Building a GIS from the Beginning: Part 3: Editing Techniques

Andy Schmidt

Project Manager, GIS

Great River Energy





Part 3: Editing Techniques

Presentation agenda

- Editing setup and templates
- Creating data
- Feature construction
- Using snapping
- Attribute edits
- Bulk editing
- Tips and tricks

- Set up layer properties
 - Benefits
 - Determine how layers are displayed and provide properties for feature templates

Layer Properties	1	1	-			X
Time		HTML Popup			CarryMap Identify	
General Source Selection	Display	Symbology	Fields	Definition Query	Labels	Joins & Relates
📰 🗊 🕇 🕶 🕹 🕶 Options	-					
Choose which fields will be visible		⊟ A	ppearance			
OBJECTID		A	lias	OB	JECTID	
V Shape		H	ighlight	No		
V Location			eld Details	Ob	in at ID	
V Laber V Name			ata Type ame	OB		
servAddr1		A	llow NULL \	/alues No	20110	
Substation						
V Feeder						
TransformerID						
				OK	Cancel	Apply
	-					

- Fields
 - On/off
 - Aliases
 - Read only
 - Highlight
 - Order

Layer Properties	K		7				×
Time		HTML		L Popup		CarryMap Identify	
General Source	Selection	Display	Symbology	Fields	Definition Query	Labels	Joins & Relates
□ □ ↑ • ↓ •	Options 🔻						
Choose which fields will b	e visible		E A	ppearance			
OB IECTID			A	ias	Servi	ce Address	
Shape			H	ighlight	Yes		•
✓ Location			R	ad-Only	No		
Label			😑 Fi	eld Details			
✓ Name			D	ata Type	Text		
Service Address			Le	ength	254		
Substation			N	ame	serv	\ddr1	
V PhaseCode			A	low NULL \	/alues Yes		
TransformerID			Hig Dete	light rmine if fie	ld is accentuated v	vhen displa	yed
					ОК	Cancel	Apply

 Note leave OBJECTID and SHAPE fields turned on because they are used to manage the features in a GIS server service

- Symbols
 - Symbols are appropriate
 - Symbols are unique
 - Labels are descriptive
- Display tab
 - Display expression
 - Attributes window
 - Selection chip
 - Table of contents
 - Other places in ArcGIS

Layer Properties		L.	-	1 Port	×
Time		HTML Por	oup	Cam/Ma	n Identify
General Source	Selection	Display Symbolog	V Fields	Definition Query Lab	els Joins & Relates
Show:					
Features	Draw categ	pories using unique	values of one	field.	nport
Categories	Value Field		Color F	Ramp	
Unique values	PhaseCode		•		
Unique values, many					
Match to symbols in a	Symbol Va	alue	Label	Count	
Charte		other values	call other volu		
Multiple Attributes				67	
	• A	our interest of the second sec	A	11	
	• B		В	50	
	• C		С	6	
4 III >	 AB 	с	ABC	0	Ŧ
N	Add All Value	s Add Values	Remove	Remove Ali Advar	
Laver Properties			1.2	ОК Са	ncel Apply
Tre		UTML D.		C1	
General Seurce	Selection	Display Sumk-I-	pup N Rolda	Definition Otten:	ap identify
General Source	Selection	Symbolog	y rielas	Deminition Query Lab	Joins & relates
Scale symbols when	n a reference s	cale is set			
Transparent:	0 %				
Display Expression					
Field: Location	1		•	Expression	
Show MapTips usin	g the display e	xpression			
Hyperlinke					
Support Hyperlinks	using field:				
Bupport Hyperlinks	using neiu:				
none		*			
Ocument	O URL	Script	Edit		
Feature Exclusion					
The following features	are excluded f	rom drawing:			
Feature ID Locat	ion			Restore Drawing	
				Restore All	
				2	
				OK Ca	ancel Apply

- Set a feature template's

 Default construction tool
 Default attribute values
 Use domains when possible
 - Note:
 - Templates don't automatically update
 - Be careful of definition queries

Template Properties	×
General	
Name:	
Description:	
Tags: Point	
Default Tool: Point	Drawing Symbol
Target Layer: ServiceLocation	•
Image: A state of the state	
Location	<null></null>
Label	<null></null>
Name	<null></null>
servAddr1	<null></null>
Substation	<null></null>
Feeder	<null></null>
PhaseCode	Α
TransformerID	<null></null>
	OK Cancel Apply

Using Snapping

- Snapping tool
 - Set what to snap to



- Point, end, vertex, edge, intersection, midpoint, tangent
- Editor > Snapping > Options
 - Set tolerance
 - Distance it snaps to
- Classic snapping
 - Editor > Editing options > General > Check classic snapping
 - Used to set specific layers it can snap to
 - Editor > Snapping > Snapping Window



Snapping Environment				
Layer	Vertex	Edge	End	
ServiceLocation	~			
TransformerBank	✓			
SwitchDeviceBank	✓			
Poles	✓			
OHPrimaryLine			~	
UGPrimaryLine			✓	
UGSecondaryLine			•	
Streets		✓		
Parcels				

Creating Data

- Creating points, lines, polygons
 - Editor > Start Editing
 - Choose a point feature and create a new point
 - To move it to a different location > Select and move it
 - Or double click > right click > Choose move to if you have a GPS point, or move if you want it moved in an x,y position
 - Choose a line feature and connect two points
 - Choose starting point, vertexes between, end point
 Double click to end, or right click > Finish sketch, or F2
 - Choose a polygon feature and draw an area
 - Construct similarly to a line feature

Feature Construction Lines

- Strait Segments Default
 - Straight line between vertex
- Direction-Distance



- Allows you to create a point or vertex using a distance from a known point plus a direction from a known point to define a bearing line
- Press the D key to enter a distance
- Distance-Distance
 - Allows you to create a point or vertex at the intersection of two distances from two other points
 - Press the D key to enter a distance
- Endpoint Arc
 - Allows you to specify the start and endpoints of the curve, then define a radius for the curve
 - Press the R key to enter the radius

Feature Construction Lines

- Intersection
 - Creates a point or vertex at the place where two segments would intersect
- Midpoint
 - Allows you to place a point or vertex by clicking two points; the new point or vertex is placed at the midpoint of the line between these points
- Right Angle
 - Limits a segment to be at a 90-degree
- Trace
 - Helps you create segments that follow along existing segments
 - Use Offset to follow a feature at a distance
 - Press O key to set offset

Feature Construction

- Setup units
 - Editor > Options > Units tab
 - Choose your standard direction type
 - Choose Units



diting Opt	tions	h.		-	1	×
General	Topology Versi	oning Units	Annotation	Attributes		
Angul	ar Units					
Used	d by editing functi	ons in which dir	rections are s	pecified.		
Direc	ction Type:	Quadrant Bea	ning	-		
Direc	ction Units:	North Azimuth South Azimuth Polar	1			
Displ	lay angles using:	Quadrant Bea	ring			
- 🗐 G	round to Grid Cor	rection				
Conv	version factors us	ed where dista	nce and direc	tions are spec	ified.	
Direc	ction Offset:	0-0-0		Degrees Mir	nutes Seconds	
Dista	ance Factor:	1]		
			0	ж	Cancel	Apply

Construct a polygon with units and measures

 Place first point at the of another polygon
 N 65-10-20 W 137.32, deflect 270 for 500in,
 S 65-10-20 E 137.32, finish sketch

Vertices Editing

Edit Vertices

- Adding vertices
- Removing vertices
- Stretching
- **Sketch Properties**
- Modify position of vertices
- Add and delete vertices



Edit	Sket	ch Properties	
≜ ≊-	×	🛛 🔣 🛛 🔁 Finish Sketch	
	#	Х	γ
	0	2607672.743	758602.749
	1	2607612.580	758599.186

Reshape Features Tool

- The tool lets you reshape a line by constructing a sketch over a selected feature
- Works well for adding or removing vertices
- Faster than individual vertex editing
- Works with a geometric network

Keeps connectivity



Geometric network editing

- Connect and disconnect
- Stretching and moving



- When a junction is moved, the network features to that is connected moves with it to maintain connectivity
- Connectivity models
 - Complex: allows you to snap features to the edge of another feature without breaking it
 - Simple: each line feature is broken at a junction

Other Edit Tools

- Merging features
 - Select multiple features to merge into one feature
 - Be cautious of multipart features
 - Won't work with a geometric network
- Copy parallel
 - Allows you to copy a feature at a set distance
 - Works to copy to other layers
 - Both sides, or one side based on digitized direction

Other Edit Tools

- Mirror
 - Select features (even if on different layers)
 - Draw a mirror line to mirror (copy) the selected features
- Rotate
 - Select feature
 - Position anchor
 - Pres A key to type angle
- Scale
 - Select feature, position anchor
 - Pres F key to type scale factor



Other Edit Tools

- Constructing points on a line

 Select a line feature
 Editor > construct points
 Enter your specifications
- Split
 - Choose a line
 - Editor > split
 - Enter your specifications

Construct Points		×
Template	• A	
Line Length: 81	.117	
Construction On		
Construction Op	iuons	
Number of Po	oints	
Distance Distance		
By Measure		
Create additi	ional points at start and end	1
Orientation	-i-t-fli	
From Start p From End pai		
O From End por	Int of Line	
	OK	Cancel
Split		x
Split Line Length:	81.117	×
Split Line Length: Split Options	81.117	X
Split Line Length: Split Options	81.117	x
Split Line Length: Split Options Oistance	81.117	
Split Line Length: Split Options Split Options Distance Into Equal Percentage	81.117	×
Split Line Length: Split Options O Distance Into Equal Percentage By Measure	81.117	
Split Line Length: Split Options Split Options Distance Into Equal Percentage By Measure	81.117	
Split Line Length: Split Options Split Options Distance Into Equal Percentage By Measure Orientation	81.117 Parts Parts Parts Point of Line	
Split Line Length: Split Options Distance Into Equal Percentage By Measure Orientation From Start	81.117 Parts Parts Point of Line Point of Line	
Split Line Length: Split Options Split Options Distance Into Equal Percentage By Measure Orientation Srom Start From End P	81.117 Parts e 0 Point of Line Point of Line	

Attribute Edits

- Must be in an edit session
- Editor > Start Editing
- Select a feature
- Open attribute window
 - Editor > Editing Window > Attributes
- Select fields to update
 - Type in the data
- Select multiple attributes to update together
 - Select highest level layer name
 - Type in data
 - All features will have the same attribute
- Copy and paste
 - Right click on a feature > Copy Attributes
 - Right click on the feature you want updated > Paste Attributes
 - Both features will have the same data

Attributes	×
	®II
OBJECTID	9
Location	28QCC03-207
Label	207
Name	North Mankato Resident
servAddr1	19 North Mankato Road
Substation	14
Feeder	5
PhaseCode	C
TransformerID	TRF7

Attributes	×		
28QCC03-207			
🖻 28QCC03-208			
Hard UGSecondaryLine			
- • •			
OBJECTID			
Location			
Label			
Name	North Mankato Resident		
servAddr1			

Field Calculations

- Right click on a layer > Open attribute table
- Select multiple features you want to update
 - If no records are selected, all records will be updated
- Right click on the column you want to update data on > Field Calculate
- Enter in the data you want all features to have
 - Note text must be in "quotes"
 - Numbers do not require quotes



Field calculations using an existing field

- Same process as before except choose the fields you want
- Process to join two fields into one expression
- Process to split up a single field into multiple
 Service points lets make all labels a three digit number
 - Select by attributes len([Label])=2
 - Field Calculator "0"&[Label]

Calculate geometry

- Calculate X,Y of a point
- Calculate length of a line
- Calculate area of a polygon
- Similar to field calculator



- Right click and choose Calculate Geometry
- Choose property, coordinate system, and units > OK

Geoprocessing

- Bulk snapping
 - Snap many features to specified layers
 - Control distance and snap type
 - Works on selected features or all features
 - -Cannot snap network features



Basic

- Best to have all data in the same coordinate projection
 - Performance!
- Best to have all data you want to edit within a single data source

- Will not have to start and stop edits often

 Definition query: works best with discrete (=) queries

– Performance!

- Save MXD's and edits
 - Especially before adding large datasets
 - Before printing a map
 - After digitizing features
- Setup different MXD's for different tasks
- Use find and replace in the attribute table
 - It gives you the ability to search and optionally replace text or values in an attribute table
- Customize your toolbar
 - Put tools you use most often on a new toolbar

Feature templates

- Setup multiple templates for the same feature
 Each can have different attribute defaults and tools
- Delete templates you are not using
- Use Filter by and Group by
 - Type, layer, frequency
- Use search if template list is long
 Add tags and descriptions for searching
- Why are my feature templates hidden?
 To avoid creating features that cannot be drawn

- Switching among tools while editing
- Use keyboard shortcuts: E, C, X, Z, and B
 - E key to toggle among construction, Edit, and Edit Annotation tools
 - C key to pan
 - X key to zoom out
 - Z key to zoom in
 - B key to zoom and pan continuously
 - Tab key to move the Feature Construction toolbar

- Switching among tools while editing
- Editing keyboard shortcuts:
 - E key Toggle between construction, Edit, and Edit Annotation tools
 - CTRL key Move the selection anchor
 - SHIFT key Add to/Remove from the selection
 - N key Select next feature

- Best advice in using ArcGIS for editing is to read the help file
 - <u>http://desktop.arcgis.com/en/arcmap/</u>
 - Practice concepts in the help file
 - Don't be afraid to try something new
- Second best advice
 - Ask questions, share successes with colleagues, peers, blogs, conference attendees...



QUESTIONS?

ANDY SCHMIDT

GREAT RIVER ENERGY 763-445-6026 ASCHMIDT@GRENERGY.COM