**GIST 7128
ArcGIS 1: Introduction**

**Lecture 6
Editing and Geocoding**

Geocoding

- Address list → Point map layer
- Input:
  - **Address table** or text file
  - **Street Segment layer** with street names (name/type/direction) and address ranges (L_F_Add, L_T_Add, R_F_Add, R_T_Add)
  - **Address Locator** – metadata for above plus rules, tolerances
- Output:
  - **Address Points** layer – interpolated position on correct side
    - saved as a shapefile or in geodatabase
  - **New Attributes** (optional) – X,Y, and match results fields
- Example in *Getting to Know ArcGIS*, chapter 14

2

Data Editing

- Modification (or Creation) of spatial & attribute data
- ArcMap can edit shapefiles and geodatabases
- Using these general toolboxes…
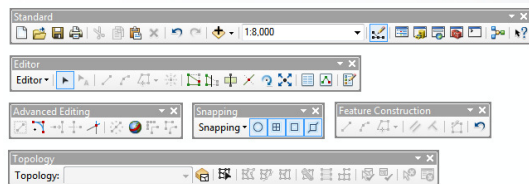
- …and other advanced/specialized editing tools

3

General Editing Steps

1. Add feature layers to edit to a map
2. Open Editor toolbar
3. Editor > Start Editing to begin edit session
4. Select Tool – editing operation
   - e.g. create new feature
5. Specify the target layer or feature(s)
6. Perform the operation
7. Select Editor > Save Edits – saves data (not mxd)
   - data are not automatically saved
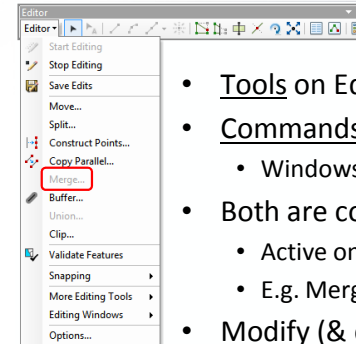8. Editor > Stop Editing – end edit session
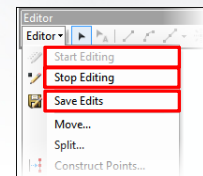
4

Standard Tools
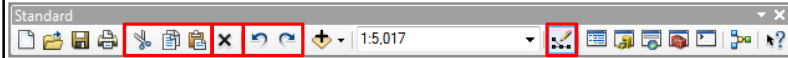
- **Cut**, **Copy**, **Paste** - selected feature(s) to specified layer
- **Delete** - selected feature(s)
- **Undo**, **Redo** – until edits are saved or session ended
- **Editor Toolbar** – open or close

5

## Editor Toolbar

- <u>Tools</u> on Editor toolbar (basic)
- <u>Commands</u> & options on Editor menu
  - Windows open with options
- Both are context sensitive
  - Active only when usable
  - E.g. Merge command: 2+ polygons are selected
- Modify (& create) features on target layer
- Does not update attributes
 - Except Area & Length in geodatabases only

6

Edit Tool & Move Command

- Edit Tool
  - Drag selected feature(s) by edge
  - anchor point is displayed

- Move command
  - enter delta X, Y distances
  - in map units

Delta X, Y
14.6   -22.5
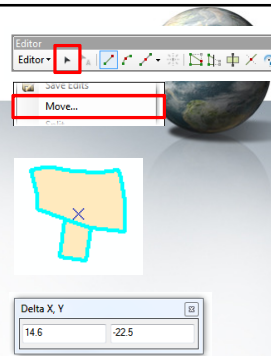
7

Reshape Feature Tool

- Change the shape of a line or polygon
- Based on a sketch drawn over the feature
- Examples:
  - Add to polygon
  - Remove part of polygon
  - Change shape of line
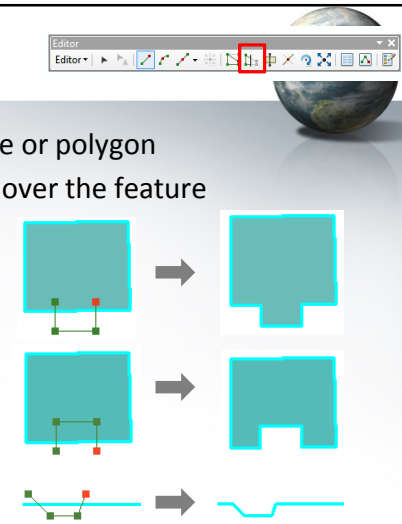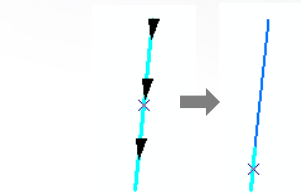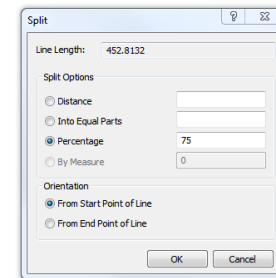
8

Cut Polygon Tool

- Splits a polygon into two features with a sketch
- Must start and finish sketch outside the polygon or snapped to its edge
- Double-click to end sketch on final point or press [F2] if outside polygon
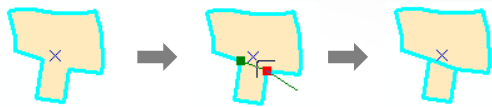
9

Split Tool & Command

- Splits a line into two or more parts based on:
- *Tool:* click a position on the line
- *Command:* enter distance, percentage, or number of equal parts

Split

Line Length: 452.8132

Split Options
- Distance
- Into Equal Parts
- Percentage   75
- By Measure   0

Orientation
- From Start Point of Line
- From End Point of Line

OK   Cancel

10

Rotate & Scale Tools

- Rotate selected feature(s) about their anchor point
- Press [A] on keyboard to set rotation Angle

Angle
90

- Scale selected feature(s) about their anchor point
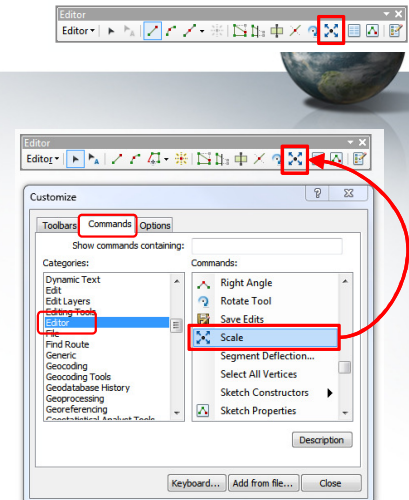- Press [F] on keyboard to set scale Factor

Scale Factor
1.5

11

Scale Tool

To use the Scale tool:
- select Customize > Customize Mode…
- select Commands tab
- select Editor category
- drag the Scale tool to an ArcMap toolbar (e.g. Editor toolbar)

Customize

Toolbars   Commands   Options

Show commands containing:

Categories: Commands:
Dynamic Text   Right Angle
Edit   Rotate Tool
Edit Layers   Save Edits
Editing Tools
Editor   Scale
Find Route   Segment Deflection…
Generic   Select All Vertices
Geocoding   Sketch Constructors
Geocoding Tools
Geodatabase History   Sketch Properties
Geoprocessing
Georeferencing

Description

Keyboard…   Add from file…   Close
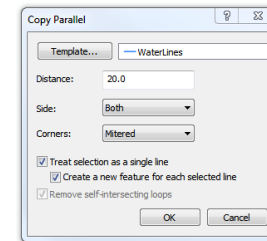
12

Create Features

- New features can be traced or drawn using CAD-like tools
- Create Features window:
  - Template toolbar
  - Template list
  - Construction Tools
    - Appropriate for selected template
- Template definition includes all info required to create the feature
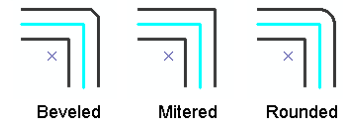 - Layer, attributes, default tool
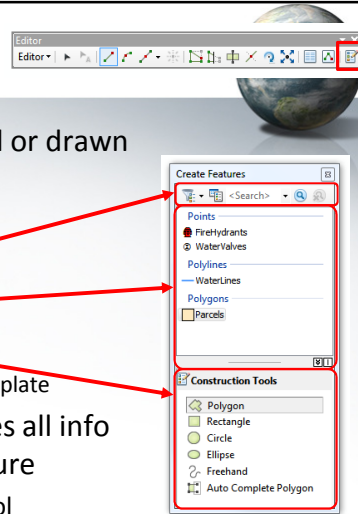
13

Copy Parallel

- Copies selected lines at an offset you specify
- Select template for new feature
- Left or Right Side depend on line direction
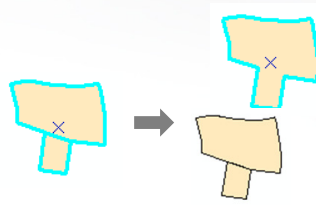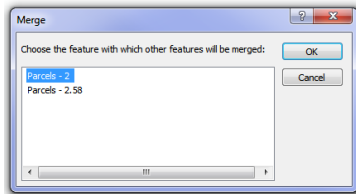- Corner type can be specified as shown below
  - e.g. powerline next to railway, road curbs from centerline

Beveled   Mitered   Rounded

14

Merge

- Merges two or more features together
- Creates new feature and *retains* original features
- Multipart features created if source features are spatially distinct
- Attributes of new feature copied from specified source feature

15

Union

- Union command
  - Combines area of two or more selected polygon features
  - Could be on different layers
  - New feature *replaces* source features
  - Retains attributes of specified source feature
- Compare:
  - **Merge** command - creates new feature, retains old features
  - **Union** overlay tool - combines all features on 2+ layers

16

Buffer

- Buffer selected features a desired distance
  - Does not act on entire feature class like Buffer layer tool
- Create buffer on features using specified template
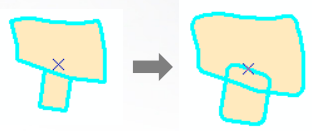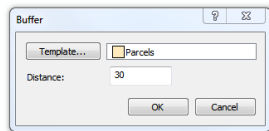
17

Clip

- Only polygon features can be clipped
- Can use any selected feature as source for clip
- Buffer distance creates "zone" for Preserve & Discard:
  - <u>Preserve</u> keeps polygons inside buffer, removes touching polygons
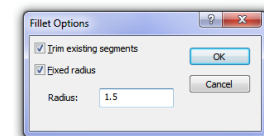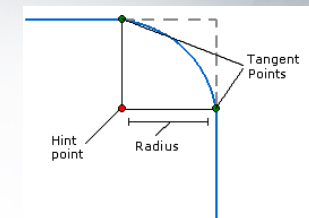 - <u>Discard</u> will remove polygons within the buffer distance
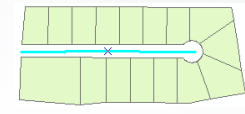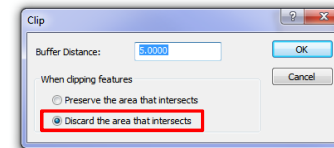
18

Copy Tool

- Copy selected feature(s) to a specified location
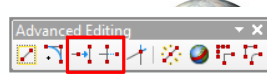- Layer for new features is specified by user
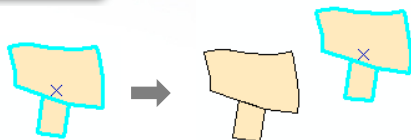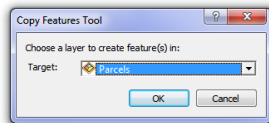
19

Fillet Tool

- Creates a circular arc tangent to two line segments on the selected feature(s)
- Press "R" on keyboard to set <u>R</u>adius and specify whether segments should be truncated

20

Extend & Trim Tools

- **Extend** lines until they touch selected feature(s)
  - Select target feature(s) – used as destination for lines
  - Then click lines you want to extend

- **Trim** the overlapping portions of lines
  - Select target feature(s) – used to cut the lines
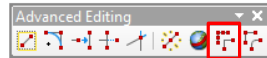 - Then click the line segments you want to trim

21

Data and Scale

- Appropriate data detail depends on map scale:

| Scale	Coverage	Detail	Vector	Raster
Large				
Small				

22

Generalize Tool

- Reduces data detail and complexity
  - e.g. output map is 1:250,000 and source data is 1:20,000
  - Need to simplify contours, coastlines, etc
- Readability, data storage, transfer & rendering speed
- Amount depends on Maximum allowable offset
  - limits distance from input to output geometry

Generalize
Maximum allowable offset: 0.5
OK   Cancel

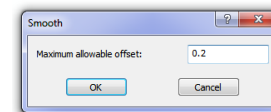— Simplified line
— Input line
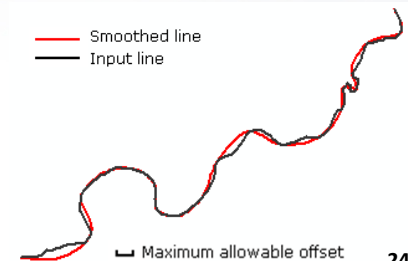⊢ Maximum allowable offset
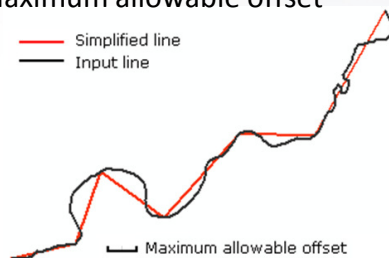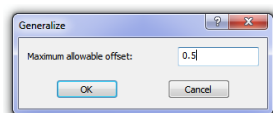
23
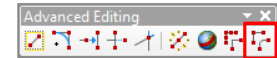
Smooth Tool

- The Smooth Tool is used to smooth the straight edges and angular corners of a feature.
- The feature geometry is replaced by a series of curved line segments
- Amount depends on Maximum allowable offset

Smooth
Maximum allowable offset: 0.2
OK   Cancel

— Smoothed line
— Input line
⊢ Maximum allowable offset

24

Snapping Toolbox

- Vector data must be "clean"
  - e.g. lines must connect, be segmented at intersections
  - polygons must close and not overlap adjacent polygons
- Snapping is used while adding or editing spatial data
- Set mode(s) on Snapping toolbox:
  - Point, End, Vertex, Edge (on toolbar)
  - Intersection, Midpoint, Tangent (on menu)
- Multiple modes active at same time
- Features added or edited will follow snapping rules
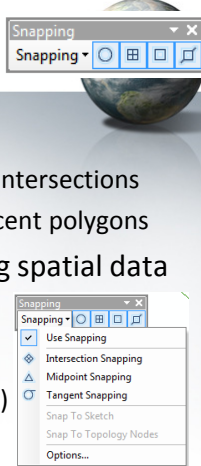
25

Snapping Options and Tips

- On Editor Toolbar:
  Editor > Snapping > Options…
  - Set snapping tolerance
    - default is 10 pixels
  - Enable Snap Tips
    - appear when near a valid feature
    - shows layer name and snap mode
- Press and hold spacebar to suppress snapping while editing

Parcels: Vertex
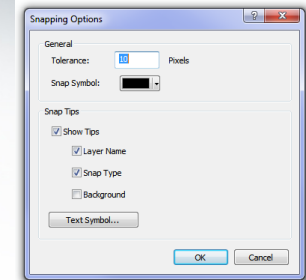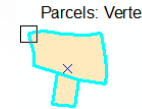
26

Feature Construction Toolbox

- a.k.a. Sketch Toolbox & Tools to:
- Create features
- To provide input for other tools
  - e.g. cut polygon, extend lines
- Can reveal the sketch of an existing feature to modify it
  - Double-click with Edit Tool
  - Or use Edit Vertices tool
- 11 different CAD-like drawing tools
- Also on Editor Toolbox
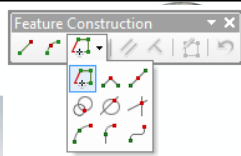
27

Feature Construction Toolbox

| Tool		To Create…	Example
Straight Segment		(default) digitize vertices of line or polygon features	street centerlines, parcels
Arc		parametric (true) curve: based on startpoint, midpoint, endpoint	cul-de-sac from underlying air photo
Bézier		smoothed curves, with handles to change adjust its shape	railway
Direction -Distance		point or vertex using a distance and direction from known point(s)	pole at specified distance from corner of one building and at defined angle from corner of another building
Distance -Distance		point or vertex at the intersection of two distances from two other points	pole based on field measure-ments: 50 feet from one building corner and 75 feet from another

28

Feature Construction Toolbox
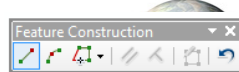
Tool	To Create…	Example
Endpoint Arc	parametric (true) curve: based on startpoint, midpoint, radius	street corners where radius is known
Intersection	point or vertex where two segments intersect or would intersect	manhole at intersection of two watermains
Midpoint	point or vertex at the midpoint two specified points	street centerlines from parcel data
Right Angle	segment constrained to 90º angle from previous segment	building footprints from air photo
Tangent	segment that is tangential to previously sketched segment	service drops for underground electrial conduit lines
Trace	segments that follow along existing segments	shoreline that follows parcel, park, and city limit boundaries

29

Draw Toolbox

- Graphics drawing tools can be used to make point, line, and/or polygon features
- Can be save as features in a feature classes
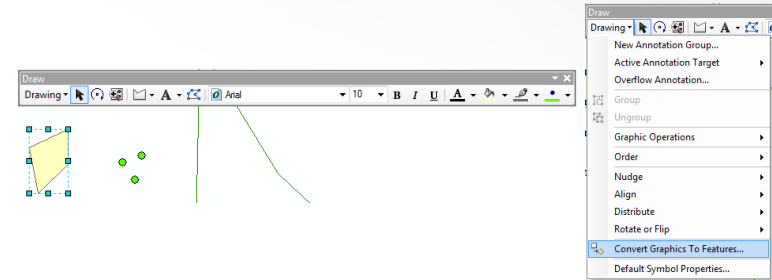
30

Map Topology for Editing

- Designed for easier and more precise editing
- For Shapefile and Geodatabase feature classes
- Polygon features do not share common borders
  - Instead, each has a unique copy of the border
  - If one adjacent polygon is edited, the other is not changed;
    – can cause gaps or overlaps
- Map Topology is for the current map extents and the current editing session only
- Geodatabase Topology is persistent and has built-in integrity rules to detect spatial errors

31

Topology Toolbar
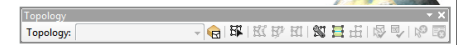
1. Start Editing
2. On the topology toolbar, click the Map Topology button
3. Check the layers to participate in the topology
4. Also set the cluster tolerance
   - Maximum distance between vertices that will be snapped together
5. Click the Topology Edit tool and click the features you want to edit using the map topology
6. The map topology is created for:
   - features visible in the current display extent
   - the current editing session
7. Perform editing operations
   - e.g. move vertex applied to multiple polygons

32