



Watershed Sciences 4930 & 6920

ADVANCED GIS

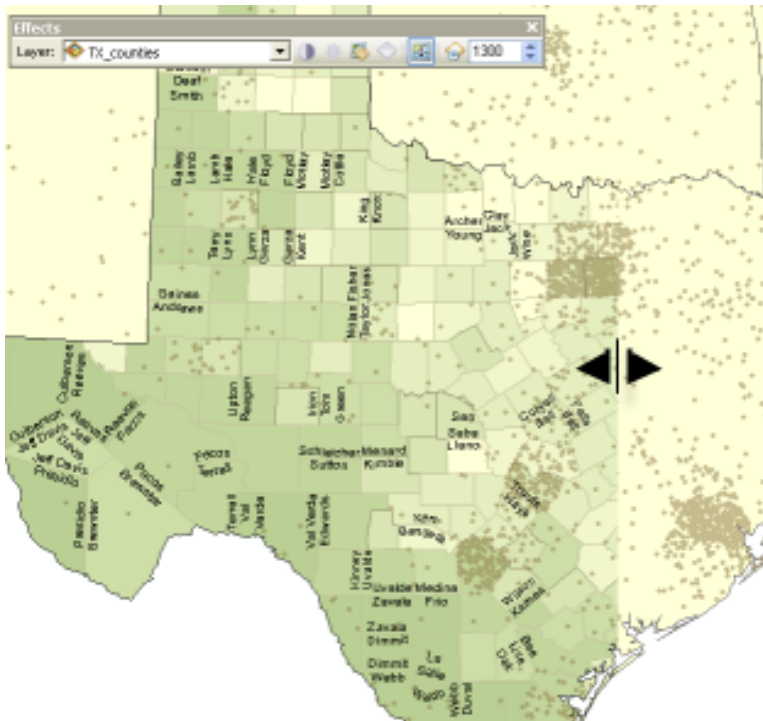
WEEK Four

EDITING & ATTRIBUTING DATA & METADATA

Joe Wheaton

HOUSEKEEPING

- Are you guys getting the help you need?
 - You guys are worryingly low maintenance..
- Thursday last *official day* for WATS 6915
- Effects Toolbar... (Cliff Claven Trivia)

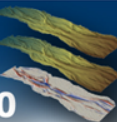


- Adjust Contrast** —Adjusts the contrast of the selected layer.
- Adjust Brightness** —Adjusts the brightness of the selected layer.
- Adjust Transparency** —Adjusts the selected layer's transparency.
- Adjust Dim Level** —Allows you to set a dim level for a map layer that enables other layers to take visual precedence. Dim is only available for basemap layers.
- Swipe Layer** —Allows you to use the swipe tool to interactively peel the selected layer back and see underneath it.
- Flicker Layer** —Allows you to have the layer blink off and on continuously. Enter the number of milliseconds (thousandths of a second) that define the flicker rate.



TODAY'S PLAN

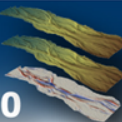
- I. Editing... What is it?**
- II. Some Editing Workflows
- III. Attributes & Attributing
- IV. Metadata
- V. Some Comments...



WHAT DOES EDIT MEAN TO YOU?



- First not in GIS terms...
- Then in the context of GIS



EDITING IN GIS

- Why edit existing data?
 - Errors and inconsistencies from data entry such as digitization (e.g. undershoots, overshoots, missing), attribution errors (misabeled)
 - Spatial data can change over time (augment it with new data)
 - Positional data only so accurate
- Editing includes drawing in GIS
 - CAD is far more powerful at drawing
- Editing is also for editing data and attributes!

TODAY'S PLAN

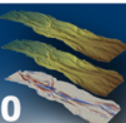
I. Editing... What is it?

II. Some Editing Workflows

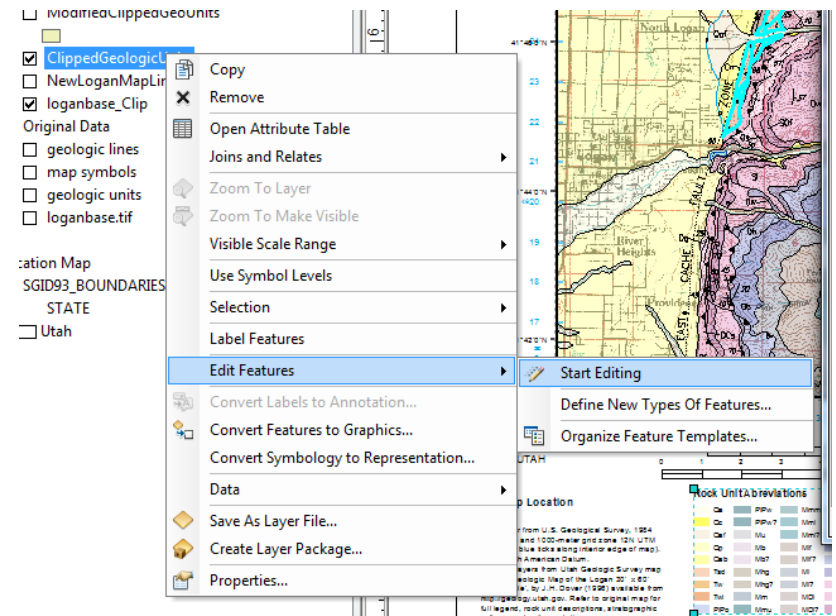
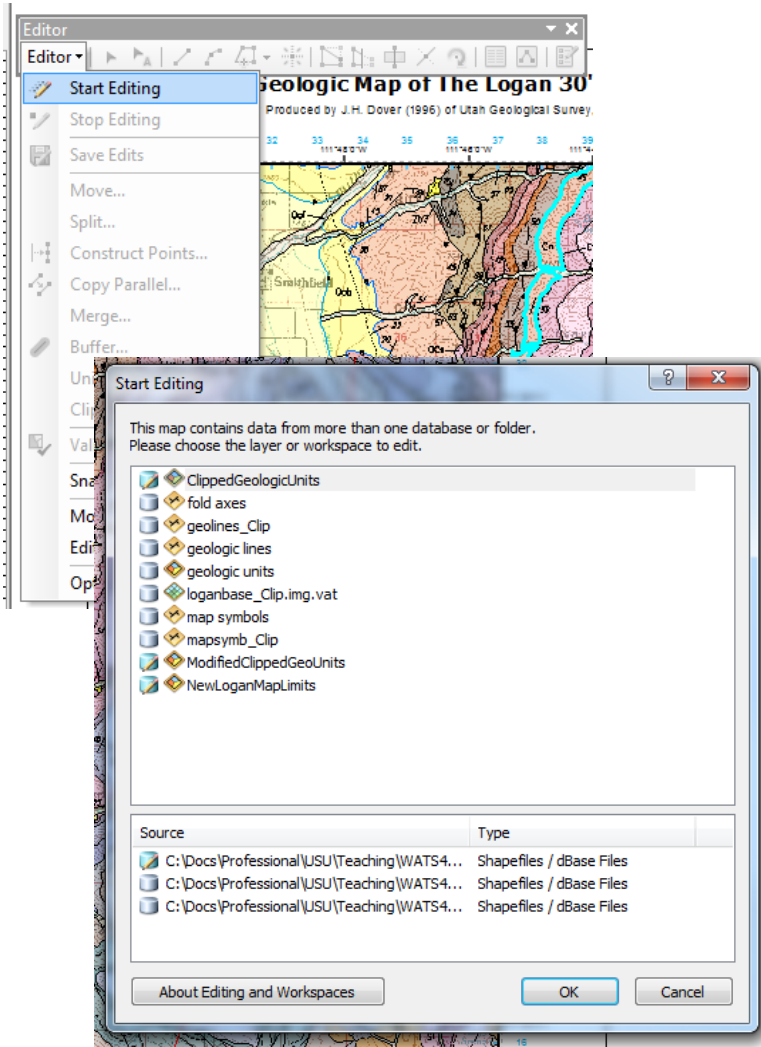
III. Attributes & Attributing

IV. Metadata

V. Some Comments...

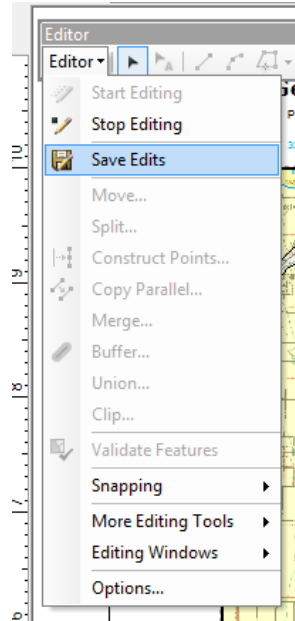
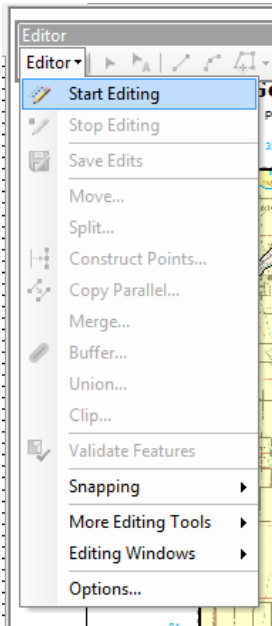


TWO WAYS TO START EDITING

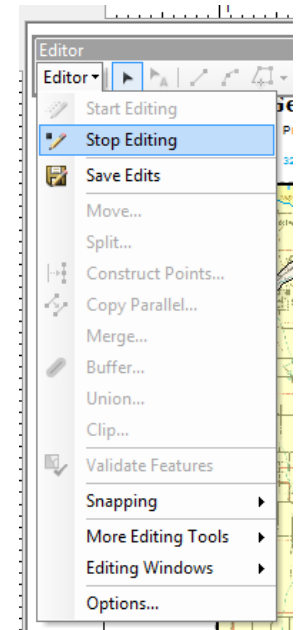


1. Use the editor toolbar
2. Right-Click on the layer you want to edit

STARTING, SAVING, STOPPING



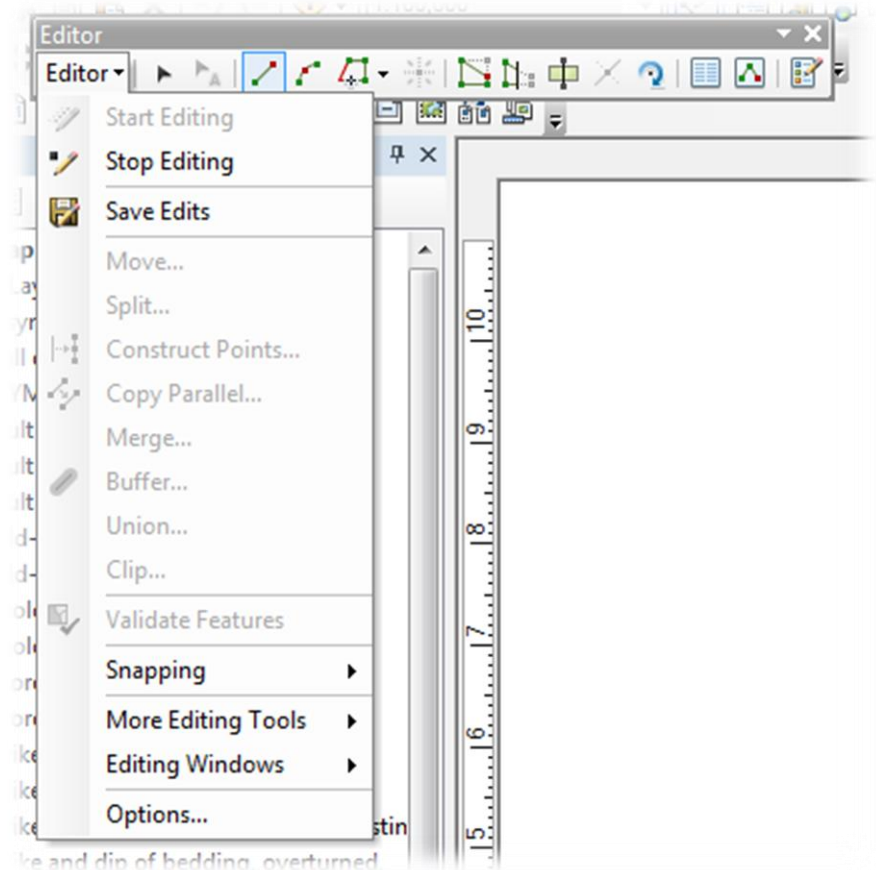
- Because your time is valuable and you're paranoid...
- Save as frequently as you're willing to redraw something...



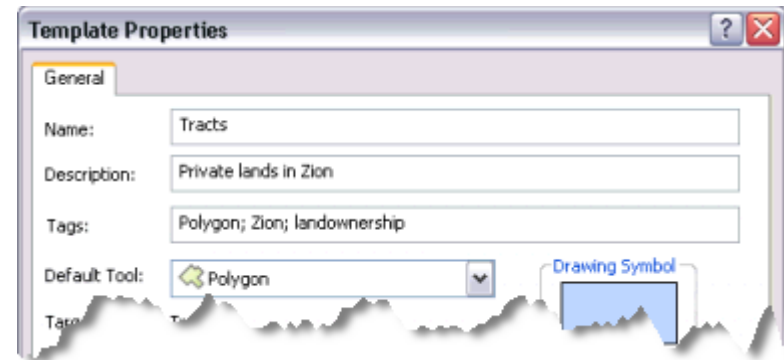
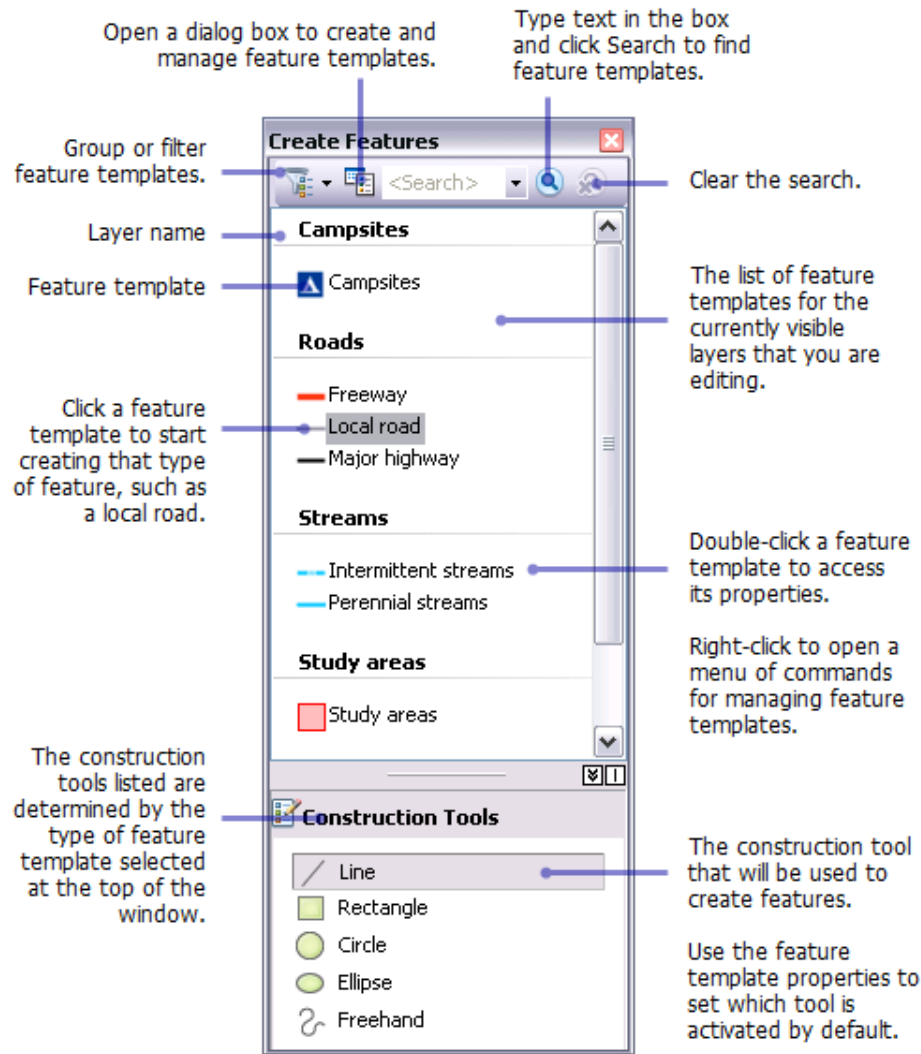
- Because You need to start somewhere..
- Because you are done with your work... don't worry it asks if you want to save your work.

THE EDITOR TOOLBAR

- Only active when you've started editing a layer
- Everything relies on feature templates..
- Encourages thinking about symbology, attributing, & drawing in one step



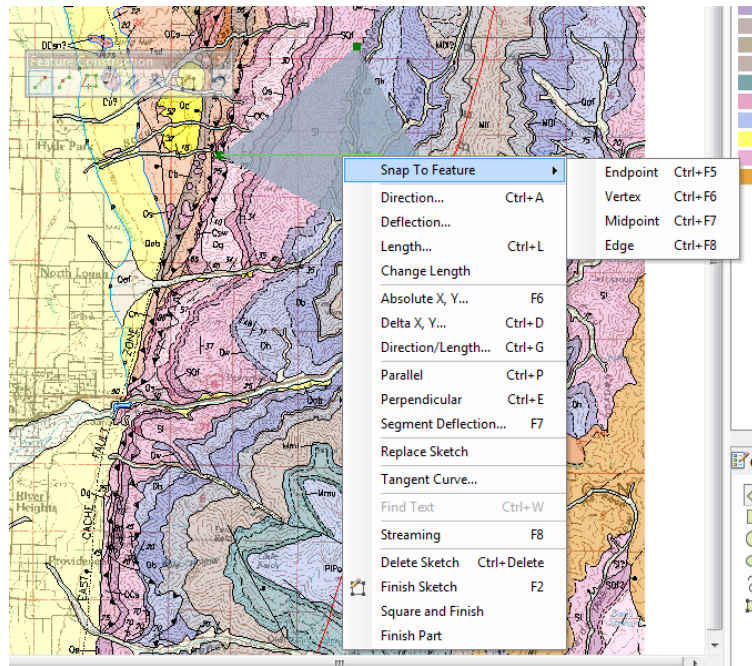
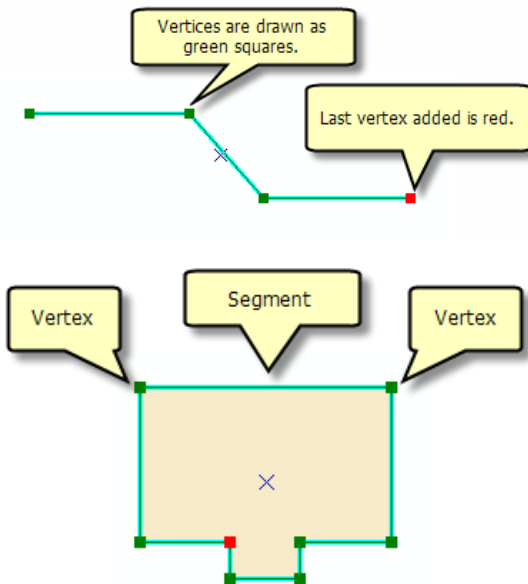
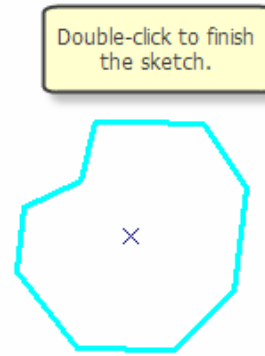
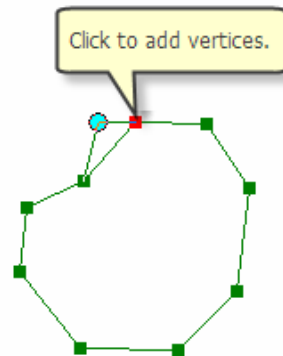
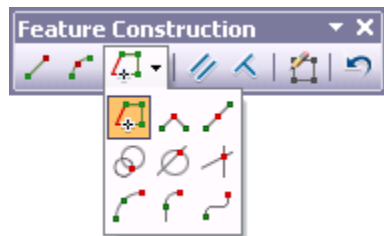
CREATING FEATURES WITH TEMPLATES



Templates impose symbology...

- You choose feature template
- Then choose construction tool

WHEN EDITING... JUST SKETCHING

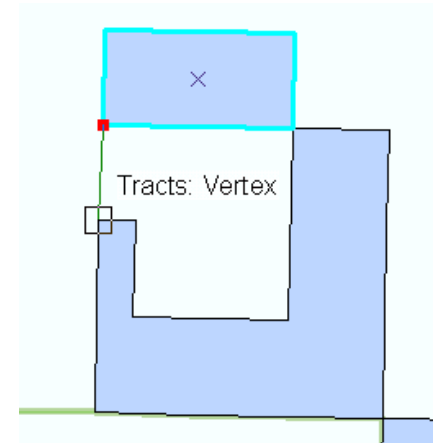
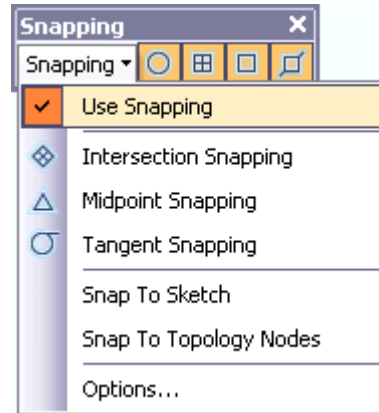


- Whatever you are drawing is a sketch, until you complete it (F2)
- Feature construction dialog follows you
- Right-click context allows you to do a lot more...

SNAPPING MAKES EDITING MORE ACCURATE

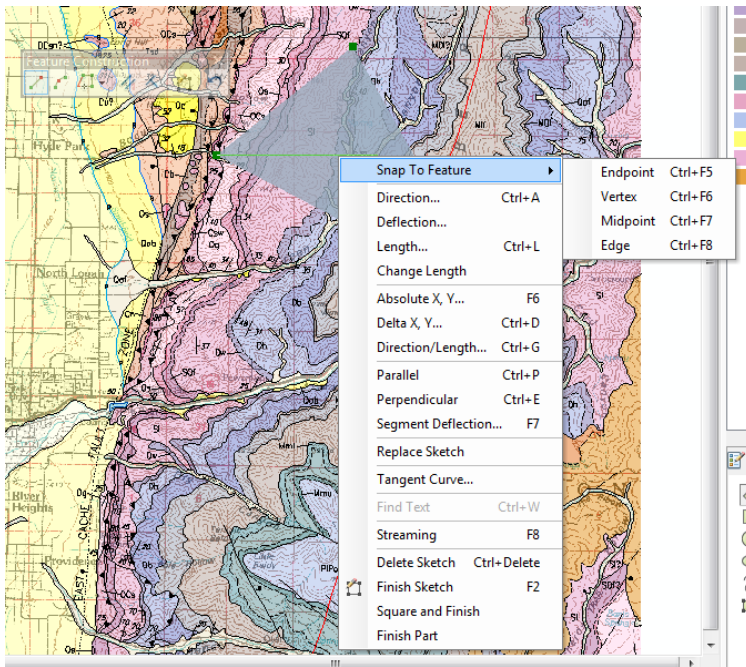
Snap Modes:

- Auto-snapping
- Manual-snapping



Snap Methods:

- Endpoint
- Vertex
- Midpoint
- Edge
- Intersection
- Tangent




SOME POLYGON TRICKS...

Creating adjoining polygons

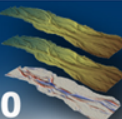
[Resource Center](#) » [Professional Library](#) » [Data Management](#) » [Editing data](#) » [Common editing tasks](#) » [Common polygon editing tasks](#)

If you are creating polygons of land uses, soils, counties, or property ownership, for example, you often need to create polygons next to one another. The polygons should share a border, but you want to avoid digitizing the border twice or having overlaps or spaces between polygons. You can use the Auto-Complete Polygon construction tool when creating new polygons to help ensure that your data forms a continuous fabric. With Auto-Complete Polygon, you can digitize a new polygon that adjoins an existing polygon, using the existing polygon's geometry and the edit sketch to define the edges of the new polygon.

Steps:

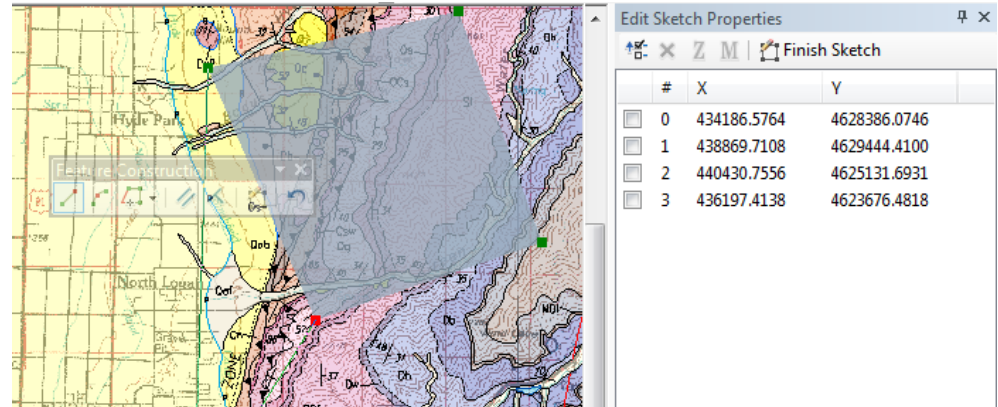
1. Click a polygon feature template in the **Create Features** window.
2. Click the **Auto-Complete Polygon** tool  on the **Create Features** window.
3. Starting from the boundary of an existing polygon in the same layer, digitize a boundary of the new polygon that will share a boundary with the existing polygon.
4. To change the shape of the sketch segment, click a construction method type on the **Editor** toolbar or on the **Feature Construction** mini toolbar. Segments can be created using a variety of methods—for example, as straight lines, with curves, or traced from the shapes of other features. You can also use keyboard shortcuts or right-click to access a menu of commands to help you place vertices in the sketch.
5. You can either snap the sketch to the edge of the existing polygon or finish the sketch just inside the existing polygon. The sketch must cross (or touch) the existing polygon edge at least two times for the new polygon to be created.

- Creating new features
 - Using feature templates
 - Defining new types of features to be created
 - Creating a point feature
 - About creating segments
 - Segment construction methods
 - The Feature Construction toolbar
 - Changing the edit sketch vertex and segment style
 - Placing a vertex in a line or polygon
 - Creating a curve
 - Creating a segment at an angle
 - Creating segments by tracing
 - Setting options for streaming
 - Creating segments by streaming vertices
 - Creating a feature by drawing freehand
 - Creating a circle feature
 - Creating an ellipse feature
 - Creating a rectangle feature
 - Creating adjoining polygons
 - Squaring off a line or polygon
 - Creating a multipoint feature
 - Creating a multipart feature
 - Creating geodetic features
 - Using a digitizer to create new features



EDIT SKETCH PROPERTIES

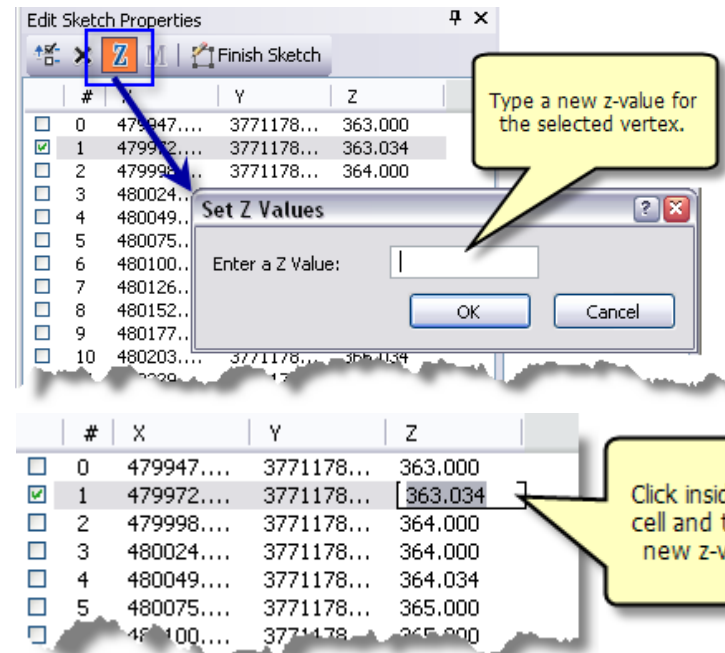
- For manually entering coordinates (when it needs to be exact)
- Also useful for Z and/or M



Edit Sketch Properties

✖ Z M Finish Sketch

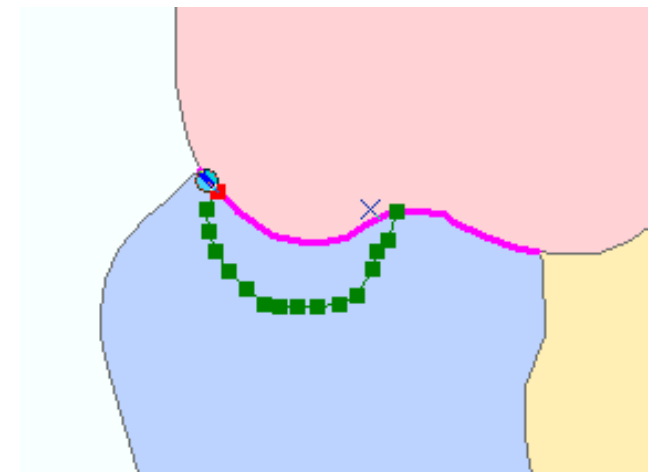
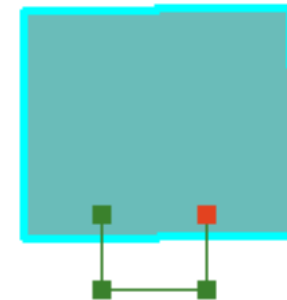
	#	X	Y	Z	M
<input type="checkbox"/>	0	-15391.862	5664860.848	73.000	1.000
<input type="checkbox"/>	1	-15389.203	5664859.420	73.000	2.000
<input type="checkbox"/>	2	-15381.676	5664855.375	196.333	3.000
<input checked="" type="checkbox"/>	3	-15375.675	5664835.435	223.000	4.000
<input checked="" type="checkbox"/>	4	-15368.733	5664812.364	223.000	5.000
<input checked="" type="checkbox"/>	5	-15364.342	5664797.775	223.000	6.000
<input type="checkbox"/>	6	-15360.128	5664783.769	223.000	7.000
<input checked="" type="checkbox"/>	7	-15356.089	5664770.348	223.000	8.000
<input checked="" type="checkbox"/>	8	-15352.050	5664756.927	270.667	9.000
<input type="checkbox"/>	9	-15384.152	5664747.267	187.500	10.000
<input checked="" type="checkbox"/>	10	-15397.845	5664740.734	187.500	11.000
<input type="checkbox"/>	11	-15429.912	5664731.086	187.500	12.000
<input type="checkbox"/>	12	-15425.699	5664717.078	187.500	13.000

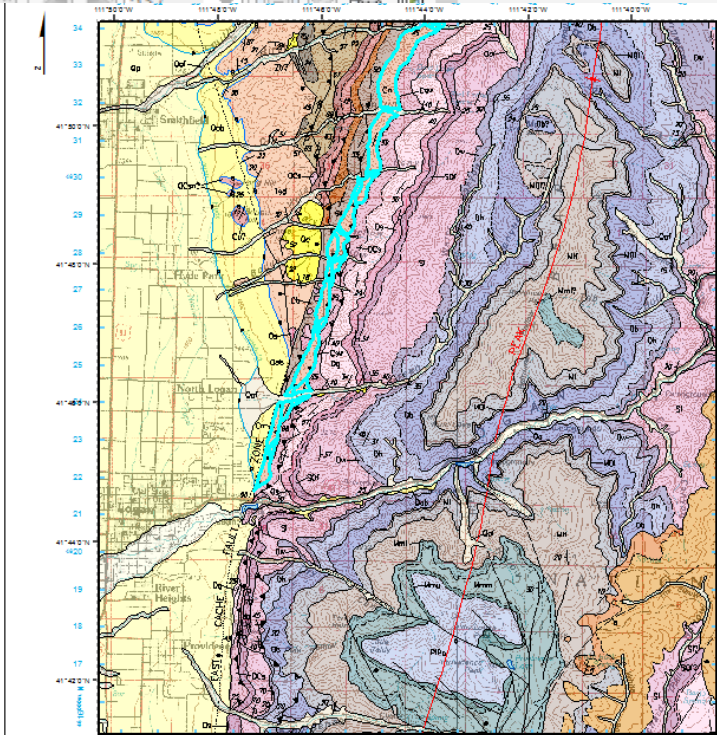


EDITING EXISTING FEATURES

- Edit Vertices
- Moving
- Deleteing
- Seperating
- Reshaping
- Splitting
- Flipping
- Scaling
- Rotating
- Slipping
- Trimming
- Simplifying

- Editing existing features
 - Selecting features while editing
 - Moving a feature
 - Rotating a feature
 - Deleting a feature
 - Separating a multipart feature (Explode)
 - Deleting a part from a multipart feature
 - Reshaping a line
 - Reshaping a polygon
 - Splitting a polygon
 - Flipping the direction of a line
 - Scaling a feature
 - Clipping a polygon feature
 - Methods for splitting line features
 - Splitting a line
 - Extending a line
 - Trimming a line
 - Simplifying and smoothing a feature
- Editing vertices and segments





Select by Attributes

Enter a WHERE clause to select records in the table window.

Method : Create a new selection

"FID"
"AREA"
"PERIMETER"
"GEOLOGY_"
"GEOLOGY_ID"

= < > Like
> > = And
< < = Or
_ % () Not

Is Get Unique Values Go To:

SELECT * FROM ClippedGeologicUnits WHERE:
"UNITSYMBOL" = 'Cn'

Clear Verify Help Load... Save...
Apply Close

UNITSYMO	UNIT
Dh	Hyrum Dolomite
Tsd	Diamantite facies of the Salt Lake For
Sl	Laketown Dolomite
Qc	Colluvium
Sl	Laketown Dolomite
Cb	Bloomington Formation
Cb	Bloomington Formation
Cn	Nounan Dolomite
Cn	Nounan Dolomite
Dw	Water Canyion Formation
Dh	Hyrum Dolomite
Qab	Alpine and Bonneville Formations
Tsd	Diamantite facies of the Salt Lake For
Db	Beirdneek Formation
Csw	Worm Creek Quartzite Member of the S
OCs	St. Charles Formation
Qaf	Side-stream alluvium and fan deposits
Qc	Colluvium
Dw	Water Canyion Formation
Cb	Bloomington Formation
Dw	Water Canyion Formation
Csw	Worm Creek Quartzite Member of the S
OCs	St. Charles Formation
OCs	St. Charles Formation
Cn	Nounan Dolomite
Cn	Nounan Dolomite
Tsd	Diamantite facies of the Salt Lake For
Tsd	Diamantite facies of the Salt Lake For
Qaf	Side-stream alluvium and fan deposits

DIGITIZING

Such fun!

Manual types:

1. On-Screen Digitizing

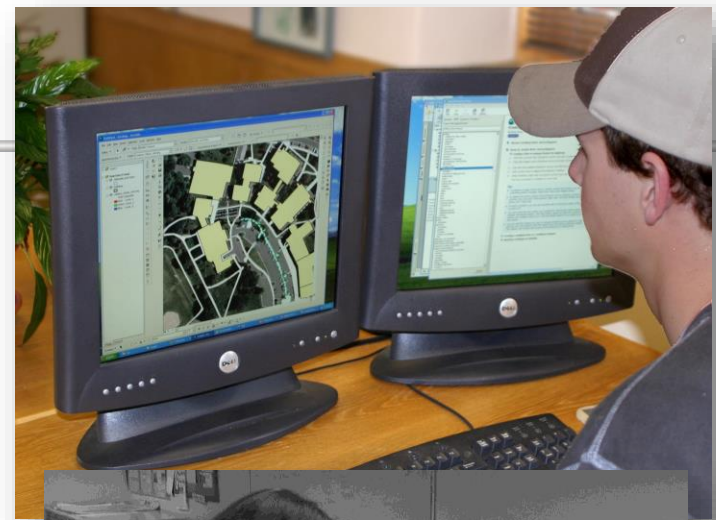
1. Based on a scanned image

2. Hardcopy Map Digitizing

1. Use a tablet, digitizer

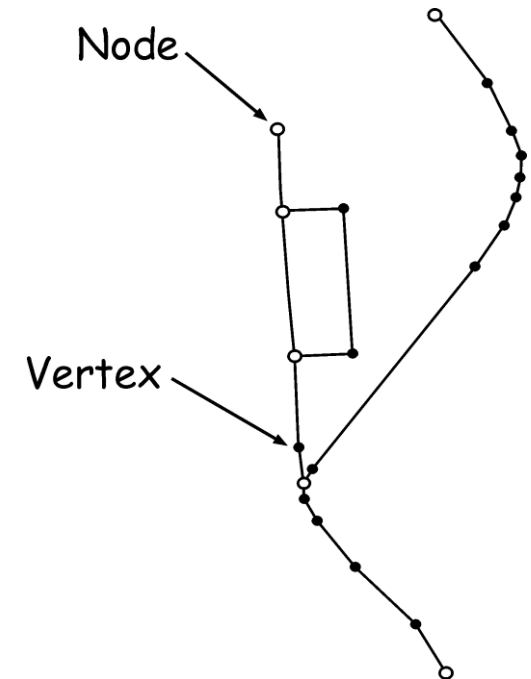
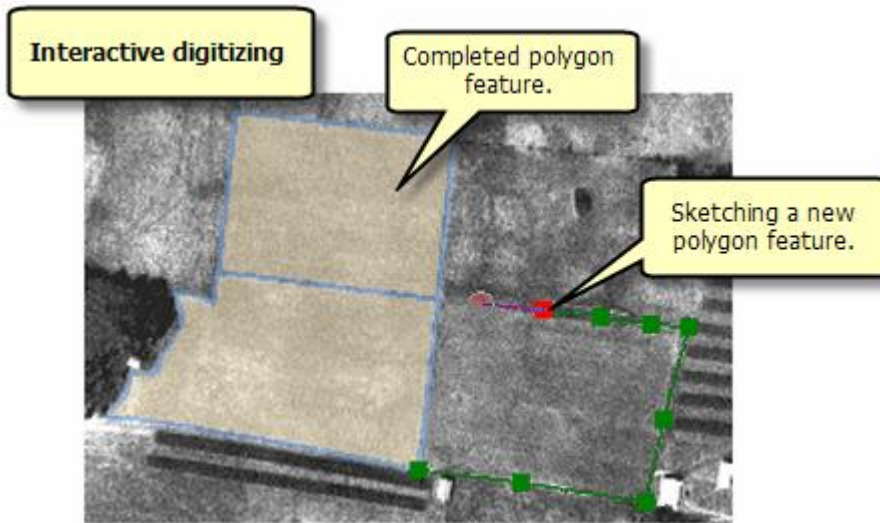
In addition:

Scanned data can *sometimes* be automatically digitized but always requires fixing



DIGITIZING PROCESS

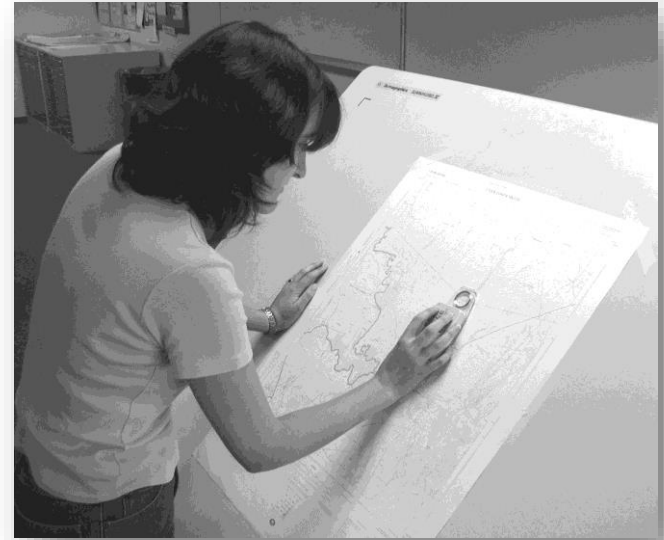
- Creation of digital vector data from either scanned images (i.e. raster data or physical hard-copy maps)



THE TABLET... NOT THE GIRL

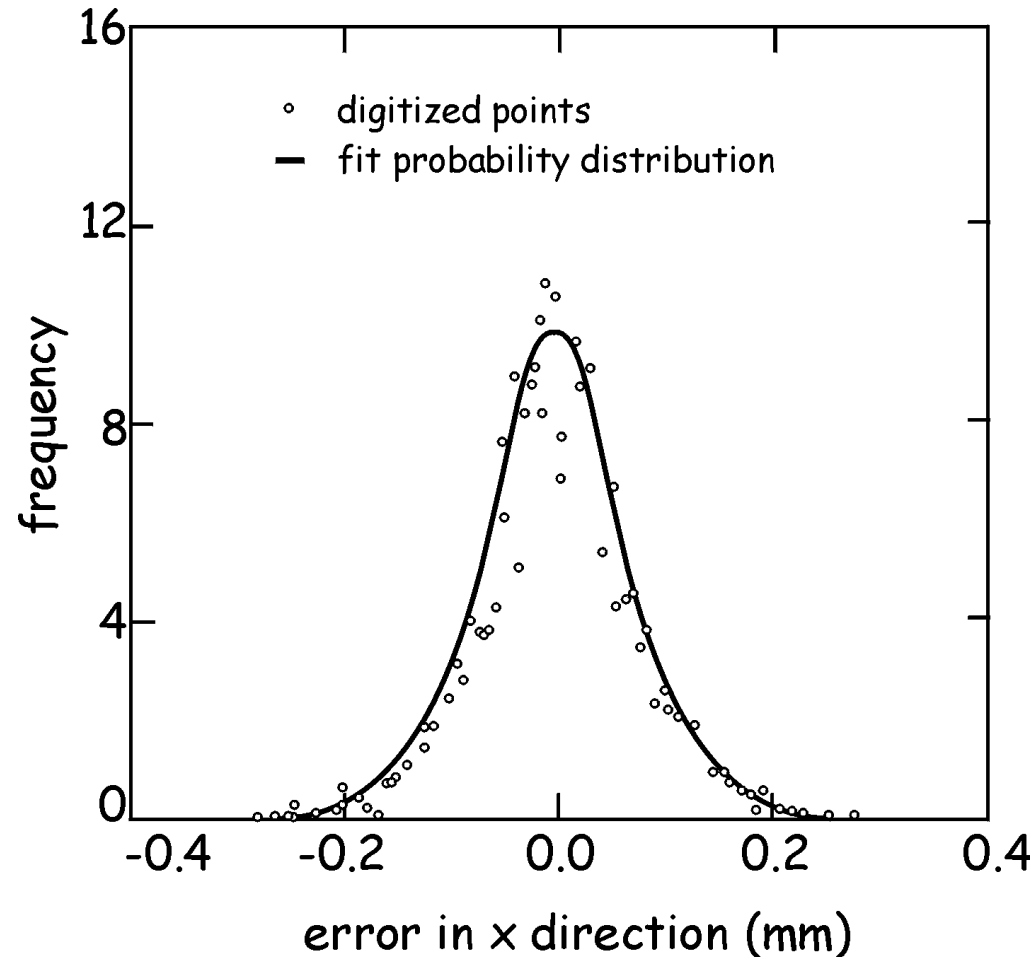


= Death to:

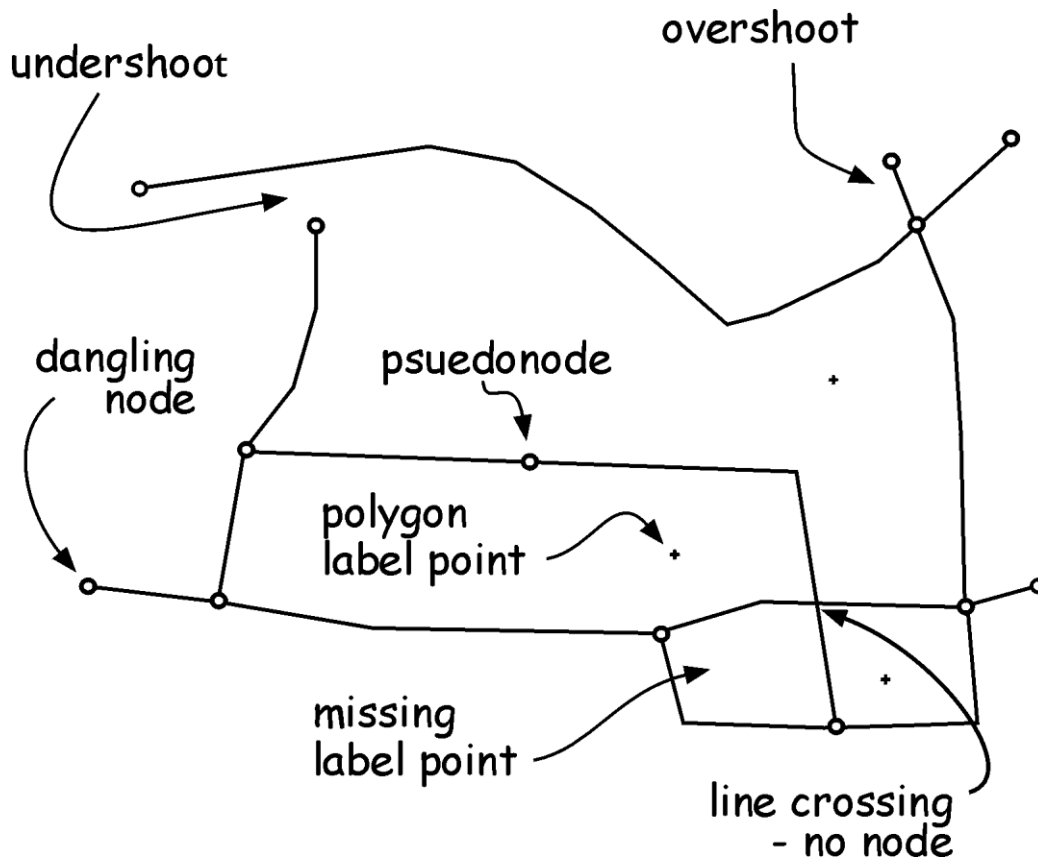


DIGITIZING ERROR

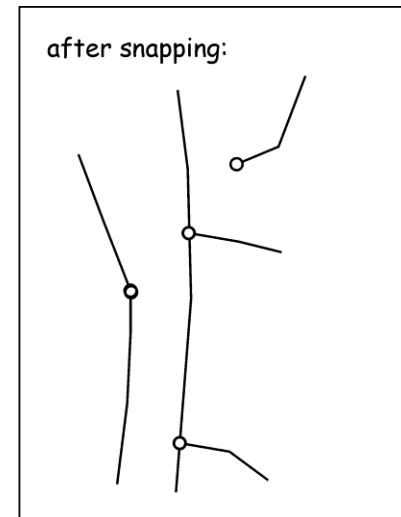
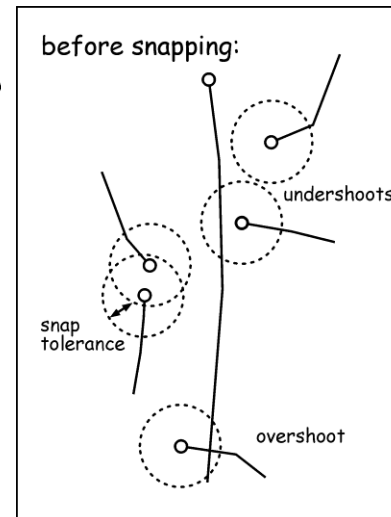
- In practice, errors are random and normally distributed about zero (this is good)
- If not, there is bias in your digitization



ONE SOURCE OF BIAS: BLUNDERS



- Snapping can help!
- CAD would be better yet...
- Or Topology Rules!



TODAY'S PLAN

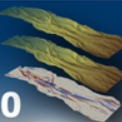
I. Editing... What is it?

II. Some Editing Workflows

III. Attributes & Attributing

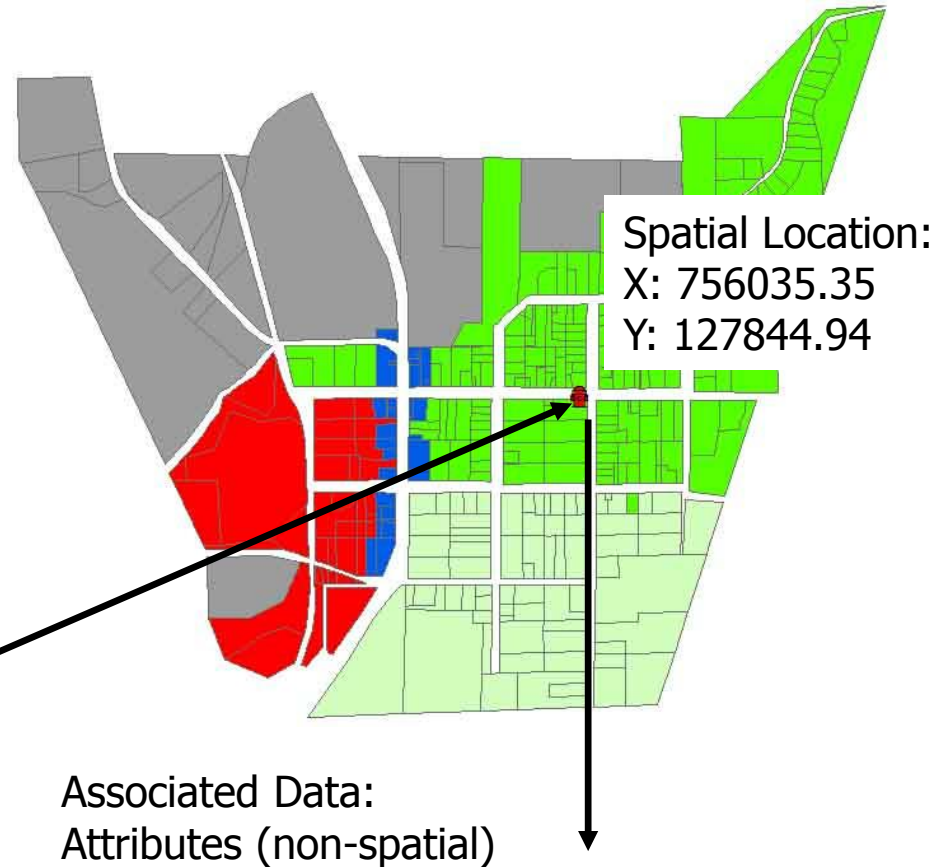
IV. Metadata

V. Some Comments...



GIS AND ATTRIBUTE DATA

Geographic (spatial) data, by default, has some type of attribute (non-spatial) data that need be stored such that they are easily accessible for query and analysis purposes



Type	Color	LastFix	FlowRate	Repair
Fire Hydrant	Red	6/23/03	200gpm	No

WHAT IS THE KEY STEP YOU HAVE TO TAKE TO ADD ATTRIBUTES?

Table

geologic units

FID	Shape *	AREA	PERIMETE	GEOLOGY	GEOLOGY_I	UNITSYMBOL	UNITNAME	AGE	NOTES
0	Polygon	3200105.667	13327.64	2	1	Ts	Salt Lake Formation	Pliocene and Miocene	
1	Polygon	5683455.731	37018.518	3	2	Ts	Salt Lake Formation	Pliocene and Miocene	
2	Polygon	11873.226	456.085	4	3	Qab	Alpine and Bonneville Formations	Pleistocene	
3	Polygon	2530497.878	28861.193	5	4	Ts?	Salt Lake Formation?	Pliocene and Miocene	
4	Polygon	88492248.67	165523.536	6	5	Qp	Provo Formation	Pleistocene	
5	Polygon	22646710.011	162393.325	7	6	Qa	Main-stream alluvium	Holocene	
6	Polygon	65810899.536	67142.778	8	7	Qp	Provo Formation	Pleistocene	
7	Polygon	241294.037	5166.28	9	8	Qaf	Side-stream alluvium and fan deposits	Holocene and Pleistocene	
8	Polygon	286378.988	2364.656	10	9	Qp	Provo Formation	Pleistocene	
9	Polygon	142844.267	2680.057	11	10	Qp	Provo Formation	Pleistocene	
10	Polygon	105457.373	1872.263	12	11	Qp	Provo Formation	Pleistocene	
11	Polygon	5092086.625	11911.497	13	12	Qp	Provo Formation	Pleistocene	
12	Polygon	681491.923	11954.917	14	13	Qaf	Side-stream alluvium and fan deposits	Holocene and Pleistocene	
13	Polygon	12904060.845	23957.92	15	14	Qp	Provo Formation	Pleistocene	
14	Polygon	2649421.144	12230.873	16	15	Qab	Alpine and Bonneville Formations	Pleistocene	
15	Polygon	5683767.098	14450.567	17	16	Tsd	Diamatite facies of the Salt Lake Formation	Pliocene and Miocene	
16	Polygon	3167062.365	8498.487	18	17	Zm	Mutual Formation	Late Proterozoic	
17	Polygon	451896.769	7028.253	19	18	Zb	Browns Hole(?) Formation	Late Proterozoic	
18	Polygon	1985495.503	8182.222	20	19	Cgl	Lower member of the Geertzen Canyon Quartzite	Lower Cambrian	
19	Polygon	3027046.447	8152.366	21	20	Cgu	Upper member of the Geertzen Canyon Quartzite	Lower Cambrian	
20	Polygon	414991.853	4652.791	22	21	Cl	Langston Dolomite	Middle Cambrian	
21	Polygon	515398.647	4340.264	23	22	Cu	Ute Formation	Middle Cambrian	
22	Polygon	331697.2	3572.775	24	23	Cbl	Blacksmith Dolomite	Middle Cambrian	
23	Polygon	873632.472	3783.94	25	24	Cb	Bloomington Formation	Middle Cambrian	
24	Polygon	2887088.131	14516.296	26	25	Cn	Nounan Dolomite	Upper and Middle Cambrian	
25	Polygon	270942.876	10037.051	27	26	Csw	Worm Creek Quartzite Member of the St. Charles Formation	Upper Cambrian	
26	Polygon	8666327.954	33838.599	28	27	OCs	St. Charles Formation	Lower Ordovician and Upper Cambrian	
27	Polygon	22606421.551	74539.992	29	28	Og	Garden City Formation	Middle and Lower Ordovician	
28	Polygon	953457.871	4995.452	30	30	Tw	Wasatch Formation	middle and lower Eocene	
29	Polygon	585615.231	12152.734	31	31	Qaf	Side-stream alluvium and fan deposits	Holocene and Pleistocene	

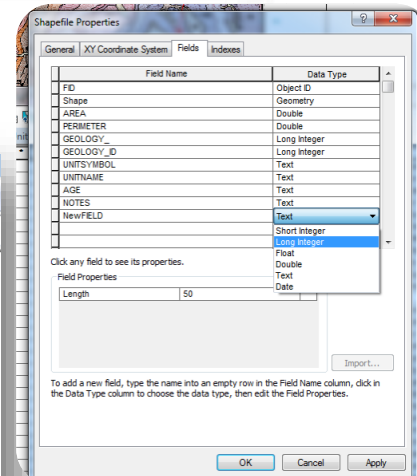
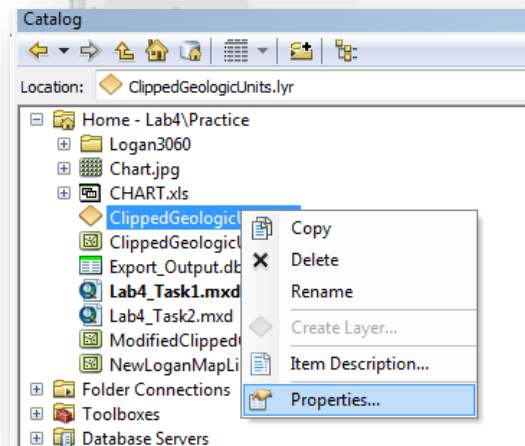
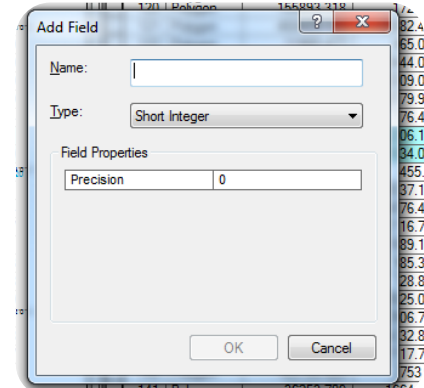
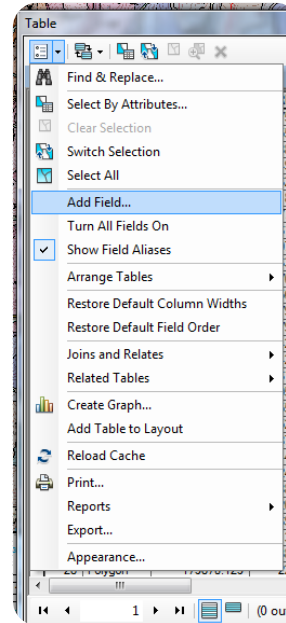
1 1 (0 out of 5341 Selected)

geologic units

- Add a new field... (i.e. column in the attribute table)

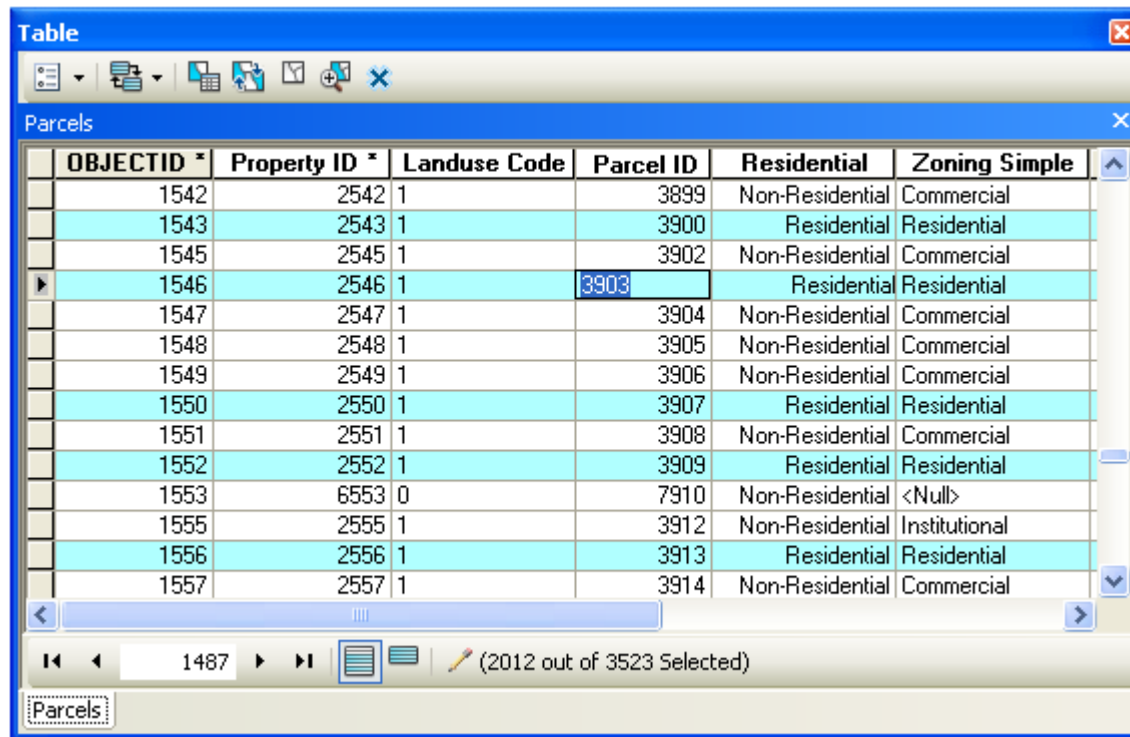
SOME FUNNY RULES ABOUT ADDING FIELDS

- You cannot *Add Field* in an active edit session
 - Solution: Stop Editing
- You cannot (always) *Add Field* from ArcCatalog if the feature is a layer in the table of contents of an open ArcMap Document
 - Solution: Unload layer or close ArcMap



EDITING IN THE TABLE WINDOW

- In an active edit session...
- What does it typically mean when you try to change a value and Arc won't let you?



Table

Parcels

	OBJECTID *	Property ID *	Landuse Code	Parcel ID	Residential	Zoning Simple
	1542	2542	1	3899	Non-Residential	Commercial
	1543	2543	1	3900	Residential	Residential
	1545	2545	1	3902	Non-Residential	Commercial
▶	1546	2546	1	3903	Residential	Residential
	1547	2547	1	3904	Non-Residential	Commercial
	1548	2548	1	3905	Non-Residential	Commercial
	1549	2549	1	3906	Non-Residential	Commercial
	1550	2550	1	3907	Residential	Residential
	1551	2551	1	3908	Non-Residential	Commercial
	1552	2552	1	3909	Residential	Residential
	1553	6553	0	7910	Non-Residential	<Null>
	1555	2555	1	3912	Non-Residential	Institutional
	1556	2556	1	3913	Residential	Residential
	1557	2557	1	3914	Non-Residential	Commercial

1487 (2012 out of 3523 Selected)

Parcels

THE ATTRIBUTES WINDOW...

- A powerful tool for query & editing...

Expand all relationships in branch

Sort fields alphabetically

Set field appearance options

Sort fields by layer order

Click the layer name to update values for all the selected features in that layer.

Related table

The Blocks layer's display expression is "Block ID:" and an ID.

Attribute values for this feature are shown below.

Click a related item to edit its values.

Field with highlighting enabled

Click a cell to change the value.

Subtype field

Field used to symbolize the layer

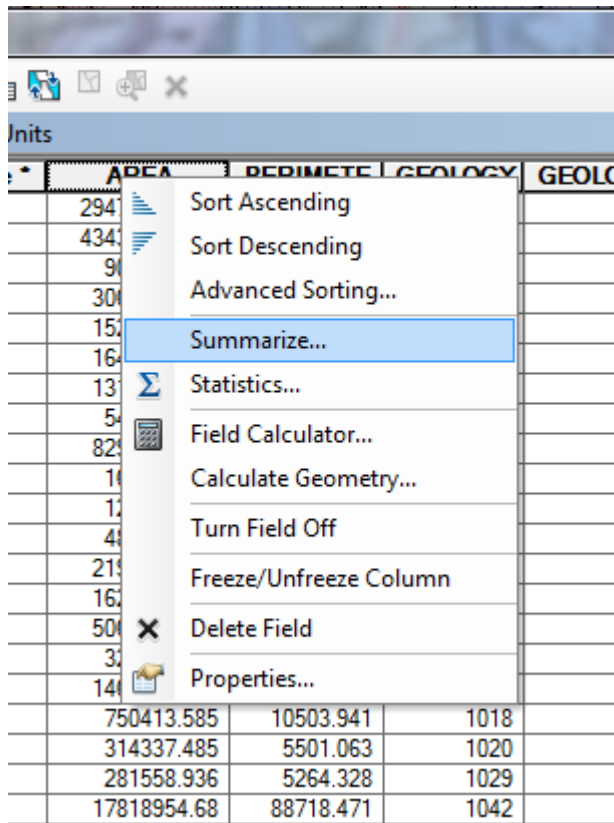
ArcGIS system field

System information about the selected field

OBJECTID	1993
Property ID	2993
Parcel ID	4350
Land-use code	1
Residential status	Non-Residential
Zoning - simple	Commercial
Zoning code	1
SHAPE_Length	353.626517

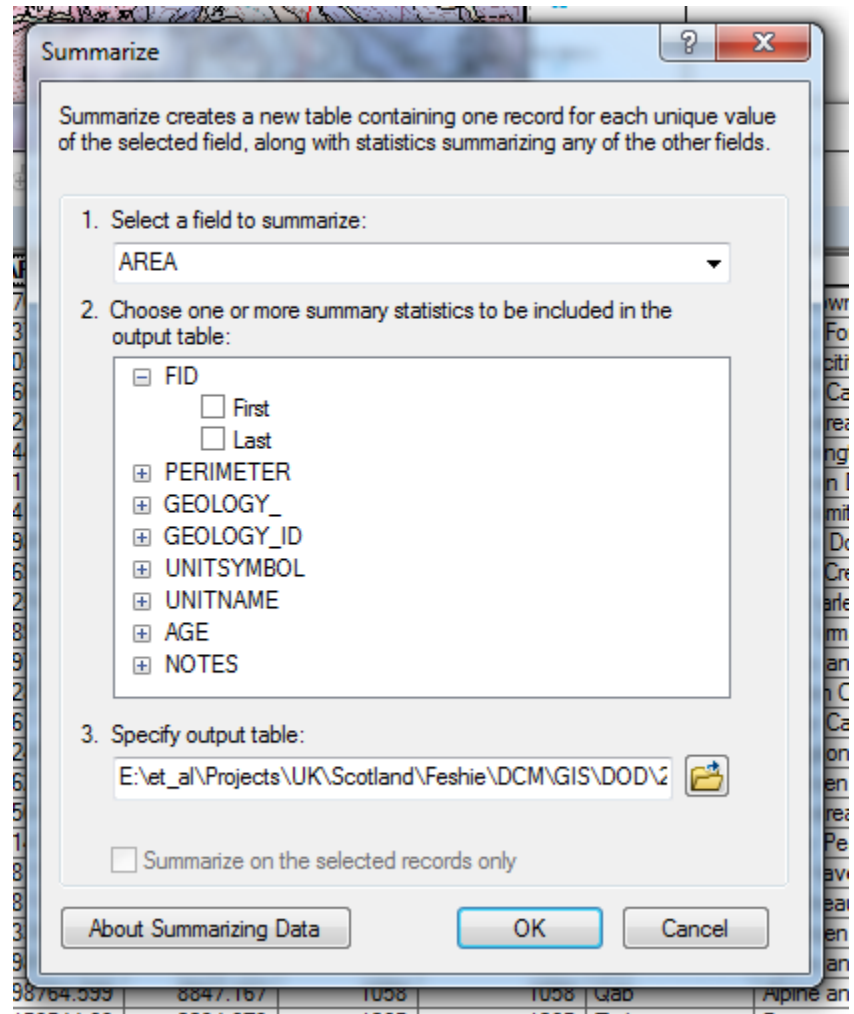
Parcel ID
Long Integer
Null values allowed

SUMMARIZE...



The screenshot shows a context menu for a table with columns AREA, PERIMETER, GEOLOGY, and GEOLOGY_ID. The 'Summarize...' option is highlighted in blue. Other options include Sort Ascending, Sort Descending, Advanced Sorting..., Statistics..., Field Calculator..., Calculate Geometry..., Turn Field Off, Freeze/Unfreeze Column, Delete Field, and Properties...

AREA	PERIMETER	GEOLOGY	GEOLOGY_ID
294			
434			
9			
30			
15			
16			
13			
5			
82			
1			
12			
4			
21			
16			
50			
3			
14			
750413.585	10503.941		1018
314337.485	5501.063		1020
281558.936	5264.328		1029
17818954.68	88718.471		1042



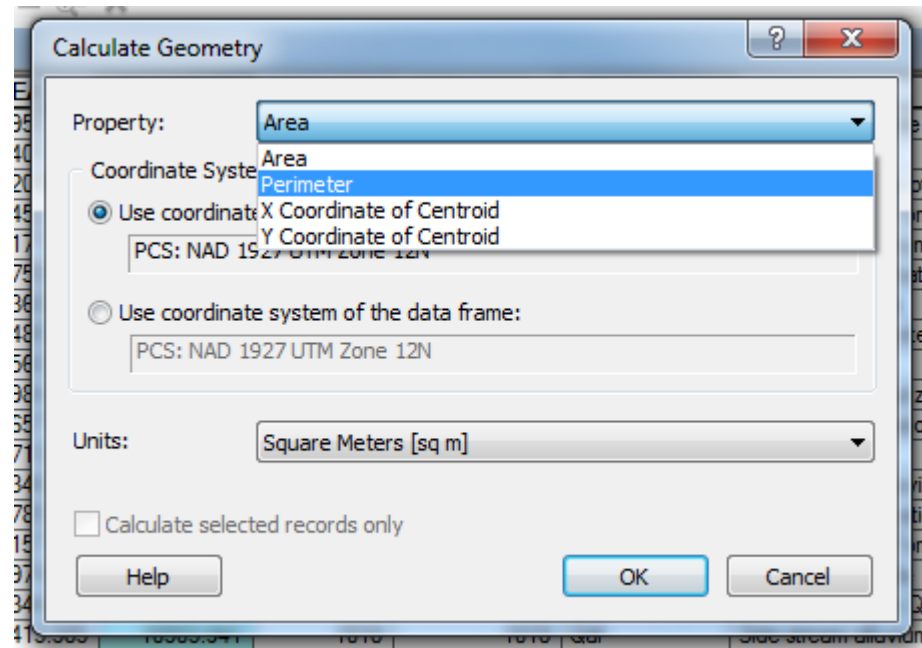
The 'Summarize' dialog box is shown with the following settings:

- 1. Select a field to summarize: AREA
- 2. Choose one or more summary statistics to be included in the output table:
 - ☐ FID
 - ☐ First
 - ☐ Last
 - ☒ PERIMETER
 - ☒ GEOLOGY_
 - ☒ GEOLOGY_ID
 - ☒ UNITSYMBOL
 - ☒ UNITNAME
 - ☒ AGE
 - ☒ NOTES
- 3. Specify output table: E:\et_al\Projects\UK\Scotland\Feshie\DCM\GIS\DOD\2
- ☐ Summarize on the selected records only

Buttons: About Summarizing Data, OK, Cancel

CALCULATE GEOMETRY – SMART ATTRIBUTING

- What you can calculate depends on feature type
- You choose coordinate system
- You choose Units

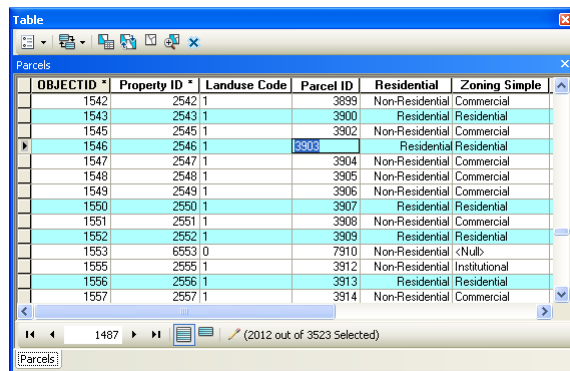


	Area	Perimeter	3D perimeter	Length	3D length	X-, y-, or z-coordinate of centroid	X-, y-, or z-coordinate of point	X-, y-, or z-coordinate of start point	X-, y-, or z-coordinate of endpoint	X-, y-, or z-coordinate of midpoint	Min, max of z-coordinate
Polygon features	✓	✓	✓			✓					✓
Line features				✓	✓			✓	✓	✓	✓
Annotation features						✓					
Point features							✓				

Geometric properties that can be calculated for specific types of features

FIELD CALCULATOR – SMART ATTRIBUTING

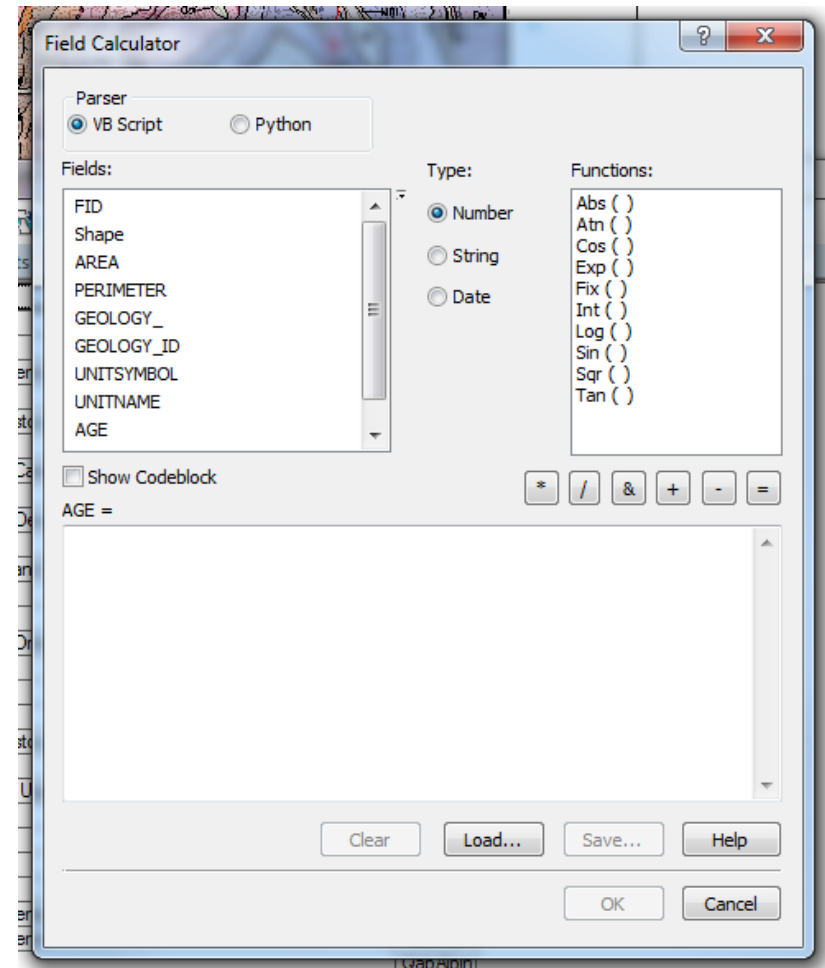
- Powerful form of spatial analysis...
- You can come up with just about anything that combines existing attributes...



A screenshot of a data table titled 'Table' with a 'Parcels' tab selected. The table has columns: OBJECTID, Property ID, Landuse Code, Parcel ID, Residential, and Zoning Simple. The data is as follows:

OBJECTID	Property ID	Landuse Code	Parcel ID	Residential	Zoning Simple
1542	2542	1	3899	Non-Residential	Commercial
1543	2543	1	3900	Residential	Residential
1545	2545	1	3902	Non-Residential	Commercial
1546	2546	1	3903	Residential	Residential
1547	2547	1	3904	Non-Residential	Commercial
1548	2548	1	3905	Non-Residential	Commercial
1549	2549	1	3906	Non-Residential	Commercial
1550	2550	1	3907	Residential	Residential
1551	2551	1	3908	Non-Residential	Commercial
1552	2552	1	3909	Residential	Residential
1553	6553	0	7910	Non-Residential	Null
1555	2555	1	3912	Non-Residential	Institutional
1556	2556	1	3913	Residential	Residential
1557	2557	1	3914	Non-Residential	Commercial

At the bottom, it shows '1487' and '(2012 out of 3523 Selected)'.



YOUR EXCERCISE

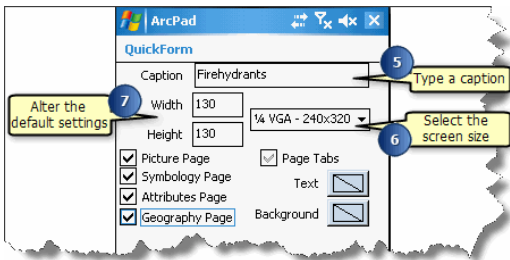
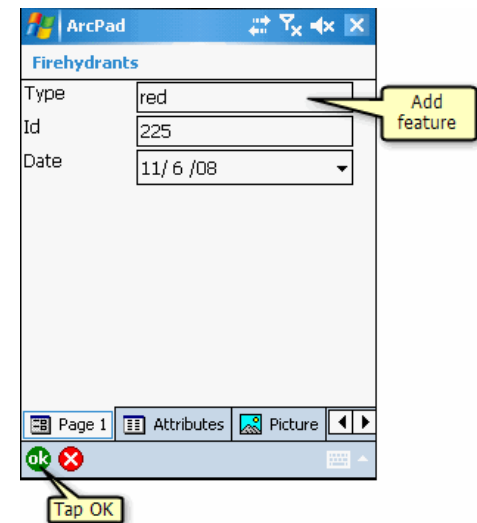
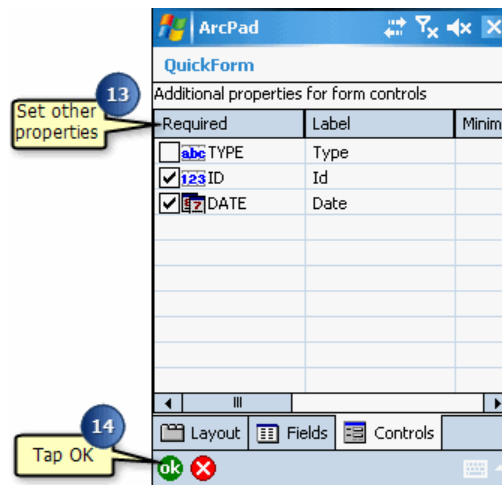
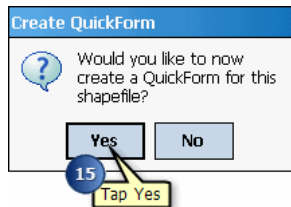
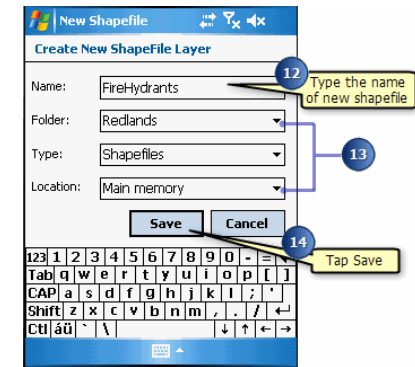
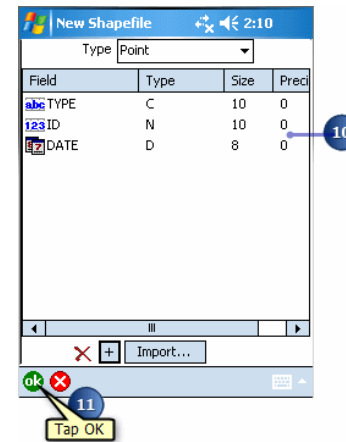
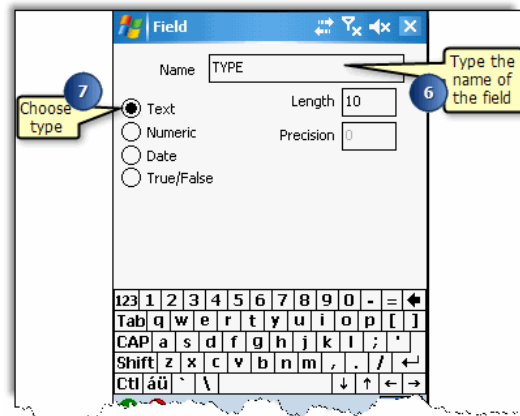
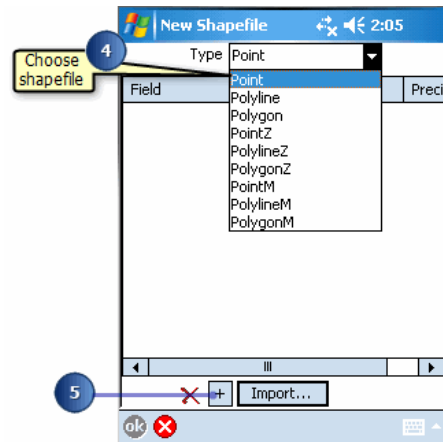
- Break into groups of 2-4 people
 - Define your overarching question or field monitoring problem
 - What type of information you want to collect (polygons, polylines or points)
 - How you would represent that as attributes and pop-up dialogs
 - What the field types would be (e.g. text, numeric, integer, drop-down, button, radios, images, etc.

ARCPAD MAKES IT EASY (SORT OF)

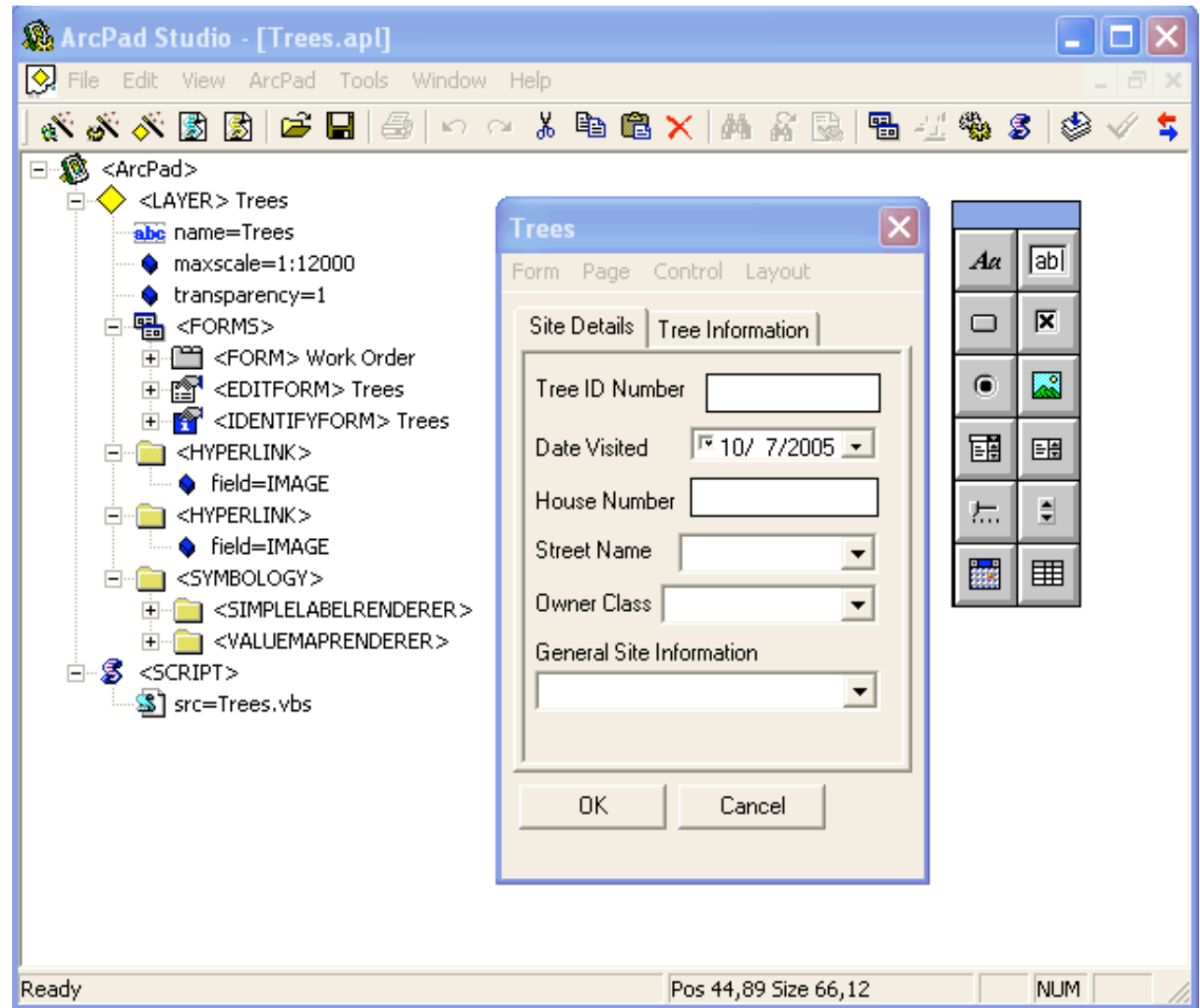
- Attribute that data in the field (when collecting raw data) instead of back in the office...
- Build in error checking...



CREATE SHAPEFILE, THEN QUICKFORM



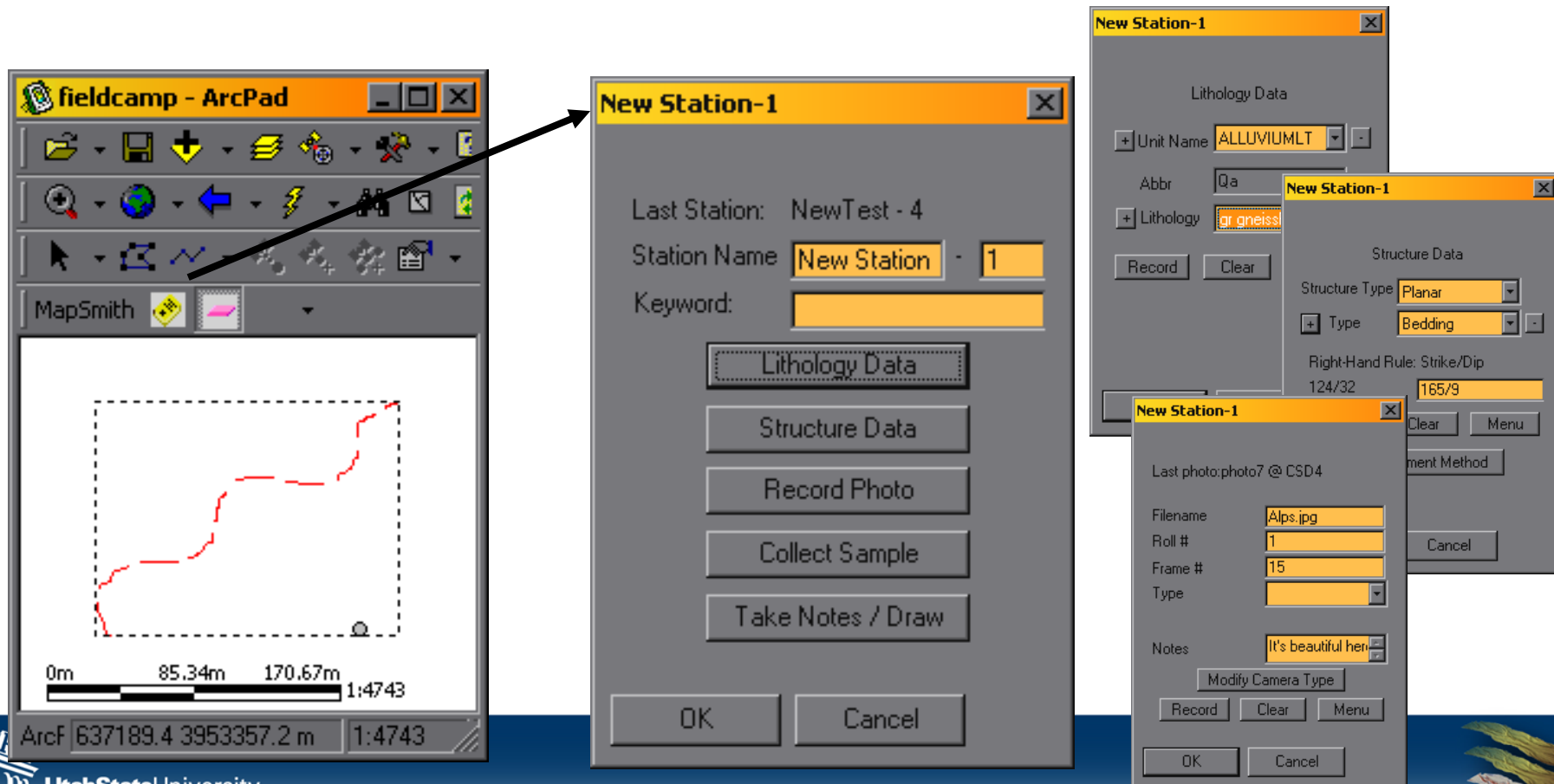
ArcPad STUDIO FOR FANCIER APPS.



ATTRIBUTING DURING DATA COLLECTION

An ArcPad extension with a suite of editing and text tools that integrate with GPS for the collection of **point** data.

(Mapsmith example from MIT Geosciences)



SUMMARY OF COMMON ATTRIBUTE TASKS

Common task or workflow	Where to go for more information	Available geoprocessing tools
Creating a new table	Creating tables To learn about other types of data sources you can use in tables, see About tabular data sources .	Create Table
Importing, copying, and converting tabular data sources	Importing tables An overview of adding datasets to the geodatabase To learn about the importing process and the geodatabase, see How data converts when importing .	Table To Geodatabase Table To Table Table To dBASE Copy Rows
Adding fields	Adding and deleting fields To learn about fields and their data types, see Geodatabase field data types .	Add Field Delete Field
Displaying tables	Adding and viewing tables in ArcMap Previewing a table in ArcCatalog Setting field properties, aliases, and table display options	Make Table View
Creating associations among tables, such as joining, relating, and using relationship classes	About joining and relating tables Joining tables Relating tables Relationships and ArcGIS Deciding between relationship classes, joins, and relates	Add Join Remove Join Create Relationship Class
Editing attribute values	Editing values in a table Editing attributes	
Calculating the values in fields	Making field calculations Working with date fields	Calculate Field
Printing tables	Printing a table	
Creating a layer from a table with x,y coordinate data	Add x,y data to ArcMap to display it	Make XY Event Layer
Using linear referencing	An overview of linear referencing	An overview of the Linear Referencing toolbox
Geocoding a table of addresses	An overview of geocoding	An overview of the Geocoding toolbox

Common table-related tasks and where to go for more information



CHEAP DESIGN & MONITORING APPs...

- Transparently document design intent
- Articulate explicit, testable design hypotheses (THE EXPERIMENT)
- Combines design, installation & monitoring into one App



FileMaker.



All buttons and features accessible in LifeJacket, including speaker and microphone

Enhanced shock and scratch protection

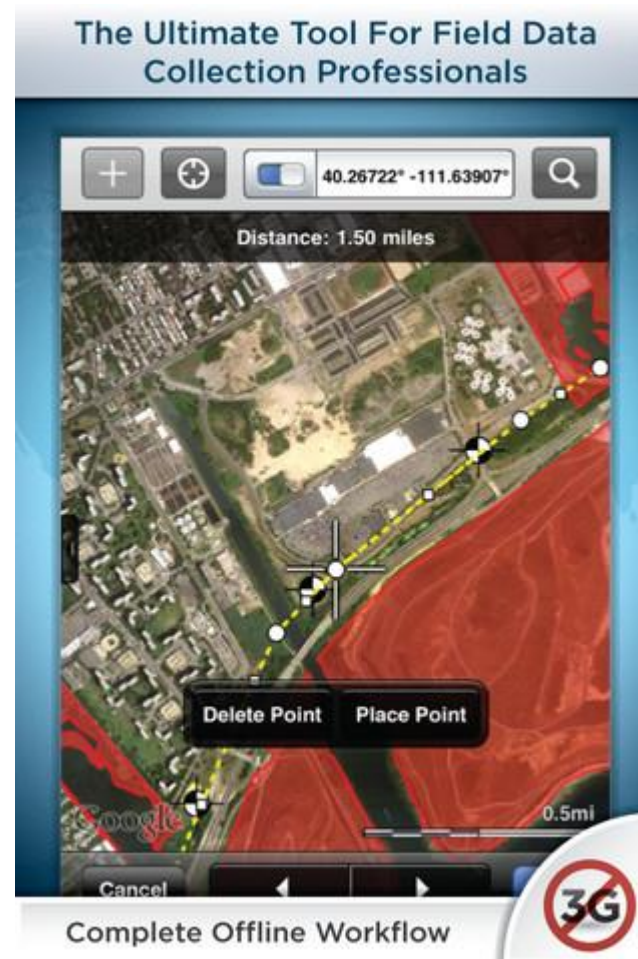
Buoyant - will float to surface if dropped in water



Nick Weber of Eco Logical Research, Inc.

WATS 4930

GAFRA - GIS PRO



- \$299 ... It isn't perfect... but

STREAM RESTORATION DESIGN APP...

iPad 7:02 AM 94%

AsotinDWS_v1.2_Master

Main SF-S2-061 Design Implement

Section Name SF-S2 DWS Number 051 DWS Name SF-S2-051

Design Date 6/21/2012 Design Crew SB

General Wood Photos

Bank Location RL Post Orientation 120

Est Post Count 4 to 6 % Channel Constriction 60-70

LWD Intro Type 2 Guy LWD

Anchor Feature ☒ Boulder ☐ Wood ☐ LWD ☐ Roots ☐ Rock Structure

Existing Feature ☐ Forced Pool ☐ Bank Erosion ☐ Eddy Bar ☐ Tree Recruitment ☐ Riffle ☐ Plunge Pool ☒ Undercut ☐ Mid Channel Bar

Exploit Existence Of ☒ Boulder ☐ Wood ☐ LWD ☐ Roots ☐ Rock Structure

Intended Response ☒ Forced Pool ☐ Bank Erosion ☐ Eddy Bar ☐ Tree Recruitment ☒ Riffle ☐ Plunge Pool ☒ Undercut ☐ Other... ☐ Mid Channel Bar

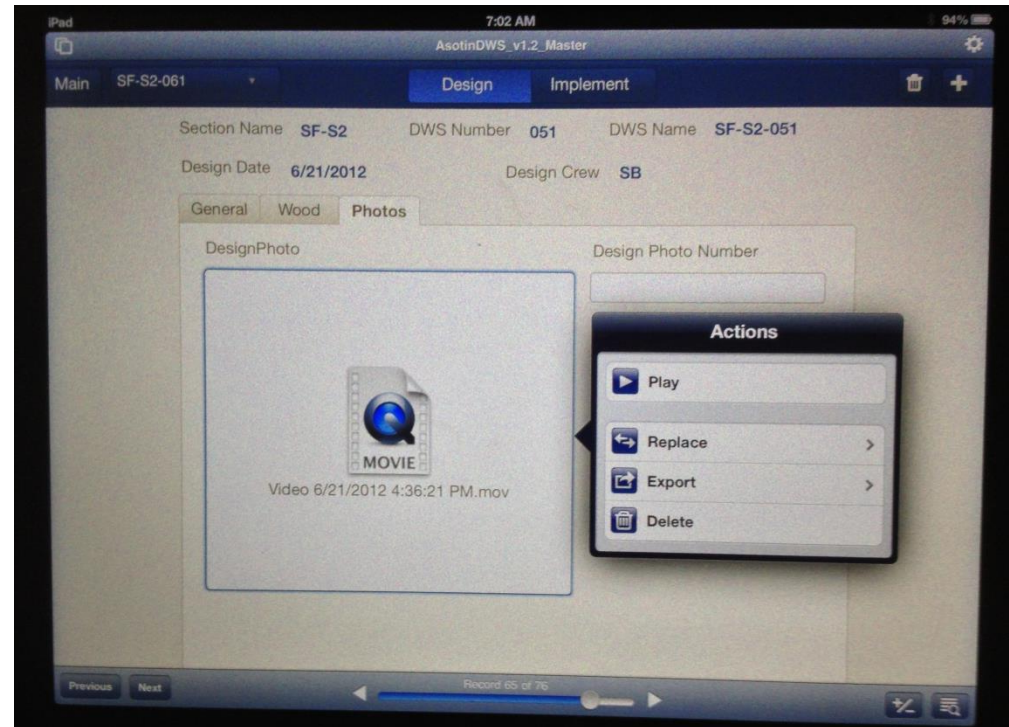
DWS Design Notes

Get Lat Long

iPad_Design Record 65 of 76

WHEN IT DOES NOT FIT IN THE FORM...

- A geotagged video or voice note captures the observations...
- Don't let technology stifle the power of observation
- Designers record video & optionally installation crew records video



TYPICAL YouTube CAT DESIGN VIDEO

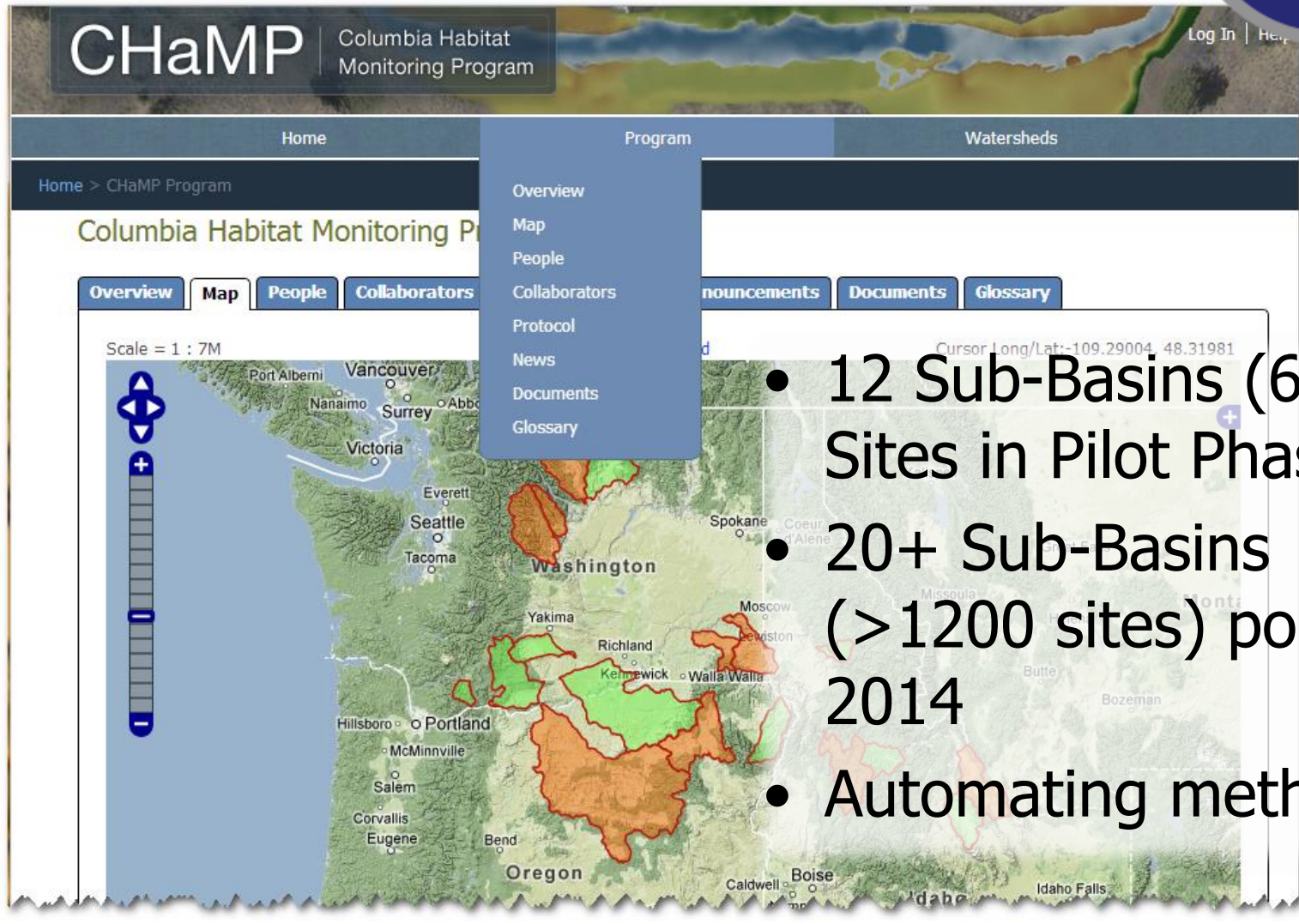
- Not going to win any



THIS IS NOT JUST ACADEMIC...

CHaMP

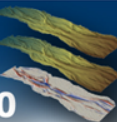
- Columbia Habitat Monitoring Program



- 12 Sub-Basins (600 Sites in Pilot Phase)
- 20+ Sub-Basins (>1200 sites) post 2014
- Automating methods

TODAY'S PLAN

- I. Editing... What is it?
- II. Some Editing Workflows
- III. Attributes & Attributing
- IV. Metadata**
- V. Some Comments...



WHAT IS METADATA?

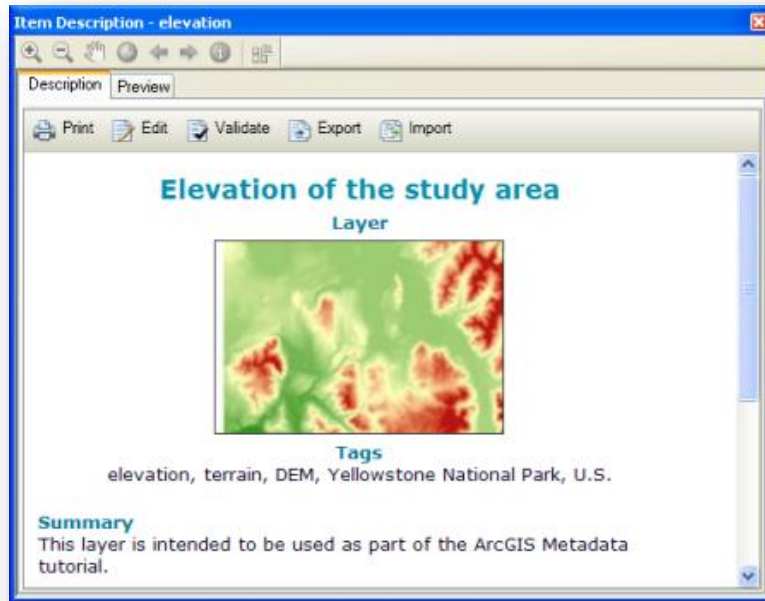
What is metadata?

[Resource Center](#) » [Professional Library](#) » [Data Management](#) » [Geographic data types](#) » Metadata

Most items in ArcGIS have a description that relates what the item is. This description is technically referred to as the item's metadata.

There are lots of things you can say about GIS resources. Many communities and organizations have tried to standardize what those things are to avoid miscommunication and wasted time with GIS resources that aren't quite what you needed. Some people must create metadata following a standard for their GIS resources, while others do not.

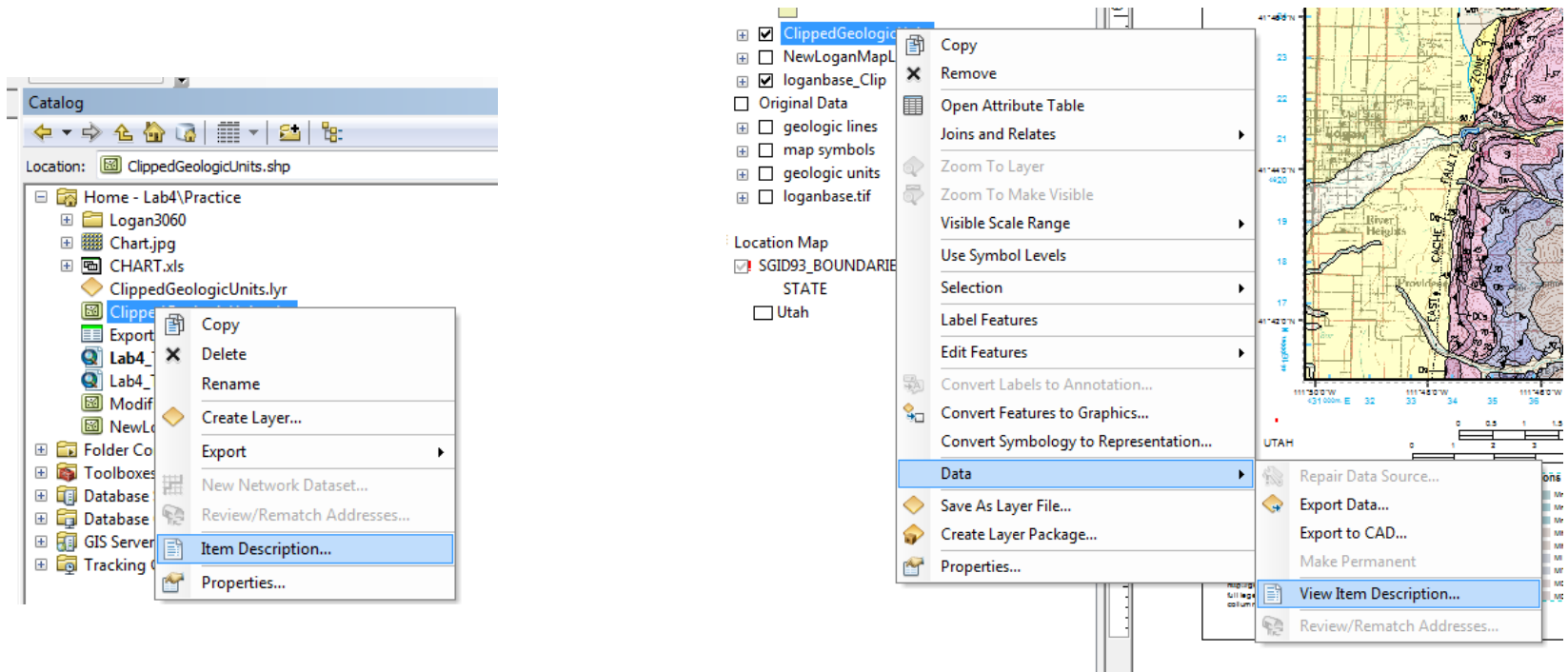
If you don't need to create complete metadata for an item following a metadata standard, use the default settings in ArcGIS Desktop. With the default **Item Description** metadata style, you can view and edit a concise description for an item that can be efficiently and effectively searched in ArcGIS and published with the item to ArcGIS online.



- The what
- The how
- The who
- The where
- i.e. CONTEXT

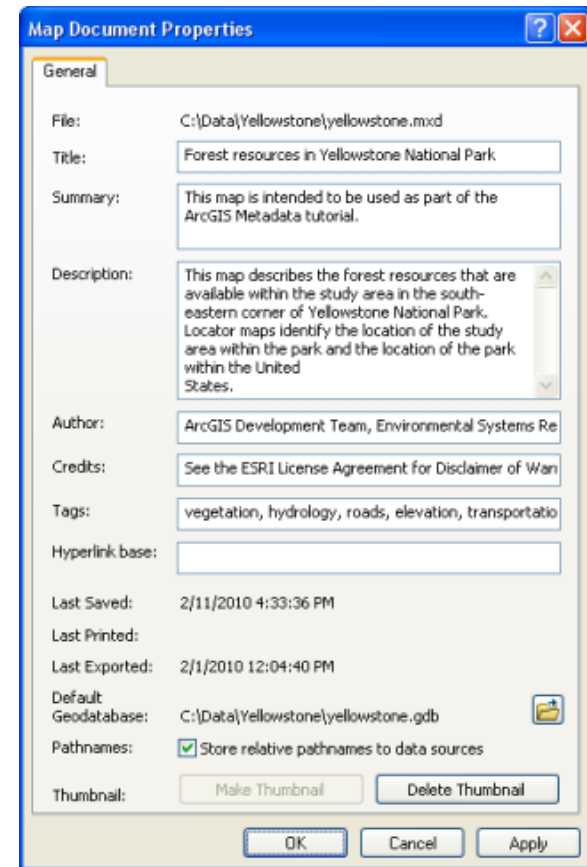
WHAT? THERE'S METADATA?

- Get to it from Table of Contents and our favorite right-click...
- Or from ArcCatalog... and a right-click



METADATA – OF THE MAP DOCUMENT

- How many of you have ever filled these things out?



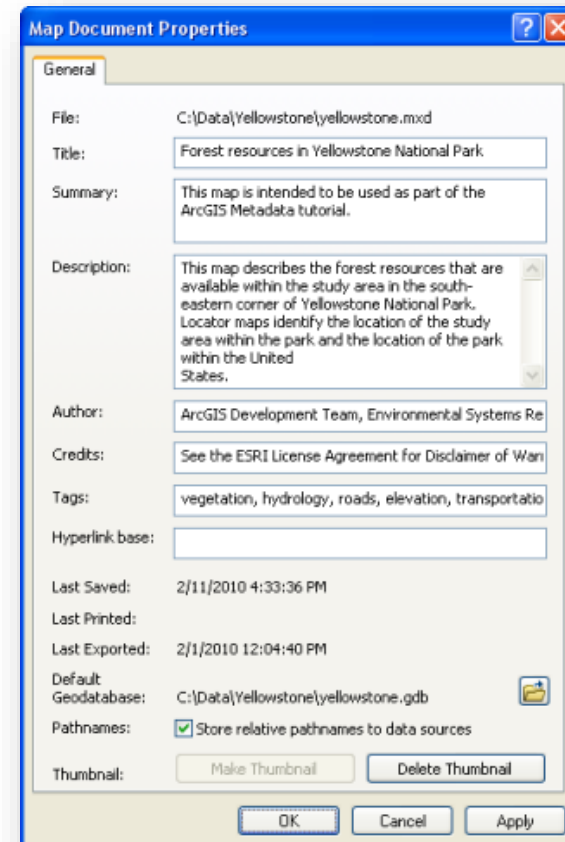
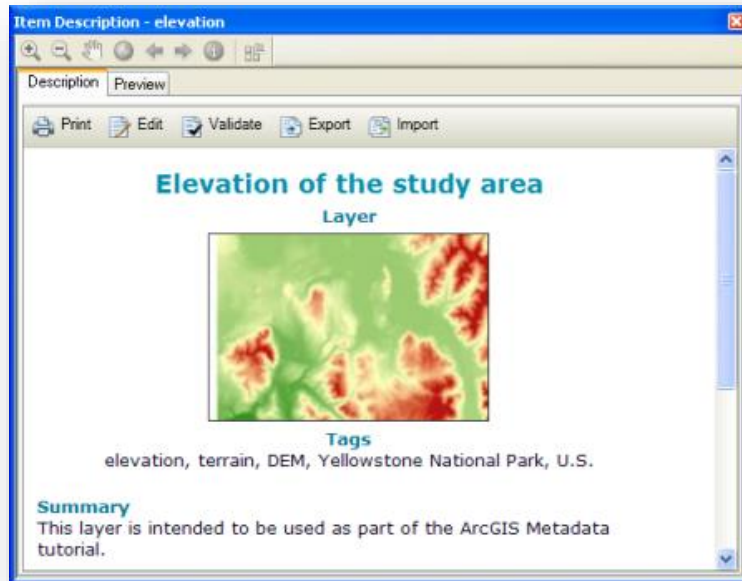
The screenshot shows the 'Map Document Properties' dialog box with the 'General' tab selected. The fields are as follows:

- File: C:\Data\Yellowstone\yellowstone.mxd
- Title: Forest resources in Yellowstone National Park
- Summary: This map is intended to be used as part of the ArcGIS Metadata tutorial.
- Description: This map describes the forest resources that are available within the study area in the south-eastern corner of Yellowstone National Park. Locator maps identify the location of the study area within the park and the location of the park within the United States.
- Author: ArcGIS Development Team, Environmental Systems Re
- Credits: See the ESRI License Agreement for Disclaimer of Wan
- Tags: vegetation, hydrology, roads, elevation, transportatio
- Hyperlink base:
- Last Saved: 2/11/2010 4:33:36 PM
- Last Printed:
- Last Exported: 2/1/2010 12:04:40 PM
- Default Geodatabase: C:\Data\Yellowstone\yellowstone.gdb
- Pathnames: ☒ Store relative pathnames to data sources
- Thumbnail: Make Thumbnail, Delete Thumbnail

Buttons at the bottom: OK, Cancel, Apply.

METADATA FOR WHAT?

- Can be for:
 - A folder
 - A file
 - A geodatabase
 - A map document



DID YOU KNOW... GEOLOGIC UNITS

How to I cite this data?

geounits
Shapefile

Thumbnail Not Available

Tags
Geology, Contact, Fault, Marker Bed, Scarp, Shoreline, Water Boundary

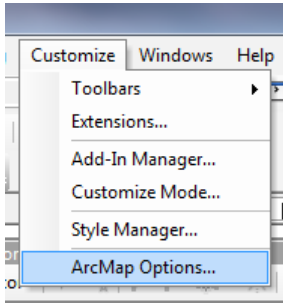
Summary
To provide basic geologic data at 1:100,000 in digital format for government, academic, and public users.

Description
This dataset represents the geology of the Logan 30' x 60' quadrangle. The source map was: Geologic map of the Logan 30' x 60' quadrangle, Cache and Rich Counties, Utah and Lincoln and Uinta Counties, Wyoming by J. H. Dover, U.S. Geological Survey Miscellaneous Investigations Series Map I-2210 (1995).

Credits
Project Manager: Jon K. King, UGS; GIS Data Preparation: Basia Matyjasik, UGS; Review: Jon K. King, Grant C. Willis, J. Buck Ehler, Robert Ressetar, UGS; Funding: Utah Geological Survey and U.S. Geological Survey under National Cooperative Geologic Mapping Program (STATEMAP agreement no. 05HQAG0084)

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MAKE IT SHOW MORE...

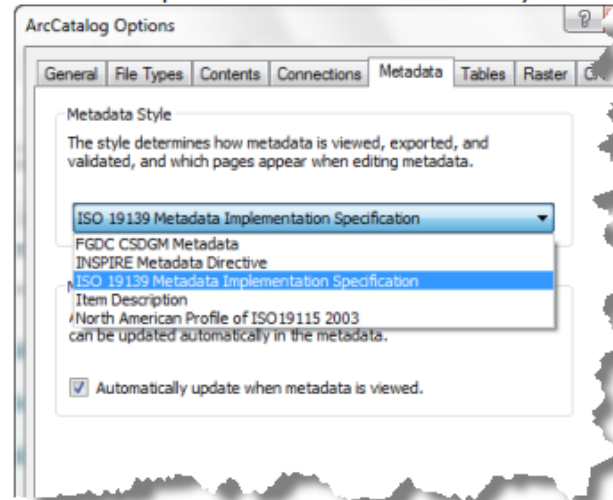


Steps:

1. Open the **Options** dialog box for your ArcGIS Desktop application.
 - In ArcMap, click **Customize > ArcMap Options**.
 - In ArcCatalog, click **Customize > ArcCatalog Options**.
 - In ArcGlobe, click **Customize > ArcGlobe Options**.
 - In ArcScene, click **Customize > ArcScene Options**.

The **Options** dialog box appears.

2. Click the **Metadata** tab.
3. Click the drop-down arrow and click the style of metadata you want to create.



4. Click **OK**.

MORE FROM... GEOLOGIC UNITS

Data Source Item Description - geologic units

Print Edit

necessarily representing the official policies, either expressed or implied, of the U.S. Government. Persons or agencies using these data specifically agree not to misrepresent the data, nor to imply that changes they made were approved by the Utah Geological Survey, and should indicate the data source and any modifications made on plots, digital copies, derivative products, and in metadata.

ArcGIS Metadata ▶

- Resource Identification ▼
- Spatial Representation ▼
- Reference System ▼
- Distribution Information ▼
- Metadata Details ▼
- ESRI Metadata and Item Properties ▼
- ESRI Spatial Information ▼
- ESRI Feature Class ▼
- ESRI Fields and Subtypes ▼

FGDC Metadata ▶

- Identification ▼
- Data Quality ▼
- Spatial Data Organization ▼
- Spatial Reference ▼
- Entities and Attributes ▼
- Distribution Information ▼
- Metadata Reference ▼

RESOURCE IDENTIFICATION... GEOLOGIC UNITS

Data Source Item Description - geologic units

Print Edit

ArcGIS Metadata ▶

Resource Identification ▶

CITATION
TITLE geounits

* **PRESENTATION FORMAT** digital map

TAGS FOR SEARCHING Geology, Contact, Fault, Marker Bed, Scarp, Shoreline, Water Boundary

KEYWORDS 002
THESAURUS

ABSTRACT (DESCRIPTION)
This dataset represents the geology of the Logan 30' x 60' quadrangle. The source map was: Geologic map of the Logan 30' x 60' quadrangle, Cache and Rich Counties, Utah and Lincoln and Uinta Counties, Wyoming by J. H. Dover, U.S. Geological Survey Miscellaneous Investigations Series Map I-2210 (1995).

PURPOSE (SUMMARY)
To provide basic geologic data at 1:100,000 in digital format for government, academic, and public users.

DATASET LANGUAGES * English (UNITED STATES)

RESOURCE CONSTRAINTS
CONSTRAINTS
LIMITATIONS OF USE
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Except for changes explained in Appendix.pdf file, the digital product is the same as the published map. For use at 1:100,000 scale only. The Utah Geological Survey (UGS) does not guarantee accuracy or completeness of data.

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Persons or agencies using these data specifically agree not to misrepresent the data, nor to imply that changes they made were approved by the Utah Geological Survey, and should indicate the data source and any modifications made on plots, digital copies, derivative products, and in metadata.

* **SPATIAL REPRESENTATION TYPE** vector

* **PROCESSING ENVIRONMENT** Microsoft Windows Server 2008 R2 Version 6.1 (Build 7600) ; ESRI ArcGIS 10.0.0.2414

BOUNDING RECTANGLE
* **EXTENT TYPE** Full extent in the data's coordinate reference
* **WEST LONGITUDE** 416534.375
* **EAST LONGITUDE** 500000.000002
* **NORTH LATITUDE** 4650046
* **SOUTH LATITUDE** 4594051.5
* **EXTENT CONTAINS THE RESOURCE** Yes

BOUNDING RECTANGLE
* **EXTENT TYPE** Full extent in decimal degrees
* **WEST LONGITUDE** -112.00779

SPATIAL REPRESENTATION... GEOLOGIC UNITS

Data Source Item Description - geologic units

Print Edit

explained in Appendix.pdf file, the digital product is the same as the published map. For use at 1:100,000 scale only. The Utah Geological Survey (UGS) does not guarantee accuracy or completeness of data. The views and conclusions contained in this document are those of the authors and should not be interpreted as necessarily representing the official policies, either expressed or implied, of the U.S. Government. Persons or agencies using these data specifically agree not to misrepresent the data, nor to imply that changes they made were approved by the Utah Geological Survey, and should indicate the data source and any modifications made on plots, digital copies, derivative products, and in metadata.

ArcGIS Metadata ►

Resource Identification ▼

Spatial Representation ►

Vector

* LEVEL OF TOPOLOGY FOR THIS DATASET geometry only

GEOMETRIC OBJECTS

* NAME geounits

* OBJECT TYPE composite

* OBJECT COUNT 5341

Hide ▲

Reference System ▼

Distribution Information ▼


Metadata Details ▼

ESRI Metadata and Item Properties ▼

ESRI Spatial Information ▼

ESRI Feature Class ▼

ESRI Fields and Subtypes ▼

 UtahStateUniversity

WATS 4930

DISTRIBUTION INFORMATION... GEOLOGIC UNITS

Data Source Item Description - geologic units

Print Edit

Spatial Representation ▼

Reference System ▼

Distribution Information ►

DISTRIBUTOR

AVAILABLE FORMAT

* FORMAT NAME Shapefile

TRANSFER OPTIONS

* TRANSFER SIZE 7.357

ONLINE SOURCE

* ONLINE LOCATION (URL) file:///\\NRUGSBMATYJASIK\D\$\webgis\Logan3060\geounits.shp

* CONNECTION PROTOCOL Local Area Network

DESCRIPTION Downloadable Data

DISTRIBUTION FORMAT

* FORMAT NAME Shapefile

TRANSFER OPTIONS

* TRANSFER SIZE 6.013

Hide ▲

Metadata Details ▼

ESRI Metadata and Item Properties ▼

ESRI Spatial Information ▼

ESRI Feature Class ▼

ESRI Fields and Subtypes ▼

FGDC Metadata ►

METADATA & ITEM PROPERTIES... GEOLOGIC UNITS

Data Source Item Description - geologic units

Print Edit

ArcGIS Metadata ►

- Resource Identification ▼
- Spatial Representation ▼
- Reference System ▼
- Distribution Information ▼
- Metadata Details ▼
- ESRI Metadata and Item Properties ►
 - METADATA PROPERTIES
 - ARCGIS ESRI-ISO
 - CREATED IN ARCGIS 2006-12-08T15:10:51
 - LAST MODIFIED IN ARCGIS 2011-02-01T06:49:05
 - AUTOMATIC UPDATES
 - LAST UPDATE 2011-02-01T06:49:05
 - HAVE BEEN PERFORMED Yes
 - ESRI-ISO METADATA IDENTIFIER {77EF527A-3FAD-45A3-8DAA-D9AED840BE9C}
 - ITEM PROPERTIES
 - NAME geounits
 - SIZE 6.013
 - CONTENT TYPE Downloadable Data

Hide ▲

ESRI Spatial Information ▼

ESRI Feature Class ▼

SPATIAL INFORMATION... GEOLOGIC UNITS

Data Source Item Description - geologic units

Print Edit

Metadata Details ▼

ESRI Metadata and Item Properties ▼

ESRI Spatial Information ►

EXTENT IN THE ITEM'S COORDINATE REFERENCE

BOUNDING RECTANGLE

- * WEST LONGITUDE 416534.375000
- * EAST LONGITUDE 500000.000002
- * NORTH LATITUDE 4650046.000000
- * SOUTH LATITUDE 4594051.500000
- * EXTENT CONTAINS THE RESOURCE Yes

COORDINATE REFERENCE

TYPE Projected

PROJECTION NAD_1927_UTM_Zone_12N

GEOGRAPHIC COORDINATE REFERENCE GCS_North_American_1927

COORDINATE REFERENCE DETAILS

PROJECTED COORDINATE SYSTEM

WELL-KNOWN IDENTIFIER 26712

X ORIGIN -5121000

Y ORIGIN -9998000

XY SCALE 450450052.74759901

Z ORIGIN -100000

Z SCALE 10000

M ORIGIN -100000

M SCALE 10000

XY TOLERANCE 0.001

Z TOLERANCE 0.001

M TOLERANCE 0.001

HIGH PRECISION true

WELL-KNOWN TEXT PROJCS["NAD_1927_UTM_Zone_12N",GEOGCS["GCS_North_American_1927",DATUM["D_North_American_1927",SPHEROID["Clarke_1866",6378206.4,294.9786982]],PRIMEM["Greenwich",0.0],UNIT["Degree",0.0174532925199433]],PROJECTION["Transverse_Mercator"],PARAMETER["False_Easting",500000.0],PARAMETER["False_Northing",0.0],PARAMETER["Central_Meridian",-111.0],PARAMETER["Scale_Factor",0.9996],PARAMETER["Latitude_Of_Origin",0.0],UNIT["Meter",1.0],AUTHORITY["EPSG",26712]]

Hide ▲

ESRI Feature Class ▼

ESRI Fields and Subtypes ▼

FEATURE CLASS... GEOLOGIC UNITS

Data Source Item Description - geologic units

Print Edit

ESRI Metadata and Item Properties ▼

ESRI Spatial Information ▼

ESRI Feature Class ▶

- FEATURE CLASS NAME geounits
- * FEATURE TYPE Simple
- * GEOMETRY TYPE Polygon
- * HAS TOPOLOGY FALSE
- * FEATURE COUNT 5341
- * SPATIAL INDEX TRUE
- * LINEAR REFERENCING FALSE

Hide ▲

ESRI Fields and Subtypes ▼

FGDC Metadata ▶

Identification ▼

Data Quality ▼

Spatial Data Organization ▼

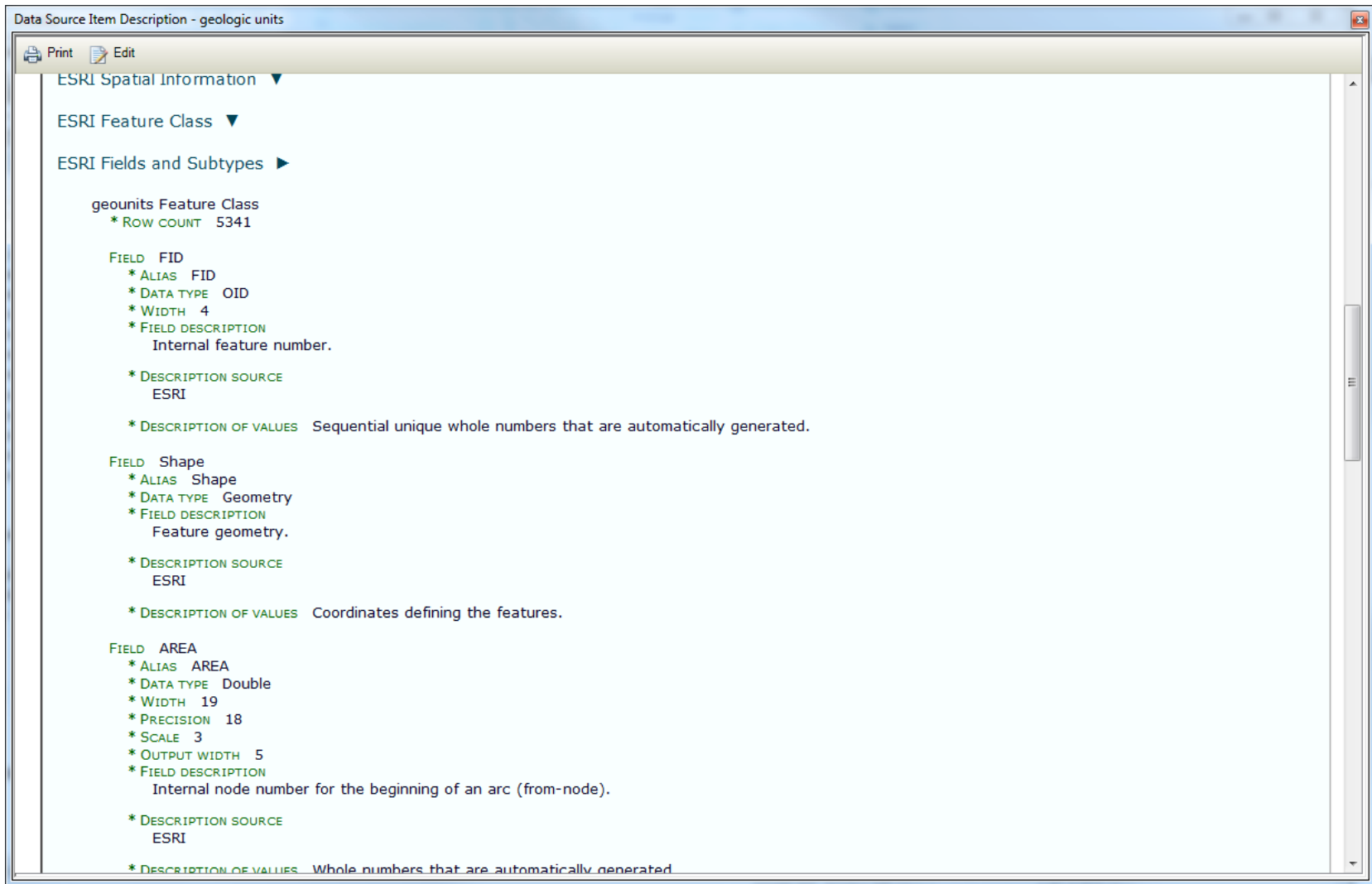
Spatial Reference ▼

Entities and Attributes ▼

Distribution Information ▼

Metadata Reference ▼

FIELDS & SUBTYPES... GEOLOGIC UNITS



HOW DO I EDIT/CREATE META DATA?

Data Source Item Description - geologic units

Save Cancel

- Overview
- Item Description
- Topics & Keywords
- Citation
- Citation Contacts
- Metadata
- Details
- Contacts
- Maintenance
- Constraints
- Resource
- Details
- Extents
- Points of Contact
- Maintenance
- Constraints
- Spatial Reference
- Spatial Data Representation
- Content
- Quality
- Lineage
- Distribution
- Fields
- Geoprocessing History

Item Description

Title

Delete Update...

Tags

Geology, Contact, Fault, Marker Bed, Scarp, Shoreline, Water Boundary

Summary

To provide basic geologic data at 1:100,000 in digital format for government, academic, and public users.

Description

B I U A^{*} A^{*} [List Icon] [Bulleted List Icon] [Pencil Icon] [Text Color Icon] [Background Color Icon] [Link Icon] [Unlink Icon] [Undo Icon] [Redo Icon]

This dataset represents the geology of the Logan 30' x 60' quadrangle. The source map was: Geologic map of the Logan 30' x 60' quadrangle, Cache and Rich Counties, Utah and Lincoln and Uinta Counties, Wyoming by J. H. Dover, U.S. Geological Survey Miscellaneous Investigations Series Map I-2210 (1995).

Credits

MORE THAN YOU PROBABLY CARE TO FILL OUT...

Data Source Item Description - geologic units

Save Cancel

Overview

Item Description

Topics & Keywords

Citation

Citation Contacts

Metadata

Details

Contacts

Maintenance

Constraints

Resource

Details

Extents

Points of Contact

Maintenance

Constraints

Spatial Reference

Spatial Data Representation

Content

Quality

Lineage

Distribution

Fields

Geoprocessing History

Lineage

Statement

Data Source

+ New Data Source

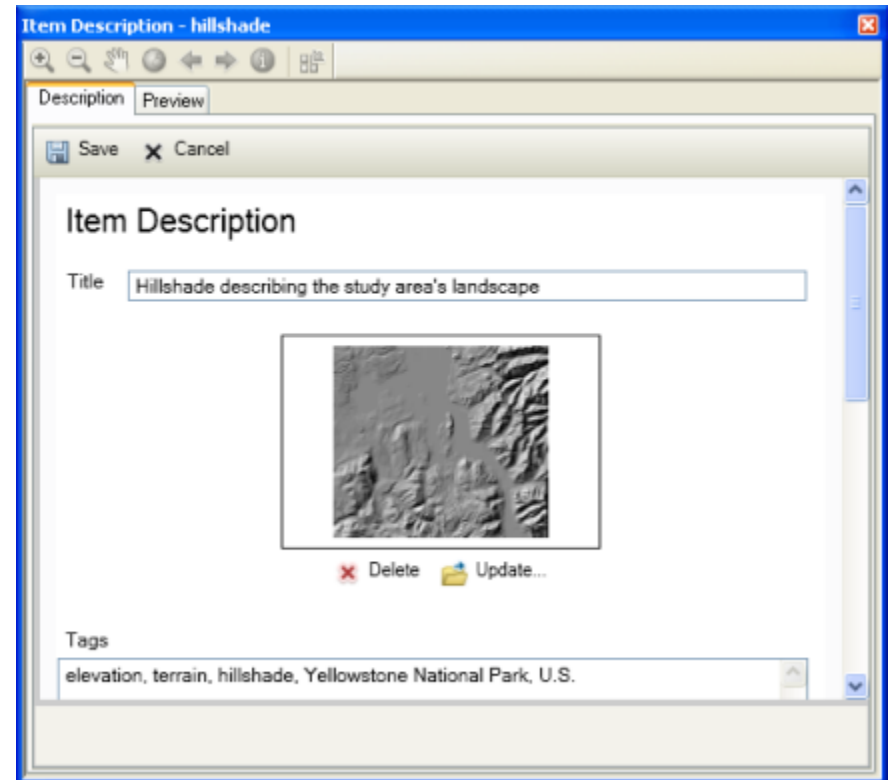
Process Step

+ New Process Step

EDITING METADATA IS EASY... BUT



- Populating such that your metadata is effective can take some effort and time...



HOW FAR TO GO (POPULATING METADATA)?

- Who is the audience you are sharing with?
 - Is it yourself (reminder)
 - Is it a colleague?
 - Is it the general public?
- What is the purpose of the data & therefore the metadata?
- When sharing a paper map or PDF what is value of metadata?
- When sharing GIS data what is value of metadata?
- How to cite? – Metadata gives an answer...

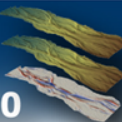
6 C'S & METADTA

1. **Colorful** - (but not cluttered) *An effective use of color to distinguish features and emphasize key aspects of your map.*
2. **Creative** - (but not confusing) *There are lots of creative ways to display your geographic data and analyses*
3. **Correct** - *All analyses, calculations and labels are correct*
4. **Context** - (location, coordinates, projections, scale, orientation, setting) *All maps should have enough context for the user to discern where it is, what it's about and what the scale is within the context that it's presented (e.g. stand-alone map vs. within a report).*
5. **Convincing** - (fit for purpose) *All maps have a purpose, and your map should be effective at conveying the message it is intended to.*
6. **Consistent** - *There should be logical, graphical and typographic consistency both within a single map and amongst multiple maps in the same assignment or project.*

- 4 of 'em anyway...

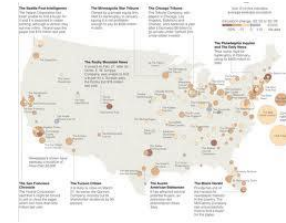
TODAY'S PLAN

- I. Editing... What is it?
- II. Some Editing Workflows
- III. Attributes & Attributing
- IV. Metadata
- V. Some Comments...**



WHAT WILL YOU USE THE TOOL DO?

- What is GIS?
 - Just a tool?
 - A powerful medium for making persuasive arguments!
- Make a persuasive argument
 - For the right reasons
 - For the wrong reasons



1. **Colorful** - (but not cluttered) *An effective use of color to distinguish features and emphasize key aspects of your map.*
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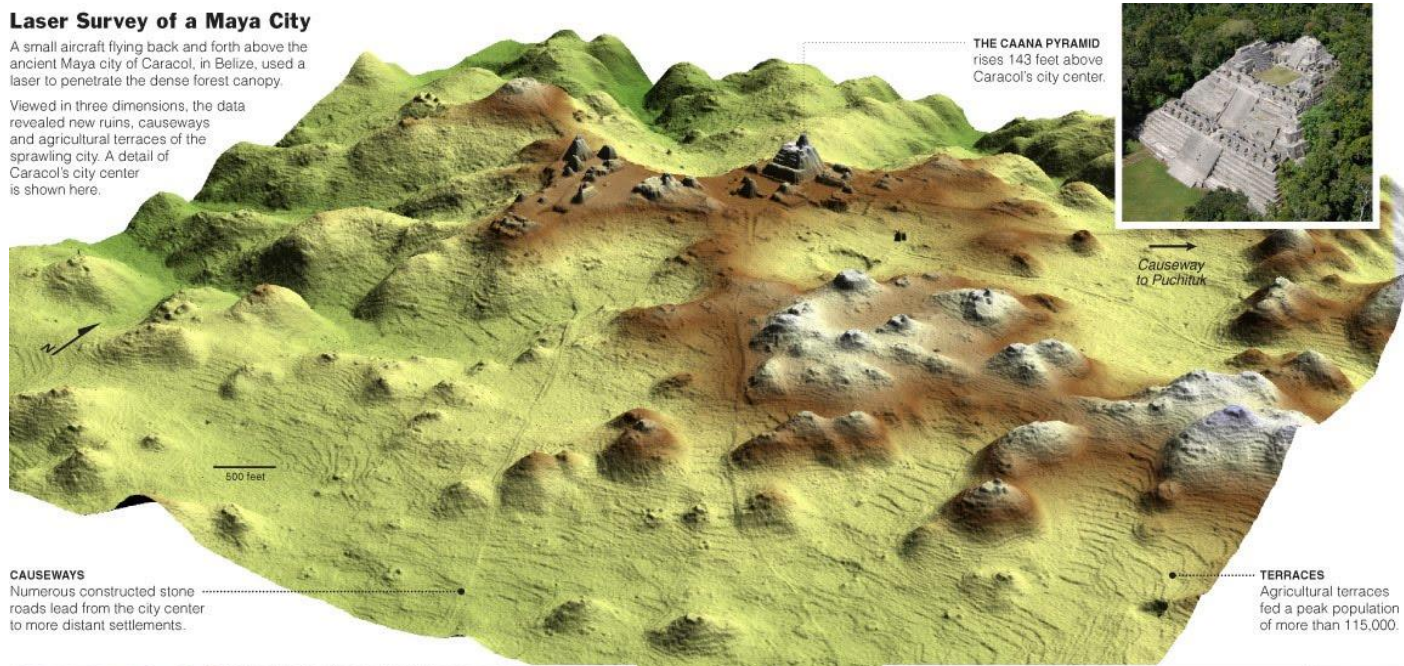
What we don't teach you in school...

WHAT WERE THE STORIES THAT STUCK WITH YOU?

Laser Survey of a Maya City

A small aircraft flying back and forth above the ancient Maya city of Caracol, in Belize, used a laser to penetrate the dense forest canopy.

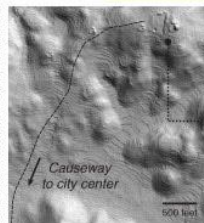
Viewed in three dimensions, the data revealed new ruins, causeways and agricultural terraces of the sprawling city. A detail of Caracol's city center is shown here.



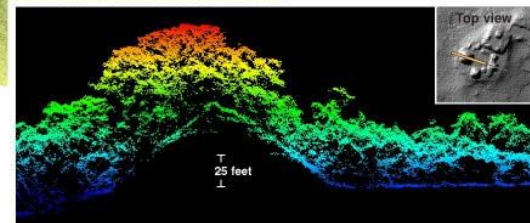
SATELLITE IMAGERY from the Ikonos satellite is unable to penetrate heavy foliage.



LIDAR Using a laser instrument called lidar, for light detection and ranging, to scan the upper canopy shows little detail (left). But some of the laser pulses penetrate the foliage and reflect off of the ground, revealing ruins and extensive terracing (right).



PUCHITUK Once surrounded by hundreds of open terraces, the hilltop settlement of Puchituk is now obscured by the forest.



PEERING THROUGH THE FOREST A lidar scan along a straight track (orange line, inset) shows reflections off of the ground and different layers of foliage, revealing the cross-section of a pyramid-shaped structure. In this image the measured points are colored according to height, and are accurate to about six inches.

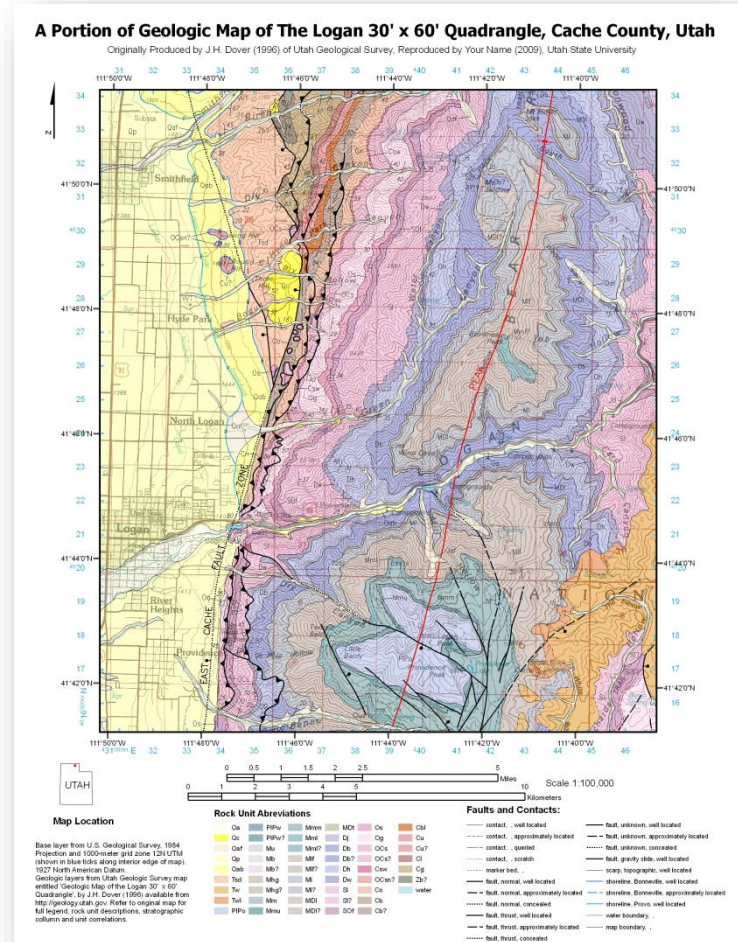
Source: Arlen F. Chase, Diane Z. Chase and John F. Weishampel, University of Central Florida

THE NEW YORK TIMES, IMAGES COURTESY OF CARACOL ARCHAEOLOGICAL PROJECT

THIS WEEK'S LAB

Lab 3: Reproducing Maps – Geologic Map

- Teach you how to manipulate display properties and symbology to reproduce a map in as close as possible a fashion to the original.
- Teach you how to extract summary statistics and data from existing data



NEXT WEEK'S LAB

Lab 4: Digitizing, Editing & Sharing Data

- Edit existing Vector Data
- Create new vector data layers and edit them (i.e. digitizing)
- Edit and create tabular data
- Share vector and tabular data with other GIS users

