

More Access for the Mountain State

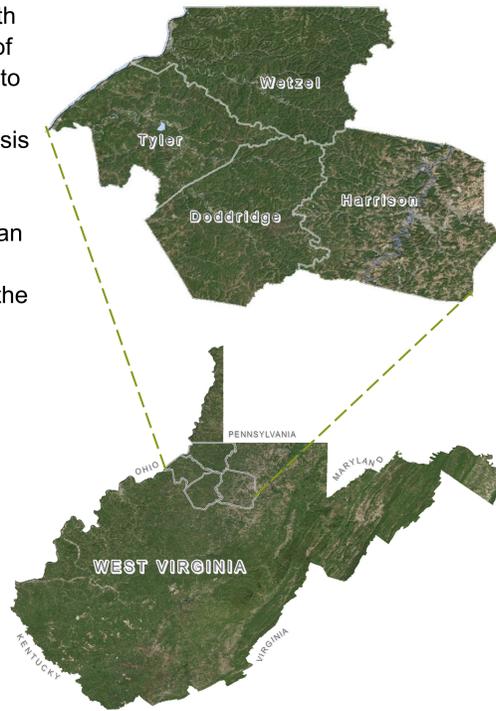
Identifying Areas for New Grocery Retailers in North Central West Virginia

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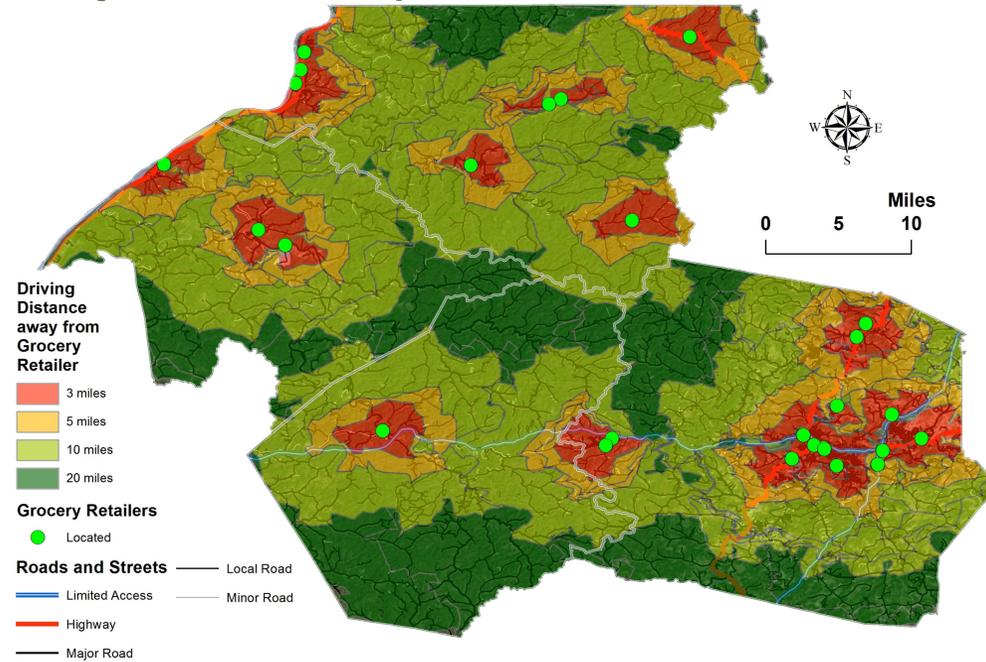
Introduction

This spatial analysis examines the impact of adding grocery store(s) with produce section to a 4-county area of North Central West Virginia in order to increase the population's access to fresh produce. Counties in the analysis are Doddridge, Harrison, Tyler and Wetzel. The ideal location for new grocery store(s) would be greater than 10 driving miles from current closest grocery stores and would increase the number of county residents' access to fresh produce.

Research from WV FOODLINK claims, "The retail food landscape is highly uneven... Convenience (7-Eleven, BFS, etc.) and Small Box (Dollar General, Family Dollar, etc.) retailers make up 76% of the food retailers in the state, yet offer the most limited options for healthy foods. Less than 5% of those retailers offered fresh produce. Grocery stores (Kroger, Save-A-Lot, etc.) and Big Box retailers (Walmart, Target, etc.) on the other hand tend to be geographically concentrated in larger towns where residents have higher overall incomes."



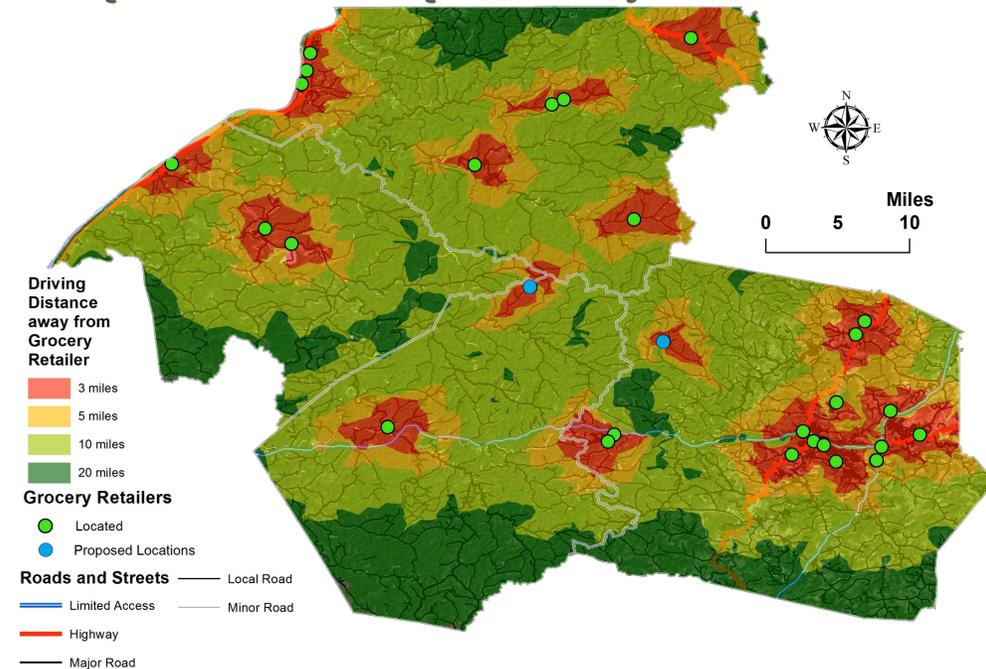
Map 1: Current Grocery Retailer Access



With West Virginia's mountainous terrain, drive times are a significant determinant of grocery access. Analyzing distance to grocery retailers in Euclidean distance would inaccurately represent true access. Noting this, I chose to analyze distance from grocery retailers in a network analysis using 2017 West Virginia Roads and Streets data. Network breaks were set at 3, 5, 10, and 20 miles driving distance from the current grocery retailers.

Map 1 highlights areas lacking grocery access within 10 miles driving distance including areas on the extremities of the area of interest. This result may partially be attributable to exclusion of grocery retailers on or near borders in neighboring counties and states. Yet, there is a sizable area in the center of the 4-county region. Avoiding assumptions about grocery access on the borders where the true effect of grocery locations was not measured, I proposed two locations near the center of the area of interest. Map 2 displays the new service area and network.

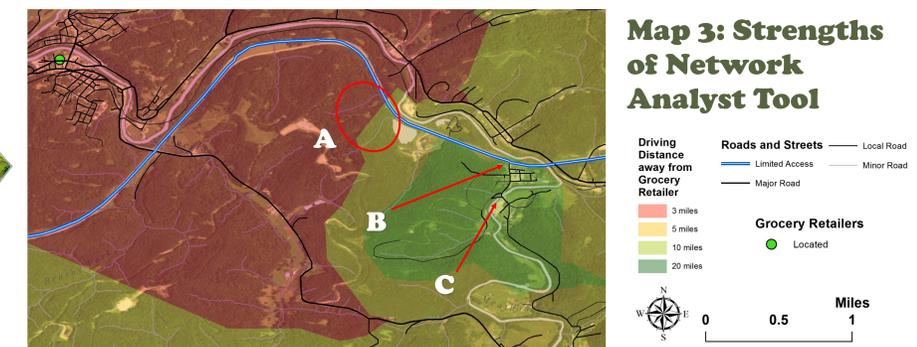
Map 2: Current and Proposed Grocery Retailer Access



Results

In combining the grocery retailer data and roads to create a network analysis and using the 2010 U.S. Census Bureau data for blocks, the model estimates there are approximately 96,859 residents that live in blocks whose centroid is within the 10-mile drive time to a grocery store under conditions simulated in Map 1. By adding two proposed locations simulated in Map 2, the model estimates access for an additional 2,178 residents living in blocks whose centroid is within the new 10-mile drive time, increasing total access to an estimated 99,032 residents.

Spatial Analysis Tools



Inverting layers shows the strengths of network analyst. Map 3 shows a location in Doddridge County. Here, the relationship between local roads (one or two-way traffic), limited access highways (median separation, exits), and bridges can be seen to understand network break definitions. For example:

- A. Two roads in different network breaks within .25 miles Euclidean distance. Drive distance to the store is calculated with consideration to traffic direction and medians.
- B. A highway exit shows how the traffic direction affects the network break and drive distance.
- C. The road crosses a waterbody. Network analyst takes bridges into account to form network breaks. Euclidean distance ignores the factors which humans must take into account.

Limitations

I acknowledge limitations of this spatial analysis:

- I chose arbitrary locations for the new facilities. Further analysis of the proposed locations would be necessary in order to select sites that are suitable (ex. is not private property or conservation land). While this is a major limitation, the goal of this analysis was to determine approximate locations to increase access to grocery stores.
- Despite building additional grocery stores, residents may still choose to travel into larger towns to shop based on personal choice and proximity to other amenities. Adding new grocery stores may reduce travel distance for some residents, population within the area may not be the most critical determinant of grocery store viability.

Conclusions

Using these methods, I was able to model conditions that may simulate current access to grocery retailer with fresh produce in 4-counties of North Central West Virginia and propose two new locations that would increase access for residents of blocks within 10-miles driving distance. The models could be expanded and explored further to analyze site suitability for new grocery retailer locations.

Methods

I used Primary and Code 1 Standard Industrial Classification (SIC) codes from ReferenceUSA to find current grocery retailer locations. If the Primary SIC Code was "Grocers-Retail" or "Food Markets", I assumed these stores would have suitable produce sections.

Primary SIC Code	Code 1
541101	Food Markets
541105	Grocers-Retail

Primary SIC Code	Code 1
531102	Department Stores
531110	Wholesale Clubs
581208	Restaurants

If the Primary Code was "Department Stores", "Wholesale Clubs", or "Restaurants", I used the Code 1 to make a decision whether a location was likely to have a produce section.

One location was a well-known Big Box retailer with Primary and Code 1 as "Department Store". I asked residents in the area if this store had a produce section comparable to grocery stores. With confirmation, it was included in the data. To me, this level of thoroughness was necessary, especially given WV FOODLINK's explanation Big Box retailers' role in the food landscape. Exclusion of the location based on SIC codes could have underestimated access. "Current conditions" reflect 31 locations that are most likely to have acceptable produce selection.

Data & Literature Sources

- All Maps Projected in UTM Zone 17N
- Nourishing Networks, West Virginia Community Food Security Assessment 2016. WV FOODLINK, accessed 20 Dec 2017.
- Grocery Business Data, Published by ReferenceUSA, accessed 11 Dec 2017.
- All Roads and Streets 2017, Published by US Census Bureau Tiger/Shapefiles, accessed 11 Dec 2017.
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- County Boundaries (1:100,000 scale) 2000. Published by NRAC at West Virginia University, accessed 11 Dec 2017.