Overshoots (dangles)

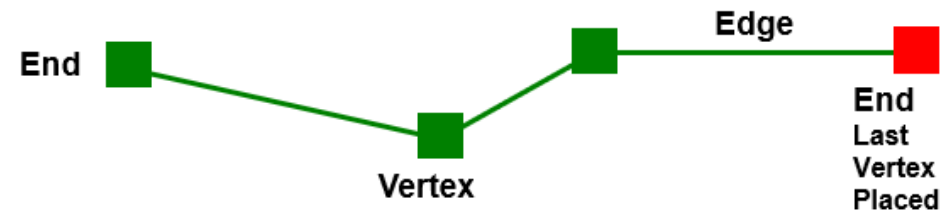
Vertex
Edge

■ Snapping
— tolerance



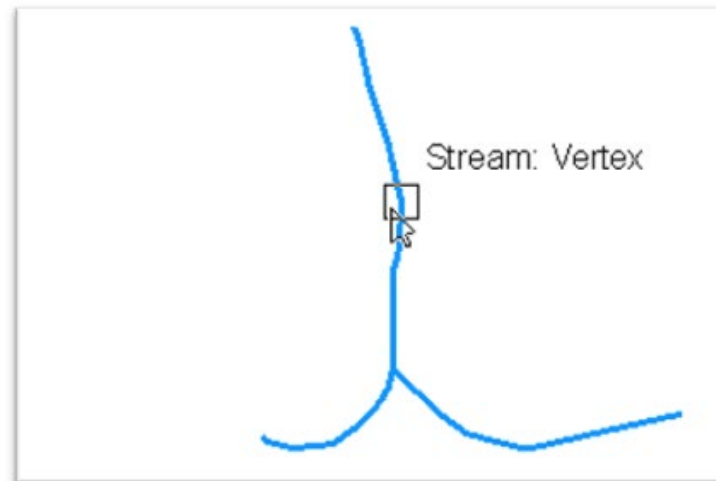
- You can snap to a feature's ...
 - Vertex
 - Edge
 - End
 - Point

■ Point



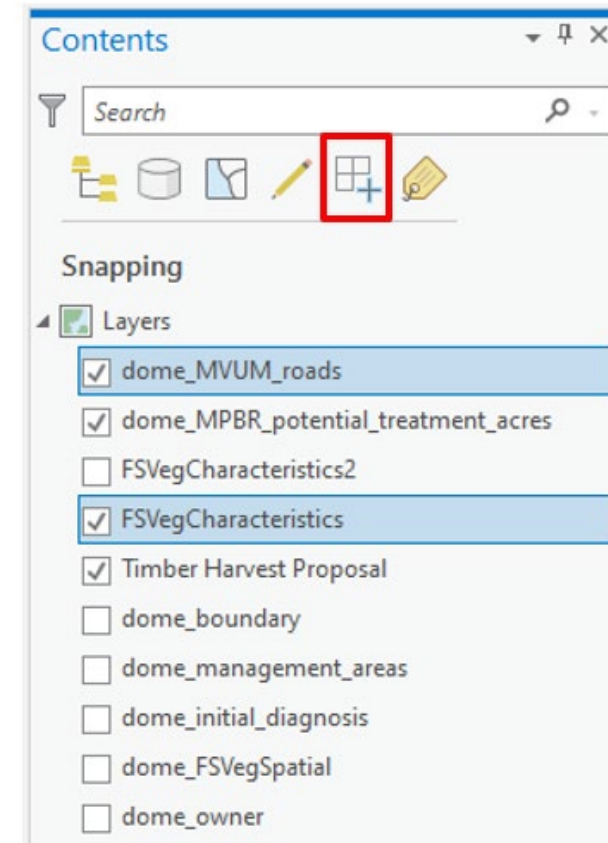


Snap Tips



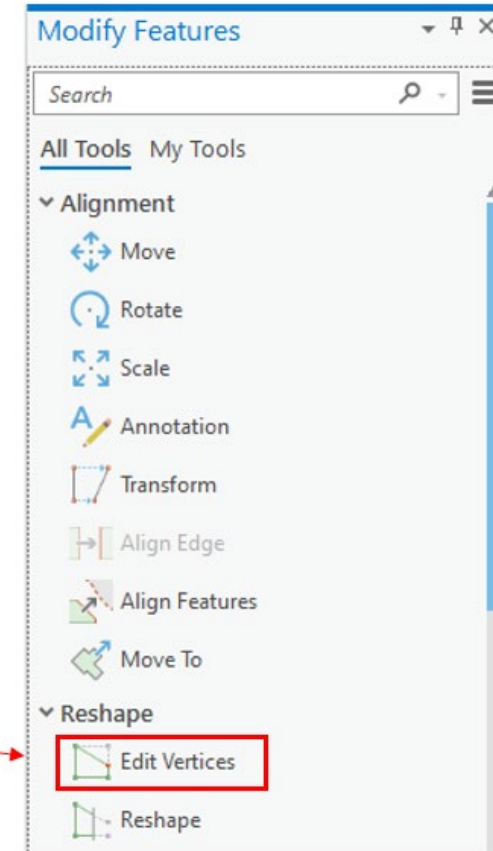
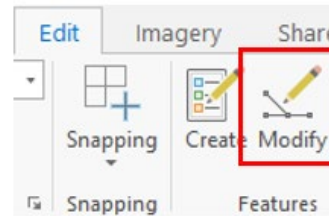
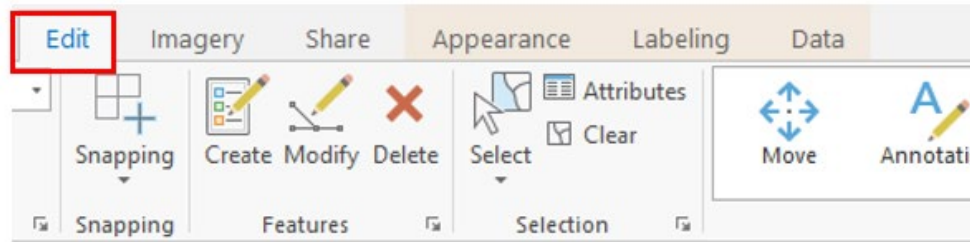
List by Snapping

- New to Pro
- You can toggle snapping on and off by layer
- To reduce the chance of snapping to the wrong layer



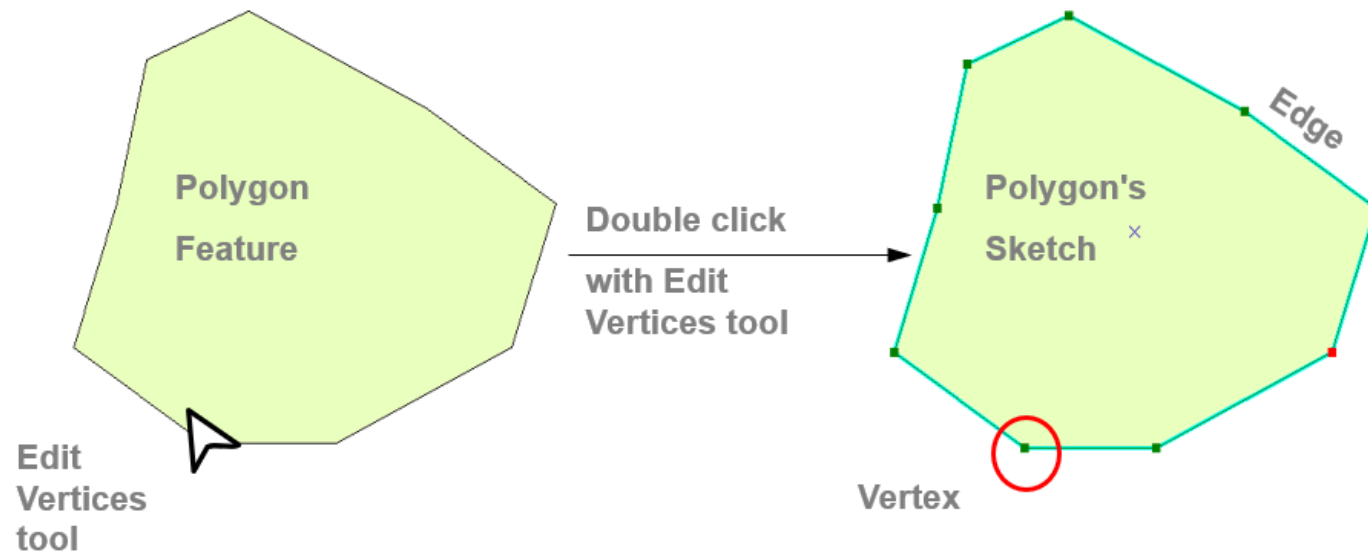
Start Editing with the Edit Vertices Tool

- Access the Edit Vertices Tool two ways



ArcGIS Pro Sketches

- When editing in ArcGIS Pro you edit a Sketch.
- Sketch: vertices and edges defining a feature's shape
 - Vertex – XY coordinate
 - Edge – Line segment between connected vertices
 - End – End vertices of a line feature

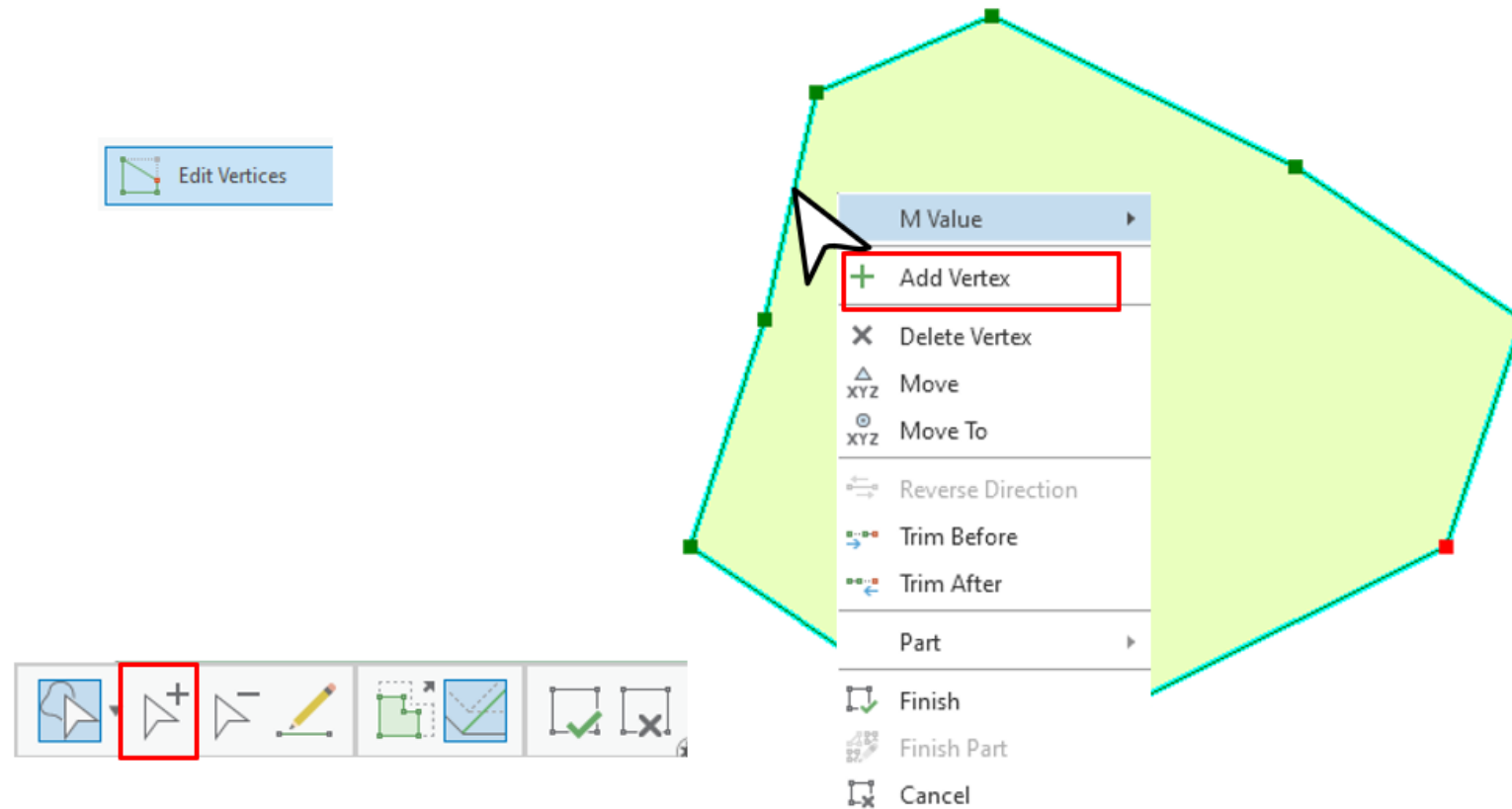


Edit a Sketch with the Edit Vertices Tool

•

•

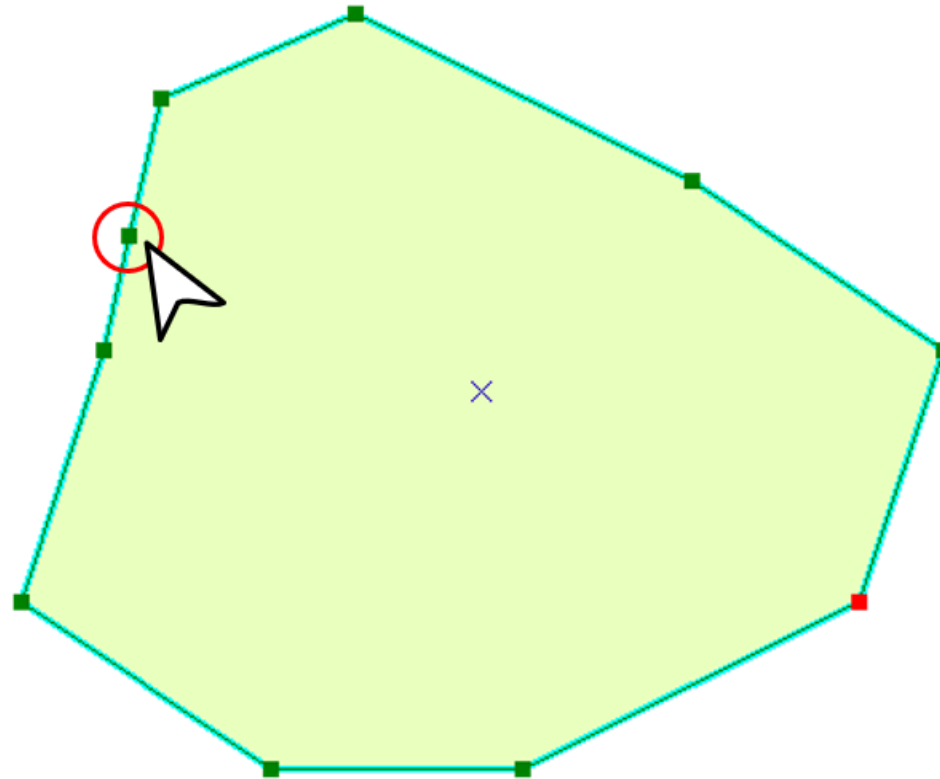
•





Edit a Sketch with the Edit Vertices Tool

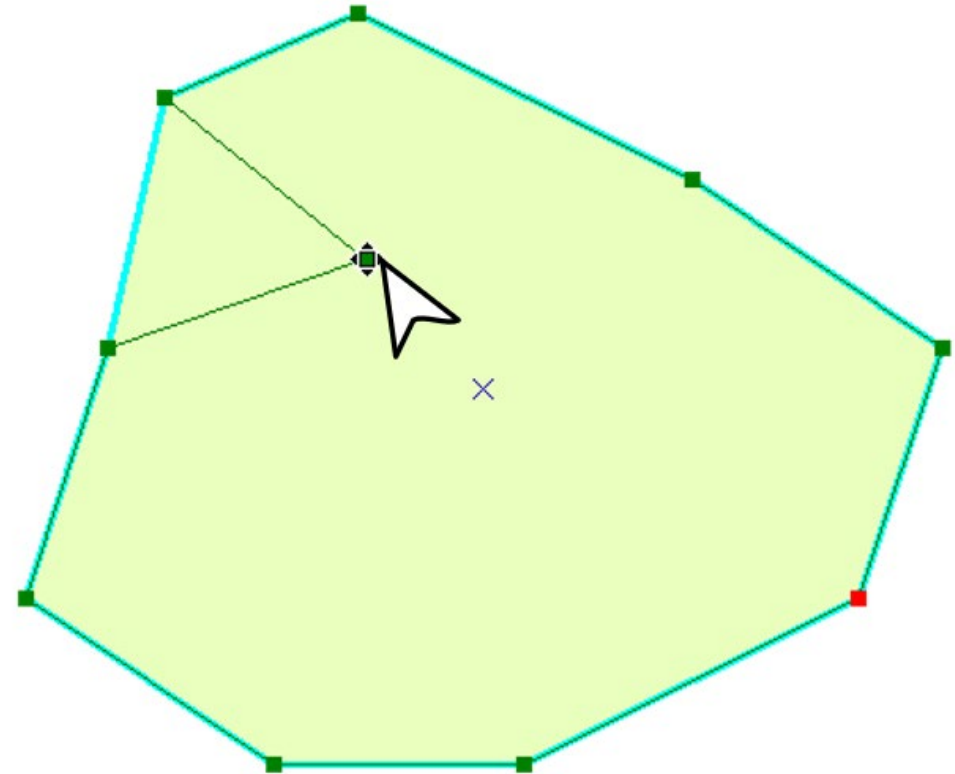
- A Vertex is inserted where you clicked





Edit a Sketch with the Edit Vertices Tool

Use the Edit Vertices tool to grab the vertex with your mouse and move it.

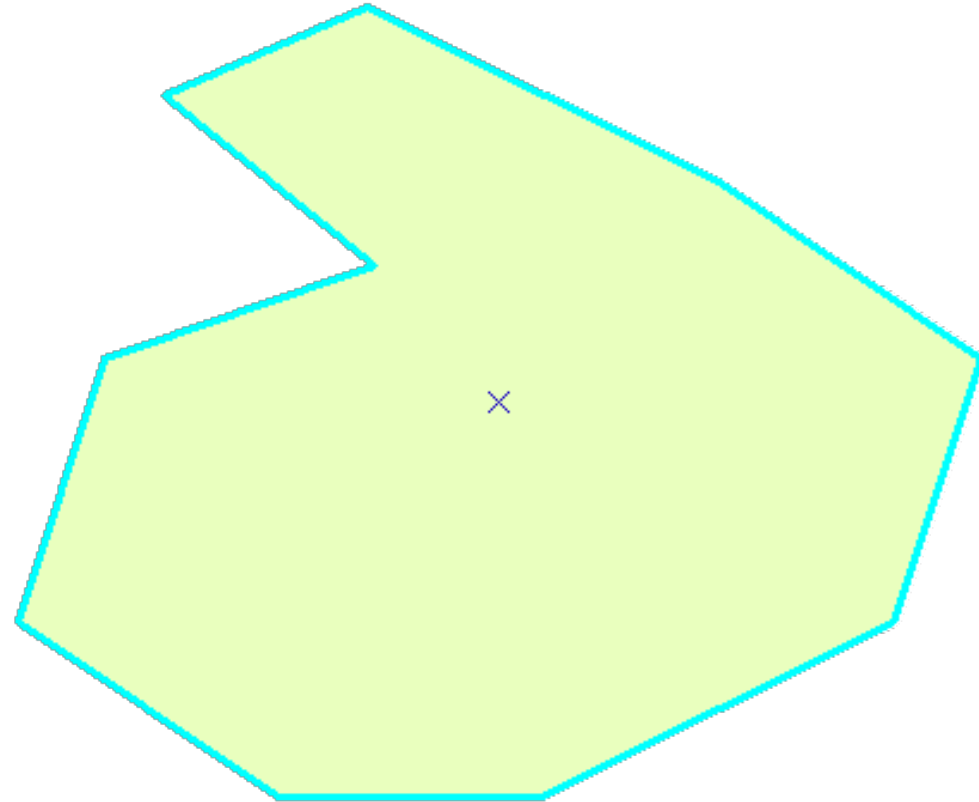


Edit a Sketch with the Edit Vertices Tool

- Click F2 to Finish Sketch
- Or click the Finish Sketch tool

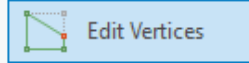


- Feature will be edited
- Can Undo until you Save Edits

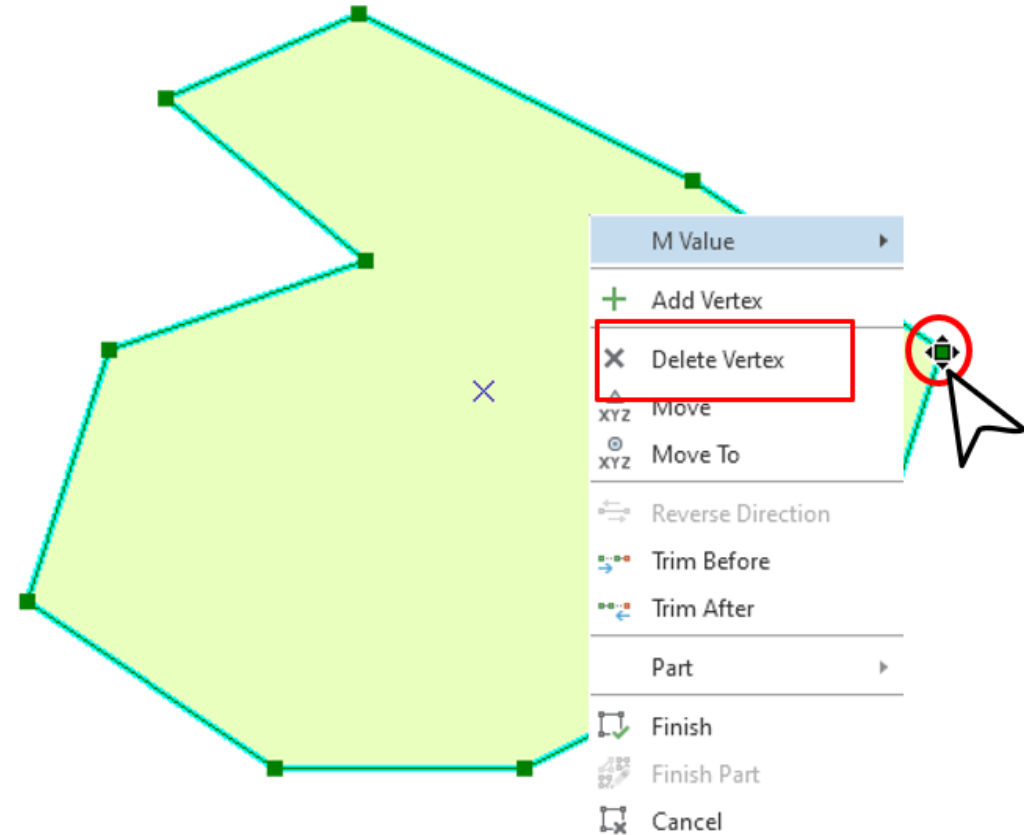


Edit a Sketch with the Edit Vertices Tool

- Double-click the feature using the Edit Vertices Tool

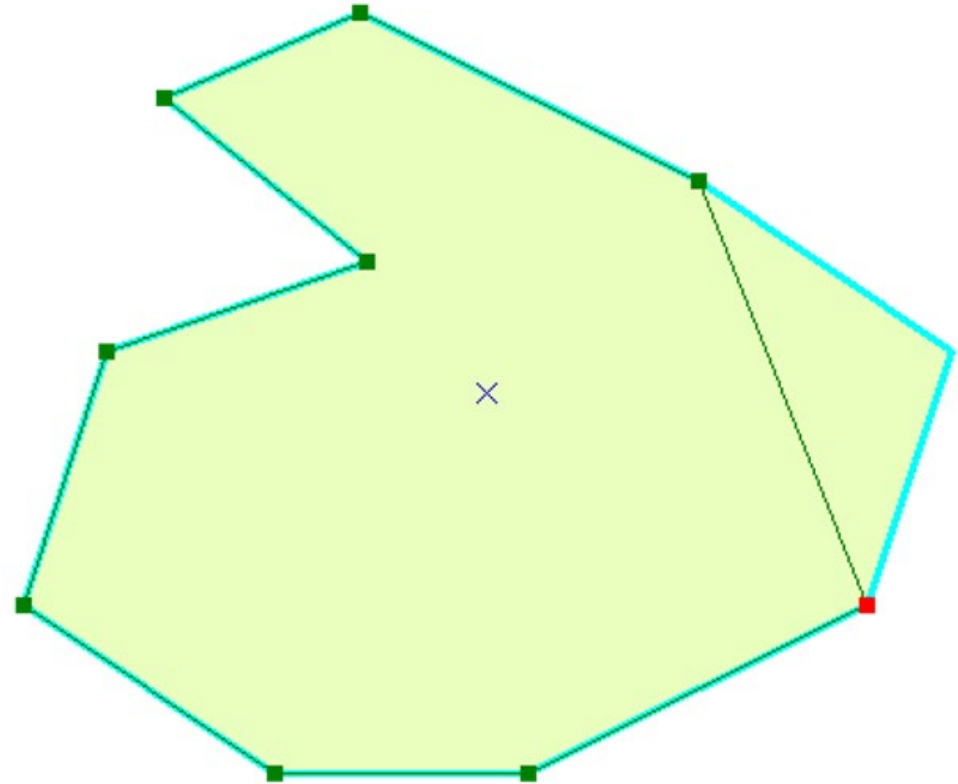


- Right-click on Sketch to see Context Menu and select Delete vertex
- Could click the Delete Vertex tool also



Edit a Sketch with the Edit Vertices Tool

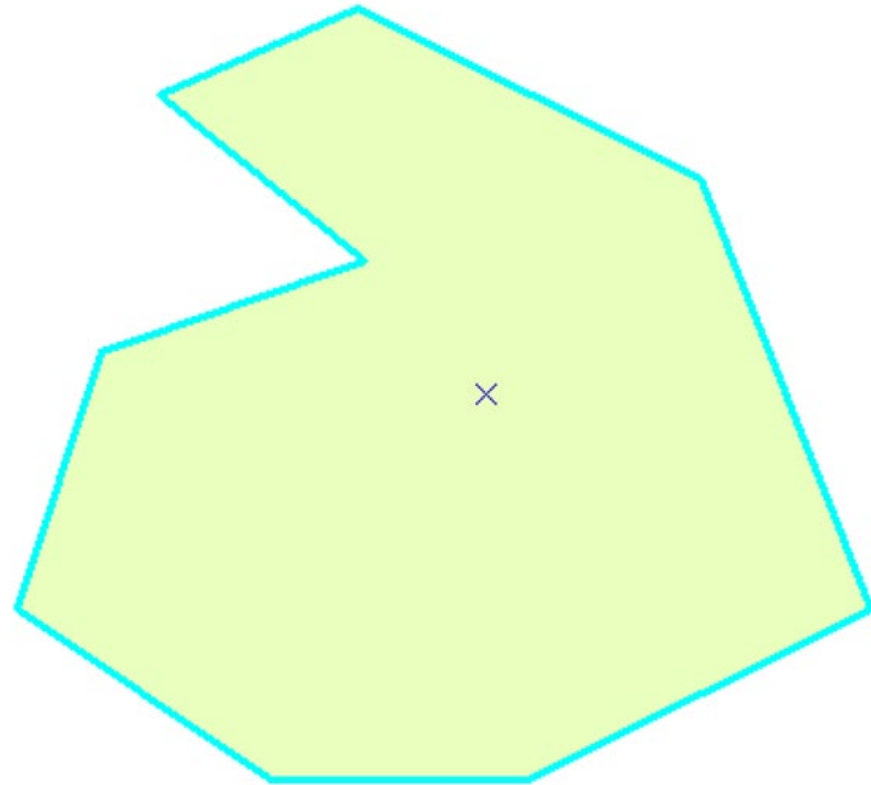
- Sketch looks like this until you Finish Sketch either by double-click or F2
- Could also click the Finish Sketch button on the edit toolbar





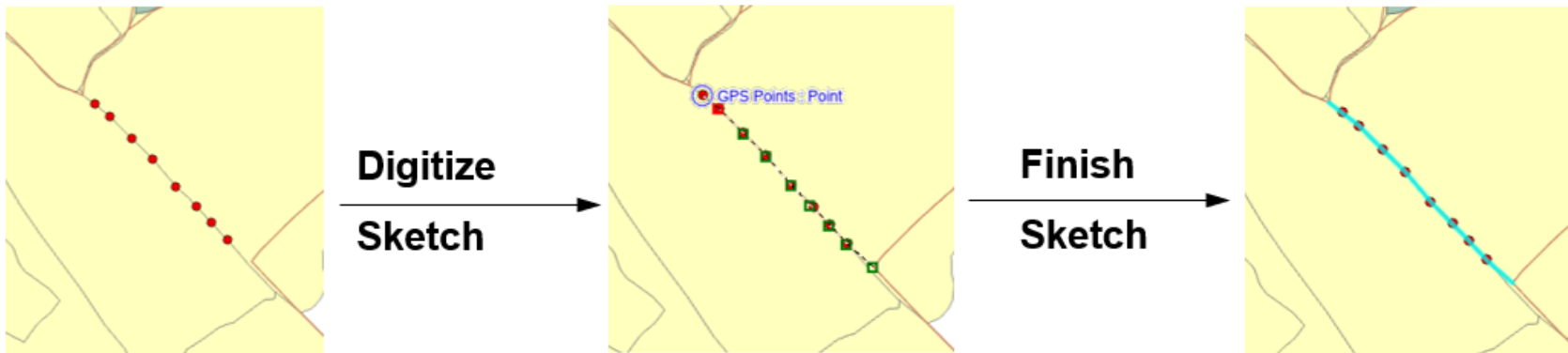
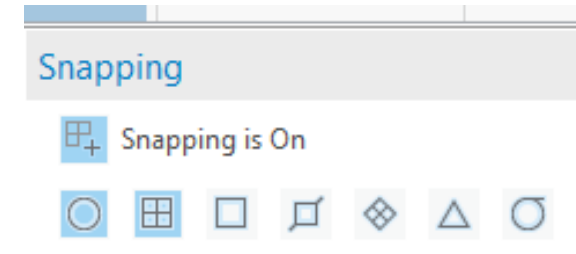
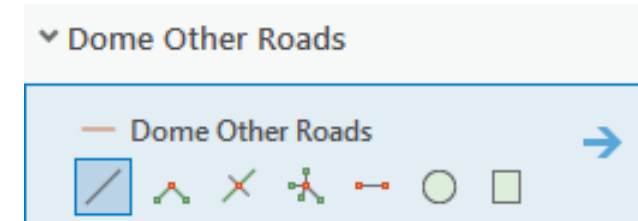
Edit a Sketch with the Edit Vertices Tool

- Polygon is edited



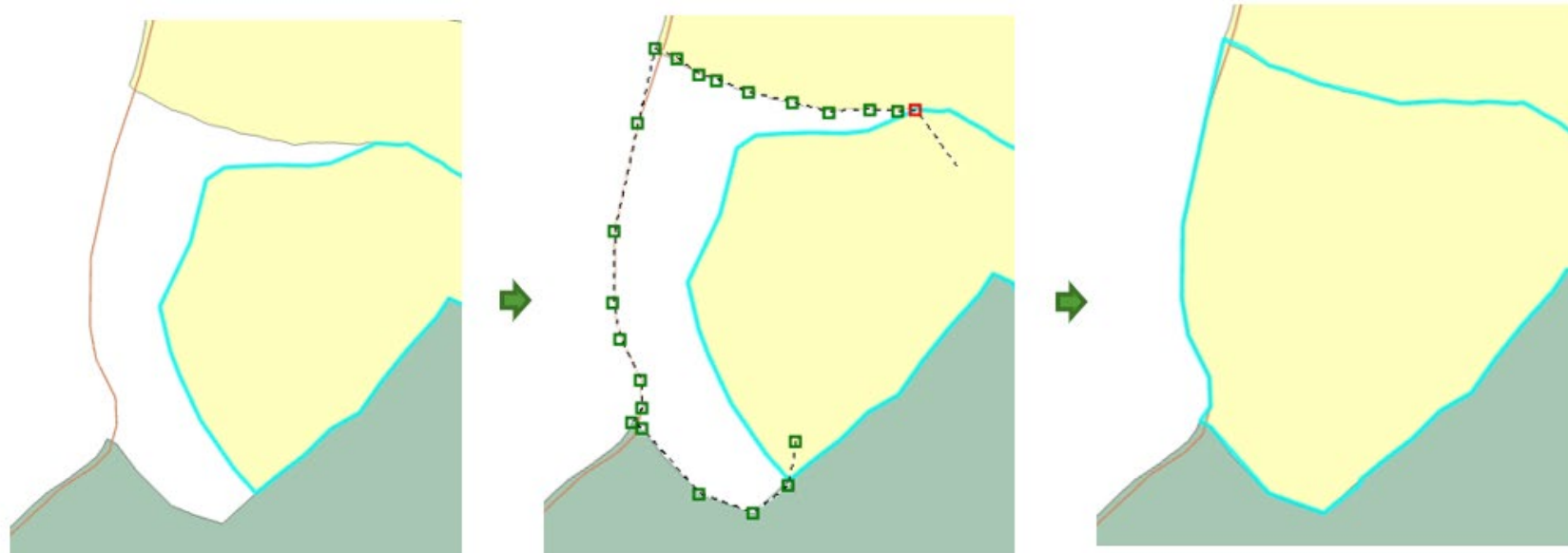
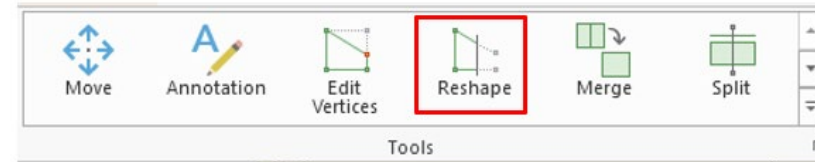
Create New Line Features

- Edit scenario: Create a new road line between existing roads
 1. Select Template and Construction Tool
 2. Set Snapping to End and Point Snapping
 3. Use cursor to define new feature's shape



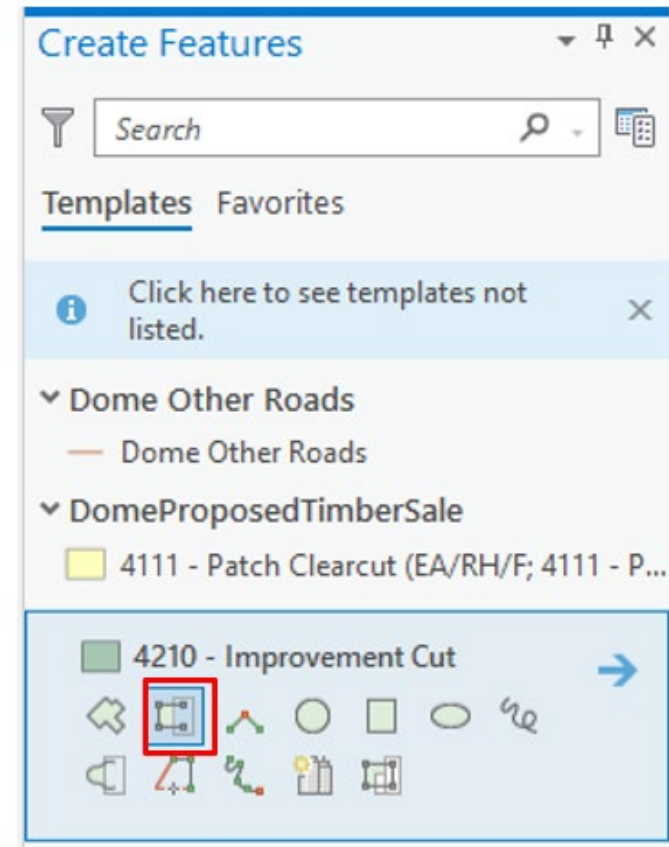
Reshape Feature Tool

- Select feature to edit
- Modify Tools Button
- Reshape tool
- Start inside feature and end back inside feature



Autocomplete Polygon Tool

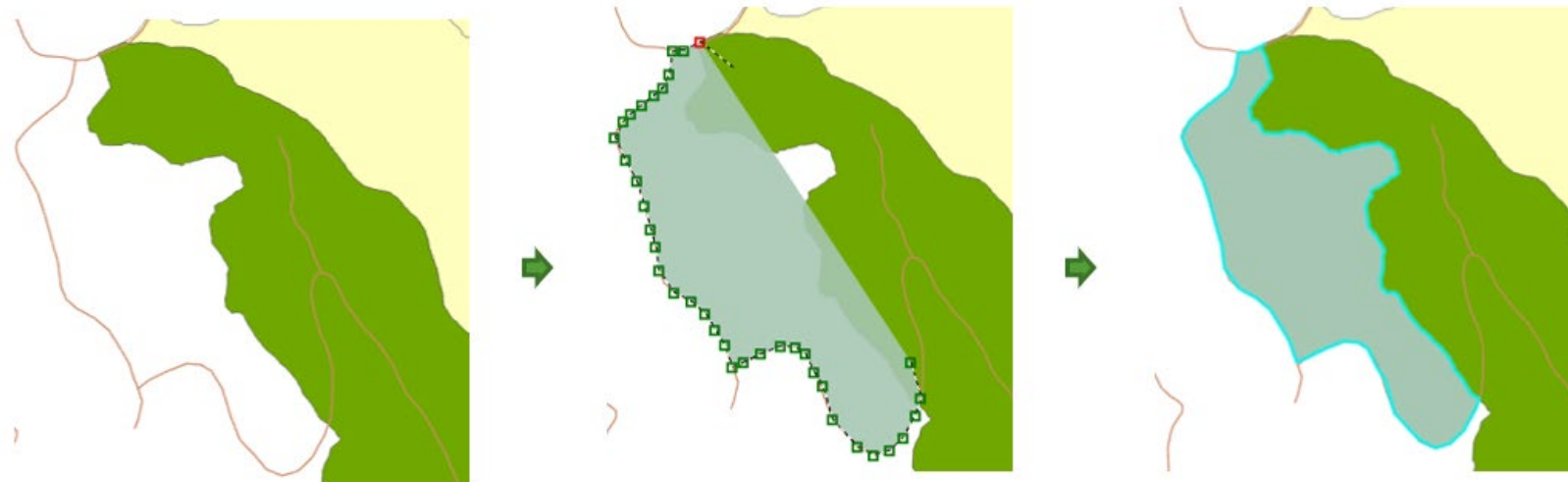
- Choose the Layer to edit in Create Features Window
- Select the Autocomplete Polygon from Construction Tools



Autocomplete Polygon Tool

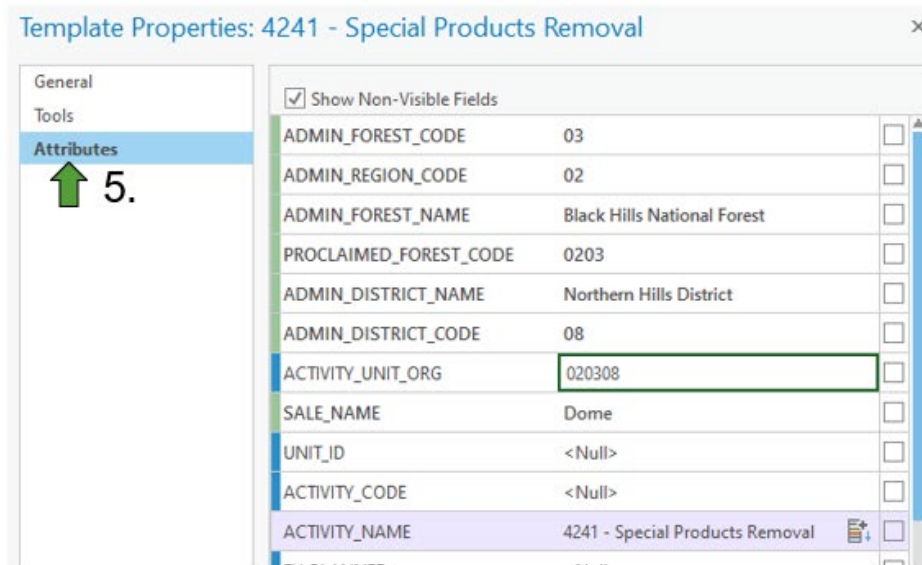
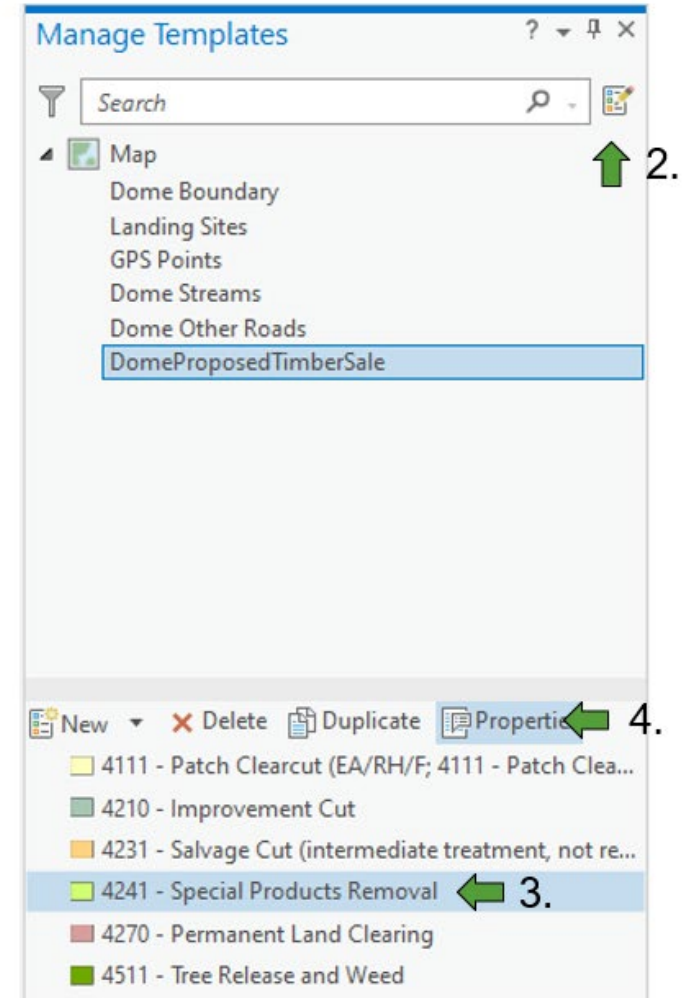
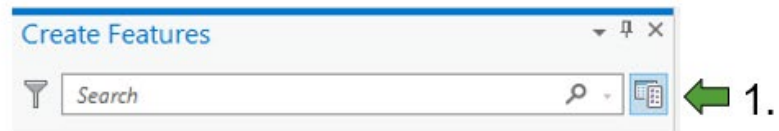
To create new polygon feature adjacent to existing polygon:

- Begin inside or intersect existing polygon
- Digitize new polygon
- Intersect existing polygon again double-click
- The coincident boundary between the two polygons is automatically created



Manage Templates

- Se



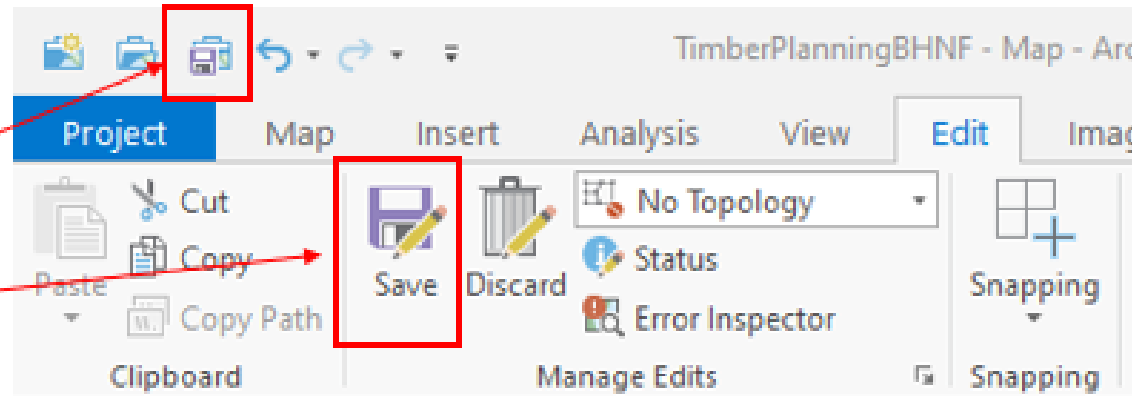
Save Your Work

Save your edits often!

- Use Save Edits command
- Saving the Project DOES NOT save your edits

Save Project

Save Edits

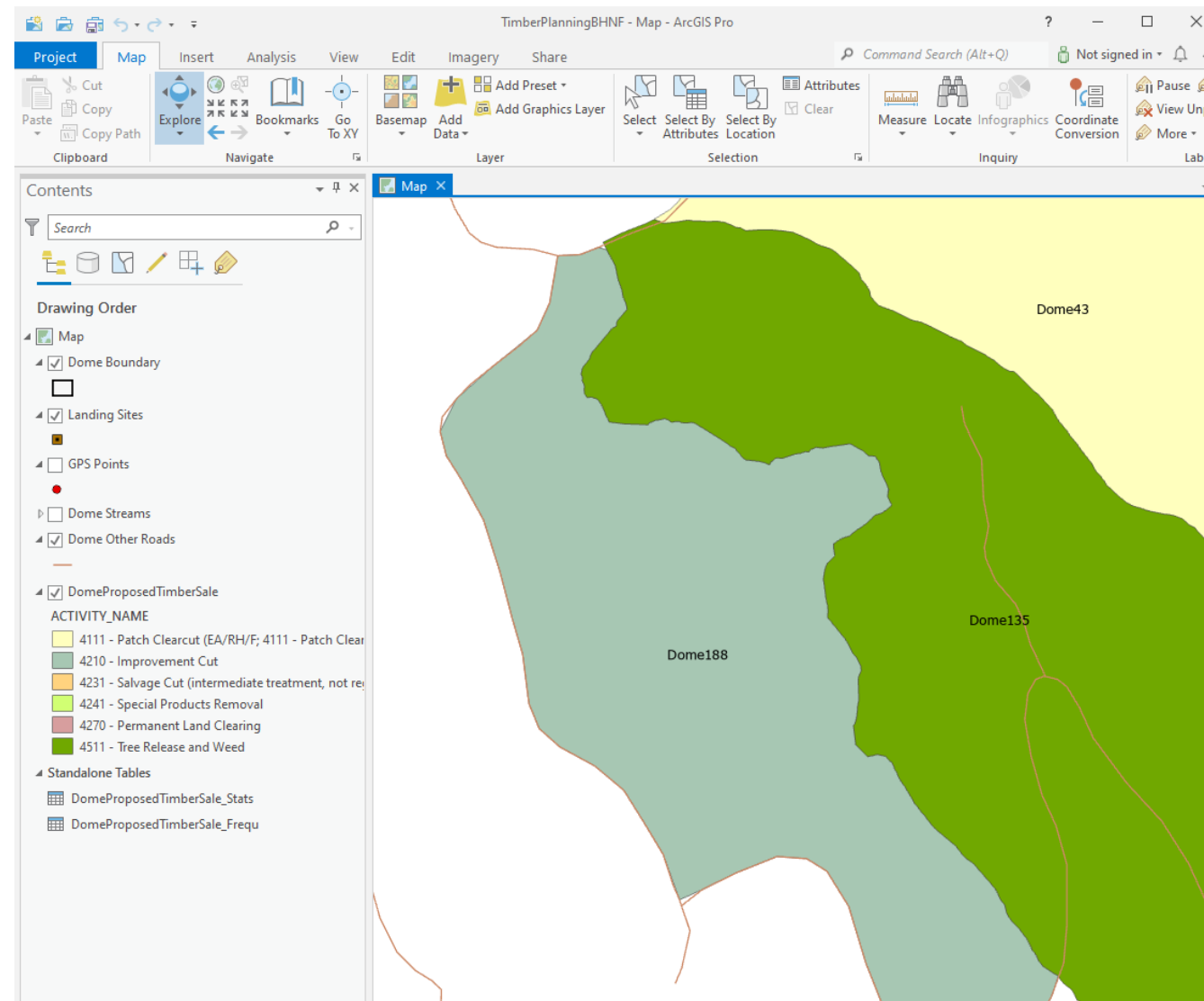




More Editing Information

- Talk to your GIS Coordinator for Best Practices!
- [FS Data Stewardship](#) Direction and Training
- Visit the [FS ArcGIS Pro SharePoint](#)
- Refer to the [ESRI ArcGIS Pro Help](#)
- Free ESRI Virtual Campus courses for FS employees available through AGOL. Click [HERE](#) for more info.
- Problems? [Create GIS Helpdesk Ticket](#)

Demonstration



Questions?