Last Updated: April 2021

Version: ArcGIS Pro 2.6.1

EXERCISE 2

# Editing – Attribute Edits

Introduction

In this exercise you will create and modify values stored in a layer’s attribute table. Your goal in this scenario is to produce a proposed timber sale feature class that includes attribute information to be used during the NEPA analysis then later for entering into the Federal Activities Tracking (FACTS) national database.

In the first exercise you jumped right in and started digitizing. In this exercise you will step back and do some planning first. The first exercise may seem quick and easy, but a with a little planning your project not only ends up being easier and quicker in the long run, but also yields data with better attribute integrity and improved integration with National databases.

Objectives

* Verify that all attributes all have a value
* Edit Values from the Attribute Table
* Edit Values using the Calculate Fields window
* Edit Values from the Attributes Dialog window
* Create a Frequency Table

Prerequisites

* **Install ArcGIS Pro on local computer.**
* **Completed the GTAC “Arc Pro for ArcMap Users” class or equivalent experience.**
* **Copy the data to your workspace and unzip.**

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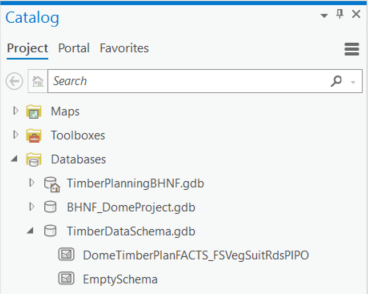
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Step I: Explore the Attribute Table

In this exercise, you will use various methods to examine and edit a dataset’s attributes. In this scenario you have worked with your GIS Specialist to filter out the FSVeg polygons within the Dome project boundary that meet your criteria for logging. You have also decided on an attribute Schema and Domains that you want to use in all your future timber sales. We will begin by examining your new Timber Data Schema..

1. If necessary, navigate to your data folder and open the **TimberPlanningBHNF.aprx**.
2. In the Contents Pane, right-click and **Remove** the **DomeTimberSaleProposal** layer.   
   

Since, in this scenario, we now have a working subset of the FSVeg data that has all the polygons that met our qualifications, plus useful attributes FSVeg, and attributes to be used later in FACTs, we can delete the Feature Class we created in Exercise 1.

1. Open the Catalog pane, expand the Databases folder then the TimberPlanningBHNF.gdb. **Right-click on your DomeTimberSaleProposal** feature class and click **Delete**.
2. Expand the **TimberDataSchema** geodatabase.  
   
3. Right-click on the **DomeTimberPlanFACTS\_FSVegSuitRdsPIPO** feature class and click **Copy**.

When editing a dataset, it is a good idea to save a copy of the original. Once the edits are completed and proofed to be correct, the back-up can be deleted.

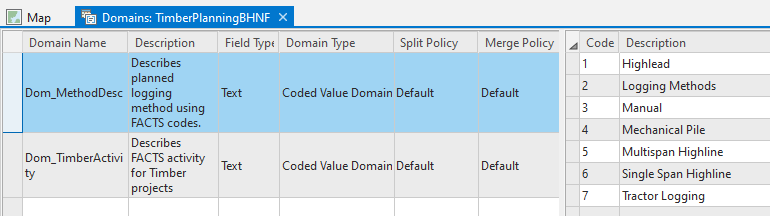
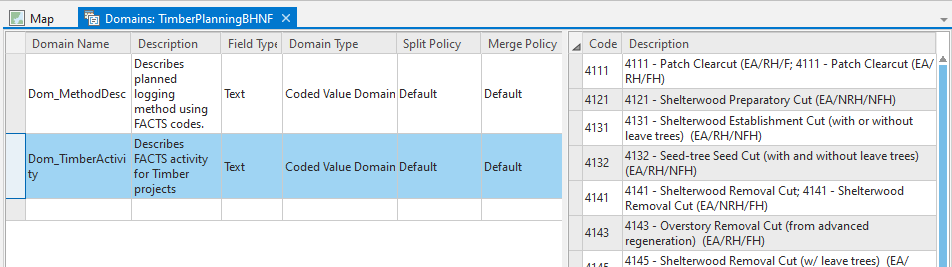
1. Right-click on the **TimberPlanningBHNF.gdb** and click **Paste**.

Concepts / Vocabulary

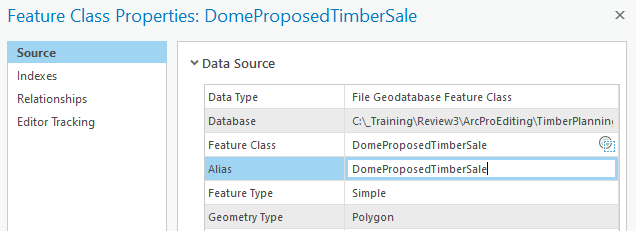
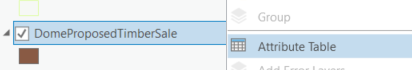
**Schema:** A schema defines the physical structure of the geodatabase along with the rules, relationships, and properties of each dataset in the geodatabase. ... Users often share their schemas with others. Data model templates exist for many GIS application domains. **Attribute Domain:** Fields stored in a geodatabase feature class can be linked to a range of numbers or a pre-defined list of values (LOV) called an attribute domain. Attribute domains have an important advantage of ensuring values entered in the table are consistent. When editing a cell linked to an attribute domain, you can only select a value from the LOV.

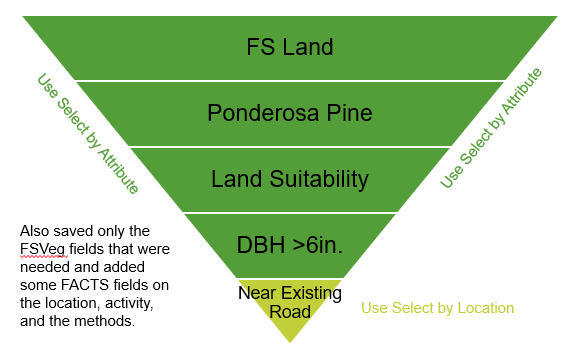
1. **Right-click** on **TimberPlanningBHNF.gdb** and click **Domains**. A new pane will open up describing the Domains created to help speed up your data entry process as well as enforce acceptable values that prevent typos and other mistakes.

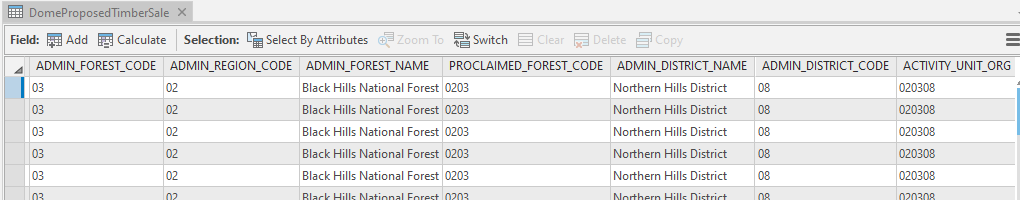
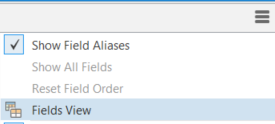
When copying data that has a Domain attached to it, the Domain will be copied into the Geodatabase. A Domain is created at the Geodatabase level and assigned to Fields within the Feature Classes. Once assigned, during attribute editing a list of values will appear as a dropdown, to enforce the acceptable values. To learn more about Domains take the Geodatabases class.

1. **Click on the** **Dom\_MethodDesc** row to highlight it. To the right you will see the acceptable list of values to use for the FACTS Method Description field. When you edit and click on the assigned field you can simply click from a dropdown instead of typing.  
   
2. **Click on the Dom\_TimberActivity** row to highlight it. To the right you will see the acceptable list of values to use for the FACTS Activity field for timber projects. During attribute editing you click on the assigned field you can simply select from a dropdown instead of typing this long description.  
   
3. Click the X to **close the Domains pane**. To learn more about how to create and assign Domains you can take the Geodatabases class.

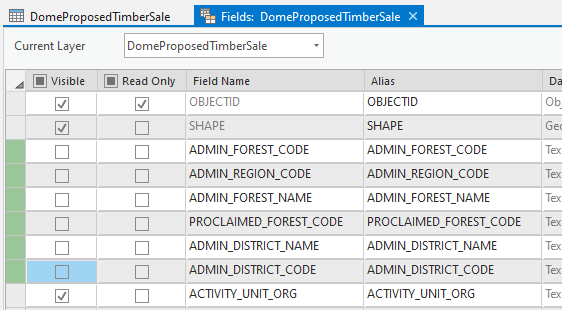
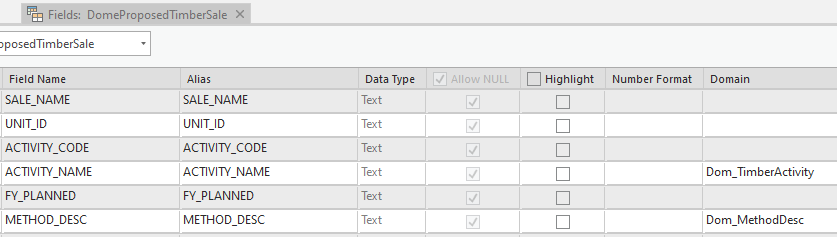
We will edit attributes using these Domains later in the lesson.

1. Open your **Catalog pane** and right-click on **DomeTimberPlanFACTS\_FSVegSuitRdsPIPO** in the TimberPlanningBHNF.gdb to select Rename**. Change the name to DomeProposedTimberSale**.
2. Right-click on the **DomeProposedTimberSale** and select **Properties**. Notice that the Alias is still the old name. **Change the alias to DomeProposedTimberSale**.  
   
3. Drag and drop **DomeProposedTimberSaleinto your Contents** pane below the dome\_FSVegSpatial layer. Change the symbol to a color of your choosing.
4. Right-click on the DomeProposedTimberSale layer and **open the Attribute table**.  
   

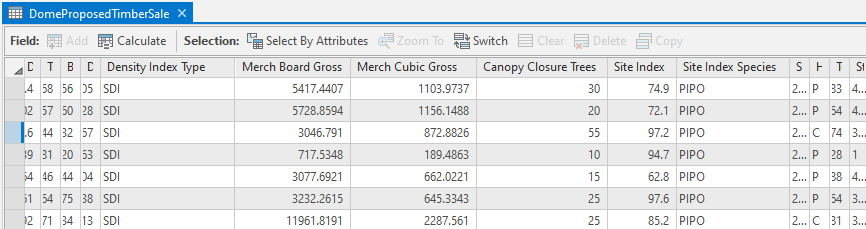
Below is a reminder of how the new data template was created for the timber goals of this project, and also to assist in future database entry requirements. There are still data editing tasks to be completed, but this template gives us a much better head start than trying to start from scratch manually digitizing and entering attributes. The resulting final data will also have much better spatial and attribute integrity.   


1. **Scroll over** to see that the first seven user-defined fields are **pre-populated FACTS codes** for the BHNF and the Northern Hills District, populated in the project template by your GIS Specialist.  
   
2. Click on the **menu icon** in the upper right side of the table and select **Fields View**.   
   

This will open a new pane where you can manage certain properties like the visibility and Aliases for all the Fields. There are other Field properties that cannot be changed such as Data Type, Number Format or Length.

1. Since the data is the same for every polygon, in order to simplify your table **turn off** the visibility of the following fields by unchecking the box in the Visible column next to:  
   ADMIN\_FOREST\_CODE  
   ADMIN\_REGION\_CODE  
   ADMIN\_FOREST\_NAME  
   PROCLAIMED\_FOREST\_CODE  
   ADMIN\_DISTRICT\_NAME  
   ADMIN\_DISTRICT\_CODE  
     
   
2. **Scroll over to the Domain Field** and scroll down to see that the Dom\_TimberActivity domain is assigned to the ACTIVITY\_NAME field, and the Dom\_MethodDesc domain has been assigned to the METHOD\_DESC fields.  
   
3. **Close the Fields pane** by clicking the X.
4. **Return to the DomeProposedTimberSale attribute table**. Scroll over to explore the rest of the fields in the table that relate to the timber stand evaluations from FSVeg.

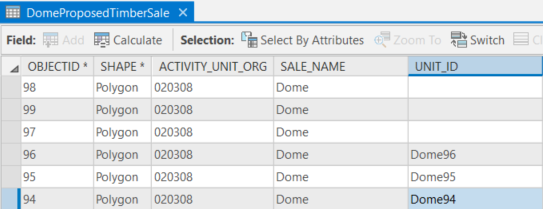
These are the fields that you decided to keep for future analysis. Some of the fields may be too small to read. You can **adjust the width to see the field names** and when you save the project it will save your settings.

1. **Scroll over to Density Index** **Type** and display the timber metrics of Merch Board Gross, Merc Cubic Gross, Canopy Closure Trees, Site Index, Site Index Species. PIPO is the code for Ponderosa Pine (*Pinus pondersosa*).  
   
2. **Save your project** from the quick tools at the top left of the window.  
    

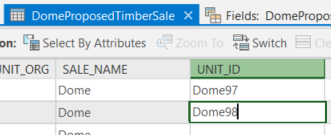
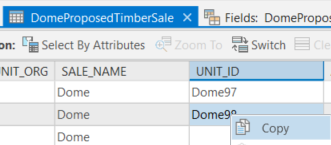
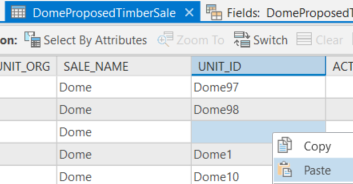
Step II: Edit Within the Attribute Table

There are three different places we will edit attribute data in this Exercise.  
1. Edit values directly in the table window  
2. Edit values with the Field Calculator tool  
3. Edit values using the Attributes window

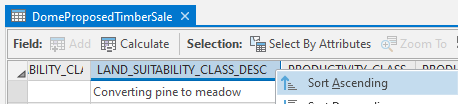
Remember, in ArcPro you don’t need to be in an Edit session to edit data. In this section we will edit within the attribute table. Simple editing in a Pro table is similar to working with an Excel spreadsheet. You can type the attribute value in the cell, copy and paste, and select data from a dropdown list of values.

1. **Right-click on the UNIT\_ID field name and Sort Ascending**. Blank or Null values will show up on top.   
   

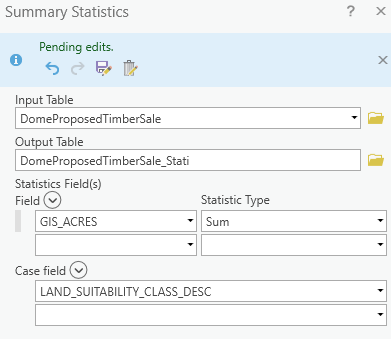
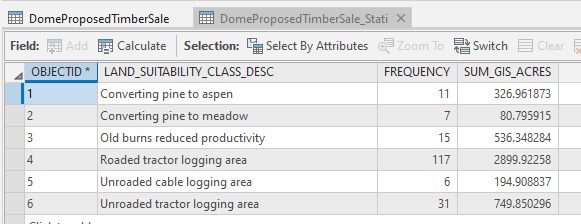
The UNIT\_ID field has an individual name for each unit, and every Unit must have a name. In this case Dome1, Dome2, Dome3, etc. One way to check for missing data in a field is to Sort it alphabetically/numerically.

1. There are three missing values in the UNIT\_ID field. Find the record with OBJECTID = 97, **click in the cell under UNIT\_ID**, and type **Dome97**.
2. Use your mouse to highlight **Dome97 and <Ctrl>C** to copy.
3. Place your mouse in the **next blank cell and** **<Ctrl>V** to paste.
4. Change Dome97 to **Dome98**.  
   
5. Highlight **Dome98 and right-click to choose Copy** this time.  
   
6. Click into the last empty cell and **right-click and Paste**.  
   
7. Change Dome98 to **Dome99**.

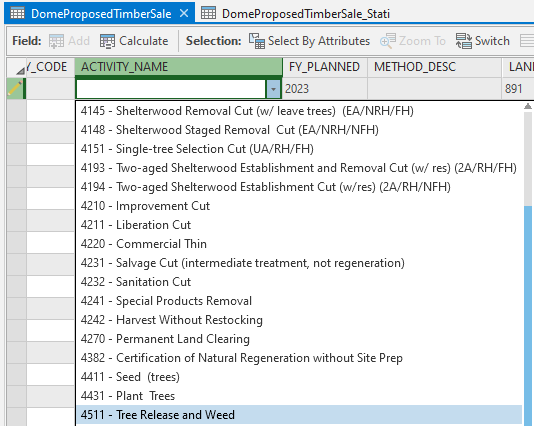
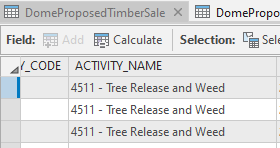
Next, we will manually edit the ACTIVITY\_NAME field in the table, which will be populated based on what was entered into LAND\_SUITABILITY\_CLASS\_DESC during the stand exam.

1. Scroll over to the **LAND\_SUITABILITY\_CLASS\_DESC** field, right-click on the field name and select **Sort Ascending**.  
   
2. **Scroll down** to see how many suitability classes there are. (There are 6 different suitability classes).

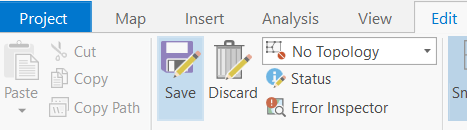
Investigating data manually is fine for smaller datasets, but it is not practical for larger datasets. Using the Summarize tool you can get an output table of all the different types, a count of how many there are of each, and even do calculations of acres or any other numerical field.

1. Right-click on **LAND\_SUITABILITY\_CLASS\_DESC** and select **Summarize**.
2. In the Summary Statistics window under **Statistics Field(s)** click the left dropdown and select **GIS\_ACRES**. Under Statistic Type select **Sum**. Leave the default Output Table name. Click OK.  
   
3. The new table will automatically show in the Contents pane. **Open the table**.  
   

You can now easily see how many Suitability classes there are, how many of each, and the total acres of each. In the DomeProposedTimberSale table, wherever the suitability is “Converting Pine to Aspen” we will make the ACTIVITY\_NAME value be “4511-Tree Release and Weed”.

1. Since the LAND\_SUITABILITY\_CLASS\_DESC is already sorted in alphabetical order the **Converting pine to aspen** fields are at the top. Click on the first cell under ACTIVITY\_NAME and it will activate a dropdown list of values, **select 4511-Tree Release and Weed**.   
   
2. Select a few more cells with the suitability “Converting pine to aspen” and **select 4511-Tree Release and Weed** from the list of values dropdown.  
   

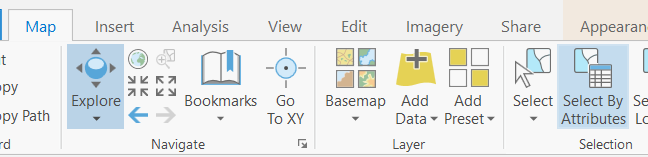
While having the list of values of all the acceptable FACTS codes saves time compared to typing the long descriptions, it will still take a long time to populate 187 records. In the next section we will use the global editing function of the Attribute pane to populate all of the selected records at once.

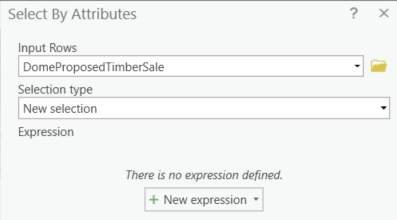
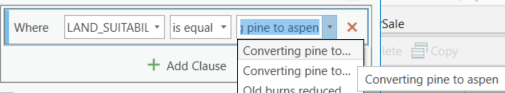
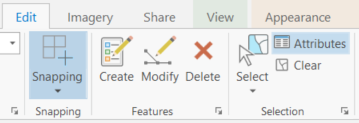
1. From the Edit ribbon, Select **Save**.  
   
2. Choose **Yes** when asked if you would like to save your edits.

Step II: Edit Values using the Attributes Pane

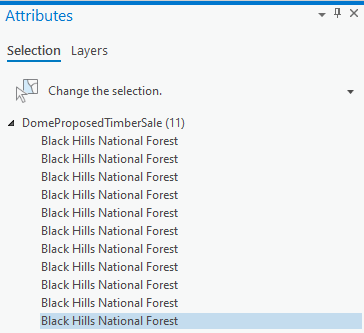
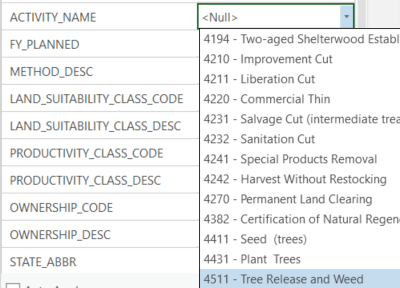
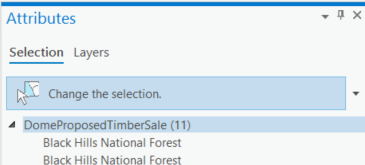
Using the Global Editing option in the Attributes Pane, you can make changes to all or many selected records at a time. This method can save you a lot of time over manually editing one cell at a time. In this Step we will select each Land Suitability Class using the Select by Attributes window, and then calculate the correct Activity Code for each.

1. Under the **Map tab** in the Selection Group, click on **Select by Attributes**.

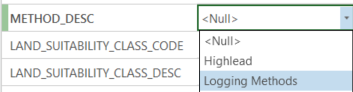
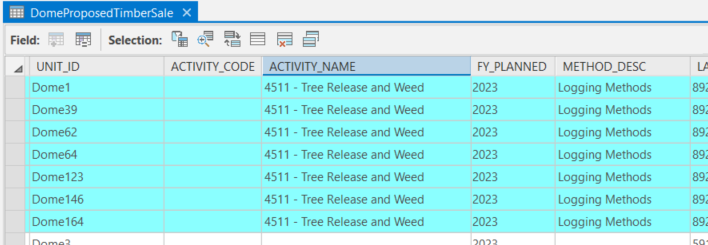
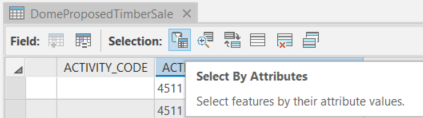
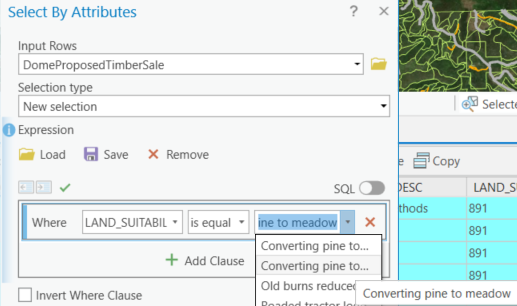


1. In the Select by Attributes window make sure that under Input Rows it says DomeProposedTimberSale. Leave the Selection type as New selection. **Click the +NewExpression button**.  
   
2. Click the down arrow by OBJECTID and **select LAND\_SUITABILITY\_CLASS\_DESC**.
3. Leave “**is equal**” in the next box.
4. Click the down arrow in the last box and **select “converting pine to aspen”**, click Apply, then OK to close the window.  
   
5. If needed, **open the DomeProposedTimberSale table**. There are 11 records selected.
6. In the Edit ribbon**, click the Attributes button** in the Selections group. When the Attributes pane opens pin it to the right side of Pro.  
   

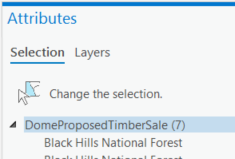
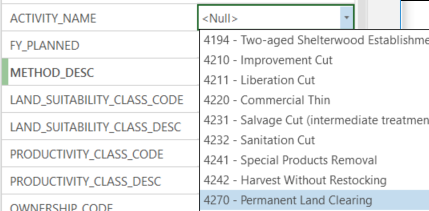
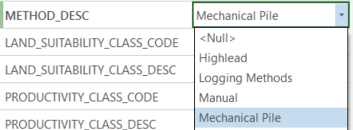
Only selected features show up in the Attributes pane. You can click on one of the selected features and edit an attribute, or you can select the layer name at the top of the selected list to make a global edit of all the selected features. Caution: whatever edits you make will over-write any existing attributes.

1. **Select the last ‘Black Hills National Forest’** listed under the DomeProposedTimberSale(11). You have already added attributes to the first few records.  
   
2. **Choose 4511 – Tree Release and Weed** from the list of values. Click Apply.  
   
3. The method above only edited that one feature. Go back to the top section and **click DomeProposedTimberSale(11)**.  
   
4. Click Save on the Edit ribbon, and Yes to save all edits

Go back down to ACTIVITY\_NAME and notice it says (Different Values). This is because most are <Null> except for the ones we edited above.

1. Click where it says (Different Values) and **select 4511 – Tree Release and Weed** from the list of values again. This time it will populate all the selected features’ attributes.
2. Click next to METHOD\_DESC and **select Logging Methods**. Click the Apply button.  
   
3. Go back to your table to see that the attributes were edited correctly.  
   
4. If necessary, in the top left side of the table **click the Select by Attributes** button.  
   
5. In the Select by Attributes window **select New Expression**.
6. Click the dropdown next to OBJECTID and **select LAND\_SUITABILITY\_CLASS\_DESC**.
7. Leave the next box “is equal”, then click the dropdown in the last box and **select “converting pine to meadow”**. Click Apply. 

Clicking Apply does not close the window. It stays open so you don’t have to re-select a whole new Expression. Either close or move aside the Select by Attributes window so you can see the Attributes pane.

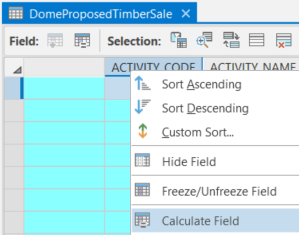
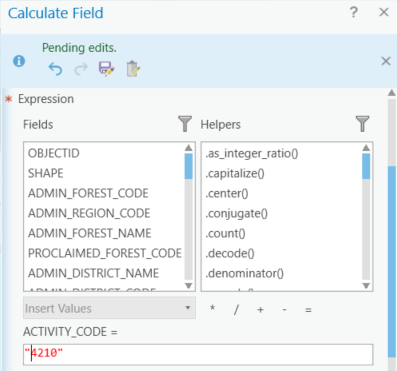
1. **Select DomeProposedTimberSale(7)** at the top of the pane.  
   
2. Click next to ACTIVITY \_NAME and **select 4270 – Permanent Land Clearing**.  
   
3. Click next to METHOD\_DESC and **choose Mechanical Pile**. Click Apply.  
   
4. **Use the steps above** to select for the rest of the LAND\_SUITABILITY\_CLASS\_DESC values **according to the table** below:

|  |  |  |
| --- | --- | --- |
| LAND\_SUITABILITY\_CLASS\_DESC | ACTIVITY\_NAME | METHOD\_DESC |
| Old burns reduced productivity | 4231 – Salvage Cut (intermediate treatment, not regeneration) | Mechanical Pile |
| Roaded tractor logging area | 4111 – Patch Clearcut (EA/RH/FH) | Tractor Logging |
| Unroaded cable logging area | 4241 – Special Products Removal | Single Span Highline |
| Unroaded tractor logging area | 4210 - Improvement Cut | Tractor Logging |

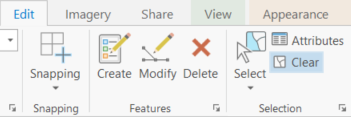
1. **Click Save** on the Edit ribbon to save your data.

Step III: Edit Values from the Calculate Field Window

Our final task in this exercise is to assign the ACTIVITY\_CODE using the Calculate Field window. Using the Calculate Field option, you can make changes to all or many selected records at a time. This method can save you a lot of time over manually editing one cell at a time.

1. Hopefully your last selection using the Select by Attributes window is still selected, if not select them again. There should be 31 Improvement Cut features selected. At the bottom of your table **click Show Selected Records**.  
   
2. Right-click on ACTIVITY\_CODE and select Calculate Field.  
   
3. Scroll down the Calculate Field window until you see ACTIVITY\_CODE =. Click in the box and **type “4210”**. Click Apply.  
   
4. Click on the **Show all Records** button at the bottom of the table. You can see that only the selected records were populated.

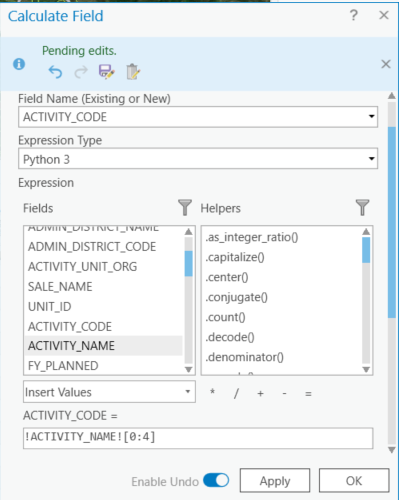
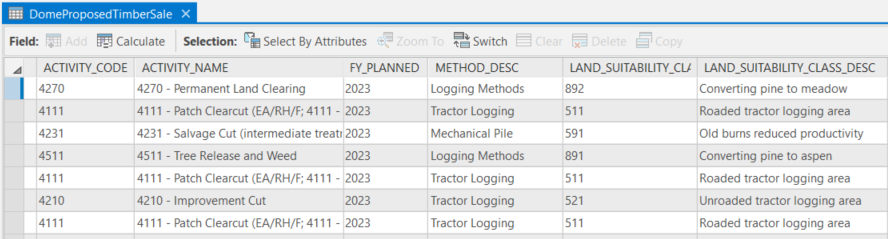
In order to save ourselves the hassle of selecting all the ACTIVITY\_NAMES again, we will use the Calculate Field tool in a different way.

1. Click Clear on the Edit ribbon in the Selection group.  
   
2. Right-click on the ACTIVITY\_CODE field heading and **select Calculate Field**.

In the Calculate Field window you will see that the Expression Type is Python 3. We are going to use a simple line of code to generate all the activity codes at once.

1. In the Fields box scroll down and **double click on ACTIVITY\_NAME**.

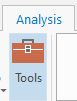
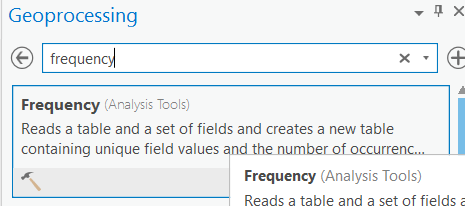
Scroll down the Calculate Field window to ACTIVITY\_CODE = box and see that is has been populated with the ACTIVITY\_NAME with an exclamation point on either side. That is Python 3’s was of delineating a field name.

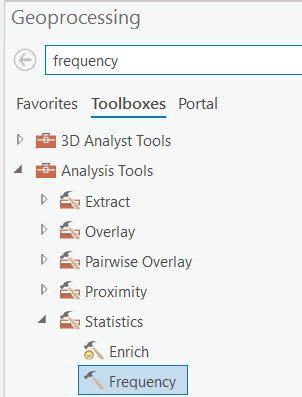
1. Click in the box to the right of !ACTIVITY\_NAME! and **type [0:4]**.  
   
2. **Click Apply** and the ACTIVITY\_CODE magically populates!  
   

The Python 3 code told Pro to take the first 4 characters of the ACTIVITY\_NAME for each record and populate the ACTIVITY\_CODE field. Python code is a very powerful tool but is beyond the scope of this course. Most one-line calculations can be generated using the Helpers, operators, and double-clicking the Field names. Google is your best friend when it comes to Python code.

Challenge: Create a Frequency Table

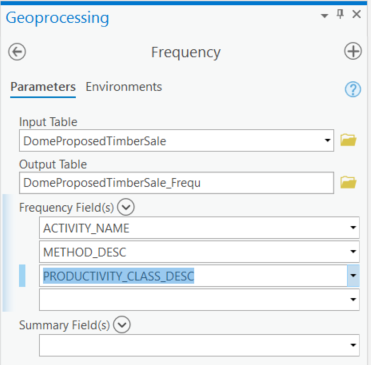
It is easy enough to visualize how many and which different Activity Codes are in the project. It is more difficult to determine the number of polygons with a specific Activity Code that fall within a particular Productivity Class. For example, how many (if any) polygons are “4210 – Improvement Cut”, with “Tractor Logging”, and “120-164 cubic feet per acre per year”? Through ArcToolbox’s Frequency tool, we can count the number of times a PRODUCTIVITY\_CLASS\_DESC value repeats for each ACTIVITY\_NAME polygon.

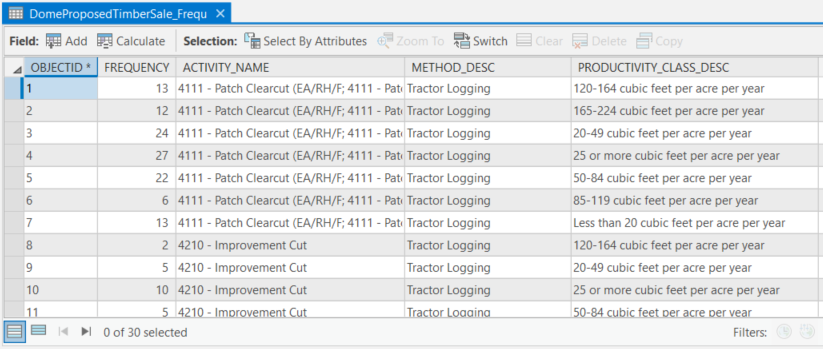
1. Activate the **Geoprocessing pane** by clicking the Analysis ribbon and clicking on the Tools button.  
   
2. **Search for frequency**. Click to launch Frequency (Analysis Tools).  
   

OR: From the Toolboxes tab, **launch the Frequency (Analysis) tool** from the Analysis toolbox and the Statistics toolset.   


We will create a Frequency table that compares ACTIVTY\_NAME, METHOD\_DESC, AND PRODUCTIVITY\_CLASS. We want to know the frequency of each separate instance.

1. Select the following options from the dropdown menus to generate a Frequency table:  
   **Input Table – DomeProposedTimberSale  
   Output Table – DomeProposedTimberSale\_Frequ (this is the default)  
   Frequency Field(s) – ACTIVITY\_NAME, METHOD\_DESC, PRODUCTIVITY\_CLASS\_DESC**



1. **Click Run** to run the Frequency tool. The Frequency Table is automatically added to the Contents pane.
2. Right-click on the table name in the Contents pane and **open and examine the Attribute table**.  
   

QUIZ: How many “4210 – Improvement Cut” polygons have a Productivity Class of “25 or more cubic feet per acre per year”?

NOTE: Because the Frequency table is non-spatial, you cannot select a record in the Frequency table and expect a polygon to highlight in the Map.

**Congratulations!** You have successfully completed this exercise.