ADVANCED EDITING

Tutorial

Advanced Vector Editing

with

TNTmips®

TNTedit™

Before Getting Started

The Spatial Data Editor in TNTmips® and TNTedit™ lets you create, alter, and update geospatial data in a robust editing environment that allows combination of multiple editable and reference layers for simple or complex editing tasks. This booklet introduces more advanced vector editing topics than are presented in the *Editing Vector Geodata* tutorial booklet.

Prerequisite Skills This booklet assumes you have completed the exercises in the *Displaying Geospatial Data*, *Navigating*, and *Editing Vector Geodata* tutorial booklets. Those exercises introduce essential skills and basic techniques that are not covered again here. Please consult these booklets for any review you need.

Sample Data The exercises in this booklet use sample data distributed with the TNT products. If you do not have access to a TNT products CD, you can download the data from MicroImages' web site. The exercises in this booklet use the Project Files in the EDITADV directory of LITEDATA. You will also need the CB_COMP and CB_DLG Project Files from the CB_DATA directory. Although making a read-write copy of this sample data on your hard drive is not absolutely necessary since the Editor makes a copy of a file when it is opened, making a copy on your hard drive will generally speed access.

More Documentation This booklet is intended only as an introduction to some of the advanced features for vector editing in the Spatial Data Editor. Consult the TNTmips reference manual, which contains more than 200 pages on the Spatial Data Editor, for additional information.

TNTmips and TNTlite™ TNTmips comes in two versions: the professional version and the free TNTlite version. This booklet refers to both versions as "TNTmips." If you did not purchase the professional version (which requires a software license key), TNTmips operates in TNTlite mode, which limits the size of your project materials and does not allow export. All exercises in this booklet can be completed in TNTlite using the sample geodata provided.

Merri P. Skrdla, Ph.D., 5 May 2002

It may be difficult to identify the important points in some illustrations without a color copy of this booklet. You can print or read this booklet in color from MicroImages' web site. The web site is also your source of the newest Getting Started booklets on other topics. You can download an installation guide, sample data, and the latest version of TNTlite.

http://www.microimages.com

Welcome to Advanced Vector Editing

The Spatial Data Editor lets you create and edit raster, vector, CAD, and TIN objects. All of these data types can be open in the Editor at one time for either editing or reference. There is an introductory booklet for editing each of these object types. Be sure you have gone through the introductory booklet for vectors (*Editing Vector Geodata*) before doing the exercises in this booklet as it is assumed you are already familiar with this process.

Vector editing has many additional intricacies, such as auto generated labels and setting contour Z values, not found for other object types. You can even select E00, Coverage, and shapefiles directly for editing and save in the original format if desired or convert the file to an object in RVC format within the Editor. Just be aware of the limitations of external formats if you choose to save to them. For example, if you create a new table for a shapefile, it is lost when saved in shapefile format, since shapefiles support only one associated database table.

Unlike Spatial Data Display where all element types have selection off by default, the Editor has selection for all element types on by default. A big part of easing editing tasks is to have selection limited to the elements you want to work with at the time. The Editor also has more windows that are associated with the process; if you are adding or editing elements, there will be four windows open. Even the View window has Editor specific icon buttons (Cut, Copy, Paste, Undo, and Redo are on the View toolbar).

The Editor provides multiple step Undo functions for the editing changes you have made in multiple layers. There is also a single step Redo after any Undo for each of the editable layers.

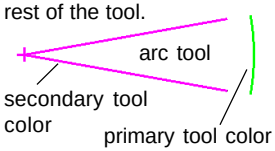
STEPS

☑ copy the files in the EDITADV data collection and the CB_COMP and CB_DLG Project files from the CB_DATA data collection to your local drive

The exercises on pages 4–5 and 8–9 introduce general topics that affect your operation in the Editor. Pages 6–7 discuss snapping to and auto tracing from elements in different layers. The intricacies of labeling are described on pages 10–16. Filters, panning by query, setting contour Z values, using external files, and cut/copy/paste are discussed on pages 17–21. The two methods for assigning attributes by default as elements are added are described on pages 22–23.

Editor Preferences

Vocabulary: Some tools, such as the arc and arc chord tools, have parts necessary for positioning and resizing that will not be part of the element added. For such tools, the **primary tool colo**r is used for the part that represents the element and the **secondary tool color** is used for the rest of the tool.



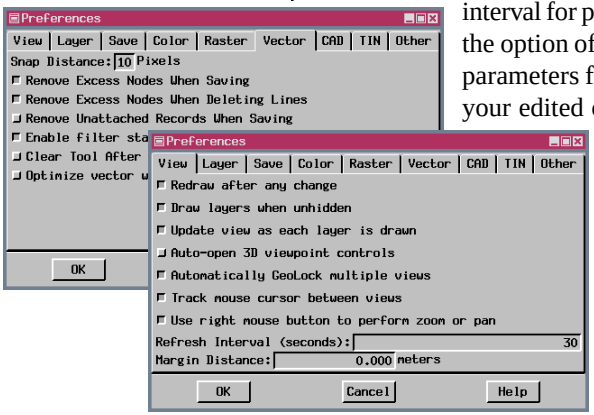
STEPS

- ☑ select Edit / Spatial Data
- ☑ choose Setup / Preferences in the Spatial Data Editor window
- ☑ set the choices on the View and Layer panels to suit your own preferences
- ☑ browse the Save, Color, Vector, and Other panels so you know what options are available

You have direct control over many aspects of the Editor's behavior through the Preferences window. Because editing takes place in a View window, many of the choices are the same as they are in Spatial Data Display. The options that are the same as in Display have the same meaning as in the Display process. For example, having the *Redraw after any change option* on initiates a redraw whenever a layer is added or removed or has its drawing style changed. It does not initiate a redraw for editing changes made to the active layer.

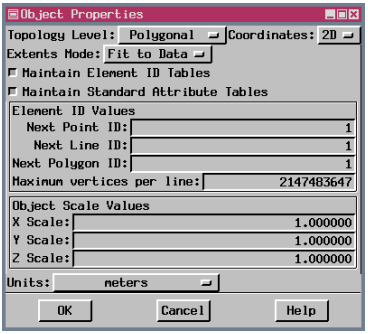
The View and Layer panels each have one option unique to the Editor. The Margin Distance lets you define the distance between your layers and the edge of the window when zoomed so that the layers fill the window. The default distance is 8 pixels, but you can enter a distance if you prefer a larger margin for ease in editing along the edge of your layers. If you're not sure what a reasonable distance in meters would be, use the Ruler tool in the GeoToolbox to determine an appropriate distance. In addition to the Display options on the Layer panel, you can choose to disable DataTips for the editable layer.

The Save panel lets you decide whether you want to be prompted to save while editing and the time interval for prompting. You also have the option of saving separate display parameters for use in the Editor with your edited object. The color panel lets you save tool and preview colors and line widths. The vector panel has parameters specific to vector objects and the Other panel has miscellaneous options for the Editor in general.



Layer Properties

Most of the options in the New Object Values window that opens when you elect to create a new object also appear in the Layer Properties window. The only properties that cannot be changed once the object is created are the coordinate system used to assign object coordinates and whether an extents box is added automatically.



When creating a new object, the Units option menu determines the units used to display the reference object's extents. If the reference object's georeference is in Latitude / Longitude, the Units option menu is disabled. If you want your new vector to have different extents or be in a different projection, choose User Defined from the choices listed for the implied georeference. You can also use the User Defined option to set the coordinate system and extents for a new object in the absence of reference layers.

The X and Y Scale values are determined from an object's georeference and values you enter will be ignored unless your vector has no georeference. Under such circumstances, you can choose to have your object coordinates in any supported units.

If you use Open External to edit ESRI data (E00, Coverage, or shapefiles) and save them in their original format, a *Convert to internal format toggle* also appears in this window (above the Element ID panel). Turning the toggle on lets you save your changes in RVC format. Keep in mind that the ESRI format you are editing may not support all the editing changes you make. For example, shapefiles do not support element labels and Coverages are limited to lines with 500 vertices*.

Vocabulary: An object that uses georeference coordinates as object coordinates has **implied georeference**. A vector, CAD, or TIN object created using a raster to supply its georeference has implied georeference.

STEPS

- ☑ click on the Add Reference Layer icon and choose _16BIT_RGB from the CB_COMP Project File and HYDROLOGY and ROADS from the CB_DLG Project File
- ☑ click on the Create New Object icon and choose Vector
- ☑ note the options available in the New Object Values window (including expandable Object Scale and Element ID Values panels) and click [OK]
- ☑ choose Layer / Properties from the Spatial Data Editor window and note the options available and current settings, then click [Cancel]
- ☑ keep this editing session open for the next three exercises

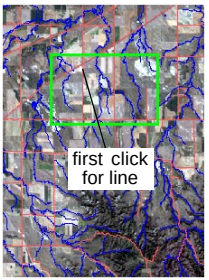
* Lines created in the Editor with more vertices will be broken into lines that fit in a Coverage when saved; labels added to an opened shapefile are lost if you save in the original format.

Snap to Elements in Different Layers

Vocabulary: The **snap distance** is how close you must be to an element for snapping to be active. The **snap layer** contains the elements used to determine the snapping position.

STEPS

- ☑ use the Zoom Box to enlarge display of the area outlined below

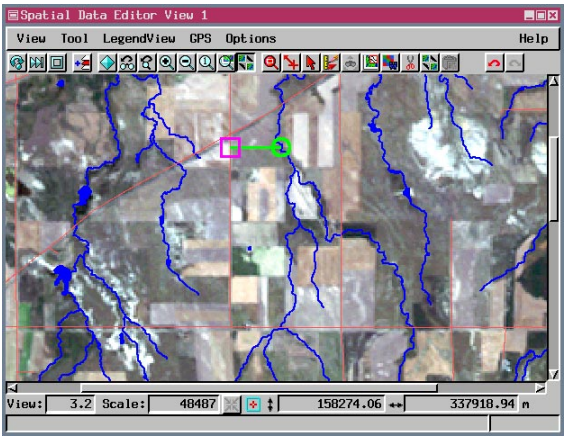


- ☑ click on the Add Line icon
- ☑ check that the Show Markers icon is toggled on in the Action panel of the Line/Polygon Edit Controls
- ☑ click on [Snap Layer] in the Line/Polygon Edit Controls window that opens and select ROADS
- ☑ click on the road at the field boundary shown below the road intersection
- ☑ next click on the stream to the right of your initial click
- ☑ click on [Snap Layer], and this time choose HYDROLOGY

Line elements created in the Editor will not have gaps unless the automatic snapping feature is turned off. The markers at the ends of the line tool change to the secondary tool color when you are within snapping distance of another element. The *Editing Vector Geodata* booklet describes how to snap lines to one another that should, but don't quite, meet in the layer you are editing. Such errors are often found in imported vector objects.

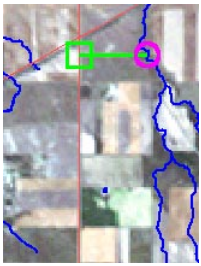
While snapping to existing lines in the same layer is quite useful, you may often want to snap to lines in a reference layer, such as a stream or road layer when drawing parcel boundaries. You may even want to snap different parts of the line to elements in different vector layers. The Spatial Data Editor lets you snap lines to elements in any vector layer loaded either for editing or reference.

The snap distance is set by vector preferences (page 4). When you change the snap layer, the line end markers change color depending on the proximity of elements in the newly selected layer. Changing the snap layer changes the position of the vertex only at the end of the line being added; previously snapped vertices, such as the start of the line in this exercise, remain at their original positions.



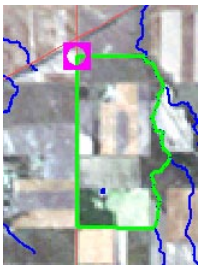
Auto-Tracing Line Segments

The Spatial Data Editor has three drawing modes when creating/ editing lines: draw, stretch, and trace. The draw mode adds vertices to the line as you drag or click the mouse. The stretch mode lets you preview the line position as it stretches from the last added vertex, adding a vertex when the mouse button is released. The trace mode is only active when a layer other than the layer you are editing is selected as the snap layer.



The trace mode makes a vertex by vertex copy of the line in the snap layer between two successive mouse clicks. The tool will not work if the second mouse click is separated from the first by more than one node. The line snapped to in this example branches shortly after it is met. To trace the line with a minimum number of clicks, your next click should be after the first branch but before the second. Note that Close Polygon will trace a line in the snap layer if you are in trace mode.

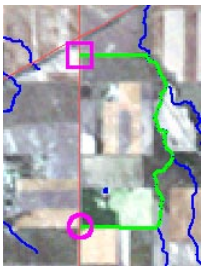
If it appears that the Add Line tool is not working in trace mode with a vector of yours, first double-check that you have selected the intended snap layer, then zoom up to locate the source of the problem. You will generally discover a previously unseen "bubble" in the line, which means you were attempting to cross two nodes when tracing. Simply pick the preferred side of the bubble and click there and then click on down the line, or edit out the bubble then resume tracing.



STEPS

- ☑ note that the markers at the ends of the lines have changed color
- ☑ click on the Trace icon 
- ☑ click downstream on the left fork a little below the fork

- ☑ click on the next left fork at the field boundary shown
- ☑ click on the Stretch icon, then click on [Snap Layer], and select ROADS 
- ☑ click on the road to the left, adjusting the line to follow the field boundary



- ☑ click on Trace, then click on Close Polygon 
- ☑ either right-click to add the line or click on [Add]

Save / Restart Editing Sessions

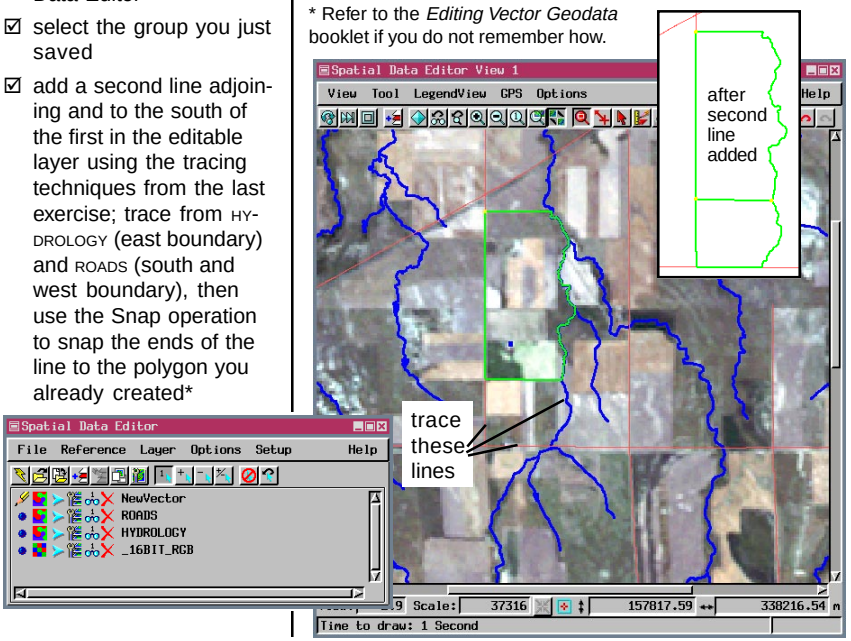
STEPS

- ☑ click on the Vector icon for the NewVector layer and change the line drawing style to green and 2 pixels wide
- ☑ choose File / Save Group
- ☑ create a new file and save the group in it
- ☑ you will next be asked to save your vector object; create a new object in the same file as the group
- ☑ choose File / Exit in the Spatial Data Editor window
- ☑ choose Edit / Spatial Data from the main menu
- ☑ click on the Open icon in the Spatial Data Editor
- ☑ select the group you just saved
- ☑ add a second line adjoining and to the south of the first in the editable layer using the tracing techniques from the last exercise; trace from HYDROLOGY (east boundary) and ROADS (south and west boundary), then use the Snap operation to snap the ends of the line to the polygon you already created*

Large editing projects or creation of new vector objects from reference layers may require several editing sessions. When you have a number of reference layers and possibly a number of editable layers, it is a great convenience to be able to save the group and reopen it just as it was. An editing session group not only saves all the layers but whether they were editable or reference layers and which layer was active. Other editing conditions, such as display style, preferences, and DataTips are also retained.

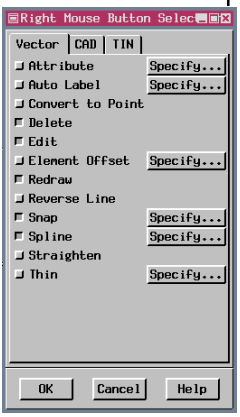
Groups saved in the Editor can also be opened in Display and vice versa. Obviously, information about which layers are editable will not be part of a group saved in display. If during the course of an editing session that started by opening a group you save an editable layer with a new name, you will be asked if you want to save changes to the group when you exit.

* Refer to the *Editing Vector Geodata* booklet if you do not remember how.



Right Mouse Button Operations

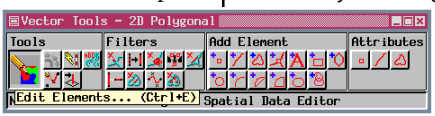
The right mouse button menu lets you increase the speed at which you edit when switching frequently between editing operations for single elements. You can open an existing object and immediately begin editing, labeling, snapping, and deleting elements among other operations. Your right click selects the element to perform the operation on from the elements available for selection using the search distance set in your preferences*. If the operation you choose from the menu opens a window, such as for element editing, the window closes when you right click or press the Save or OK button to finish the operation.



Some of the right mouse button operations, such as assigning attributes and labeling, require specification of parameters for the operation. When you want to use different parameters, you can either change what is specified for the right mouse button or you can run the operation from the window interface (mostly the Edit Elements window).

The right mouse button menu is not available unless an editable layer with at least one element is the active layer. It is also not available when you have selected an operation, such as adding or editing elements, that uses the right mouse button for other purposes.

The Editor also has a number of hot keys to let you switch quickly between different tools, filters, and adding different element types. The hot key for each of these elements is shown in the ToolTip for the icon. A QuickGuide that lists all hot keys is available from MicroImages' web site.



STEPS

- ☑ create a new table in the polygon database with a One Record per Element attachment type and a single integer field of width 5 (see *Editing Vector Geodata* or *Managing Relational Databases* if you don't know how)
- ☑ choose Setup / Right Mouse Button
- ☑ turn on Attributes, click on [Specify], select the table you created as the Polygon table, and click [OK]
- ☑ turn on Auto Label, click on [Specify], set the polygons to label by attribute and choose the field in the table you created, also set the label height to 120 on the Metrics panel
- ☑ click on the Zoom Box icon 
- ☑ right click within the upper polygon choosing Attribute from the menu; enter 2045
- ☑ right click on the same polygon and choose Auto Label from the menu
- ☑ right click on the lower polygon and repeat steps 6 and 7, but enter 2046 as the value

* If multiple element types are selectable and the wrong one is selected, use <tab> to cycle through eligible elements

Auto Labeling Multiple Elements

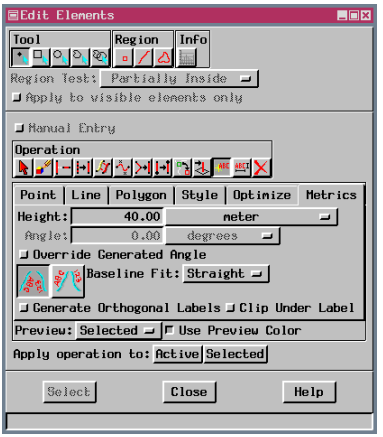
STEPS

- ☑ save the changes to your vector object, then choose File / Close Group
- ☑ click on the Open icon and choose CBSOILS_LITE* from the CB_SOILS Project File
- ☑ click on Show Details, then click on the Select/ Deselect icon for polygons and choose Select All
- ☑ click on the Edit Elements icon (Vector Tools window) then on the Auto Generate Label icon
- ☑ on the Polygon tabbed panel, set the Label option menu to Attribute and select CLASS in the Table and Field columns
- ☑ on the Metrics panel, enter 40 meters for the Height
- ☑ turn on the Use Preview Color toggle, then set the Preview option menu to Selected (below the tabbed panels)
- ☑ click on the Apply operation to: Selected button
- ☑ choose File / Save As and create a new object
- ☑ click on the Edit Element icon (Operation panel of the Edit Elements window)

* Be sure to use the CBSOILS_LITE copied from the EDITADV directory. It has been specially prepared for this exercise.

The Auto Generate Label operation creates labels for as many elements as you have selected. When used from the right mouse menu, only one element is selected at a time so only one element is labeled.

The Auto Generate Label operation lets you generate labels for all element types in a single pass if you want the labels for all to be the same text style. Some of the controls on the auto label tabbed panels apply only to one element type. The choices on the Optimize panel apply only to points and the baseline fit and text direction options on the Metrics panel apply only to lines. Obviously, the options on the Point, Line, and Polygon panel apply only to that element type.



Automatically generated polygon labels are placed in the widest horizontal span of the polygon with preference given to the span that contains the centroid. If the widest span is not large enough for the label, a suitable position is sought in the neighboring polygons and a leader line is added to indicate the polygon to which it refers (if attached to elements).

There is an Attach to Element toggle on each of the element specific panels. For most labeling situations, this option should be left on. When a label is attached to an element, it is deleted when the element is deleted. When a label is not attached, leader lines are not added for labels outside associated polygons, and “slide along the line” editing is not available for line labels.

Editing Polygon Label Positions

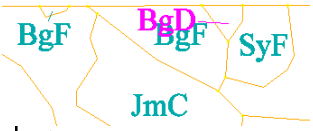
Polygon labeling does not yet handle label collisions. Such collisions are most likely to occur when a label is placed outside its associated polygon since the best place for this displaced label may likely also be the best place for the label associated with the polygon where it is placed. The second stage of labeling is to find such labels and move them, which is done one label at a time with the Edit Element tool. When labels are on top of each other, you can tell which label is selected because the leader line is also highlighted for labels with leader lines. You have selected the label that belongs in the polygon if a leader line is not highlighted.

The label editing graphical tool has a number of operating parts with associated context-sensitive cursors. You can drag the label to a new position with the cursor over the middle of the label, which is indicated by the four-point arrow cursor. The right-hand arrow cursor indicates that one of the other sensitive parts of the tool is active. The boxes serve to change the angle of the label while dragging the + resizes the label. If you resize the label using this tool, you are asked whether you want to create a new text style, change the current text style, or ignore the style changes. Your label still remains at the new height when you right click, even if you choose ignore, because the adjusted height also becomes the new element height.

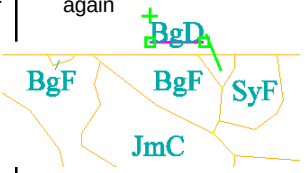
When you drag labels with leader lines, the leader line follows the label, which may result in the line running over the label depending on the label's initial and final positions. This situation is easily remedied by switching the active line from the baseline to the leader line and editing the leader line with the usual line editing tools. You can add a vertex and drag it so the leader line makes a turn between the point of attachment and the label.

STEPS

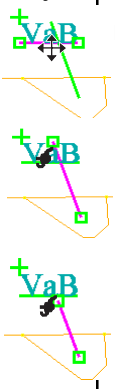
- ☑ turn off selection of all element types except labels in the Spatial Data Editor window 
- ☑ zoom up on the polygon with label collisions at the middle top (use + key)
- ☑ click on the label with the leader line (BgD), then right click

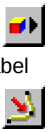


- ☑ click in the center of the label, and drag it up and outside the vector boundary, then right click again



- ☑ scroll to near the right edge where there are a number of VaB and VaF labels that collide
- ☑ click then right-click on the VaB label for the smallest polygon, and drag it outside the vector boundary



- ☑ click on the Next icon in the Leader Lines panel (Text Label Edit Controls), then click on the Drag Vertex icon 
- ☑ grab the endpoint in the middle of the text and drag it down to the baseline, then right-click

Auto Labeling Lines

STEPS

- ☑ start a new editing session, choose Open and select the LINCOLNCEHTRAL object in the STREETS Project File
- ☑ click on Show Details, then choose Select All for lines
- ☑ click on the Edit Elements icon then on the Auto Generate Label icon
- ☑ on the Line tabbed panel, set the Label option menu to Script and select STREETS.QRY*
- ☑ on the Metrics panel, enter 30 meters for the Height
- ☑ turn on the Use Preview Color toggle and set the Preview option menu to Selected and note the number of labels
- ☑ toggle Join Lines by Attribute on (Lines panel), again note the number of labels
- ☑ click on the Apply operation to: [Selected] button
- ☑ choose File / Save As and create a new object

* TIGER data requires the combination of four fields to produce street labels.

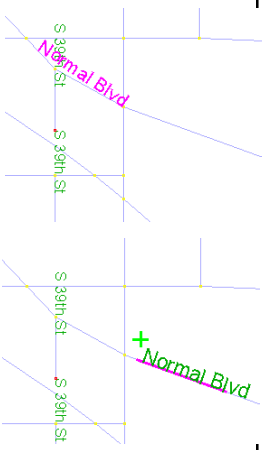
In many vector objects, a single feature is represented by multiple lines to maintain polygonal or planar topology. The object will determine whether you want each line labeled. Clearly, in the case of the extracted TIGER data used in this exercise, you do not. In the case of hydrology, you might want to label all tributary branches but not all segments of the major streams or rivers. In such a case, select by attribute and label all tributaries. Then manually select the line segments you want to label for the rivers and streams.

Two solutions are available to prevent "over labeling." One is the Set Line Labels tool, which is discussed in a later exercise. The other is to join lines by attribute as done in this exercise. This option identifies all contiguous line segments that would have the same label and places a single label in the middle of this extent.

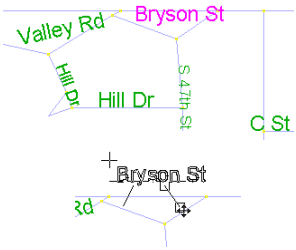
Editing Line Label Positions

Unlike polygon labels, which can be moved anywhere when editing, line labels slide along the line to which they are attached when they are repositioned. If you want to move a label off a line, it must be generated with the Attach to Element option off. Such labels can be repositioned anywhere you want and have leader lines added if desired. Adding leader lines is a feature of the label editing controls. You can even add multiple leader lines to a single label.

When you zoom in you will notice that the labels for north/south streets appear considerably smaller than the labels for east/west streets. This behavior is a result of adjusting the aspect to correct for latitude/longitude coordinates. If you find this behavior disconcerting, you can turn off the Adjust Aspect for Lat/Lon toggle in the Group Settings window or choose a coordinate system that is not based on Latitude / Longitude.



Individual label editing is not required for changes to some label parameters. You can select all labels or a smaller set of labels and change the element height, angle, style, and/or whether "clip under" is applied using the Label Attributes operation.



adding leader lines

result

The initial label position is somewhat misleading, looking like it goes with the boundary rather than the two streets below.

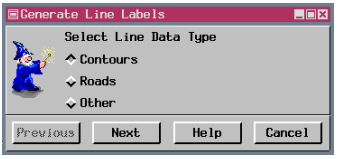
STEPS

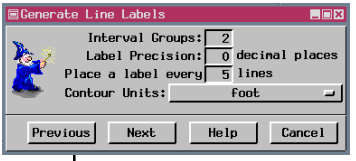
- ☑ click on the Edit Element icon
- ☑ turn off selection of all elements except labels
- ☑ position the cursor where shown on the previous page and press 4
- ☑ click on the Normal Blvd label, then right click
- ☑ click and hold in the middle of the label while dragging it down and to the right as illustrated, then right click
- ☑ pan around and reposition labels as needed
- ☑ pan to the northeast corner of the vector, click on the Delete Element icon, select the Bryson St label, and right click
- ☑ click on Auto Generate Labels, turn off Attach to Element on the Line panel, turn on selection for line elements, select the left line that was below the label, and right click
- ☑ click on the Edit Element icon, select the newly added label, and right click
- ☑ enter 0 for the Baseline Angle, then move the label as illustrated
- ☑ click on the Add Segment icon in the Leader Lines panel, then click at the base of the label and drag to the left associated line
- ☑ repeat step 11 but drag to the right associated line, then right click

Set Line Labels: Contours

STEPS

- ☑ save your work from the previous exercise, then remove the layer
- ☑ open the ELEVATION object in the CONTOURS Project File
- ☑ click on the Set Line Labels tool
- ☑ click on [Assistant], verify that Contours is selected, then click on [Next]
- ☑ set the Interval Groups to 2, Label Precision to 0 with labeling every 5 lines, and Contour Units to foot, then click on [Next]
- ☑ set the Major Contour Step Interval to 1000 feet, the Label Height to 100 meters, click on [Edit Style], and set the foreground color to orange, then click on [Next]
- ☑ set the label height for minor interval values to 60 meters, click on [Edit Style], set the foreground color to green, then click on [Finish]
- ☑ click on the third contour from the upper left and pull out a line down and to the right to just past 12000 feet; right click
- ☑ click on the second contour from the lower right and pull out a line up and to the left over the peak as shown; right click
- ☑ save then remove the contour layer

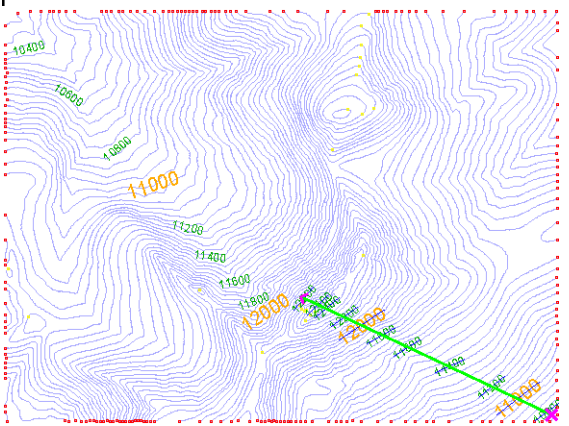




The Set Line Labels tool lets you pick the label position by drawing a line on which the labels are centered. This tool is specifically designed for contours and TIGER data but will work with any vector object. An Assistant is provided to aid you in writing scripts to generate your labels.

When labeling contours, the Assistant generates a script that designates the line interval between labels, sets up interval groups (major and minor contours) and styles, establishes the units for labeling and does any necessary conversions, and establishes the elevation distance between major contours.

Once the script is generated, position the cursor on the first contour you want labeled, and draw it out to the last contour you want labeled with labels in the same orientation. In order for major and minor contours to appear, you need to make sure you start on a contour line such that a major contour is a multiple of the line interval away.



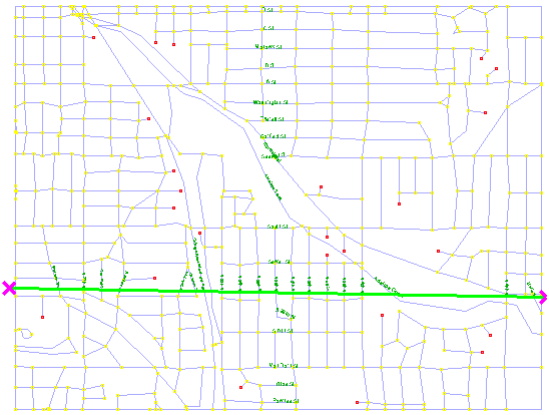
Set Line Labels: Roads

The Assistant for road labels automatically detects TIGER data and fills in the four fields required to generate a complete street name. Other data types may have the entire name in a single field. If so, choose this field for the road name, which is the only required field.

This tool used to be the method of choice for labeling streets. However, now that you are able to join lines by attribute and the Assistant has been incorporated in automatic label generation, it is now more a matter of preference although the two additional orientation options may give better labeling results for some objects. This tool is still the method of choice for labeling contours, particularly when you want to impose major and minor contour styles.

The default line interval is one, but in areas that have only numbered or lettered streets, you could elect to label every second or third street only.

The Left to Right from Tool and Right to Left from Tool orientations are particularly important for labeling lines that run at an angle together with vertical lines if you want all labels to read in the same direction.



STEPS

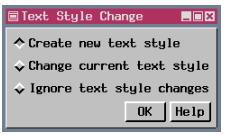
- ☑ choose Open and select the LINCOLNCENTRAL object in the STREETS Project File (the original object, not the one you labeled)
- ☑ click on the Set Line Labels tool
- ☑ click on [Assistant], click on the Roads toggle, then click on [Next]

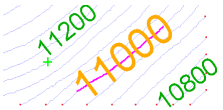
- ☑ note the fields selected then click [Finish]
- ☑ set the Height to 30 meters (metrics panel)
- ☑ click at the top of the vector object then hold and drag to the bottom and release
- ☑ change the label color if necessary (click on [Edit Style] on the Style tabbed panel)
- ☑ right click over the view, or click on [Assign]
- ☑ click at the left edge of the vector and drag across to the right edge
- ☑ on the Baseline panel, click on the Left to Right from tool icon and note that some of the labels flip
- ☑ right click over the view or click on [Assign]

Editing Label Size and Style

STEPS

- ☑ remove the layer from the previous exercise, choose Open and select the labeled contour object you saved on p. 14
- ☑ show details, and turn off selection of all element types except labels
- ☑ click on Edit Elements, then on Edit Element, select the 11000 foot label at the lower right of the contours, and right click
- ☑ drag the + on the label tool and drag it down to make the text somewhat smaller, and change the text foreground color to blue (Style tabbed panel)
- ☑ right click and when the Text Style Changes window opens, choose Change current text style
- ☑ note that other labels with the MajorContour style are also smaller and blue

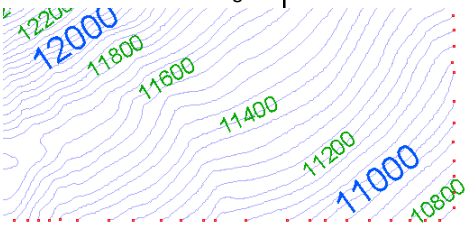




before and after editing

Changing the height or other style parameters when editing individual labels introduces issues that must be resolved before continuing. Labels auto-generated in a single pass generally all have the same style (unless otherwise defined by script). When you select a single label and change the font or other style parameter, the question is whether you want to change the font for all the labels that have the same style or change the font for the selected label only. In the latter case, you need to create a new text style so the selected label can be displayed differently than the others.

You do not have to remember to create the new text style—the Editor asks what you want to do when you make a change that affects the style. Your options are to create a new text style, change the current text style, or ignore the text style changes. If the first option is chosen, a new style is created with the settings you chose. The only label with that style assigned is the label just edited. You can assign the style to other selected elements later if desired. (When you want to change the style of a number of elements, you should use the Label Attributes operation rather than the Edit Element operation.) If the second option is chosen, all elements using the same style will be changed to match the edited element. The third option is not quite equivalent to cancel. Changing the size of a label changes the ascender height associated with the current style and the element height, so changes in label size are retained when you choose the third option. Changes in label angle are also retained because they are not part of the style.



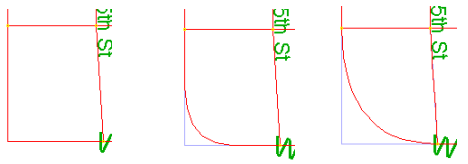
After editing one label, the other labels drawn in the same text style also change if you elect to change the current text style.

Filter Tools

The Spatial Data Editor provides nine filtering tools: Dangling Lines, Line Simplification, Remove Bubbles, Remove Excess Nodes, Sliver Polygons, Undershoots, Dissolve Polygons, Line Densification, and Remove Islands. Each of these tools works on the entire vector object using parameters you set. If you want to apply a filter to a subset of the elements, choose Process / Vector / Filter to do your filtering. Use of filters for cleaning up common problems in raster to vector conversion is described in the *Digitizing Soil Maps* booklet.

Each of the filters, with the exception of Remove Excess Nodes, opens a window so you can set relevant parameters and run a test if desired before applying the filter. When you run a test, the lines that will be drawn after filtering are drawn in the color shown on the test color button. You can change this color by clicking on the button. Any lines drawn in the original line color in the test image will not be there after the filter is run. After running a test, you can get quantitative results by clicking on the Report button. The report provides the number of vertices added / removed, the number of nodes, lines, polygons, or islands removed

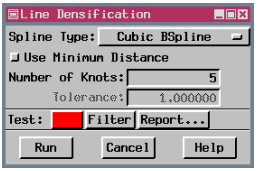
The line densification filter adds vertices to lines to make them better approximate a smooth curve. There are three different spline types to choose from: Cubic BSpline, Quadratic BSpline, and Bezier Spline. Cubic BSpline is best for cases in which you wish to retain sharp angles in the absence of a node.



Cubic BSpline | Quadratic BSpline | Bezier Spline

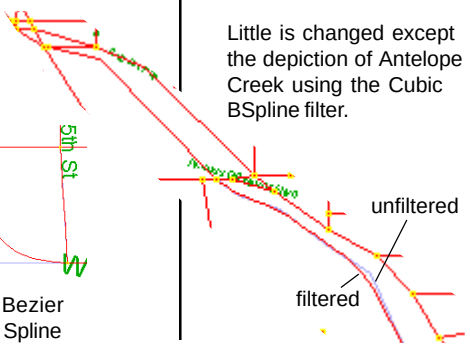
STEPS

- ☑ remove the layer from the previous exercise, choose Open and select the labeled streets object you saved on p. 15
- ☑ click on the Line Densification icon
- ☑ choose Cubic BSpline and set the number of knots to 5



- ☑ click on [Filter] on the Test panel
- ☑ after the test is run, click on [Report]
- ☑ change the number of knots to 8, then repeat steps 4 and 5 noting the difference in the number of nodes added
- ☑ remove this layer before beginning the next exercise

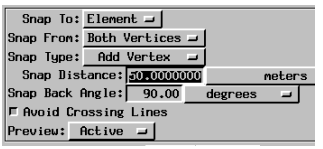
Little is changed except the depiction of Antelope Creek using the Cubic BSpline filter.

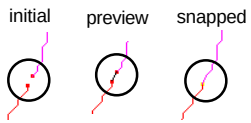


Using Pan By Query for Editing

STEPS

- ☑ open the AUTOTRACED SOILS object in the SOILSCONV Project File 
- ☑ turn off selection of all element types except lines and zoom in twice
- ☑ click on Select / Deselect for lines, choose Select by Query, then File / Open / *.QRY File, and select DANGLINE.QRY 
- ☑ click on [Apply] and note your view has shifted and the gap between the active element and the line to its southwest
- ☑ click on Edit Elements, choose the Snap Operation, set parameters as shown and apply the previewed snap to the [Active] element 



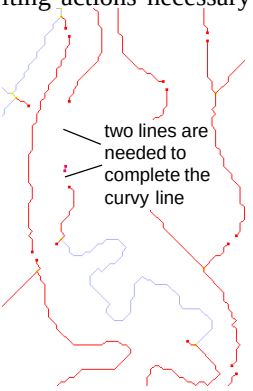


- ☑ click on the Next Selected icon in the line element selection / icon row 
- ☑ notice another line in the view is now highlighted and has a snap preview, then click [Active]
- ☑ click on Next Selected, choose the Delete operation, and click on [Active] 

- ☑ click on Next Selected, then on the Add Line tool, and add lines to fill in the blanks in the curvy line
- ☑ click on Apply in the select By Query window, and continue stepping through and editing elements until you get the basic idea*

Generally, when you are at a zoom level useful for editing elements, the full vector object is not visible in the view. You, thus, need a means of getting from one selected element to the next. Pan by query refers to selecting by query then stepping through each of the selected elements for editing considerations, which includes panning the view to center the active element if it is not already in the view window. Because TNTmips uses the concept of active and selected elements, you can select a large number of elements and evaluate each in turn taking the necessary editing steps for individual elements and applying the change to the active element only.

This exercise utilizes a vector object created from a scanned soil map using Auto-Trace for raster to vector conversion. The vector has many extraneous lines and gaps in what should be continuous lines. The majority of these problems can be identified by selecting dangling lines (a line that is not attached to another line at one or both ends). You can step through these elements one by one, taking any editing actions necessary and applying them to the active element only.



When you click on the Next Selected button, the view does not pan if the new active element is visible. This object contains many very short lines, which may be difficult to identify as selected. If the view has panned, the active element is centered.

* It is not intended that you clean up the entire vector. Pan by query is generally a finishing step in editing.

Using 3D Views to Assist with Editing

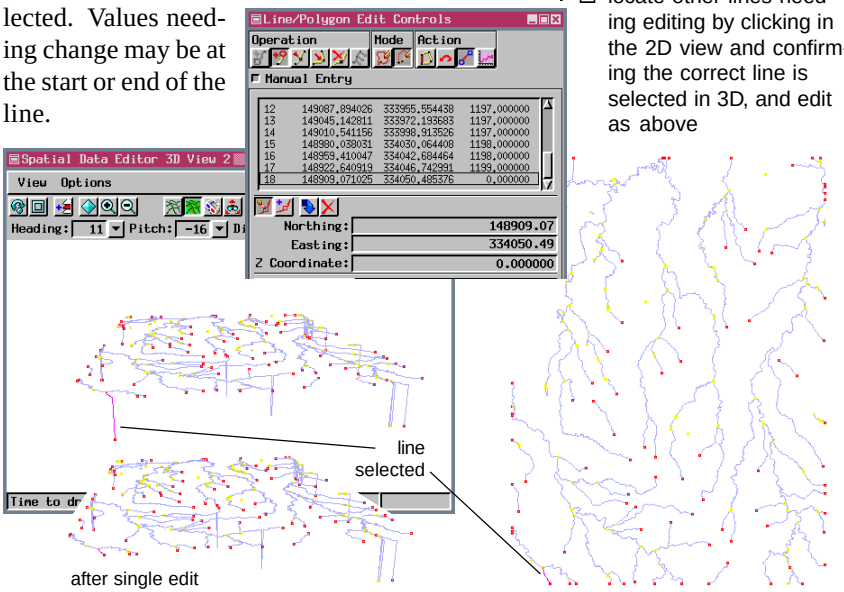
When 3D vectors are created using Process / Convert / 2D to 3D Vector and the raster used to provide the elevation values has smaller extents than the vector or contains null or anomalous values, some line vertices may have incorrect elevation values. You can readily identify the presence of such lines in a 3D view because they drop precipitously (unless your data happens to be near sea level). The anomalies could also appear as spikes.

The vector object edited in this exercise has 15 lines with endpoint values of zero. The editing strategy is to find these lines and change the value of the endpoint to that of the nearest vertex. If multiple vertices have incorrect values, you may want to vary the values assigned. You could use pan by query with this vector object, but that only works when the anomalous value is known. You cannot select elements directly in the 3D view, but elements selected in the 2D view are also highlighted in 3D so you can confirm you have the correct element selected. Values needing change may be at the start or end of the line.

STEPS

- ☑ remove the object from the previous exercise and open _3D_VECTOR from the HYDROL Project File
- ☑ choose Reference / Open 3D View, and adjust the viewpoint to

- ☑ choose Edit Elements, then Edit Element, select the line at the lower left, and right click
- ☑ turn on the Manual Entry toggle, scroll to the bottom of the list, and select vertex 18
- ☑ in the fields below the list, change the Z coordinate from 0 to 1199
- ☑ click on the Update Vertex icon, then on [Save]
- ☑ locate other lines needing editing by clicking in the 2D view and confirming the correct line is selected in 3D, and edit as above

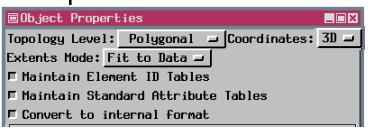


Set Contour Z Values, External Files

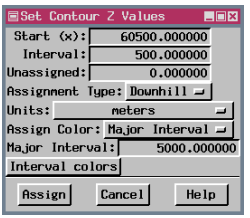
STEPS

- ☑ choose File / Open External / ArcView Shapefile, select MFI.SHP, and accept the defaults in the Import Parameters window
- ☑ choose Layer / Properties, turn on the Convert to internal format toggle, and change the Coordinates option button from 2D to 3D
- ☑ click on the Set Contour Z Values icon on the Tools panel of the Vector Tools window
- ☑ set the Start value to 60500, the Interval to 500, the Assignment Type to Downhill, the Assign Color to Major Interval, the Major Interval to 5000, then click on [Interval Colors], and assign orange for the Major Interval and green for the Minor Interval
- ☑ click inside the central circle, drag down past the lowest left contour, release, and right click
- ☑ repeat step 5, but drag to the lowest right contour

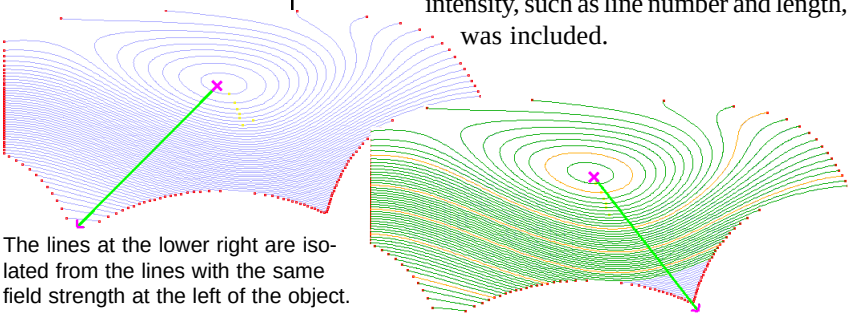
The Spatial Data Editor lets you choose external file types, namely E00, Coverage, and Shapefiles, for editing. You then have the option of converting them to internal format (RVC) or saving them in their original format. Shapefiles can also be opened directly (File / Open), but they are treated as CAD objects if that path is taken.



The shapefile used in this exercise does not have 3D coordinates, but the database contains the information to assign values to the isolines for magnetic field strength over North America. In order to make this shapefile a 3D object, it needs to be converted to internal format. If you want the object for use in ArcView again, it can be exported with 3D coordinates. An object must have 3D coordinates for the Set Contour Z Value tool to be active.



If you are familiar with ArcView, you may notice that this shapefile has been modified from the original—many of the standard fields have been deleted from the associated database file. The modification was made to assist you in this exercise because many of the isolines were actually 2 or 3 lines that could not be combined by removing excess nodes because unique information not related to magnetic field intensity, such as line number and length, was included.

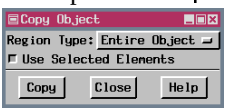


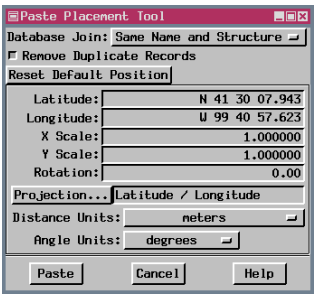
The lines at the lower right are isolated from the lines with the same field strength at the left of the object.

Cut, Copy, and Paste

Cut, copy, and paste are familiar functions in word processing. You have to either cut or copy to have something to paste. Using cut removes the elements from their original location, while copy leaves them in place. In the Spatial Data Editor, you can copy from an editable or reference layer, but an editable layer must be active for the cut and paste functions to be available. The cut, copy, paste icons on the View window toolbar are for use with vector layers only. The raster tools window has similar functions, which work between rasters of the same data type only. You can achieve the same ends in a CAD object by saving and inserting blocks.

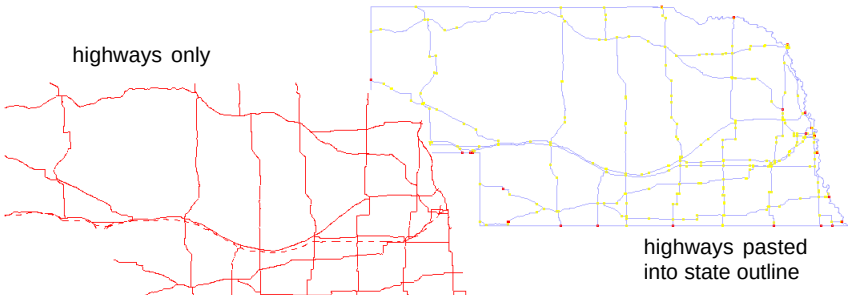
You can cut or copy selected elements, selected elements within a region, or all elements within a region. When you choose Paste, a placement rectangle appears so you can verify that the position is correct before pasting. These rectangle is positioned by georeference. If georeferencing is not highly accurate, some repositioning or resizing to obtain the best fit may be necessary. In the absence of georeference, object coordinates are used to determine where the placement rectangle goes.





STEPS

- ☑ click on the Add Reference Layer icon and select HIWAYS from the NETRA Project File
- ☑ click on the Open Object for Editing icon and choose the NEOUTLINE object from the same Project File
- ☑ click on the Select icon for the HIWAYS layer, show details for that layer, and in the line element selection icon row, click on the Select/ Deselect icon and choose Select All
- ☑ click on the Copy icon (View window), set the Region Type to Entire Object, turn on the Use Selected Elements toggle, and click [Copy]
- ☑ click on the Select icon for the NEOUTLINE layer, click on the Paste icon, then on [Paste]
- ☑ remove the reference layer, and save your edited object

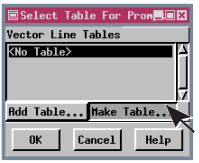


Default Record in the Spatial Data Editor

STEPS

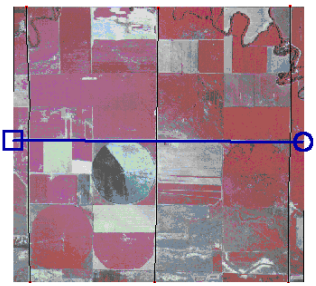
- ☑ remove the layer from the previous exercise
- ☑ click on the Add Reference Layer  icon and select the CIR_4 object from the DAWSON Project File, click on the Create New Object  icon, choose Vector, and click [OK] in the New Object Values window
- ☑ click on the line Attributes icon and choose Default Record, then click on [Make Table], enter FEATURES as the name, and click [OK]
- ☑ set up the table with a single primary key string field (Width 18) with One Record Per Element as the Attachment Type, and Prompt when adding elements toggled on
- ☑ click [OK] in the open windows
- ☑ type *county road* into the field in the Default Record window and click [OK]
- ☑ click on the Add Line  icon and add one horizontal and three vertical lines that follow the roads as shown
- ☑ click on the line Attributes icon, choose Default Record, select FEATURES table, and change the field entry to *intermittent canal*
- ☑ add a line for the canal as shown (turn snapping off)
- ☑ change to the Select tool, open the Features table, and view the line attributes 

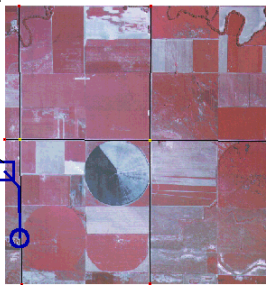
You can set a "default" record for each element type in the Spatial Data Editor. The default record is attached to every element of that type added until you set the default to no record or turn on the tabular view default record option. Assignment of a default record is best suited for adding a number of vector elements of the same type, such as when photointerpreting county roads. Assignment of a default record from the Attributes panel of the Vector Tools window is the method of choice for new vector objects when you will be creating a new table for attribute assignment. Setting the default record in tabular view (next exercise) is a better choice when the records you want to attach already exist.



When the attachment type is One Record Per Element, only one record will be created for each attribute value entered. One record will be created for each element added for any other attachment type.

Entering a new attribute value creates a new record when the next element is added.

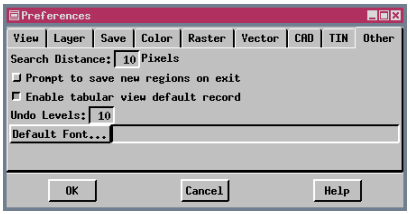


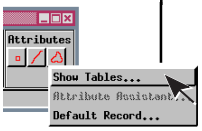


Open the table and select elements to confirm attachments are as expected.

Setting Tabular View Default Record

There are two different ways to set up a default record for attachment, so you need to have some means of specifying which you want to use. The act of setting up a default record from the Attributes panel (previous exercise) is sufficient to turn on that method. You need to turn on a toggle button in the Preferences window to use the tabular view default record. Once this option is turned on, it attaches the selected record to each element added. Selecting a different record changes the default record attached to elements when added. Any record selected prior to choosing an add element tool is cleared when you initially choose to add elements, but persists as you change elements added if still applicable (default line attributes are assigned to polygon lines).

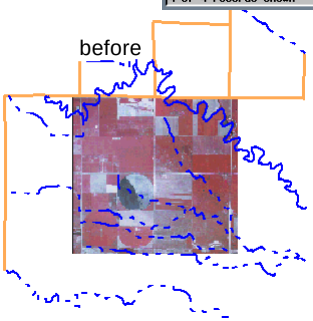




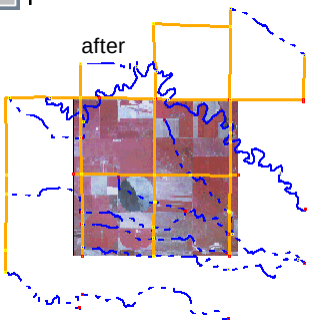
When elements are displayed by attribute, you can tell immediately if added elements have been assigned to the expected class because they are drawn in the assigned style as soon as they are added.

STEPS

- ☑ remove the New Vector layer created in the previous exercise (keep the reference layer open)
- ☑ click on the Open Object for Editing icon and select the TGR_EXTRACT object in the DAWSON Project File; open its Object Display Controls and set the lines style to By Attribute
  - ☑ choose Setup / Preferences, click on the Other tab, and toggle on the *Enable tabular view default record* option
- ☑ click on the Line icon in the Attributes panel of the Vector Tools window, choose Show Tables, and open the CLASS table from the list in the Spatial Data Editor window
- ☑ click on the Add Line tool then, with all records showing, click in the Select Record box for the A31 class
- ☑ add lines just as in the last exercise (roads only)



The record currently selected will be attached to the elements added.



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