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GIS Application Paper
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I interviewed Neil Dixon, a downtown revitalization assistant, about his work with GIS applications at the Center for Community Economic Development (CCED) at UW-Extension. The GIS application that Neil uses most often in his work is determining trade areas of selected Wisconsin Main Street Communities that are in the process of putting together a market analysis for their downtowns. This work is done through CCED in collaboration with the Wisconsin Department of Commerce Main Street Office. In order to determine the trade areas, Neil used four methods.

The first, and primary method, is Huff's probability-based gravity model in ESRI's Business Analyst GIS software package. Neil provided the following brief description of this GIS application he used in determining the trade area for Stevens Point using the gravity model. The gravity model contained in ESRI Business Analyst was developed by spatial interaction researcher Dr. David Huff of the University of Texas about 40 years ago. It is based on the principle that the probability of a given consumer shopping at a given site is a function of the distance to that site, its attractiveness, and the distance and attractiveness of competing sites. In the case of this project, a point feature located in downtown Stevens Point became the subject site. Its attractiveness was defined by adding three fields to the "Stevens Point" feature; one containing total retail sales in the community from the 2002 Economic Census, one containing the number of retail establishments in the community according to the 2002 Economic Census, and one containing the population of the community from the 2000 Population and Household Census. The competing sites became the communities of Marshfield, Wausau, Wisconsin Rapids, and Waupaca. Point features were established in the downtowns of each community. Based on these data, Neil was able to create maps using census block groups as the unit of analysis and the above data to illustrate the trade area. (See Map 1: Gravity Model Method)

The primary drawback of the gravity model method is that the data available were not current since the version of Business Analyst used contains 2004 data. The total retail sales per community and the number of establishments per community were both retrieved from the 2002 Economic Census, and the total population per community was retrieved from the 2000 Population and Household census. Correcting this problem would be difficult and expensive. Also, the census data used were the most current data available. This application could be improved through more accurate and recent data.

Along with the gravity model, Neil also explained the use of three other methods to determine trade areas. The first is the method of equal competition or Theissen polygon, which examines the travel distance from the subject community to competing markets. This is done by drawing a midpoint between the subject community and surrounding communities. This method is used to determine destination-type trade areas. A second method is that of analyzing drive times to evaluate the market for goods and services bought on the basis of convenience. This method is used to determine the origin of convenience-seeking customers. The third alternative method of determining trade areas is that of analyzing customer origins through zip code data. Customer zip codes are collected from local business owners. These are then mapped using GIS (See Map 2: Customer Origin Method). The advantage of this method is that it is based on actual customer data. These each have their own drawbacks including accuracy and reliance on others

for data collection, but they all provide good alternatives for determining trade areas when economic and population census data may not be available.

When asked about the benefits of this and the other GIS applications, Neil explained that this type of analysis is important for communities, like Stevens Point, that are trying to stay vibrant and prosperous in the current era of big-box retail. Accurately defining the trade area for a community's downtown allows city planners, business owners, and community organizers to define a viable niche. It does this by defining the geographic area from which the majority of customers originate. Once this area is defined, further research can be performed, revealing the shopping habits, preferences, and lifestyle choices exhibited by the population of the trade area. A community with a defined niche can capitalize on uniqueness of place and product selection, both traits which consumers often prefer. Therefore, while downtown Stevens Point may not be able to match the price or selection offered at large big-box retailers, it may be able to capture a sustainable share of the consumer market by defining a niche that the people in its trade area will support.

The results of the trade area analysis specifically for Stevens Point, but also for other communities that Neil is working with are posted on a website through the WI Department of Commerce and CCED in order that local citizens can access the information. Hard copies of the reports are also provided to local business leaders and Main Street staff. The information about the trade areas along with all other elements of the market analysis including business owner and consumer surveys, business inventories, etc. are all discussed at a strategy session with Main Street staff in order to decide how to move forward with downtown revitalization through business retention and recruitment in these Main Street communities.

Map 1: Gravity Model Method	Map 2: Customer Origin Method