Exercise 4 - Geodatabase Design for Project Specific Data Collection

Session Objectives: At the conclusion of this session, you will be able to:

- ❑ Create a project specific geodatabase using a structured framework.

Material Created By: Eric Kelchlin (Oct 2011)

Revision: November 2013

Software: ArcGIS 10, SP 5

Data Path: C:\ or D:\CSP7200\Exercise4

Databases:

Imagery: Imagery\Aerial_2009.sid

MXD:

SECTION 1 – Designing a New Geodatabase for a Specific Project

Please read the project summary below first!

Title: Invasive Plant Inventory

Contact Information: Phil Pannill; Land Manager at NCTC

Problem Statement:

NCTC is plagued with an infestation of east coast weeds. Phil Pannill, our trusted Land Manager, would like to conduct an inventory of the worst weed patches on the NCTC property. Phil would like to document patch size and estimate percent cover of the weed species. Permanent photo-point stakes should also be established at a sample of the most horrible sites and pictures taken to document the horror.

Project Objectives:

1. Map the invasive weeds on NCTC property over a 6 month period (May-Oct.).
2. Establish permanent photo-point markers at the worst infested sites and take initial photographs.

Existing Data: (CSP7200\Exercise3 and Imagery)

1. Imagery\Aerial_2009.sid
2. Tables\Weeds.xlsx

Methodology:

1. Create a file geodatabase with weed (polygon) and photo-point (points) feature classes.
2. Create domains (i.e., drop-down pick lists) to speed-up data collection.
3. Collect the data with ArcPad 10 on a 2008 series Trimble GeoXH GPS receiver.
4. Create metadata using the project summary as a reference.

Deliverables:

1. A file geodatabase with feature classes, domains and metadata.
2. Photographs of the most despicable infested sites.
3. A map document (.mxd) and a detailed map printed on a large format printer.

TASK 1–Create the Geodatabase Structure

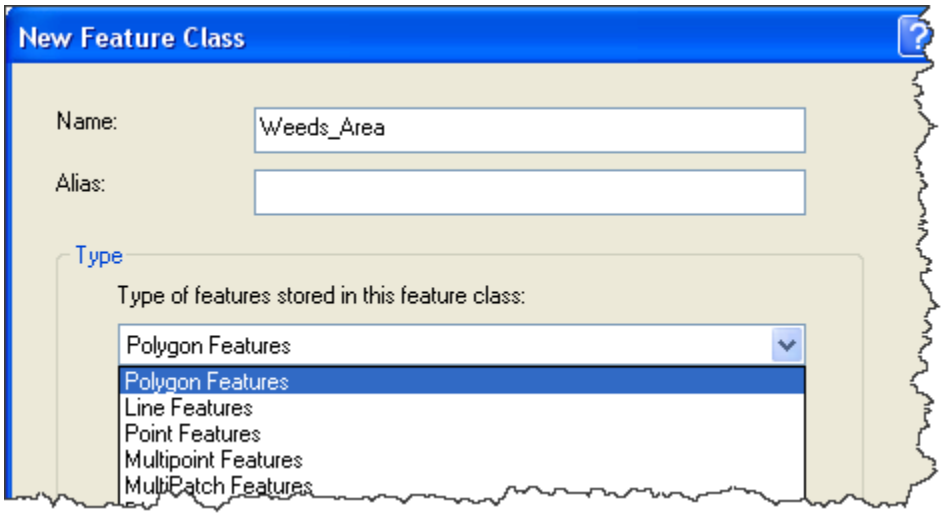
1. Remove the Feature Class Design Form in the back of this exercise. This completed form will serve as your structural design template while working through the exercise.

2. Create a new file geodatabase in the **Exercise2** folder and name it **Weed_Project.gdb.**

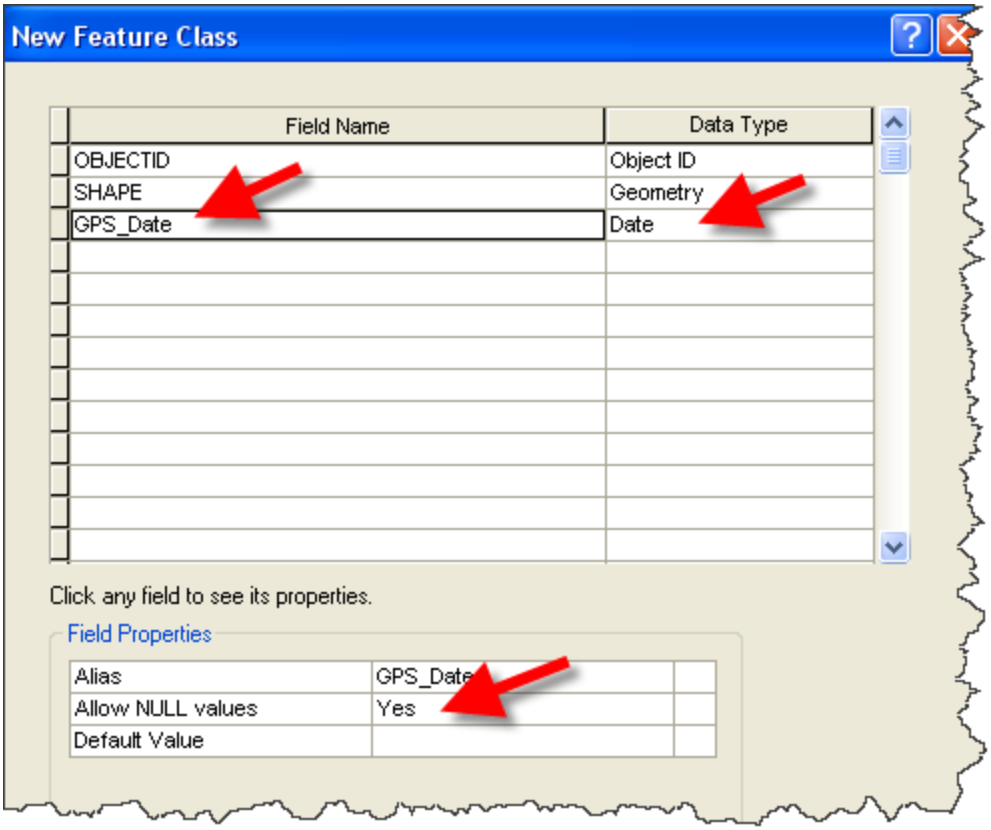
3. Create a new feature dataset and name it **Inventory**.

   - Assign the **NAD83, UTM Zone 18** datum and coordinate system to the feature dataset. Use "**none**" for the vertical datum.

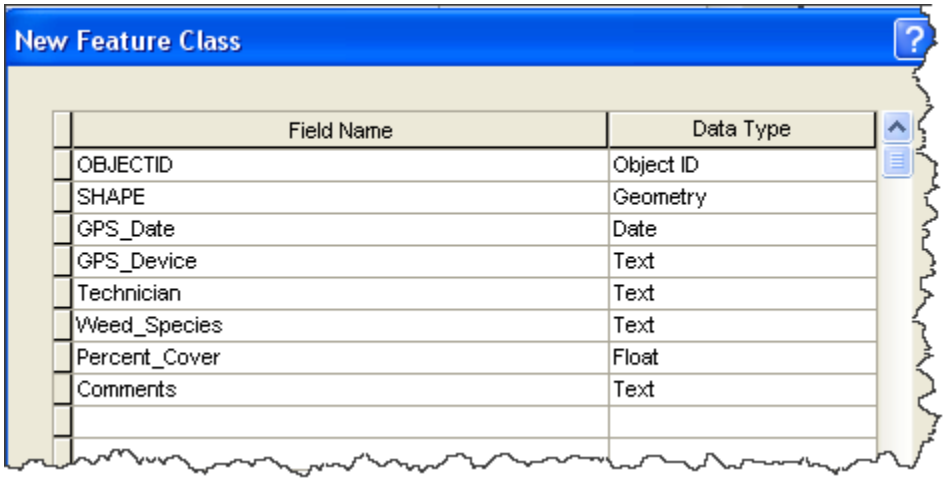
4. Right-click on the Inventory feature dataset and create a new feature class. Name the feature class **Weeds_Area**. Make sure the data type is a **Polygon Feature**. Click **Next** twice, keeping the default configuration setting.



5. Following the Feature Class Design Form, create the first new field "**GPS_Date**". Change the data Type to **Date**. Keep the "**Yes**" in all the **Allow NULL values** field. See the example below.



- Continue creating new fields as listed in the data form. Change the text field size in the field properties section as listed on the data form, but ignore the Domain Name and Default Value columns for now. We'll add those in the next section.

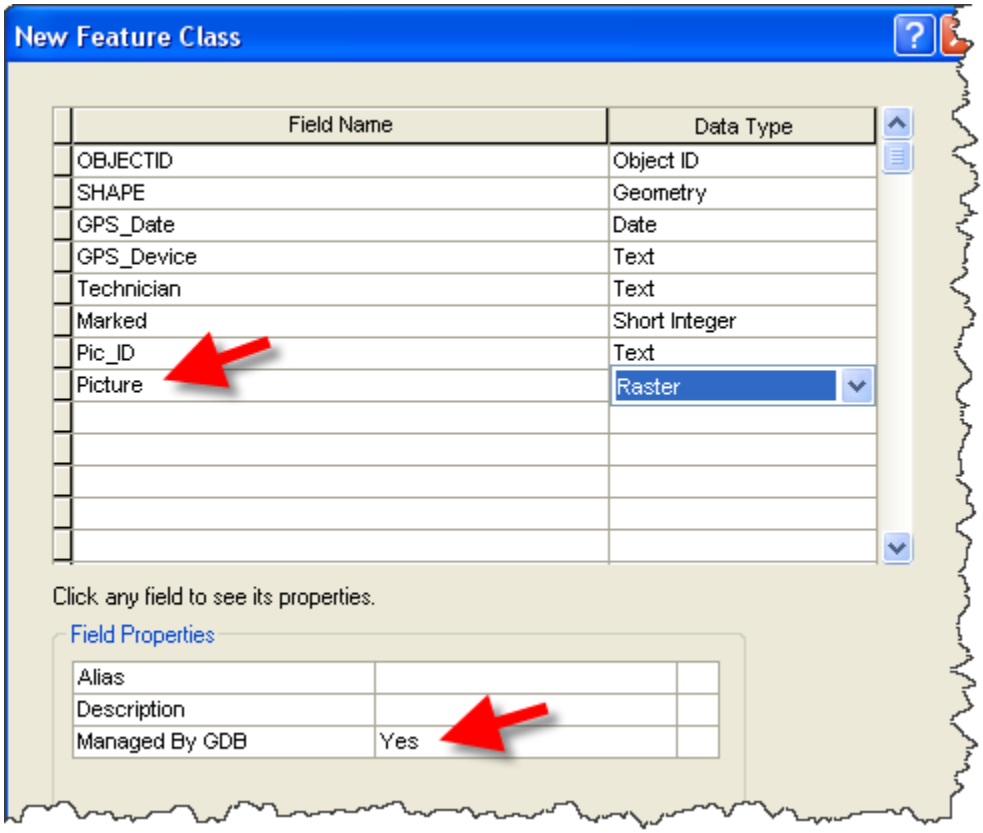


6. Next, create the **Photo_Points** feature class as shown on the data form. However, when you get to the blank fields screen, select the Import... button towards the bottom of the screen.

   - Browse to the **Weeds_Area** feature class you just created. Click **Add**.

   - Delete the last five fields by selecting each field and hitting Delete on your Keyboard. Add the **Marked, Pic_ID** and **Picture** fields as listed on the data form.

   - Have the **Picture** raster field be managed by the GDB (i.e., the geodatabase). Click **Finish** when done.

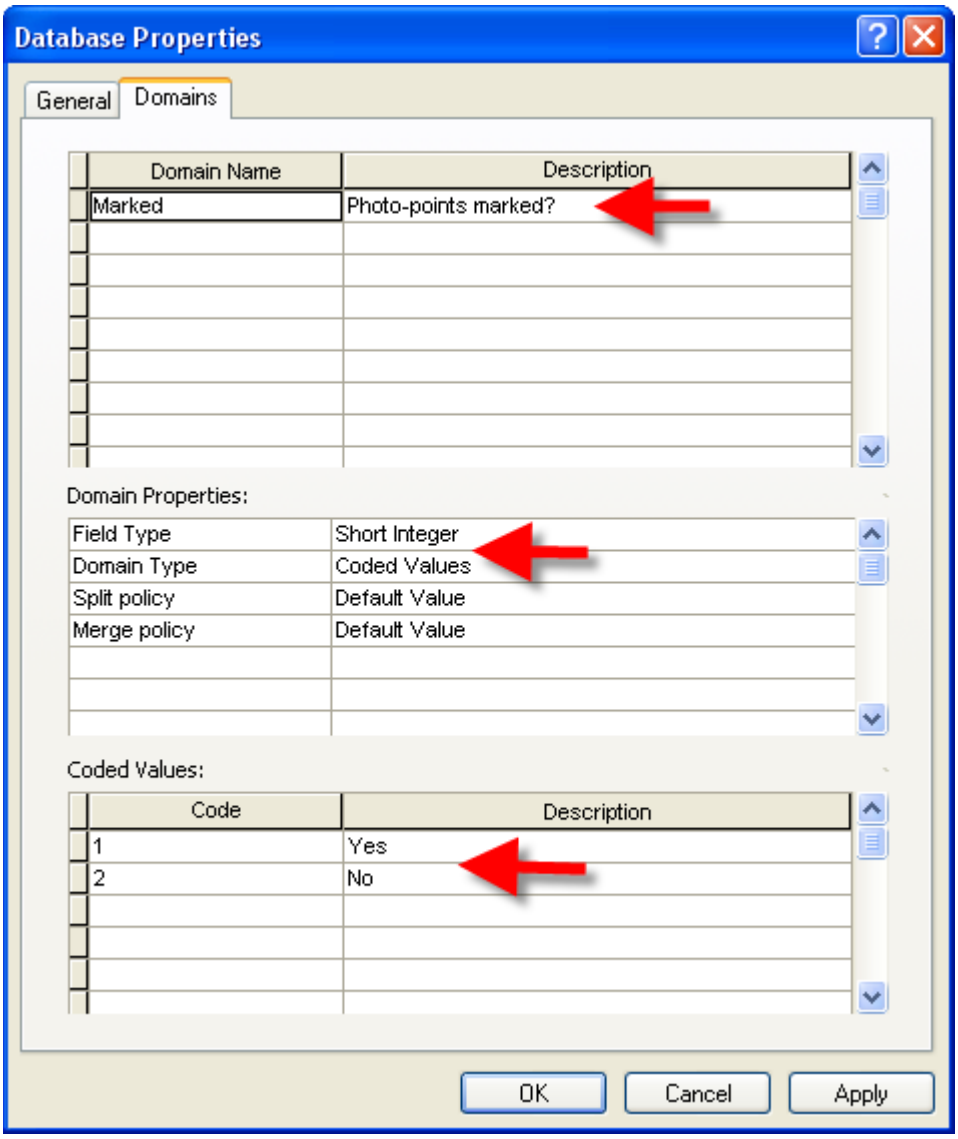


TASK 2–Create the Domains

According to our data form we need to add 4 domains to our geodatabase. Let's create the shortest domain by hand first, and then use ArcToolbox to add the rest from Excel worksheets.

1. Right-click on the **Weed_Project** geodatabase (i.e., the can) and select **Properties**.

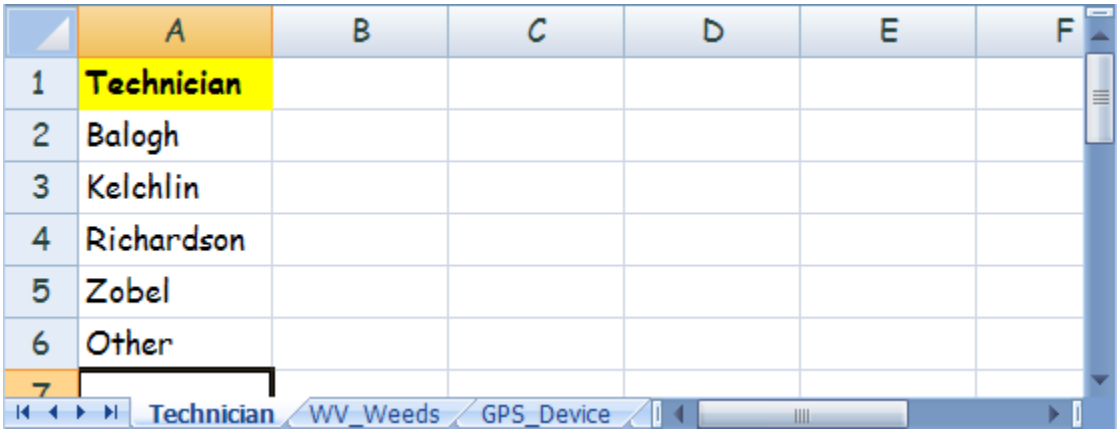
   - Click the Domains tab. Type "**Marked"** in the first cell and provide a description. Change the Field Type to **Single Integer** and the Domain Type to **Coded Values** by clicking on the far right end of the cell, which will pop-down a list of data types. Fill-out the Coded Values section as shown below.



- Click **Apply** and **OK** when done. For longer lists, its best to type the attributes in an Excel worksheet then upload the values into domains using the Table to Domain Tool in ArcToolbox.

2. Minimize ArcCatalog for a moment. Open the **Weeds** Excel file in the **Tables** folder using Windows Explorer or MS Excel. Familiarize yourself with the attributes on each of the worksheets.

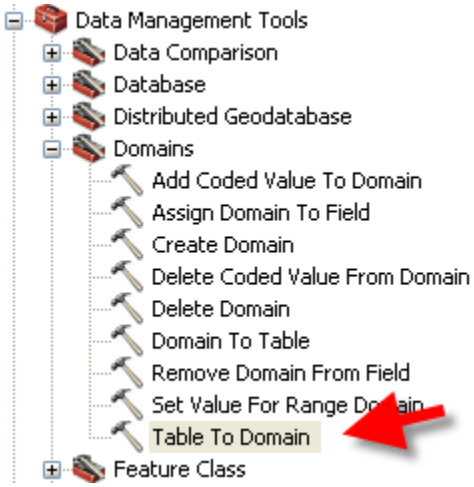
3. Add your last name to the **Technician** list worksheet just below "Other". Save the document and close Excel.



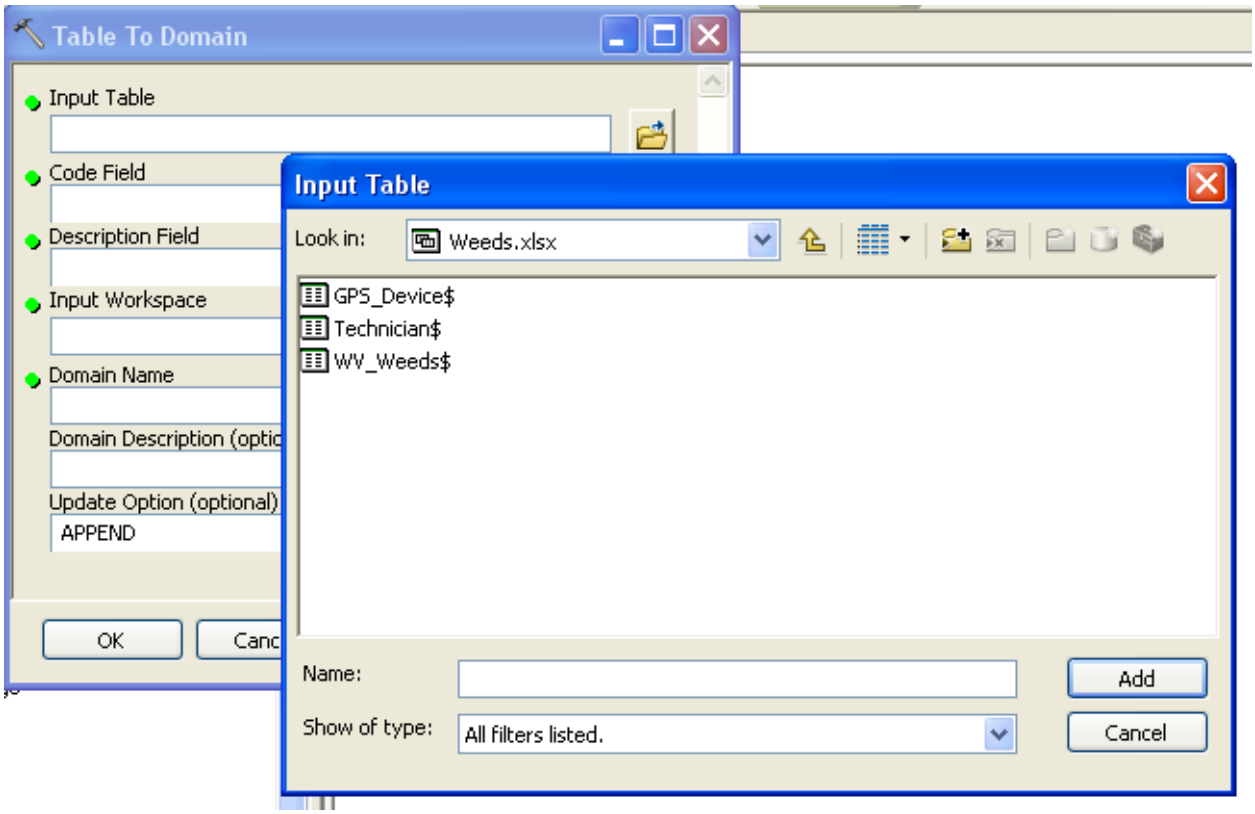
4. The next step will be to import the worksheets into the geodatabase as domains.

- Maximize ArcCatalog and open ArcToolbox on the side bar.

- Locate the **Table to Domain** tool in the **Data Management Tools > Domains** Toolbox. Double tap on the **Table to Domain** to activate the tool.



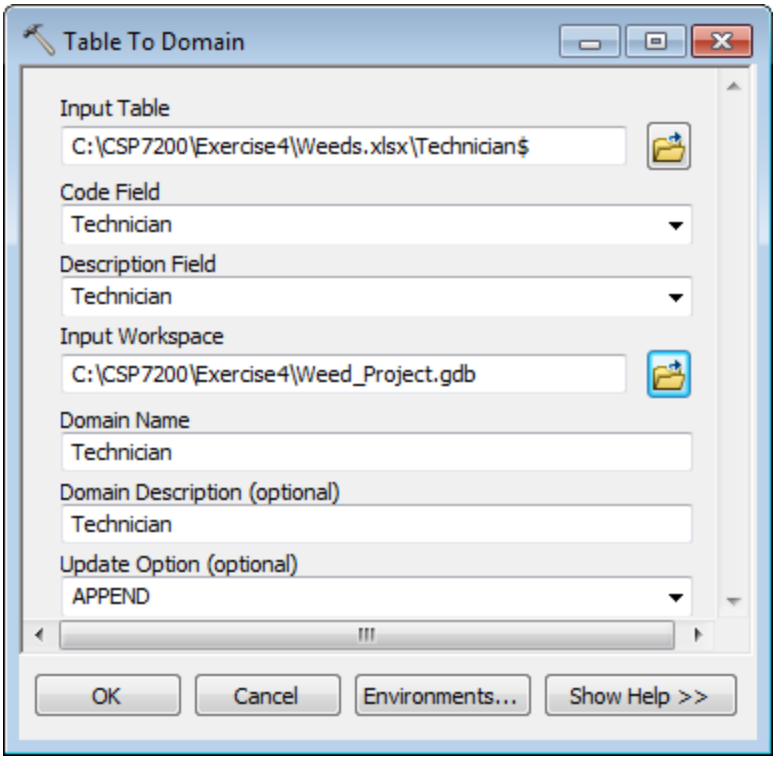
- Click browse at the Input Table field and navigate to the **Weeds** Excel file in the Tables folder. Double tap on the **Weeds** Excel file to view the worksheets. Select **Technician$** and click the **Add** button.



- Using the dropdown list button on the end of each field, select the **Technician** for both the **Code** and **Description** fields (it's the only column in the worksheet).

- For input workspace, browse to the location of the **Weeds_Project** geodatabase and click **Add**.

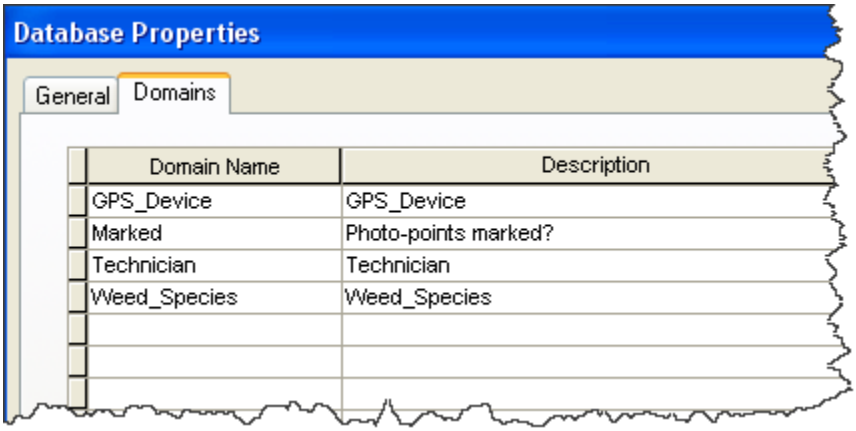
- Accept the default **Domain Name**, which will be the "**Technician**" Excel column header. Your screen should look like the one below. Click **OK** when done.



5. Use the Table to Domain tool to import the **GPS_Device** and **Weed_Species** Excel worksheets.

   - When you're importing the **Weed_Species** worksheet, use the **Weed_Code** column for the Code Field and the **Weed_Species** column for the Description field. Make sure to name the domain **Weed_Species**.

6. Right-click on the **Weed_Project** geodatabase, select **Properties** and the Domains tab to verify the values were successfully imported and the domain names match those on your design form.



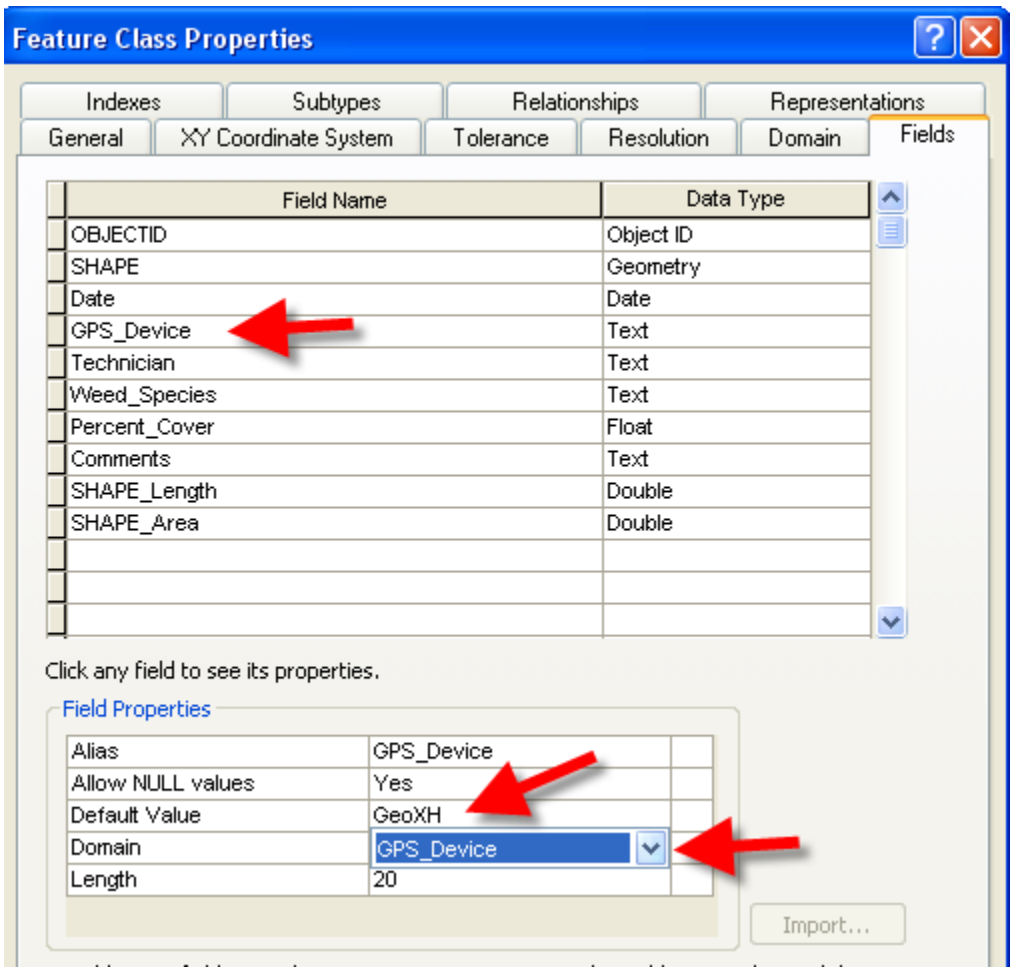
TASK 3–Assign Domains to Fields

1. Right-click on the **Weeds_Area** feature class and select **Properties**.

2. Click on the **Fields** Tab.

3. Select the **GPS_Device** field and specify the **GPS_Device** domain in the Field Properties section of the dialog.

4. In the Default Value field type the default domain value listed on your design form. Click the **Apply** button after you assign each domain. Click **OK** when done.



5. Finish assigning the domains to the remaining fields in both the **Weed_Area** and **Photo_Points** feature classes as listed on your design form.

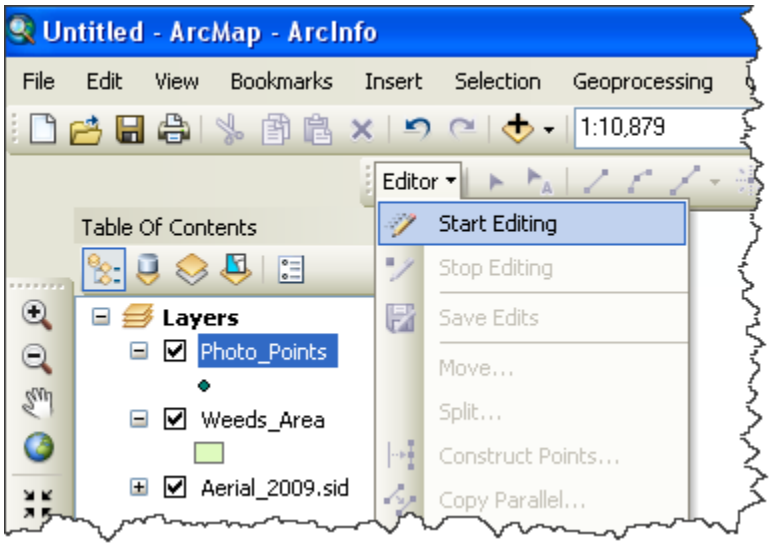
TASK 4– Create Data in ArcMap

1. Close ArcCatalog and Launch ArcMap.

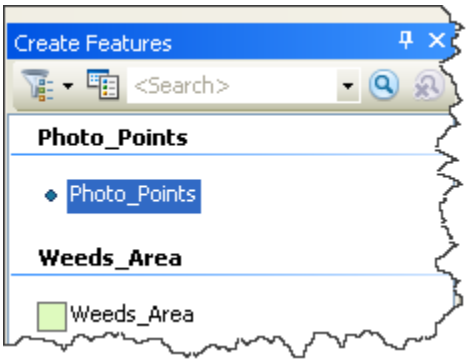
2. Open a New Blank Map and **Add** the **Aerial_2009.sid** layer from the **GIS_Data\Imagery** folder.

3. **Add** the **Inventory** feature dataset and both layers will be loaded. If the imagery is the top layer in the Table of Contents, just drag it down to the bottom of the list so you can see the point and polygon features once you start editing.

4. Start and editing session from the Editor Toolbar.



5. Select the **Photo_Point** layer in the Create Features Dialog and tap anywhere on the map to create a point.



6. Click on the Attribute button in the Editor Toolbar to view and edit the Attribute table.

7. What fields are automatically populated and why?

_____

_____

_____

_____

8. Click on the value's in each field. Notice the drop-down menu's in the fields that are auto-populated. These are the domains that you created and assigned to each field. The value's that our auto-populated are the default values you gave to each domain.

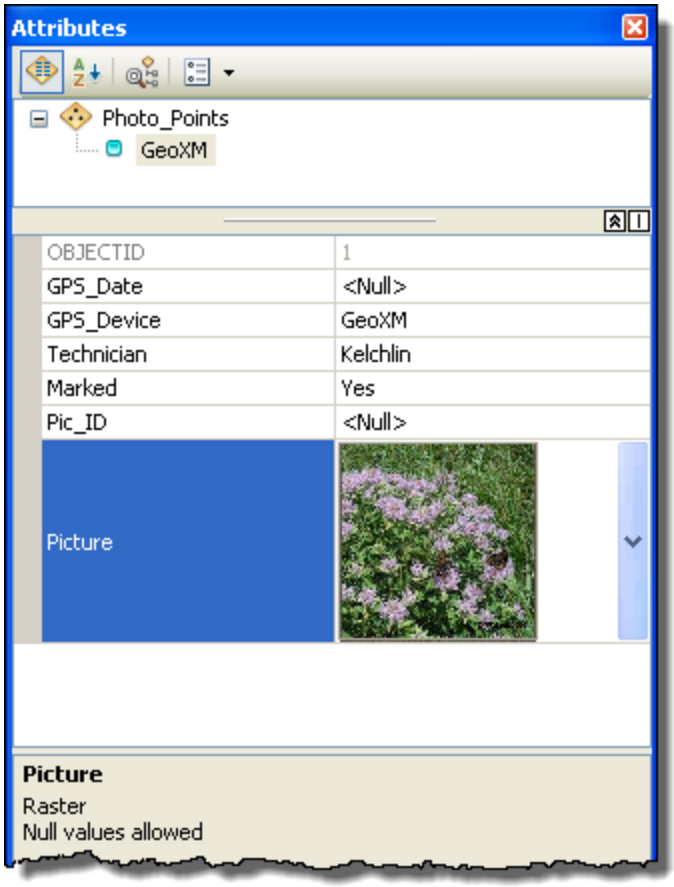
9. Why do you have a **Yes** in the **Marked** field when you gave it a "**1**" as a default _____?

10. Next we're going to add a JPG raster image to the picture field to document our weed infestation status at the photo point.

    - Click on the **<Null>** value in the **Picture** field and select **Load**.

    - Browse to a file in the **Picture** folder. Select any JPG file and click the **Add** button. Click **OK**.

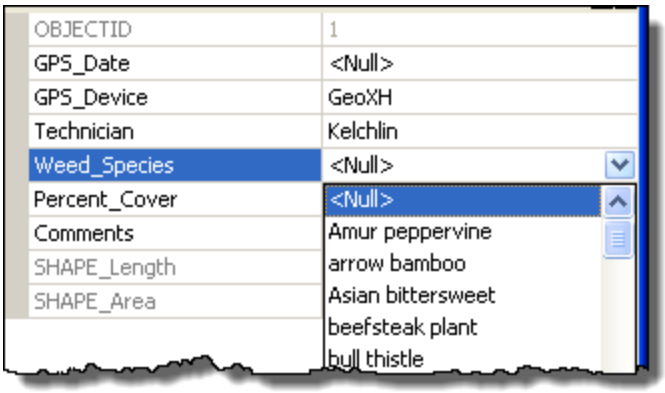
    - You should see the photo in **Picture** field on the Attributes table. Now, you can't do that with a shapefile!



11. Create a couple more points and load a photo into the picture field for each one.

12. Create a new polygon in the **Weeds_Area** layer. Examine the attributes to make sure all the assigned domains are working properly.

13. Stop editing, save edits and save the map document. Name it **Weeds.mxd**. We'll be using this mxd and data in the next exercise.



Feature Class Design Form

Feature Class or Table Name	Data Type	Field Name	Field Type	Text Length	Domain Name	Default Value
Weeds_Area	Polygon	GPS_Date	Date			
		GPS_Device	Text	20	GPS_Device	GeoXH
		Technician	Text	35	Technician	"*your last name*"
		Weed_Species	Text	35	Weed_Species	
		Percent_Cover	Floating			
		Comments	Text	40		
Photo_Points	Point	GPS_Date	Date			
		GPS_Device	Text		GPS_Device	GeoXH
		Technician	Text		Technician	"*your last name*"
		Marked	Short Int		Marked	1
		Pic_ID	Text	25		
		Picture	Raster			