

Addressing Food Insecurity in Washington, DC: A Grocery Store Suitability Study

Background

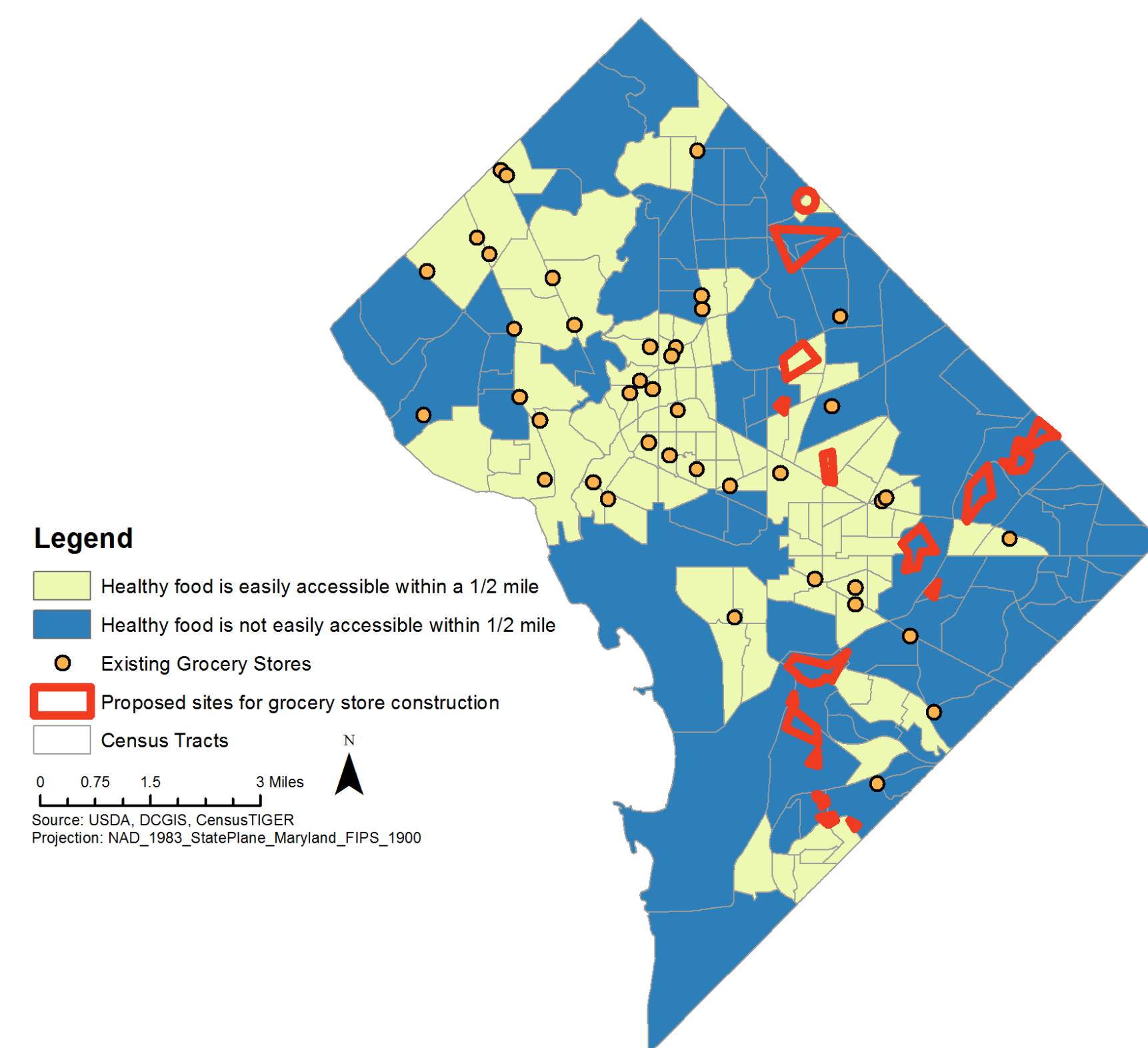
In Washington, DC – a city with a population of over 600,000 – more than 68,000 people including 35,000 children currently experience food insecurity. (DC Hunger Solutions, 2006) As defined by the United States Department of Agriculture (USDA), food insecurity is a “household level economic and social condition of limited or uncertain access to adequate food.” (Coleman-Jensen, et al. 2012) According to the USDA, 12.6% of all households in Washington, DC experienced food insecurity between 2009 and 2011. (Coleman-Jensen, et al. 2012)

When looking at food insecurity, it is important to consider the relationship between food deserts and demographic characteristics. A food desert is an “area where people have limited access to a variety of healthy and affordable food, often featuring large proportions of households with low incomes, inadequate access to transportation, and a limited number of food retailers providing fresh produce and healthy groceries for affordable prices.” (Dutko, et al. 2012) Areas with limited access to affordable food often lack access to other services as well (such as health care and recreational areas). Combined with higher food prices, limited health care services can result in adverse health outcomes for residents living in these areas.

In Washington, DC, grocery stores are unevenly distributed throughout the city. According to the “Healthy Food, Healthy Communities” study conducted in Washington, DC, Wards 5, 6, 7, and 8 have the largest populations of residents in poverty but contain the fewest grocery stores. (DC Hunger Solutions, 2006, 2010)

This study aims to determine the areas most suitable for grocery store construction as well as examine the demographic trends in an effort to illustrate the relationship between food security and population patterns.

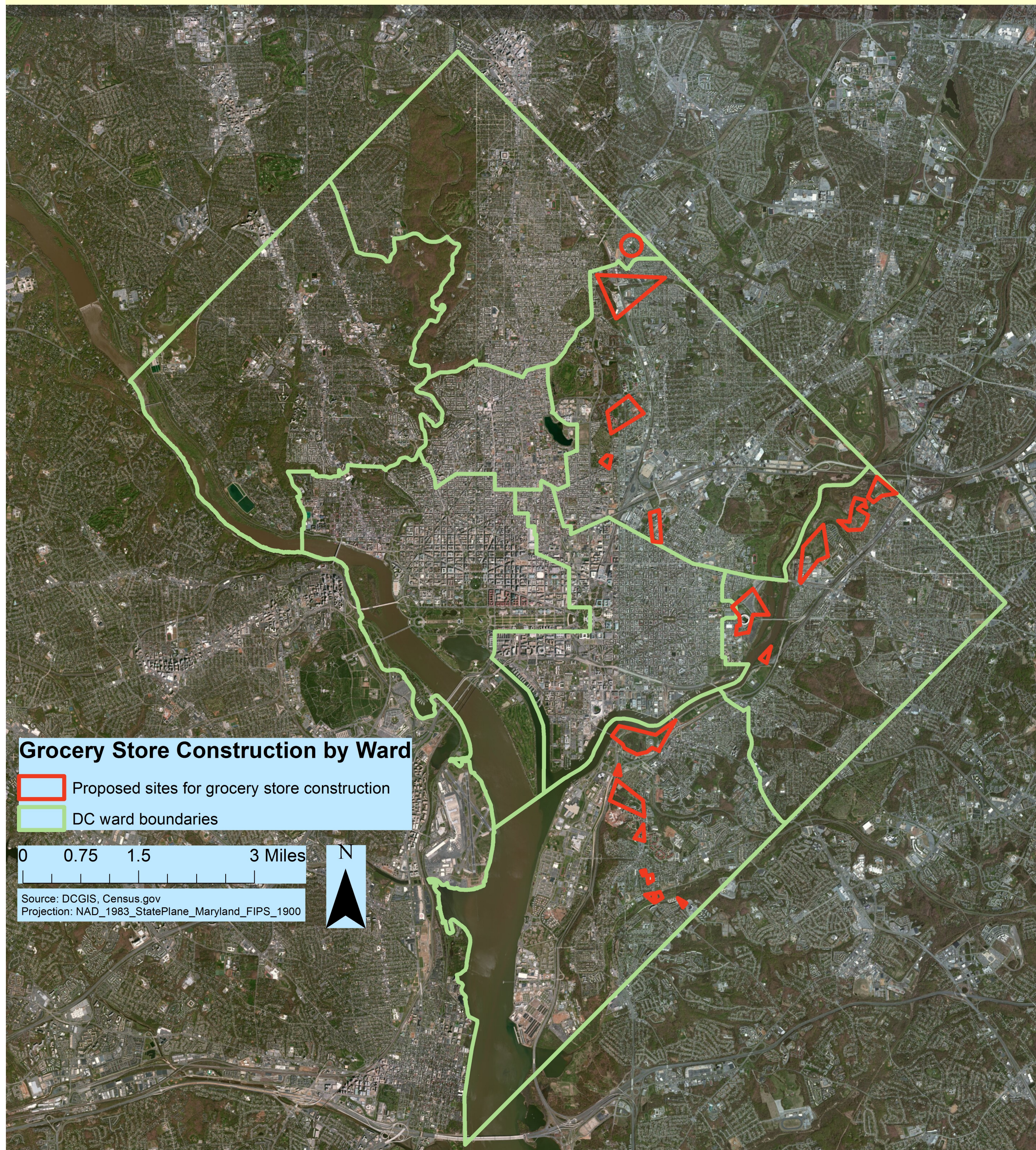
Low Access to Healthy Food by Census Tract



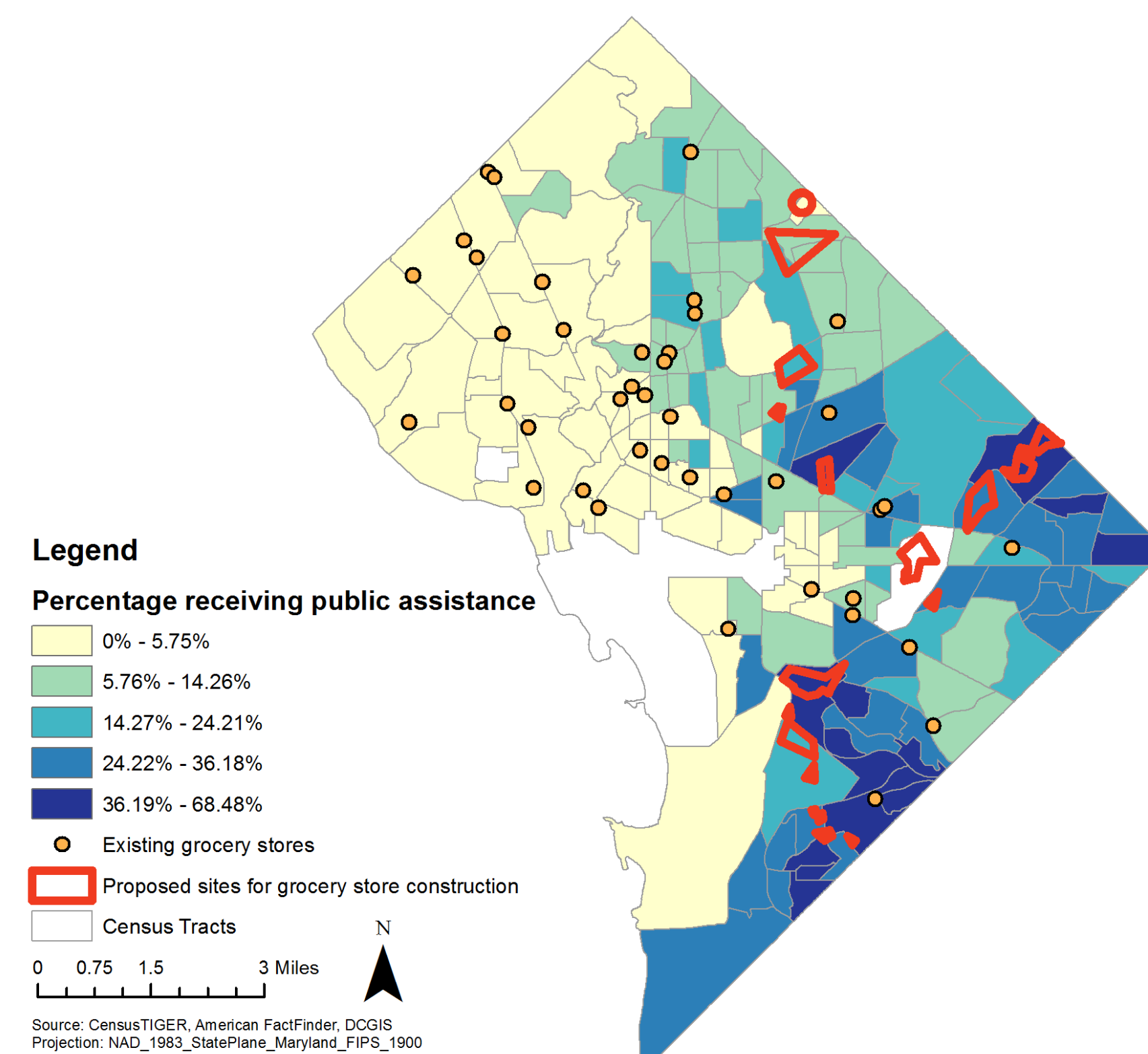
Sarah Kester
Intro to GIS, Spring 2013
Projection: Lambert Conformal Conic; Coordinate System:
NAD_1983_StatePlane_Maryland_FIPS_1900; Scale: 1:166,921

Sources: DCGIS; Census.gov; Coleman-Jensen, Alisha, Mark Nord, Margaret Andrews, and Steven Carlson. “Household Food Security in the United States in 2011.” Rep. Washington: USDA, 2012; DC Hunger Solutions. “Healthy Food, Healthy Communities: An Assessment and Scorecard of Community Food Security in the District of Columbia.” Rep. Washington: DC Hunger Solutions, 2006; DC Hunger Solutions. “What Healthy Food is Out of Reach: An Analysis of the Grocery Gap in the District of Columbia, 2010.” Rep. Washington: DC Hunger Solutions, 2010; Dutko, Paul, Michele Ver Ploeg, and Tracey Farrigan. “Characteristics and Influential Factors of Food Deserts.” Rep. Washington: USDA, 2012.

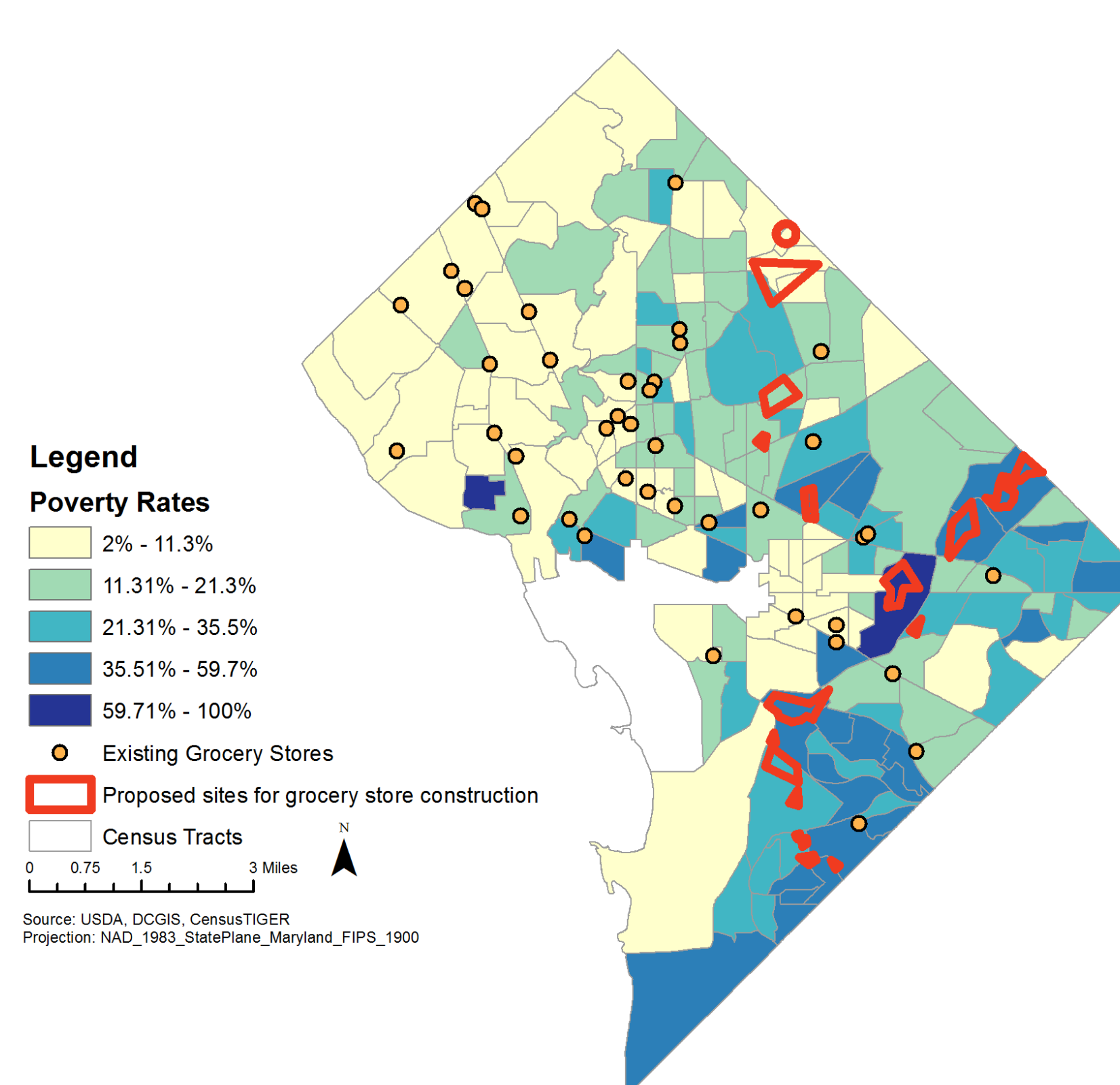
Suitable Locations for Construction of New Grocery Stores by Ward, Washington, DC



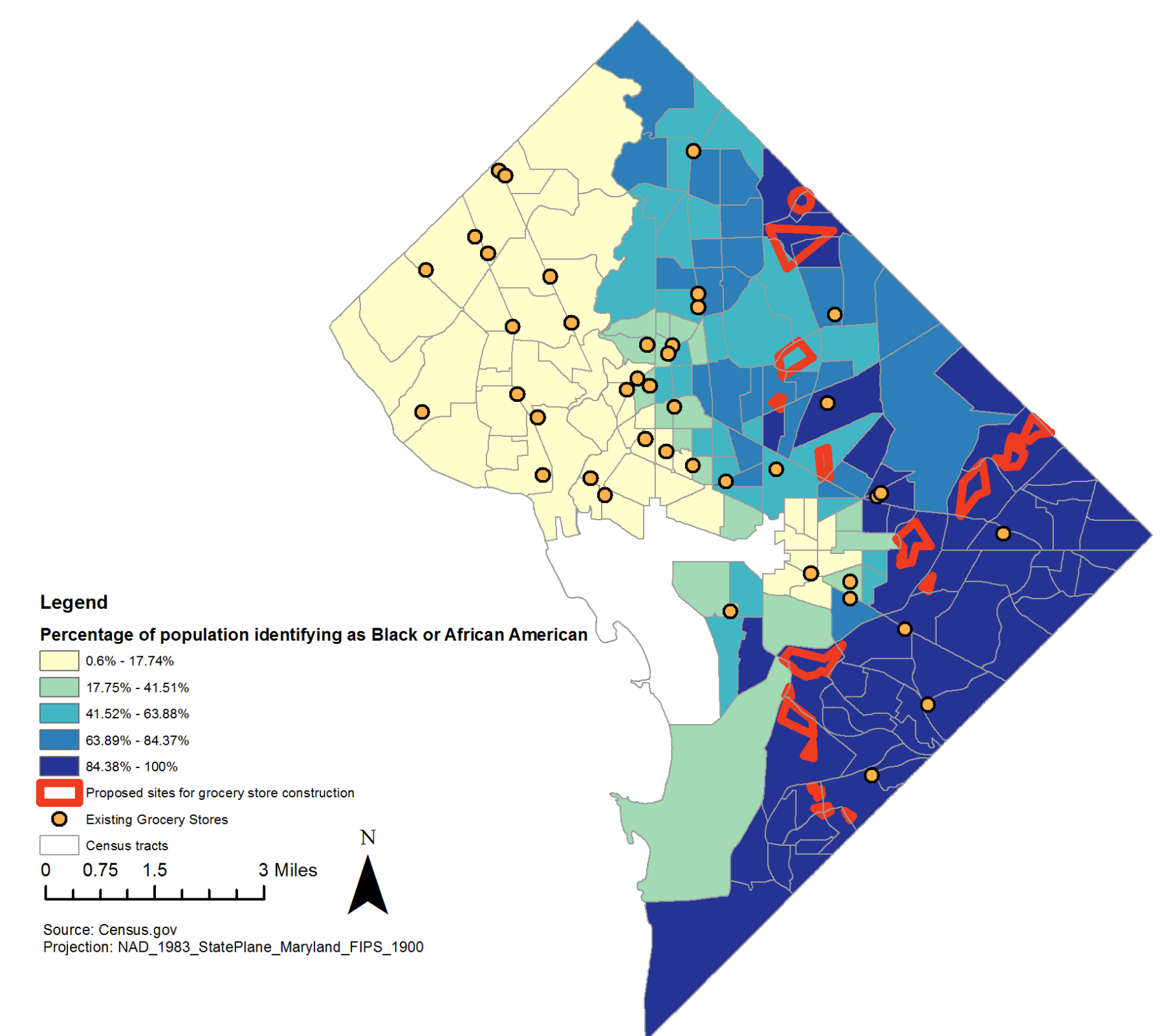
Public Assistance in the Past Year by Census Tract



Poverty Rates by Census Tract



African American Residents by Census Tract



Methods

While there are many factors to consider when examining land suitability for grocery store construction, in an effort to address food insecurity in Washington, DC, this study takes into consideration public transportation accessibility, existing grocery stores, vacant land and Supermarket Tax Credit Zones (areas in which supermarkets receive tax credits). Data sets for these variables were found in the DC GIS database.

The first step of this study was to address projection errors as the census tract map downloaded from census.gov had no projection. Using the other data sets, the Lambert Conformal Conic projection and the NAD_1983_StatePlane_Maryland_FIPS_1900 coordinate system were de-

finer. A 1 kilometer buffer was used for each of the point data sets (bus stops, metro entrances, and existing grocery stores) as that represents suitable walking distance. In order to determine the appropriate land parcels (vacant land), I used the “Select by Attribute” tool and selected for computed area > 40000 square feet, the appropriate amount of space for a full-size grocery store.

In addition to utilizing the buffer tool for the point data, I used the intersect tool for the selected parcel data and supermarket tax credit zones. This new data set was then intersected with both the bus stop and metro entrance buffers. The bus stop buffer produced an empty output, possibly due to the fact that all bus stop buffers of 1 kilometer intersect. The union between

the existing grocery store buffer and a data set of historic landmarks represented the most unsuitable areas for grocery store locations. By using the erase tool, it was possible to determine the suitable land area for grocery store construction with respect to public transportation and parcel size that did not include the historic landmark/grocery store union.

Another major aspect of this study was comparing the location of grocery stores with a variety of demographic data obtained from both the US Census and the USDA. All of the data was obtained in excel files and using the join tool, I was able to join the demographic and food security data with the Census tract base map used in the previous steps.

Findings and Conclusions

After examining public transportation accessibility, parcel size, supermarket tax credit zones, and existing grocery store locations, it is evident that the majority of the land area suitable for grocery store construction falls within the 7th and 8th wards of the city. These two wards historically have contained the poorest areas of the city, indicating a need for grocery stores that cater to lower-income communities.

The demographic data shown indicate that the majority of the existing grocery stores are located in areas with

low percentages of residents on food stamps, low poverty rates, and low percentages of African American residents. Both Ward 7 and Ward 8, the areas with the most suitable land for grocery development contain large numbers of census tracts that experience low access to healthy food, high poverty rates, and higher percentages of individuals receiving public assistance. The disparity in food access indicates a greater racial and economic disparity that occurs throughout the city – areas with higher rates of poverty and larger minority populations often have reduced access

to a variety of services. Overall, this suitability study demonstrates both the need for more grocery stores in areas that are less economically well-off throughout the city as well as the relationship between food security and demographic data such as poverty level, race and public assistance. It is likely that in recent years, food insecurity, particularly in the 7th and 8th Wards has been reduced given the increase of gentrification, however, as this data shows, there is still a distinct relationship between food insecurity and demographic variables.