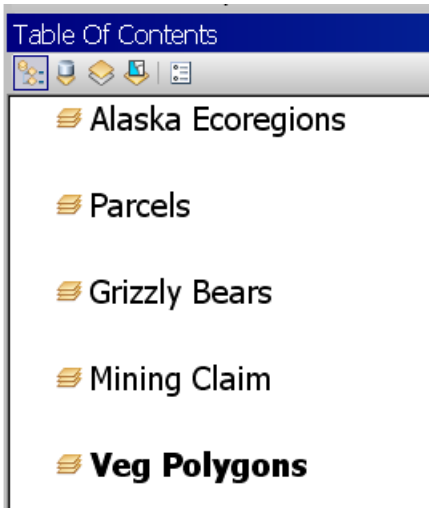


### Polygon Analysis

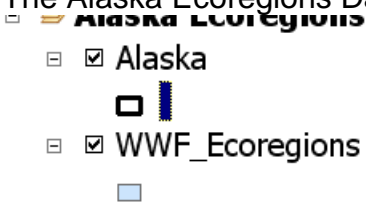
Download and unzip the personal geodatabase ***polygon\_analysis\_lab.mdb*** from

<http://dverbyla.net/nrm435/data/>

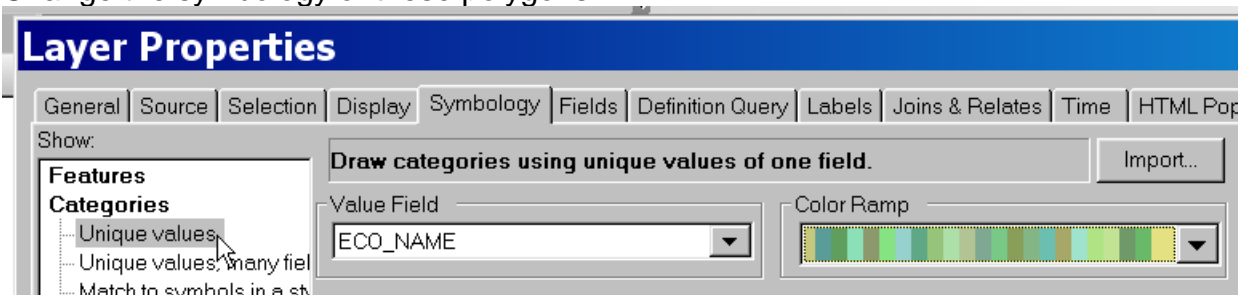
The personal geodatabase contains five feature datasets....create an Arcmap data frame corresponding to each feature dataset.



The Alaska Ecoregions Data set contains 2 polygon feature classes:



The Ecoregions are a global polygon dataset produced by the World Wildlife Federation. Change the symbology of these polygons.



What is the total area in Hectares by Ecoregion Name in Alaska?

First, **Clip** out the Ecoregion polygons inside the Alaska polygons. Then compute the area of each clipped polygon in Hectares. Run the **Summary Statistics** with Eco\_Name as your case field. Finally run the **Sort** tool and sort your table descending by Hectares.

AK_Ecoregions_Sorted_By_Ha	
ECO_NAME	SUM_Hectar
Interior Alaska-Yukon lowland taiga	40,485,833
Beringia lowland tundra	14,757,016
Brooks-British Range tundra	13,377,762
Alaska-St. Elias Range tundra	12,843,606
Arctic foothills tundra	12,414,402
Interior Yukon-Alaska alpine tundra	11,513,138
Beringia upland tundra	9,678,153
Pacific Coastal Mountain icefields an	8,204,976
Northern Pacific coastal forests	5,015,818
Arctic coastal tundra	4,936,284
Alaska Peninsula montane taiga	4,283,911
Rock and Ice	4,115,431
Cook Inlet taiga	2,769,667
Copper Plateau taiga	1,727,509
Ogilvie-MacKenzie alpine tundra	1,070,924
Aleutian Islands tundra	600,247
Northern Cordillera forests	2,782

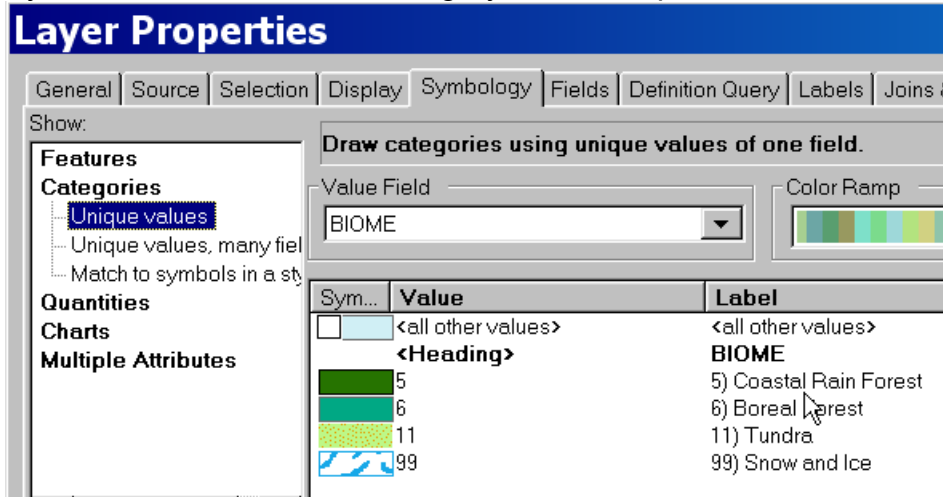
Another method of determining total area by category could be using the Dissolve tool.

Each polygon also has a biome field, which represents the following:

- AK\_Ecoregions
  - BIOME
  - 5) Coastal Rain Forest
  - 6) Boreal Forest
  - 11) Tundra
  - 99) Snow-Ice

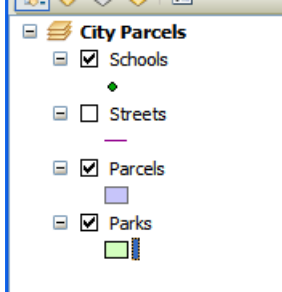
What is the total area in KM<sup>2</sup> for each biome category?

Use the **Dissolve** tool to create polygons representing these biome classes. Symbolize and label each category...and compute area in km<sup>2</sup>



BIOME	KM2	Name
99	41,154	Snow and Ice
11	893,965	Tundra
6	492,697	Boreal Forest
5	50,158	Coastal Rain Forest

The City Parcels feature dataset contains a point theme of Schools, a line theme of Streets, and polygon themes of Parks and Parcels. Notice that the X,Y coordinates are in feet:

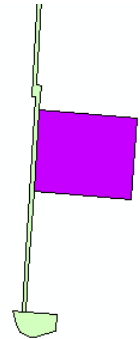


Find all the parcels with:

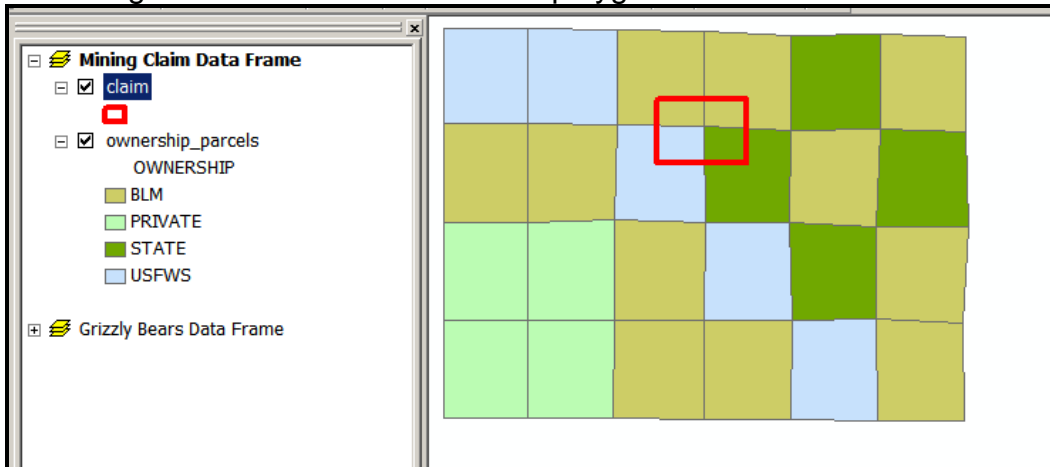
- 1) at least 1 acres in size,
- 2) a building area from 1000 to 2000 ,
- 3) least 2 baths,
- 4) total appraised value less than \$150,000
- 5) next to a Park.

A screenshot of a GIS table window titled "Table" with the subtitle "Candidate\_Parcels". The table contains two rows of data. Below the table, there are navigation controls showing "0" selected out of 2 items. At the bottom of the window, there are tabs for "AK\_Biomes", "Parcels", and "Candidate\_Parcels", and buttons for "Results", "ArcToolbox", "Table Of Contents", "Search", and "Table".

Shape *	APPR_TOT	NO_BATHS	BLDG_AREA	YR_BUILT	Acres
Polygon	129800	2	1253	2000	1.110436
Polygon	77900	2	1008	1987	5.081849



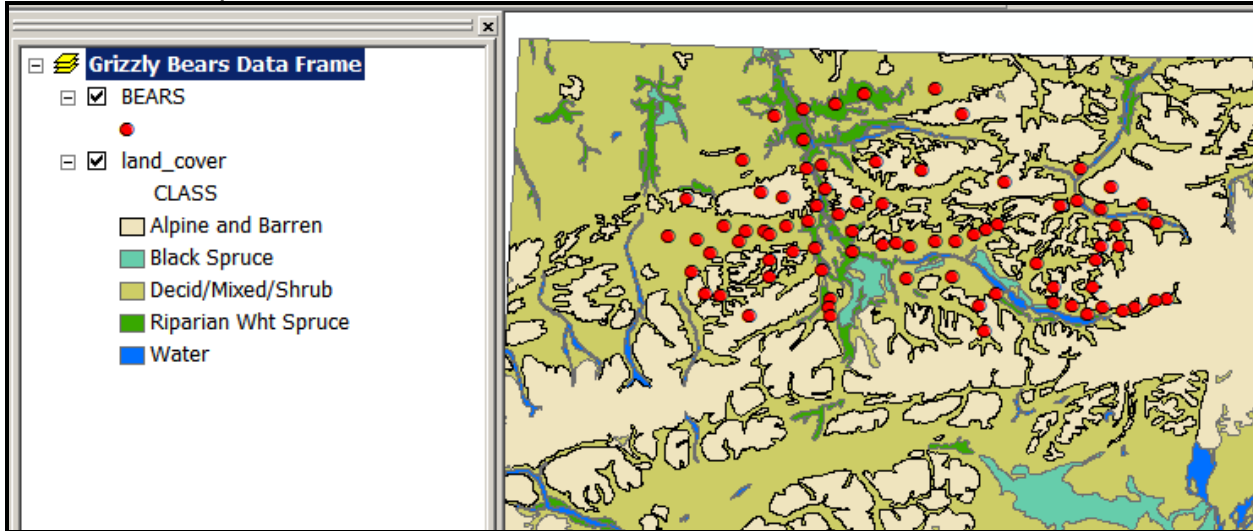
The Mining Claim Dataset contains two polygon themes:



Determine the area of this mining claim by ownership and create the following table:  
(Use Clip or Intersect with Claim polygon)

OWNERSHIP	Sum_Hectares
STATE	96.1379
USFWS	113.2357
BLM	147.2258

The Grizzly Bears dataset contains landcover as a polygon feature class and grizzly bear locations as a point feature class.

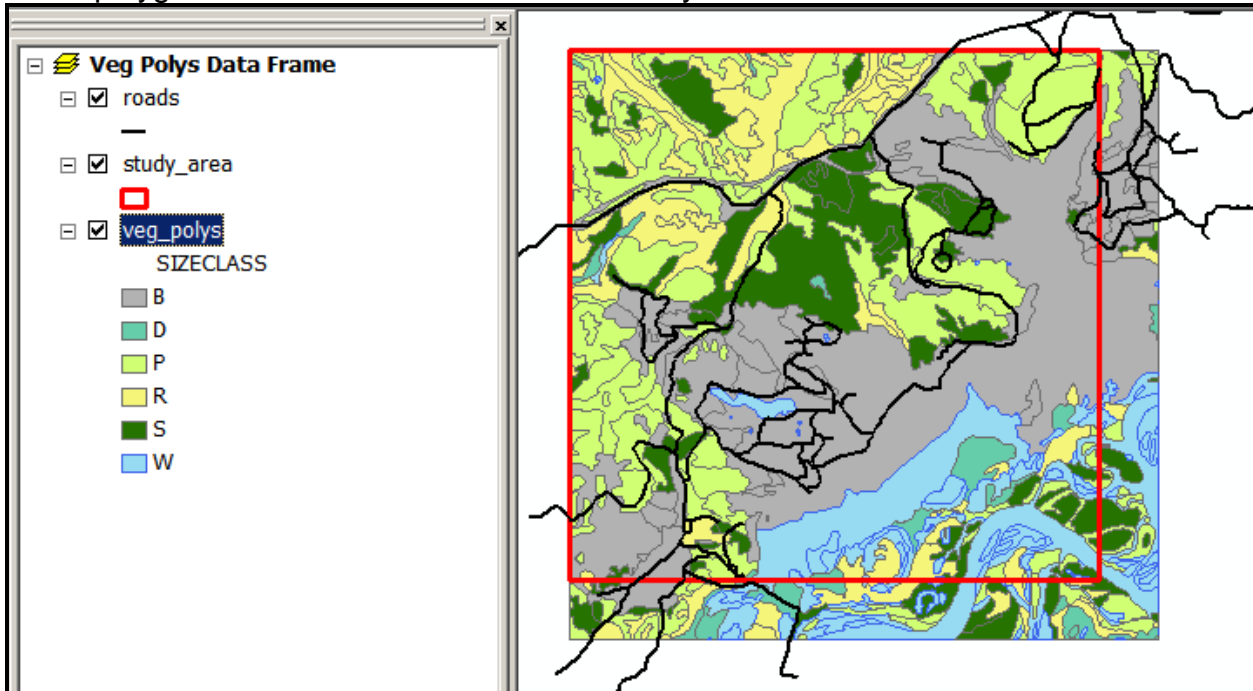


Determine the total number of bears by ageclass and the total number of bears by ageclass within the land cover classes of Alpine and Barren, Decid/mixed/Shrub and Riparian White Spruce.

AGECLASS	Total Bears
1	29
2	14
3	16
4	21

AGECLASS	CLASS	Total Bears
1	Alpine and Barren	6
2	Alpine and Barren	3
3	Alpine and Barren	6
4	Alpine and Barren	6
1	Decid/Mixed/Shrub	17
2	Decid/Mixed/Shrub	10
3	Decid/Mixed/Shrub	9
4	Decid/Mixed/Shrub	15
1	Riparian Wht Spruce	6
2	Riparian Wht Spruce	1

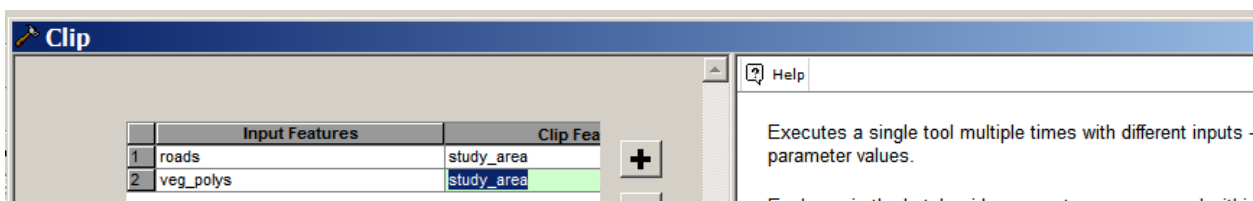
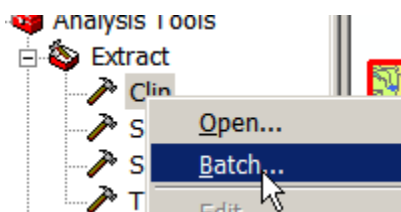
The Veg\_polys dataset contains a roads line theme, a polygon theme of vegetation polygons and a polygon theme that is the extent of a study area.

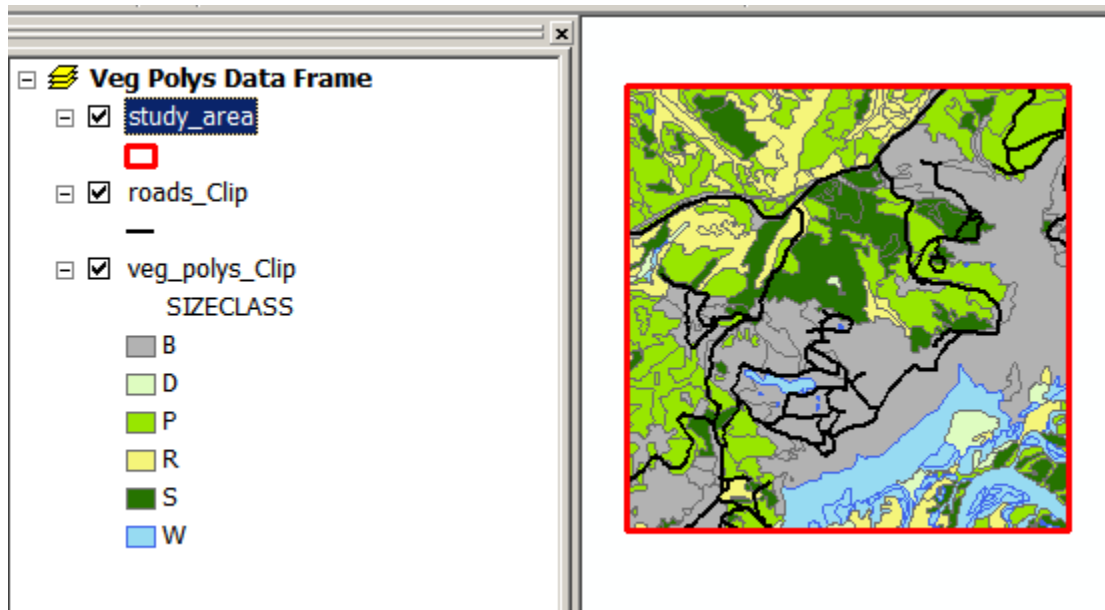


You will analyze three scenarios of different constraints, and determine the area of sawtimber of a certain stand size with a study area near roads and away from wetlands.

	Near Road Constraint	Away From Wetlands Constraint	Stand Size Constraint
Scenario1	100 m	200m	5 hectares
Scenario2	500m	1000m	5 hectares
Scenario3	100m	50m	1 hectares

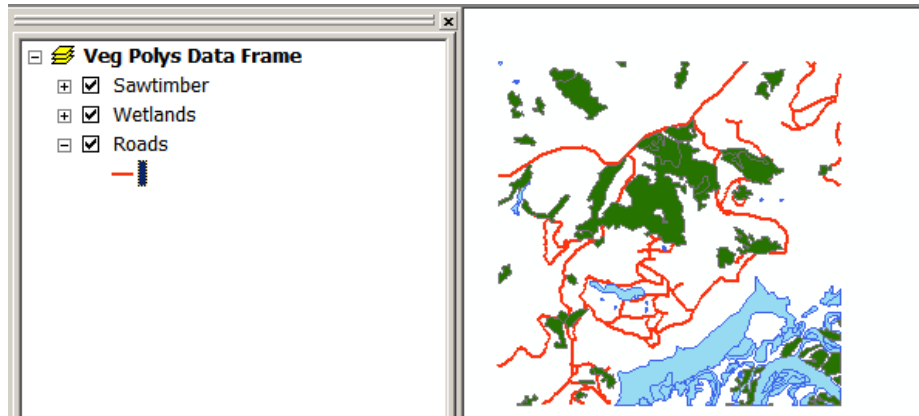
First use your **Clip** tool in your to clip out the roads, veg\_polys inside the study area polygon as a Batch process.





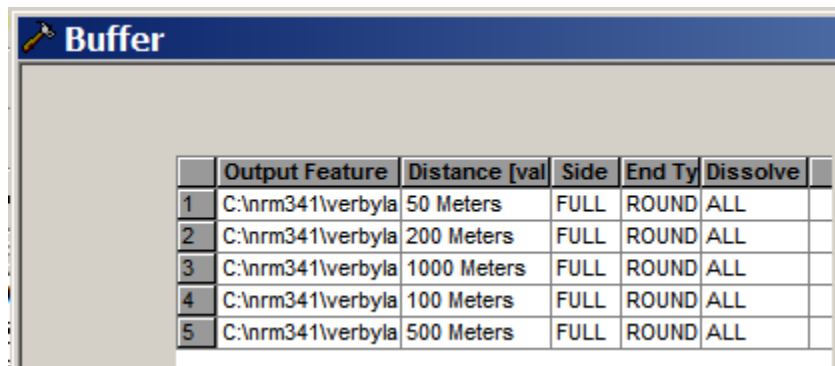
The **veg\_polys** theme has an attribute item called **vegclass** and an attribute item called **sizeclass** (S for sawtimber, P for poles, W for wetland). Create a layer from veg\_polys for wetlands and a layer for sawtimber.

Create a wetlands layer and a sawtimber layer by defining these layers using the sizeclass attribute.

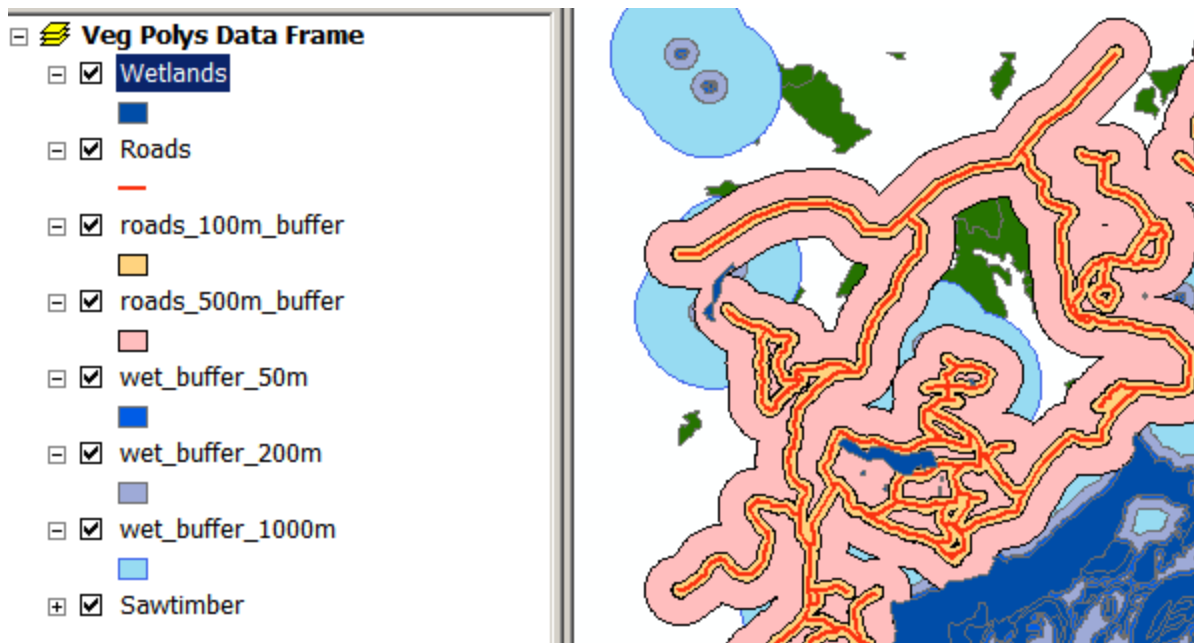


Then use Arc toolbox tools in batch mode to do the following:

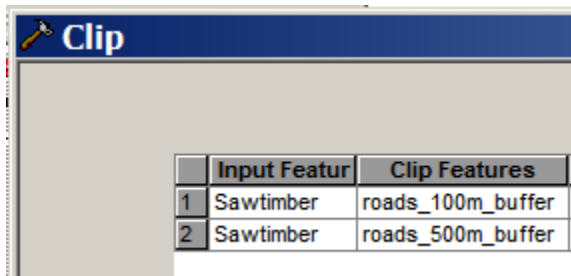
- ✓ **Buffer** your roads theme by 100 and 500 meters and your wetlands by 50, 200, and 1000 meters



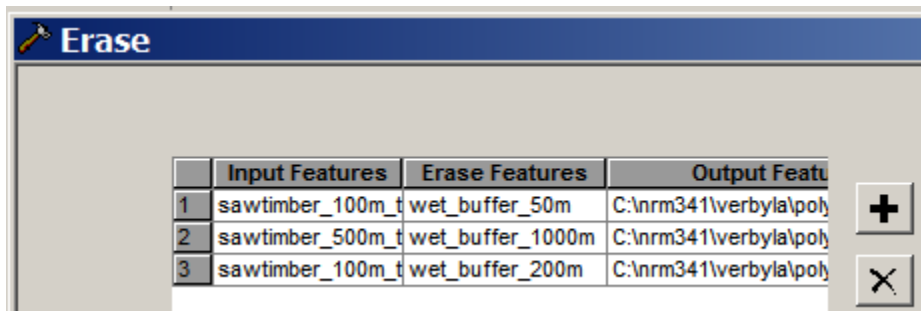




Next, use the **Clip** tool to batch clip the sawtimber polygons close enough to a road.

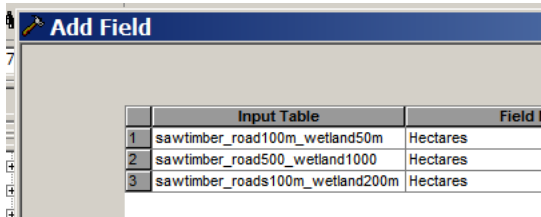


Then use the **Erase** tool with the three wetlands buffer feature classes to erase any sawtimber close enough to a road but within a wetlands buffer.

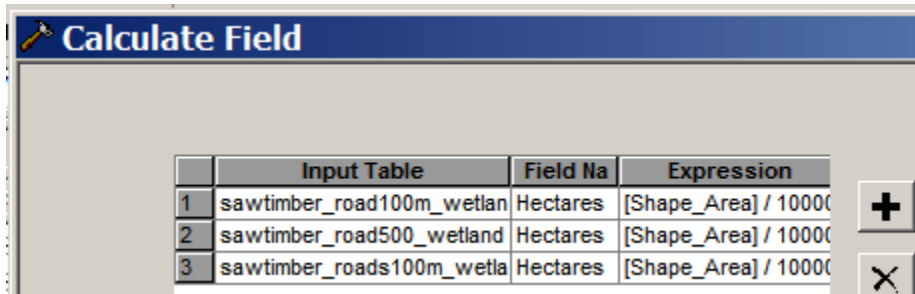


	Near Road Constraint	Away From Wetlands Constraint	Stand Size Constraint
Scenario1	100 m	200m	5 hectares
Scenario2	500m	1000m	5 hectares
Scenario3	100m	50m	1 hectares

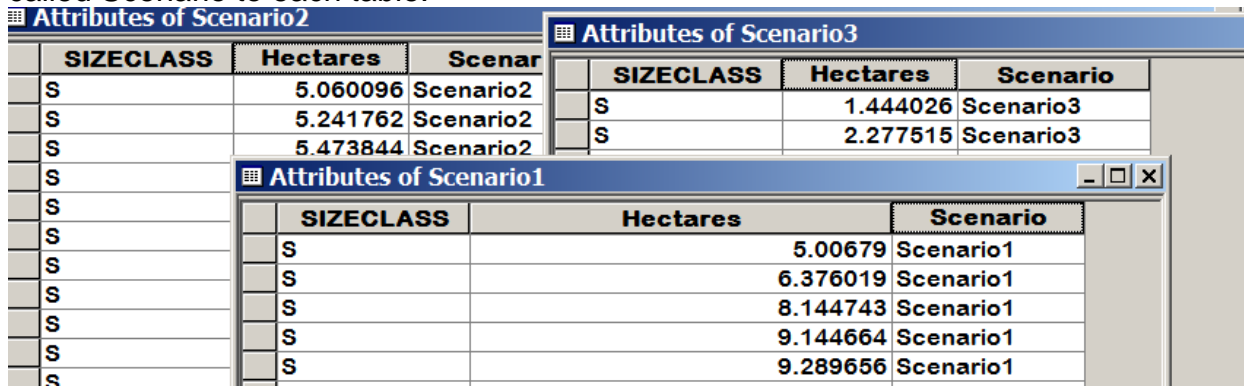
Use the **Add Field** tool to batch add a double precision field named Hectares to each scenario output theme.



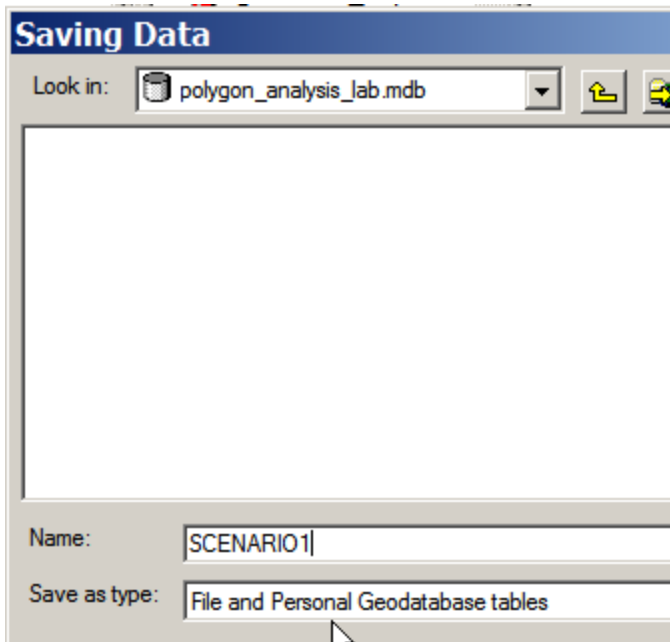
Then use the **Calculate Field** tool to batch calculate Hectares



Use the Layer Properties Definition to query for the polygon size constraint. Add a text field called Scenario to each table.



Export your three tables to your personal geodatabase with only the fields of SIZECLASS, Hectares and Scenario visible.



Use the **Merge** tool to merge your three scenario tables into one table

Attributes of SCENARIOS				
	OBJECTID *	SIZECLASS	Hectares	Scenario
	2	S	5.00679	Scenario1
	3	S	35.708781	Scenario1
	4	S	28.263428	Scenario1
	5	S	8.144743	Scenario1
	6	S	9.144664	Scenario1
	7	S	10.531236	Scenario1
	8	S	9.289656	Scenario1
	1	S	6.376019	Scenario1
	9	S	25.045231	Scenario2
	18	S	8.555996	Scenario2
	17	S	7.592374	Scenario2
	16	S	7.60225	Scenario2
	15	S	5.473844	Scenario2

Finally, summarize by Scenario....use the Summary Statistics geoprocessing tool with Scenario as case field, summing Hectares.