

Food Access in the City of San Diego

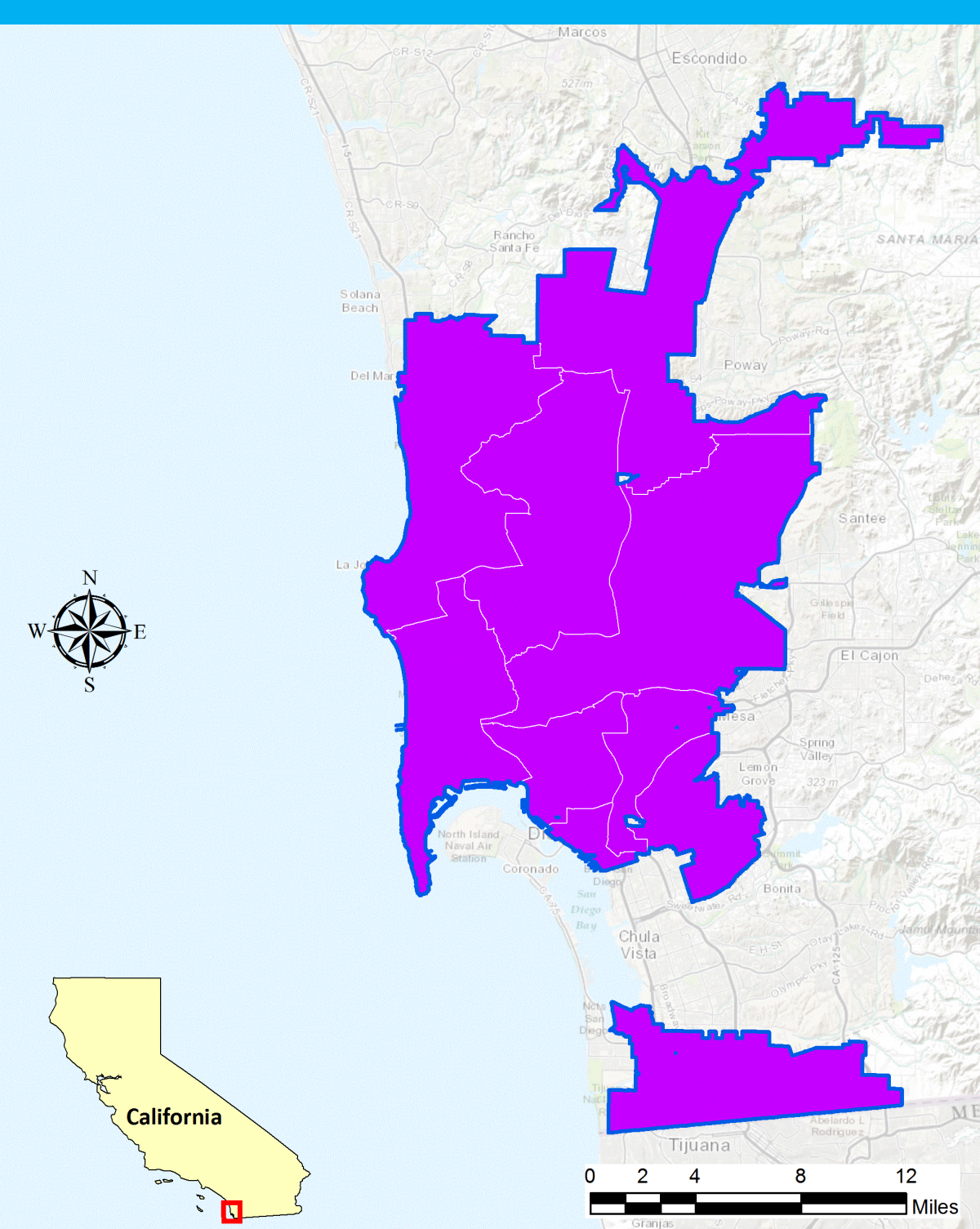
Project Description

Poor access to healthy and nutritious foods has been identified as a major nutritional problem. In order to address the issue of food access it is important to have strong data that identifies the areas that need to be improved in terms of food availability. Many studies have been conducted in order to identify food deserts (areas of little or no access to nutritious food). However many of these studies measure food access by measuring the straight-line (Euclidean) distance between supermarkets or grocery stores and residential areas, and do not take into consideration the state of the streets or possible barriers that may increase the distance between both points. Another weakness in the method is that most studies identify areas of poor access based around the measurement of 1 mile. This distance threshold is effective assuming that most of the targeted population conducts their grocery shopping on foot. However, this does not work accurately in many US states as car ownership rates are high among most sectors of the population and a better and fairer way to measure food access is by measuring driving distances rather than walking distance.

Purpose

The purpose of this project is to measure food access in the city of San Diego, California in a more accurate way; by measuring the distance (1-mile distance and a 10-minute drive) around grocery stores, supermarkets and farmers markets using the street network of city of San Diego.

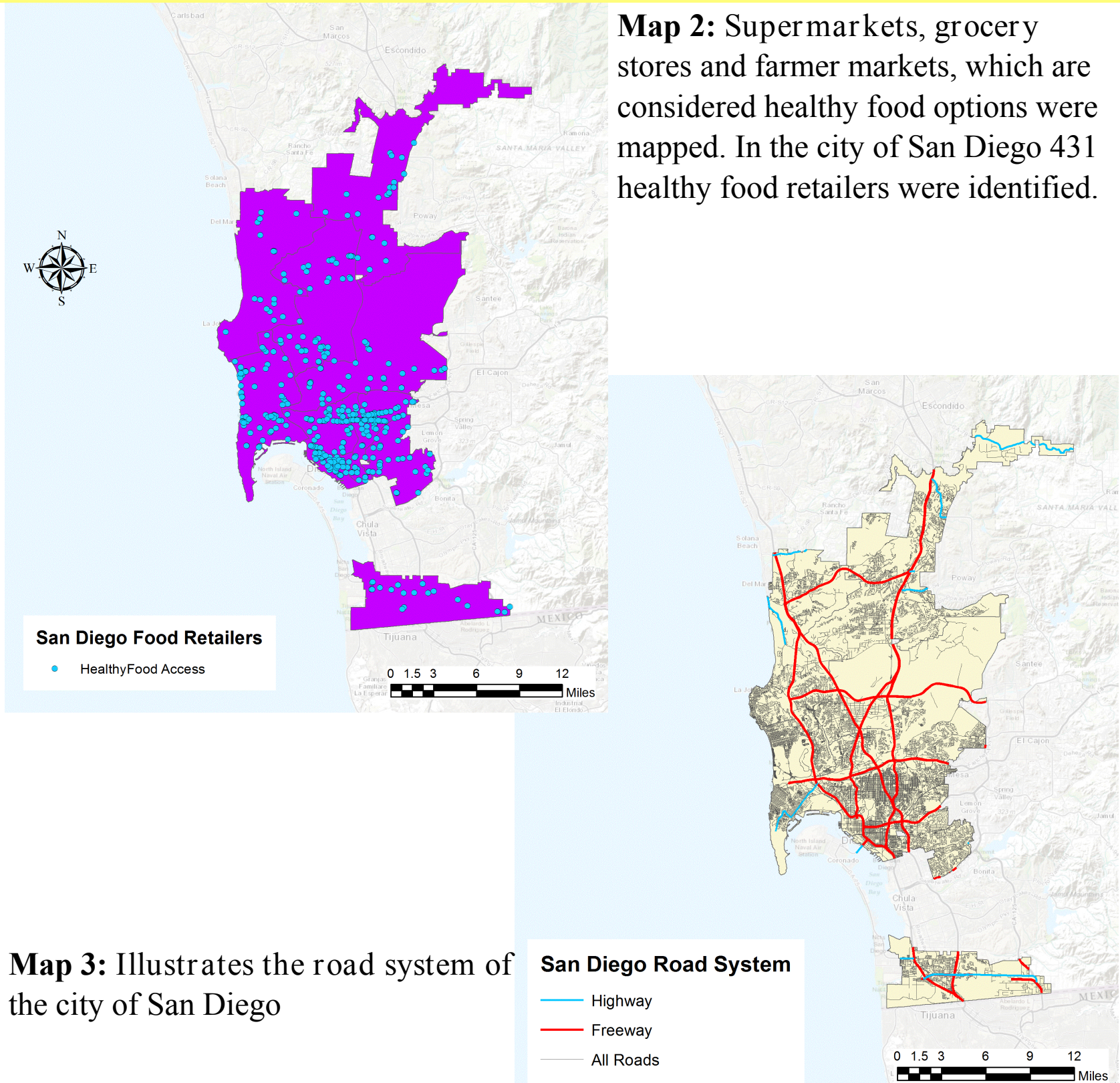
STUDY AREA: CITY OF SAN DIEGO



Map 1: Depicts the area of the City of San Diego and the district divisions.

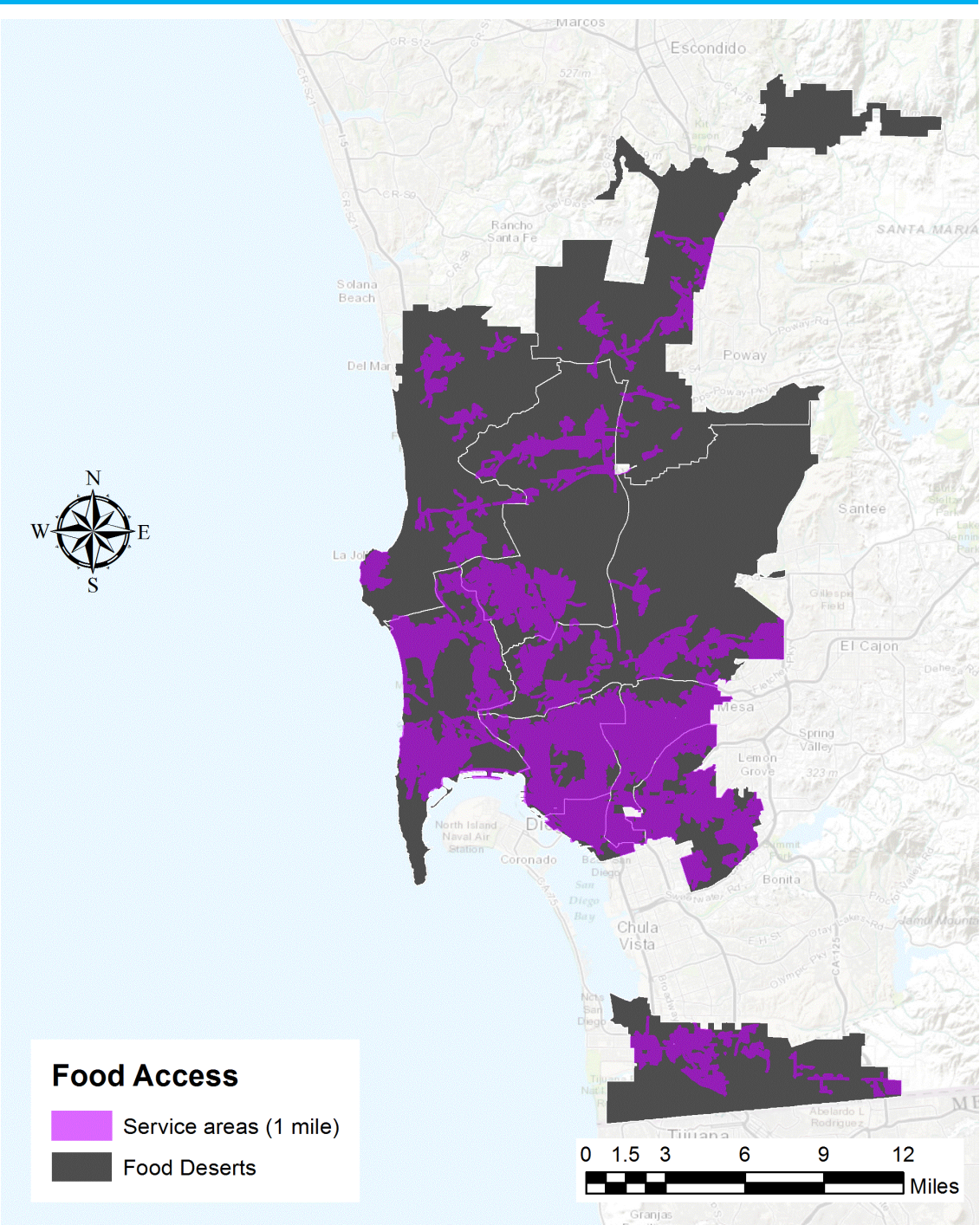
Methods

- A list with the addresses of the supermarkets and grocery stores from San Diego were obtained from ReferenceUSA. And the addresses of farmer markets were obtained from the Farm Bureau San Diego County. These were geocoded using GIS Geocode service.
- A data set with all the roads was obtained from SanGIS. Two different data sets were created from the roads data set in order to conduct two different analyses.
 1. The analysis of 1-mile service areas assumes that people are walking to the supermarkets therefore the data set used for this analysis excludes non-walkable features such as highways and freeways. This is important to maintain a more realistic representation of walkable routes.
 2. The analysis of 10-minute drive service areas uses a data set that excludes walkways and streets with speed attribute equals to zero.



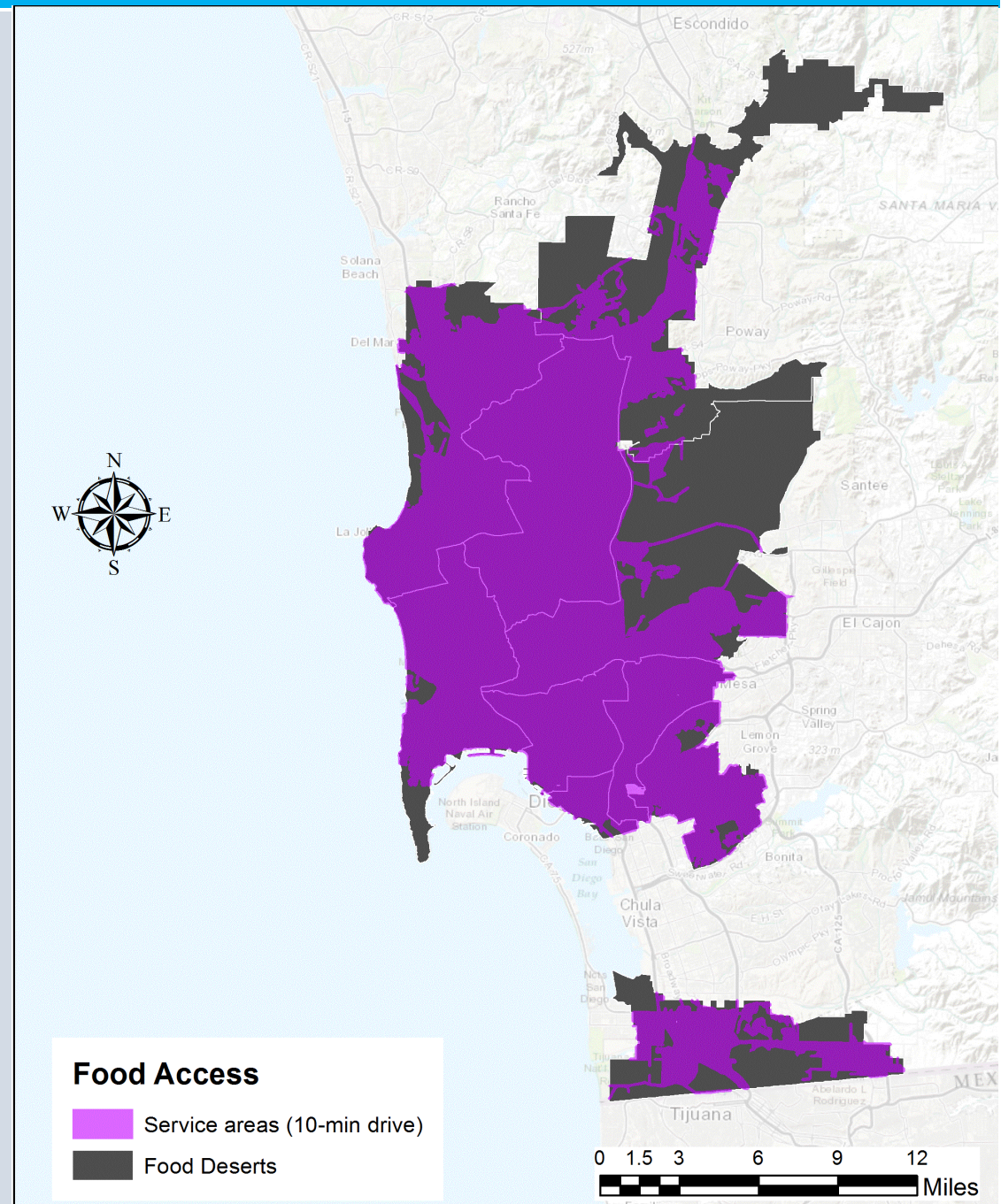
Map 4: Food Access in San Diego — 1-mile Service Area

1. A new network data set was created in ArcCatalog
2. An analysis to identify service areas within 1-mile distance from supermarkets, grocery stores and farmers markets was performed.
 - Load locations of supermarkets, grocery stores and farmers markets as the facilities.
 - Choose the “spit lines at breaks” option in Line Generation
 - Choose “miles” in Accumulation
 - And use 1-mile distance as the default break in the Analysis Settings.
 - Choose overlapping option in the Polygon Generation



Map 5: Food Access in San Diego — 10-minute Drive Service Area

1. A new network data set was created in ArcCatalog. Because this network was used to calculate time a new attribute for “time” was created.
 - In the option to specify the attributes for the network dataset add a new attribute. The new attribute will be created using a formula for time using available attributes of “speed” and “distance”.
2. An analysis to identify service areas within 10-minute drive from supermarkets, grocery stores and farmers markets was performed following the same steps describe above but choosing “time” in Accumulation and 10 minutes as the default break.



Analysis

Maps 4 and 5 illustrate the service areas around supermarkets at 1-mile and 10-minutes respectively. If we were to do only the analysis of 1-mile, which is the distance threshold that many studies use; we would have concluded that the city of San Diego has a great problem of food access. However, because San Diego ownership vehicle rates are so high (96.5% according to 2011 ACS 5 year) it was important to perform an analysis for service areas based on driving time. Map 5 illustrates these service areas. From this map it can be concluded that even though there are areas in San Diego that need to be improved; the food access in the City of San Diego is fairly good.

Future Research

Network analyst is an excellent tool that can be used to measure access to food and identification of food deserts. Even though this study only measure access to food by walking or driving. This analysis can be extended by using other modes of transportation such as cycling or public transportation. This analysis only illustrates the service areas around supermarkets, grocery stores, and farmers markets in the different districts of the City of San Diego. However, further analysis can be done using census tracts or census block group to understand what census tracts/blocks are underserved and the demographic and economic characteristics of these areas.

Limitations

Network Analyst results are more accurate compared to Euclidean measurements. However, network analysis may be a time consuming method depending on the number of facilities and the size of the network.

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Data Sources: Roads—SanGIS 2013; Council Districts— San GIS 2012; Grocery Stores/Supermarkets—Reference USA 2013; Farmer Markets—Farm Bureau San Diego County 2012; Esri Basemaps,



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