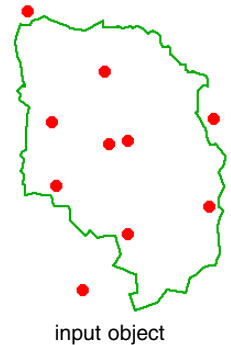


## Geospatial Analysis

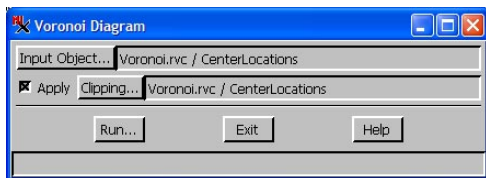
# Clipping Voronoi Diagrams

A Voronoi diagram is composed of Voronoi, or Thiessen, polygons. Voronoi diagrams can be generated in TNTmips from TIN nodes or from the points selected from a vector object. These input nodes/points are variously called the center points, input points, or source points. *Source points* is used here to avoid the potential confusion caused by the term *center point* since these points are often not in the center of the Voronoi polygon. Every location within an individual Voronoi polygon is closer to the source point of that polygon than to any other Voronoi polygon's source point. Voronoi polygons are also convex such that a line drawn between any two locations in the polygon is contained entirely within the boundaries of the polygon. A Voronoi diagram provides efficient two-dimensional spatial analysis. For example, the points may represent air rescue centers in a state or other geographic region. If a Voronoi diagram has been generated from these points, the center closest to a given rescue site on a direct straight line can be readily determined by locating the geographic coordinates within the diagram.

the slightly extended minimal convex polygon surrounding the points (default), the geographic min/max box of any selected raster, vector, CAD, TIN, or shape object, or it can be clipped to the irregular outline of a region object.

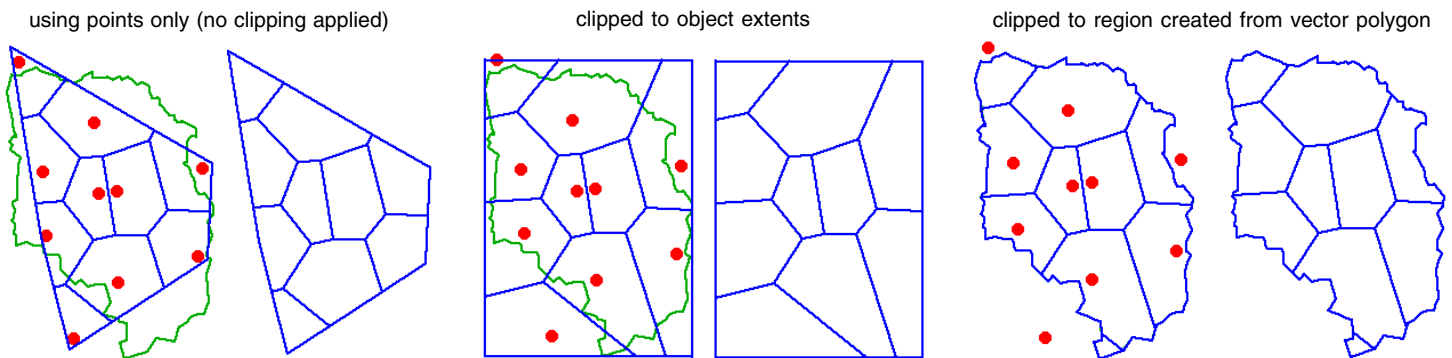


A common choice to use for non-default clipping of Voronoi diagrams is the vector from which the diagram was generated. A Voronoi diagram that uses the extents of the vector it was generated from will have some larger polygons than those generated with default clipping (see center pair in illustration below) unless there are points at the four geographic extremes of the object, and the Voronoi diagram generated will satisfy the Voronoi criteria. The Voronoi diagram solution for the selected set of points can be extended to include the full extents of the reference object or region used for clipping, and it is this extended solution that is clipped when clipping is applied.



The vector object used to generate a Voronoi diagram can contain lines and polygons, as well as points, but only the points are used to generate the diagram. A theoretical Voronoi diagram is unbounded, but representation as a vector object requires a finite boundary. When generated from vector points in TNTmips (Geometric/Compute/Voronoi Polygons from Vector), a Voronoi diagram can be clipped to

Another common choice for clipping uses a region created from one or more polygons in that vector or any other object (see pair at right in illustration below). You can create and save such a region directly in the Voronoi Diagram process. If a region is used for clipping, some polygons may no longer meet the Voronoi criteria described above: some polygons may not have source points that fall within their area and/or may not be convex. If the source points have attributes, they are automatically transferred to the resulting polygons so the closest source point can be identified.



Three pairs of Voronoi diagrams generated from the same set of points are shown above. Each pair has the Voronoi diagram in position over the input vector object (left member of pair) and alone. The pair at the left shows the Voronoi diagram generated when the source points are used to define the area (default clipping applied). The center pair shows the diagram that results from clipping the extended Voronoi diagram to the extents of the input vector object. This result is also meets the Voronoi criteria. The pair at the right shows the result when the extended Voronoi diagram is clipped to a region. This clipping result does not meet the Voronoi criteria described: some polygons lack source points and the diagram is not convex. In all cases point attributes are automatically transferred to the resulting polygons, which enables the closest point to be readily identified.