

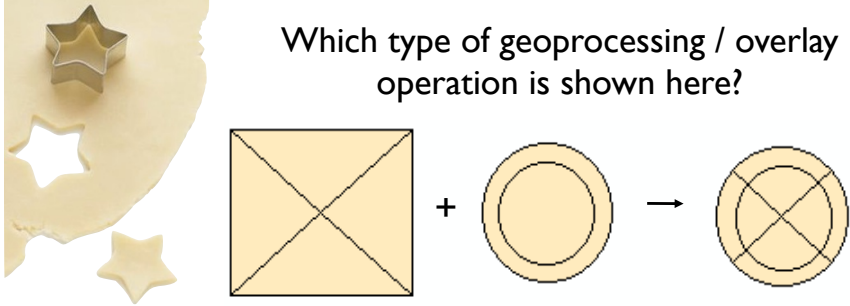
GEOL 452/552 - GIS for Geoscientists I

Lecture 17 - geoprocessing / overlay - Chapter 7 - part 2

- Review from last lecture (Voting)
- Finish Chapter 7 - buffer, dissolve, appending
- (multi-part polygons)
- follow along data in: CH7B_class_ex folder
- Textbook SKills reference: ANALYSIS p. 559-
- HW 8 (mini proj. 2 due Nov. 1)
- HW 9 (mini project 3) - due Nov. 3

1

Which type of geoprocessing / overlay operation is shown here?



The diagram illustrates a geoprocessing operation. On the left, there is a square with a diagonal 'X' inside. To its right is a plus sign followed by a circle with a smaller circle inside it. An arrow points to the right, where the result is shown: a circle with the 'X' from the square overlaid on it.

Clip	Erase
Intersect	Union

2

For which operation is the **order** of layers of importance?

Clip

Union

Intersect

All

3

Which of these geoprocessing operations also join the **attribute** tables of all layers involved?

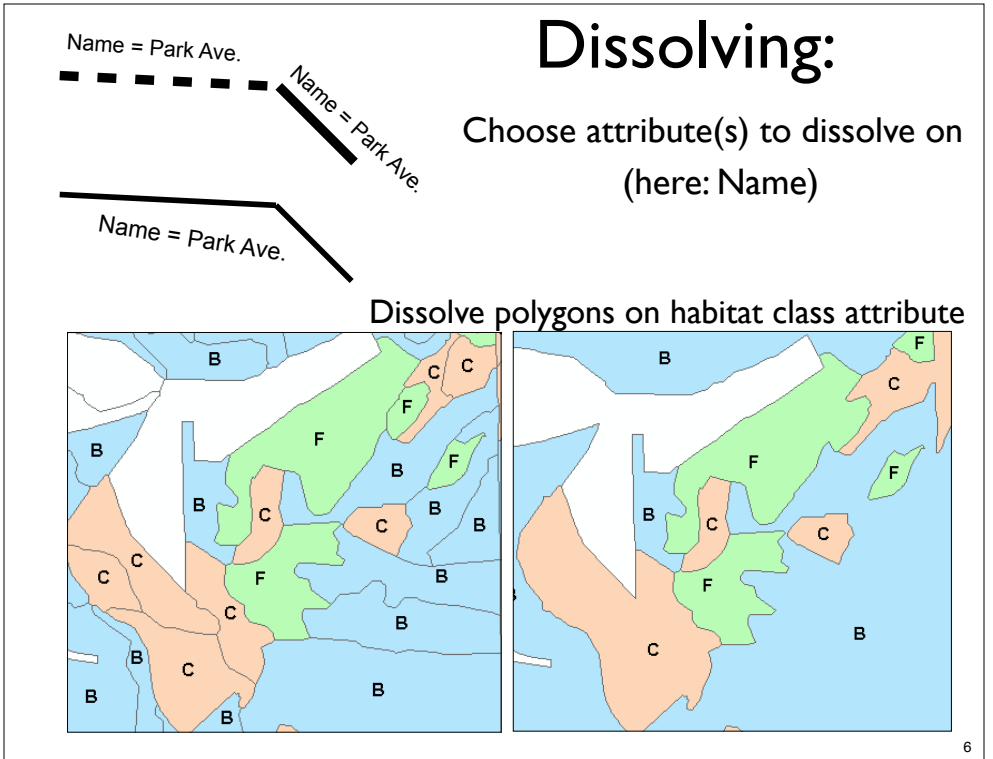
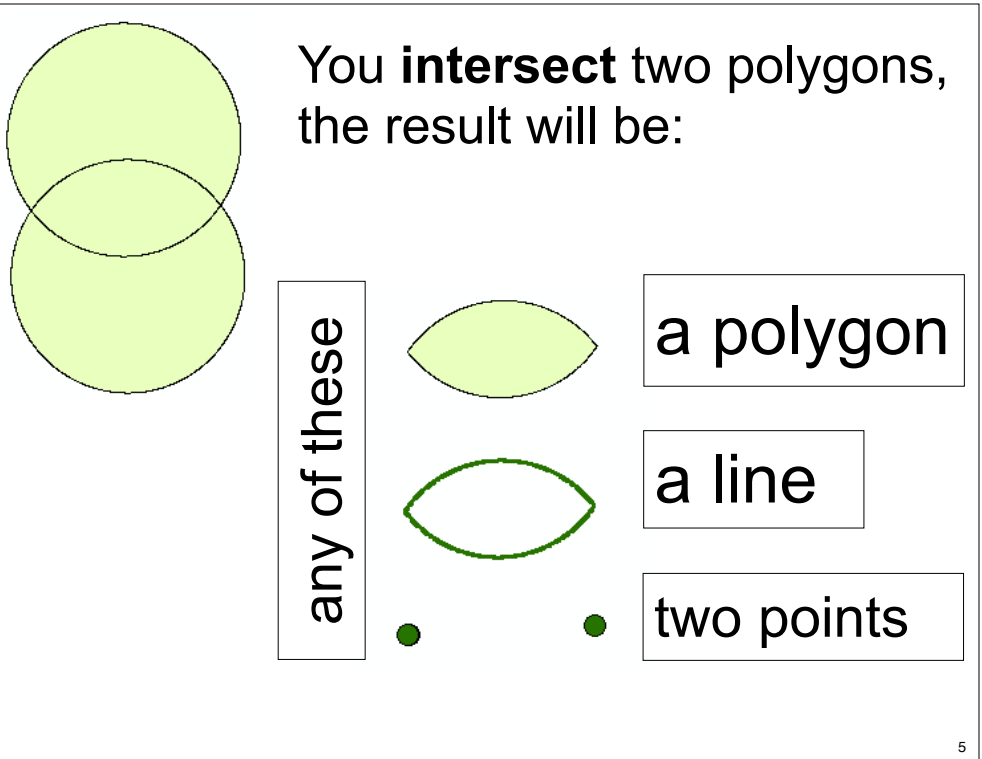
Clip

Erase

Intersect

All

4



Dissolve Tool

If **no** attribute is selected - dissolving is “graphical” only

Uncheck **multipart** to create single part features. (If you need correct number of features)

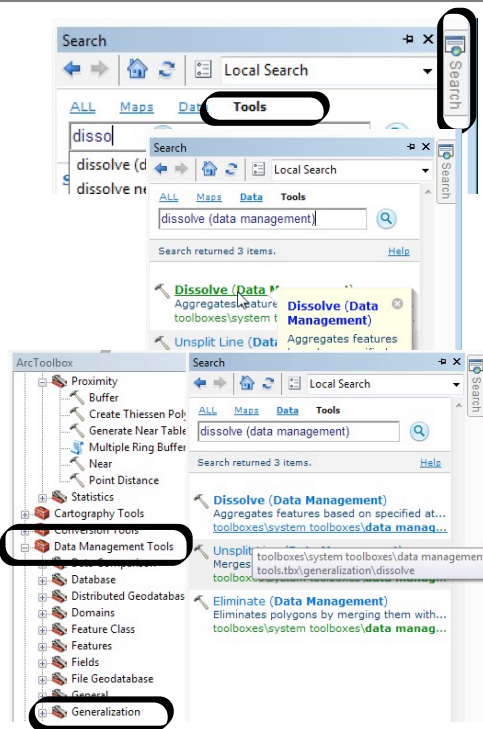
Polygons in DMLobe_MDRock_Union.shp before the dissolve operation”

FID	Shape	REGION	NAME	FID Ja_geo	GLG	DESC.
0	Polygon	2	Des Moines Lobe	-1		Middle Devonian
1	Polygon	0		42	D2	Middle Devonian
2	Polygon	0		47	D2	Middle Devonian
3	Polygon	0		55	D2	Middle Devonian
4	Polygon	0		65	D2	Middle Devonian
5	Polygon	0		93	D2	Middle Devonian
6	Polygon	0		119	D2	Middle Devonian
7	Polygon	2	Des Moines Lobe	109	D2	Middle Devonian
8	Polygon	2	Des Moines Lobe	112	D2	Middle Devonian
9	Polygon	2	Des Moines Lobe	113	D2	Middle Devonian
10	Polygon	2	Des Moines Lobe	115	D2	Middle Devonian
11	Polygon	2	Des Moines Lobe	119	D2	Middle Devonian
12	Polygon	2	Des Moines Lobe	120	D2	Middle Devonian

Note: each polygon’s REGION attribute value is either 0 or 2

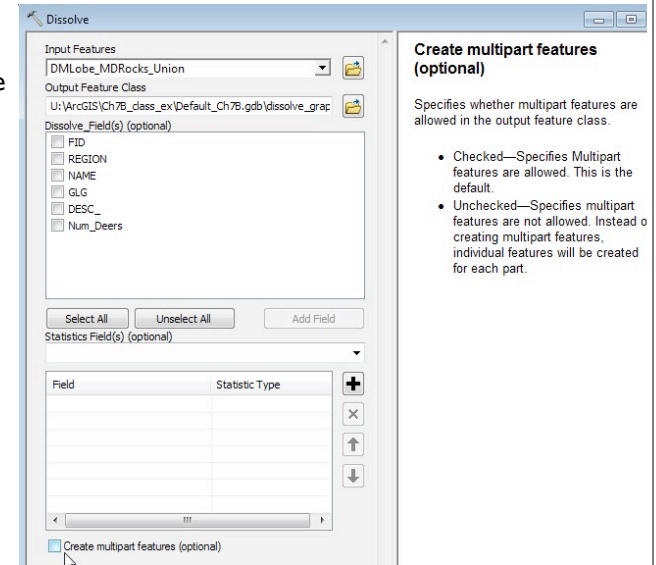
Finding ArcTools with ArcMap's Search

- Windows - Search or Search Tab
- Local Search, Tools
- dissol
- Completes to all Tools related to Dissolve
- Choose Dissolve (Data Management)
- Data Management - Generalization is its "folder" in ArcToolbox



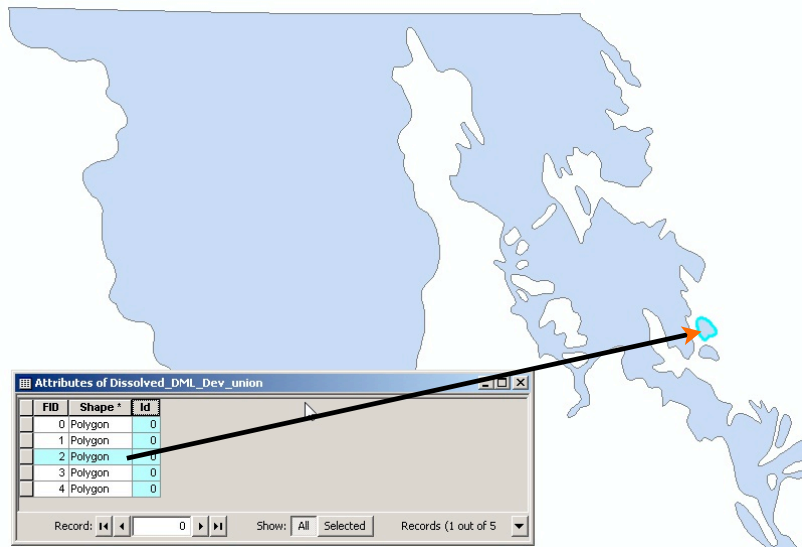
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- ArcToolbox - Data Management Tools - Generalization - Dissolve
- Put all your output into: Default_CH7B.gbd
- **Don't check** any Dissolve_Fields
- "Graphically" dissolve i.e. aggregate polygons that "touch"
- **Don't check:** Create multi-part features
- Make standard (single part) polygons
- Output layer name: dissolve_graphical_single_polygons



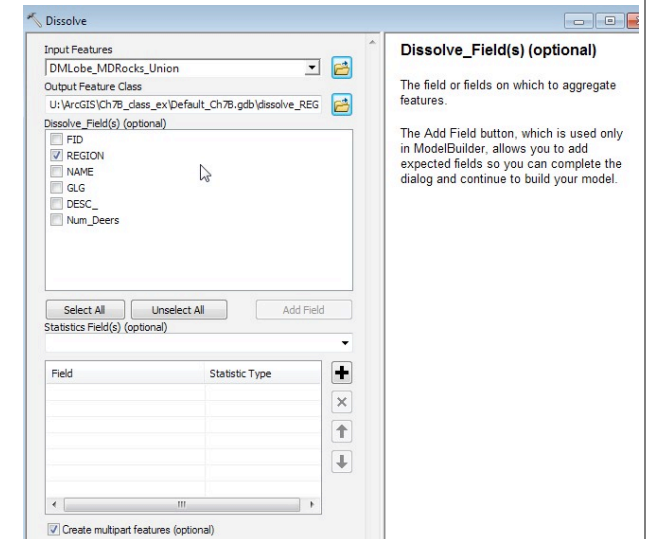
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Dissolved without attributes ("graphically") and creating **single part** polygons



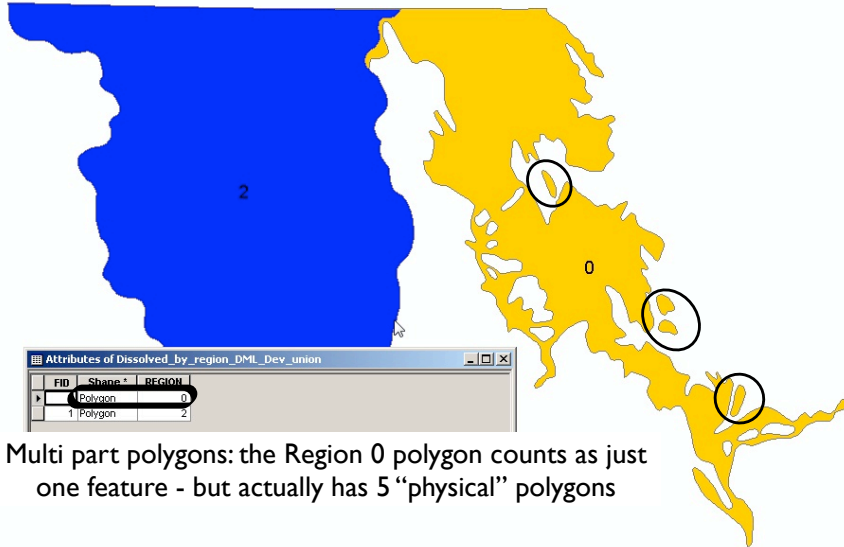
11

- Open Dissolve Tool again
- **Check** REGION in Dissolve_Fields
- aggregate polygons that have a the same value for REGION (either 0 or 2)
- **Check:** Create multi-part features
- Creates a Multi-part polygon
- Output layer name: dissolve_REGION_multi-part_polygons



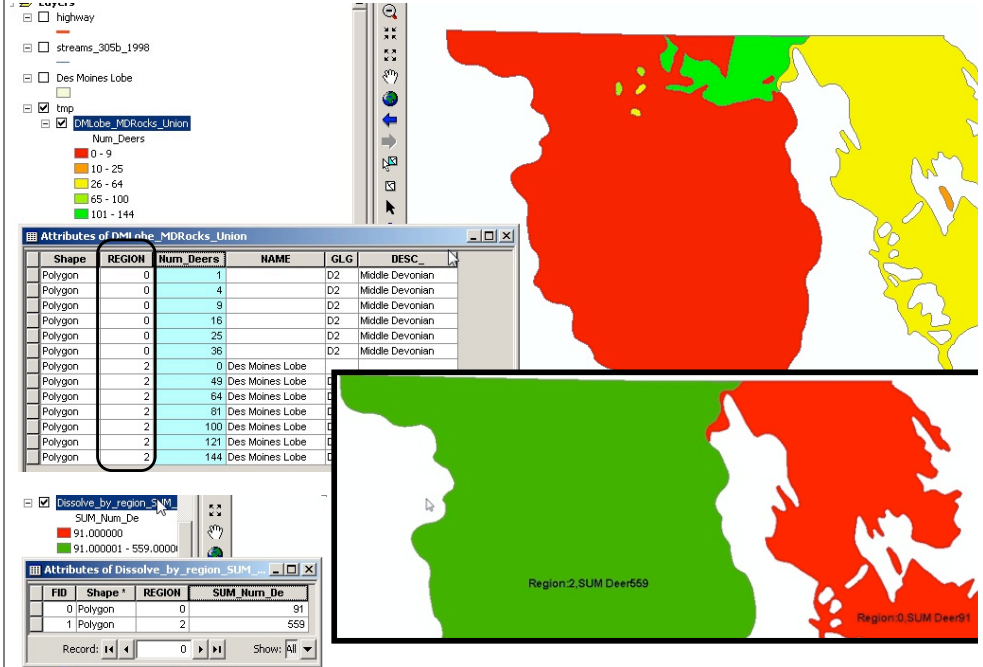
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After Dissolve using REGION attribute (and multipart = ON)



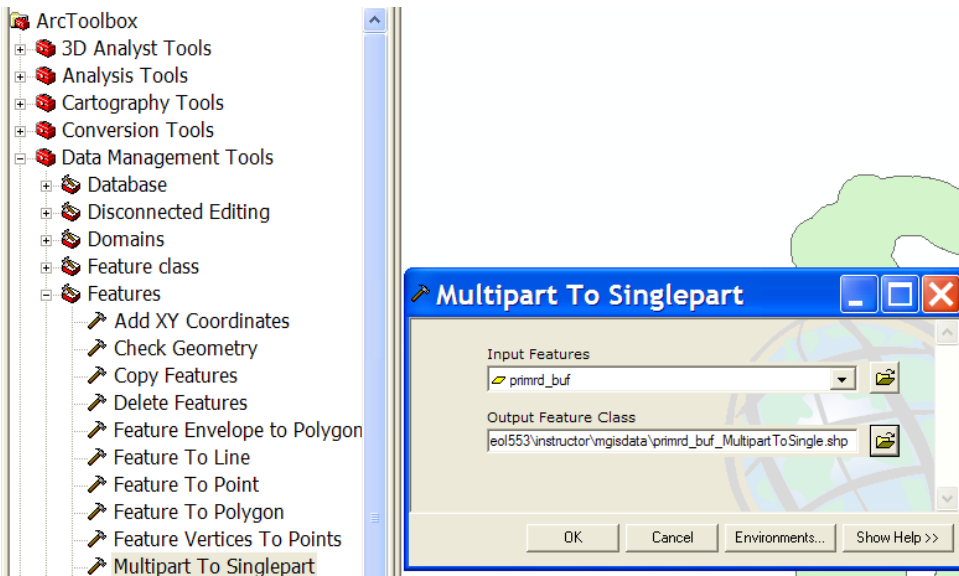
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Optional Step: Summarize Num_Deers attributes by (now dissolved) Region



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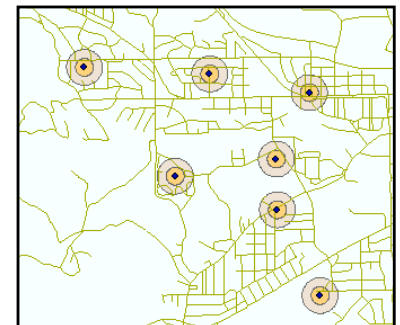
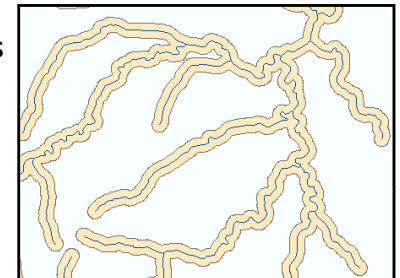
Optional: How to convert the multi-part polygon into many single polygons:
Data Management Tools –
Features – Multipart to Singlepart



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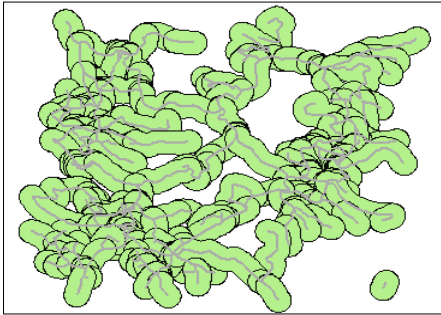
Buffering

- Creates single or multiple buffers (rings, polygons) around points, lines or polygons
- Buffer Tool (Single buffer): Adds a new attribute called **BUF_DIST** for buffer-distance
 - By default: no dissolving
- Multi-buffer tool
 - needs **list of distances** (50, 100, 200, 500)
 - creates multi-part polygons
 - attribute's name is **distance**
 - Dissolves ALL by default
 - can take a long time



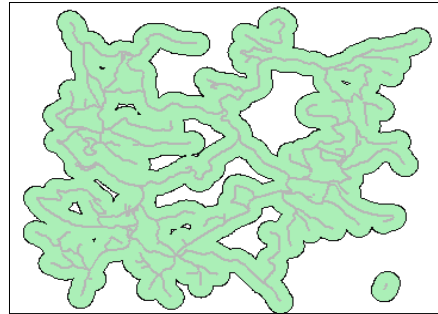
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The Dissolve option in Buffering

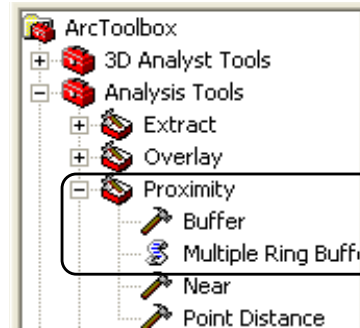


Buffering with the NONE option (**default**): 1 buffer polygon per point/line

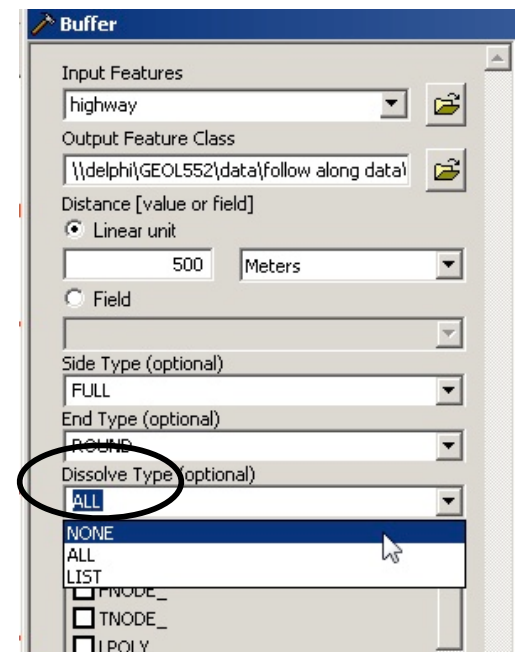
- Set **Dissolve** to ALL (to actually get dissolved buffers)
- Single buffer default is NONE
- But: Dissolving takes time! (Depends on number of features)



Buffering with the ALL option: Automatic Dissolve (nicer?)

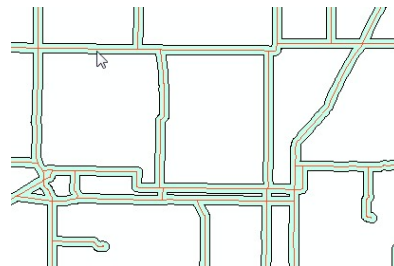
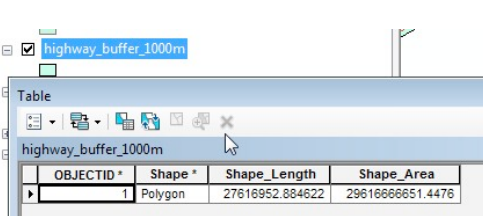
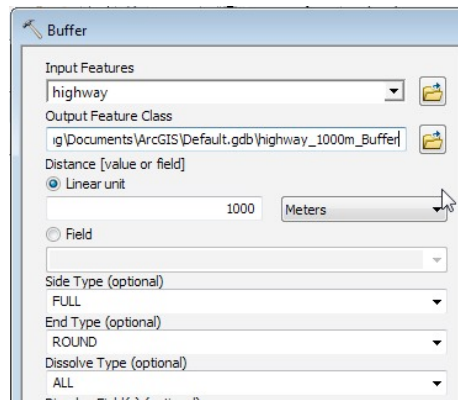


To dissolve buffers set Dissolve Type to ALL (or select from the list of Attributes)

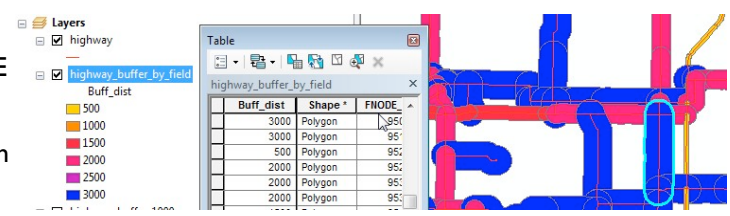
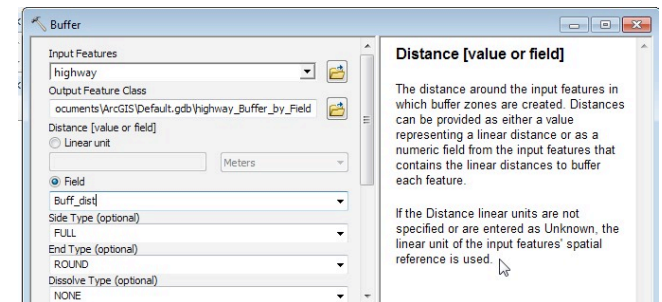


Analysis Tools - Proximity - Buffer

- Create a 1000 m buffer around each highway line
- Output name: highway_1000m_Buffer
- Dissolve: ALL
- graphically dissolve into a single multi-part polygon

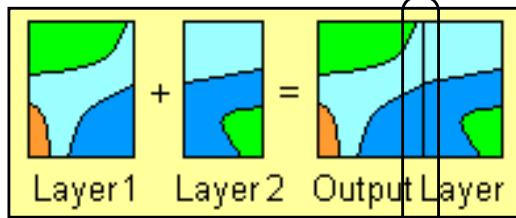


- Use buff_dist field (attribute) in highway as buffer distance
- Buffer width will depend on this number (500, 1000, ..., 3000)
- Output name: highway_buffer_by_field
- Dissolve: NONE
- Creates a single polygon for each line segment
- color by Buff_dist

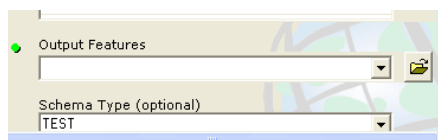


- Feature class
- Features
- Fields
- General
 - Append
 - Copy
 - Delete
 - Rename
 - Select Data
- Generalization
- Indexing

Append (Merge)



- Combines feature classes into one layer (no dissolving of features!)
- To bring attributes along, tables of input features classes must match exactly: same classes, same order, same definitions
- TEST: combine tables
- NO_TEST: don't combining tables, graphical appending only
- Merge: like Append but attribute table matching is more flexible



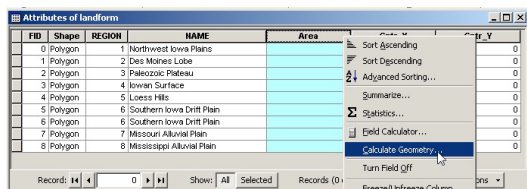
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Length/Area calculations

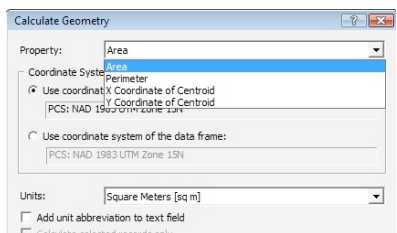
- Area/Length fields in **Shapefiles** are NOT internally updated after geoprocessing operations
- Solutions ?
 - Calculate Geometry (similar to Field calculator)
 - Convert shapefiles to GeoDB feature classes
 - ArcCatalog: create new GeoDB, convert shapefile, into feature class, within GeoDB, add to ArcMap
 - Polygon area: toolbox-utilities-Calculate Area

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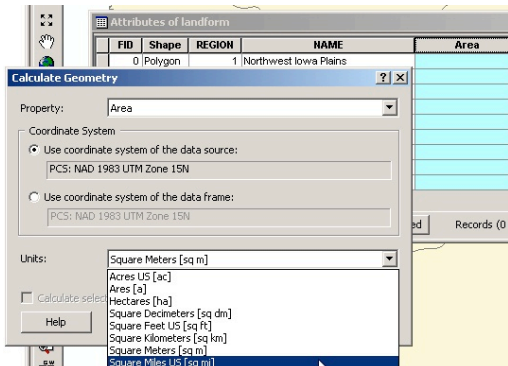
Calculate Geometry - right click on column in Attribute table



(I added a new float attribute called Area)



FID	Shape	REGION	NAME	Area
0	Polygon	1	Northwest Iowa Plains	4636.6099
1	Polygon	2	Des Moines Lobe	11853.7
2	Polygon	3	Paleozoic Plateau	2550.47
3	Polygon	4	Iowan Surface	9346.2402
4	Polygon	5	Loess Hills	1354.74
5	Polygon	6	Southern Iowa Drift Plain	23041
6	Polygon	6	Southern Iowa Drift Plain	1531.53
7	Polygon	7	Missouri Alluvial Plain	1120.35
8	Polygon	8	Mississippi Alluvial Plain	819.633



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Wrap up

- Lab: Finish HW 8 first!
- Mini project 3
- Copy Miniproject 3 data from GEOL552\data\miniproj3_data
- Read Instructions - ask if not clear
- Instructions.pdf in miniproj3_data and on WebCT (larger, in color)

27-Oct	Ch 7 - Geoprocessing
1-Nov	Ch 12/13 - Editing
3-Nov	Ch 12/13 - Editing
8-Nov	Ch 8 - Raster Analysis
10-Nov	Ch 8 - Raster Analysis
15-Nov	Ch 8 - Raster Analysis
17-Nov	Ch 8 - Raster Analysis
22-Nov	Thanksgiving Break
24-Nov	Thanksgiving Break
29-Nov	Work on Class Project (Geol 552)
1-Dec	Review for Final
6-Dec	Review for Final
8-Dec	Project Presentations
TBA	Final exam

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