Farmers Markets

Site selection for new farmers market sites in the Bay Area. Geospatial analysis conducted for the Farmer's Market Association.

Christopher Prendergast
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Introduction

The Farmer's Market Association, in conjunction with the Bay Area Transit Authority have asked us to identify potential sites for new farmer's markets which will serve food deserts and low income residents.

Attractive potential sites must satisfy the following criteria: -

- Within 1/2 mile of a BART, CalTrain or VTA Light Rail station.
  More than 1 mile from an existing farmers market that accepts WIC or SNAP (food stamps).
  Within 1/2 mile of a food desert.

In addition, the Farmers Market Association would like to reach out with marketing to low income populations within 5 miles of a farmer's market.

We undertook a geospatial analysis to identify attractive potential sites that meet these criteria combining data from ESRI, the USDA, CalEnviroScreen, and the US Census. Our analysis covers the nine Bay Area counties.

Passenger Rail Stations

To find eligible sites, we mapped a 1-Mile exclusion zone around existing farmers markets and identified the passenger rail stations that fall outside this zone. We identified passenger rail stations using a data layer supplied by ESRI. We identified existing farmers markets which accept WIC and SNAP payment using data supplied by the USDA. The map below shows the eligible site we identified as a result of our analysis.
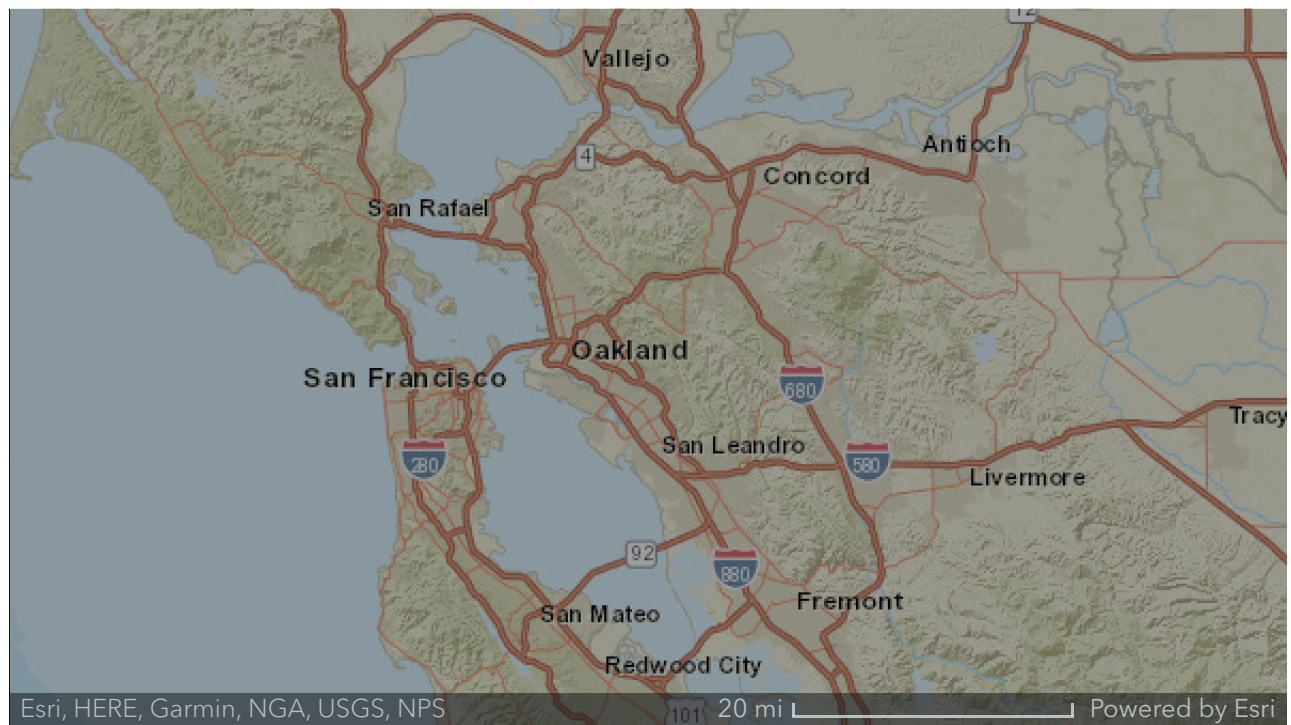
Potential Sites at Eligible Passenger Rail Stations

Food Deserts

We identified food deserts which are census tracts with poor access to food using data supplied by the USDA and US Census. Our analysis was limited to tracts identified by the USDA as being urban. The following map show census tracts which the USDA has designated as having low access to food within a half mile.
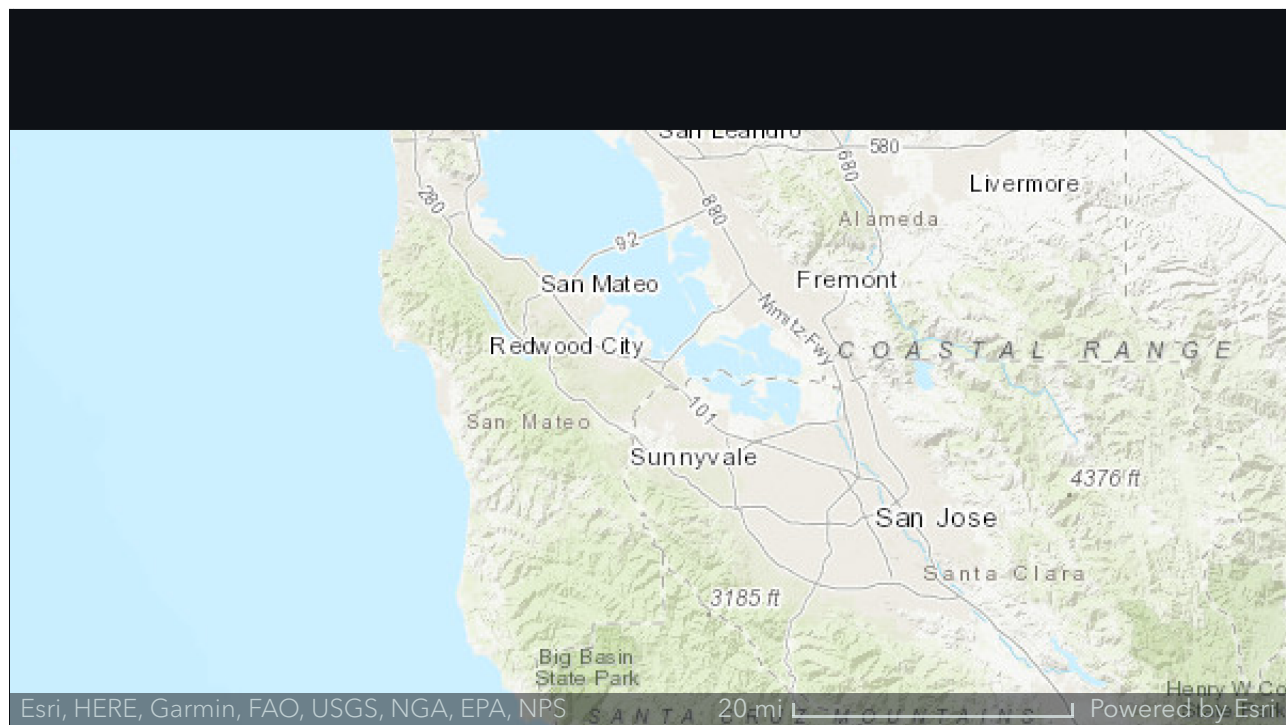
Food Deserts - Census Tracts with Low Access to Food within a Half Mile.
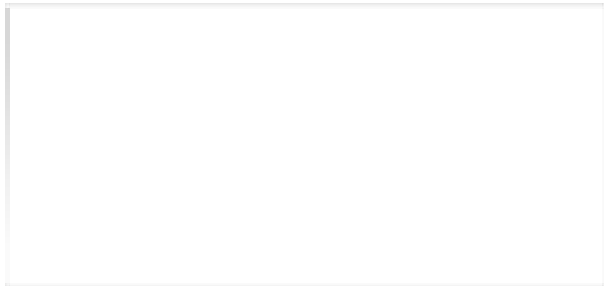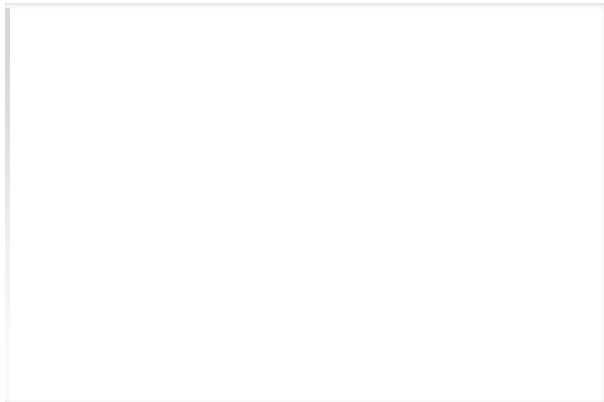
Low Income Areas

We also used the USDA data to identify census tracts designated by the USDA as low income. These census tracts are shown in the map below.
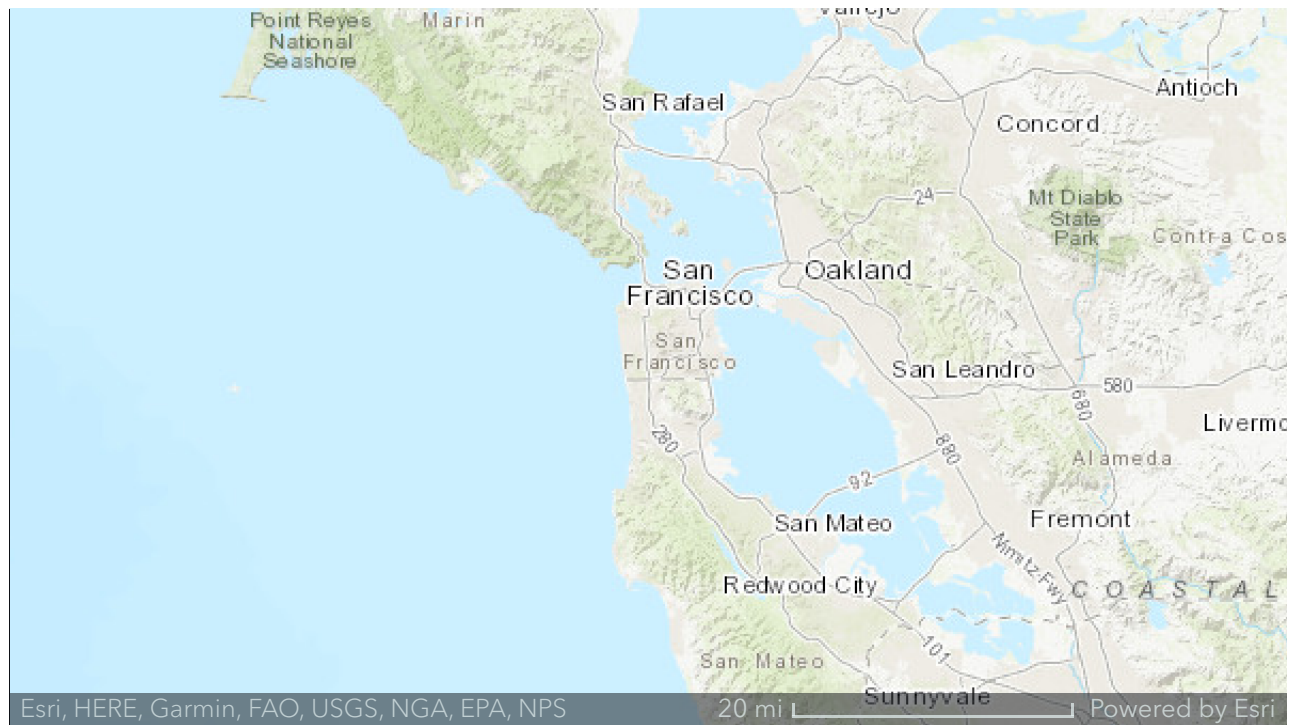
Low Income Census tracts

Low Income Food Deserts

Based on the USDA data we identified census tracts which are both low income and have low food access within one half mile. These low income food deserts are shown in the map below.
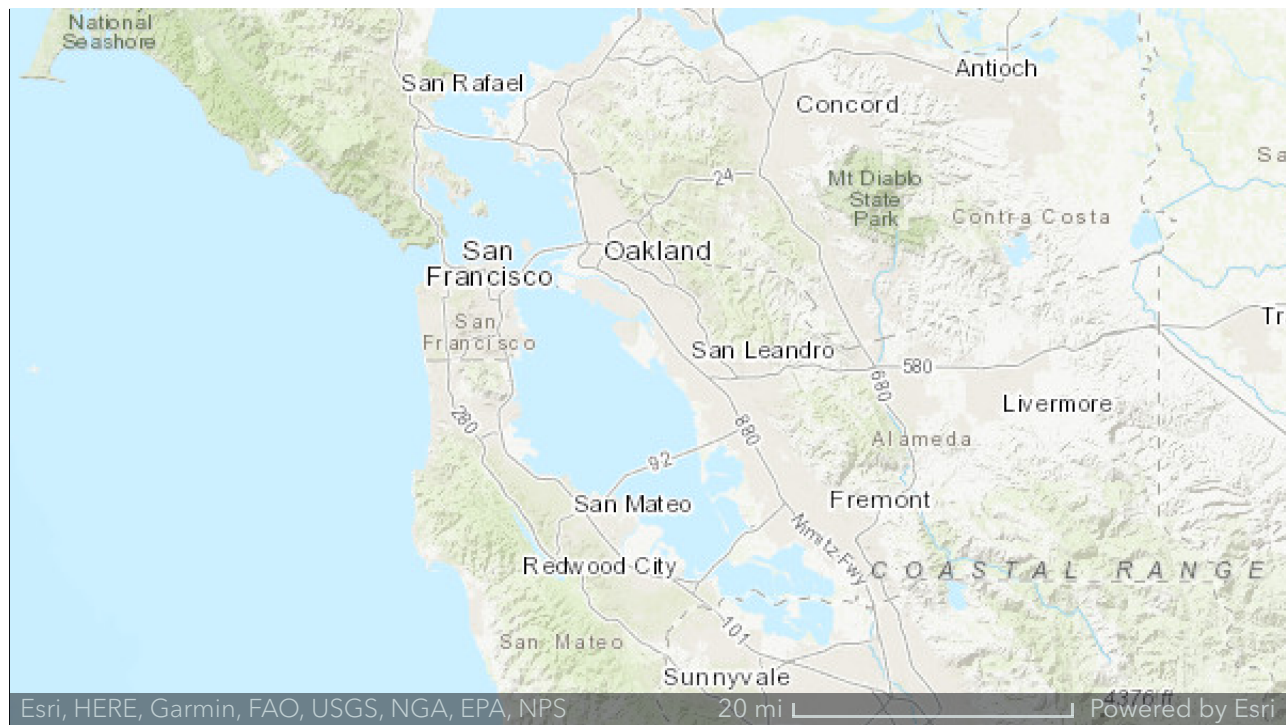
Low Income Food Deserts - Census Tracts
with Low Income and Low Access to Food.

Potential Sites

We identified potential sites for new farmer's markets using the criteria specified above. Each of these sites is located within 1/2 mile of a BART, CalTrain or VTA Light Rail station, and more than 1 mile from an existing farmers market that accepts WIC or SNAP payment. In addition, each of the sites identified is within a 1/2 mile radius of a census tract identified by the USDA as having low access to food within 1/2 mile. The map below shows potential sites for farmers markets which meet these criteria.

Potential Sites for New Farmer's Markets which meet the Specified Criteria.

Top Five Food Deserts

To identify under-served populations, we listed and ranked census tracts identified by the USDA as food deserts with low access (within one half mile) in descending order by the size of their low access populations. We then selected the top five census tracts by the size of their low access poulation and identified eligible passenger rail stations within a half mile radius of these tracts. The map below shows the top five low access census tracts we found and the adjacent passenger rail stations.
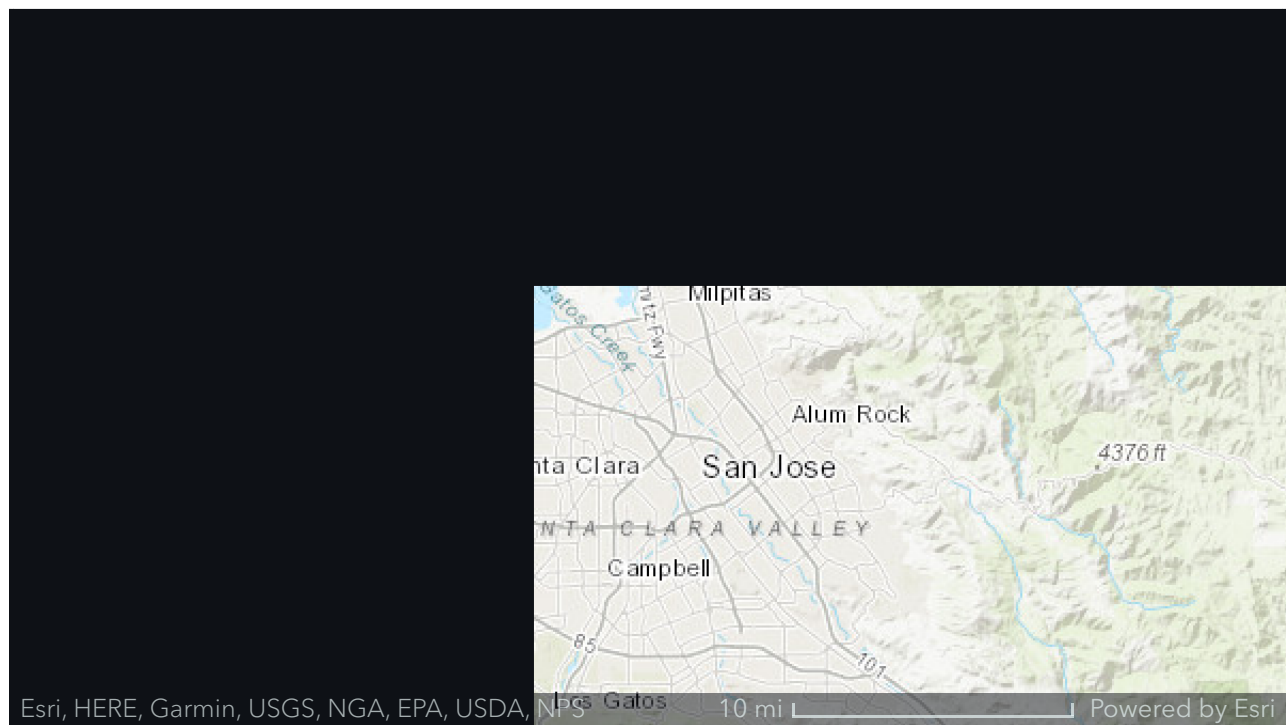
Top Five Low Access

Attractive Potential Sites

As a result of our analysis, we identified the following eighteen passenger rail stations in Fremont, San Jose, Santa Clara, and Sunnyvale. These passenger rail stations offer attractive potential sites for new farmer's markets.

- Caltrain - Blossom Hill Station, CALTRAIN

- FREMONT AMTRAK, Amtrak Capitol Cor. & Reg. Svc

- SANTA CLARA AMTRAK, Amtrak Capitol Cor. & Reg. Svc

- ACE - FREMONT STATION, ACE

- ACE - GREAT AMERICA STATION, ACE

- BERRYESSA STATION, San Jose, Santa Clara VTA

- CAPITOL STATION, San Jose, Santa Clara VTA

- CHAMPION STATION, San Jose, Santa Clara VTA

- COTTLE STATION, San Jose, Santa Clara VTA

- CURTNER STATION, San Jose, Santa Clara VTA

- GREAT AMERICA STATION, Santa Clara, Santa Clara VTA

- LICK MILL STATION, Santa Clara, Santa Clara VTA

- OLD IRONSIDES STATION, Santa Clara, Santa Clara VTA

- PENITENCIA CREEK STATION, San Jose, Santa Clara VTA

- REAMWOOD STATION, Sunnyvale, Santa Clara VTA

- RIVER OAKS STATION, San Jose, Santa Clara VTA

- SANTA TERESA STATION, San Jose, Santa Clara VTA

- TASMAN STATION, San Jose, Santa Clara VTA


Marketing Outreach

The Farmers Market Association would like to reach out with marketing to low income populations within 5 miles of a farmers market. In order to identify low income census tracts for targeted advertising campaigns we conducted an optimized hot spot analysis.

Poverty Hot Spot Analysis

For each census tract, we calculated the population living in poverty from CalEnviroScreen data as follows: we multiplied the total population of the tract by the percentage of the population in that tract living below two times the federal poverty level. We then conducted an optimized hot spot analysis to identify poverty hot spots in the Bay Area. From this analysis we selected census tracts with a score of greater than or equal to 3. The map below shows the results of our poverty hot spot analysis.


Esri, HERE, Garmin, FAO, USGS, NGA, EPA, NPS   20 mi   Powered by Esri
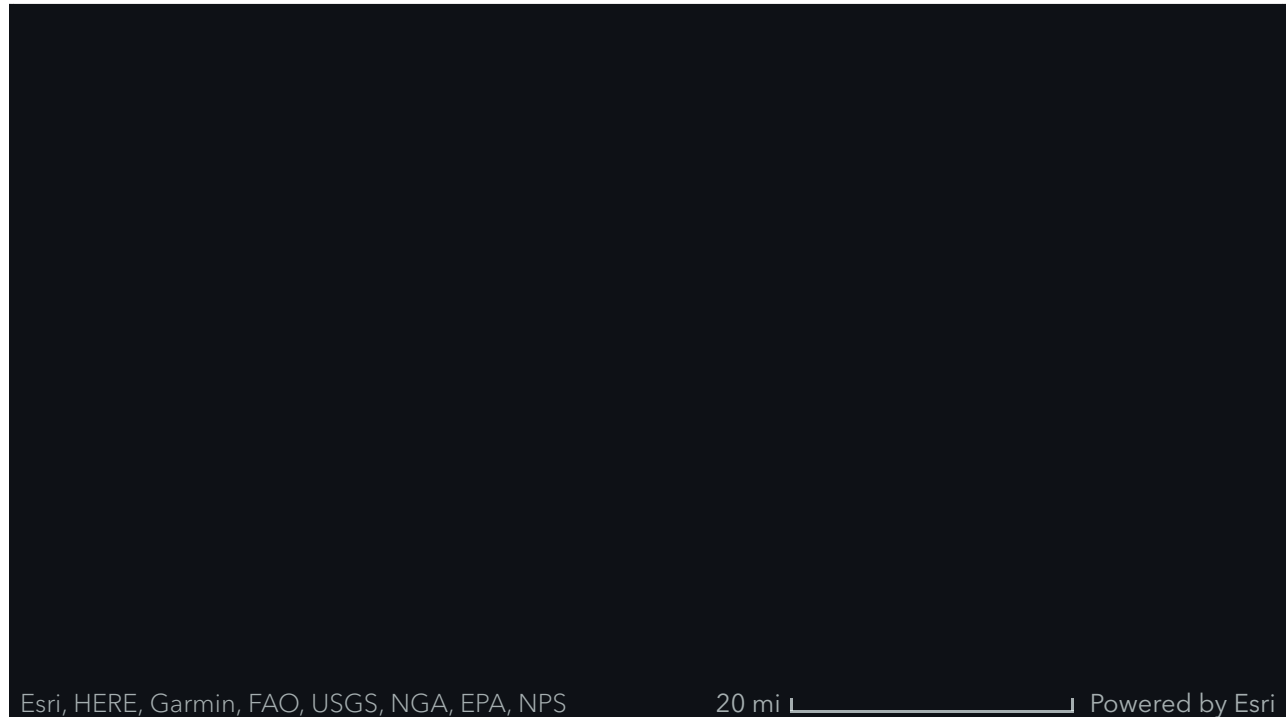
Poverty Hot Spots - Census tracts with a hot spot score of greater than or equal to 3.

Target markets

We used CalEnviroScreen data to identify low income target census tracts within a five mile radius of the eighteen passenger rail stations we identified above. The population living in poverty for each tract calculated from the CalEnviroScreen data. From this analysis, we identified 270 target census tracts for marketing outreach focused on low income residents. The greatest concentration of target low income census tracts is around downtown San Jose. There is a smaller cluster of target tracts in Fremont. The map below shows census tracts which form the

target audience for advertising aimed at low income residents. For reference, the poverty hot spot map is shown as an overlay.
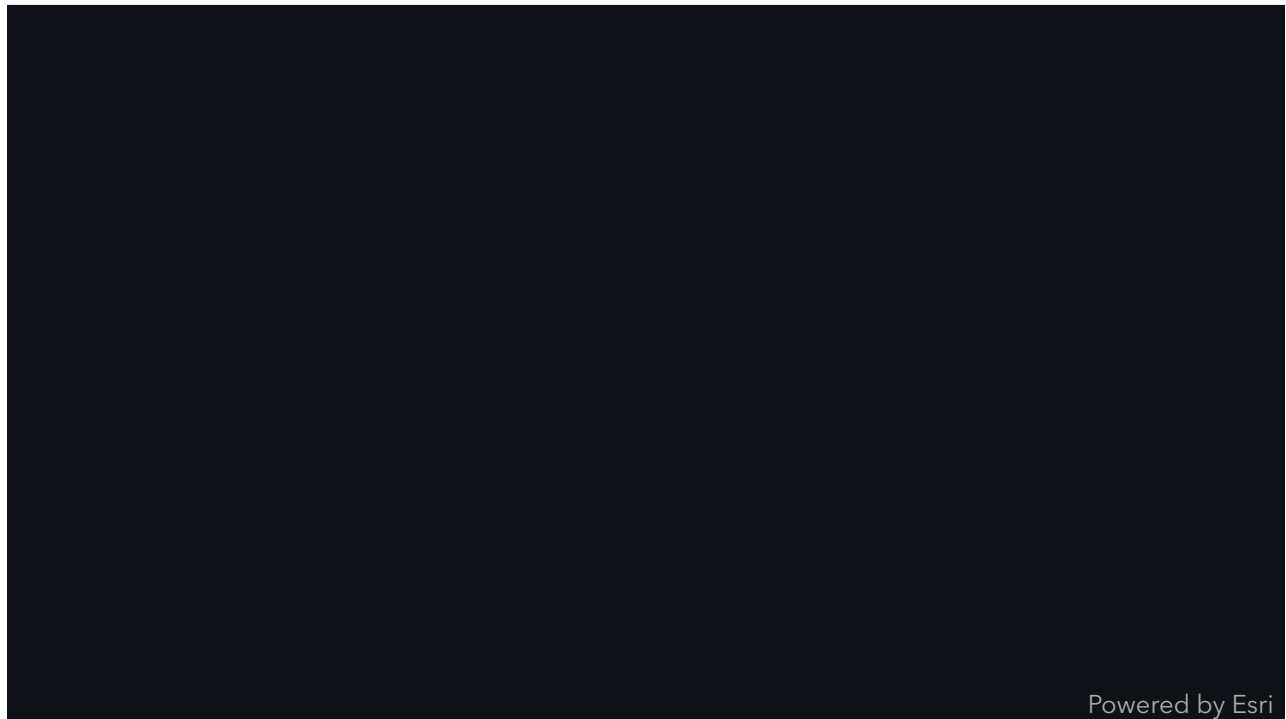
Marketing Outreach - Target Census Tracts
Identified by Population Living in Poverty.

Top Five Target Tracts

Our analysis identified the top five census tracts for low income marketing outreach as follows:-

Rank, Census Tract, Location, Percentage living on Poverty, Total Population, Population Living in Poverty

1. 5120.17, San Jose, 37.2%, 7804, 2903
   5035.08, San Jose, 46.3%, 6219, 2879
   5034.02, San Jose, 52.3%, 5263, 2752
   5040.02, San Jose, 45.2%, 5875, 2655
   5033.05, San Jose, 43.7%, 6069, 2652

Conclusion

Results of Geospatial Analysis

We conducted a geospatial analysis to identify attractive potential sites for farmer's markets which meet the criteria specified for proximity to passenger rail stations, distance from existing farmers markets, and proximity to food deserts. From this analysis we developed a list of eligible passenger rail stations. Using this list of eligible passenger rail stations, we selected a subset of eighteen stations in Fremont, San Jose, Santa Clara, and Sunnyvale based based on their proximity to the top five food deserts with the greatest number of residents identified by the USDA as having low access to food within half a mile. We then developed a list of low income census tracts within a five mile radius of the selected stations based on CalEnviroScreen poverty data. This list will form the basis for future marketing outreach and advertising campaigns designed to reach low income populations.

Recommendations

We recommend that the Farmer's Market Association, in conjunction with the Bay Area Transit Authority, review our analysis and further refine the list of eighteen passenger rail stations we identify as attractive sites for future farmer's markets. This may require the potential sites to be ranked by additional criteria including availability, feasibility, and viability.

Further Study

When additional information on the availability, feasibility, and viability of individual sites becomes available, we recommend that a further geospatial analysis be conducted to rank the attractiveness of the potential sites against these criteria. In addition to the optimized hot spot analysis we performed to identify census tracts with populations living in poverty, we recommend

conducting a weighted overlay analysis to use additional criteria from the USDA and CalEnviroScreen data to further rank the potential sites in order of attractiveness.

Data Sources

Our analysis used the following data sources: -

- Farmers markets registered with the USDA. We used this data to identify existing farmers markets which accept WIC and SNAP payment and exclude sites from the list of eligible passenger rail stations.
  BART, CalTrain, Light Rail and ACE stations in 2019 Passenger Rail stations database. We used this layer provided by ESRI in the ArcGIS Online's living atlas was used to identify the locations of BART, CalTrain or VTA Light Rail station in the Bay Area.
  USDA food deserts. We used the data for populations with low access withing a half mile to identify food deserts in the Bay Area.
  Tiger line files. We used this US Census data to defines the census tracts used in our analysis.
  Cal EnviroScreen 3.0 Data. We used this data to identify populations living in poverty and locate census tracts for targeted marketing.

Credits

CalEnviroScreen, ESRI, USDA, US Census