LET'S TALK BUSINESS

Ideas for Expanding Retail and Services in Your Community

Using GIS to Measure Patterns Of Retail Sprawl

by
Matt Kures and Bill Ryan*

The growth and expansion of our communities have changed patterns of retail development over the last several decades. Traditional stores that once were located downtown have given way to big-box stores that are sprawling at the urban fringe. The shift has been so extreme that in 1994 large stores on the urban fringe accounted for 80-percent of all new retail (Benfield, 1999).

Most new retail stores tend to be located at the urban fringe because of a variety of market factors such as less restrictive zoning, simpler site preparation, larger lot sizes and space for ample parking. Many argue that fringe locations have negative effects on both society and the environment as these locations can decrease shopper accessibility, consume farmland, increase infrastructure costs, and decrease downtown retail activity.

In response to sprawl, a variety of planning initiatives have appeared under the rubric of Smart Growth. Proponents of Smart Growth initiatives suggest that we need to create qualitatively better communities rather than quantitatively larger of more numerous suburbs (Hudnut, 1999). While we could evaluate communities using qualitative criteria, we can also examine their growth in a quantitative manner (Ewing, 1997). By examining changes in the amount of development, we can see where and how much growth is occurring. As this pattern changes over space and time, the analytical capabilities of a technology called Geographic Information Systems (GIS) becomes quite useful.

Quantifying Changes in Retail Development

Quantifying retail development in a community requires the creation of a database that includes past and current retail businesses, as well as their addresses and store size in gross leasable area (GLA). Using a process called geocoding, the GIS can use the addresses to map past and current retail locations (points) throughout the community and then measure how much retail space has changed over time. These points, represented by triangles, are illustrated for an example community in figure 1.
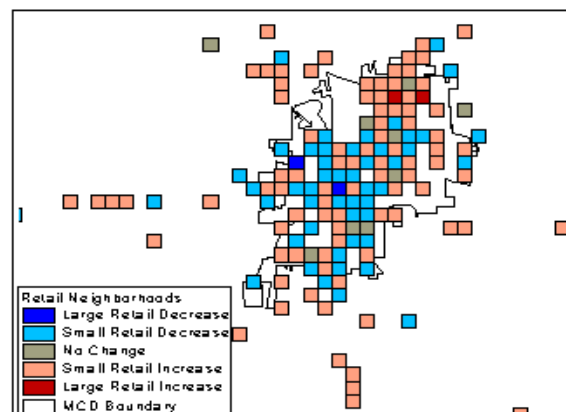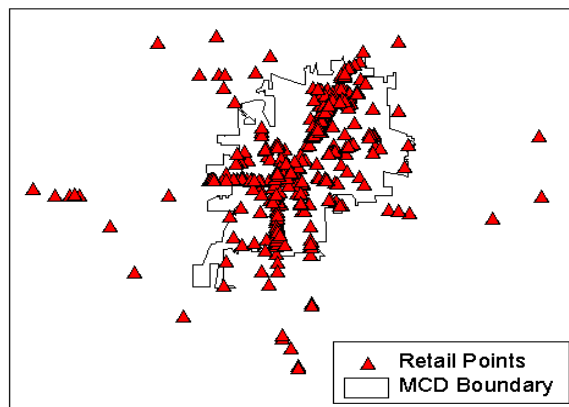

Figure 1 - Changes in Retail Development

To ensure a consistent basis of measurement, the entire community is divided into 1/2- by 1/2- mile squares (cells). These cells are then overlaid on the retail location points also illustrated in Figure 1. Changes in the amount of retail space within each of these geographic cells is then calculated. The uniformity of the cells allows for consistent calculation of retail space change over time, and for comparison with cells representing other parts of the community. Figure 1 shows differences in retail growth throughout a community. Areas that have experienced increased retail development are shown in red, decreased development in blue, and minimal retail change in gray.

**Calculating Changes in Retail Space
by 1/2 x 1/2-mile Cell
Year 1 vs. Year 2**

Step 1: Determine what retail businesses are located within each 1/2- by 1/2-mile cell for both years.

Step 2: Using these businesses and their associated GLAs, calculate the total GLA in every cell for both years.

Step 3: Calculate the change in retail GLA by subtracting Year 1 GLA from the Year 2 GLA.

Analyzing Development Patterns in the Community

This method can also be used to examine general patterns of retail development in a community. One development pattern that can be measured is how retail space is increasing near the edge of a community, and decreasing near the central business district (CBD). Changes in this pattern would determine the amount of business migration occurring from the CBD to the fringe. Figure 1 demonstrates this trend as illustrated by the blue cells (decreases) near the center of town and red cells (increases) near the edge of town.

The graph in figure 2 shows the results for this type of analysis is the example community. The GIS totaled the amount of retail in each 1/2- by 1/2-mile cells for 1990 (gray graph bars) and 1999 (black graph bars). Figure 2 demonstrates how retail space has grown faster at locations further away from the CBD. This points out that retail development is moving away from downtown in favor of fringe locations.
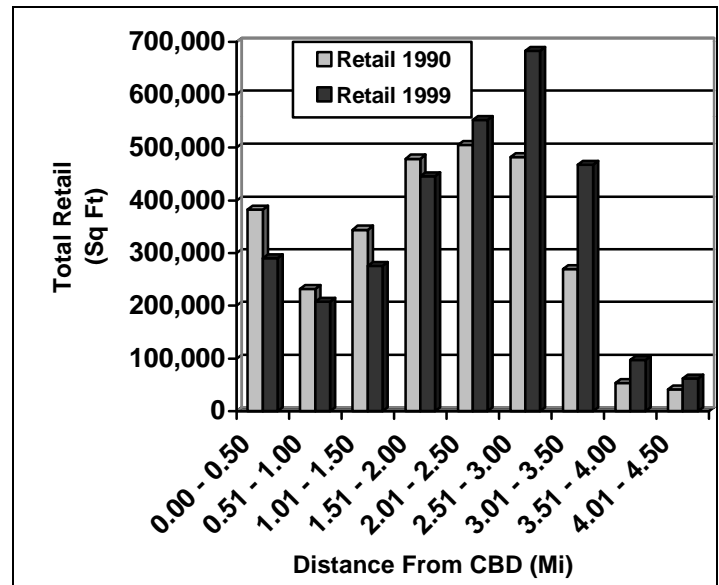
Conclusion

Retail sprawl is occurring in both large and small communities throughout Wisconsin. Because retail development results in both economic and land use impacts, it should be addressed within the economic development element of a community's comprehensive plan. Quantitative measures of retail development and sprawl can enhance such a plan by providing information on past (and projected) growth trends. GIS provides a powerful tool in the development of these quantitative measures.

Figure 2 - Total Retail as a Function of Distance from CBD

References

Benfield, F. Kaid. "Once There Were Greenfields." *Forum for Applied Research and Public Policy*. 14.3 (1999): 6-11.

Hudnut, William H. "Smart Growth in a Three-Tiered City." *Urban Land*. 58.8 (1999): 20-23.

Ewing, Reid. "Is Los Angeles Style Sprawl Desirable?" *Journal of the American Planning Association*. 63.1 (1997): 107-23.

* Kures is a graduate student in GIS at the University of Wisconsin-Madison. He works with Ryan, community business development specialist at the UWEX Center for Community Economic Development. Newsletter production by Alice Justice, program assistant with the Center.