Irregular Pattern

A plug-in for Adobe Illustrator by the Institute of Cartography, ETH Zurich

Short Description

The Irregular Pattern plug-in fills polygons with up to six different point symbols. Symbols can be regularly arranged or randomly distributed. They do not overlap other map elements. The plug-in can be used, for example, for placing tree symbols in forest areas, for symbolizing quarries and pits with small irregular dots, or for filling a cemetery with cross symbols.

The Irregular Pattern plug-in creates a pattern of up to six symbols across a selected area. The pattern can be regular (orthogonal or diagonal) or it can be randomized and irregular. One advantage of this tool over using an Illustrator pattern is that the plug-in places symbols only when they fit, so no symbols are cut off by the bounds of the area being filled. Obstacles, such as buildings in a park or open paths such as roads, are not overlaid with symbols.

The Irregular Pattern plug-in is available for Adobe Illustrator CS 4 for Windows.

Access the plug-in from Object > Filters > Thematic Maps > Irregular Pattern

How to use it

Installation

The Irregular Pattern plug-in is available for Adobe Illustrator CS 4 for Windows. Download the plug-ins to your computer (packed as ZIP-format) from http://www.ika.ethz.ch/plugins.html. To install the plug-ins, unzip the ZIP file, and copy the whole folder with all plug-ins to the plug-in folder of Adobe Illustrator. **Important**: Make sure that the plug-ins are not available from different locations.

Symbol Definition

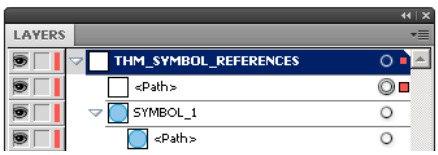
Important: The symbols used by the plug-in are independent of Illustrator symbols listed in the Symbols palette. The plug-in uses groups of symbolized paths instead.

Start by preparing a symbol:

1. design a symbol and make it a group
2. give the group a name
3. place the group in a top-level layer called THM_SYMBOL_REFERENCES.

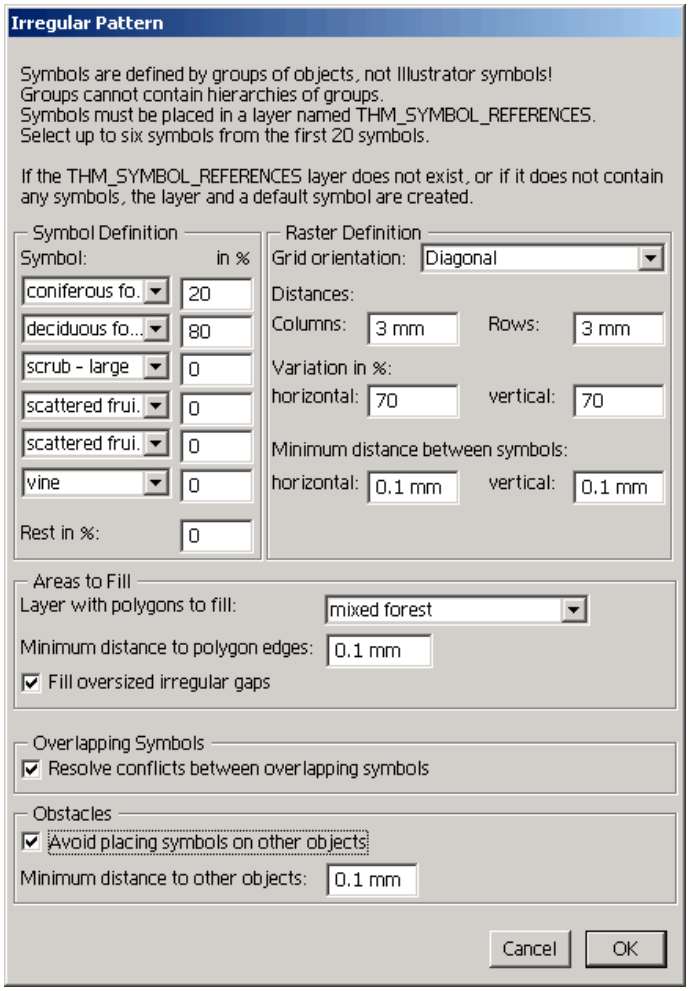
Note that the symbol group must not contain other groups or layers.

If the THM_SYMBOL_REFERENCES layer is not found, it will be created by the plug-in with a small blue circle as the default symbol, placed near the origin of the coordinate system.



A symbol is a single group of objects, however simple (even a single path) or complex; Illustrator symbols can be used only if they are expanded first, ungrouped, and regrouped into a single group. Raster images or type cannot be used.

Paths in symbols can consist of Bézier curves, but when distances are computed, they are approximated with straight lines. Distances are computed when resolving conflicts between overlapping symbols and between obstacles and symbols, as well as for keeping a minimum distance to the border of areas to fill. To increase the accuracy of distance computations, you may want to insert additional points in Bézier curves that define the outer border of a symbol.

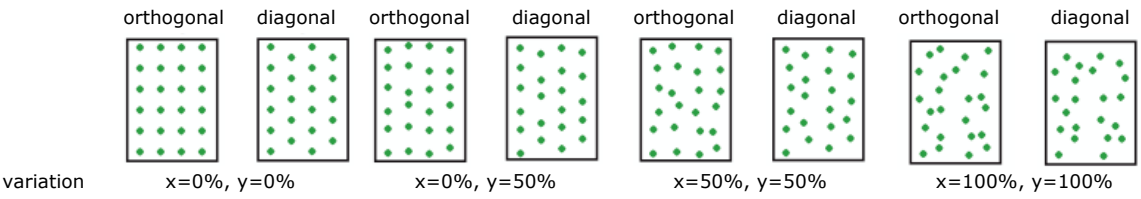


Plug-in Dialog

Open the plug-in dialog with Filter > Thematic Maps > Irregular Pattern. When the OK button is pressed, the dialog is closed and the pattern is added to a layer called THM_SYMBOL_OCCURRENCES. This layer is automatically created if it does not exist. Choose the symbol you want from the drop-down list labeled **Symbol Definition**. If you want to apply two or more symbols, select them in the successive rows and choose the frequency with which each symbol should appear in the second column. Percentages must sum up to 100%.

In **Raster Definition**, choose between Orthogonal and Diagonal, depending on whether you want the symbols to be arrayed at right angles or diagonally. Define the width and height of the columns and rows of symbols with the **Distances** text fields.

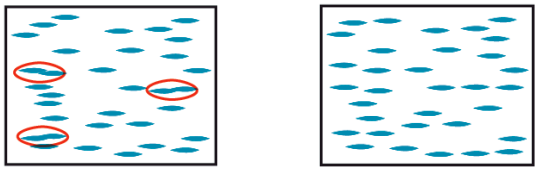
The **Variation** parameters define the horizontal and vertical irregularity, or variation, from the center point of the invisible cell they occupy: use 0% for a regular pattern, 50% for moderate randomization, and 100% for a completely irregular placement.



The **Minimum distance between symbols** specifies the required empty space between symbol instances in the pattern.

The menu in the **Areas to Fill** group lets you choose the layer containing the closed paths that are to be filled with the pattern. Only one layer can be chosen at a time, other layers are considered as obstacles, as described below. Only closed paths and closed compound paths are filled with symbols. The **Minimum distance to polygon edges** sets the distance between the borders of areas to fill and the symbols. A higher value leaves a larger empty buffer without symbols along the inside edge of the areas. Select **Fill oversized irregular gaps** if you want empty space to be filled in an additional processing step. Empty space can occur when points are very irregularly distributed.

The **Overlapping Symbols** section deals with point symbols that touch each other. Overlapping symbols can occur if the raster distances are small, if the variation value is large, or if the minimum distance between symbols is large. If the **Resolve conflicts between overlapping symbols** is selected, the plug-in will move symbols to avoid overlapping. Note: This can take some time if large areas are filled with many densely packed symbols.



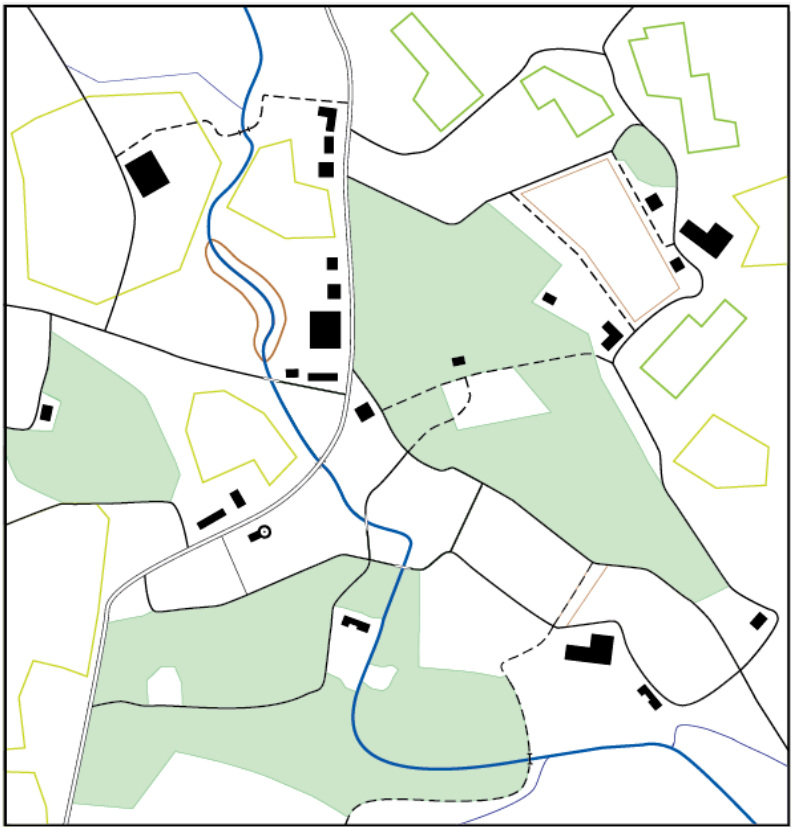
The effect of Resolve conflicts between overlapping symbols*. The conflicts marked by red ellipses (left) are resolved (right).*

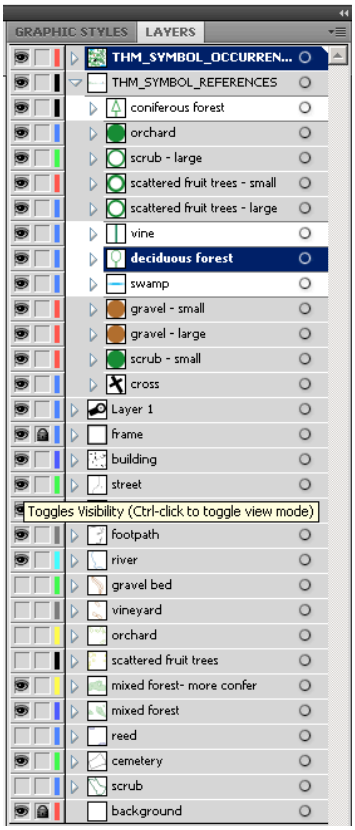
Other features can be treated as **Obstacles**. Obstacles are other features that overlap the path that is filled with symbols. With **Avoid placing symbols on other objects** enabled, select both the features to be filled and the obstacles, and make sure the layer containing the features to be filled is selected in **Layer with polygons to fill**. Enter the **Minimum distance to other objects** to define the width of an empty buffer between other features and the symbols.

Example

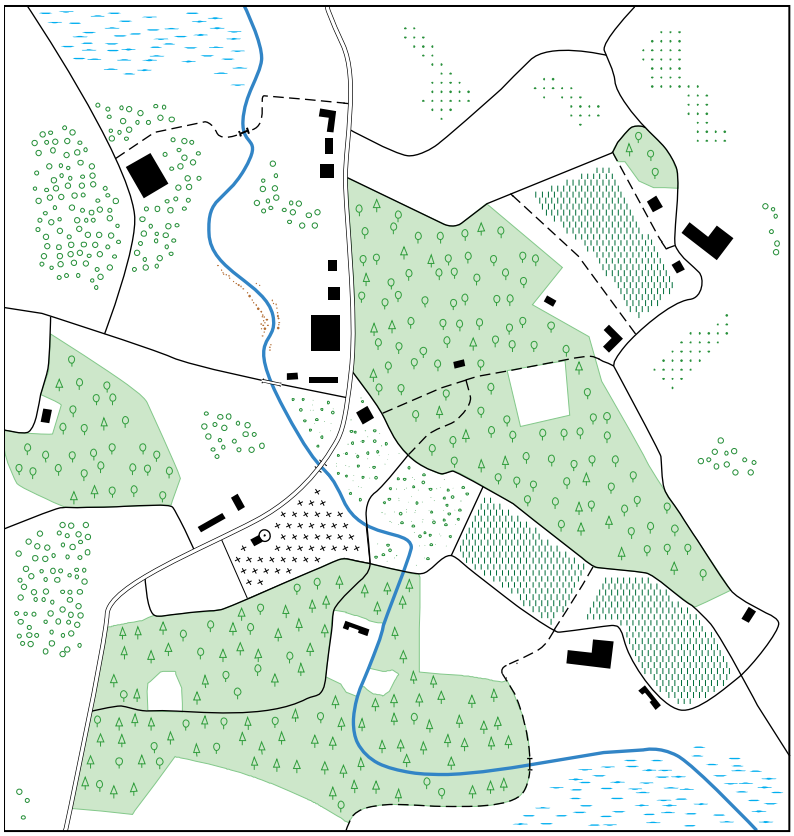
The following simplified section of a map illustrates various options of the Irregular Pattern plug-in.

Symbols placed (enlarged twice):




GRAPHIC STYLES
LAYERS
THM_SYMBOL_OCCURREN...
THM_SYMBOL_REFERENCES
coniferous forest
orchard
scrub - large
scattered fruit trees - small
scattered fruit trees - large
vine
deciduous forest
swamp
gravel - small
gravel - large
scrub - small
cross
Layer 1
frame
building
street
Toggles Visibility (Ctrl-click to toggle view mode)
footpath
river
gravel bed
vineyard
orchard
scattered fruit trees
mixed forest- more confer
mixed forest
reed
cemetery
scrub
background

Layer	Symbol	Distances		Variation in %		Minimum distance		
		columns	rows	horizontal	vertical	symbols	polygon edges	obstacles
vineyard	vine	0.8 mm	0.8 mm	0	0	0.2 mm	0.2 mm	0.3 mm
orchard	orchard	1.2 mm	1.2 mm	0	0	0.8 mm	0.3 mm	0.3 mm
scattered fruit trees	scattered fruit trees – small (50%) large (50%)	1.5 mm	1.5 mm	100	100	0.3 mm	1.0 mm	0.5 mm
mixed forest	deciduous forest (80%) coniferous forest (20%)	3.0 mm	3.0 mm	70	70	0.1 mm	0.1 mm	0.1 mm
mixed forest-more conifer	deciduous forest (20%) coniferous forest (80%)	3.0 mm	3.0 mm	70	70	0.1 mm	0.1 mm	0.1 mm
reed	swamp	3.0 mm	1.5 mm	100	100	0.05 mm	0.5 mm	0.5 mm
gravel bed	gravel – small (80%) large (20%)	0.4 mm	0.4 mm	100	100	0.01 mm	0.3 mm	0.3 mm
cemetery	cross	1.5 mm	1.5 mm	0	0	0.5 mm	0.3 mm	0.3 mm
scrub	scrub - small (50%) large (50%)	1.5 mm	1.5 mm	100	100	1.0 mm	0.3 mm	0.5 mm



Result after using the plug-in Irregular Pattern.

Contact

For any comments or suggestions about this plug-in, please contact Ernst Hutzler, Institute of Cartography, ETH Zurich. hutzler@karto.baug.ethz.ch

This document is an extended and completed version of a description of the plug-ins by Michael Borop, World Sites Atlas. Text and figures by Michael Borop, Bernhard Jenny, Ernst Hutzler and Annemarie Jordan.

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