Making ArcGIS Work for You

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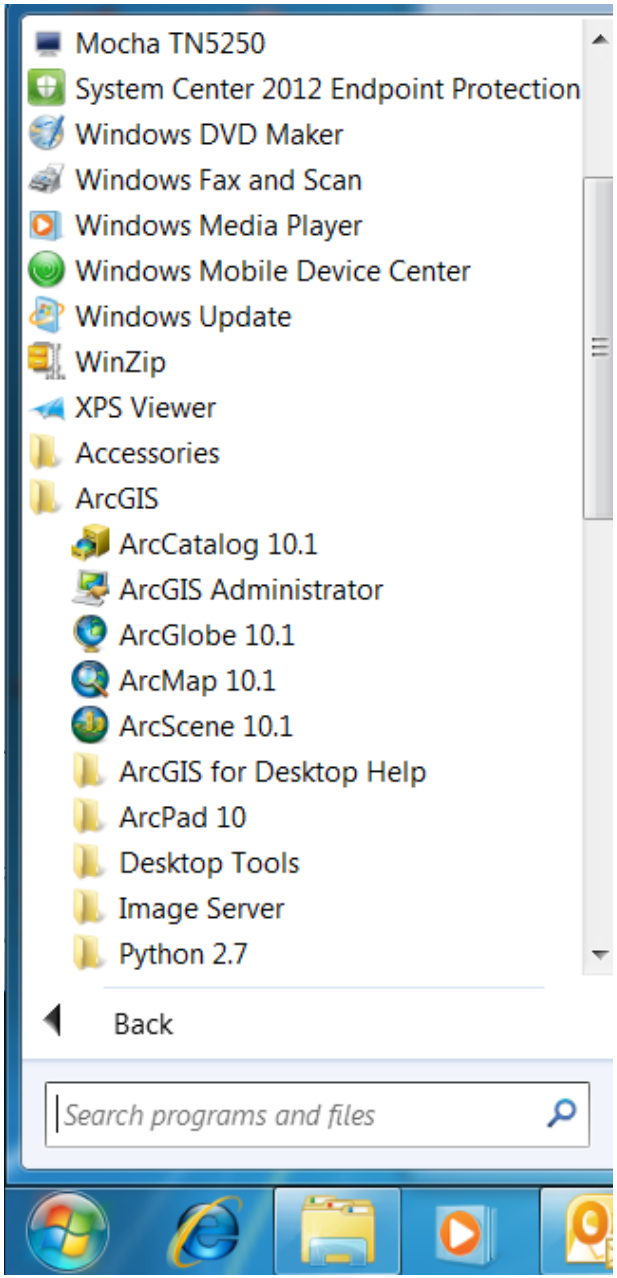
Topics

- **Using ArcMap – beyond the Toolkit buttons**
  - GIS data formats
  - Attributes and what you can do with them
  - Calculating Acres
  - Determining Map coordinates for locations
  - Making and editing shapefiles; calculating acres
  - Using the data on f:\geodata
  - Data analysis (clip, intersect, buffer, dissolve)

Introductory Thoughts

1. ***You can use ArcMap and other ArcGIS components outside of Toolkit***
   - Quick access to photography, CLU, and other data
   - When not planning or scheduling conservation practices that require reporting
   - In many cases, ArcMap without Toolkit may be an easier and faster way to accomplish a task



To Open ArcMap without Checking out a customer in Toolkit

Start>>All Programs>>ArcGIS>>ArcMap or ArcCatalog

2. **Toolkit buttons in ArcMap shorten the steps of some GIS functions**, but are limited in their application, for example, to specific data sets. Knowing the "straight ArcMap" way to accomplish these functions allows you to use them for other purposes.
   - *Examples: add data to a table, select a subset of a layer based on an attribute, spatially clip the extent of a layer*
   - *NOTE: Toolkit toolbar buttons **do not** work if you open ArcMap without going through Toolkit*

3. This is conceptual training, not step-by-step. ArcMap is a vast toolbox. We will see what some of the tools do, and then you can decide how they apply to your everyday tasks!

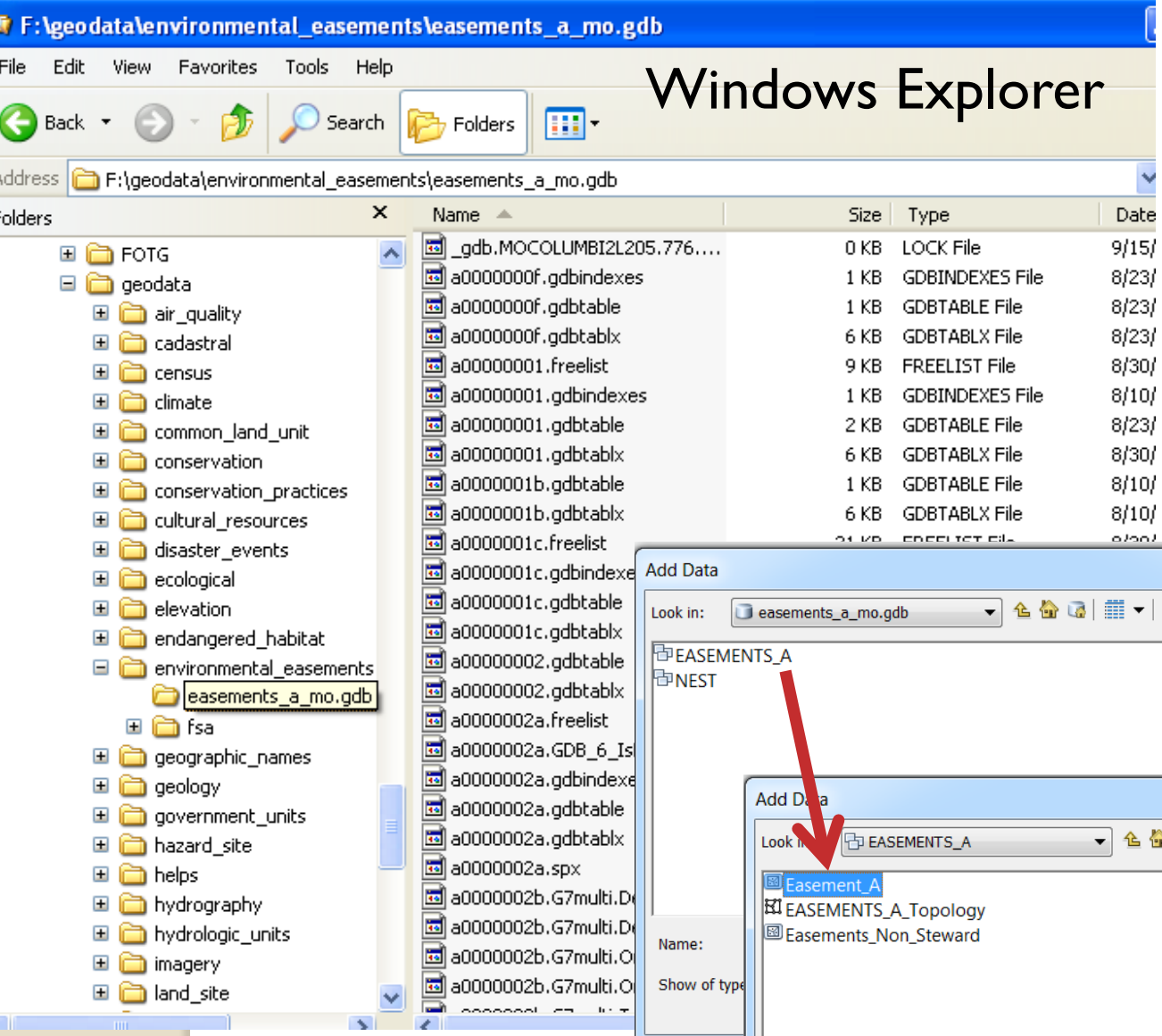
GIS Data Formats

- Shapefiles
  - Are actually a collection of 3-7 files, ***even though you only see the .shp file listed in an ArcMap browse listing***
  - Must have a minimum of .shp, .shx and .dbf files for a shapefile to work
  - Cannot double-click on a shapefile to open; must use 'Add Data' in ArcMap
  - Shapefiles can only contain vector spatial data of one type of geometry per file – points, polylines (lines) or polygons

- Raster datasets
  - Data in a grid cell format with each cell being a square representing a certain area on the ground
  - .sid raster is used for aerial imagery (NAIP = 1x1 meter cells); sid is a compression format to make imagery files smaller
  - .tif raster (ex. DRG topographic maps with 2.47 m x 2.47 m cells)
  - GRID raster (ArcGIS specific) are used for digital elevation models; GRIDs are folders rather than files

- Geodatabases
  - Newer data format than shapefiles and stand-alone raster files
  - Three types - personal, file, and SDE
  - Geodatabases can contain mixed types of data (vector point, line, and polygon; raster; external tables, etc.), stored in different **feature classes**
  - Geodatabases are stored as a **folder**, ending with .gdb
  - Easements data on f:\geodata are in a file geodatabase
  - Toolkit uses the personal geodatabase format with some unique customizations for PLU and practice data

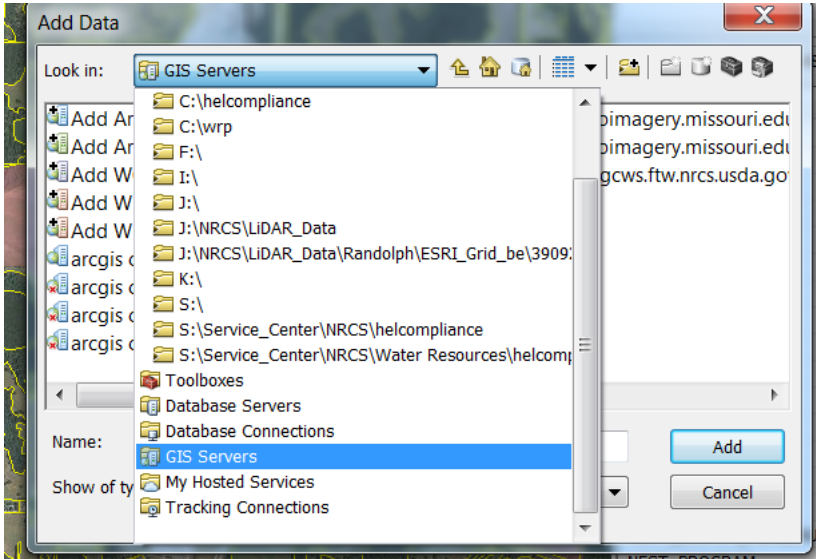
Windows Explorer



ArcMap

GIS Servers

- We are changing from locally stored GIS data to data on centralized servers
- Still use the Add Data button in ArcMap to access these data, but go to GIS Servers to locate data stored at a web URL
- Example: NAIP on http://gis.apfo.usda.gov/arcgis/services



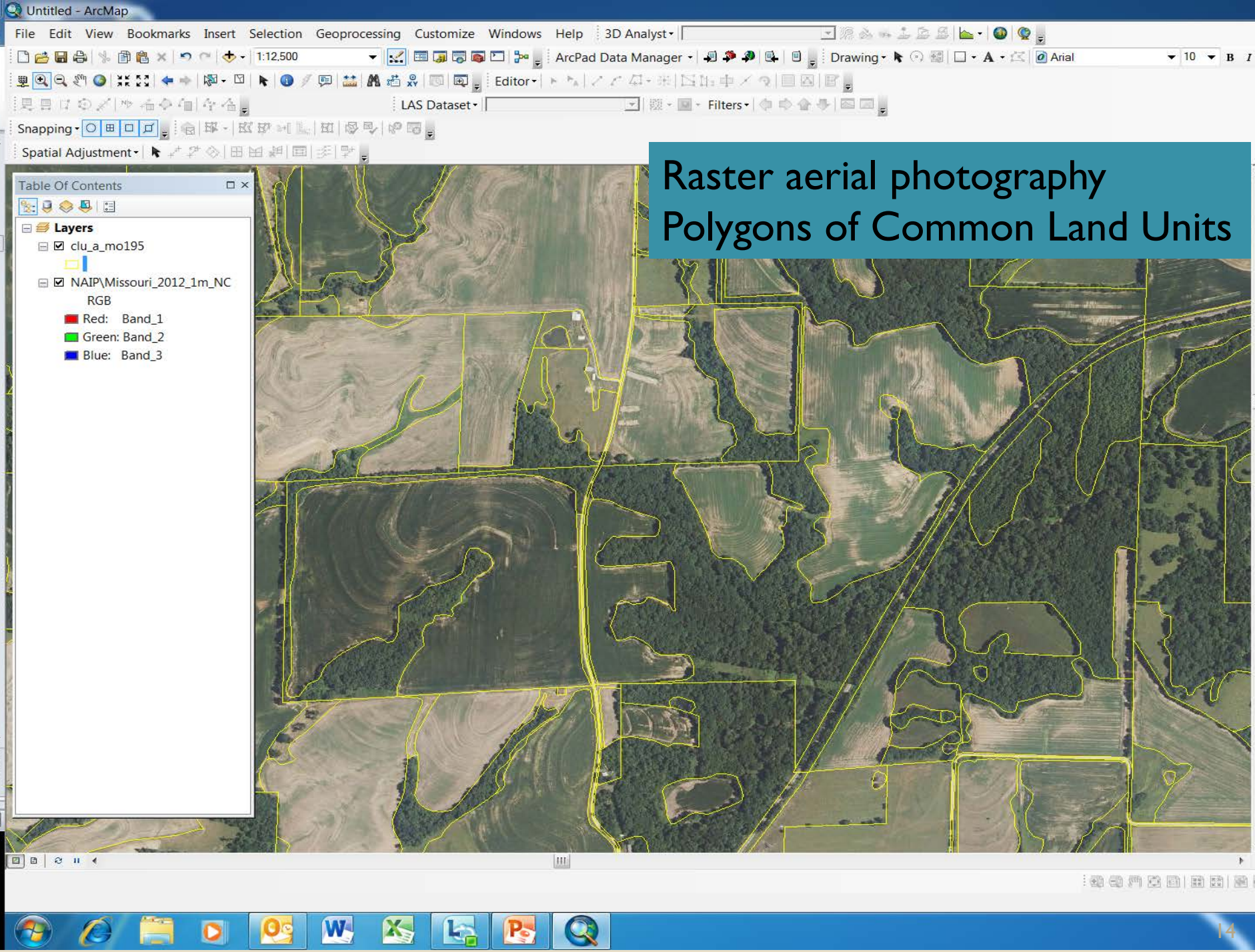
Anatomy of GIS Data

- **Where -** point, line, polygon or raster (grid cell) representing a feature on the ground; map feature
  - Point representing a well, outlet, photo station
  - Line representing a fence or terrace
  - Polygon representing a field boundary, area of homogenous soils
  - Raster cell representing a 1x1 meter area for which a value like elevation is known

Anatomy of GIS Data

- **What** – information about the point, line, polygon or raster
  - Photo station id, well type of a point
  - Fence type such as barbed or electric of a line
  - Map unit symbol for soils polygon
  - Elevation of a raster

This information is stored in an ***attribute*** table associated with the spatial data. The link between the spatial map feature and the attribute table is an essential element of GIS.


Untitled - ArcMap
File Edit View Bookmarks Insert Selection Geoprocessing Customize Windows Help 3D Analyst
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ArcPad Data Manager
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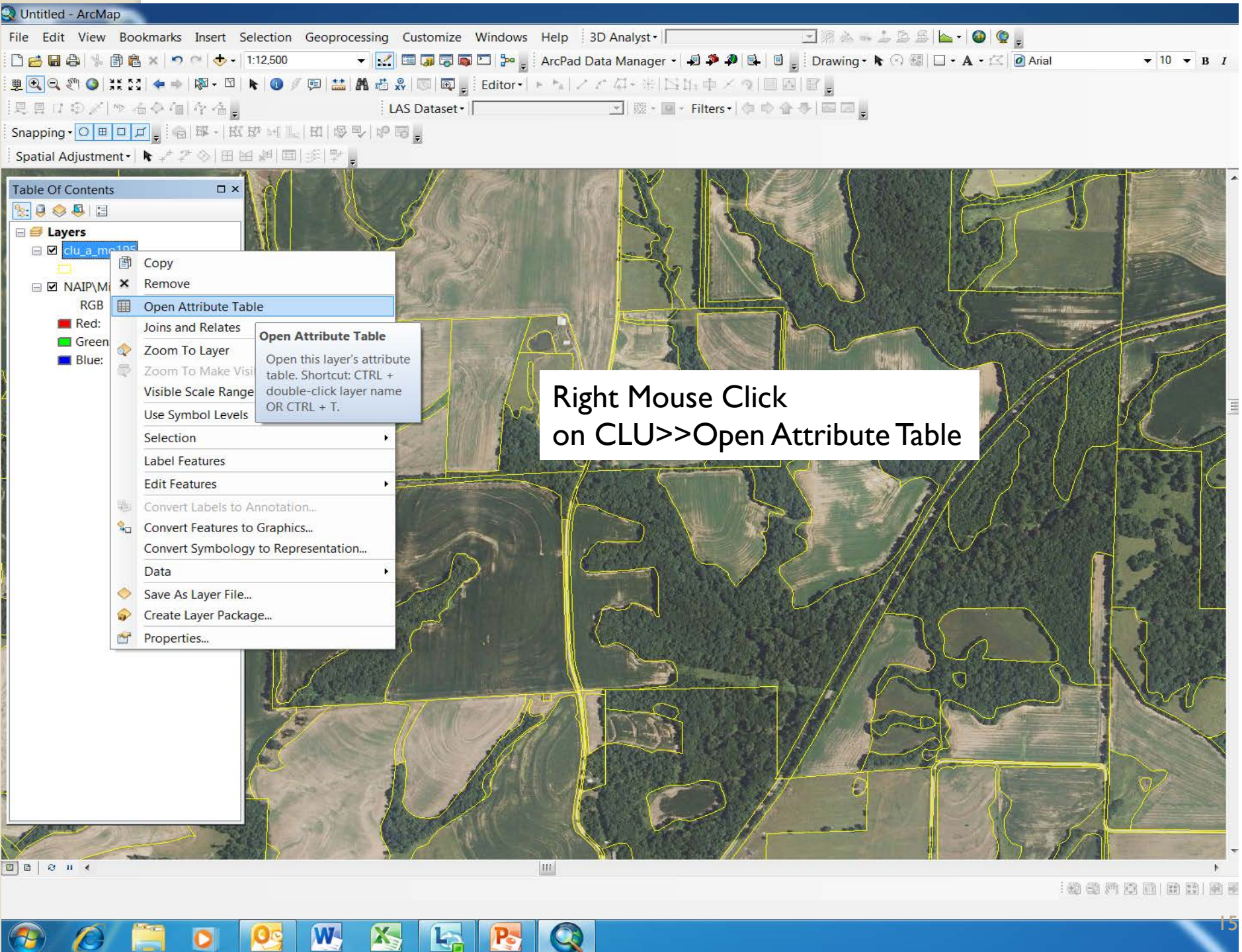
RGB
Red: Band_1
Green: Band_2
Blue: Band_3
Raster aerial photography
Polygons of Common Land Units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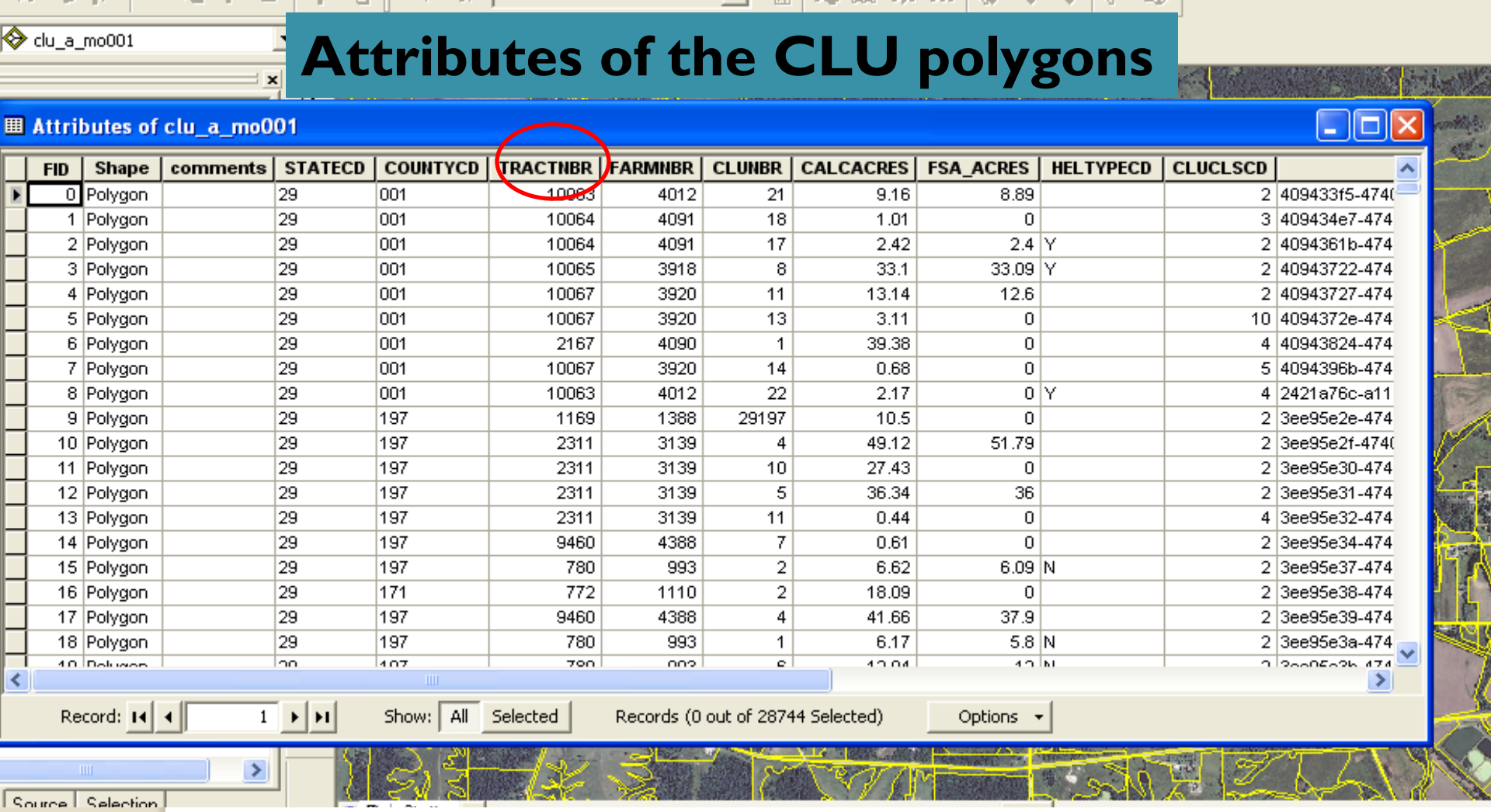
Visible Scale Range
Use Symbol Levels
Selection
Label Features
Edit Features
Convert Labels to Annotation...
Convert Features to Graphics...
Convert Symbology to Representation...
Data
Save As Layer File...
Create Layer Package...
Properties...
Open Attribute Table
Open this layer's attribute table. Shortcut: CTRL + double-click layer name OR CTRL + T.
Right Mouse Click
on CLU>>Open Attribute Table

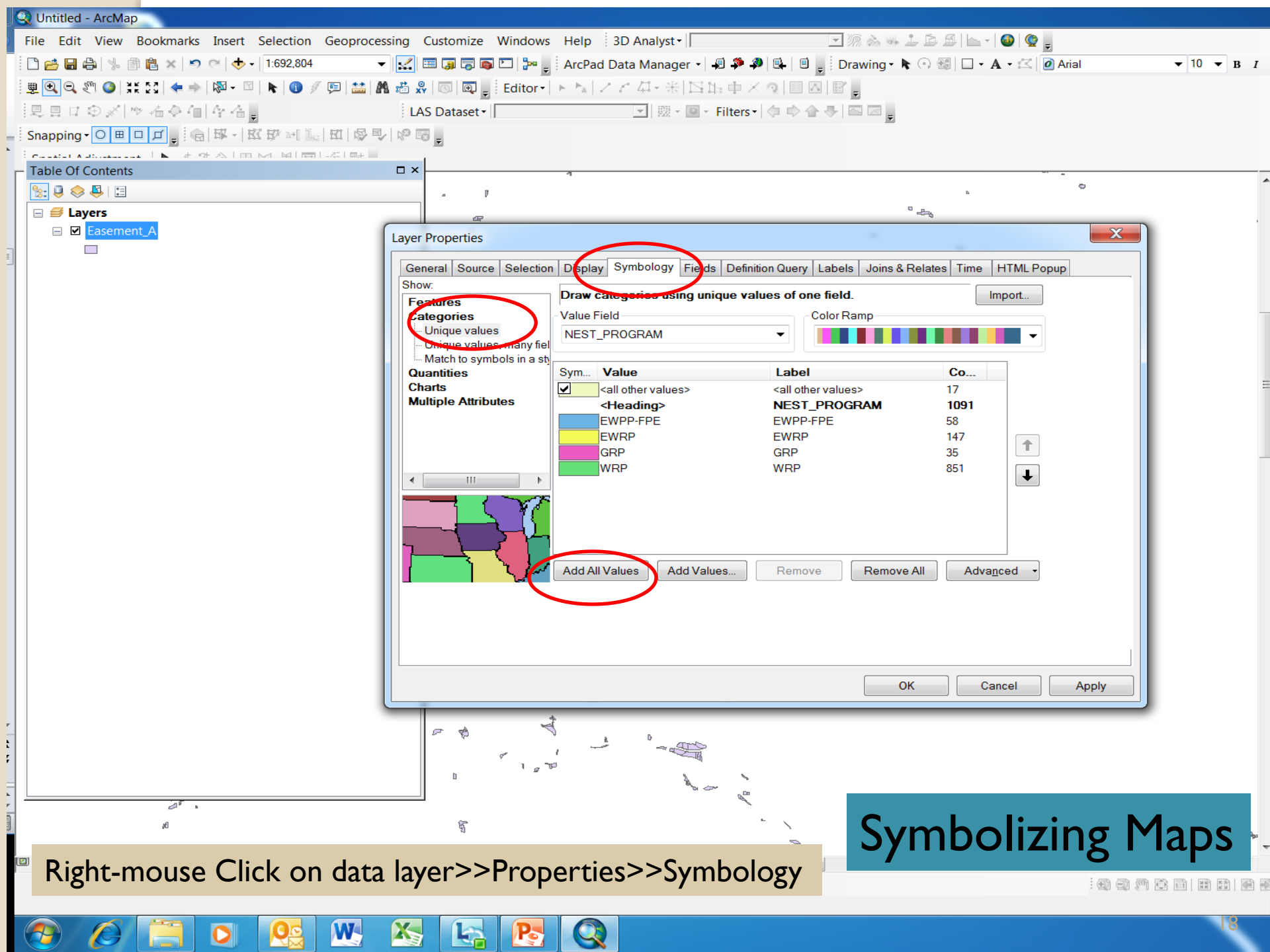
Attributes of the CLU polygons



FID	Shape	comments	STATECD	COUNTYCD	TRACTNBR	FARMNBR	CLUNBR	CALCACRES	FSA_ACRES	HELTYPECD	CLUCLSCD	
0	Polygon		29	001	10063	4012	21	9.16	8.89		2	409433f5-474(
1	Polygon		29	001	10064	4091	18	1.01	0		3	409434e7-474
2	Polygon		29	001	10064	4091	17	2.42	2.4	Y	2	4094361b-474
3	Polygon		29	001	10065	3918	8	33.1	33.09	Y	2	4094372-474
4	Polygon		29	001	10067	3920	11	13.14	12.6		2	4094372-474
5	Polygon		29	001	10067	3920	13	3.11	0		10	4094372e-474
6	Polygon		29	001	2167	4090	1	39.38	0		4	4094382-474
7	Polygon		29	001	10067	3920	14	0.68	0		5	4094396b-474
8	Polygon		29	001	10063	4012	22	2.17	0	Y	4	2421a76c-a11
9	Polygon		29	197	1169	1388	29197	10.5	0		2	3ee95e2e-474
10	Polygon		29	197	2311	3139	4	49.12	51.79		2	3ee95e2f-474(
11	Polygon		29	197	2311	3139	10	27.43	0		2	3ee95e30-474
12	Polygon		29	197	2311	3139	5	36.34	36		2	3ee95e31-474
13	Polygon		29	197	2311	3139	11	0.44	0		4	3ee95e32-474
14	Polygon		29	197	9460	4388	7	0.61	0		2	3ee95e34-474
15	Polygon		29	197	780	993	2	6.62	6.09	N	2	3ee95e37-474
16	Polygon		29	171	772	1110	2	18.09	0		2	3ee95e38-474
17	Polygon		29	197	9460	4388	4	41.66	37.9		2	3ee95e39-474
18	Polygon		29	197	780	993	1	6.17	5.8	N	2	3ee95e3a-474

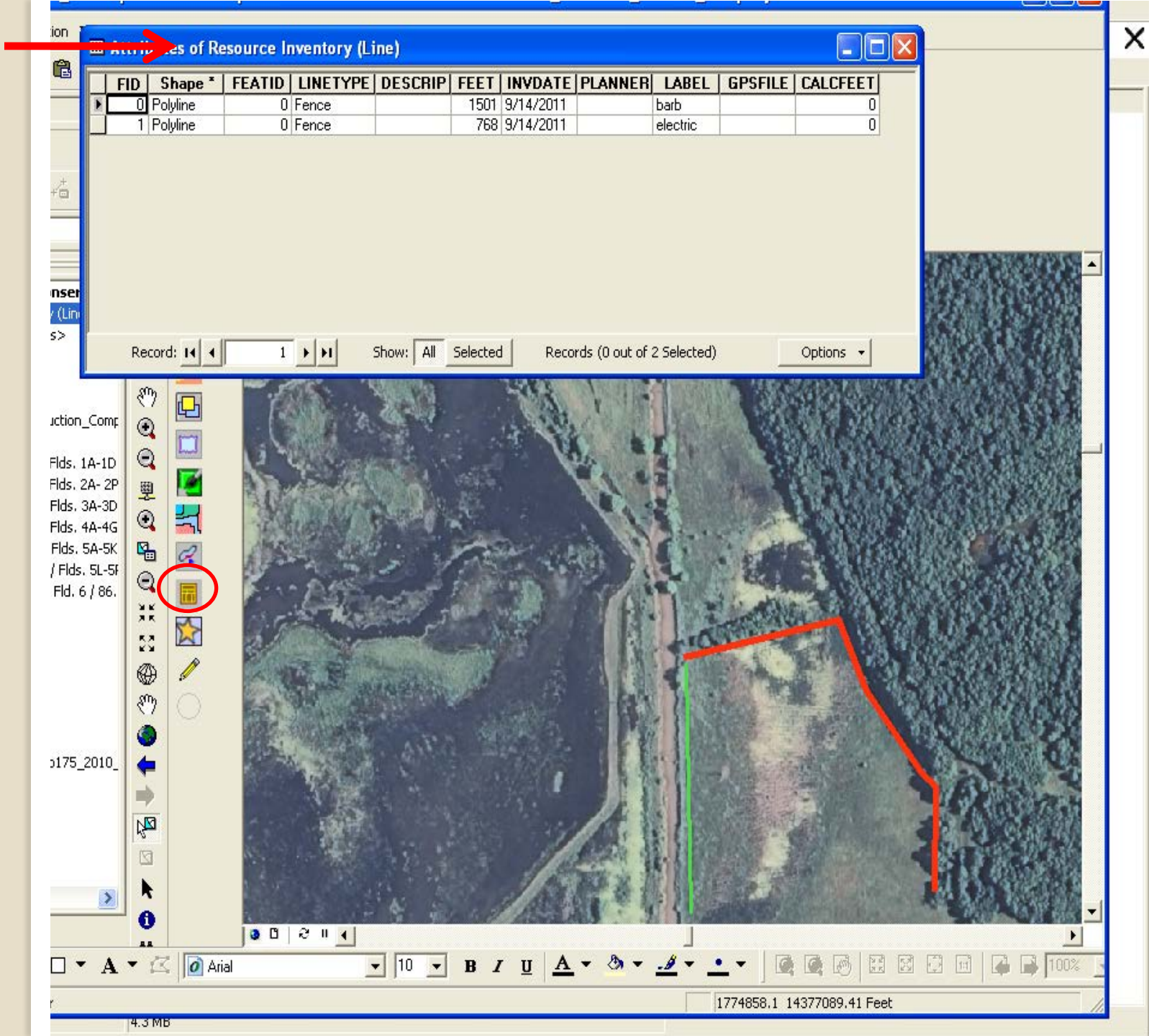
In most cases, there is one record or row in the table for each ***feature*** (point, line or polygon) in the data set

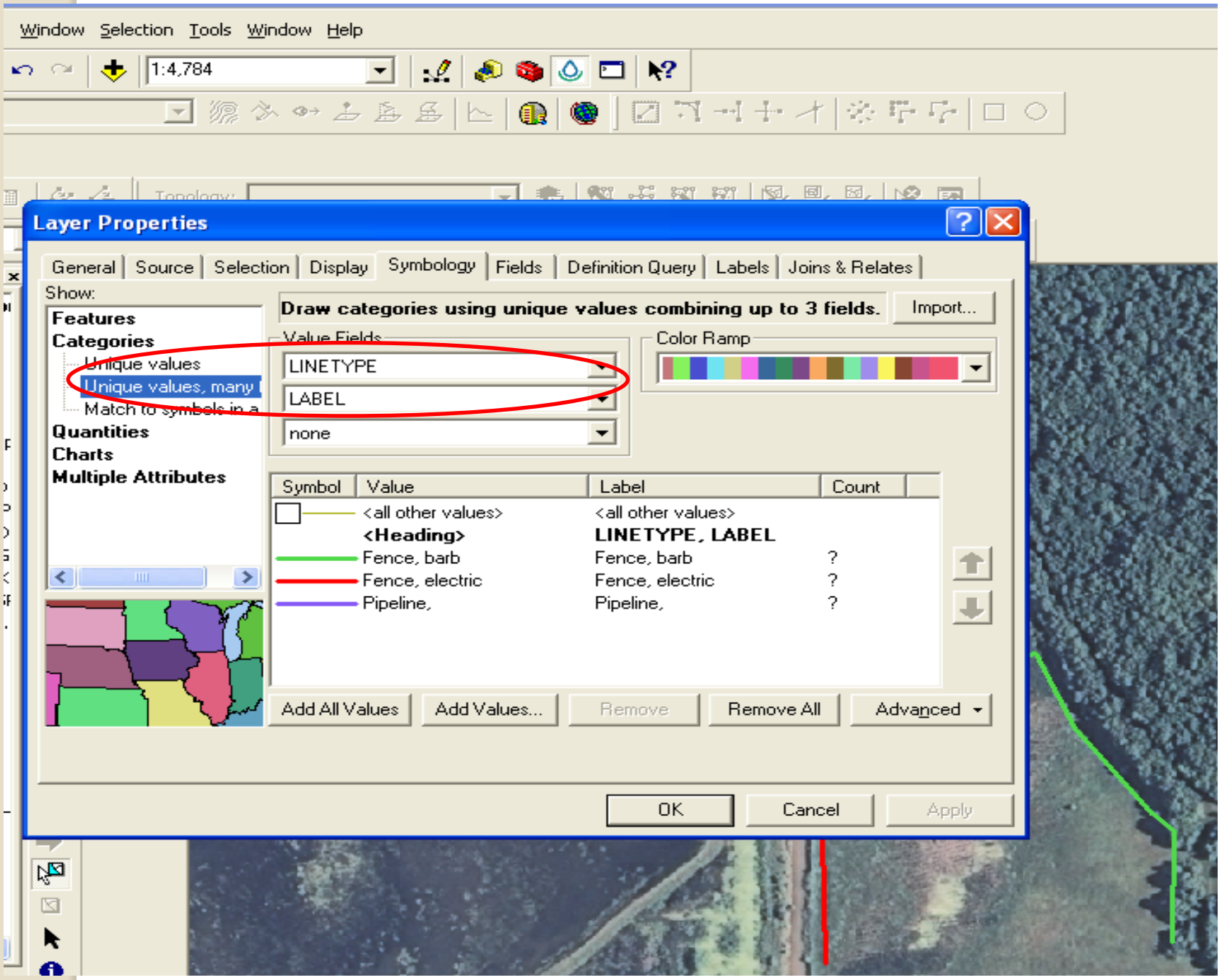
What can attributes do for you?

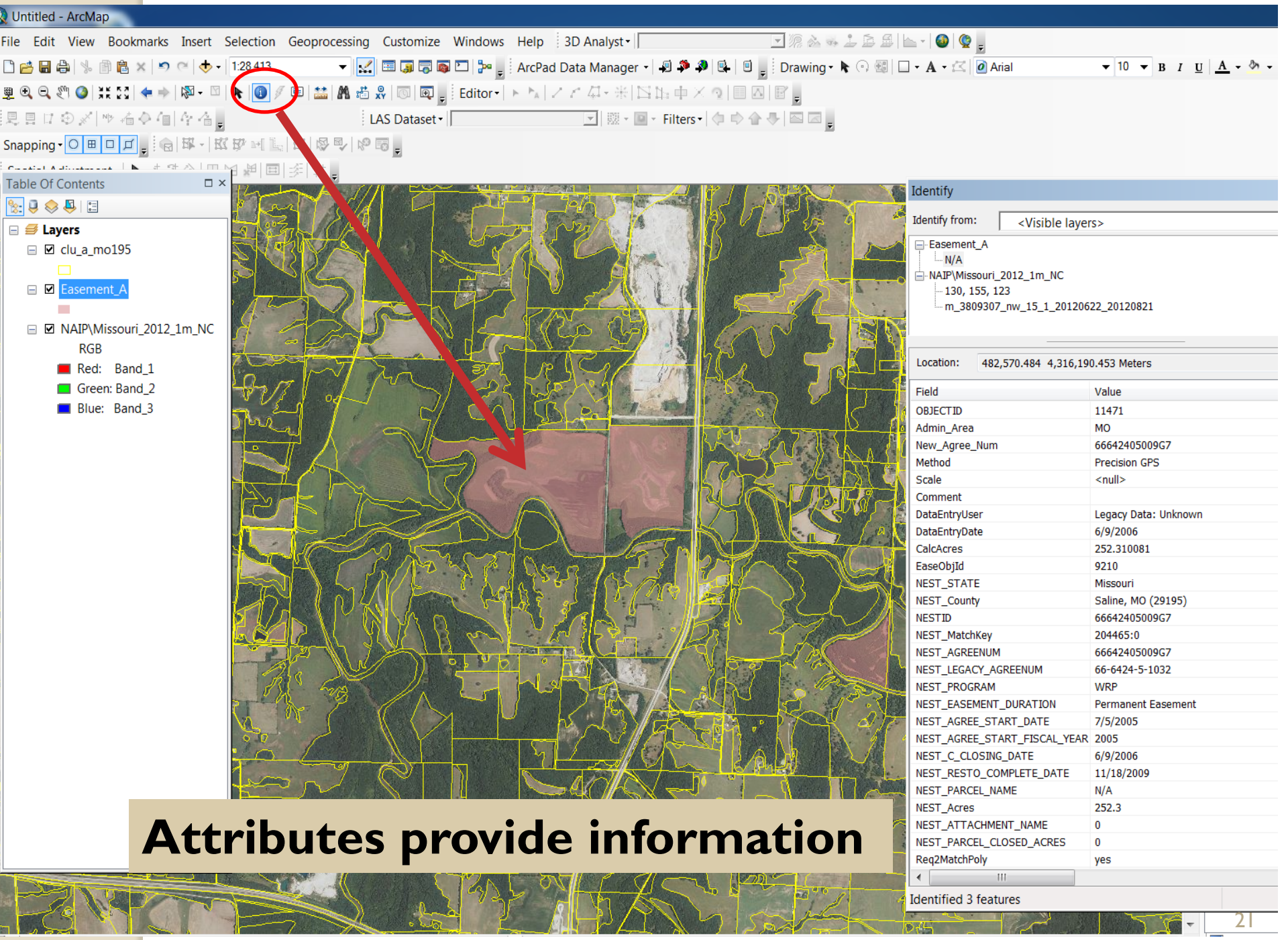


Symbolizing Maps

Right-mouse Click on data layer>>Properties>>Symbology

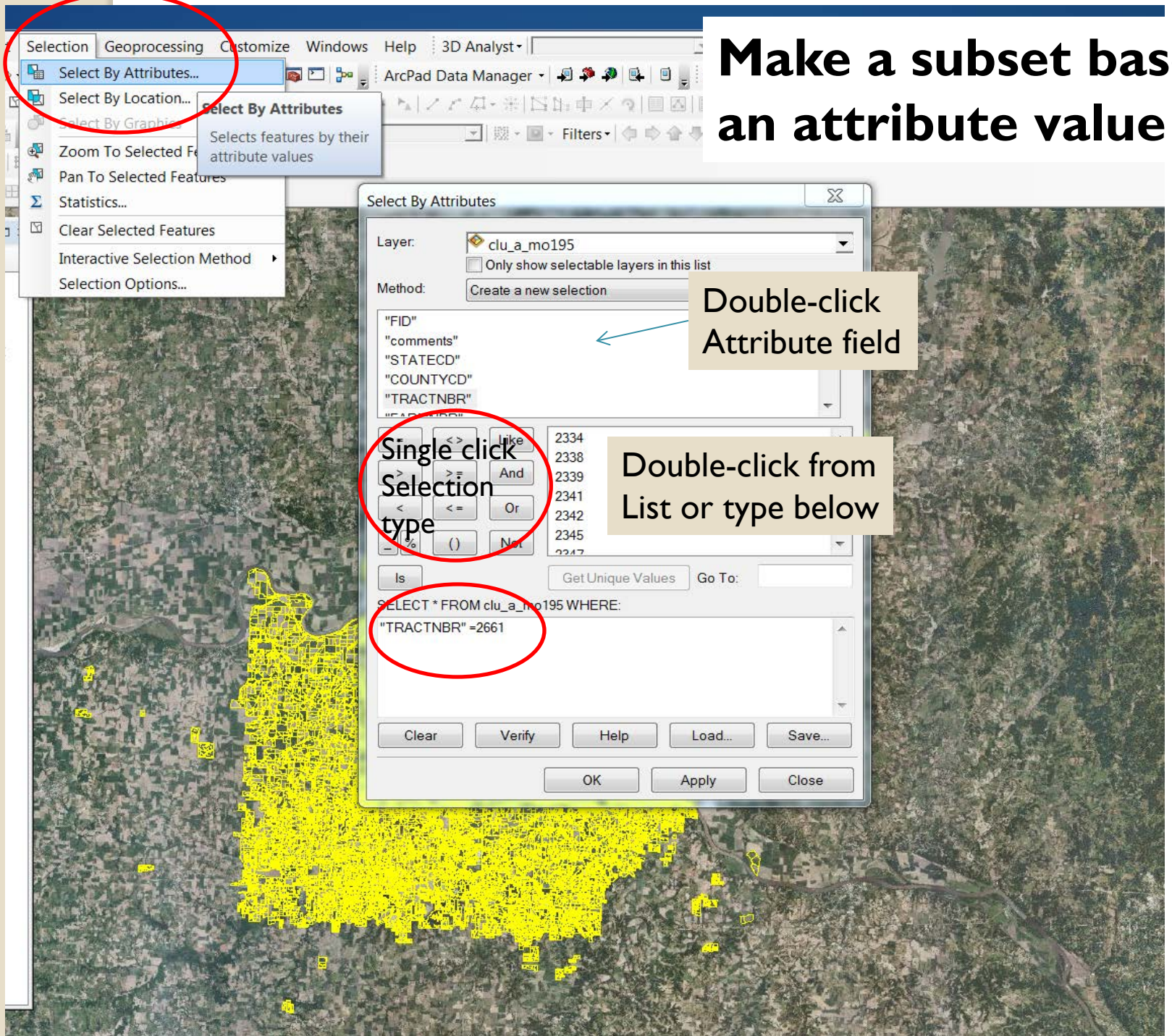

Attributes of Resource Inventory (Line)
FID | Shape * | FEATID | LINETYPE | DESCRIP | FEET | INVDATE | PLANNER | LABEL | GPSFILE | CALCFEET
0 | Polyline | 0 | Fence | | 1501 | 9/14/2011 | | barb | | 0
1 | Polyline | 0 | Fence | | 768 | 9/14/2011 | | electric | | 0
Record: 1
Show: All Selected
Records (0 out of 2 Selected)
Options
Arial
10
1774858.1 14377089.41 Feet


Window Selection Tools Window Help
1:4,784
Layer Properties
General Source Selection Display Symbology Fields Definition Query Labels Joins & Relates
Show:
Features
Categories
Unique values
Unique values, many
Match to symbols in a
Quantities
Charts
Multiple Attributes
Draw categories using unique values combining up to 3 fields.
Import...
Value Fields
LINETYPE
LABEL
none
Color Ramp
Symbol Value Label Count
<all other values> <all other values>
<Heading> LINETYPE, LABEL
Fence, barb Fence, barb ?
Fence, electric Fence, electric ?
Pipeline, Pipeline, ?
Add All Values
Add Values...
Remove
Remove All
Advanced
OK
Cancel
Apply

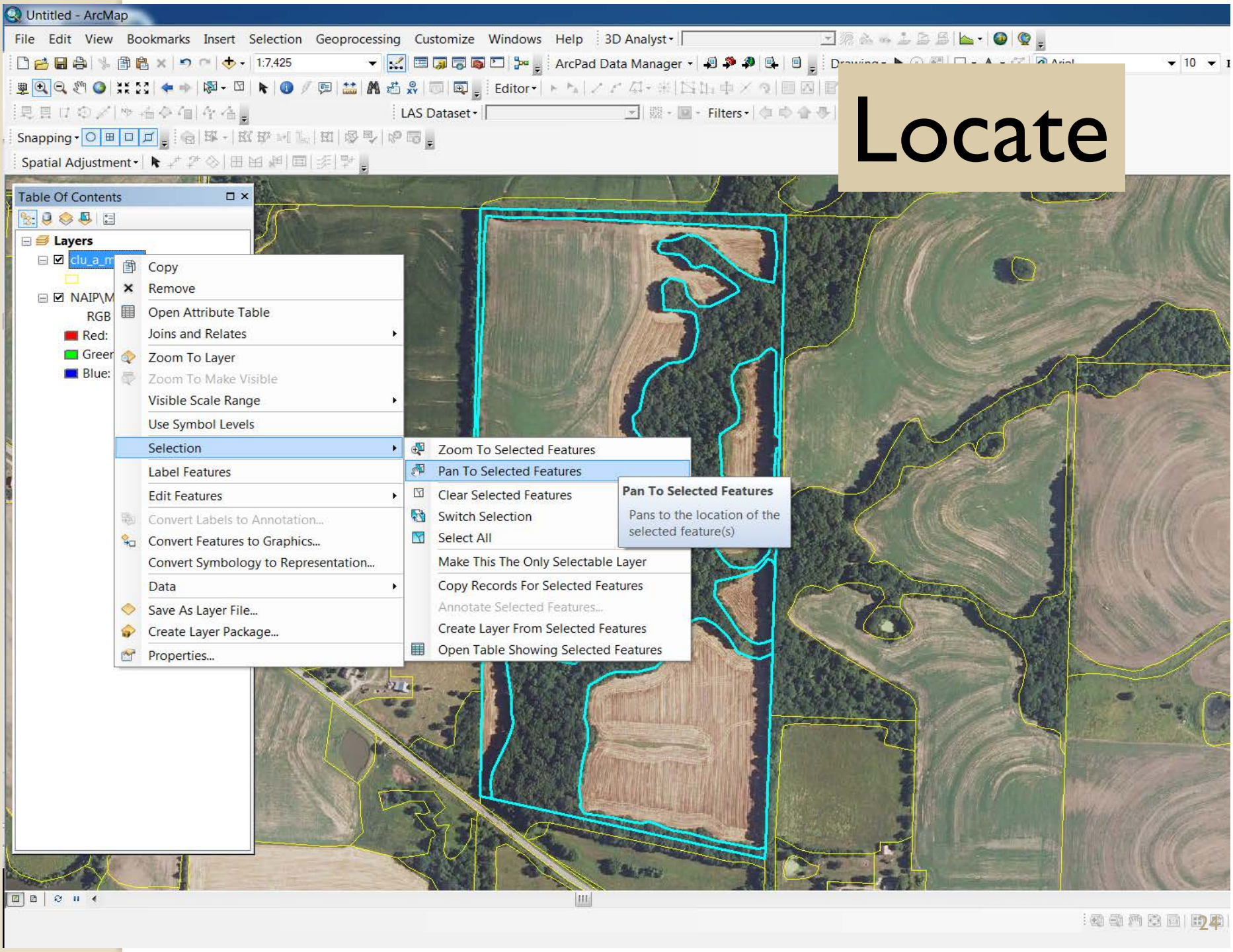


Attributes provide information

Make a subset based on an attribute value



What can you do with a selected subset?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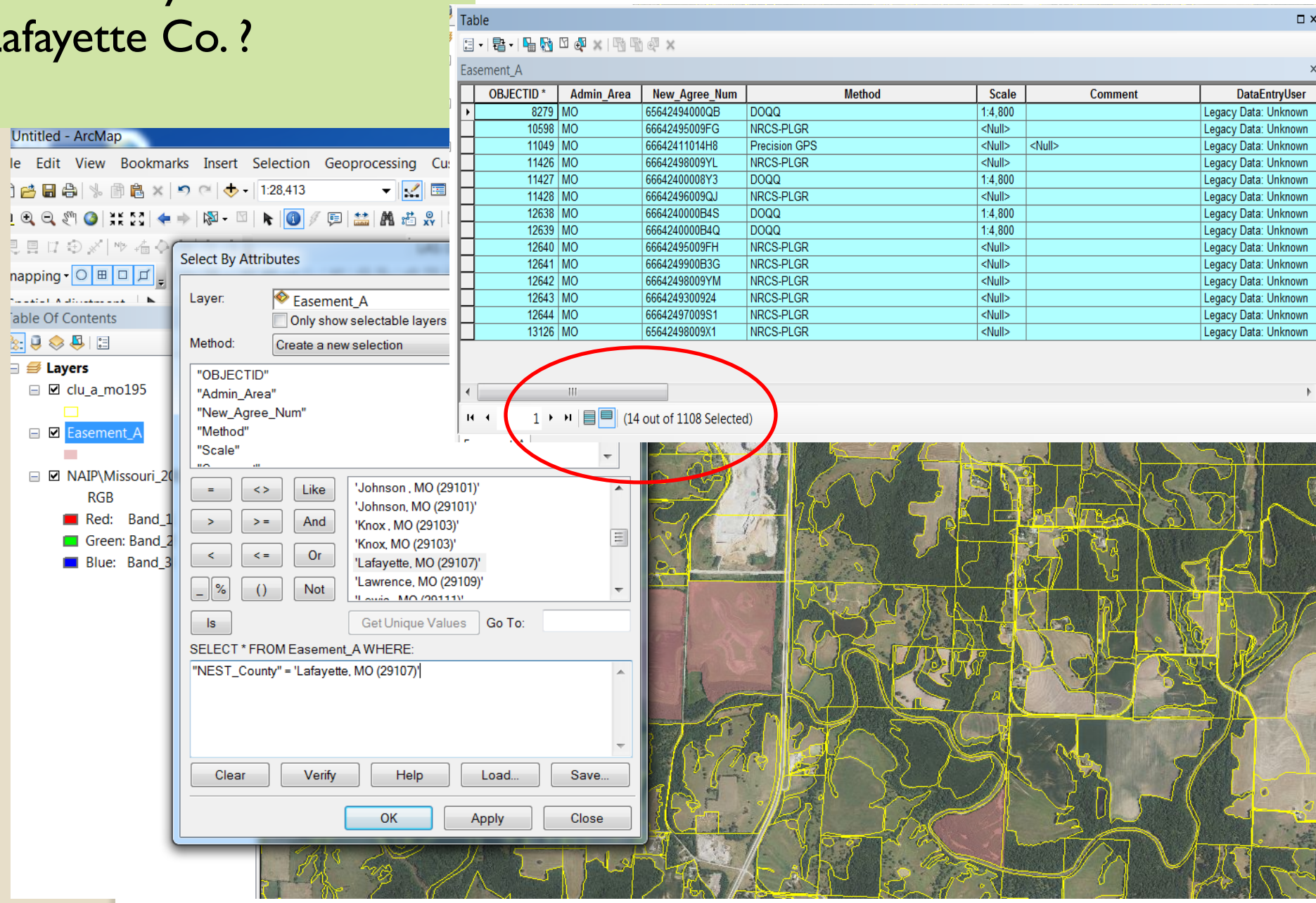
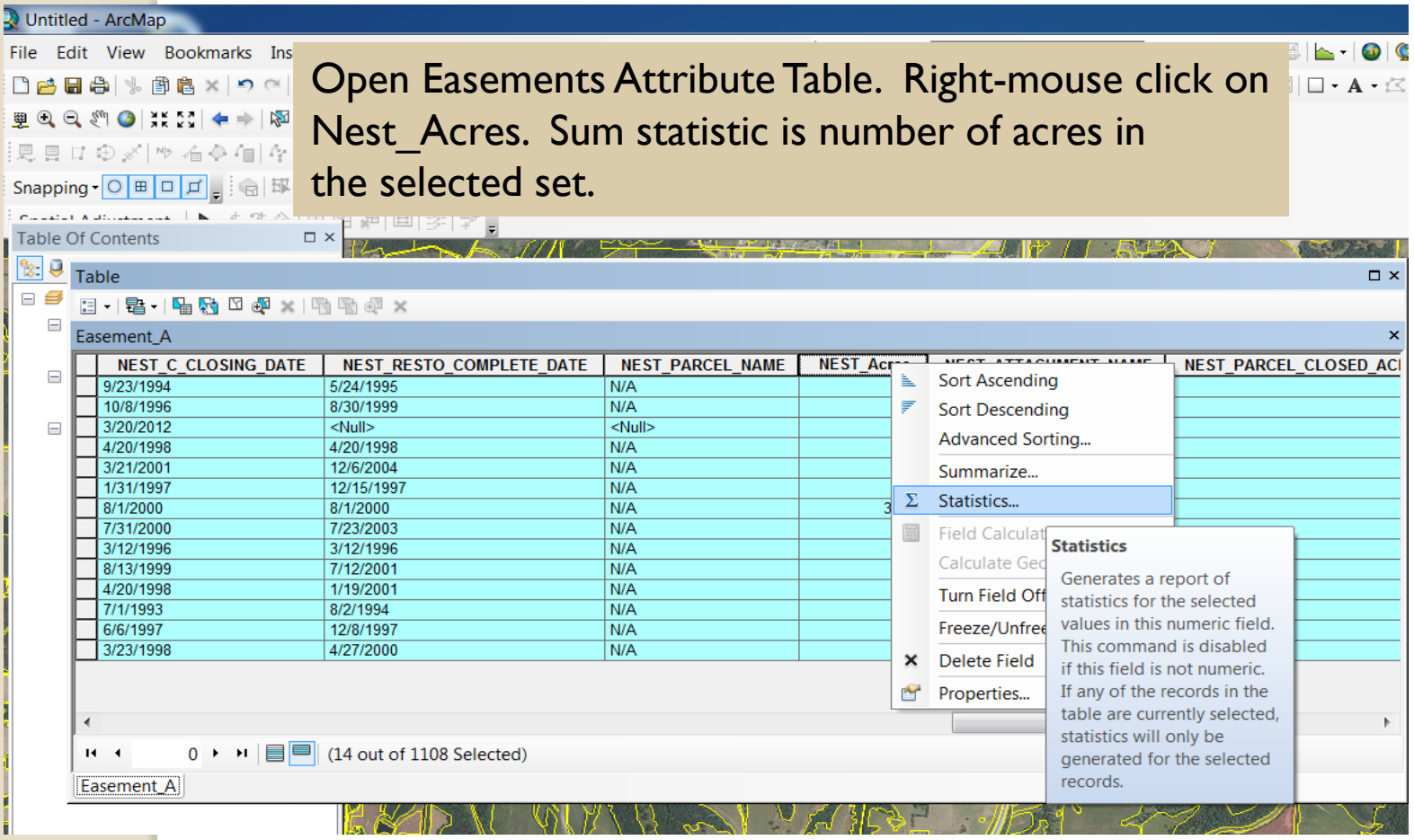
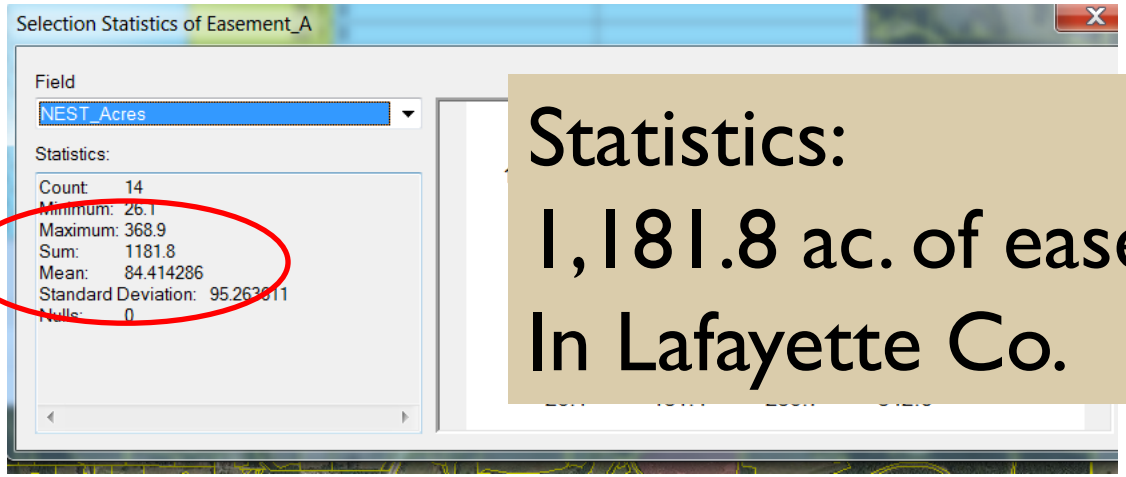
Zoom To Make Visible
Visible Scale Range
Use Symbol Levels
Selection
Label Features
Edit Features
Convert Labels to Annotation...
Convert Features to Graphics...
Convert Symbology to Representation...
Data
Save As Layer File...
Create Layer Package...
Properties...
Zoom To Selected Features
Pan To Selected Features
Clear Selected Features
Switch Selection
Select All
Make This The Only Selectable Layer
Copy Records For Selected Features
Annotate Selected Features...
Create Layer From Selected Features
Open Table Showing Selected Features
Pan To Selected Features
Pans to the location of the selected feature(s)

How many easements in Lafayette Co. ?

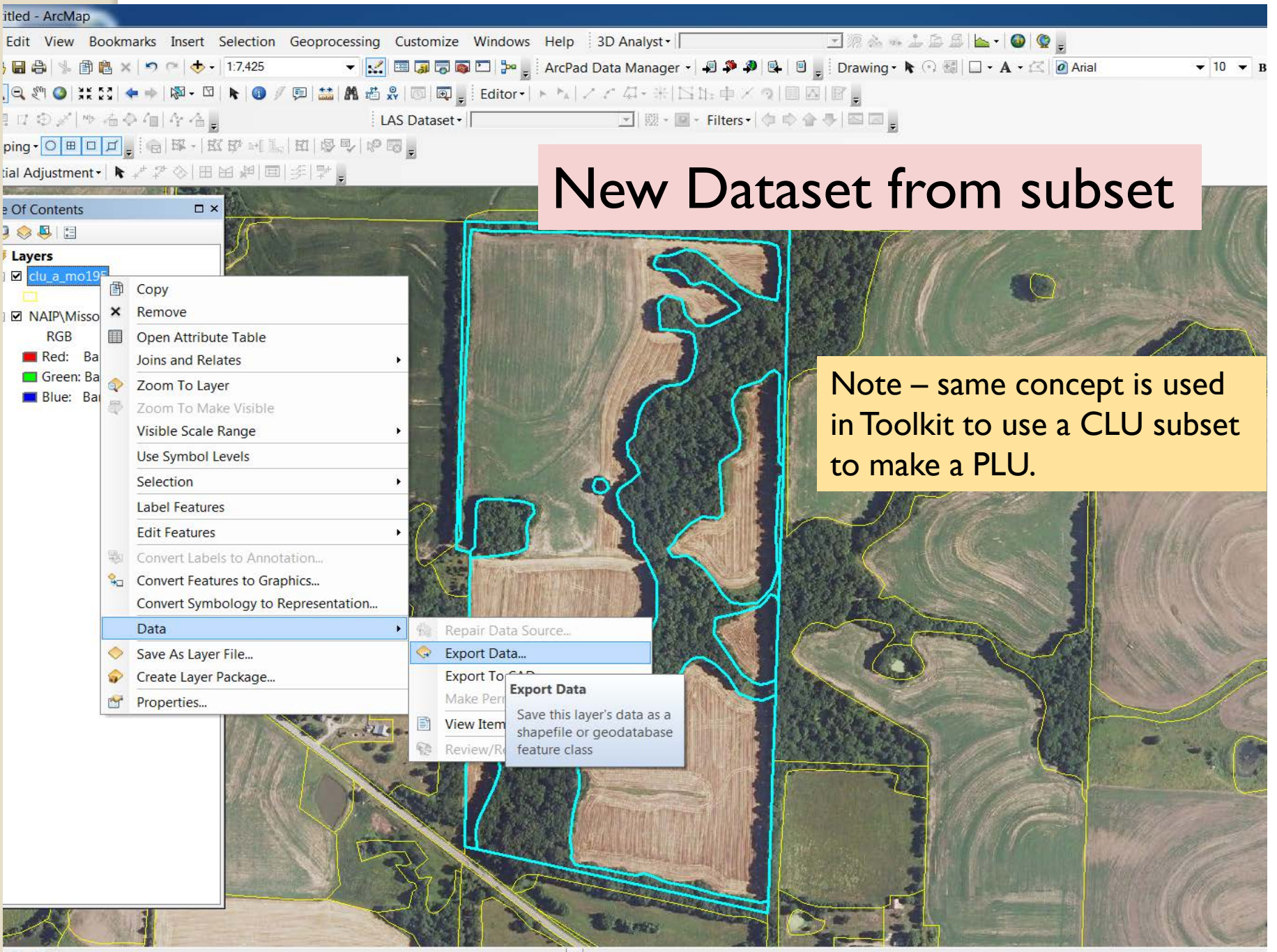


Open Easements Attribute Table. Right-mouse click on Nest_Acres. Sum statistic is number of acres in the selected set.





Statistics:
1,181.8 ac. of easements
In Lafayette Co.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Selection
Label Features
Edit Features
Convert Labels to Annotation...
Convert Features to Graphics...
Convert Symbology to Representation...
Data
Save As Layer File...
Create Layer Package...
Properties...
Repair Data Source...
Export Data...
Export To
Make Per
View Item
Review/R
Export Data
Save this layer's data as a shapefile or geodatabase feature class
New Dataset from subset
Note – same concept is used in Toolkit to use a CLU subset to make a PLU.

Making a shapefile without using the Toolkit  button

Acres as an Attribute

- Add Acres field to table of a polygon layer
- Make sure it is Float type, with at least 0.1 resolution
- Right-mouse click on acres field>>Calculate Geometry

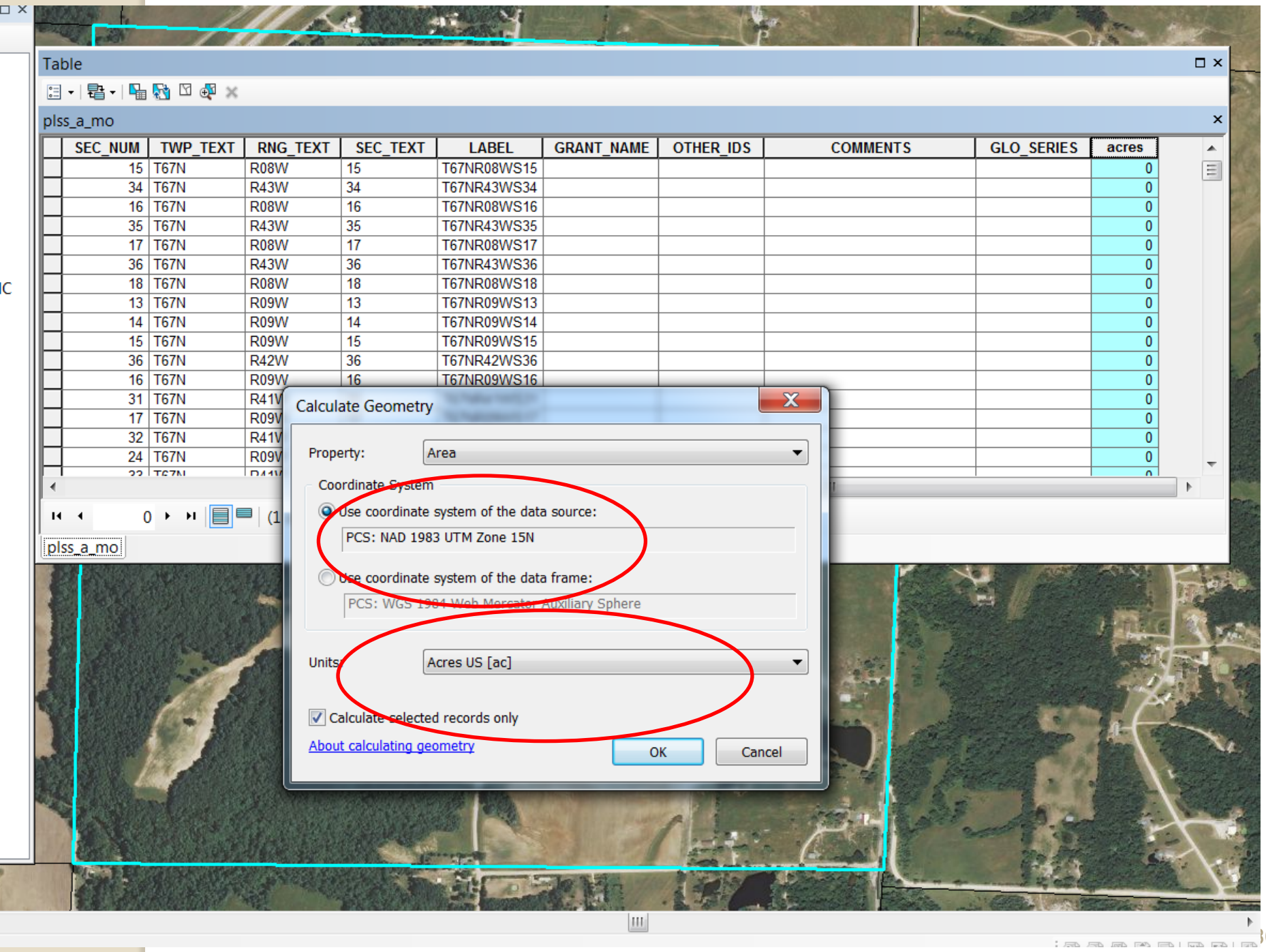
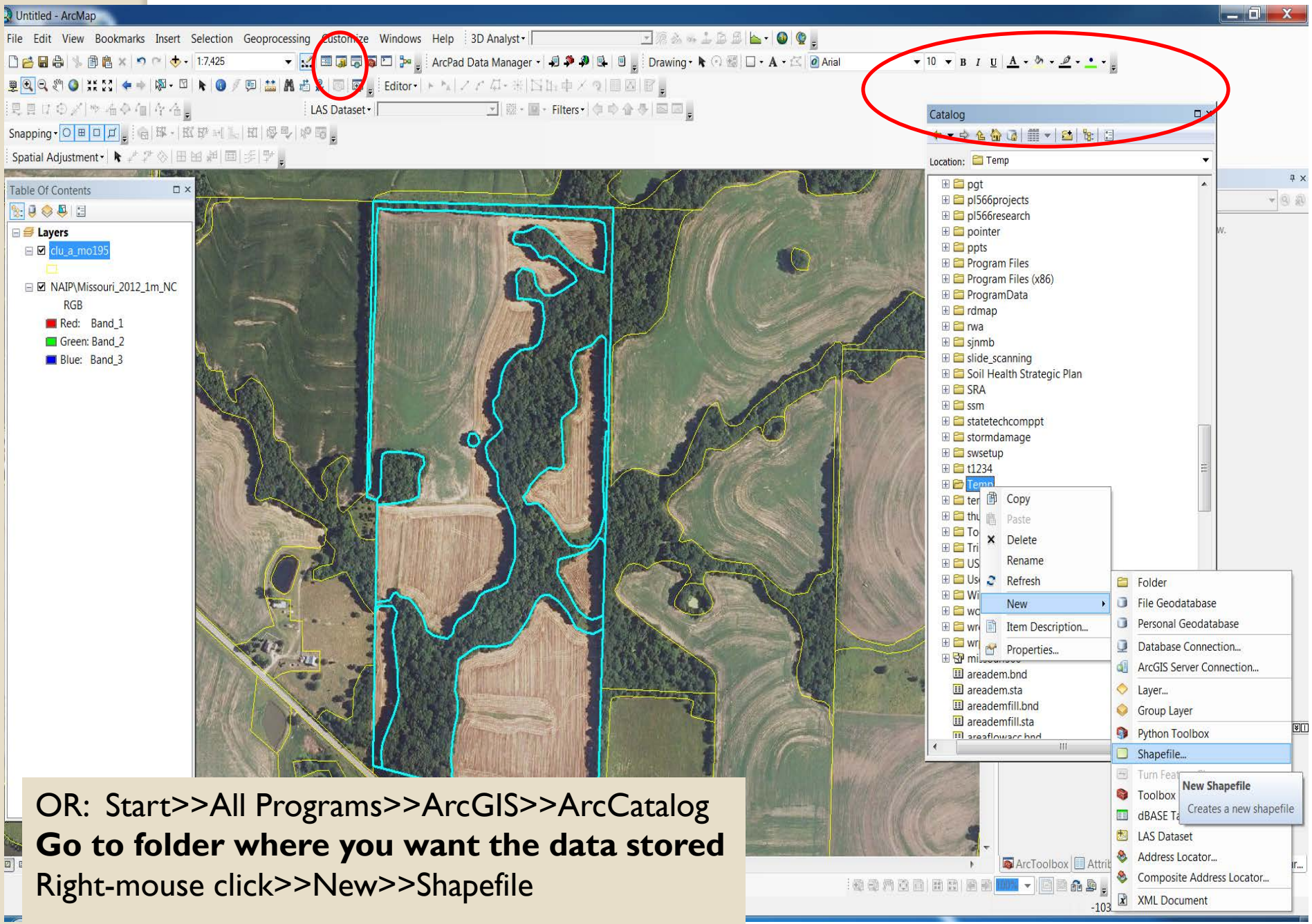


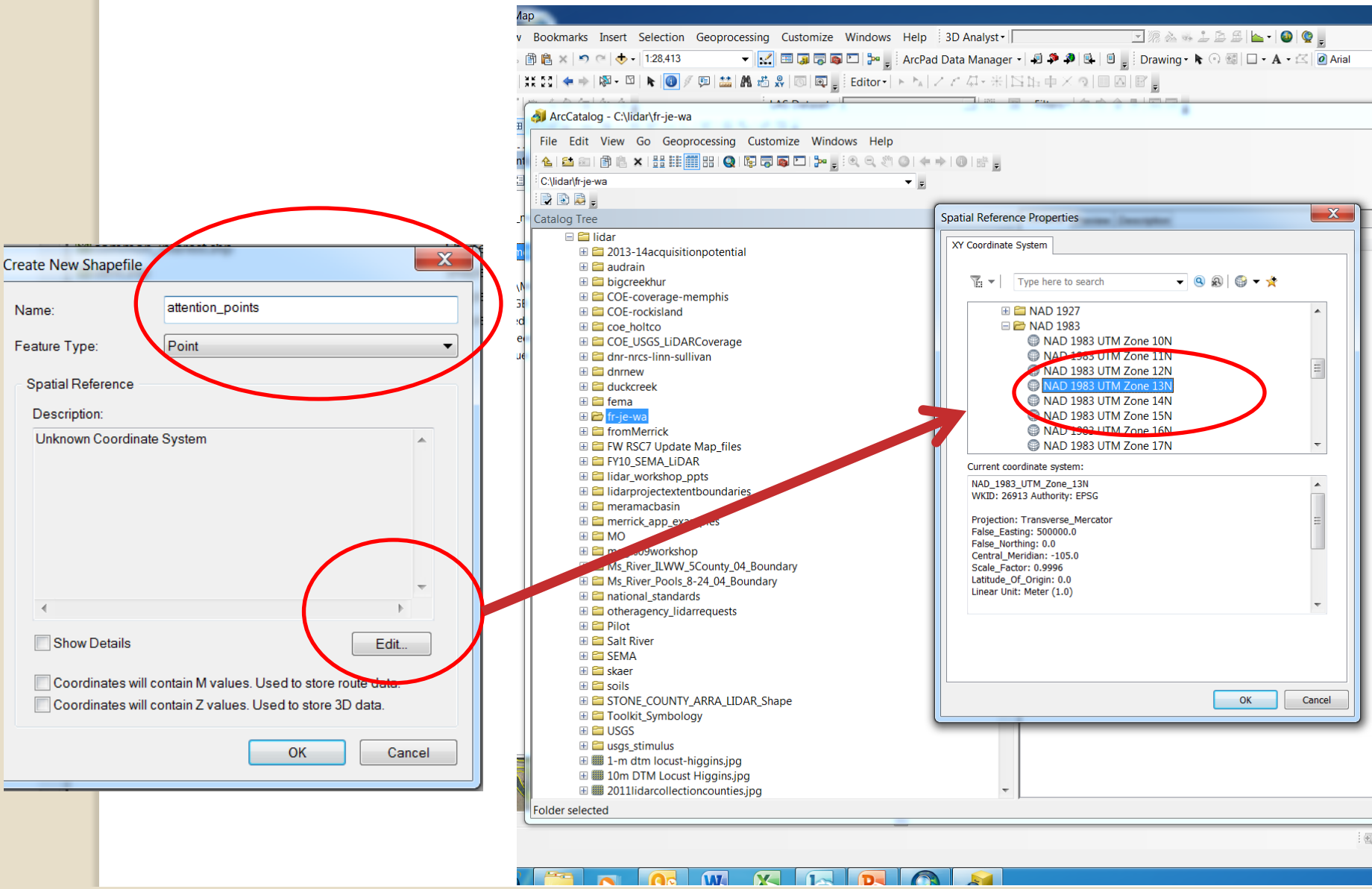
Table
plss_a_mo
SEC_NUM TWP_TEXT RNG_TEXT SEC_TEXT LABEL GRANT_NAME OTHER_IDS COMMENTS GLO_SERIES acres
15 T67N R08W 15 T67NR08WS15 0
34 T67N R43W 34 T67NR43WS34 0
16 T67N R08W 16 T67NR08WS16 0
35 T67N R43W 35 T67NR43WS35 0
17 T67N R08W 17 T67NR08WS17 0
36 T67N R43W 36 T67NR43WS36 0
18 T67N R08W 18 T67NR08WS18 0
13 T67N R09W 13 T67NR09WS13 0
14 T67N R09W 14 T67NR09WS14 0
15 T67N R09W 15 T67NR09WS15 0
36 T67N R42W 36 T67NR42WS36 0
16 T67N R09W 16 T67NR09WS16 0
31 T67N R41W 0
17 T67N R09W 0
32 T67N R41W 0
24 T67N R09W 0
plss_a_mo
Calculate Geometry
Property: Area
Coordinate System
Use coordinate system of the data source:
PCS: NAD 1983 UTM Zone 15N
Use coordinate system of the data frame:
PCS: WGS 1984 Web Mercator Auxiliary Sphere
Units: Acres US [ac]
Calculate selected records only
About calculating geometry
OK
Cancel



OR: Start>>All Programs>>ArcGIS>>ArcCatalog

Go to folder where you want the data stored

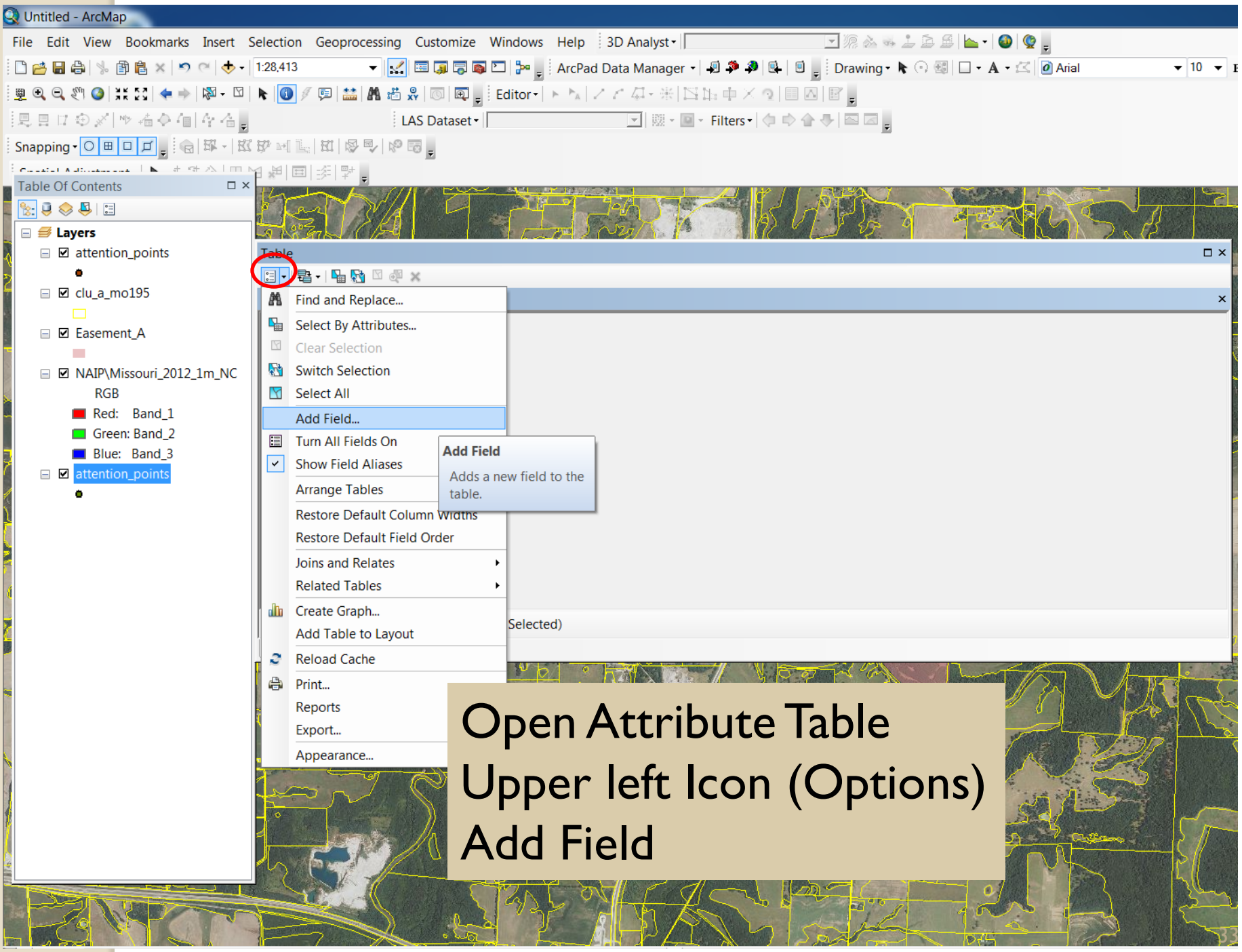
Right-mouse click>>New>>Shapefile



Name the shapefile

Feature Type: Pick Point, Polyline or Polygon (there are others you won't use)

Edit to select projected coordinate system (UTM NAD83 Zone 15 or 16)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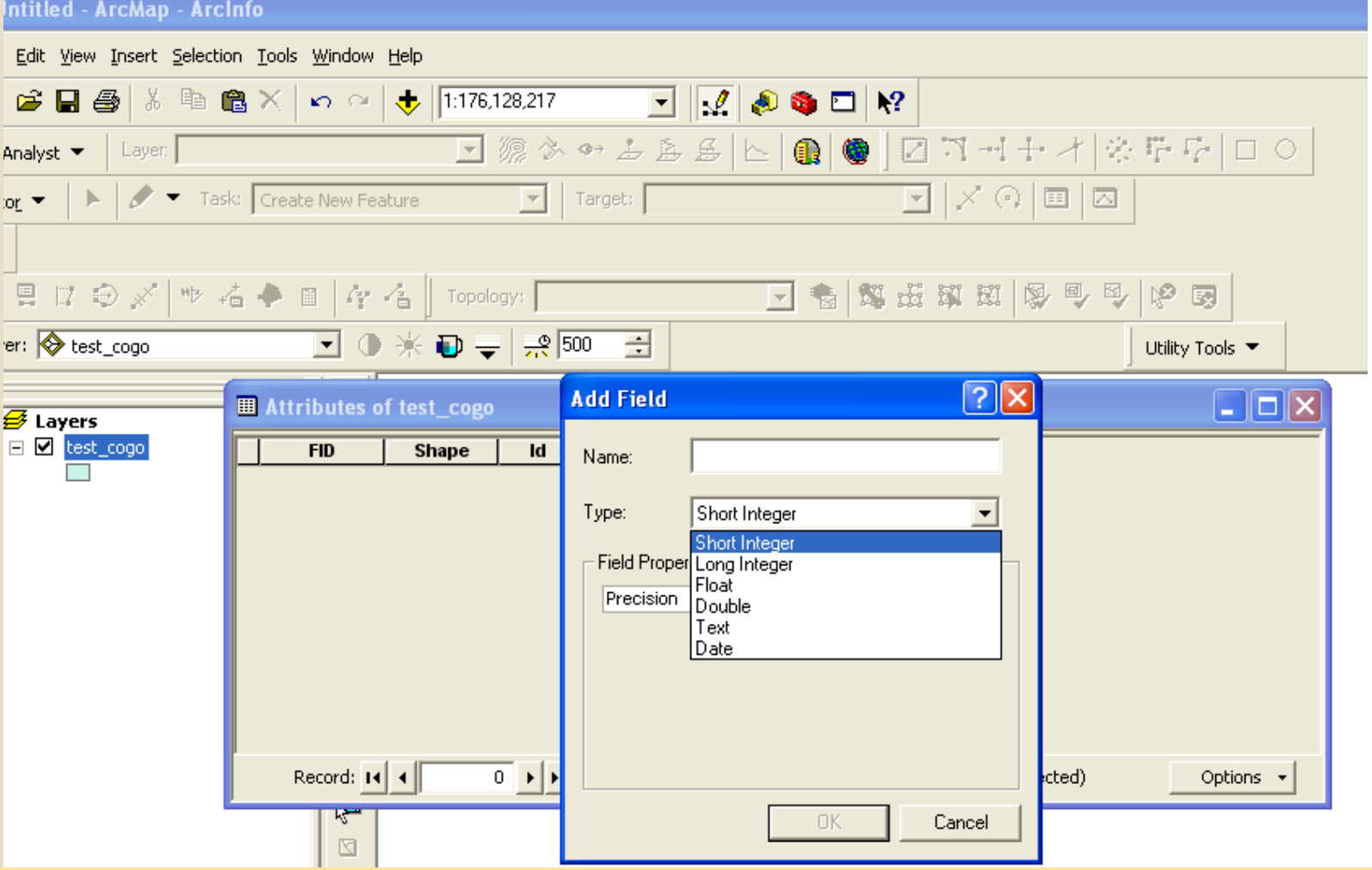
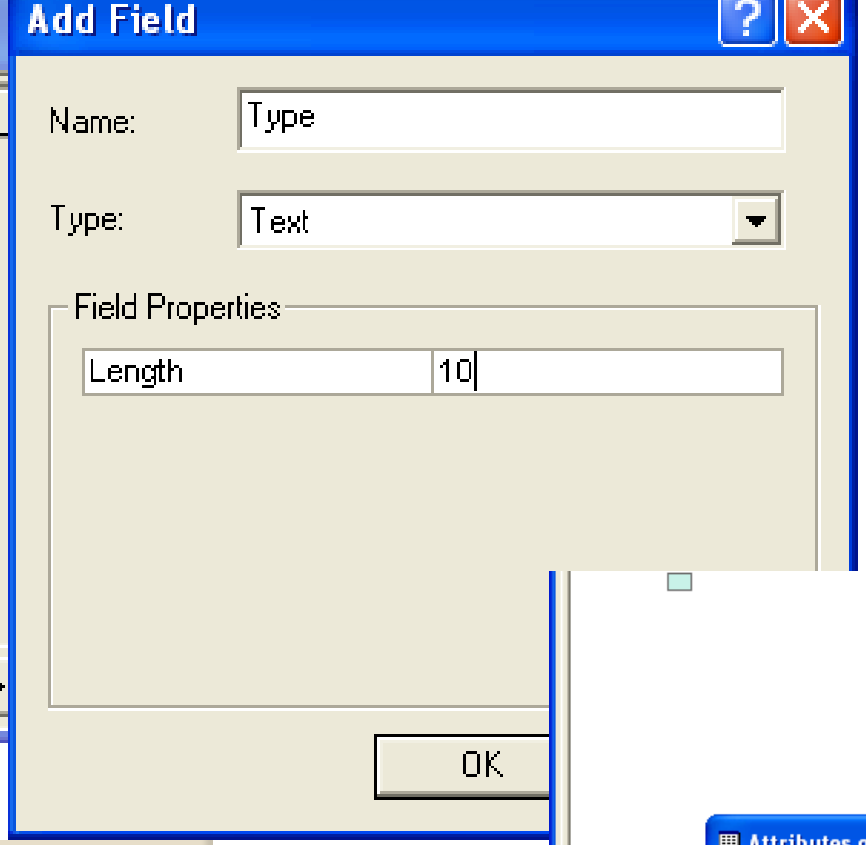
Green: Band_2
Blue: Band_3
attention_points
Table
Find and Replace...
Select By Attributes...
Clear Selection
Switch Selection
Select All
Add Field...
Turn All Fields On
Show Field Aliases
Arrange Tables
Restore Default Column Widths
Restore Default Field Order
Joins and Relates
Related Tables
Create Graph...
Add Table to Layout
Reload Cache
Print...
Reports
Export...
Appearance...
Add Field
Adds a new field to the table.
Selected)
Open Attribute Table
Upper left Icon (Options)
Add Field



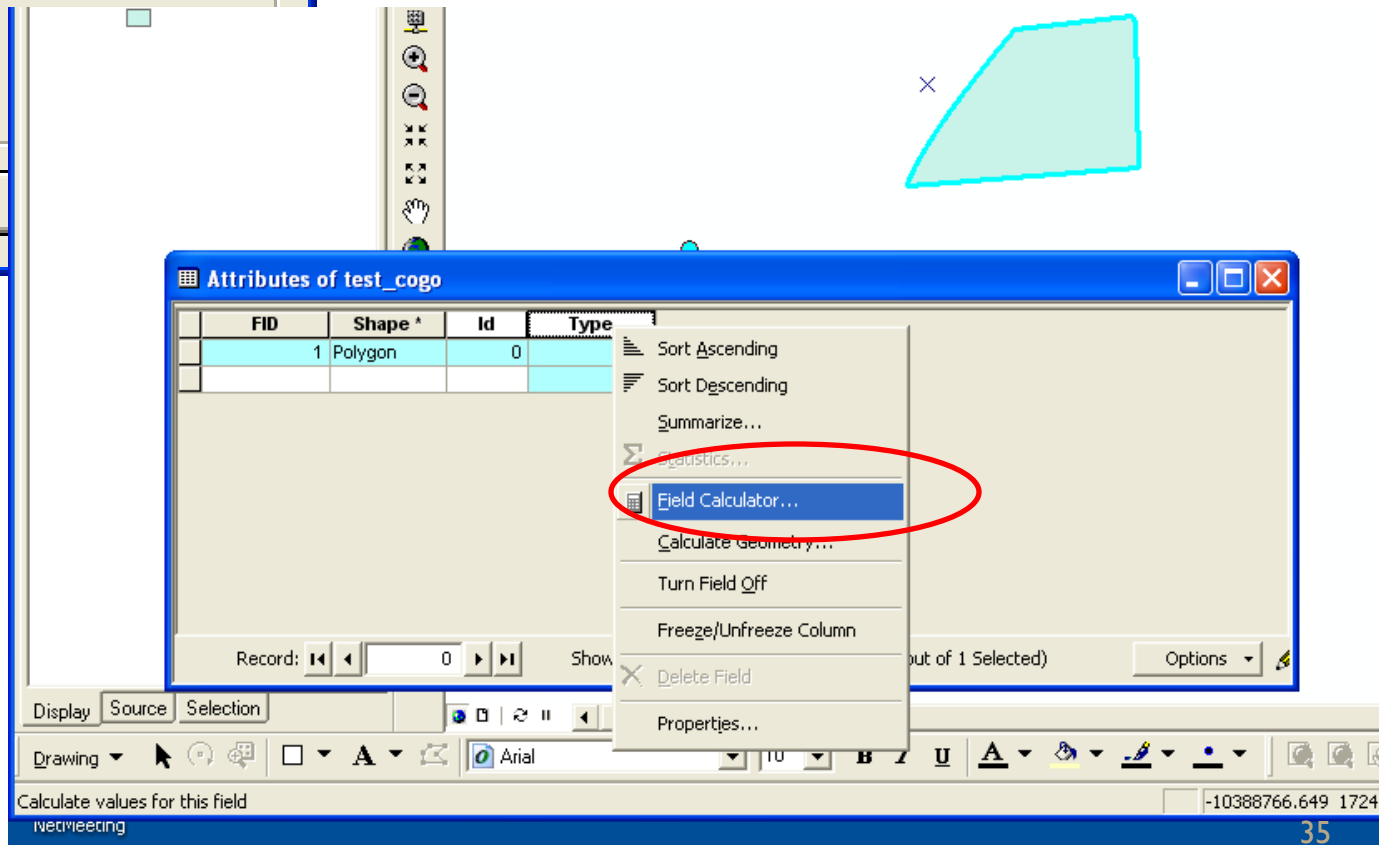
Name the Field (10 character limit; no spaces; certain special characters not allowed)

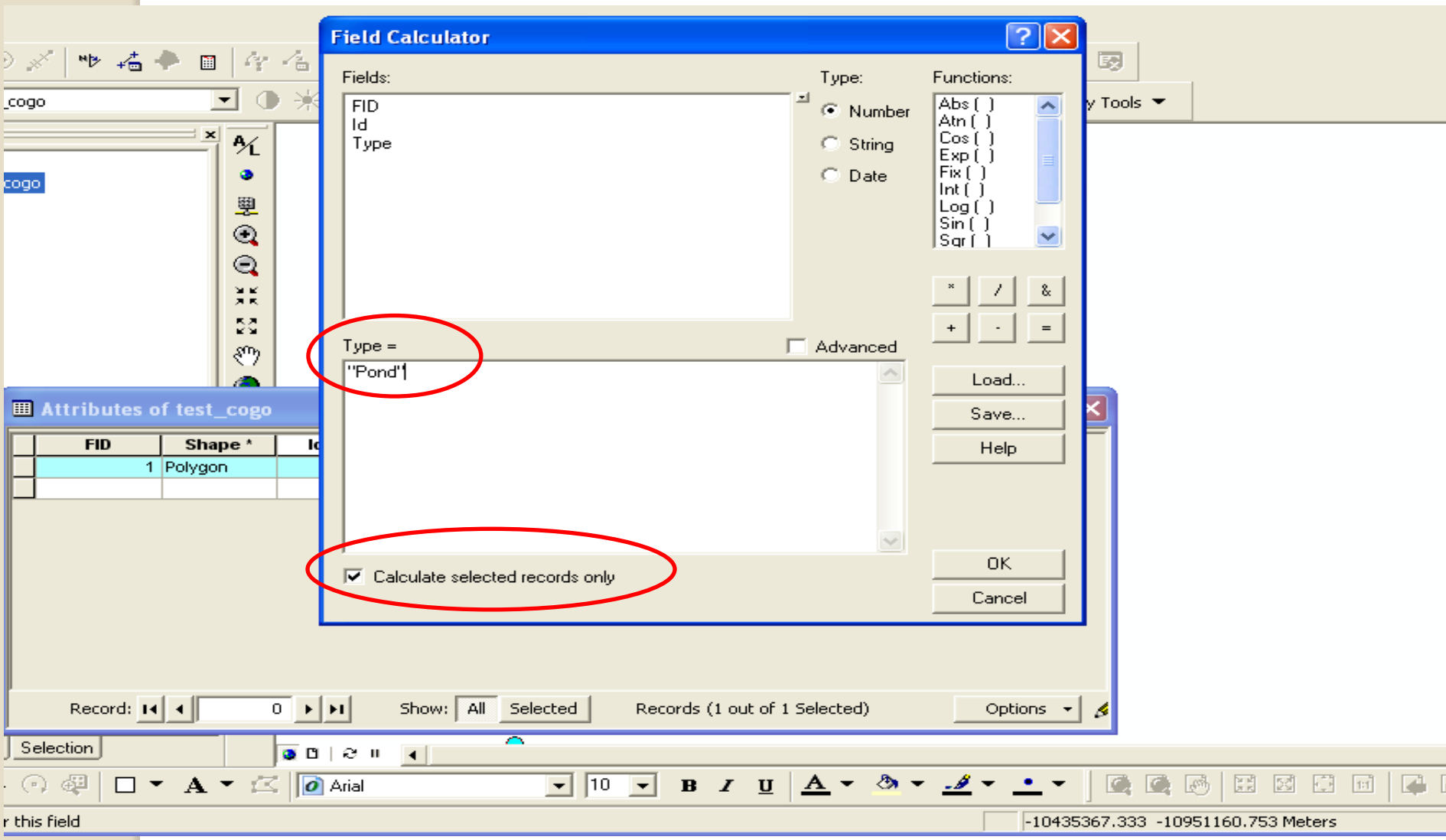
Choose Type – most commonly short integer, (whole numbers), float (decimal numbers) or text)

For decimal (float) numbers, Precision is total length of number and Scale is number of decimal places



Select feature to attribute
Right-mouse click on field name,
Field Calculator

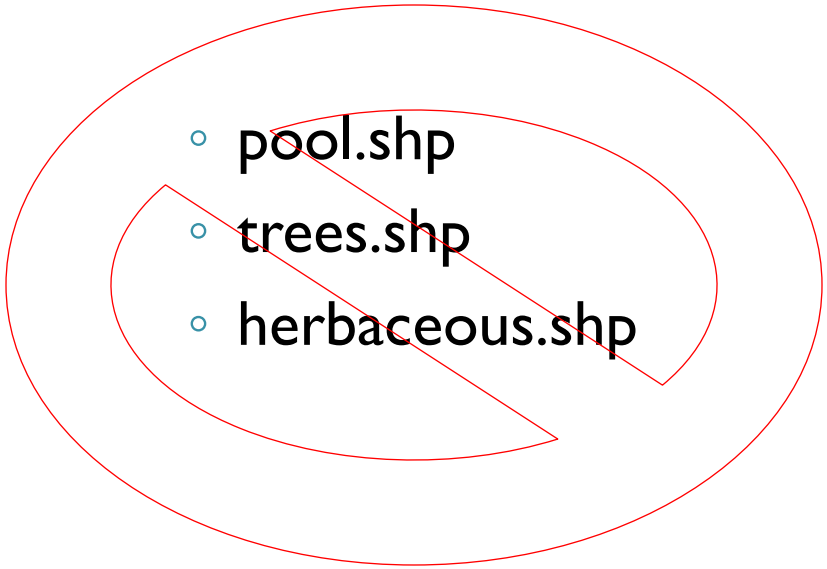




Text values are put into double quotes

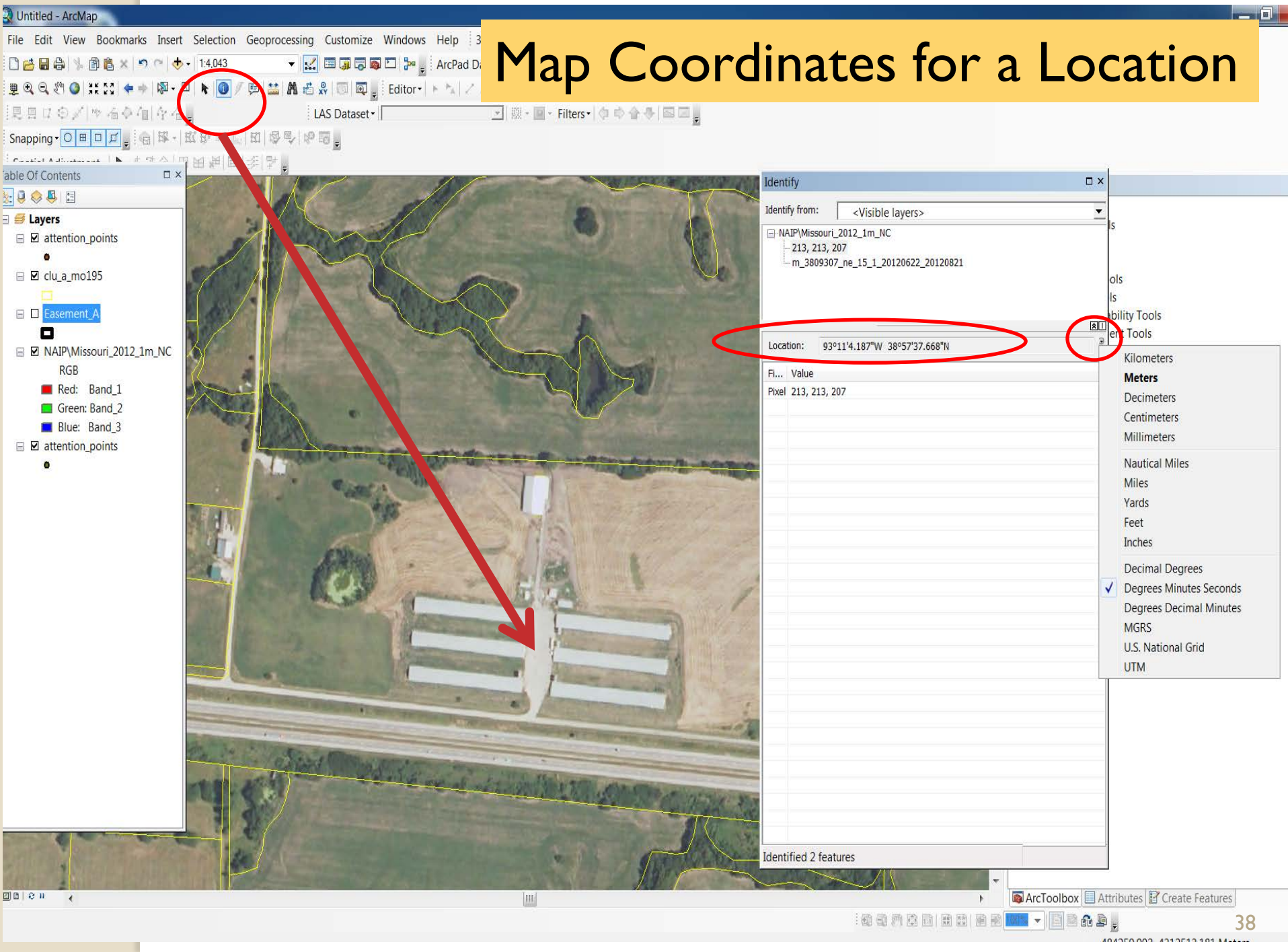
Attributes

- Use attributes to differentiate feature types – not separate shapefiles

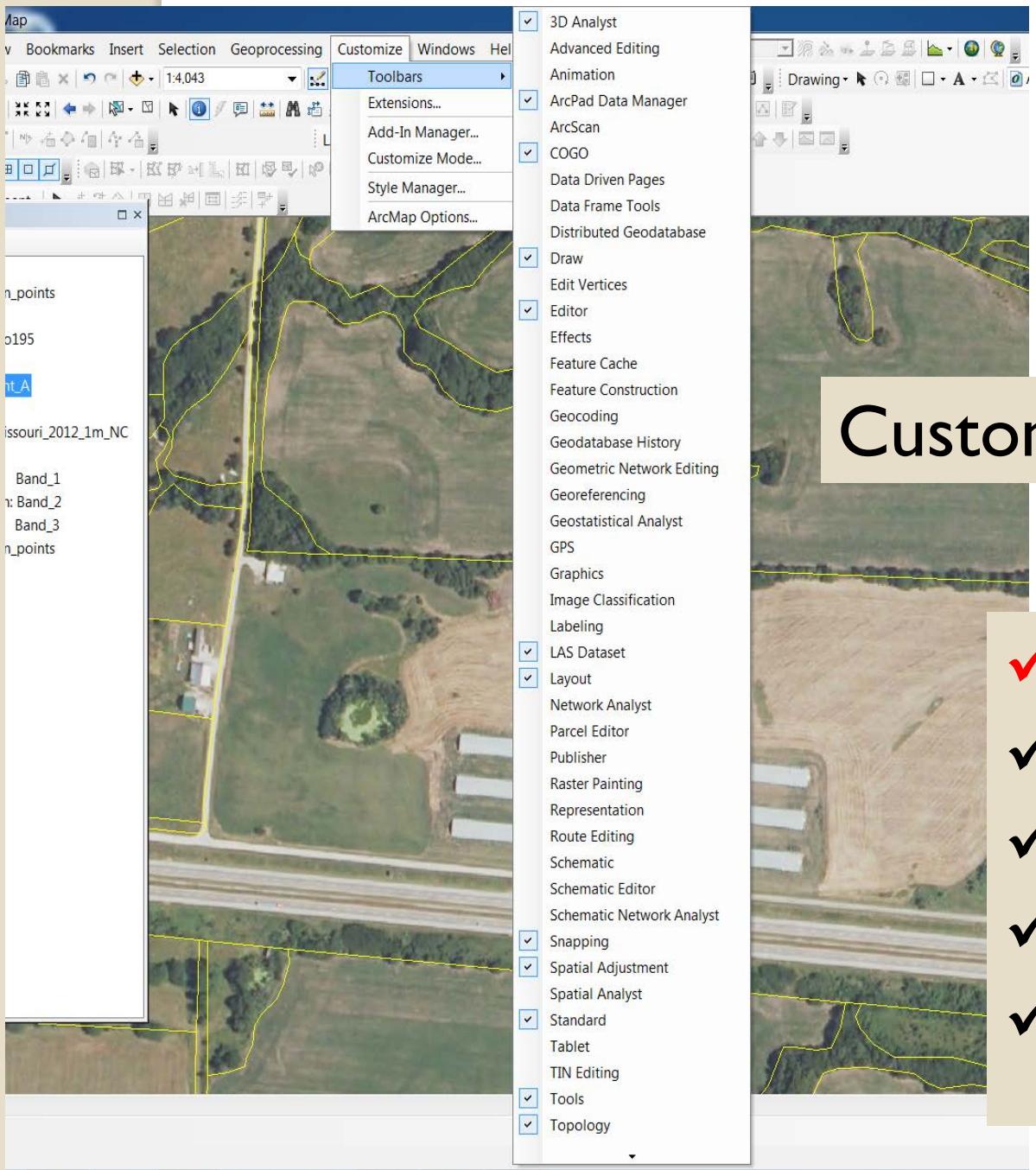


- INSTEAD:
  - ***T1234_habitats.shp*** with an text attribute field called *Type* that is calculate to "pool", "trees planted", or "herbaceous"

Map Coordinates for a Location



Editing Data when not in Toolkit



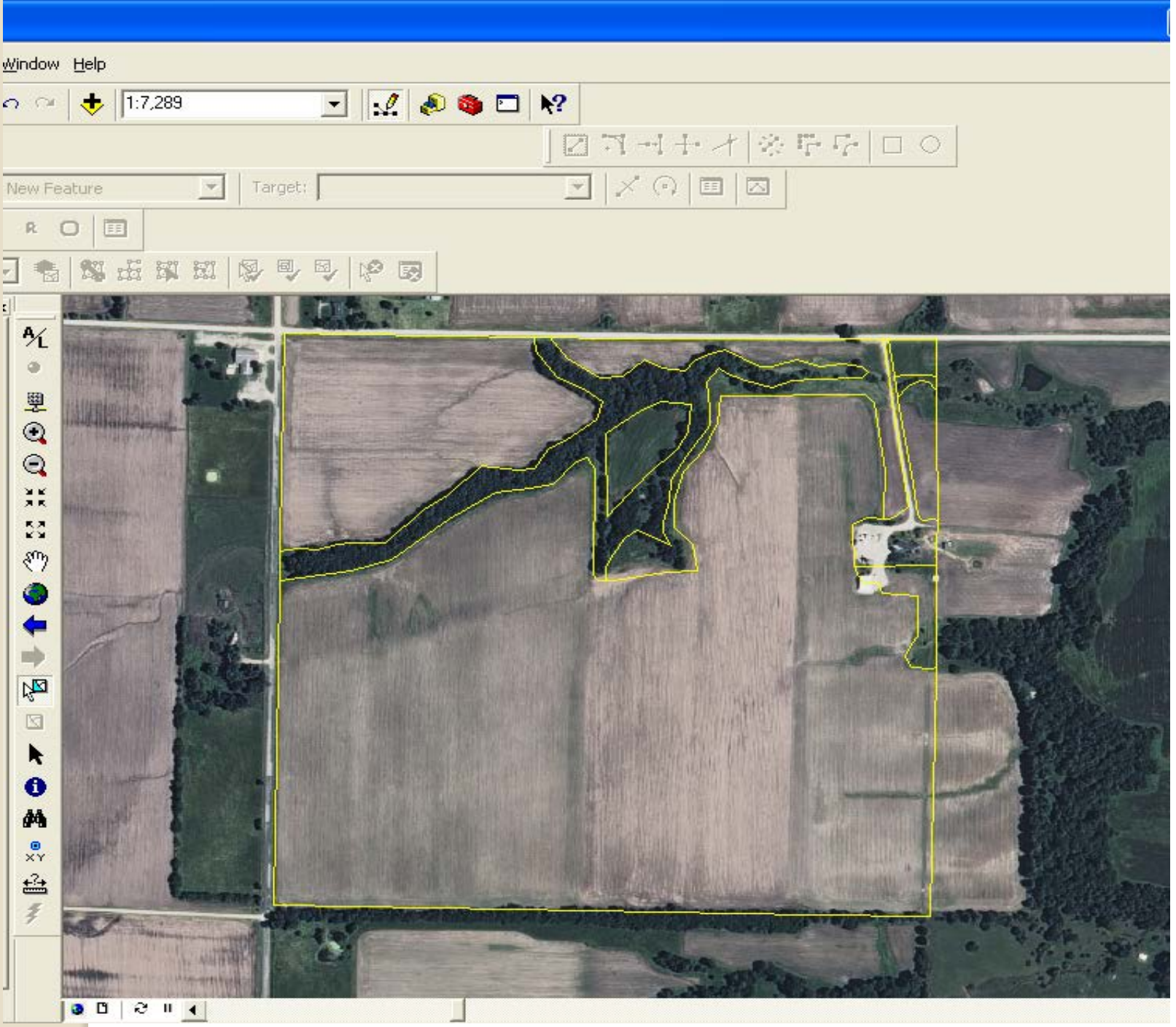
Customize>>Toolbars>>

- ✓Polygon Editor
- ✓Line Editor
- ✓Point Editor
- ✓Editor
- ✓Topology

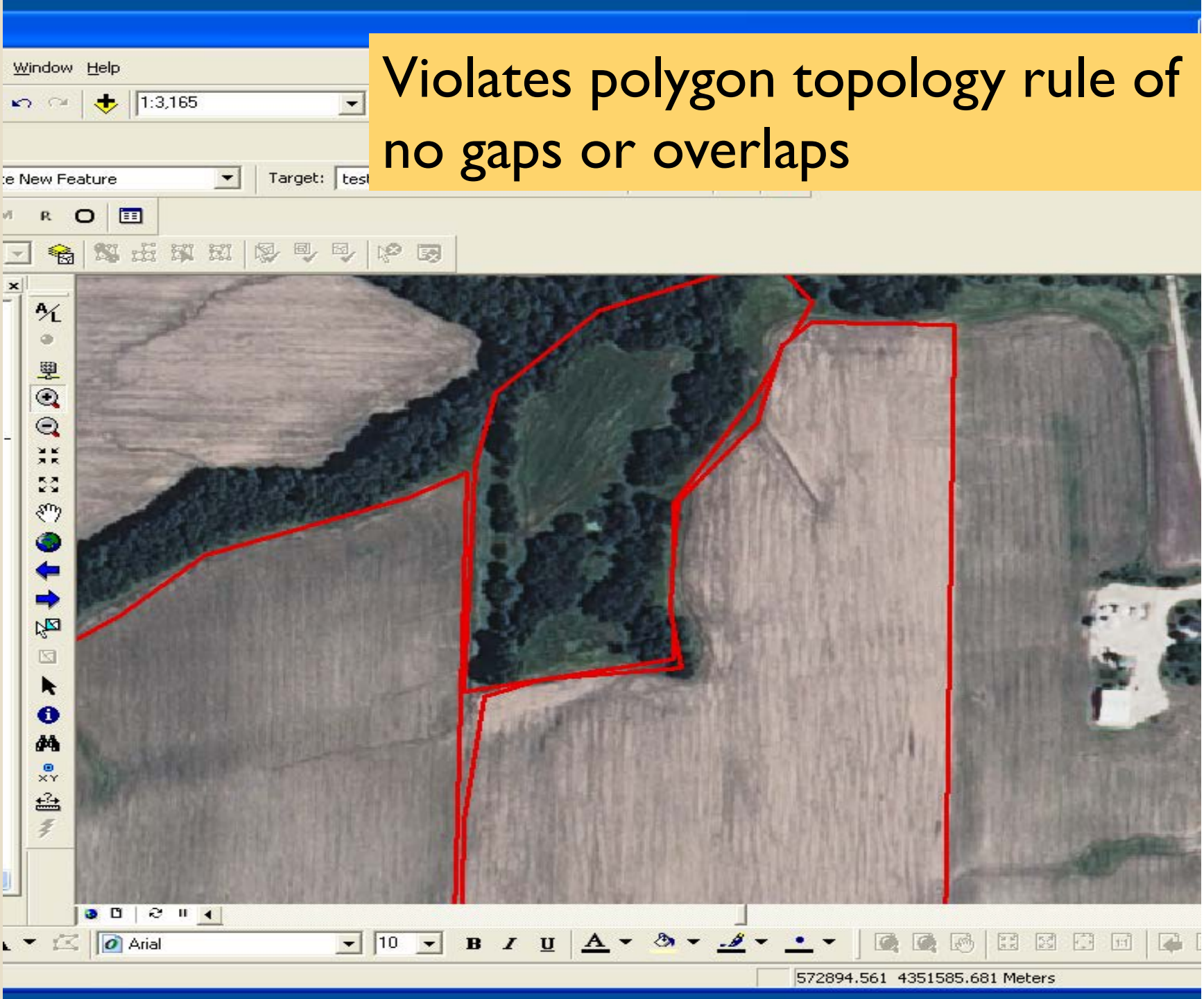
- Polygon Editor is a Toolkit Toolbar for editing polygon layers – is a bit more user friendly than the ArcMap Editor toolbar. ***I recommend using it for most polygon editing.***
- Similarly, line and point editor are Toolkit toolbars for those feature types. They are easier to use for basic data entry.

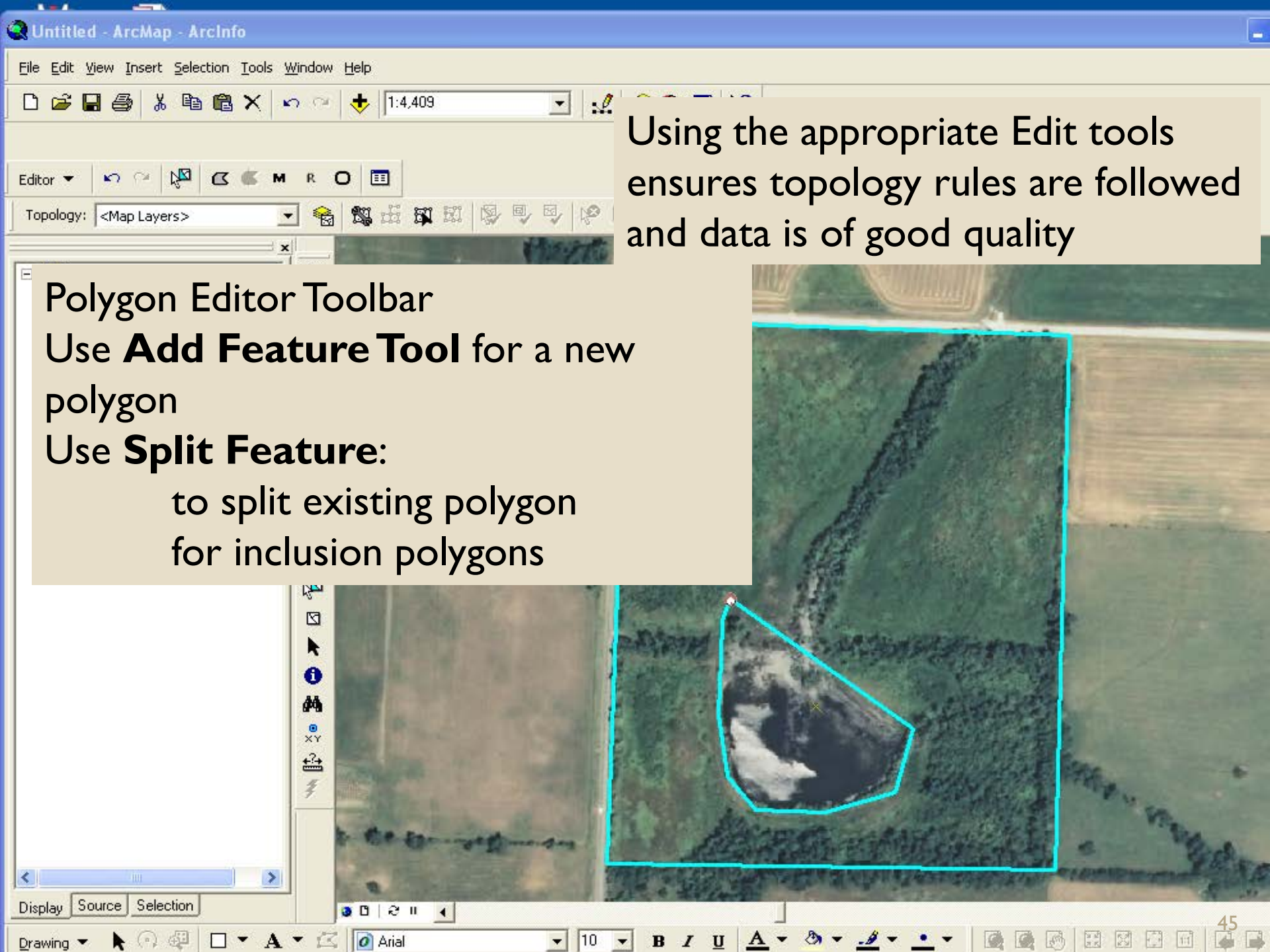
Polygon Topology

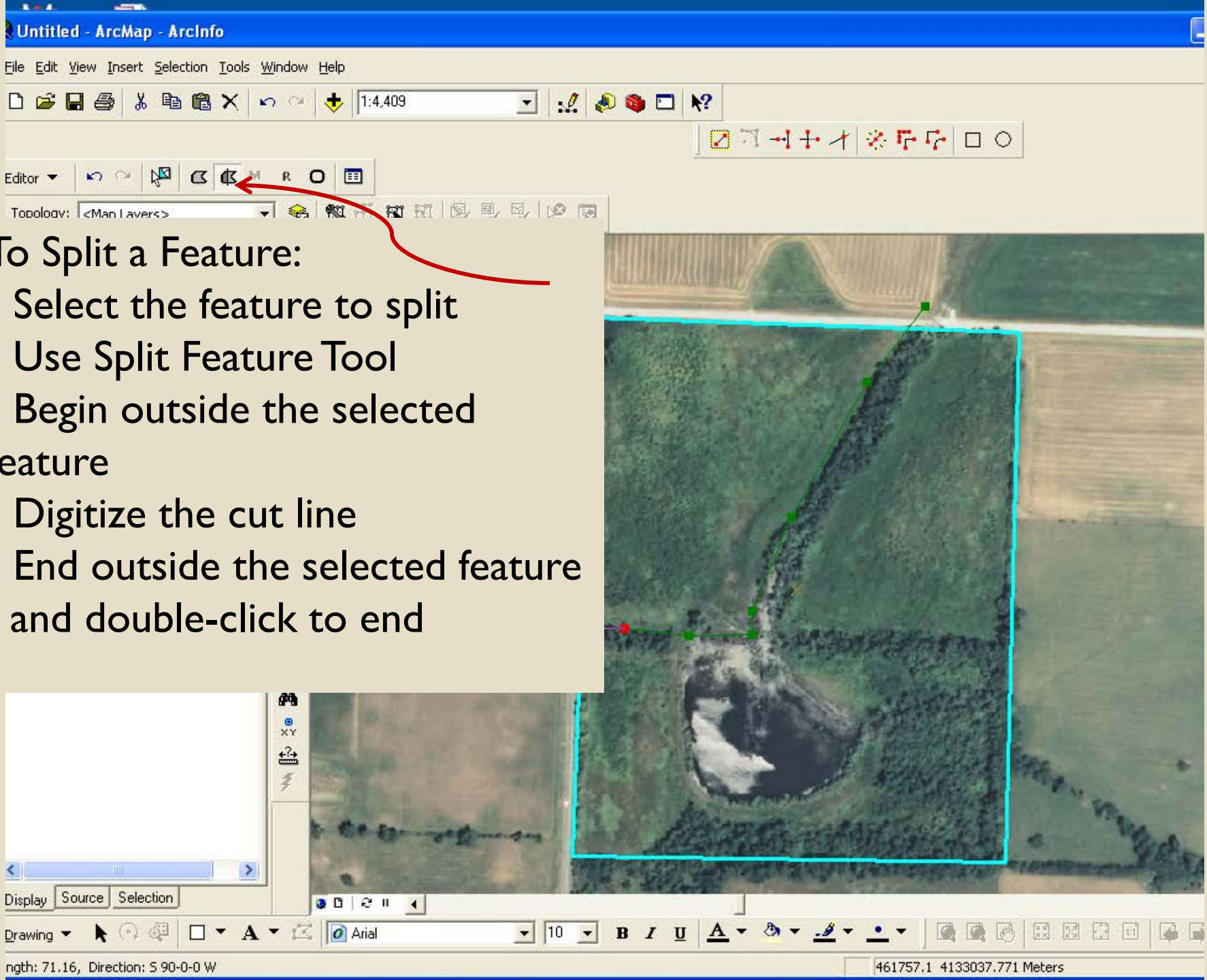
- For many polygon data layers, the goal is to account for ALL land area once and only once, i.e. **no gaps and no overlaps**
- Topology is a term used for the relationships among data; one type of topology is "**polygons share boundaries with no gaps or overlaps**"
- Examples – soils, CLU with a few exceptions (some gaps or voids), **PLU**


Window Help
1:7,289
New Feature
Target:

Violates polygon topology rule of no gaps or overlaps

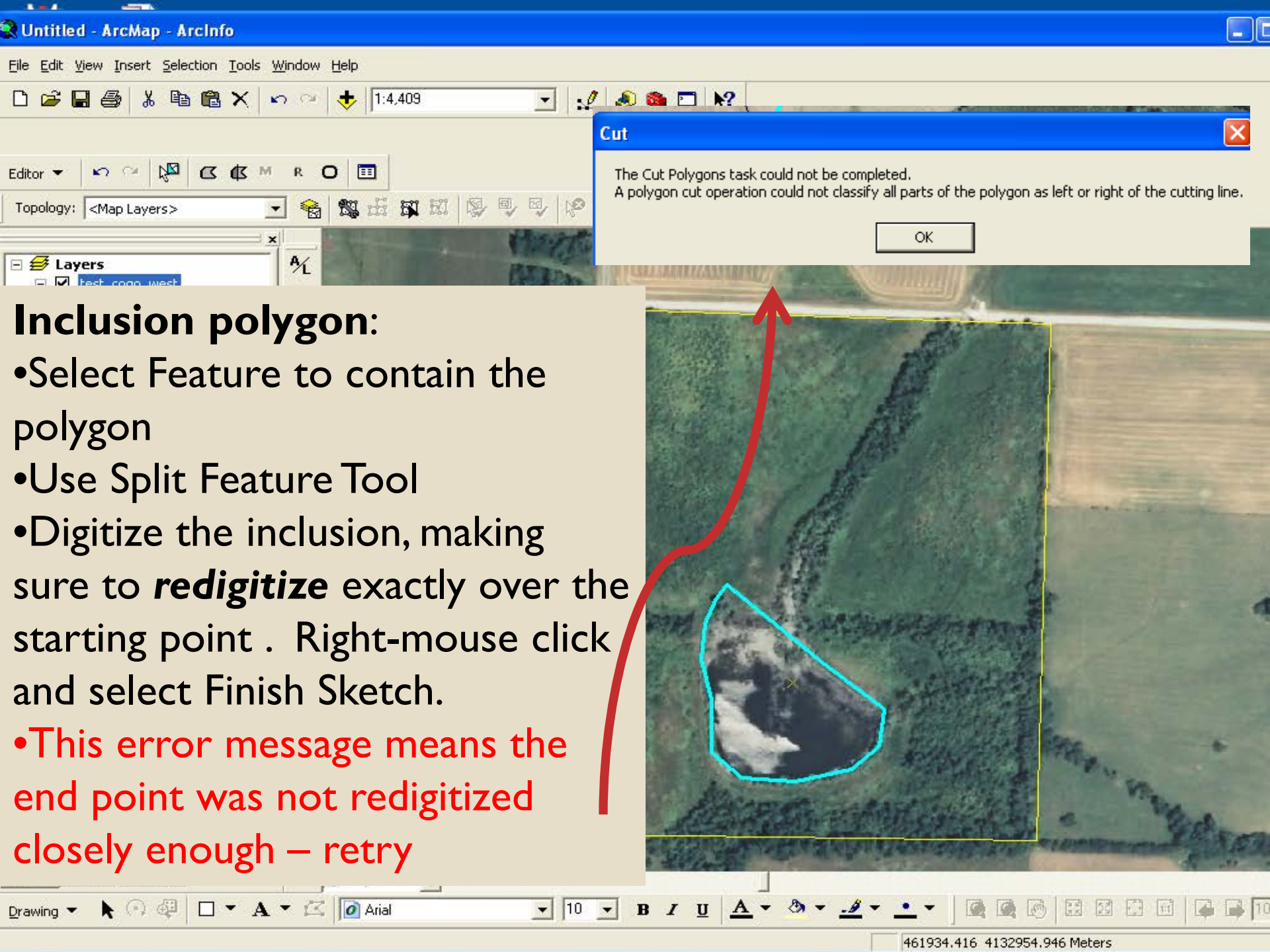



Untitled - ArcMap - ArcInfo
File Edit View Insert Selection Tools Window Help
1:4,409
Editor
Topology: <Map Layers>
Using the appropriate Edit tools ensures topology rules are followed and data is of good quality
Polygon Editor Toolbar
Use **Add Feature Tool** for a new polygon
Use **Split Feature**:
to split existing polygon
for inclusion polygons
Display Source Selection
Drawing
Arial
10



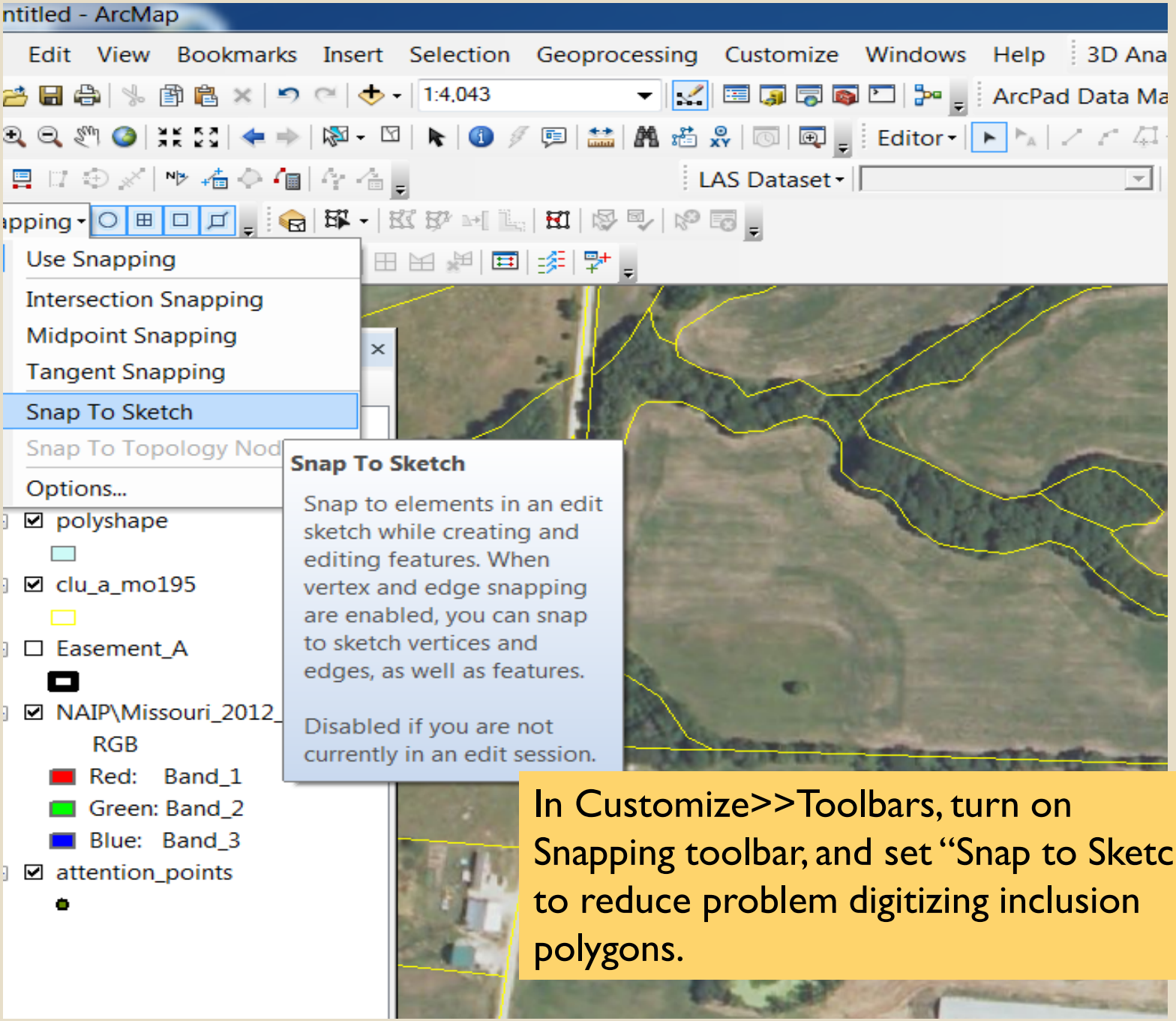
To Split a Feature:

- Select the feature to split
- Use Split Feature Tool
- Begin outside the selected feature
- Digitize the cut line
- End outside the selected feature and double-click to end

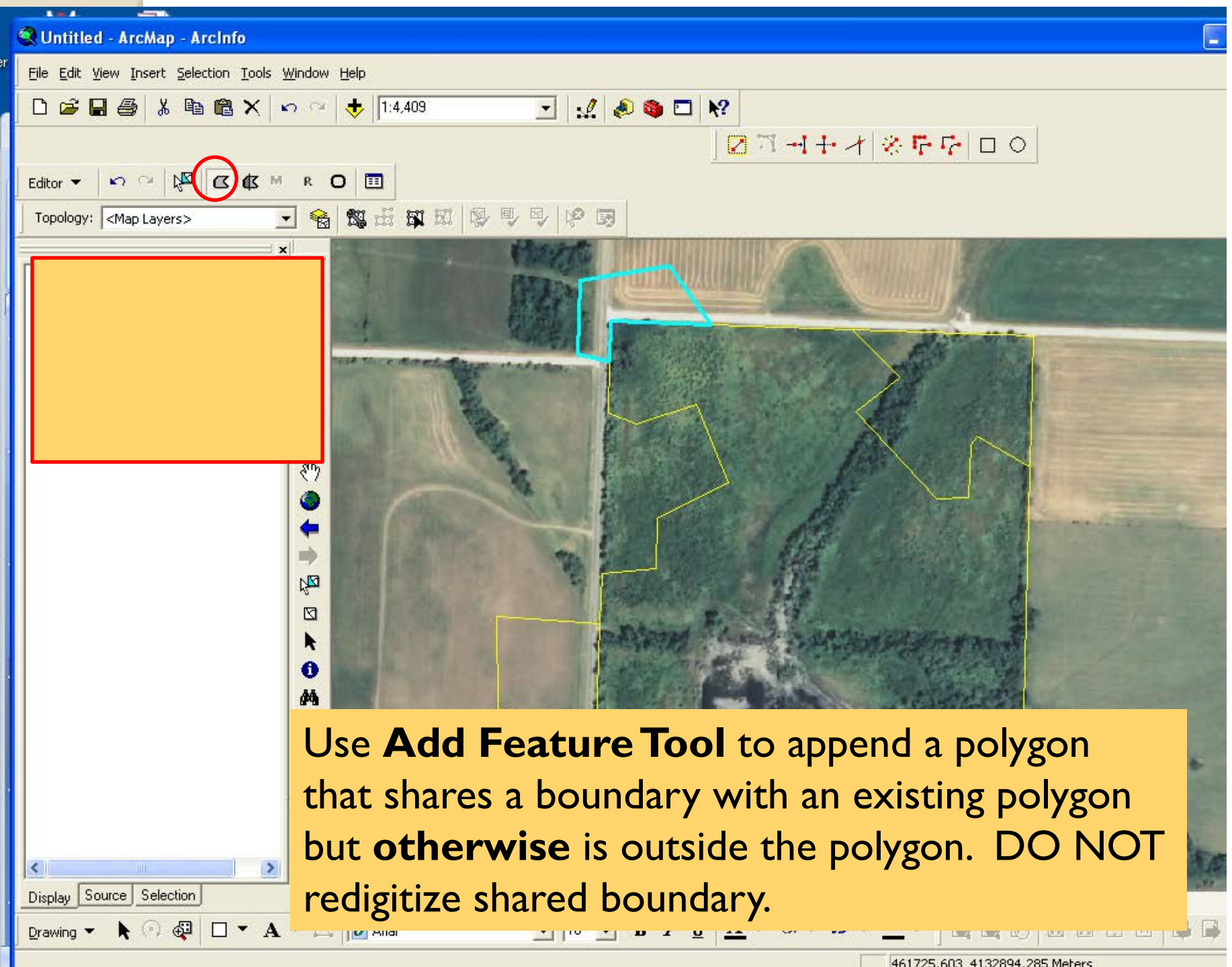


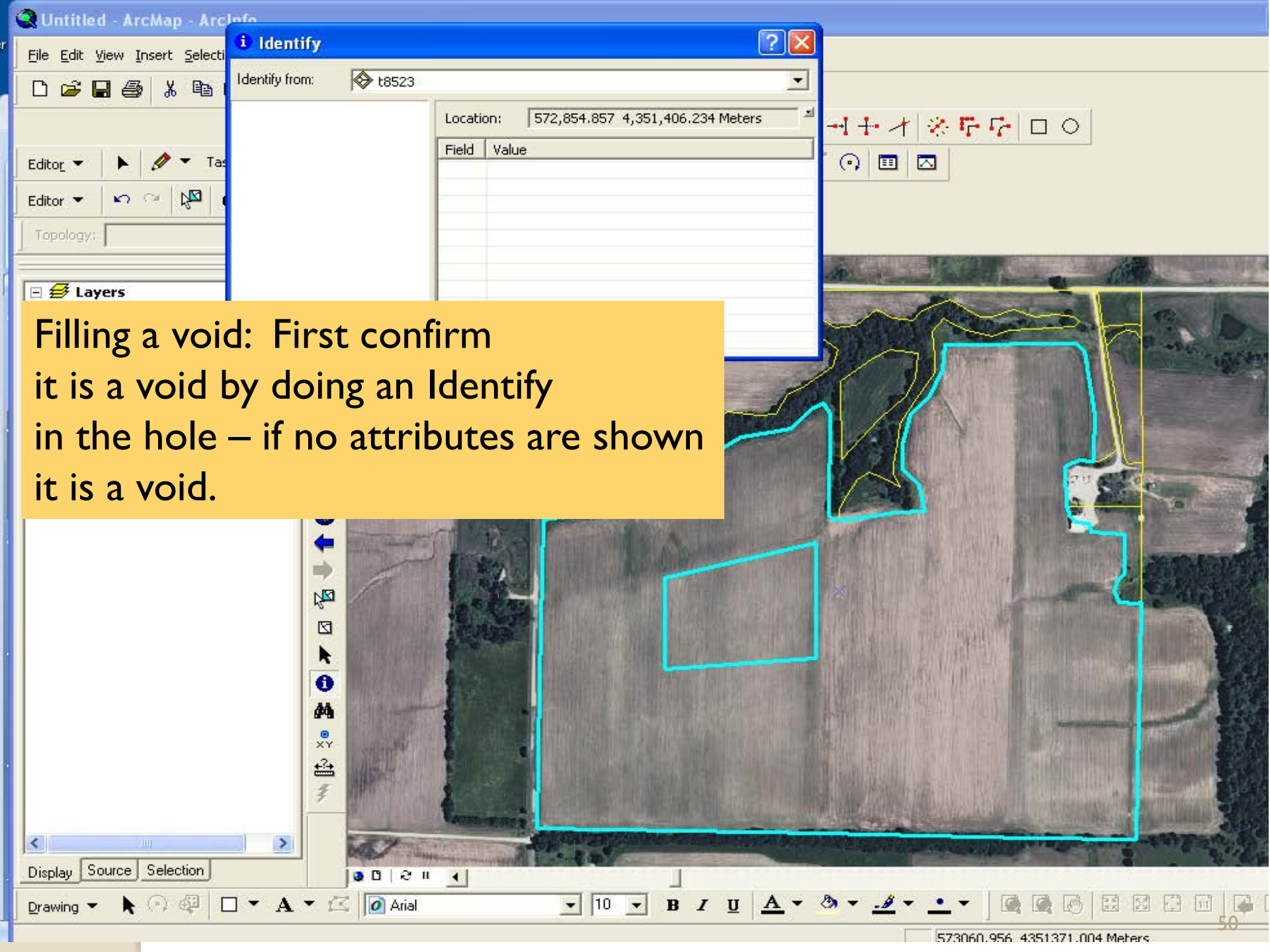
Inclusion polygon:

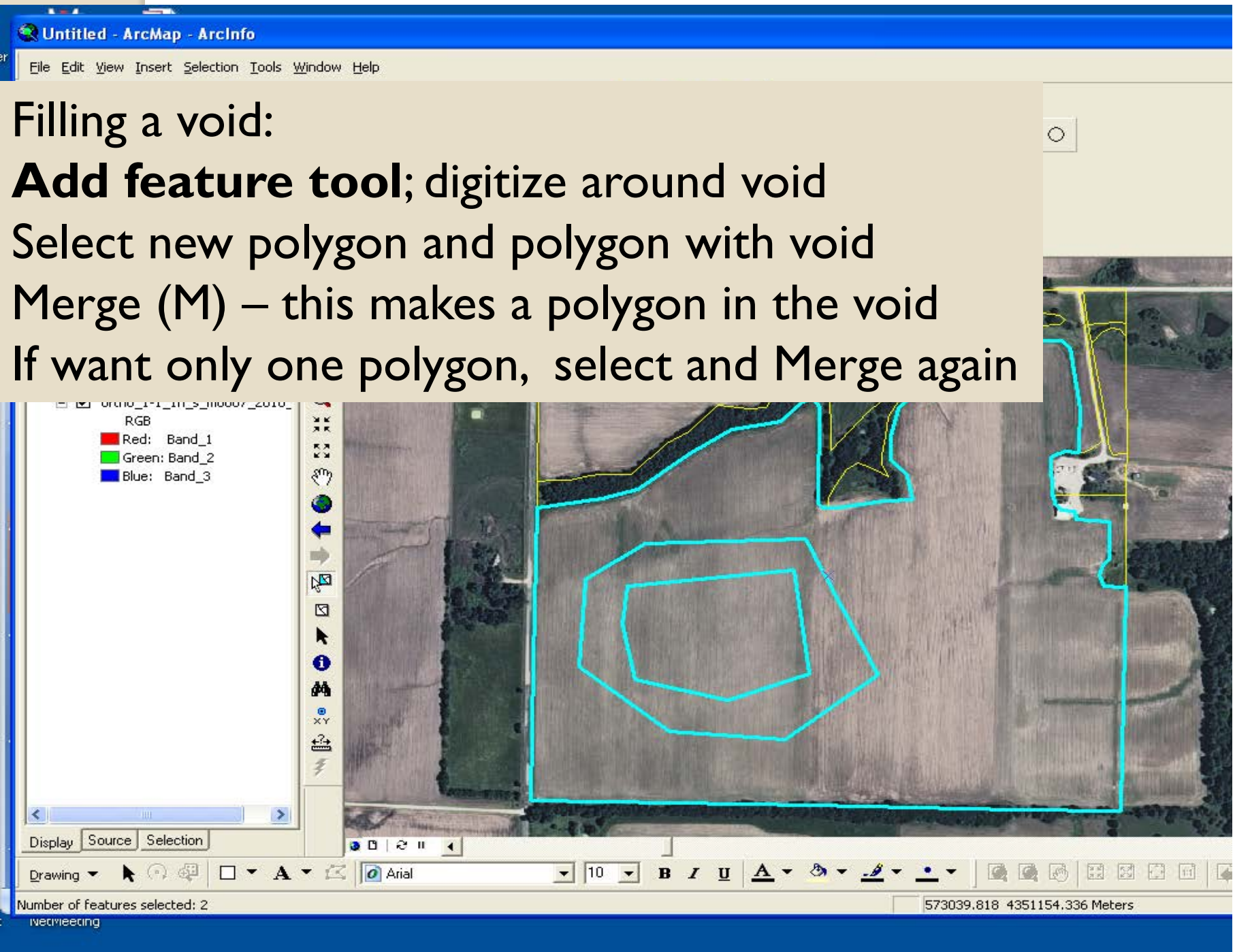
- Select Feature to contain the polygon
- Use Split Feature Tool
- Digitize the inclusion, making sure to ***redigitize*** exactly over the starting point . Right-mouse click and select Finish Sketch.
- This error message means the end point was not redigitized closely enough – retry

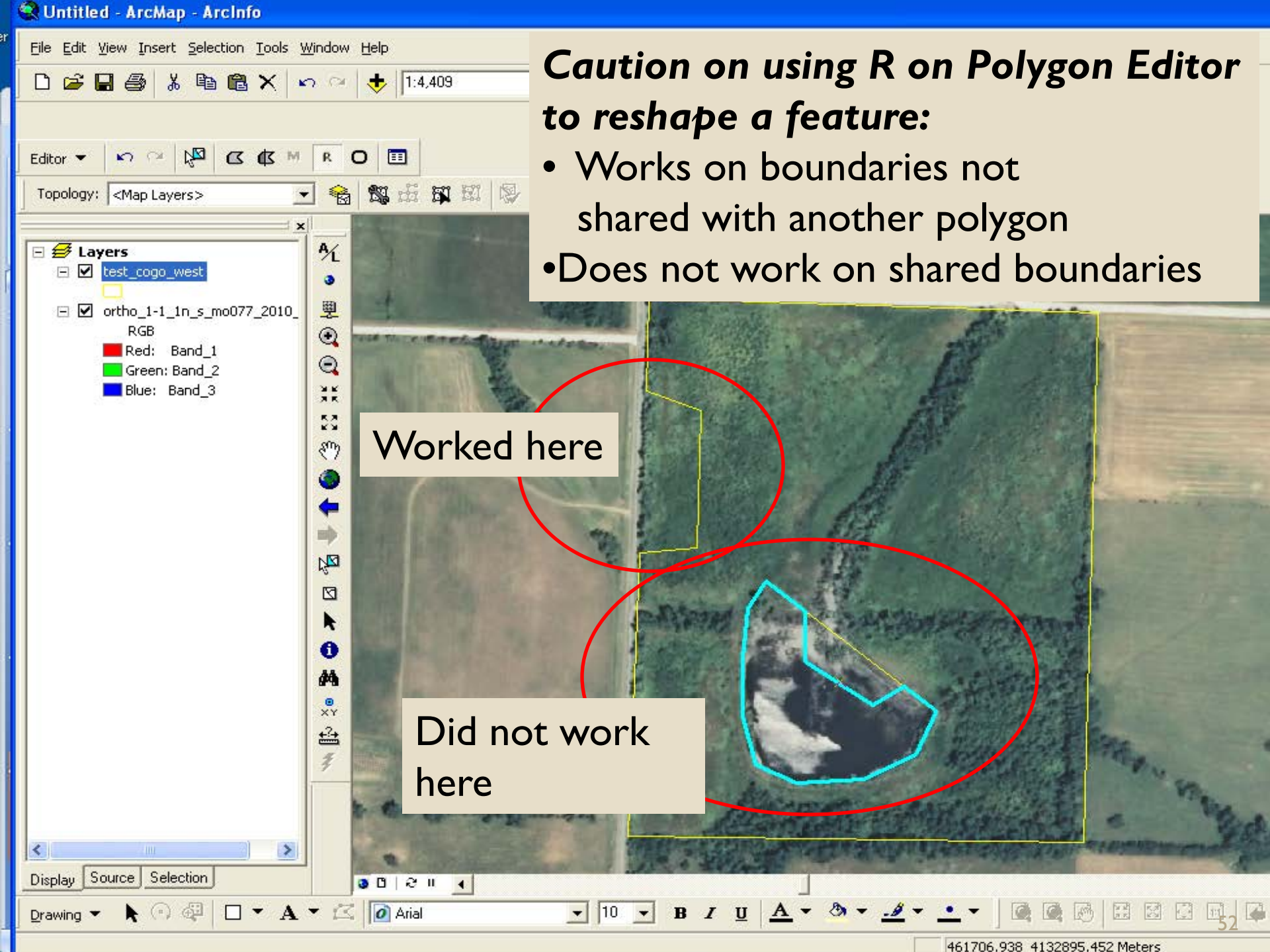


In Customize>>Toolbars, turn on Snapping toolbar, and set "Snap to Sketch" to reduce problem digitizing inclusion polygons.


Untitled - ArcMap - ArcInfo
File Edit View Insert Selection Tools Window Help
1:4,409
Editor
Topology: <Map Layers>
Display Source Selection
Drawing
Use **Add Feature Tool** to append a polygon that shares a boundary with an existing polygon but **otherwise** is outside the polygon. DO NOT redigitize shared boundary.

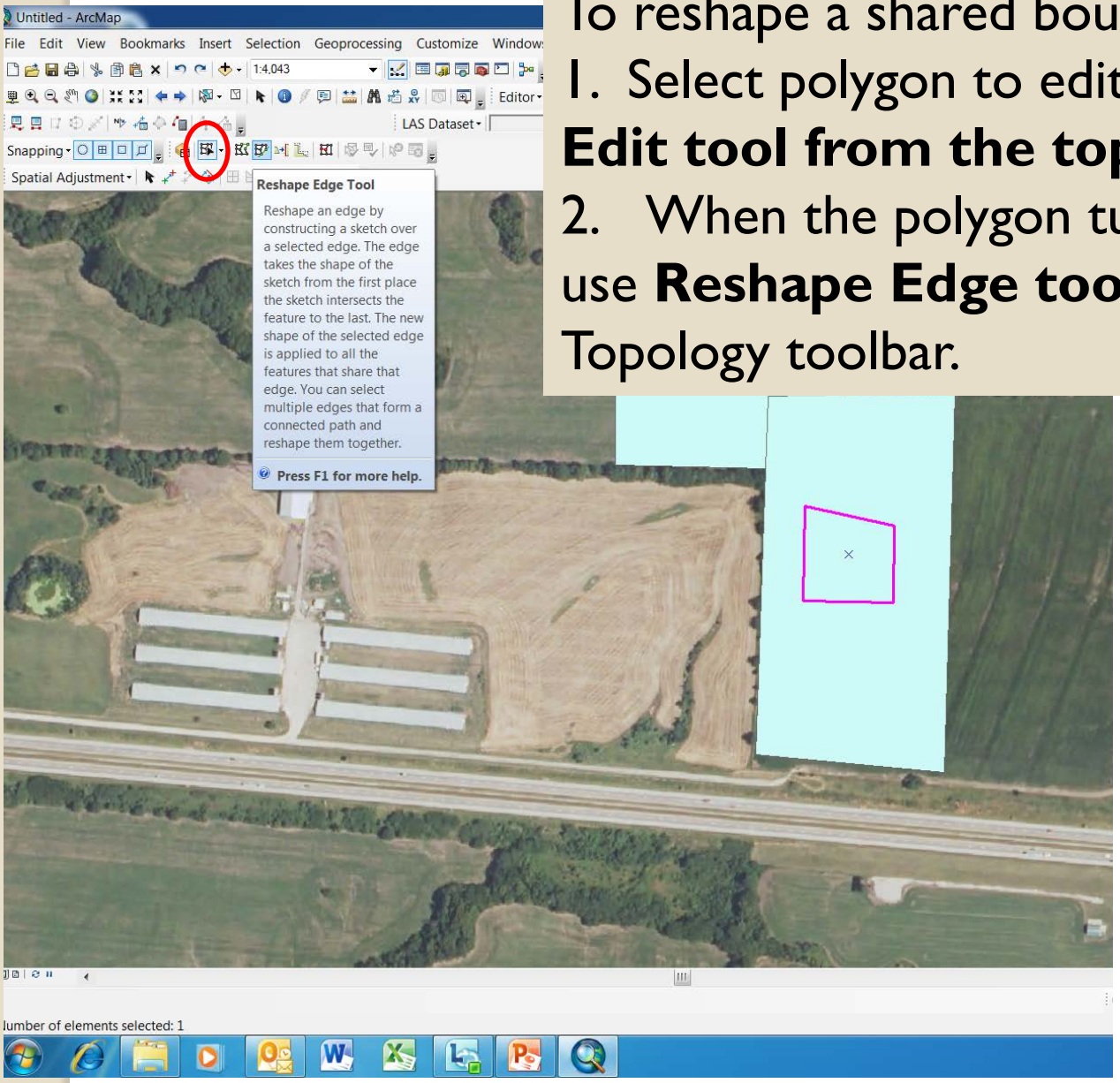

Untitled - ArcMap - ArcInfo
File Edit View Insert Selecti
Identify
Identify from:
t8523
Location:
572,854.857 4,351,406.234 Meters
Field
Value
Editor
Editor
Topology:
Layers
Filling a void: First confirm
it is a void by doing an Identify
in the hole – if no attributes are shown
it is a void.
Display
Source
Selection
Drawing
Arial
10
573060.956 4351371.004 Meters

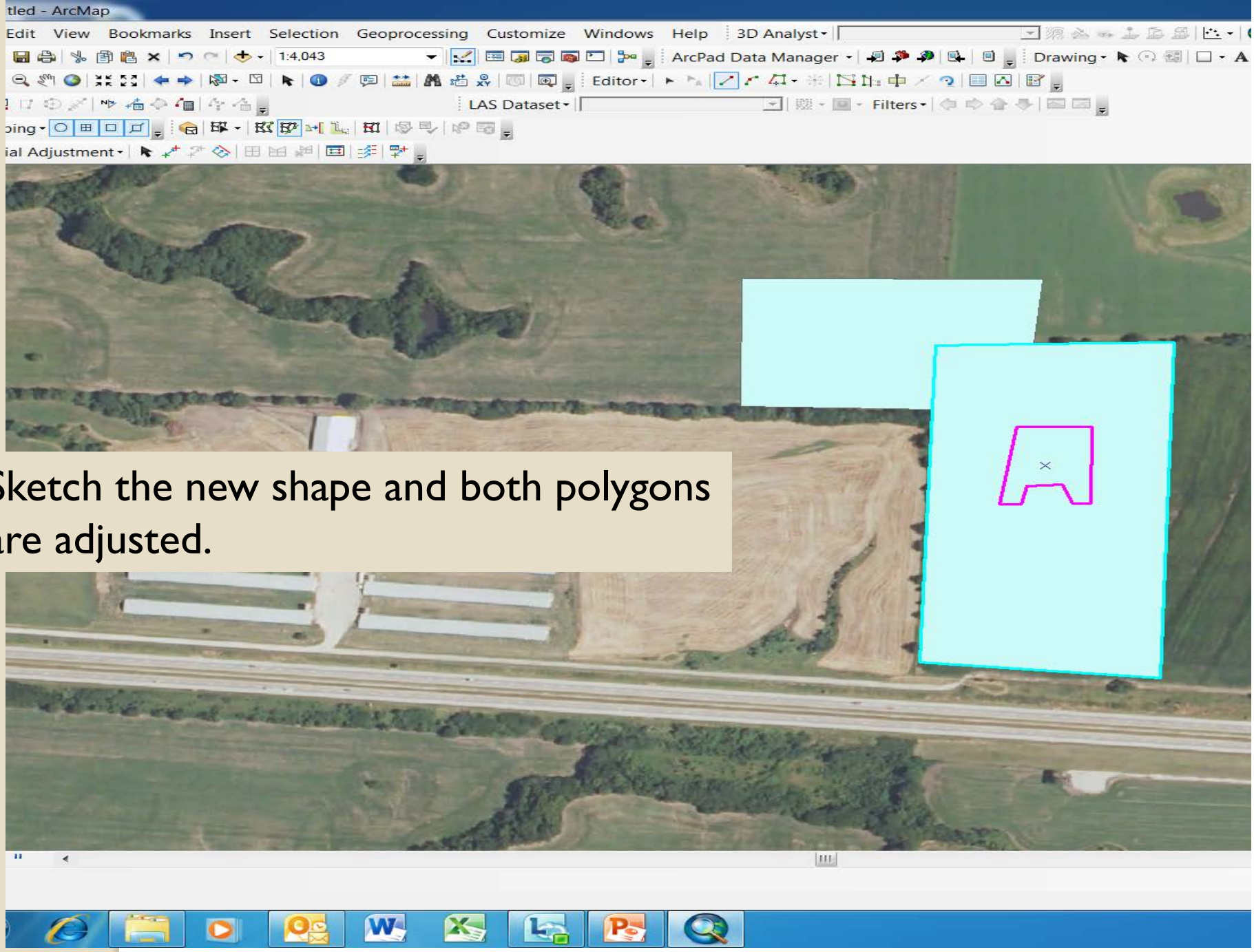

Untitled - ArcMap - ArcInfo
File Edit View Insert Selection Tools Window Help
Filling a void:
Add feature tool; digitize around void
Select new polygon and polygon with void
Merge (M) – this makes a polygon in the void
If want only one polygon, select and Merge again
RGB
Red: Band_1
Green: Band_2
Blue: Band_3
Display Source Selection
Drawing
Arial
10
Number of features selected: 2
573039.818 4351154.336 Meters


Untitled - ArcMap - ArcInfo
File Edit View Insert Selection Tools Window Help
1:4,409
Editor
Topology: <Map Layers>
Layers
test_cogo_west
ortho_1-1_1n_s_mo077_2010_
RGB
Red: Band_1
Green: Band_2
Blue: Band_3
Display Source Selection
Drawing
Arial
10
Caution on using R on Polygon Editor to reshape a feature:
• Works on boundaries not shared with another polygon
•Does not work on shared boundaries
Worked here
Did not work here
461706.938 4132895.452 Meters

To reshape a shared boundary:

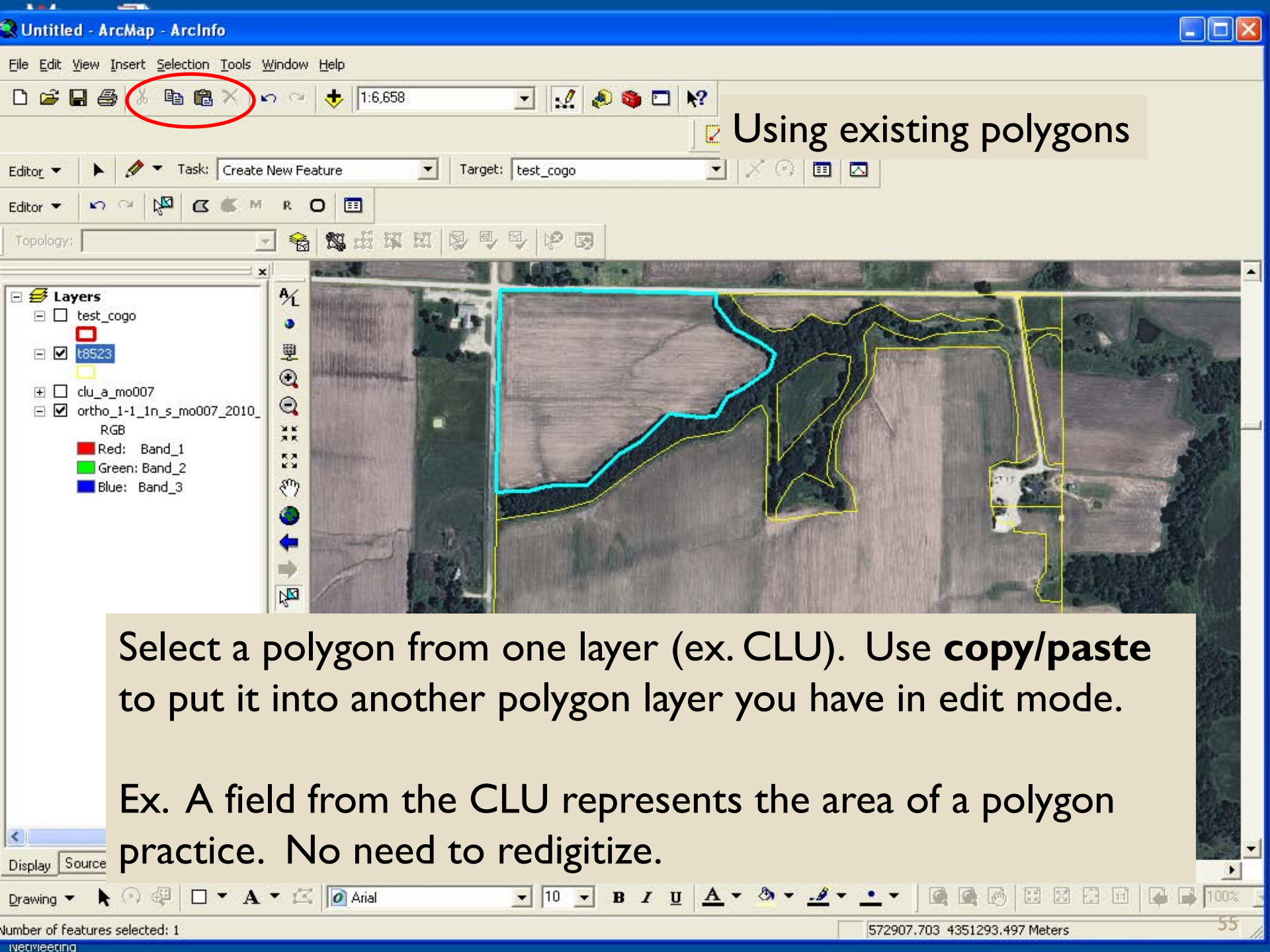
1. Select polygon to edit with the **Topology Edit tool from the topology toolbar.**
2. When the polygon turns magenta, use **Reshape Edge tool** from Topology toolbar.





Sketch the new shape and both polygons are adjusted.

Using existing polygons



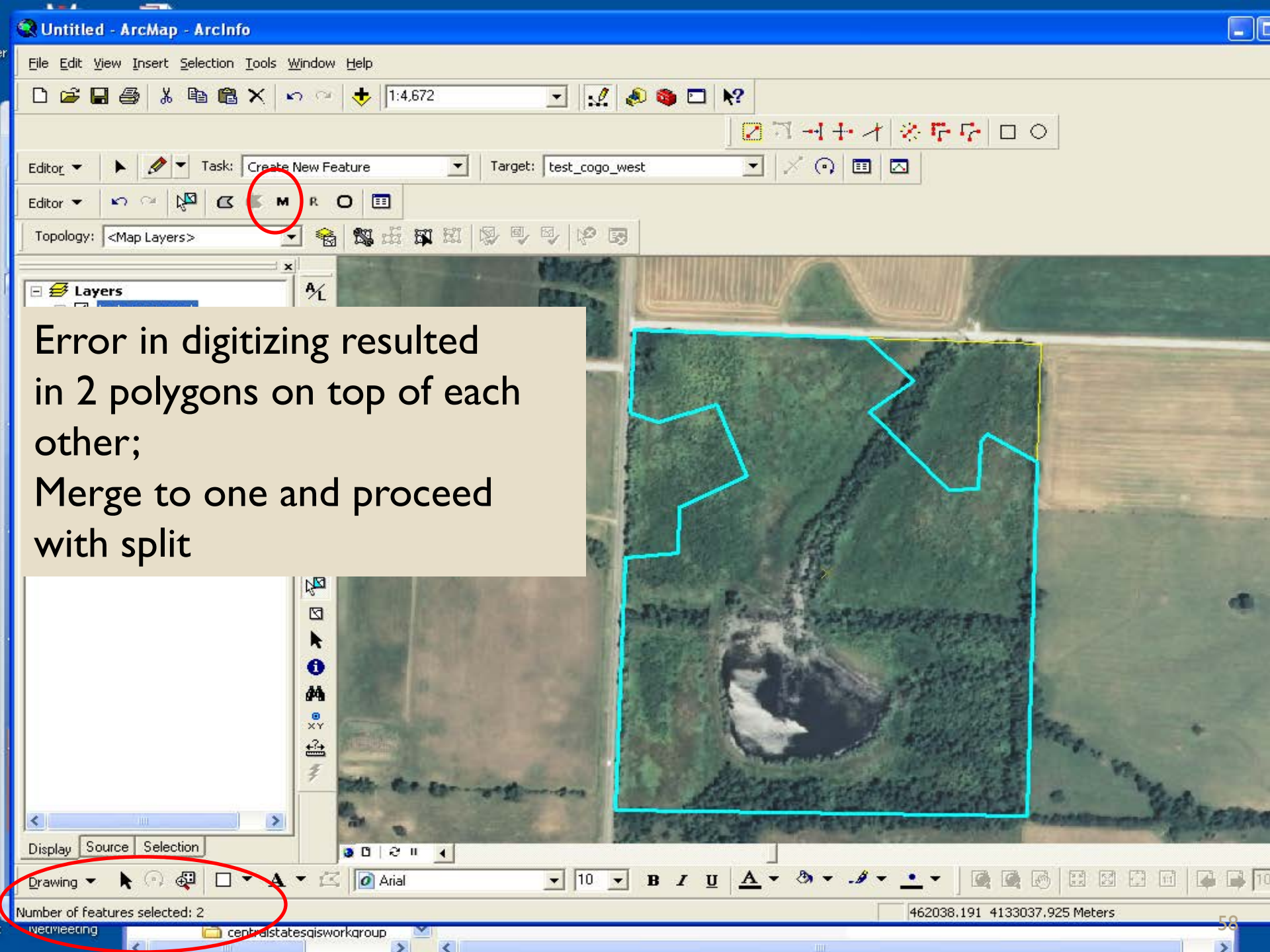
Select a polygon from one layer (ex. CLU). Use **copy/paste** to put it into another polygon layer you have in edit mode.

Ex. A field from the CLU represents the area of a polygon practice. No need to redigitize.

General Comments on Polygon Editing

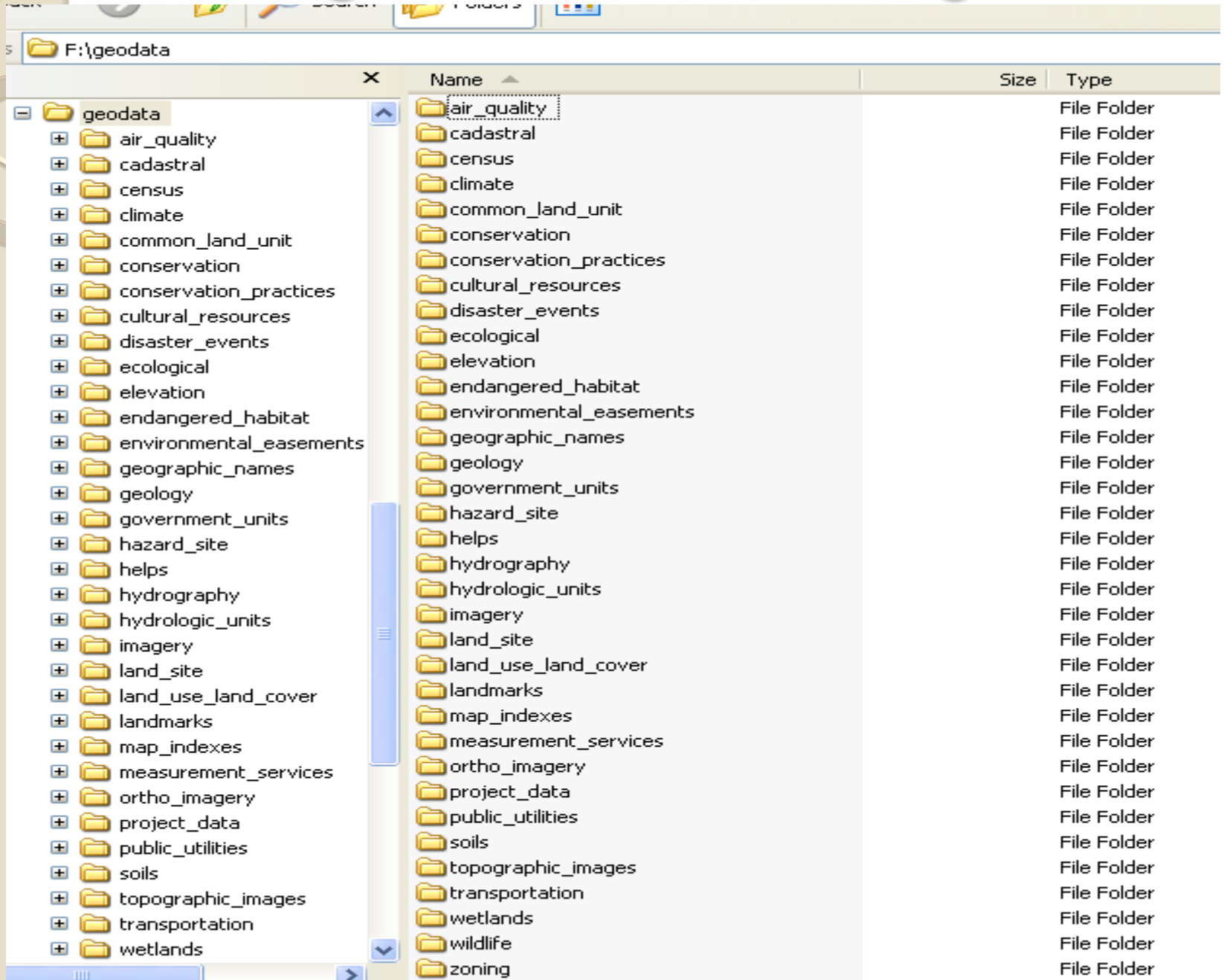
- Merge polygons back together if a split or inclusion is not needed (Select polygons to merge; M on Polygon Editor toolbar or Editor>>Merge on Editor Toolbar). Deleting polygons often leaves voids you don't want.

- Most common reason the Split Feature tool is grayed out is when more than one polygon is selected; can only split one polygon.


Untitled - ArcMap - ArcInfo
File Edit View Insert Selection Tools Window Help
1:4,672
Editor
Task: Create New Feature
Target: test_cogo_west
Topology: <Map Layers>
Layers
Error in digitizing resulted in 2 polygons on top of each other;
Merge to one and proceed with split
Display Source Selection
Drawing
Arial
10
Number of features selected: 2
462038.191 4133037.925 Meters

- Starting from scratch, such as merging polygons and resplitting, is often much easier than trying to reshape shared boundaries
- Be cautious, however, if editing polygons associated with CONTRACTS.

Making Use of Data on f:\geodata



Highlights

- f:\geodata\census\towns\towns_a_mo.shp
- ..\cultural_resources\cultural_resources_a_mo.shp
- ..\ecological\heritage2012_a_mo.shp
- ..\elevation\contour_l_mo<fips>.shp
- ..\environmental_easements\easements_a_mo.gdb
  all easements – wrp,grp,ewp,frpp
- ..\hydrography\femadfirm_a_mo<fips>.shp
  or femaq3_a_mo<fips>.shp 100-yr and 500 yr floodplains

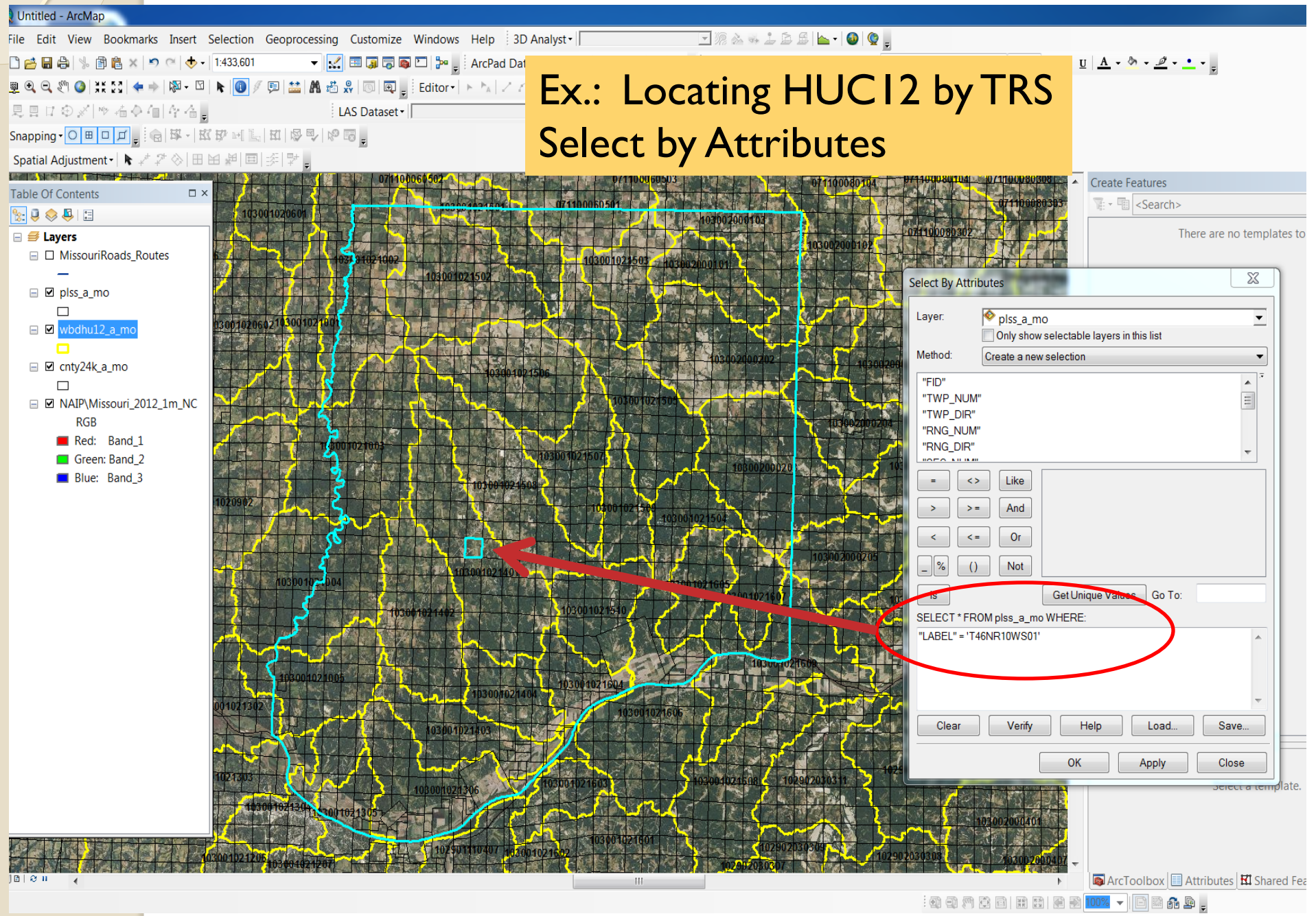
- \hydrography\nhd24k_l_<8-digit HUC>.shp
  streams data
- \hydrologic_units\wbdhu12_a_mo.shp;
  wbdhu8_a_mo.shp
- \transportation\roadsmodot_l_mo<fips>/shp
- \cadastrak\plss_a_mo.shp
  township/range/sections
- \government_units\cnty24k_a_mo.shp

- \wetlands\nwi_a_mo<fips>.shp national wetlands inventory data
- \wetlands\certified_determination_wetlands_a_mo.shp since 2008*

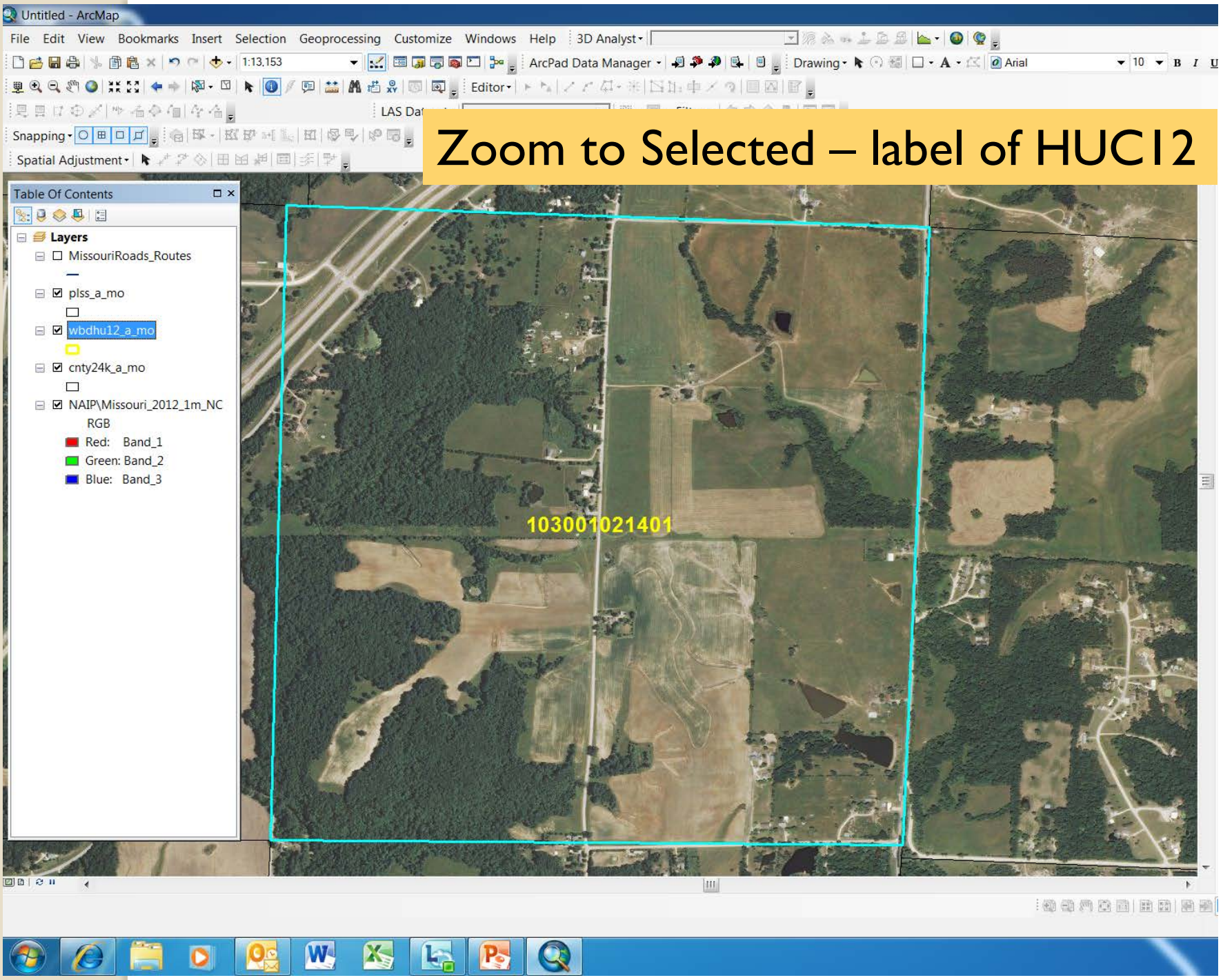
* FSA uses this layer for recons of CLU – **no need to make a map for them**

Some layers are updated frequently!

Request updates if you suspect it is not current.


Untitled - ArcMap
Ex.: Locating HUC12 by TRS
Select by Attributes
Table Of Contents
Layers
MissouriRoads_Routes
plss_a_mo
wbdhu12_a_mo
cnty24k_a_mo
NAIP\Missouri_2012_1m_NC
RGB
Red: Band_1
Green: Band_2
Blue: Band_3
Select By Attributes
Layer:
plss_a_mo
Only show selectable layers in this list
Method:
Create a new selection
"FID"
"TWP_NUM"
"TWP_DIR"
"RNG_NUM"
"RNG_DIR"
Like
And
Or
Not
Get Unique Values
Go To:
SELECT * FROM plss_a_mo WHERE:
"LABEL" = 'T46NR10WS01'
Clear
Verify
Help
Load...
Save...
OK
Apply
Close
Create Features
There are no templates to
ArcToolbox
Attributes

Zoom to Selected – label of HUC12

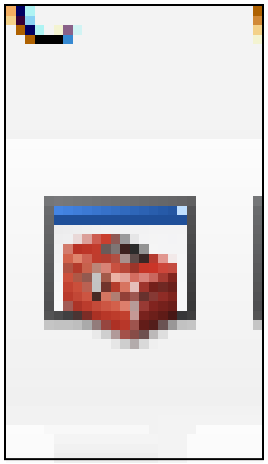


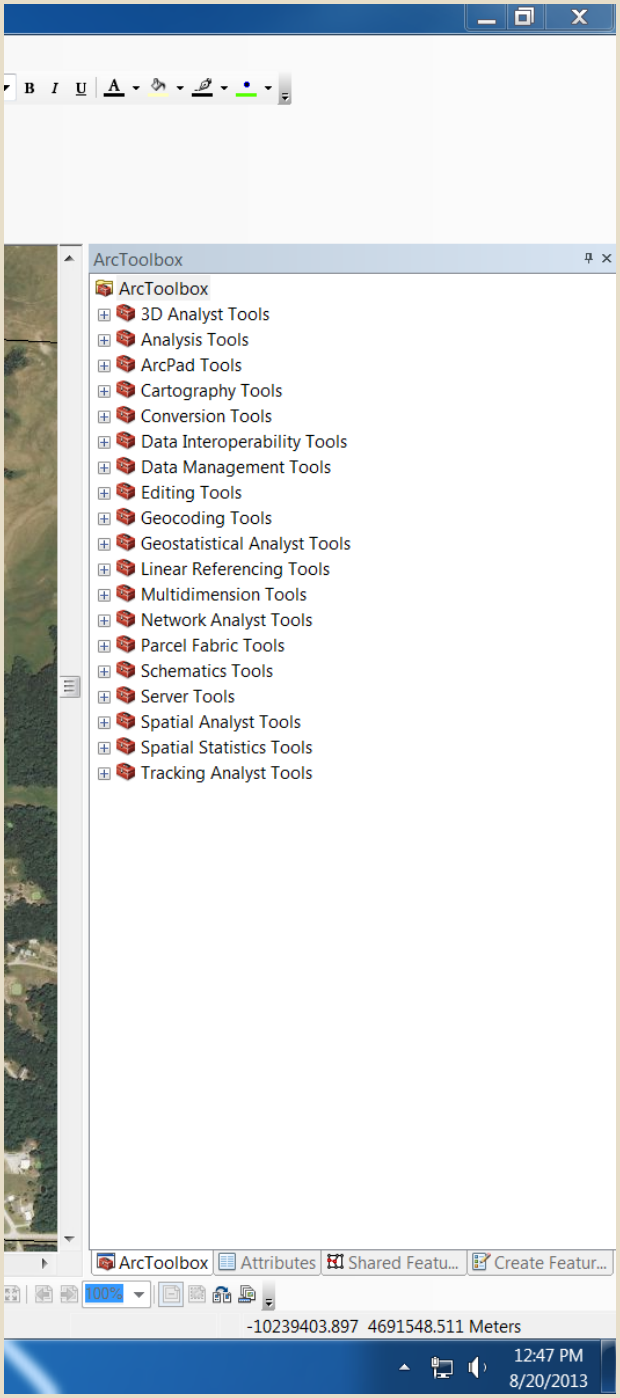
Metadata

- Information about a data layer
- Stored in a .txt, .met, .xml or .doc file
- Example:
  - Mapclassification.doc explains NWI coding; stored at f:\geodata\wetlands
  - metadata.txt stored with cultural_resources_a_mo.shp

Data Analysis

- ArcToolbox – accessed from Geoprocessing>>ArcToolbox or from the ArcToolbox icon

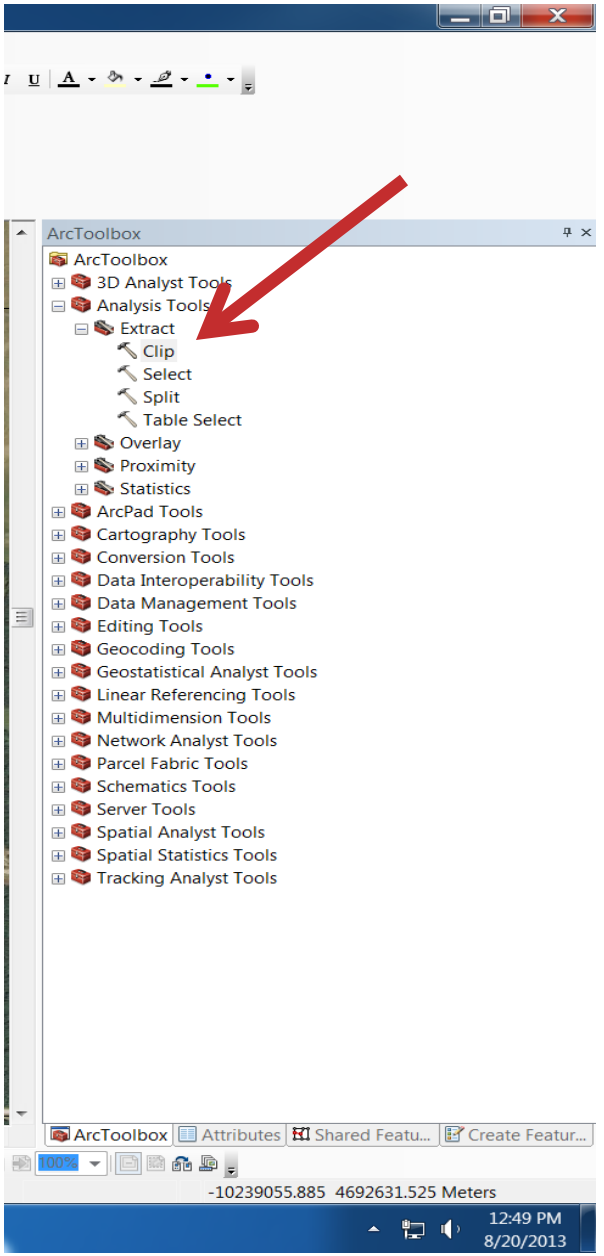


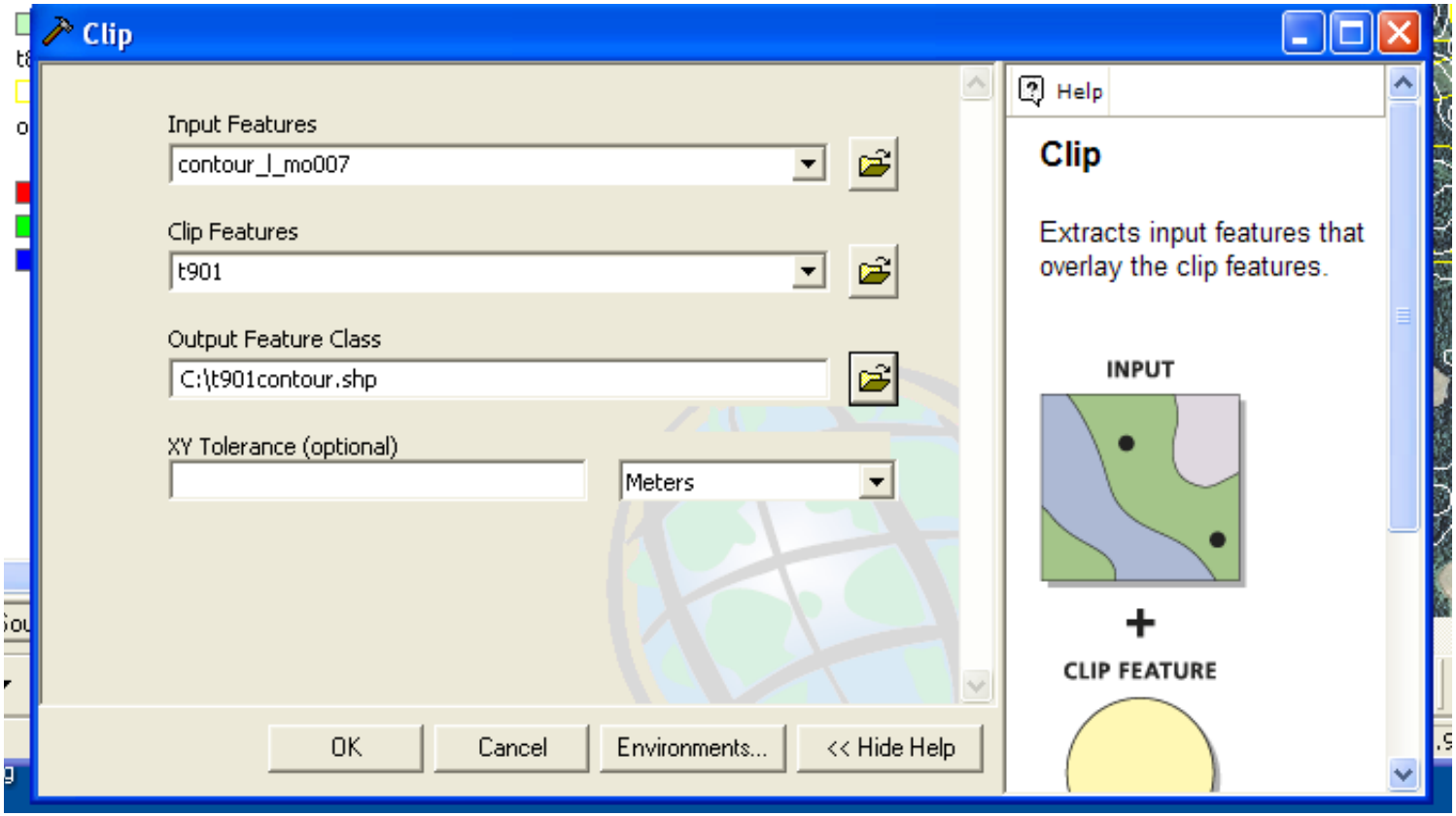

ArcToolbox
ArcToolbox
3D Analyst Tools
Analysis Tools
ArcPad Tools
Cartography Tools
Conversion Tools
Data Interoperability Tools
Data Management Tools
Editing Tools
Geocoding Tools
Geostatistical Analyst Tools
Linear Referencing Tools
Multidimension Tools
Network Analyst Tools
Parcel Fabric Tools
Schematics Tools
Server Tools
Spatial Analyst Tools
Spatial Statistics Tools
Tracking Analyst Tools
ArcToolbox
Attributes
Shared Featu...
Create Featur...
100%
-10239403.897 4691548.511 Meters
12:47 PM
8/20/2013

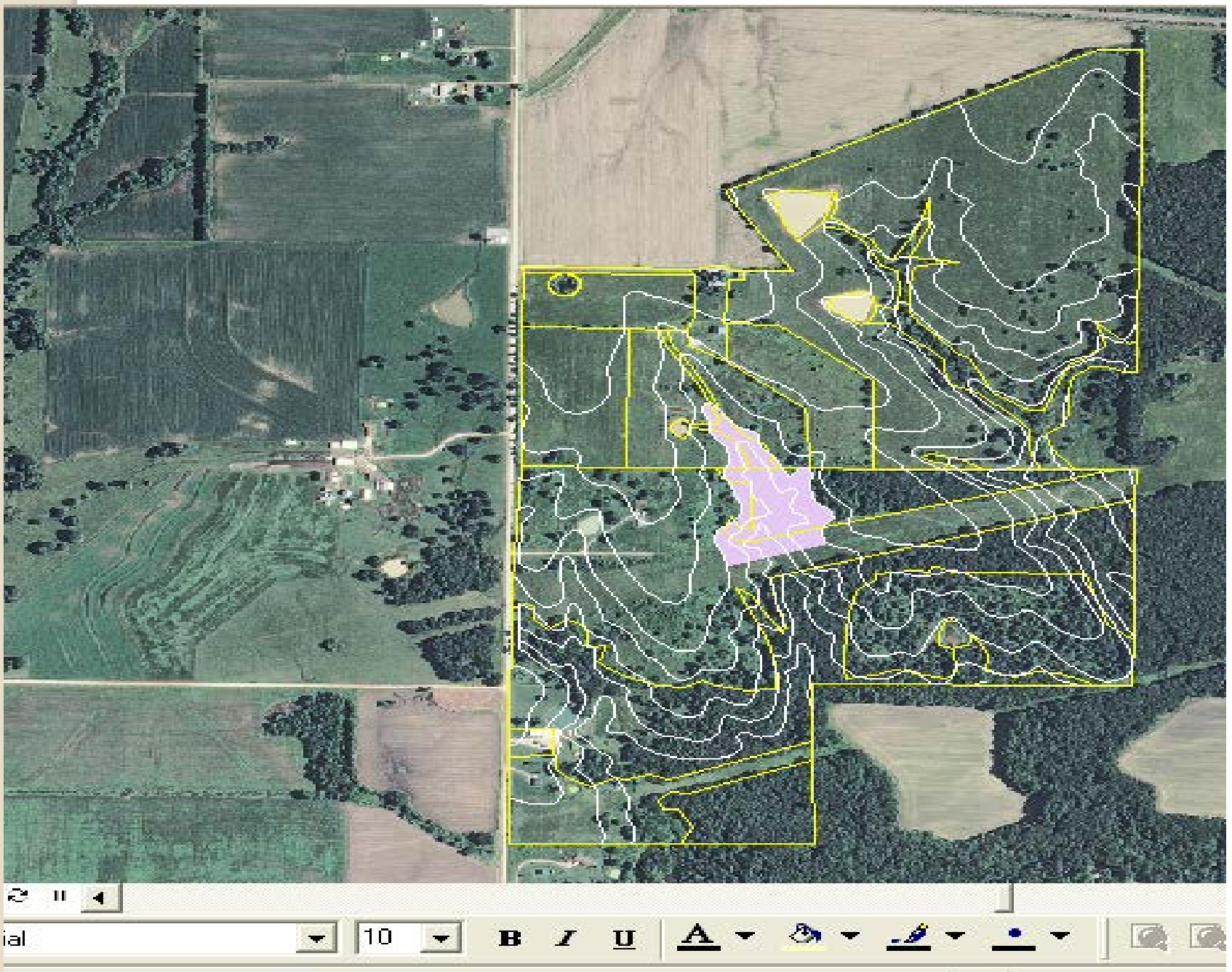
Example:

Show only the contours covering one tract

- ***Clip*** – creates a new layer containing the features of the input layer limited to the geographic extent of the clip layer



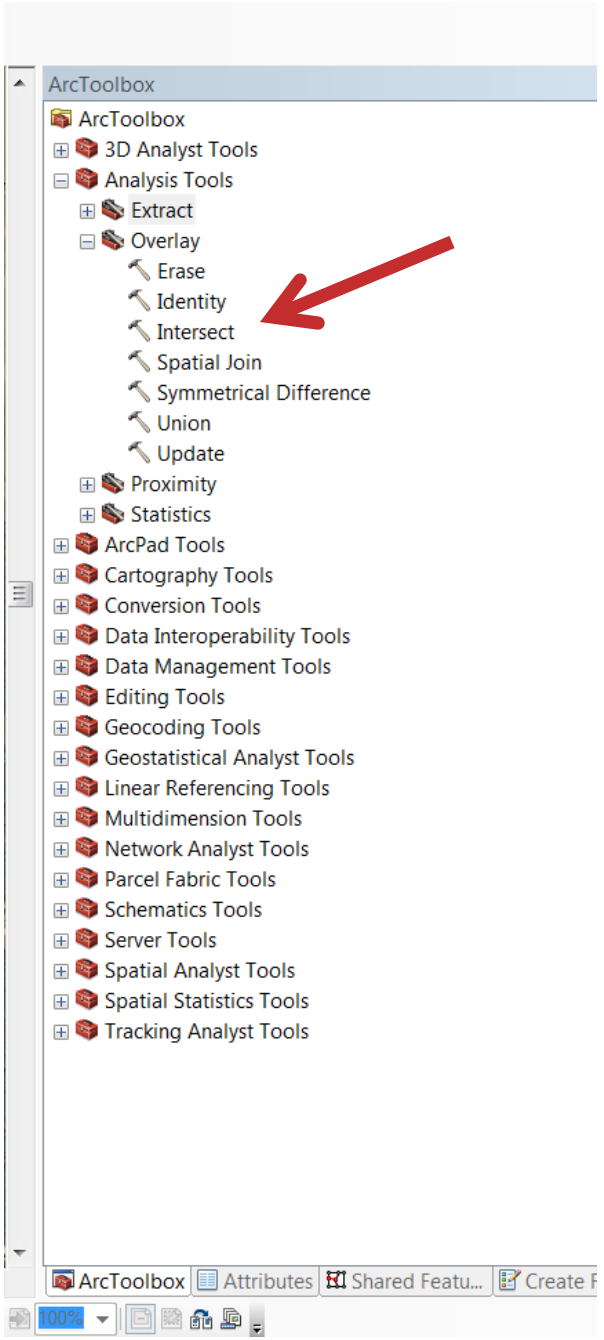

Clip
Input Features
contour_l_mo007
Clip Features
t901
Output Feature Class
C:\t901contour.shp
XY Tolerance (optional)
Meters
OK
Cancel
Environments...
<< Hide Help
Help
Clip
Extracts input features that overlay the clip features.
INPUT
CLIP FEATURE

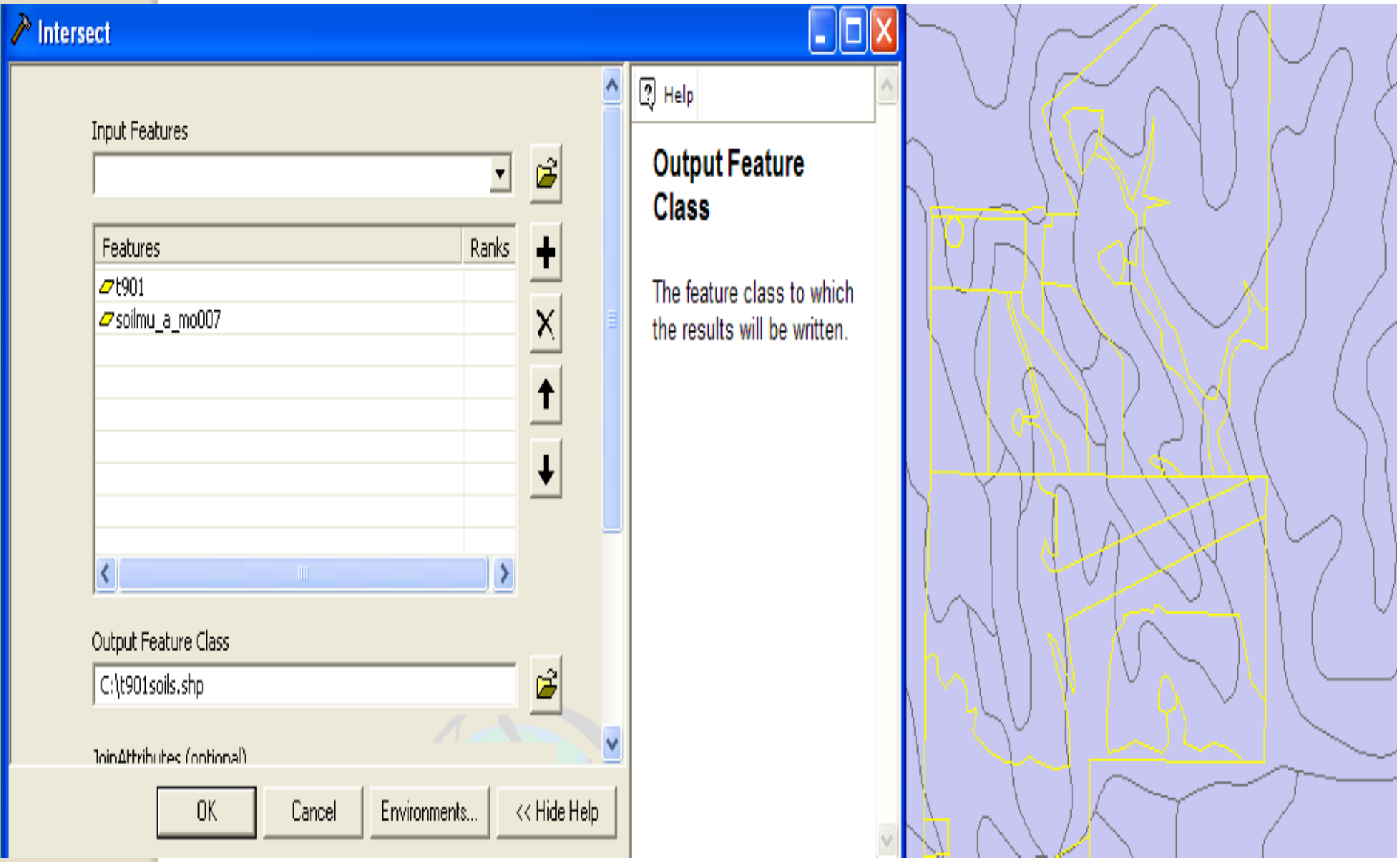

10

Example:

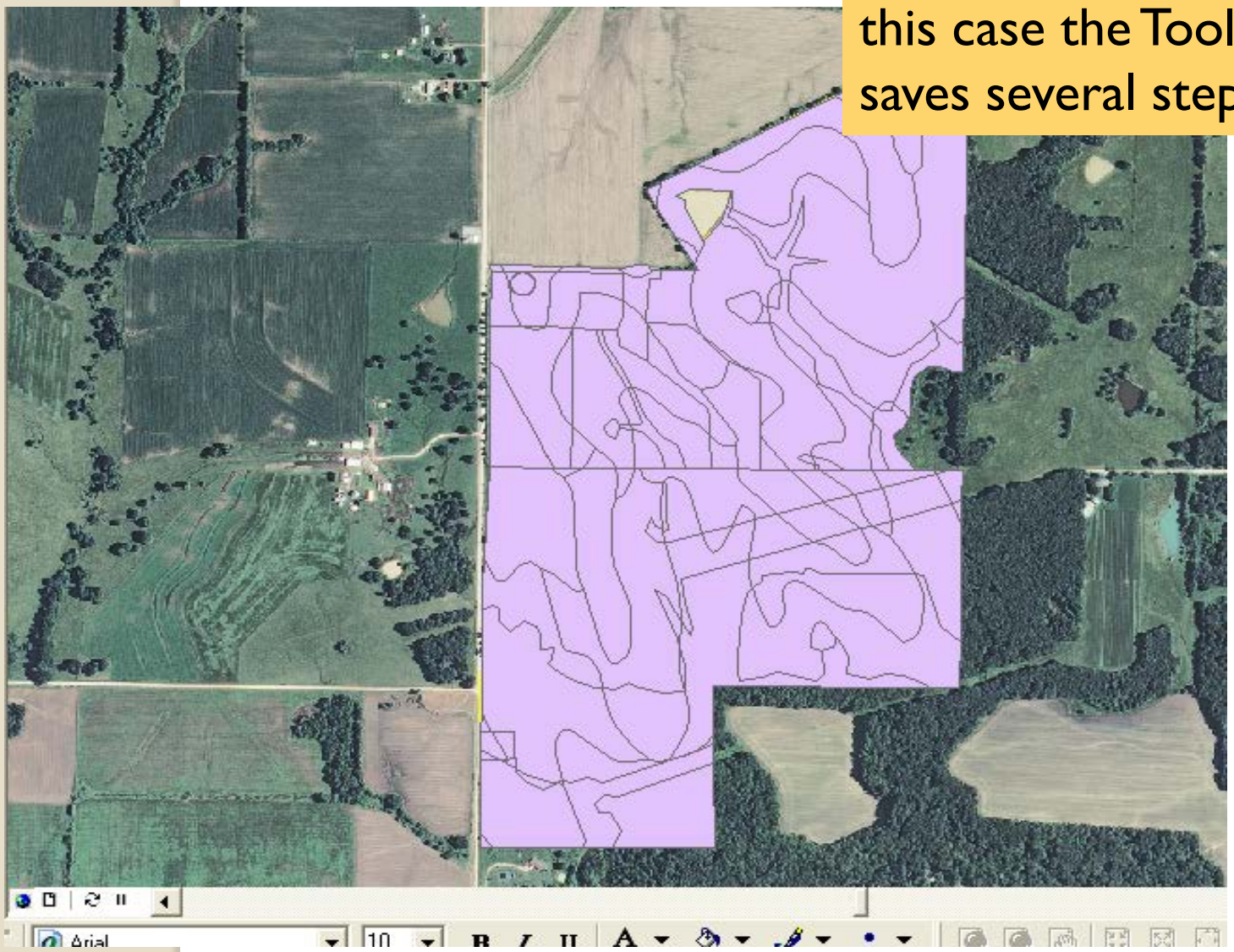
Soil Maps Units by fields of a single tract

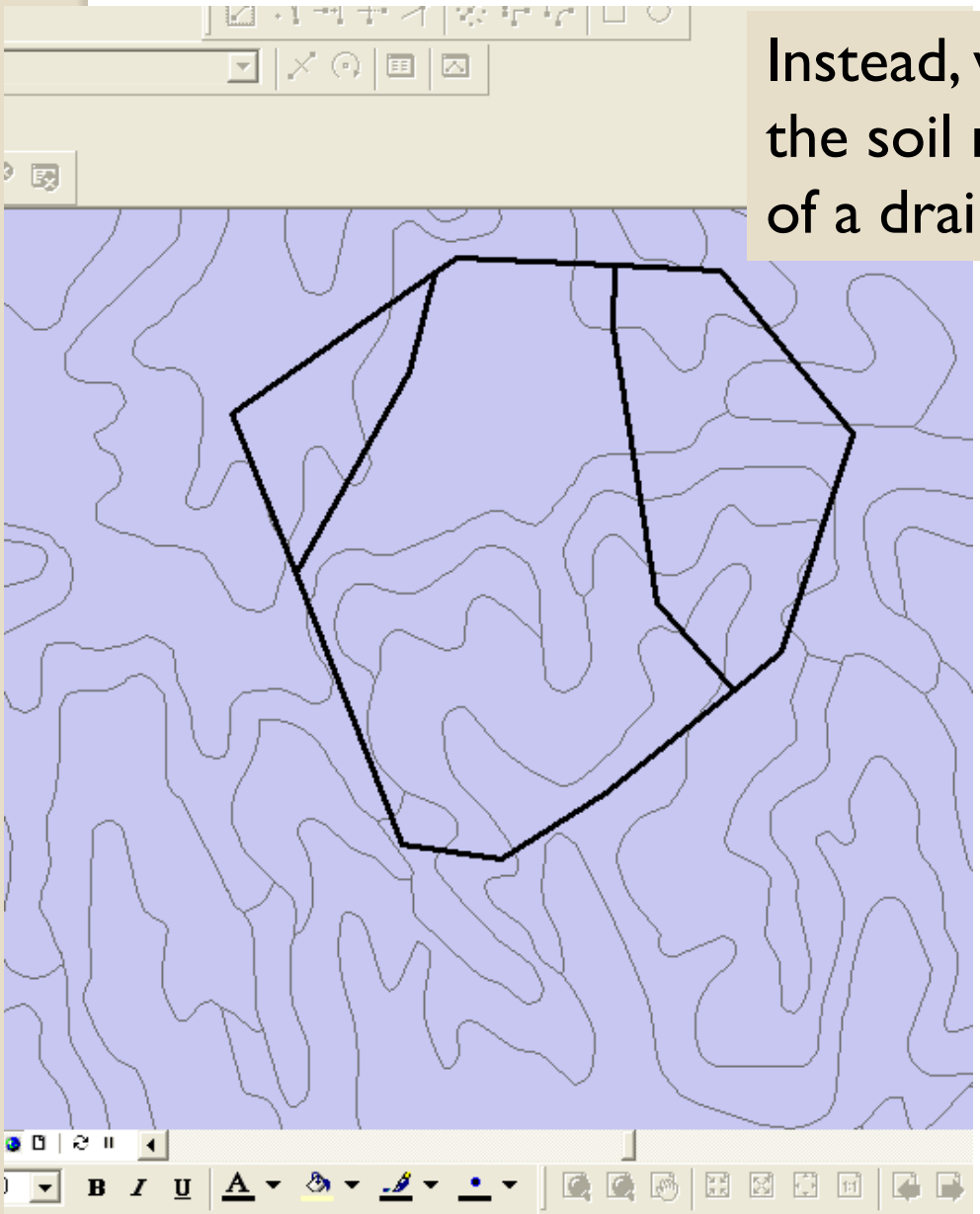
- ***Intersect*** – creates a new layer that combines the features of two input layers, limited to the geographic extent of the smaller layer



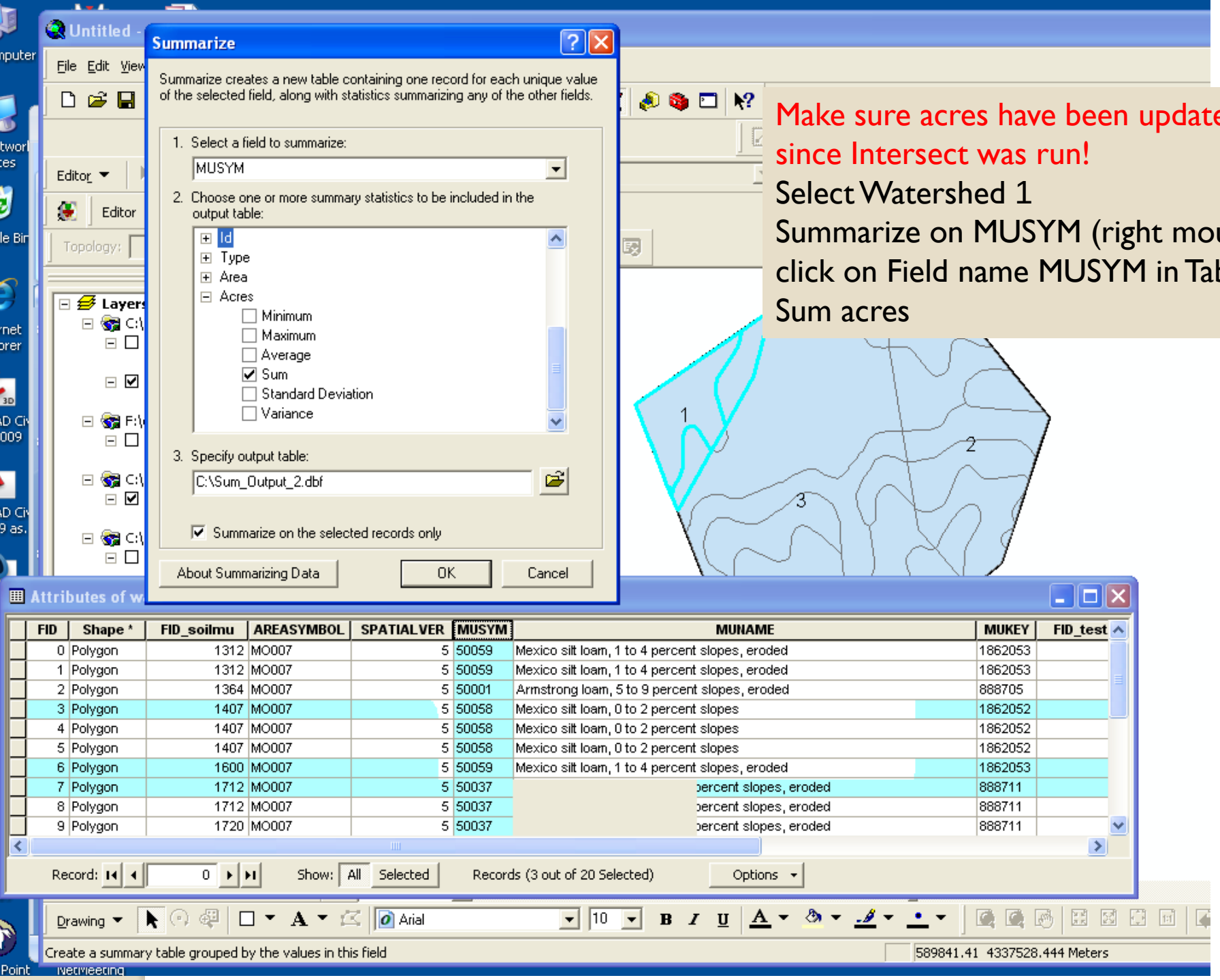

Intersect
Input Features
Features
Ranks
t901
soilmu_a_mo007
Output Feature Class
C:\t901soils.shp
OK
Cancel
Environments...
<< Hide Help
Help
Output Feature Class
The feature class to which the results will be written.

Soils Inventory Button in Toolkit – then has some reporting functions built in – in this case the Toolkit button saves several steps!

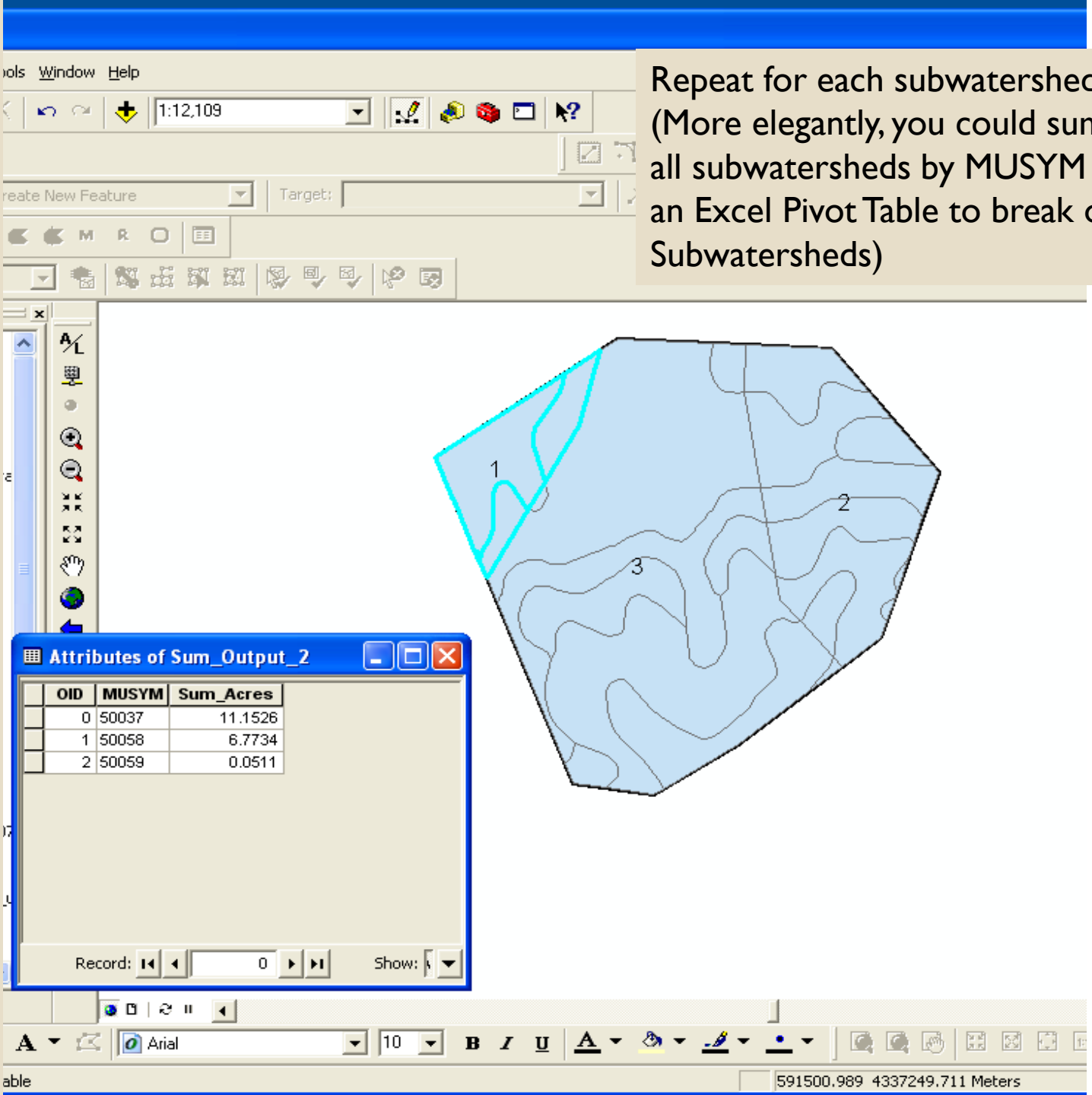




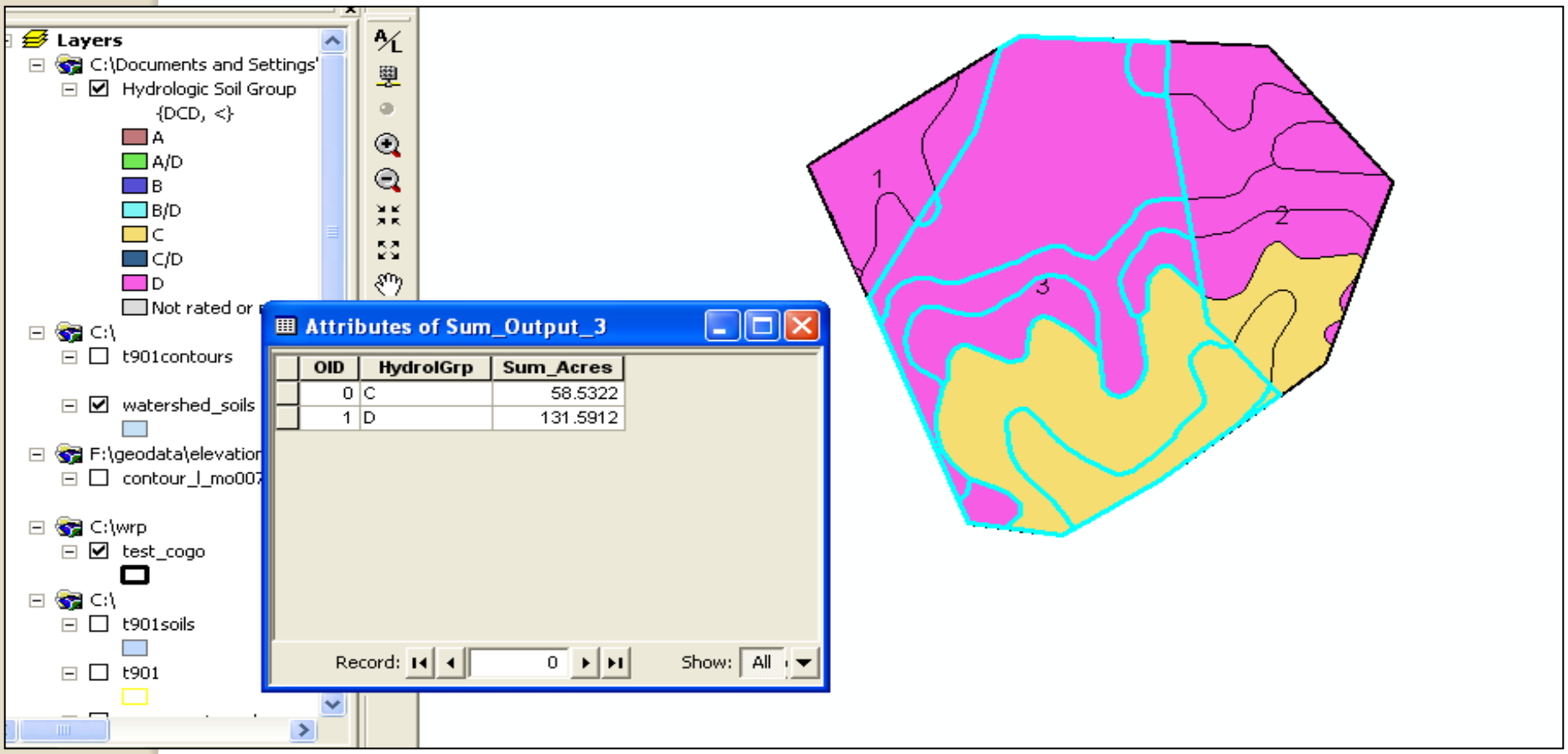
Instead, what if you wanted
the soil map units by subwatersheds
of a drainage area:


Summarize
Summarize creates a new table containing one record for each unique value of the selected field, along with statistics summarizing any of the other fields.
1. Select a field to summarize:
MUSYM
2. Choose one or more summary statistics to be included in the output table:
Id
Type
Area
Acres
Minimum
Maximum
Average
Sum
Standard Deviation
Variance
3. Specify output table:
C:\Sum_Output_2.dbf
Summarize on the selected records only
About Summarizing Data
OK
Cancel
Make sure acres have been updated since Intersect was run!
Select Watershed 1
Summarize on MUSYM (right mouse click on Field name MUSYM in Table)
Sum acres
1
2
3
Attributes of w
FID | Shape * | FID_soilmu | AREASYMBOL | SPATIALVER | MUSYM | MUNAME | MUKEY | FID_test
0 | Polygon | 1312 | MO007 | 5 | 50059 | Mexico silt loam, 1 to 4 percent slopes, eroded | 1862053
1 | Polygon | 1312 | MO007 | 5 | 50059 | Mexico silt loam, 1 to 4 percent slopes, eroded | 1862053
2 | Polygon | 1364 | MO007 | 5 | 50001 | Armstrong loam, 5 to 9 percent slopes, eroded | 888705
3 | Polygon | 1407 | MO007 | 5 | 50058 | Mexico silt loam, 0 to 2 percent slopes | 1862052
4 | Polygon | 1407 | MO007 | 5 | 50058 | Mexico silt loam, 0 to 2 percent slopes | 1862052
5 | Polygon | 1407 | MO007 | 5 | 50058 | Mexico silt loam, 0 to 2 percent slopes | 1862052
6 | Polygon | 1600 | MO007 | 5 | 50059 | Mexico silt loam, 1 to 4 percent slopes, eroded | 1862053
7 | Polygon | 1712 | MO007 | 5 | 50037 | percent slopes, eroded | 888711
8 | Polygon | 1712 | MO007 | 5 | 50037 | percent slopes, eroded | 888711
9 | Polygon | 1720 | MO007 | 5 | 50037 | percent slopes, eroded | 888711
Record: 0
Show: All Selected
Records (3 out of 20 Selected)
Options
Drawing
Arial
10
Create a summary table grouped by the values in this field
589841.41 4337528.444 Meters

Repeat for each subwatershed (More elegantly, you could summarize all subwatersheds by MUSYM and use an Excel Pivot Table to break out the Subwatersheds)



Use Soil Data Viewer to assign Hydrologic Soil Group to Watershed_Soils
Again, summarize a subwatershed selection



Other tools

- Analysis>>Proximity>>Buffer
  - Works like the Toolkit buffer tool with a few more options
- Data Management Tools>>Generalization>>Dissolve (removes boundaries among polygons of the same attribute, such as dissolve CLU on TractNBR for a tract boundary layer)

Summary

- ArcMap is a powerful tool that can make certain tasks easier or more effective
- Do not be caught thinking that GIS is a mapping tool – it can assist with map making but is so much more!