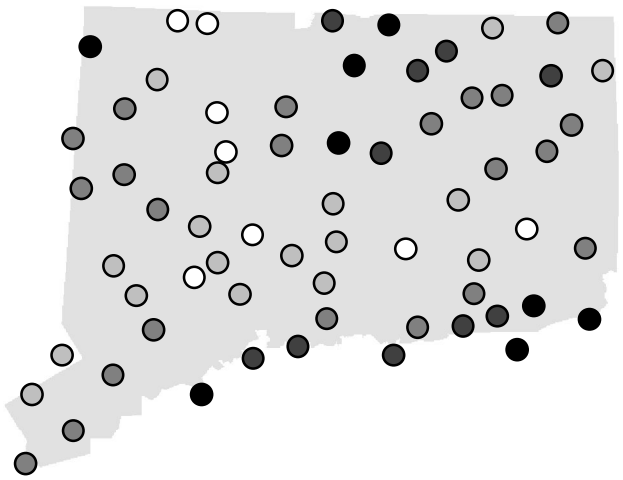
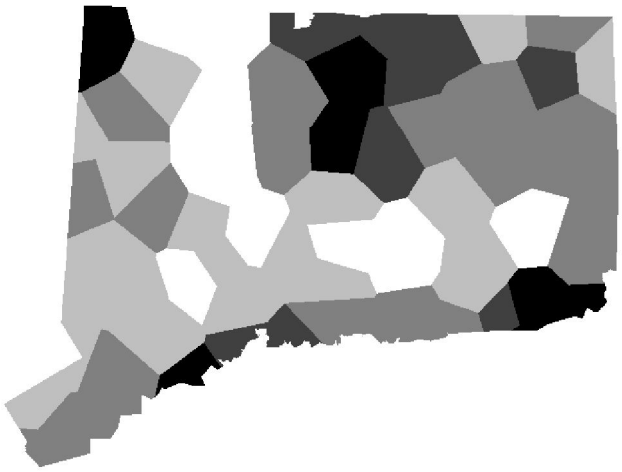
Average Annual Precipitation in Connecticut

Original Annual Precipitation Sample Points

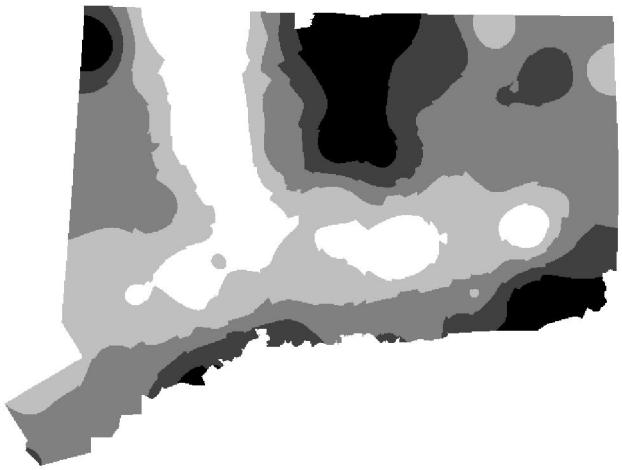


Nearest Neighbor Interpolation



Second Order Trend Surface

Inverse Distance Weighted
Interpolation to the 2nd Power



Average Annual Precipitation

- Low
- Low-Moderate
- Moderate
- Moderate-High
- High

Sources:
PRISM dataset
USGS Watershed Boundary Dataset
U.S. Census 2010 Tigerfile

Projection:
NAD 1983 StatePlane Connecticut

Layout By:
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22/04/2015

0 12.5 25 50 Miles

1:2,000,000

N

1. Every Thiessen polygon is a proximal zone that surrounds a single point, and any point within the polygon is closer to that single input point than any other point. These are created based on TIN networks, and the perpendicular bisectors for the triangle edges are used to create the edges of the Thiessen polygon. In this case, they are used to associate a point within the map with its nearest sample point.
   Another example where nearest neighbor interpolation is the best option is in the case of finding the closest facility (bank, hospital, etc.) because you pick a starting point and want to find the next point representing the specified facility within the shortest distance.
   Some limitations of using Thiessen polygons to interpolate discrete data is that the polygons size and the distance between the points and the edges vary due to differences in bisectors from one TIN to the next within the entire framework of the network. This can lead some points to be close and others to be farther apart, regardless of the polygon coverage.

2. A first order trend is linear, whereas a second order trend is parabolic and curved. First order trend surfaces work better on surfaces with more consistent sloping, whereas second order accounts more for bending and curves within the landscape, such as a valley. The resulting trend surfaces reveal a pattern of average total annual precipitation increasing as you move West and inland in the state of Connecticut.

3. Nearest Neighbor Interpolation is a simple, yet effective, form of spatial interpolation for defining a field based on its discrete data. It is based on local averaging and a fixed radius around the sample point. The resulting surface is more structured, with edges from the Thiessen polygons, and not as smooth. The polygons are clearly separated and symbolically defined.

   Trend Surface Interpolation fits polynomial equations to given sample points in order to display patterns in the data on a larger scale. It is not exact but based on a trend line, in which some data points will lie above or below. It is generally more global than local since its large scale pattern detection will produce similar results regardless of the area. The resulting interpolated surface is based on the order of the polynomial and can range from linear to logical, and 1^{st} to 2^{nd} order (in this case). It is a bit smoother than nearest neighbor, but still based on lines and edges that separate classes.

   Inverse Distance Weighted (IDW) Interpolation uses a weighted average based on distance to calculate values at unknown destinations. The power parameter, k, controls the degree of local influence based on the distance from the desired location, and it allows you to decide how many neighboring points to consider and/or specify a search radius. The resulting surface is smoother in transition but also more spotty and blurred.

   I feel that the IDW best represents variability in AveAnnPre because it's based more on local points than estimation.