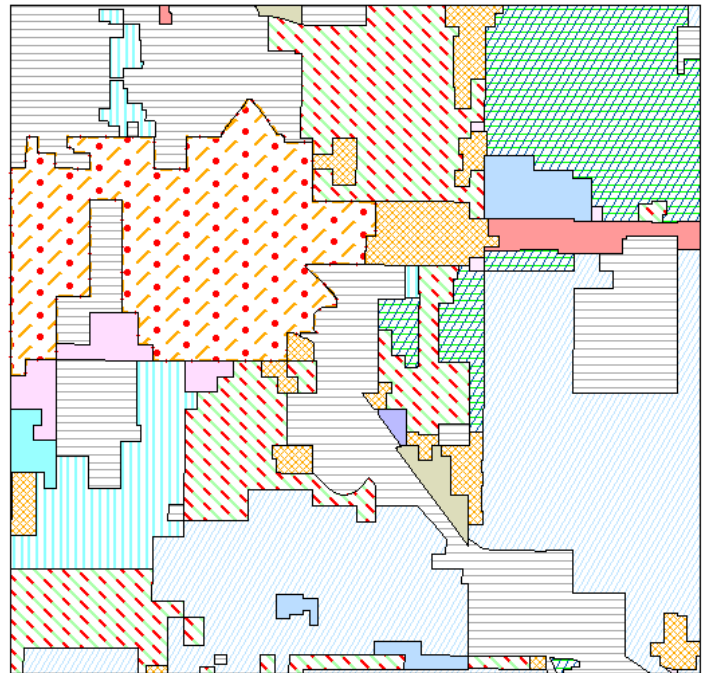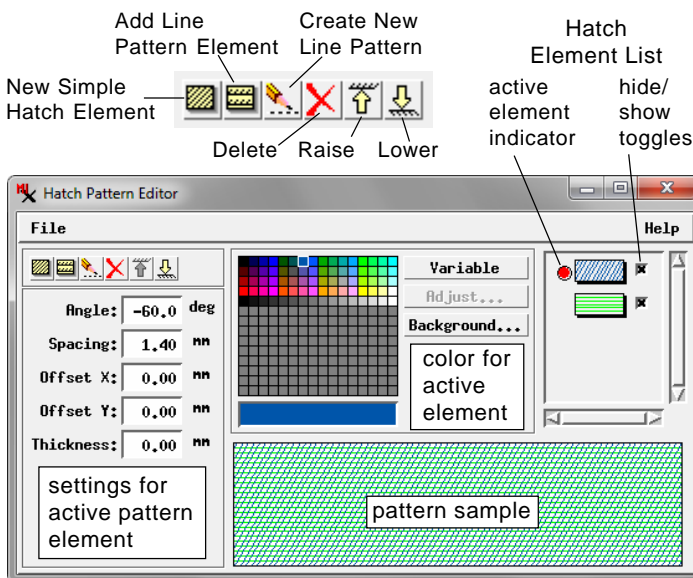# Hatch Patterns for Polygon Fills

Hatch patterns are one option for styling polygon fills in vector, CAD, and shape objects. Hatch patterns are composed of sets of repeated parallel lines with a regular spacing and a transparent background. A hatch pattern can be made up of one or more line sets (*hatch elements*); each hatch element can have its own color, angle, spacing, and thickness. The hatch elements can be simple solid color lines or more complex line patterns created in the Line Pattern Editor.
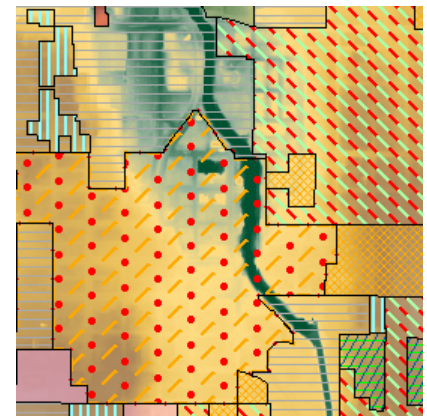
Because hatch patterns have a transparent background, polygons with hatch pattern fills can be overlaid on other data layers without fully obscuring these layers. Hatch patterns allow you to design a more diverse set of "transparent" fill styles than using partially-transparent solid fill colors alone. Like bitmap fills, hatch patterns are always rendered at the same scale on screen, but they can be easily modified by changing any of the pattern settings, such as color, angle, and spacing. In addition, each line set can be turned on and off so that a number of different patterns can be designed and saved from the same group of line sets.

Hatch Pattern Editor

The Hatch Pattern Editor is opened by choosing the Hatch option in the Fill Style controls and pressing the *Create or Edit Pattern* icon button. The Hatch Pattern Editor window is divided into several sections (see illustration below). The toolbar has icon buttons for adding a new simple hatch element, choosing a line pattern, or creating a new line pattern. Each hatch element you add is shown in an element list (top right) with a graphic sample and hide/show toggle button for each element. Left-click on an element in the list to make it the active element, as shown by the red circle indicator to the left of the element sample. Use the settings controls on the left side of the window to change the geometric settings (*e.g.*, angle and spacing) for the active hatch element, and the color controls to choose a color for the element. The pattern sample panel at the bottom of the window shows the complete hatch pattern at the same size as it will be rendered in the polygon fill on screen.

Hatch pattern fills can include one or more simple line elements or more complex line patterns. Use two hatch elements at different angles to create cross-hatch patterns.
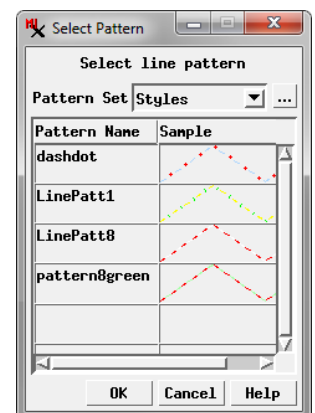

Hatch fill patterns have a transparent background, so that underlying data layers are not obscured by the fill.

Toolbar

The Hatch Pattern Editor opens with a new empty pattern. Press the Add Simple Hatch Element icon button on the toolbar to add a hatch element consisting of simple repeated solid lines. To use an existing line pattern for the hatch element, press the Add Line Pattern Element icon button; the Select Pattern window (right) then opens. The Pattern Set menu in this window provides the choices Basic (for the basic set of standard line patterns) or Styles, which shows any line patterns that

are already available in the current style object. Left-click on a line pattern name in the Select Pattern window and press OK.

You can create a new line pattern to be stored in the current style object by pressing the Create New Line Pattern icon button. The Pattern Name window opens so you can provide a name and description for the new pattern. The Line Pattern Editor window then opens to allow you to create and save the pattern. See the Technical Guide entitled *Line Pattern Editor* for a description of this window.

The remaining icon buttons in the toolbar are provided for managing the list of hatch pattern elements. The Delete icon button deletes the active hatch element. Use the Raise and Lower icon buttons to move the active element up or down in the list.

Hatch Element Geometric Settings

Use the fields in the left portion of the Hatch Pattern Editor to set the geometric properties of the current hatch pattern element.

Angle: sets the angle of the hatch element in degrees. The initial value is 0 degrees, which results in horizontal lines. Positive angles are measured clockwise from the horizontal (see Angle samples in illustration to the right). You can enter values between -360 and +360 degrees.

Spacing: sets the distance between the lines in millimeters on the screen. Samples with spacing between 1 and 3 mm are illustrated to the right.
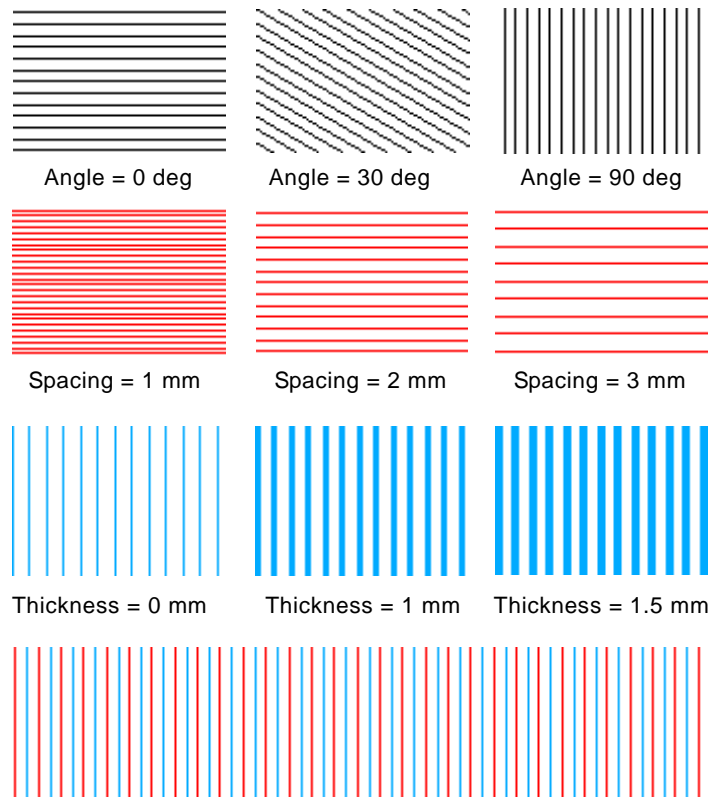
Thickness: sets the width of the hatch lines in millimeters on the screen. The minimum thickness of 0 (the default) results in lines 1 screen-pixel wide. If you increase the thickness without increasing the spacing, the hatch lines may merge into a solid color.

Offset X and Offset Y: all hatch elements are drawn from a common origin on the screen, so that different patterns with the same spacing, thickness, and angle are aligned at common boundaries. You can enter values in the Offset X and Offset Y fields (in millimeters) to change the origin for a hatch element. For example, you can create a pattern with alternating lines of different colors by using two hatch elements with the same angle, spacing and thickness, but with the Offset X (for vertical lines) or Offset Y value (for horizontal lines) for one element set to half of the spacing (see illustration above right).

Colors

When you add a line pattern as a hatch element, the colors set for the line pattern elements are maintained in the hatch pattern. When you add a simple hatch element, you use the panel in the top center of the Hatch Pattern Editor to assign a color to the element. The default color for simple hatch elements is black. Left-click on a color tile in the palette to assign a fixed color to the element. The rectangle below the palette shows the currently-selected color. You can add other colors to the default palette by clicking on one of the unassigned (gray) tiles in the lower portion of the palette, which activates the Adjust pushbutton. Pressing this button opens a standard Select Color window from which you can select or design a custom color to add to the palette. The custom color can then be selected from the palette like any of the standard colors.

Hatch Element Geometric Settings Examples

Angle = 0 deg   Angle = 30 deg   Angle = 90 deg

Spacing = 1 mm   Spacing = 2 mm   Spacing = 3 mm

Thickness = 0 mm   Thickness = 1 mm   Thickness = 1.5 mm

Pattern with two vertical hatch elements, each with Spacing = 4 mm and Thickness = 0. The blue element has Offset X = 0 while the red element has Offset X = 2 mm, which produces a uniform interleaving of the two parallel elements. Without the positive Offset X value, the red lines would be superimposed on the blue lines.

Instead of assigning a fixed color to a hatch element, you can press the Variable pushbutton next to the palette (the word "Variable" is then shown in the color sample area below the palette). When the hatch pattern is used in a polygon fill style, a hatch element with "variable" color is assigned the color currently set for the polygon fill. (When the Hatch Pattern Editor first opens, the polygon fill color for the current style is shown in the pattern sample area.) The same hatch pattern can then be used for a number of different styles simply by changing the color in the Fill Style controls. Hatch patterns can include elements with both fixed and variable colors.

Press the Background pushbutton to open the Select Color window and change the color used as the background for the pattern sample area in the window. This option allows you to preview how the hatch pattern appears over different background colors.

File Menu

When you have finished creating a hatch pattern, choose Save or Save As from the File menu to name the pattern and save it to the current style object. If you make incremental changes to a named pattern, press Save to overwrite the previously-saved pattern. To open an existing hatch pattern, select Open from the File menu. The Select Pattern window opens and lists any hatch patterns previously saved to the current style object. Left-click on a pattern entry in the list to select it and press OK to complete the selection.