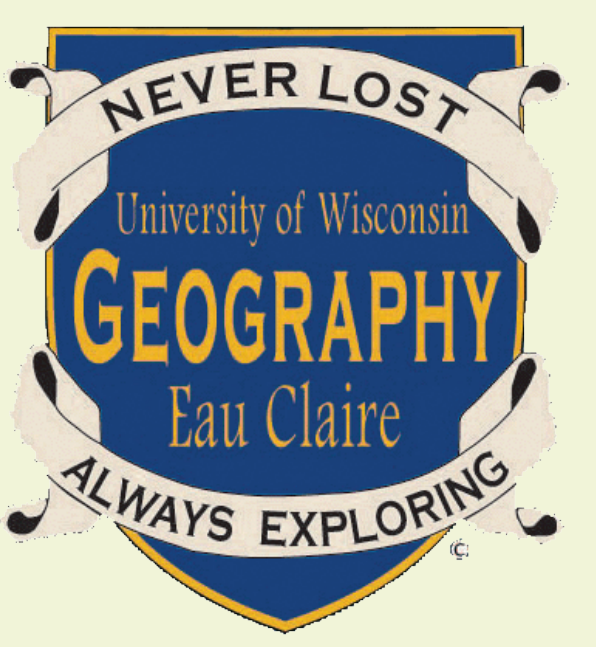




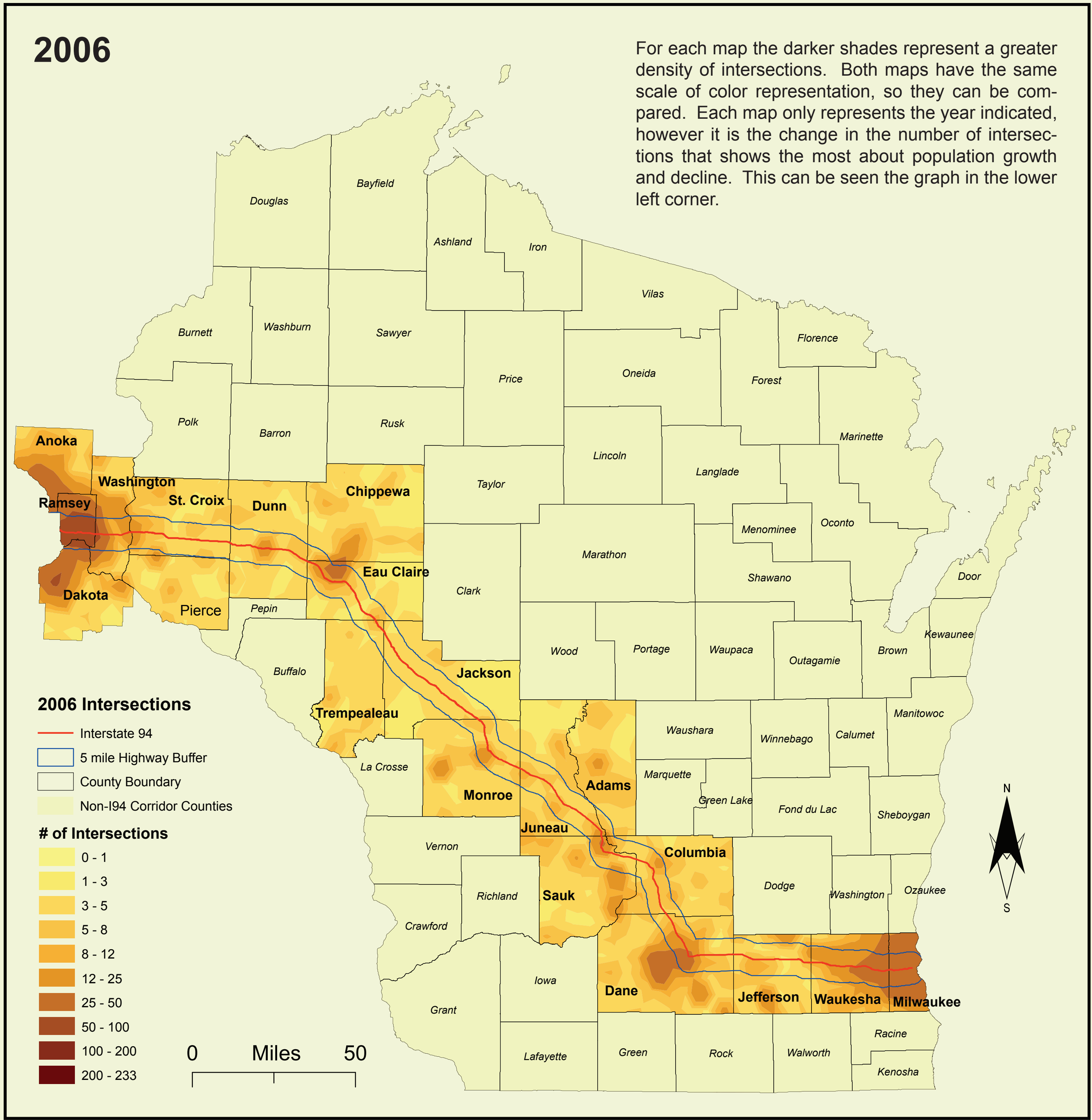
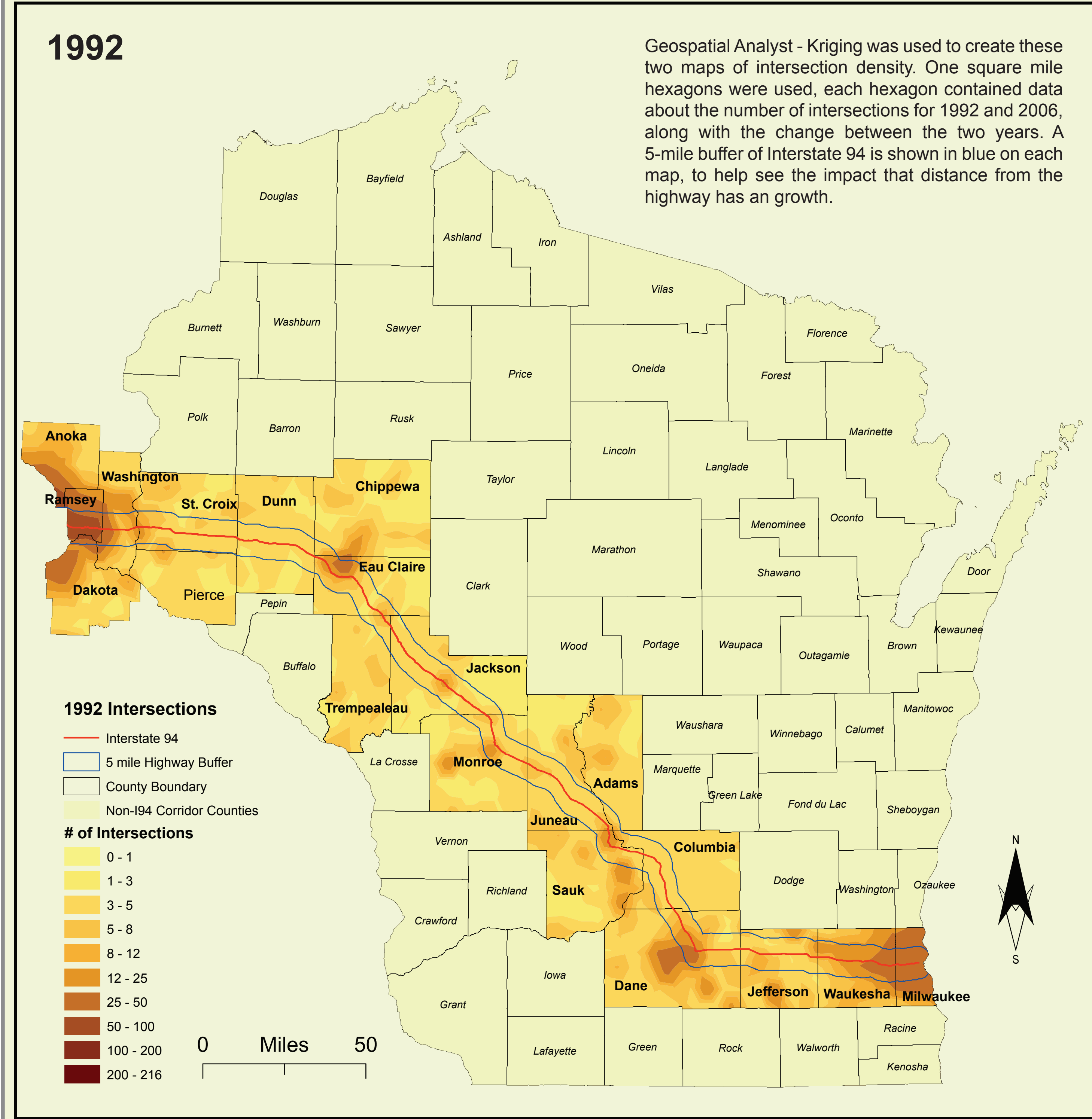
Using Street Intersection Density to Model Sprawl: I-94 Corridor

University of Wisconsin - Eau Claire, Department of Geography and Anthropology
Rachel A. Kjos



ABSTRACT: This project investigates the use of street intersection density to model urban sprawl along the Interstate 94 Corridor from Milwaukee, WI to Minneapolis/St. Paul, MN. The study analyzes changes from 1992 to 2006. The methodology is based on four premises: 1) streets are a necessary prelude to development; 2) intersection density is a bellwether of development at the edges of a city; 3) Intersections can be derived from Census TIGER files using data processing routines; and 4) the updating cycle for TIGER is useful for measuring change on an annual basis. We derived street intersection points (latitude/longitude) for Wisconsin and Minnesota Counties for 1992 and 2006 for this project. The points were loaded into a GIS for analysis. Intersections per square mile were calculated for a hexagonal grid (1 square mile in areas) used to produce a Geostatistical surface (kriging) for each of the test years. A detailed analysis of urban size and the distance decay from urban nodes was conducted for the entire transect. Results show that the methodology produces a pattern of urban sprawl over time acceptable for visualization and analysis. Additional demographic data was obtained from the Census Bureau for comparison.

Street Intersection Density



Geospatial Analyst - Kriging was used to create these two maps of intersection density. One square mile hexagons were used, each hexagon contained data about the number of intersections for 1992 and 2006, along with the change between the two years. A 5-mile buffer of Interstate 94 is shown in blue on each map, to help see the impact that distance from the highway has an growth.

For each map the darker shades represent a greater density of intersections. Both maps have the same scale of color representation, so they can be compared. Each map only represents the year indicated, however it is the change in the number of intersections that shows the most about population growth and decline. This can be seen the graph in the lower left corner.

TIGER Methodology

TIGER = Topologically Integrated Geographic Encoding & Ranging

- Electronic street map of USA
- File = a series of latitude and longitude points
- "Connect-the-dot" routines to build up roads, water, railroads, block, etc.

Stack From and To Latitude and Longitude to form a single database of nodes.

Create Count of Common Node Values. Eliminate any records less than three.

The intersection count provided the basis for intersections-per-square-mile GeoStatistical Analysis.

Three or more points with the same coordinates equals an intersection.

Point Code	From Longitude	From Latitude	To Longitude	To Latitude
A31	-89.500000	43.123456	-89.503406	43.567890
A31	-89.503406	43.567890	-89.506812	43.567890
A31	-89.506812	43.567890	-89.510218	43.567890
A31	-89.510218	43.567890	-89.513624	43.567890
A31	-89.513624	43.567890	-89.517030	43.567890
A31	-89.517030	43.567890	-89.520436	43.567890
A31	-89.520436	43.567890	-89.523842	43.567890
A31	-89.523842	43.567890	-89.527248	43.567890
A31	-89.527248	43.567890	-89.530654	43.567890
A31	-89.530654	43.567890	-89.534060	43.567890
A31	-89.534060	43.567890	-89.537466	43.567890
A31	-89.537466	43.567890	-89.540872	43.567890
A31	-89.540872	43.567890	-89.544278	43.567890
A31	-89.544278	43.567890	-89.547684	43.567890
A31	-89.547684	43.567890	-89.551090	43.567890
A31	-89.551090	43.567890	-89.554496	43.567890
A31	-89.554496	43.567890	-89.557902	43.567890
A31	-89.557902	43.567890	-89.561308	43.567890
A31	-89.561308	43.567890	-89.564714	43.567890
A31	-89.564714	43.567890	-89.568120	43.567890
A31	-89.568120	43.567890	-89.571526	43.567890
A31	-89.571526	43.567890	-89.574932	43.567890
A31	-89.574932	43.567890	-89.578338	43.567890
A31	-89.578338	43.567890	-89.581744	43.567890
A31	-89.581744	43.567890	-89.585150	43.567890
A31	-89.585150	43.567890	-89.588556	43.567890
A31	-89.588556	43.567890	-89.591962	43.567890
A31	-89.591962	43.567890	-89.595368	43.567890
A31	-89.595368	43.567890	-89.598774	43.567890
A31	-89.598774	43.567890	-89.602180	43.567890
A31	-89.602180	43.567890	-89.605586	43.567890
A31	-89.605586	43.567890	-89.608992	43.567890
A31	-89.608992	43.567890	-89.612398	43.567890
A31	-89.612398	43.567890	-89.615804	43.567890
A31	-89.615804	43.567890	-89.619210	43.567890
A31	-89.619210	43.567890	-89.622616	43.567890
A31	-89.622616	43.567890	-89.626022	43.567890
A31	-89.626022	43.567890	-89.629428	43.567890
A31	-89.629428	43.567890	-89.632834	43.567890
A31	-89.632834	43.567890	-89.636240	43.567890
A31	-89.636240	43.567890	-89.639646	43.567890
A31	-89.639646	43.567890	-89.643052	43.567890
A31	-89.643052	43.567890	-89.646458	43.567890
A31	-89.646458	43.567890	-89.649864	43.567890
A31	-89.649864	43.567890	-89.653270	43.567890
A31	-89.653270	43.567890	-89.656676	43.567890
A31	-89.656676	43.567890	-89.660082	43.567890
A31	-89.660082	43.567890	-89.663488	43.567890
A31	-89.663488	43.567890	-89.666894	43.567890
A31	-89.666894	43.567890	-89.670300	43.567890
A31	-89.670300	43.567890	-89.673706	43.567890
A31	-89.673706	43.567890	-89.677112	43.567890
A31	-89.677112	43.567890	-89.680518	43.567890
A31	-89.680518	43.567890	-89.683924	43.567890
A31	-89.683924	43.567890	-89.687330	43.567890
A31	-89.687330	43.567890	-89.690736	43.567890
A31	-89.690736	43.567890	-89.694142	43.567890
A31	-89.694142	43.567890	-89.697548	43.567890
A31	-89.697548	43.567890	-89.700954	43.567890
A31	-89.700954	43.567890	-89.704360	43.567890
A31	-89.704360	43.567890	-89.707766	43.567890
A31	-89.707766	43.567890	-89.711172	43.567890
A31	-89.711172	43.567890	-89.714578	43.567890
A31	-89.714578	43.567890	-89.717984	43.567890
A31	-89.717984	43.567890	-89.721390	43.567890
A31	-89.721390	43.567890	-89.724796	43.567890
A31	-89.724796	43.567890	-89.728202	43.567890
A31	-89.728202	43.567890	-89.731608	43.567890
A31	-89.731608	43.567890	-89.735014	43.567890
A31	-89.735014	43.567890	-89.738420	43.567890
A31	-89.738420	43.567890	-89.741826	43.567890
A31	-89.741826	43.567890	-89.745232	43.567890
A31	-89.745232	43.567890	-89.748638	43.567890
A31	-89.748638	43.567890	-89.752044	43.567890
A31	-89.752044	43.567890	-89.755450	43.567890
A31	-89.755450	43.567890	-89.758856	43.567890
A31	-89.758856	43.567890	-89.762262	43.567890
A31	-89.762262	43.567890	-89.765668	43.567890
A31	-89.765668	43.567890	-89.769074	43.567890
A31	-89.769074	43.567890	-89.772480	43.567890
A31	-89.772480	43.567890	-89.775886	43.567890
A31	-89.775886	43.567890	-89.779292	43.567890
A31	-89.779292	43.567890	-89.782698	43.567890
A31	-89.782698	43.567890	-89.786104	43.567890
A31	-89.786104	43.567890	-89.789510	43.567890
A31	-89.789510	43.567890	-89.792916	43.567890
A31	-89.792916	43.567890	-89.796322	43.567890
A31	-89.796322	43.567890	-89.799728	43.567890
A31	-89.799728	43.567890	-89.803134	43.567890
A31	-89.803134	43.567890	-89.806540	43.567890
A31	-89.806540	43.567890	-89.809946	43.567890
A31	-89.809946	43.567890	-89.813352	43.567890
A31	-89.813352	43.567890	-89.816758	43.567890
A31	-89.816758	43.567890	-89.820164	43.567890
A31	-89.820164	43.567890	-89.823570	43.567890
A31	-89.823570	43.567890	-89.826976	43.567890
A31	-89.826976	43.567890	-89.830382	43.567890
A31	-89.830382	43.567890	-89.833788	43.567890
A31	-89.833788	43.567890	-89.837194	43.567890
A31	-89.837194	43.567890	-89.840600	43.567890
A31	-89.840600	43.567890	-89.844006	43.567890
A31	-89.844006	43.567890	-89.847412	43.567890
A31	-89.847412	43.567890	-89.850818	43.567890
A31	-89.850818	43.567890	-89.854224	43.567890
A31	-89.854224	43.567890	-89.857630	43.567890
A31	-89.857630	43.567890	-89.861036	43.567890
A31	-89.861036	43.567890	-89.864442	43.567890
A31	-89.864442	43.567890	-89.867848	43.567890
A31	-89.867848	43.567890	-89.871254	43.567890
A31	-89.871254	43.567890	-89.874660	43.567890
A31	-89.874660	43.567890	-89.878066	43.567890
A31	-89.878066	43.567890	-89.881472	43.567890
A31	-89.881472	43.567890	-89.884878	43.567890
A31	-89.884878	43.567890	-89.888284	43.567890
A31	-89.888284	43.567890	-89.891690	43.567890
A31	-89.891690	43.567890	-89.895096	43.567890
A31	-89.895096	43.567890	-89.898502	43.567890
A31	-89.898502	43.567890	-89.901908	43.567890
A31	-89.901908	43.567890	-89.905314	43.567890
A31	-89.905314	43.567890	-89.908720	43.567890
A31	-89.908720	43.567890	-89.912126	43.567890
A31	-89.912126	43.567890	-89.915532	43.567890
A31	-89.915532	43.567890	-89.918938	43.567890
A31	-89.918938	43.567890	-89.922344	43.567890
A31	-89.922344	43.567890	-89.925750	43.567890
A31	-89.925750	43.567890	-89.929156	43.567890
A31	-89.929156	43.567890	-89.932562	43.567890
A31	-89.932562	43.567890	-89.935968	43.567890
A31	-89.935968	43.567890	-89.939374	43.567890
A31	-89.939374	43.567890	-89.942780	43.567890
A31	-89.942780	43.567890	-89.946186	43.567890
A31	-89.946186	43.567890	-89.949592	43.567890
A31	-89.949592	43.567890	-89.952998	43.567890
A31	-89.952998	43.567890	-89.956404	43.567890
A31	-89.956404	43.567890	-89.959810	43.567890
A31	-89.959810	43.567890	-89.963216	43.567890
A31	-89.963216	43.567890	-89.966622	43.567890
A31	-89.966622	43.567890	-89.970028	43.567890
A31	-89.970028	43.567890	-89.973434	43.567890
A31	-89.973434	43.567890	-89.976840	43.567890
A31	-89.976840	43.567890	-89.980246	43.567890
A31	-89.980246	43.567890	-89.983652	43.567890
A31	-89.983652	43.567890	-89.987058	43.567890
A31	-89.987058	43.567890	-89.990464	43.567890
A31	-89.990464	43.567890	-89.993870	43.567890
A31	-89.993870	43.567890	-89.997276	43.567890
A31	-89.997276	43.567890	-90.000682	43.567890
A31	-90.000682	43.567890	-90.004088	43.567890
A31	-90.004088	43.567890	-90.007494	43.567890
A31	-90.007494	43.567890	-90.010900	43.567890
A31	-90.010900	43.567890	-90.014306	43.567890
A31	-90.014306	43.567890	-90.017712	43.567890
A31	-90.017712	43.567890	-90.021118	43.567890
A31	-90.021118	43.567890	-90.024524	43.567890
A31	-90.024524	43.567890	-90.027930	43.567890
A31	-90.027930	43.567890	-90.031336	43.567890
A31	-90.031336	43.567890	-90.034742	43.567890
A31	-90.034742	43.567890	-90.038148	43.567890
A31	-90.038148	43.567890	-90.041554	43.567890
A31	-90.041554	43.567890	-90.044960	43.567890
A31	-90.044960	43.567890	-90.048366	43.567890
A31	-90.048366	43.567890	-90.051772	43.567890
A31	-90.051772	43.567890	-90.055178	43.567890
A31	-90.055178	43.567890	-90.058584	43.567890
A31	-90.058584	43.567890	-90.061990	43.567890
A31	-90.061990	43.567890	-90.065396	43.567890