

# Using ArcGIS Pro: Creating a Field Boundary

Pearl Webb  
Program Associate -  
Crop, Soil & Environmental  
Science

Mike Daniels  
Professor -  
Crop, Soil & Environmental  
Science

## Introduction

ArcGIS Pro® is a geographic information system (GIS) software platform developed by ESRI. The company began its development of GIS software in the early 1990s with the release of ArcView, which eventually evolved into ArcGIS Desktop. Since 2015, ESRI has been transitioning to replace ArcGIS Desktop with ArcGIS Pro.

A GIS is a software package that connects databases to geographically known locations usually depicted by geographic coordinates such as latitude and longitude. It allows for the ability to capture, analyze, model, manage and visualize geographically referenced data and information. It has many display and analysis features that make it a powerful tool in dealing with spatially explicit datasets.

A GIS has many uses in agriculture such as displaying yield maps, satellite imagery, and variable-rate fertilizer application rates. For example, spatially relevant individual field boundaries can be developed from aerial photography, pre-existing polygon shapefiles or GPS to mark the boundary of agricultural fields or other land parcels. Creating field boundaries is useful to calculate a field's area, and boundaries can serve as a foundation for many other analysis and interpolation tools within ArcGIS. Having a field bound-

ary defined is the essential starting point for actions such as creating a soil sampling grid or interpolating a field's soil sampling results.

The goal of this factsheet is to help agricultural producers and those who directly serve agriculture utilize the power of ArcGIS Pro software in farm management. The information included below assumes a basic knowledge of or exposure to ArcGIS Pro software navigation. ArcGIS Pro version 2.4.0 was used in the development of this fact sheet.

## Starting a New Map

Open a project in ArcGIS Pro and begin by creating a new map. Within the **Map** tab, select the Basemap labeled **Imagery Hybrid** to view both aerial photography and reference features (Fig. 1).

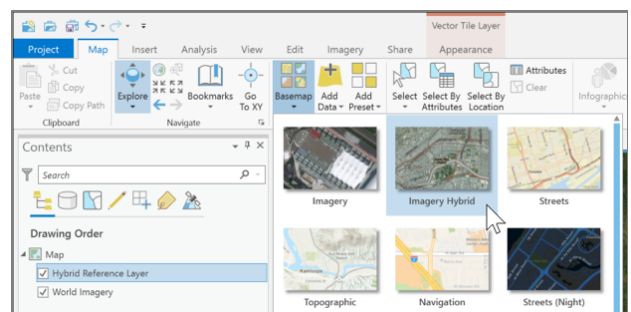


Figure 1. Selecting the appropriate basemap.

Next, navigate to the field or area where boundaries will be mapped. If the coordinates are known, use the **Go to XY** feature to quickly locate and zoom into the field (Fig. 2).

*Arkansas Is  
Our Campus*

Visit our web site at:  
<https://www.uaex.uada.edu>

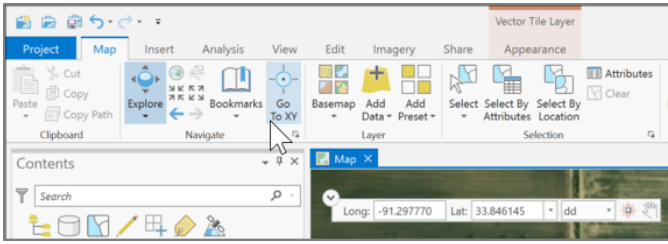


Figure 2. Enter the longitude and latitude in **Go to XY** and zoom in to the location.

## Creating the Polygon Feature or Shapefile

Open the **Catalog View** in the **View** tab (Fig. 3).

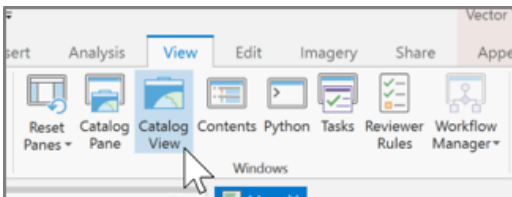


Figure 3. **Catalog View** button in the **View** tab.

Navigate to and open the project folder. The current project that is open will be located in the **Folders** menu.

The field boundary can be created as a feature class within a file geodatabase, or as a standalone shapefile. Note that if you want to transfer the files onto a GPS unit, some units may require geodatabases. File geodatabases are useful for consolidating many features to one file location. For example, one farm could have a single file geodatabase that contains many feature classes of polygons, points and lines. Shapefiles are independent files that represent one feature and can be useful when wanting to isolate certain information. Note that while a shapefile may consist only of one feature type (point, line or polygon), it can hold the information for many individual objects (i.e. a single polygon shapefile can contain boundaries for multiple fields). The same is true for a single feature class within a file geodatabase.

### To create a feature class in a File Geodatabase:

- Double click to open the **File Geodatabase (.gdb)** (Fig. 4). The default File Geodatabase for the project can be used, or a new one can be created.

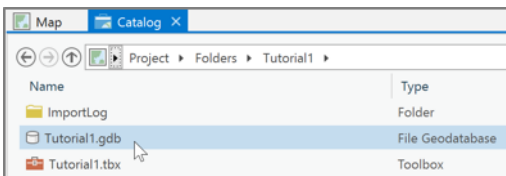


Figure 4. Selecting the **File Geodatabase** to open.

- Once the geodatabase is opened, right click and select **New > Feature Class** (Fig. 5).

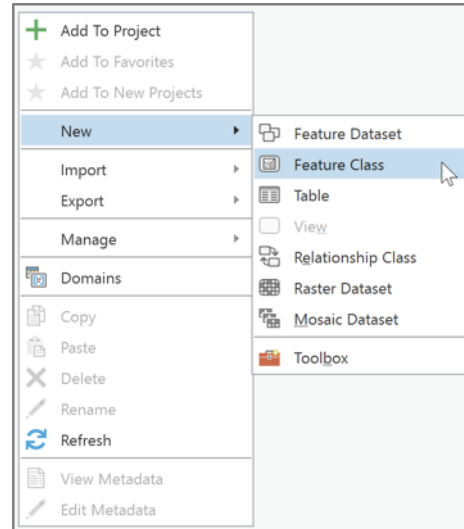


Figure 5. Creating a new feature class within the geodatabase.

- The **Create Feature Class** pane opens. Type a name for the field boundary, and make sure the **Feature Class Type** is **Polygon**. The additional settings can remain default. Press **Finish** to create the feature class (Fig. 6).

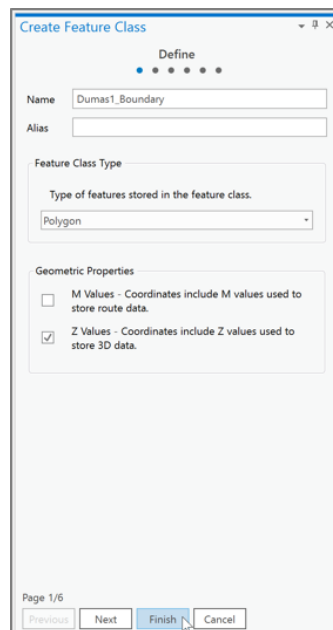


Figure 6. The **Create Feature Class** pane.

### To create a shapefile:

- In the project folder, right click and press **New > Shapefile** (Fig. 7).
- The geoprocessing pane opens to **Create Feature Class**. Type a name for the field boundary in **Feature Class Name** and set the **Geometry Type** to **Polygon**.

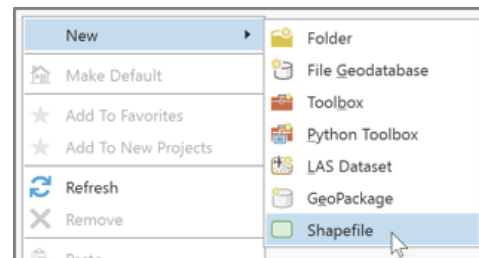


Figure 7. Creating a new shapefile within the project folder.

- Press the globe button next to **Coordinate System**. The Coordinate System selection window opens. From this window, select the appropriate coordinate system for the scale of the project. For field scale projects, the Projected Coordinate System NAD 1983 is commonly used. After selecting the desired coordinate system, press **OK** (Fig. 8).

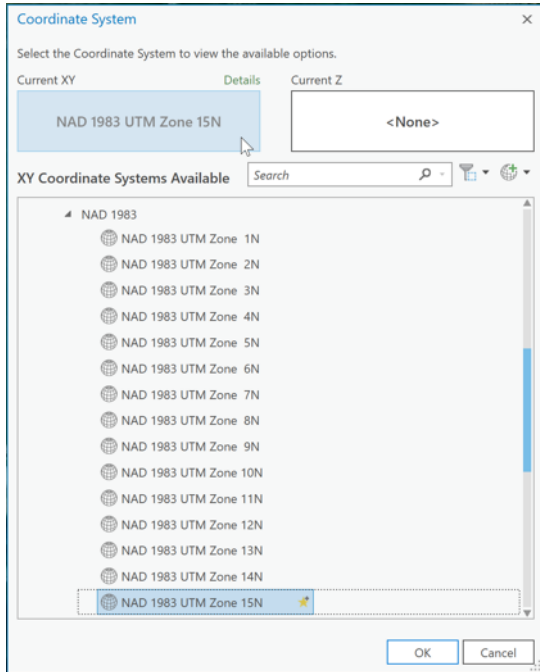


Figure 8. Selecting the coordinate system.

- Press **Run** to create the shapefile. It will appear in the project folder as a **.shp** file.

## Drawing the Field Boundary

Now that the feature class or shapefile has been created, it is like an empty shell which needs to be filled with content. Press the **Add Data** button, navigate to and add the feature class or shapefile that was just created to add it to the map.

Change the symbology of the feature class or shapefile by clicking the colored rectangle in the **Contents** pane. The **Format Polygon Symbol** pane opens. Go to **Properties**. Change the **Color** to “No color” and change the **Outline color** to something highly visible. Change the **Outline width** to 1 pt. Press **Apply** (Fig. 9).

Now it is time to draw the field boundary. Make



Figure 9. The Symbology

sure the map is zoomed in as much as possible while still viewing the full extent of the field. In the **Edit** tab, press **Create Features** (Fig. 10). The **Create Features** pane opens.

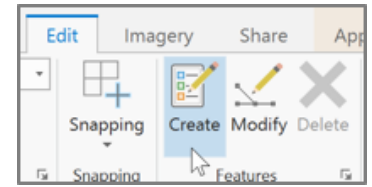


Figure 10. The Create Features button within the Edit tab.

Select the newly created feature class or shapefile. **Polygon** should be automatically selected. The construction toolbar has **Line** selected by default.

Click on the map along the field edge to create vertices. Follow along the field boundary until you complete the polygon (Fig. 11).

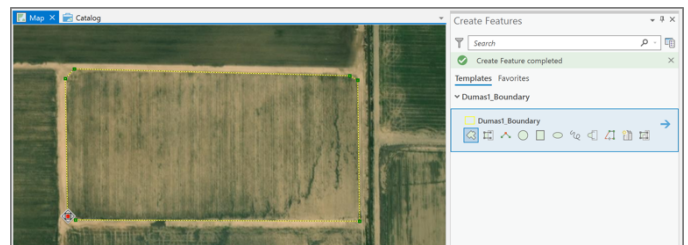


Figure 11. Adding vertices to draw the field boundary polygon.

When finished, press **F2**. In the **Edit** tab, press **Save** (Fig. 12).

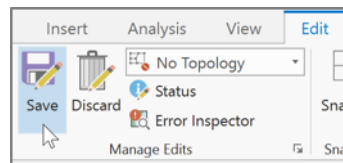


Figure 12. Press the Save button to save your edits.

## Editing the Field Boundary

If for some reason the boundary needs to be modified, in the **Edit** tab, press **Modify Features**.

The **Modify Features** pane opens. Select **Vertices** in the **Reshape** menu (Fig. 13).

Select the field boundary feature class or shapefile. Use the tools on the construction toolbar to make any necessary modifications (i.e. move a vertex by clicking and dragging; add or delete a vertex). Turn on the **Snapping** feature in the **Edit** tab to easily select along the field boundary line. Press **F2** to finish and save the edits.

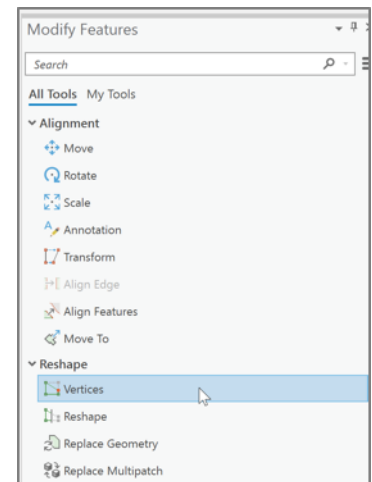


Figure 13. Modify the vertices if you need to make edits to the shape of the polygon field boundary.

## Defining the Field Attributes

The attribute table contains more detailed information about objects in a feature class or shapefile. Within the attribute table, columns (called fields) can be created and populated with desired information, including text and a variety of mathematical values. Naming the field is important when creating a shapefile or feature class with multiple field boundaries.

- Right click the shapefile or feature class in the **Contents** pane and select **Attribute Table**. In the Attribute Table, press **Add Field**. The Fields editing window opens. Enter *Name* as the **Field Name** and change the **Data Type** to *Text*.
- Click below the newly created row to add another new field. Enter *Acreage* as the **Field Name**, and *Long* as the **Data Type**.
- Press the **Save Changes** button in the **Fields** tab.
- Double click within the Name column to enter the field name of the boundary. Go to the **Edit** tab and make sure to **Save**.
- Right click the *Acreage* column and select **Calculate Geometry** (Fig. 14).

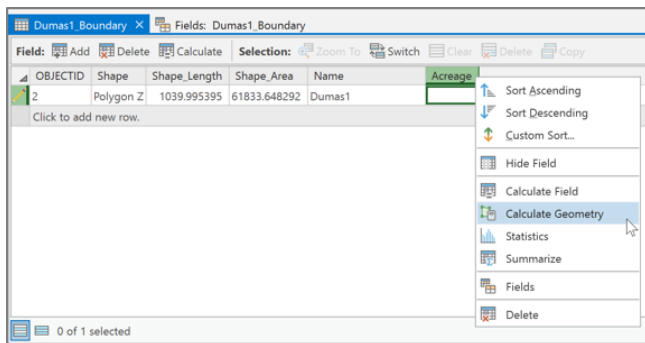


Figure 14. Selecting **Calculate Geometry** within the field boundary attribute table.

- Go back to the field boundary attribute table. The newly created fields of *Name* and *Acreage* have been added as columns.
- The **Geoprocessing** pane opens with the **Calculate Geometry Attributes** tool. The **Input Features** should be the field boundary shapefile or feature class, and the **Target Field** should be already populated as *Acreage*. Select the **Property** as *Area (geodesic)*.

- Select the **Area Unit** to *Acres*.
- Press the drop-down arrow for **Coordinate System** and select the field boundary to use the same coordinate system.
- Press **Run** (Fig. 15). The area of the field will now be displayed in the *Acreage* column of the attribute table.

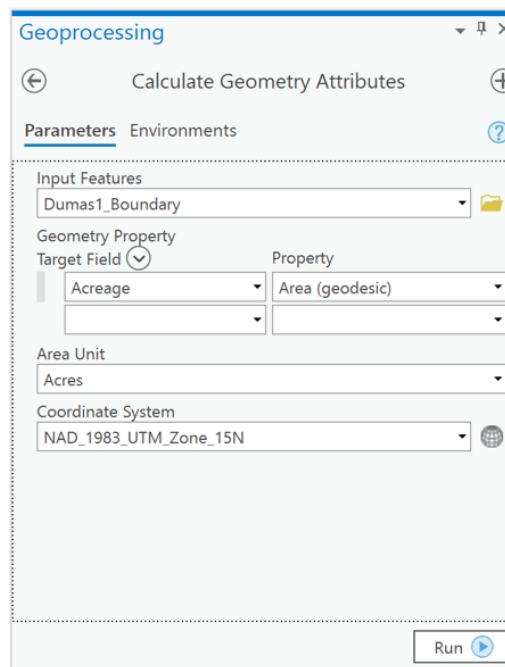


Figure 15. Settings for the Calculate Geometry Attributes tool in the Geoprocessing pane.

## Conclusion

Many field boundaries can be added to a single shapefile or feature class, for example, reflecting all of one farm's field boundaries in one polygon feature class. Following the steps outlined here will assist in creating a polygon shapefile or feature class which can then be used with numerous ArcGIS tools. Going forward with this starting foundation knowledge of shapefile and feature class creation will hopefully serve to propel learning of more advanced ArcGIS Pro capabilities. For additional learning, ESRI has highly informative [help resources](#) and [quick-start tutorials](#) available on its website, as well as a supportive [community of GIS users](#).