

## Visualizing Accessibility II: Access to Food

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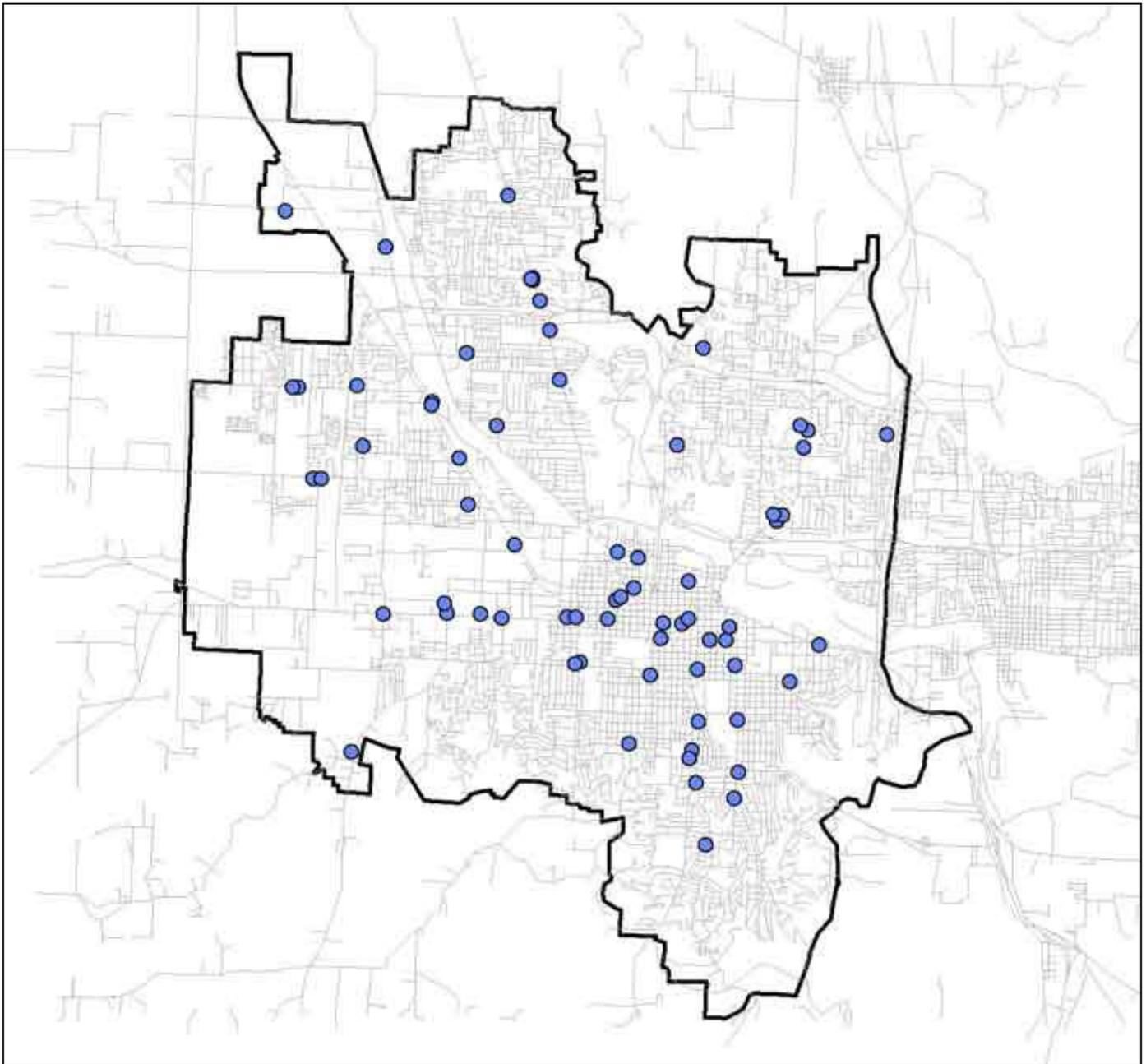
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Food security is emerging as an important aspect of community and social planning, reflected in part by a recent special issue on Community Food Systems of the *Journal of Planning Education and Research* (JPER). As noted by Campbell (2004), food systems involve many stakeholders with differing values across space and time. One particular element of this larger food security issue revolves around transportation access to local food retailers. Such access is particularly important for the poor and other transportation disadvantaged who may lack mobility options (Clifton 2004). Thus, one important component of a Community Food Assessment system (Pothukuchi 2004) is to investigate and understand the spatial relationship of where individuals live and their spatial proximity to primary food outlets.

From a planning perspective, locating food outlets within neighborhoods that are easily reached through walking is often a desirous outcome. Bernick and Cervero (1997) found that people who live in pedestrian oriented environments were more likely to go by foot to the market. Handy (1995) found that residents that live in “traditional neighborhoods” have also been found to make two to four more walk/bicycle trips-per-week to neighborhood stores than those living in nearby, automobile oriented environments. And recently, Krizek (2003) found that people who live in areas with good “neighborhood accessibility” are more likely to walk and use transit than are those who live in more traditional auto oriented environments.

Markets that are within walking distance to all residents allow for equity of access; car ownership should not be the prerequisite to purchase food. The physical exercise associated with walking to a local market is an additional small way to combat growing societal waistlines. There may be, as well, enhanced social capital building opportunities when people travel through neighborhoods by foot to local food sites.

The following maps provide a visual and spatial approach to understanding access to food outlets for residents of the City of Eugene, Oregon. A description and discussion is presented under each map. Visualizing data in this way can be helpful to community planning endeavors; the visual approach transforms the abstract issue of transportation access to food into concrete understanding. Some of the maps below (Figures 2, 3, 5, and 6) were made for a food summit, hosted by the nonprofit agency Food for Lane County. They were designed to add one more piece of data and understanding to a county-wide discourse on addressing various food issues within Lane County, Oregon.



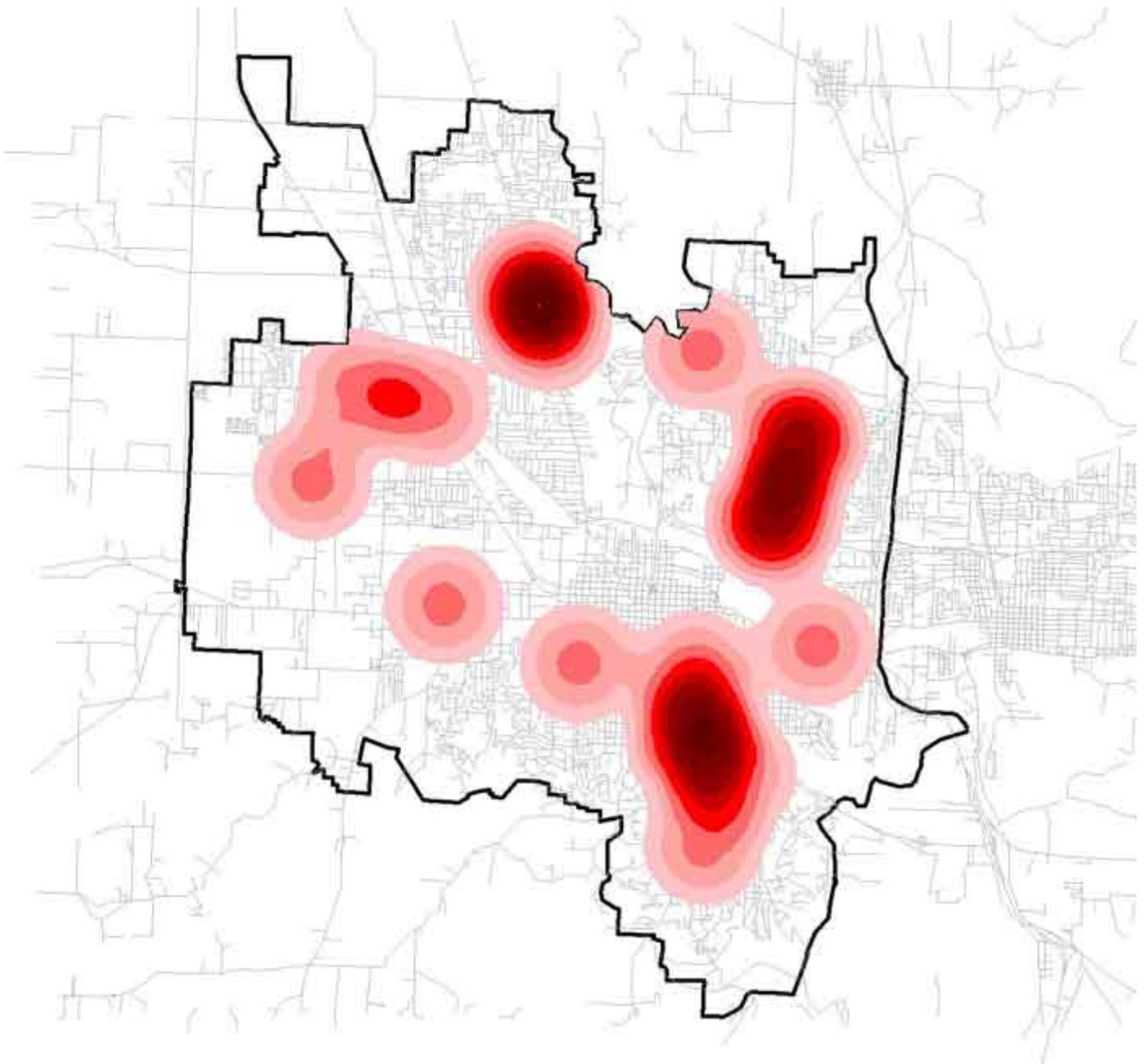
**Figure 1.** Stores and Streets.

The map in Figure 1 shows the location of sixty-nine different food markets. The underlying street network is displayed as well, providing an initial visual understanding of the urban form throughout the city. Where there is a concentration of stores in the center and center-south area, there is also a fairly tight gridded street network, representing a traditional downtown and neighborhood area in close proximity to the University of Oregon.



**Figure 2.** Food Markets by Type.

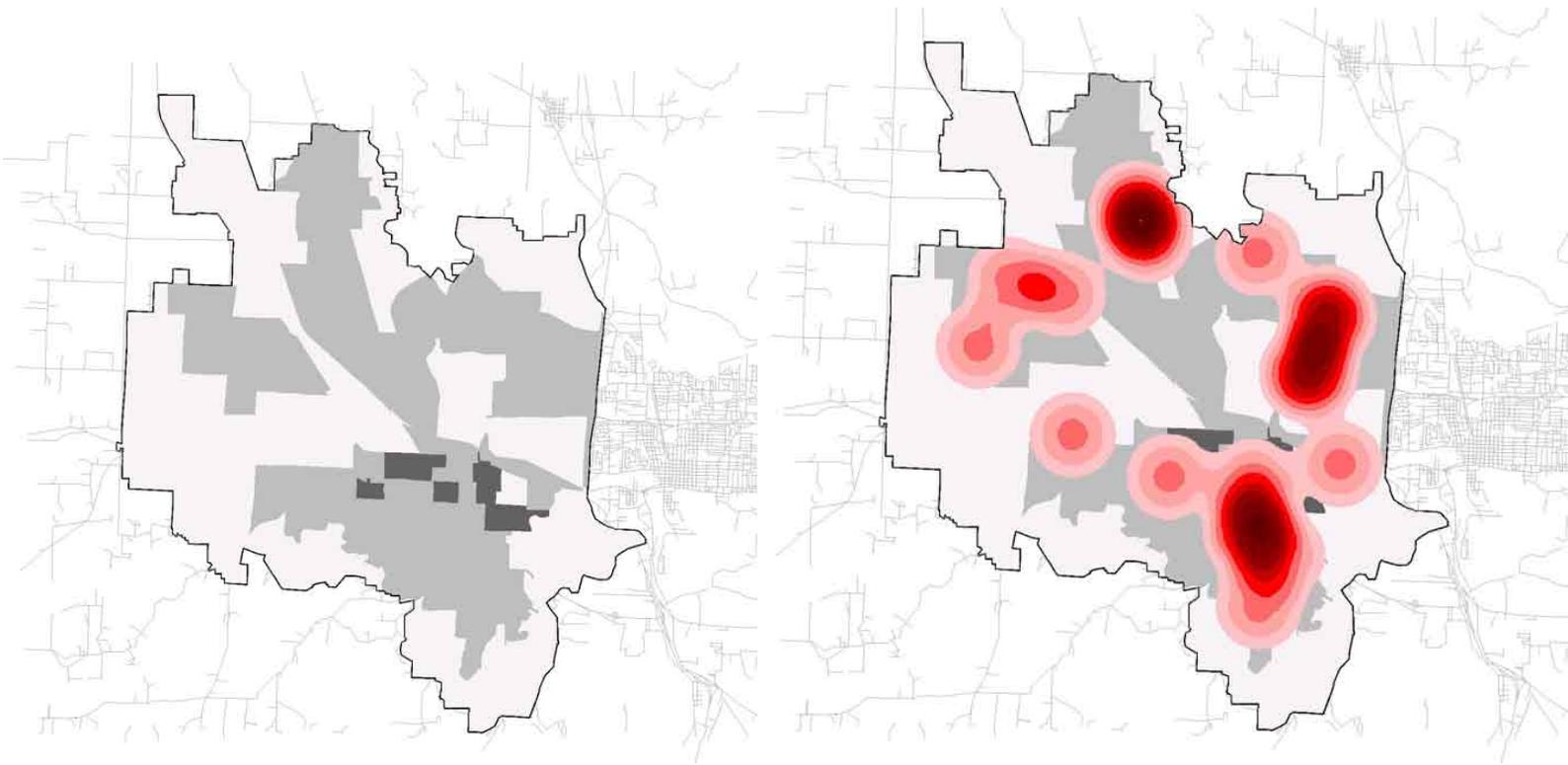
The map in Figure 2 partitions food outlets by type of establishment. In this case, retail stores have been divided into four primary categories: convenience stores, ethnic markets, neighborhood markets, and supermarkets. Both convenience stores and neighborhood markets are often located in close proximity to residential locations, but neighborhood markets are characterized by offering higher quality foods of a greater variety, including fresh produce. Although the map (Figure 2) does delineate markets by type, viewing all types at the same time while simultaneously trying to get a sense of one's accessibility to the market is difficult. The series of maps below, therefore, represents accessibility by market type.



**Figure 3.** Access to Supermarkets.

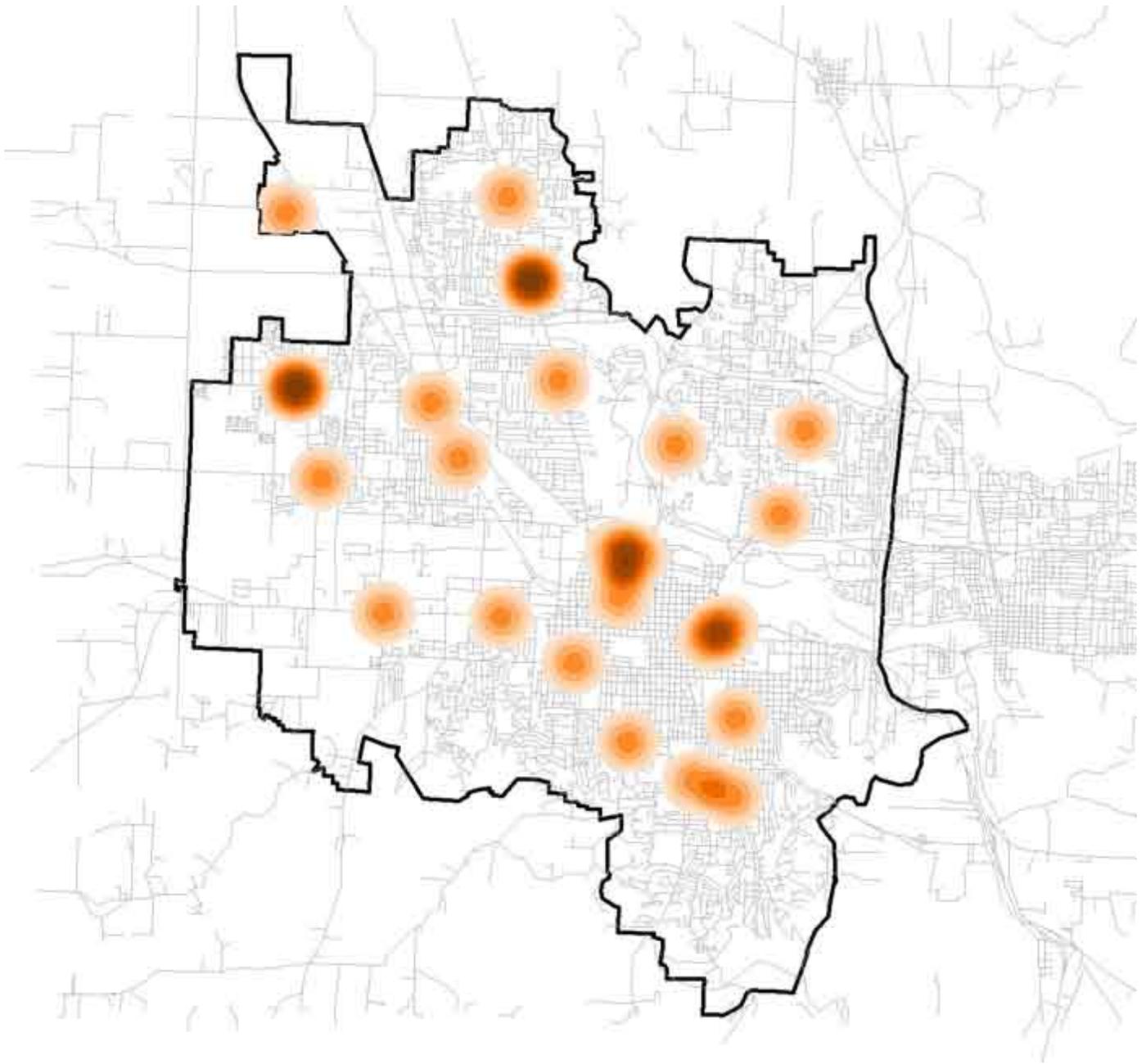
In the map in Figure 3, the density of supermarkets is displayed throughout the Eugene area. A 1-mile distance has been used as a buffer; the outer edge of the most distant and lightest band of color (light pink) is one mile from the nearest supermarket. Medium colors represent areas that have good access to a single store, while the darkest reds represent areas in Eugene that have access to multiple supermarkets - places with superb supermarket access.

It is interesting to note the general pattern of supermarket access as well. There is a general band of markets that encircles the geographic center of Eugene. This center, as defined by the map in Figure 3, actually includes two distinct areas. One area is a traditional downtown composed primarily of commercial establishments (e.g. offices, restaurants, stores); the other area is largely industrial. Both contain land use types in which one would not expect to find supermarkets. The following maps show where there are areas of medium residential density.



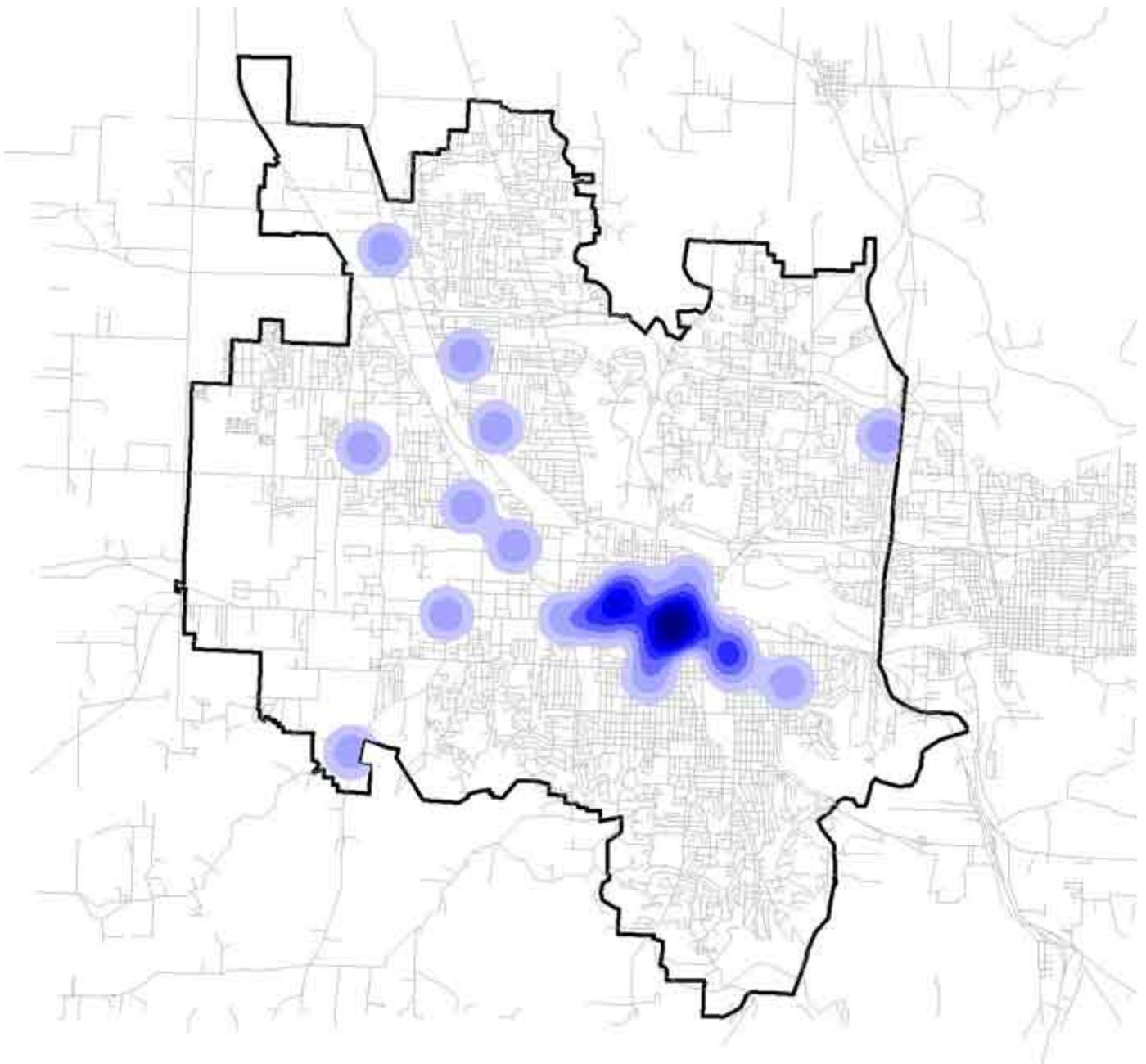
**Figure 4a and b.** Population Density and Population Density with Overlay of Supermarket Accessibility.

The map in Figure 4a represents population density, with the darkest colors representing neighborhoods generally surrounding the University of Oregon - a location with a high density of living in general (for Eugene), but with high concentrations of students in particular. The map on the right overlays the supermarket access map and the population density map in order to identify potential spatial mismatches. While the two sets of data generally align, it is evident that there are a number of neighborhoods of medium population density that are not served well by larger supermarkets. Using maps such as these as a base, a more thorough socio-demographic analysis might be conducted to identify and compare populations that are and are not served with supermarket access.



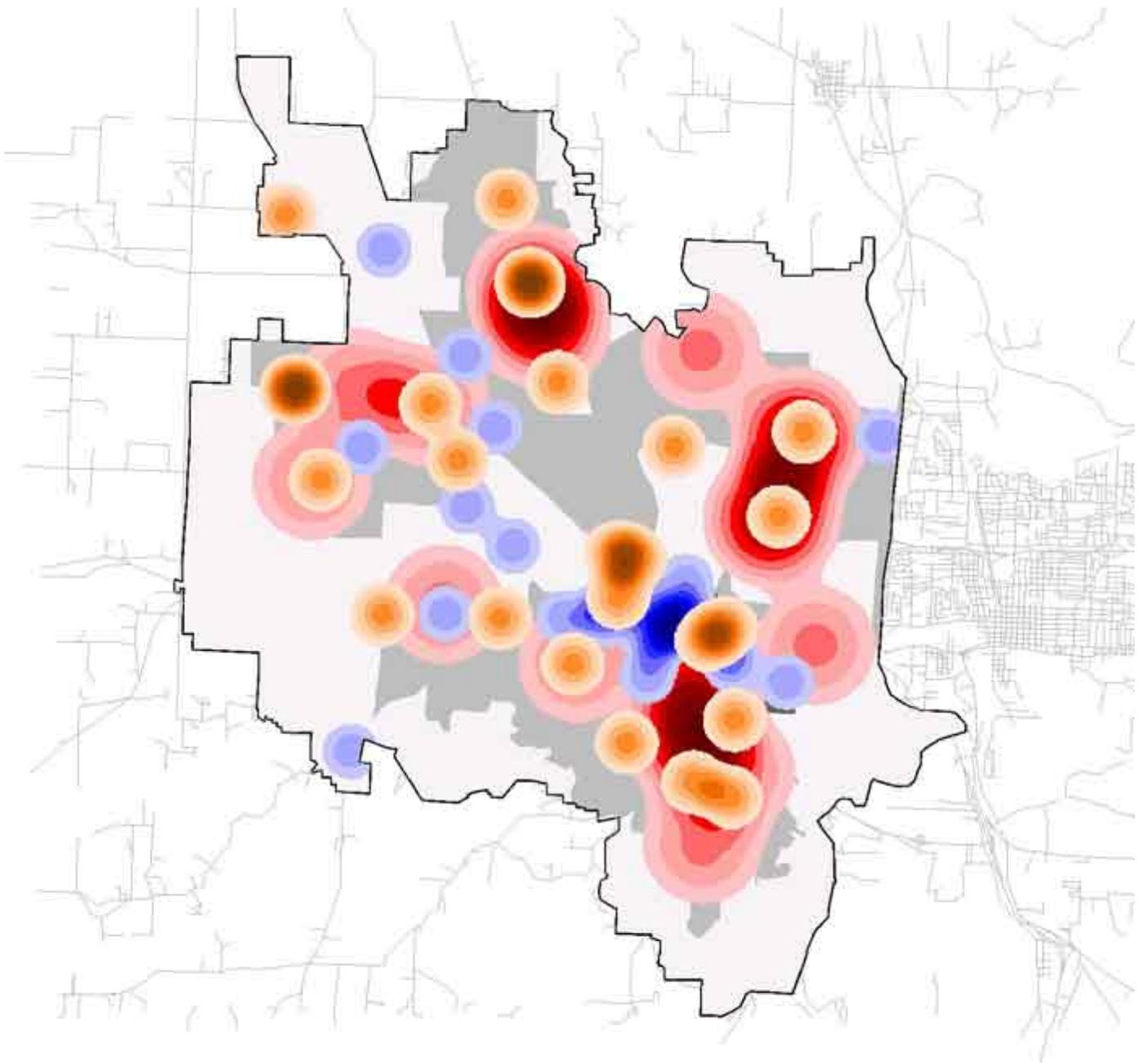
**Figure 5.** Access to Convenience Stores.

The map in Figure 5 shows access to convenience stores. in this case, distances from stores is calculated at a quarter mile - a distance many planners use when thinking about pedestrian accessibility. In this map, there are some areas with concentrations of convenience stores, but in general such stores are relatively isolated from one another and spread throughout the city.



**Figure 6.** Concentration of Neighborhood Food Stores.

The map in Figure 6 shows the spatial concentration of neighborhood food stores (using a 1/4 mile radius from the sites) - perhaps the most important type of establishment in terms of easy, independent access to food. The pattern shows a distinct concentration of neighborhood markets in the center of the city, with isolated stores existing sporadically throughout the rest of the city. Thus, it is clear that one primary neighborhood has an abundance of local neighborhood food choices, while most neighborhoods lack such an option. From a planning perspective, this map (Figure 6) is instructive. If planners want more pedestrian movement to reach essential goods and services, and if neighborhood based food outlets potentially represent the most just form of food distribution (especially for those who by income, age, or impairment cannot drive), then this particular map provides both a troubling image and an opportunity for change. Again, as in Figure 3, the area of most intensity in Figure 6 is an old traditional neighborhood that has been built for a hundred years. Other areas within the city are generally newer, characterized by more suburban development, mini-malls, and opportunities for big-box retailing - including supermarkets. Neighborhood markets, thus, have in essence been zoned out of such areas. Planners and policy makers might use such a map to target land use and zoning policies to encourage pedestrian access to quality foods in currently underserved locations.



**Figure 7.** Combined Access Pattern.

The map in Figure 7 combines the access maps of the supermarkets, convenience stores, and neighborhood markets, overlaid on the population density map. Thus, one can visualize the pattern of general accessibility to food for residents of Eugene. This map suggests that most Eugene residents have reasonable access to some type of food retail market (independent of type or quality).

Spatial analysis combined with the visualization of food outlets offers planners, community activists, public health officials, and those generally concerned with equitable access to food a means to understand the spatial extent of retail food distribution in their community. Mapping software that interacts with an underlying database (Geographic Information System, GIS, software) can provide a powerful tool for facilitating the community dialogue that will be necessary to enhance food security in communities across the country; these maps represent one approach to moving that dialogue forward.

## References

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Krizek, K. J. (2003). "Residential Relocation and Changes in Urban Travel: Does Neighborhood-Scale Urban Form Matter?" *Journal of the American Planning Association* 69(3): 265-281.

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## Related Credits and Issues

- Software: ESRI ArcView 3.2, ESRI Spatial Analyst
- Maps used for Food for Lane County: Figures 2, 3, 5, and 6 - note that the maps for the nonprofit were formatted slightly differently (in a more traditional layout with titles and scale bars and such). Also, the maps were not commissioned by the nonprofit; they were a public service done for their food summit. There are no ownership issues with the images.
- Food site data: derived from Yahoo! yellow pages
- Street and city boundary data: Lane Council of Governments
- Projection: 1927 State Plane, Oregon South

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*Solstice: An Electronic Journal of Geography and Mathematics, Institute of Mathematical Geography, Ann Arbor, Michigan.*  
Volume XV, Number 1.

<http://www.InstituteOfMathematicalGeography.org/>

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