

Knowledge Base Article

SUBJECT: Density calculation without Spatial Analyst

TICKET: 3572

DATE: 4/23/2009

PRODUCT: ArcGIS Desktop: ArcEditor

VERSION: 9.3

OPERATING SYSTEM: Windows XP

Question:

Is there a way to do a density analysis on a point dataset in ArcEditor without the Spatial Analyst extension? The intended output would be a map that shows the most dense (points per square mile) areas in the City as one color, then gradually change to a different color as the density lessens.

Answer:

To figure out point density you will first need a polygon dataset that breaks the city into smaller units. The type of unit used depends on the desired output. If you're interested in comparing point density between units of a certain theme you can break the city down into neighborhoods, blocks, census tracts, etc. An alternative to this is to split the city into small polygons of equal area (e.g. 1 square mile, 1 square meter) that have no other significance. The latter will produce results similar to a raster analysis, since both make use of equally spaced, equal area units (in the vector analysis these units are polygons, while in the raster analysis the units are the raster cells).

Once you've decided on the areal units to be used in the analysis, simply "count" the points falling within each feature (see below for details). If you make sure to break the city into units of 1 (1 square mile, 1 square meter, etc.), the results represent the point density. If on the other hand, you've decided to use non equal area units (neighborhoods, etc.), or equal area polygons in units greater than one, you'll need to add a few additional steps to calculate point density? please submit an additional ticket to the GIS Help Desk for assistance with this. The instructions below begin with splitting the city boundary into equally spaced, equal area polygons.

1. To split the city boundary into equal area polygons, you'll first create a grid layer. To assist with this, use the free third party extension called ET Geo Wizards, which contains a tool called **Vector Grid**. For more information, please visit <http://www.ian-ko.com/>.
Note that other tools may achieve similar results.
2. Next, select features from the grid layer that intersect the city polygon and export these to a new layer. This layer represents the areal units to be used in the density analysis.
3. Now that the city has been broken down into appropriate units, the next step is to count the number of points in each polygon. You can do this by creating a spatial join or using a tool called **Count Points in Polygon** offered in a third party extension called Hawth's tools. For information on this step please refer to [GIS Help Desk Ticket 2979](#). Either option results in a new count field.
4. Symbolize the polygons on the count field to represent point density across the city. For more information on how to symbolize based on the count field, refer to steps 1-5 located in [GIS Help Desk Ticket 2818](#)

For additional information on any of the above steps, please submit a new question to the Help Desk. **The Help Desk makes no warranties as to the effectiveness of third party scripts or extensions, and in no way guarantees the use of a third party script or extension.**