Caltrans Transportation Equity Index (EQI) Version 1.0 Documentation

March 2024

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Introduction

The California Department of Transportation (Caltrans) acknowledges that communities of color and under-served communities have experienced fewer benefits and a greater share of the burdens associated with California's transportation system. These disparities largely reflect a history of transportation decision-making, policy, processes, planning, design, and construction that has quite literally put-up barriers, divided communities, and amplified racial inequities, particularly in Black and Brown neighborhoods.[1]

To operationalize Caltrans' commitment to equity, the department developed the Caltrans Transportation Equity Index (EQI). The EQI is a spatial screening and evaluation tool that utilizes multiple transportation-specific and socioeconomic indicators to identify transportation-based priority populations at the Census block level.

Many tools exist to evaluate the impact of the built environment on equity. However, these tools typically consider a wide range of factors that are not explicitly focused on burdens caused or exacerbated by the transportation system.

Caltrans aims to bridge this gap with the EQI to inform how the department can best address and mitigate inequities exacerbated by the transportation system.

Broadly speaking, the EQI will be used for the following Caltrans purposes:

1. Identify transportation-based priority populations for applicable funding programs (e.g., Reconnecting Communities: Highways to Boulevards Pilot Program).
2. Provide guidance to improve the analysis of project impacts and identify opportunities to advance equitable outcomes during project planning, development, and design.

Additionally, the EQI is designed in a manner to support partner agencies and other entities who may voluntarily use the EQI to analyze impacts and evaluate the effectiveness of various transportation projects and solutions.

[1] Caltrans Equity Statement December 2020

EQI Concept

The EQI contributes to the advancement of spatial analysis tools and methods by using Census blocks instead of larger geographies (such as Census tracts), thereby enabling a more granular level of analysis. Given the nature of transportation indicators, this level of granularity is necessary because an indicator can have significant variance within a larger geography. This granular design allows the EQI to assess neighborhood-scale impacts of transportation.

The EQI only includes variables with spatial significance, meaning their distribution across the state is directly related to the spatial nature of the state's transportation system. Central to the EQI's purpose is the identification of transportation-based priority populations. This requires spatially significant data that does not have a uniform distribution throughout a geographic area. If the top 20% of Census blocks were screened using an indicator with a uniform distribution, approximately 80% of the population impacted by the indicator would be excluded. For example, indicators such as age tend to be less spatially clustered than median household income. While such indicators may be important when considering transportation equity, they require different approaches and are less useful in a spatial index such as the EQI. The use of thresholds with spatially significant indicators means that geographies screened for inclusion contain a higher share of burdened populations. This—however—does not preclude the use of non-spatial equity data in other Caltrans processes and decisions.

Lastly, the EQI relies on both publicly available and internally developed datasets, including:

- Household income data from the U.S. Census Bureau American Community Survey (ACS) 5-year estimates
- Tribal lands data from the California Office of Environmental Health Hazard Assessment (OEHHA)
- Traffic proximity/volume data from Caltrans and the United States Department of Transportation (USDOT)
- Crash data from the California Highway Patrol and UC Berkeley Safe Transportation Research and Education Center (SafeTREC)
- Access-to-destinations data from Caltrans tools and analysis

EQI Screens

Three distinct screens are included in the EQI, each intended to identify and address specific transportation-related equity issues.

- **Traffic Exposure Screen:** The Traffic Exposure Screen identifies low-income and or Tribal land Census blocks that bear a negative traffic burden as measured by proximity, volume, and vehicle type for all interstates, highways, principal arterials, and minor arterials in the state — or a negative safety burden as measured through a statewide crash exposure calculation. The screen identifies Census blocks for inclusion with traffic proximity and volume at or above the 80th percentile and or blocks with a crash exposure score at or above the 80th percentile. Traffic exposure is used as a proxy for multiple environmental burdens, including diesel particulate matter, diesel exhaust, noise, and traffic safety impacts on communities.
- **Access to Destinations Screen:** The Access to Destinations Screen identifies low-income and or Tribal land Census blocks with poor relative multimodal access to destinations. This screen includes three unique access to destinations indicators, designed to evaluate gaps in transit access, bicycle access, and pedestrian access. The transit indicator measures the ratio of transit access to destinations to congested[2] auto access to destinations. Blocks with a ratio less than 0.12 are screened for inclusion as having poor relative transit access to destinations. The analysis is run separately for both work and non-work destinations and the block is screened for inclusion if the threshold is met for either destination type. The bicycle indicator measures the ratio of bicycle access to destinations[3] on the low-stress network to bicycle access on the high-stress network[4]. Blocks with a ratio less than 0.6 are screened as having relatively poor low-stress bicycle access to destinations. The pedestrian indicator measures the ratio of pedestrian access to destinations to "ideal" access to destinations, where crows-fly[5] calculations are used to calculate travel times instead of the actual network. Blocks with a ratio below 0.6 are screened as having relatively poor pedestrian access to destinations. Poor

[2] Auto access calculated during the A.M. peak period, accounting for roadway congestion.
[3] Currently, the bicycle and pedestrian access-to-destinations indicators are only calculated for non-work destination types, reflecting shorter, non-work trips commonly taken by bike or foot.
[4] For a discussion on bicycle level of traffic stress, see this blog post: https://blog.altaplanning.com/level-of-traffic-stress-what-it-means-for-building-better-bike-networks-c4af9800b4ee
[5] https://en.wikipedia.org/wiki/As_the_crow_flies

multimodal access to destinations leads to higher transportation costs and fewer reachable destinations via non-auto modes.[6]

- **Transportation-Based Priority Populations Screen:** The Transportation-Based Priority Populations Screen includes both the Traffic Exposure Screen and Access to Destinations Screen and identifies the transportation-based priority populations of the state that are the most burdened by traffic exposure but also benefit the least from the multimodal transportation network (as measured by access to destinations). It is important to note that while this screen looks at where the transportations burdens and lack of benefits intersect, it may be more appropriate to use the Access to Destinations Screen or Traffic Exposure Screen depending on the specific use case. Moreover, if a given block is only screened by the Access to Destinations Screen or Traffic Exposure Screen---but not the Transportation-Based Priority Population Screen---it does not necessarily mean that the block is less-disadvantaged than one screened by the Transportation-Based Priority Populations Screen, only that it did not meet the screening thresholds for both Traffic Exposure and Access to Destinations.

[6] https://htaindex.cnt.org/about/HTMethods_2016.pdf

EQI Limitations

The EQI was designed to assess specific transportation-related equity issues and therefore has limitations that are important to highlight:

- **Cumulative Burdens:** The EQI focuses somewhat-narrowly on transportation-related burdens (including traffic proximity and volume, crash exposure, and lack of multimodal access to destinations). The EQI does not explicitly measure other non-transportation burdens (such as agricultural emissions). Instead, the EQI measures traffic proximity and volume as a proxy for transportation-specific emissions, as well as other externalities such as noise. Other tools, such as CalEnviroScreen, include a wider range of indicators, including many non-transportation indicators, that are useful in assessing the cumulative burdens that a transportation project may generate. While the EQI is tailored to analyze specific transportation-related equity issues, other tools remain valuable for assessing the non-transportation burdens that transportation projects may exacerbate.
- **Transportation Access:** The EQI includes several access-to-destinations indicators that are designed to assess gaps in multimodal access. Broadly speaking, access to destinations is a transportation and land use metric, and both transportation and land use changes can improve (or worsen) access to destinations. The access-to-destinations indicators included in the EQI are designed to address two specific issues that arise when assessing access at a statewide scale: 1) The significant variance in the number of work and non-work opportunities across various regions of the state, and 2) the fact that this variance is, in large part, explained by land use (i.e., lack of destinations in a particular area). With these factors in mind, the EQI uses ratios[7] to measure the relative access of a given geography. These ratios also isolate the transportation side of the transportation – land use dynamic, measuring where (and to what extent) gaps in the transportation network create access barriers.
  While this approach is useful in analyzing gaps in access attributable to transportation, it doesn't account for general lack of services. For example, essential medical services may take hours to drive to in a rural area. However, very few transportation investments would improve this situation; closer medical facilities would. Though the EQI focuses narrowly on transportation-attributable access gaps, broader land use issues are still important to consider when analyzing equity.

[7] Discussed in more depth on page 16.

- **Indicator Selection**: There are a wide range of transportation and non-transportation related indicators not included in the EQI version 1.0. These indicators were not included for three primary reasons:
  1) **Transportation Nexus:** Indicators without a direct transportation nexus were not included in the EQI, even if they were broadly related to equity and or environmental justice. Furthermore, many of these indicators (such as exposure to lead and wastewater toxins) are included in other equity screening tools such as CalEnviroScreen and the Climate and Economic Justice Screening Tool (CEJST). The EQI aims to maintain a narrow focus on transportation-specific indicators that have a direct nexus to measurable outcomes related to the Caltrans' work. Use of other tools such as CalEnviroScreen is recommended for broader environmental justice analysis.
  2) **Spatial Significance:** Only spatially significant indicators were included in the EQI. All transportation-specific indicators included in the EQI are spatially significant in that their status is largely a function of their spatial relationship to the transportation system (e.g., areas further away from public transit have lower multimodal access to destinations). Socioeconomic data was also evaluated for its spatial significance. Census blocks that are low-income tend to be clustered together, and these neighborhoods have often been underinvested in. Other indicators, such as disability status, are crucial for analyzing transportation equity, but are not spatially clustered like income.
  3) **Spatial Granularity:** Indicators that could not be measured at the appropriate level of spatial granularity to effectively assess transportation equity outcomes were not included in the EQI. Many socioeconomic datasets are only available at the Census tract level. While tract sizes are small in highly urbanized areas, they are very large in suburban and rural areas. To effectively measure outcomes and prioritize infrastructure investments such as ADA-compliant sidewalk gap closures, more granular data is needed since the variance of a given indicator within the scale of a Census tract can be large.

The lack of certain indicators in the EQI does not imply that these transportation equity issues are less important or not a priority for Caltrans. Rather, there are many transportation equity indicators which are simply not well suited for a spatial analysis tool such as the EQI and should be addressed and analyzed through other methods.

EQI Data Sources and Methodology

The EQI consists of three primary components:

1. Demographic/socioeconomic indicators focused on household income and Tribal land status.
2. Traffic indicators measuring traffic proximity and volume and crash exposure.
3. Three access-to-destinations indicators, measuring gaps in transit, bicycle, and pedestrian access to work and non-work destinations.

2020 Census blocks are the geographic unit of measurement used in the EQI. All indicators are either measured at the block level or interpolated to the block level from the block group level.

Demographic Indicators

All EQI screening scenarios include two indicators measuring low-income status and Tribal land status. If either criterion is met (as outlined below), the block is screened for inclusion for further analysis with the transportation-specific indicators (traffic exposure and access to destinations).

Income Data

To determine a block's status as either 'low-income' or 'not low-income,' two measures are used in alignment with AB 1550. A Census block group was designated as a 'low-income' community if either 1) its median household income[8] is at or below 80% of the statewide median household income, OR 2) its median household income is at or below the 2021 county low-income limit[9] established by the California Department of Housing and Community Development. If either criterion is met, the block group is identified as a low-income community and screened for inclusion for the demographic overlay. Block group income data is joined to Census block data using the GEOID20 ID in both datasets. It is important to note that US Census household income data is not available at the block level, so block group-level data is used. For the purposes of the EQI, a block is assumed to have the median household income of its parent block group. Appendix 3 shows the low-income limit by county and average household size.

[8] Median household income was retrieved from the US Census Bureau API using 2021 ACS 5-year estimates table B19013_001.

[9] For the county low-income limit, the average household size was retrieved for each block group using the 2020 ACS 5-year estimates B25010_001 table and used to find the appropriate household-size-adjusted low-income limit.

Tribal Lands

If a Census block is within or touches Tribal land, as identified in the 2022 SB 535 Disadvantaged Communities definition, it is automatically screened for inclusion in the demographic overlay, regardless of its household income status. A complete list of Tribal lands used in the EQI can be found in Appendix 4.

Traffic Exposure Indicators

The EQI utilizes two sets of traffic exposure indicators: 1) traffic proximity and volume from the highway system and arterial roads in the state and 2) Census block-level crash exposure based on crash history.

Traffic Proximity and Volume Data

1. **Input Data:** Highway Performance Monitoring System (HPMS) data is used and accessed via the Bureau of Transportation Statistics for this analysis. This spatial dataset contains all roads in the United States and car and truck Average Annual Daily Traffic (AADT) for highways and arterials. Before spatial calculations are performed, a new truck weighted AADT value is calculated, where truck AADT is weighted six times heavier than car AADT, reflecting the respective PM2.5 emission factors from trucks versus cars.
2. **Traffic Exposure Python Script:** Using the data described in the previous step as the input, a Python script[10] is used to calculate block-level exposure. The script performs the following steps:
    a. A buffer is created around each road segment at a specified distance.
    b. That buffer is intersected with Census blocks.[11]
    c. For each block, the maximum truck weighted AADT value for a given route is selected. In some cases, there is overlap between buffers for the same route, so the maximum truck weighted AADT value is used.
    d. For blocks with truck-weighted AADT exposure from multiple routes, the separate truck-weighted AADT exposure values are summed to capture the additive impact of proximity to multiple facilities.
    e. Steps a-d are repeated for all specified radii.
    f. A CSV file with the cumulative truck weighted AADT exposure for each Census block at each specified radius is exported.
3. **Post-Processing in R:** After the traffic exposure data are created in ArcGIS/Python, a simple R script is used to create traffic exposure bands

[10] https://github.com/hhmckay/Caltrans-Equity-Index-EQI-

[11] 2020 Census blocks were used in this version of the EQI.

and apply decay weights[12], finalizing the traffic exposure data for inclusion in the EQI. First, the script creates individual traffic exposure bands for a given radius by subtracting the cumulative truck weighted AADT of all narrower radii from a given radii. Once these unique bands are created, each value is decay weighted, and the resulting decay-weighted values are summed to create a final block-level traffic exposure value. For this version of the EQI, ten radii are used [500 meters, 450 meters, 400 meters, 350 meters, 300 meters, 250 meters, 200 meters, 150 meters, 100 meters, and 50 meters] and the corresponding inverse-distance decay weights include: [0.1, 0.11, 0.125, 0.14, 0.166, 0.2, 0.25, 0.25, 0.33, 0.5, and 1]. Using this approach, traffic exposure occurring closer to the linear source was weighted heavier than traffic exposure occurring further away. Figure 1 shows the relationship between distance and decay weights used for the traffic proximity and volume indicator. Lastly, a percentile rank value is calculated for each traffic exposure score, with any block scoring above 0.8 being screened for inclusion.

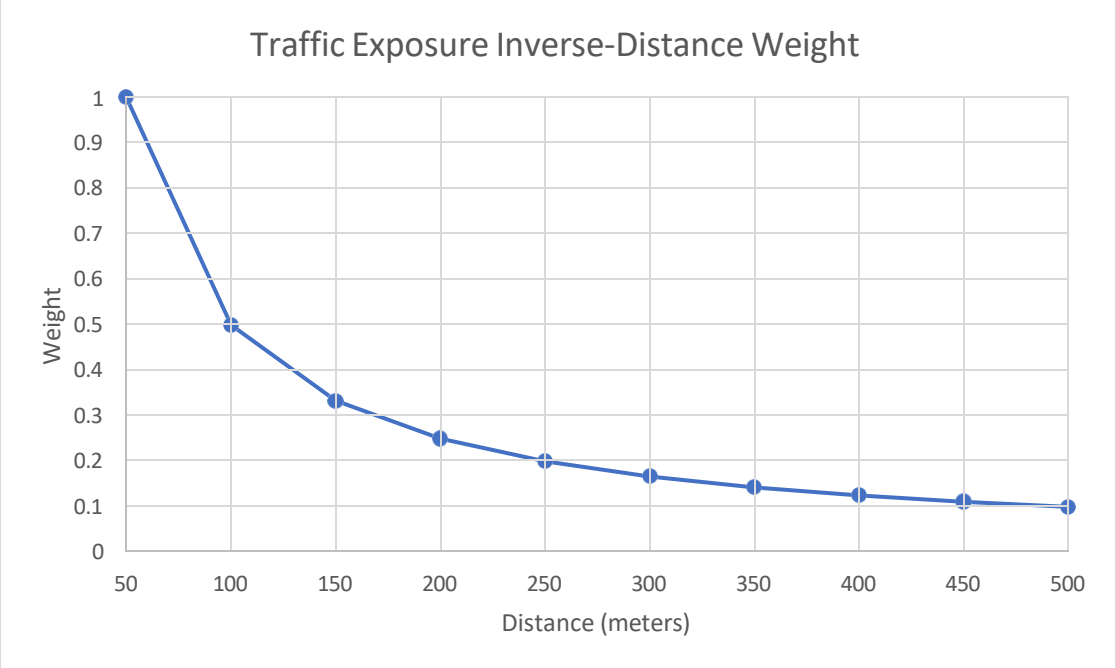

Figure 1. Traffic Proximity and Volume Weight

[12] Decay weighting is a quantitative method of giving some elements in a set more weight or influence than others, based on certain characteristics. In the EQI, decay weights are representative of spatial distance, discounting elements occurring further from the point being measured.

Crash Exposure Data

1. **Input Data:** The EQI's crash exposure indicator uses data from the Transportation Injury Mapping System (TIMS) developed by the UC Berkeley Safe Transportation Research and Education Center (SafeTREC).[13] This data is derived from the Statewide Integrated Traffic Records System (SWITRS), maintained by the California Highway Patrol. For the EQI, a five-year window of the most-recent non-provisional data is used.
2. **Data Cleaning and Weighting:** The EQI crash exposure indicator only considers crashes resulting in injuries or fatalities, so property damage-only crashes are filtered out. Each crash is subsequently weighted by the highest level of injury in the crash. Weighting factors are derived from the Cal-Benefit-Cost model[14] and remain consistent with the costs used in other Caltrans benefit-cost analyses. The following weighting factors are used:
    - Injury (minor): 1
    - Injury (moderate): 1.96
    - Injury (severe): 7.19
    - Fatality: 157.97

    The EQI crash exposure indicator excludes crashes that occur on closed-access highways, as these crashes are less spatially relevant to their surrounding communities than crashes occurring on local roads or main street sections of the highway network. State Highway System (SHS) bicycle access status is used to determine highway access status, with crashes being removed from sections of the SHS with prohibited bicycle access. Crashes occurring on highway ramps are kept in the dataset since ramp crashes have a greater impact on local traffic and safety. Figure 2 visually depicts which crashes are removed from or kept within the dataset for the Sacramento region as an example.

[13] https://tims.berkeley.edu/

[14] https://dot.ca.gov/programs/transportation-planning/division-of-transportation-planning/data-analytics-services/transportation-economics

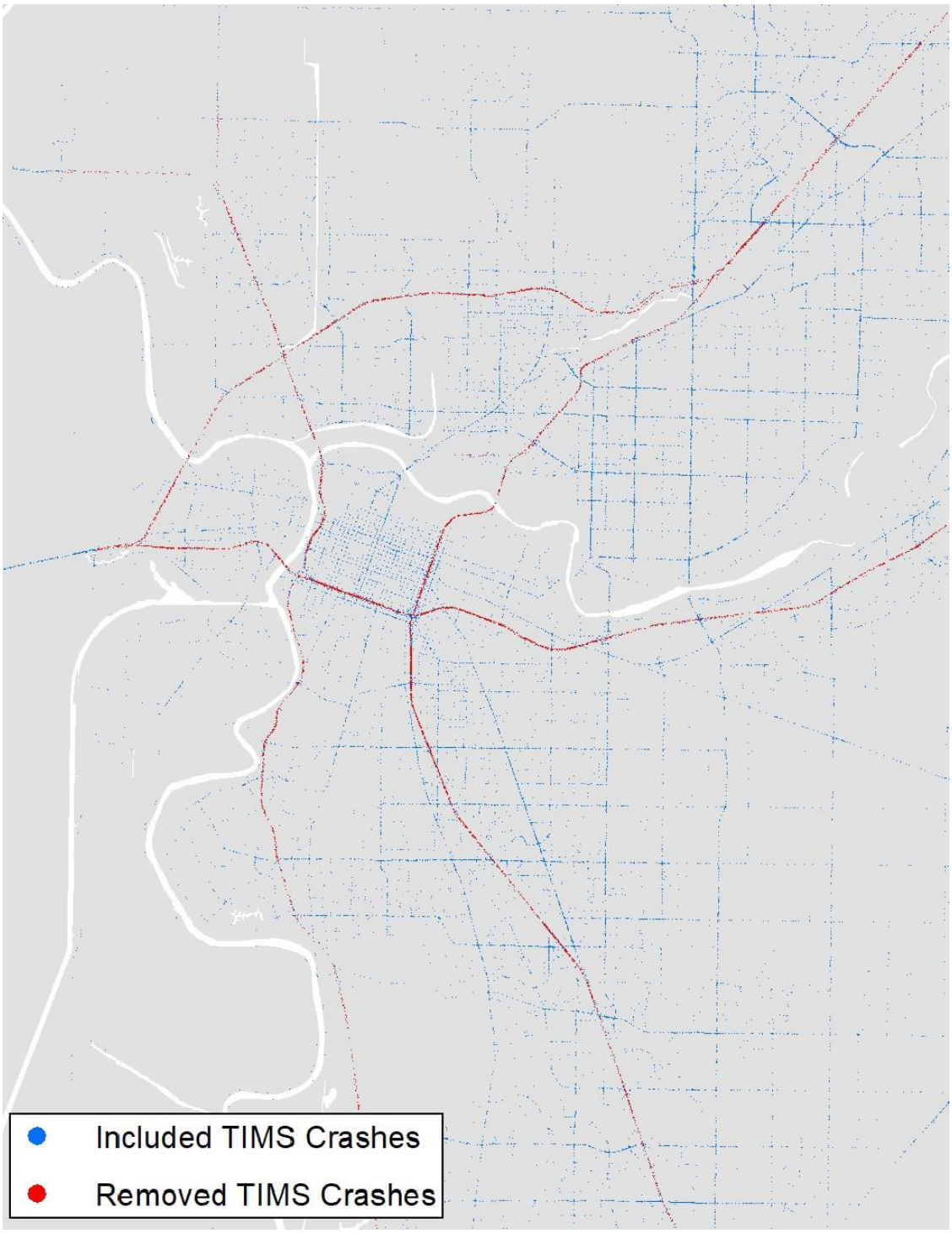

Figure 2. TIMS crash data in Sacramento, CA

3. **Data Aggregation:** Once crash data is processed and weighted, crashes are mapped and aggregated to Census blocks. A 250-foot buffer is applied around each Census block, and all crashes within that block (and surrounding buffer) are included in the block score. Since many block boundaries run along roads, crashes occurring along those roads should be associated with all immediately surrounding blocks, not just the block on the side of the road where the crash occurred. A 250-foot buffer is used since this is the approximate diagonal distance across a large intersection and is a standard buffer distance for intersection safety screening.
   The weighted crash values for all crashes occurring in the block and surrounding 250-foot buffer are summed and divided by the area of the Census block (in square miles) to calculate a density score for every Census block in the state. Lastly, a percentile rank is calculated for every Census block with a land area greater than zero and a demographic overlay score. Blocks at or above the 80th percentile are screened for inclusion.

Access-to-Destinations Indicators

The EQI measures multimodal access to destinations at the Census block level using internal Caltrans tools and analysis methods. The EQI includes three unique access-to-destinations indicators, meant to identify gaps in transit access to destinations, bicycle access to destinations, and pedestrian access to destinations.

1. **Transit Access to Destinations:** The transit indicator is calculated as the ratio of travel time-weighted transit access to destinations to travel time-weighted congested auto access to destinations. This indicator is calculated for both work and non-work destinations and is focused on more regional-scale trip-making. Blocks with a ratio below 0.12 are screened as having poor relative transit access to destinations.
2. **Bicycle Access to Destinations:** The bicycle indicator is calculated as the ratio of travel time-weighted low-stress bicycle access to destinations to travel time-weighted high-stress bicycle access to destinations. This indicator is calculated for non-work destinations and is focused on more localized trip making. Blocks with a ratio below 0.6 are screened as having poor relative bicycle access to destinations.
3. **Pedestrian Access to Destinations:** The pedestrian indicator is calculated as the ratio of travel time-weighted pedestrian access to destinations to travel time-weighted crows fly network access to destinations. This indicator is calculated for non-work destinations and is focused on more

localized trip making. Blocks with a ratio below 0.8 are screened as having poor relative pedestrian access to destinations.

Using this methodology, geographies with higher relative multimodal access to destinations will have higher ratios across all three indicators. If the screening threshold is met for any of the three indicators, the block is screened for inclusion. The following steps were used to develop the three access-to destinations-indicators using various input data sources and internal Caltrans tools:

1. **Calculating Access to Destinations:** Caltrans uses the Conveyal accessibility platform[15] to calculate access to destinations. The platform uses a routing engine to calculate the number of opportunities that can be reached from a given origin using a given mode, or combination of modes. These reachable opportunities are then decay-weighted based on the time it takes to reach them. Figure 3 shows the exponential decay curves used in the analysis. Decay curves are calibrated to reach 50% utility at a certain travel time threshold. A 30-minute curve is used for the transit indicator and 15-minute curves are used for the bicycle and pedestrian indicators. The sum of decay-weighted cumulative reachable opportunities from a given origin is that origin's accessibility.

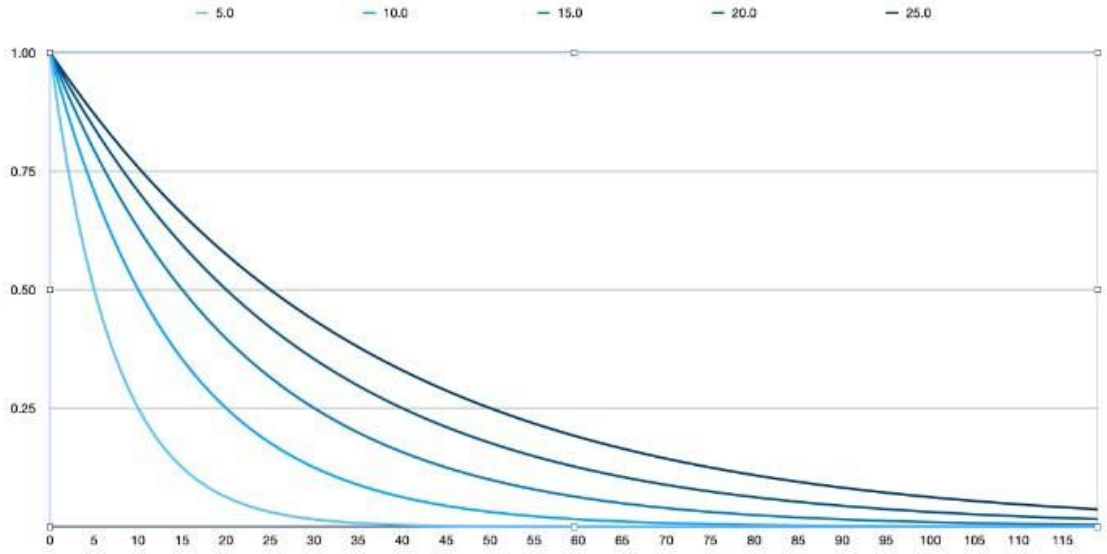

Figure 3. Access to Destinations Exponential Decay Function (Source: Conveyal)

These calculations are repeated across the state for a series of origin points making up a grid. This process is repeated for different modes, different levels of bicycle traffic stress, and for different destination types.

[15] https://conveyal.com/

For the crows fly access calculations used for the pedestrian indicator, a custom R script[16] was written to perform access calculations since Conveyal only calculates network-based access.

From Conveyal, accessibility scores can be downloaded as raster files, with each grid cell representing the accessibility of a given point. Raster files were then used to interpolate accessibility scores for each Census block in the state, using the methodology detailed in Appendix 3.

EQI Thresholds

Once the three indicator datasets are created, they are merged into one dataset using the shared block 'GEOID20' variable. All Census blocks with a land area of 0 are removed from this combined dataset. Thresholds are then applied to this dataset (as detailed below) to create the EQI's three distinct screens.

Demographic Overlay

The demographic overlay includes both income and Tribal land status.[17] If the criterion for either indicator is met, the block is screened for inclusion and is further analyzed with the traffic exposure and access-to-destinations indicators.

Traffic Exposure Indicator

The traffic exposure indicator includes a measurement for both traffic proximity and volume as well as crash exposure. Blocks at or above the 80th percentile[18] of traffic proximity and volume and or the statewide crash exposure calculation are screened as having high traffic exposure.

Access-to-Destinations Indicators

The access-to-destinations indicators provide ratios representing the relative quality of access to destinations for transit, bicycle, and pedestrian travel. For the transit indicator, blocks with a ratio below 0.12 are screened as having poor relative transit access to destinations. For the bicycle and pedestrian indicators, blocks with ratios below 0.6 are screened as having poor relative bicycle and or pedestrian access to destinations.

[16] https://github.com/hhmckay/Ideal-Access-Metric/blob/main/CrowsFlyWeighted.R

[17] These screens are detailed on pages 6-7 of this document.

[18] This percentile is only measured for blocks that have AADT exposure and or crash exposure (by being within 500 meters of the SHS and NHS or within 250 ft of a crash location).

Screening Scenarios

The EQI includes three distinct screening scenarios, each intended for different uses. The three screening scenarios include the demographic overlay by default.

Traffic Exposure Screen

The Traffic Exposure Screen identifies which areas of the state are most impacted by traffic and the negative externalities it produces (e.g., noise, pollution), as well as crashes. Figure 4 shows a map of the Traffic Exposure Screen.

Access to Destinations Screen

The Access to Destinations Screen identifies which areas of the state have poor multimodal access to destinations and may disproportionately suffer from the negative impacts of having poor access, including but not limited to spending large amounts of money on owning and maintaining a vehicle. Figure 4 shows a map of the Access to Destinations Screen.

Transportation-Based Priority Populations Screen

The Transportation-Based Priority Populations Screen combines all screens and identifies the areas of the state that are the most impacted by traffic burdens and benefit the least from the multimodal transportation network. Figure 4 shows a map of the Transportation-Based Priority Populations Screen.

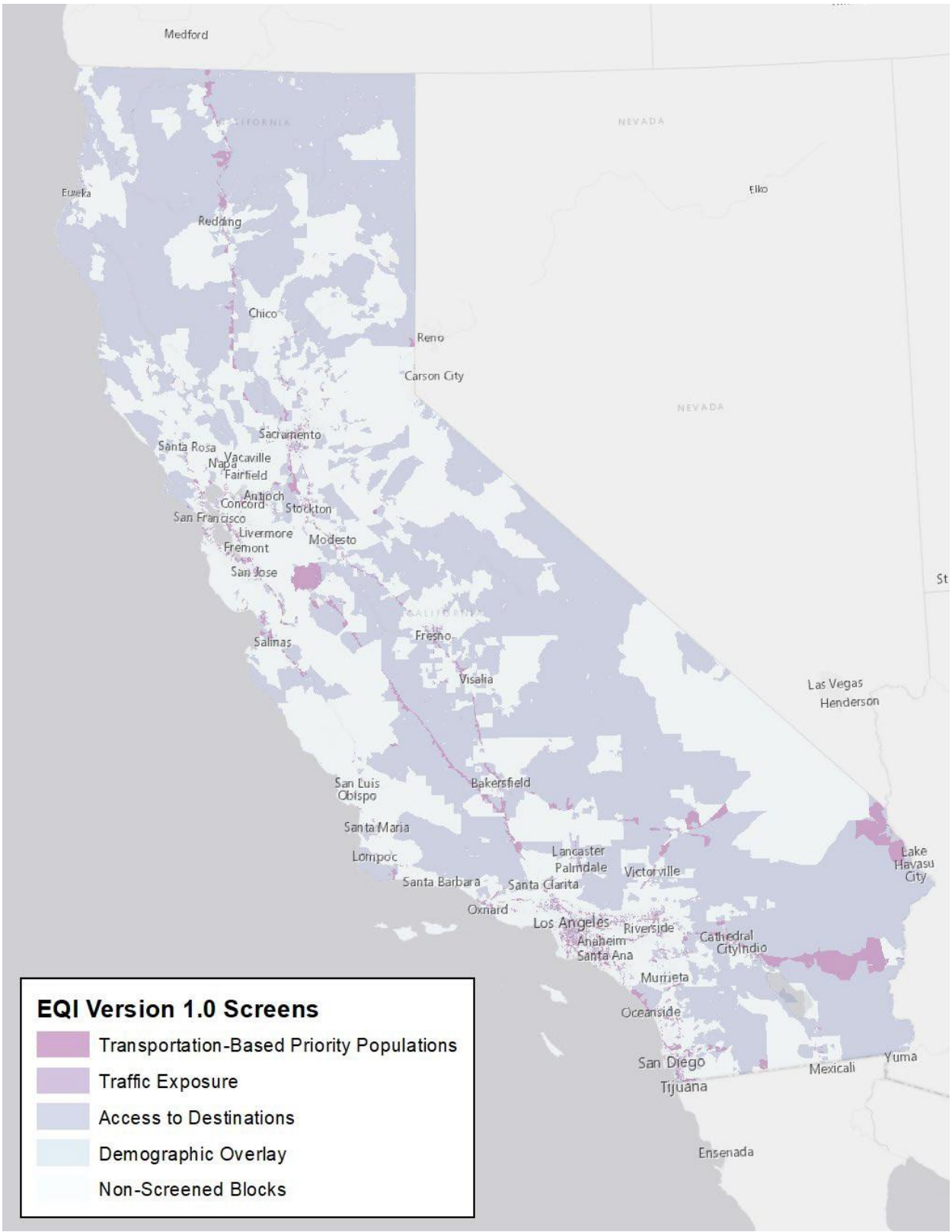

Figure 4. EQI Screens Statewide

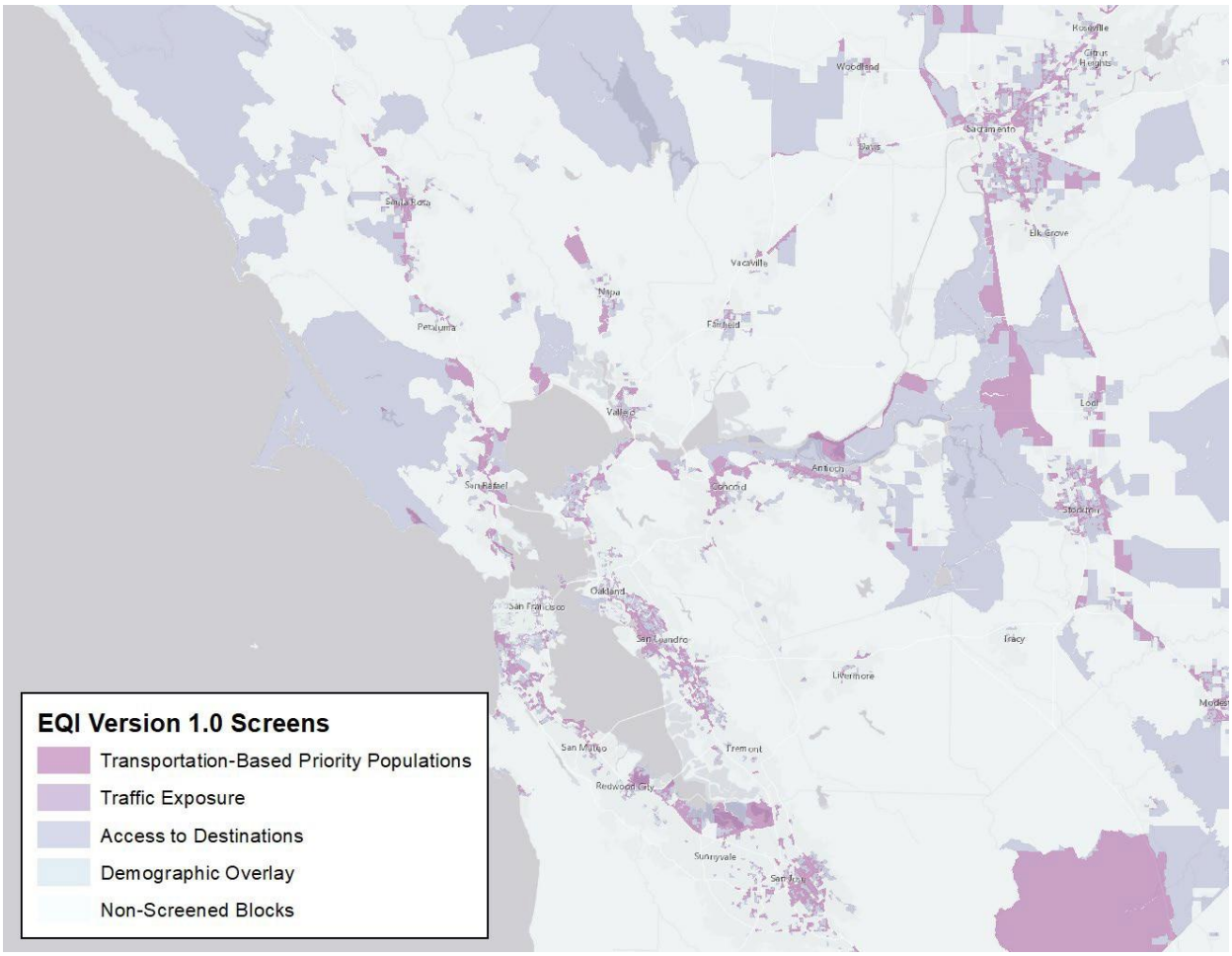

Figure 5. EQI Screens Northern California

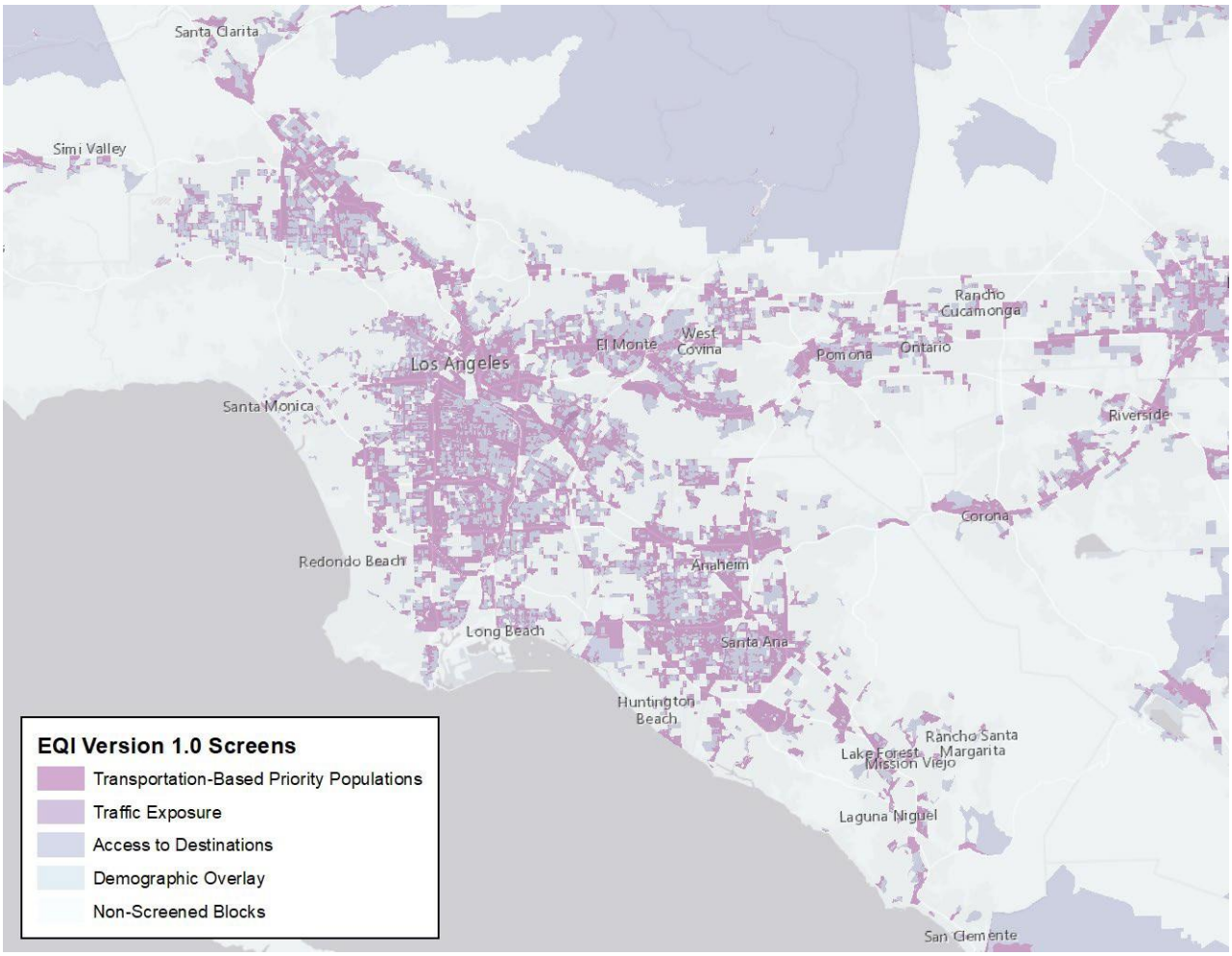

Figure 6. EQI Screens Southern California

Figure 7 shows the relationship between the EQI's indicators, demographic data, and three screening scenarios.

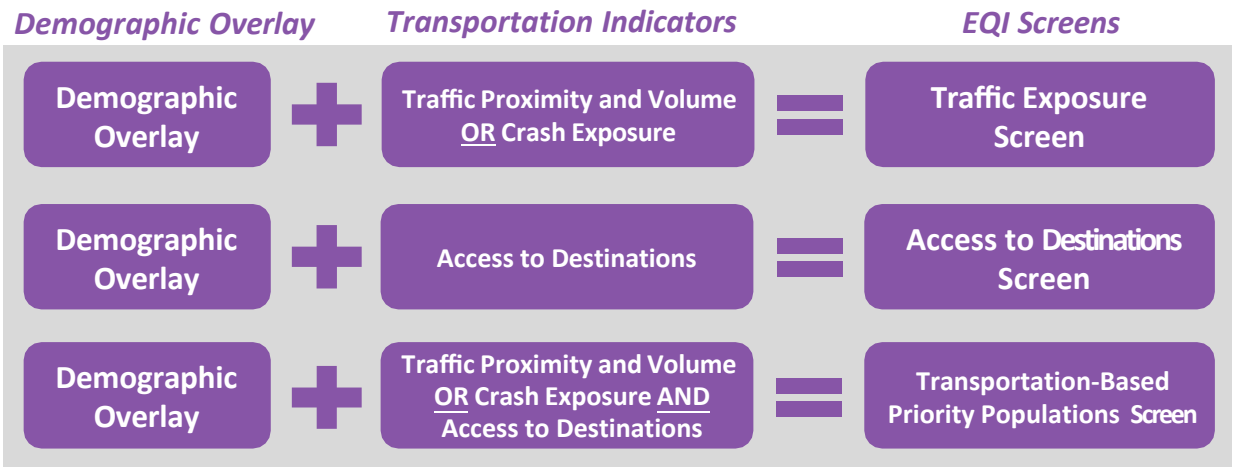

Figure 7. EQI Indicators and Screens

Appendix 1: EQI Indicator Maps

Traffic Proximity and Volume

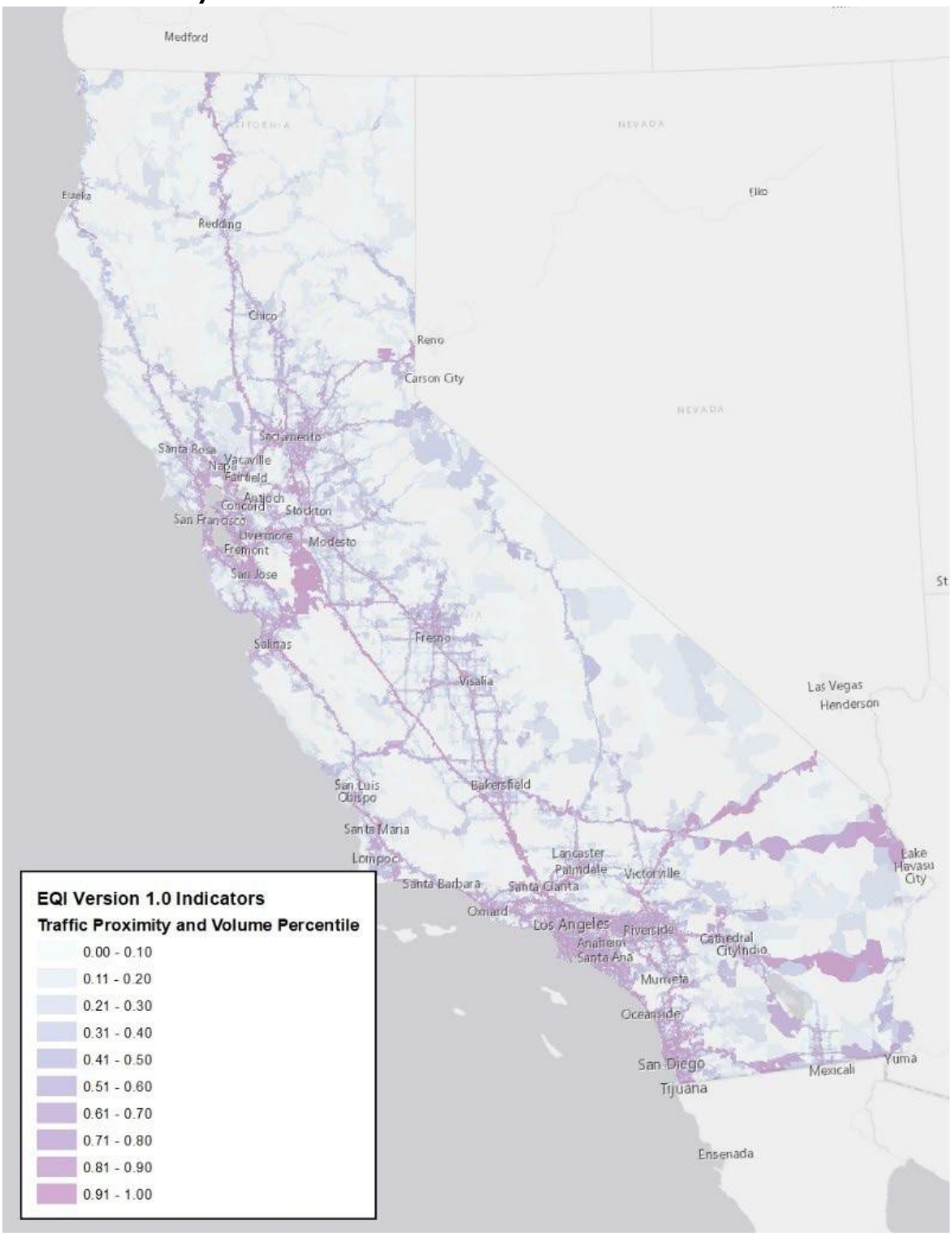

Figure A1-1. EQI Traffic Proximity and Volume Indicator Statewide

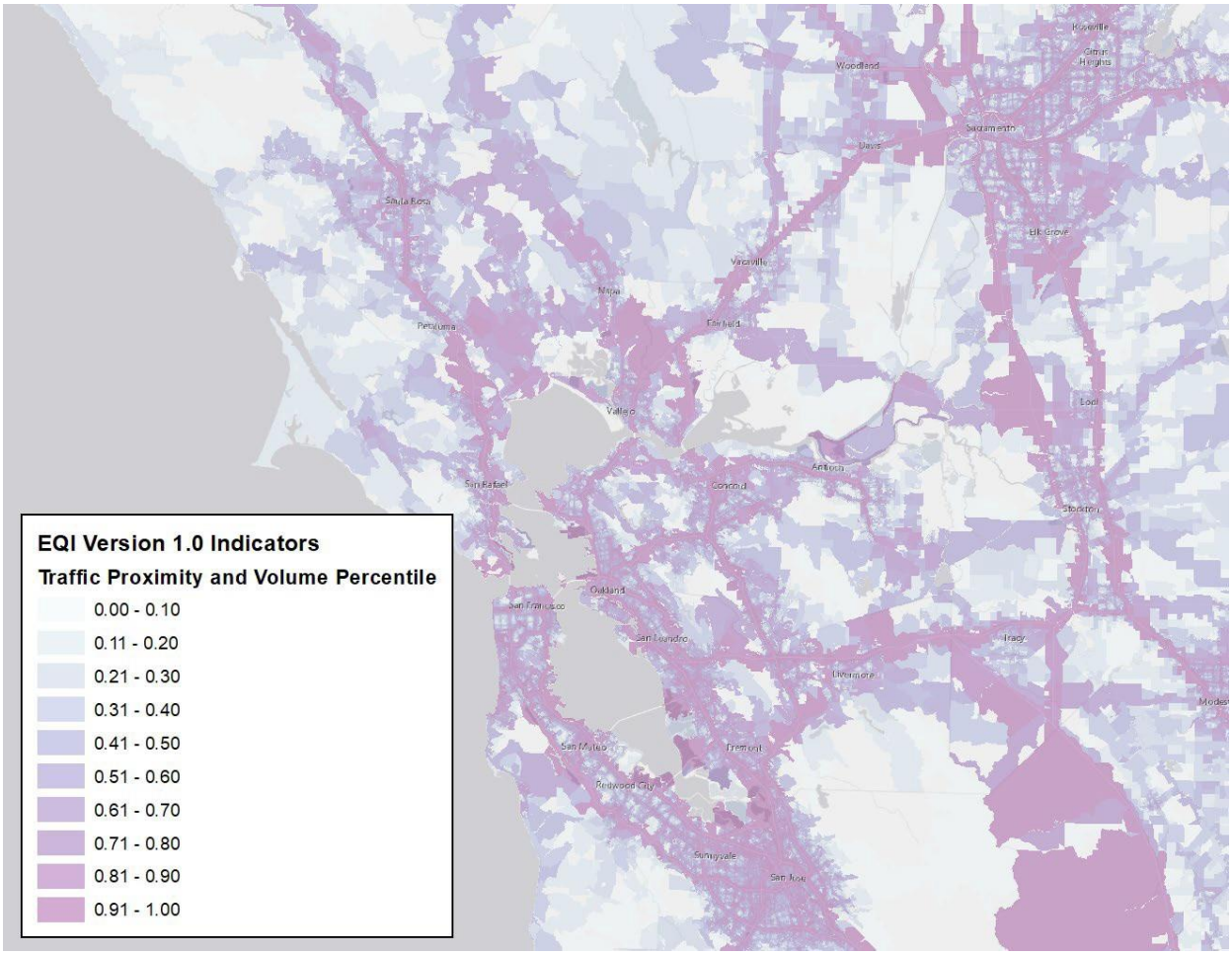

Figure A1-2. EQI Traffic Proximity and Volume Indicator Northern California

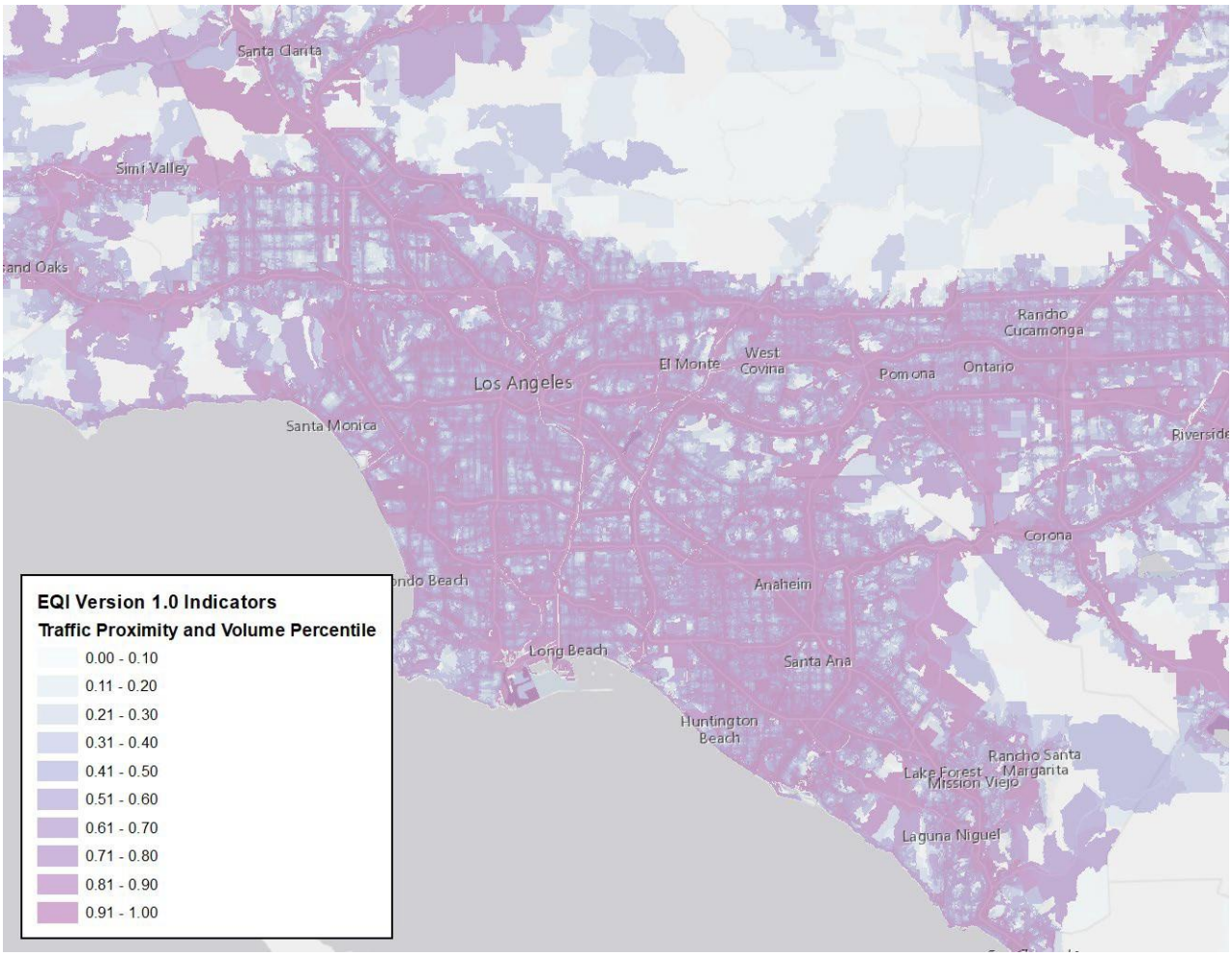

Figure A1-3. EQI Traffic Proximity and Volume Indicator Southern California

Crash Exposure

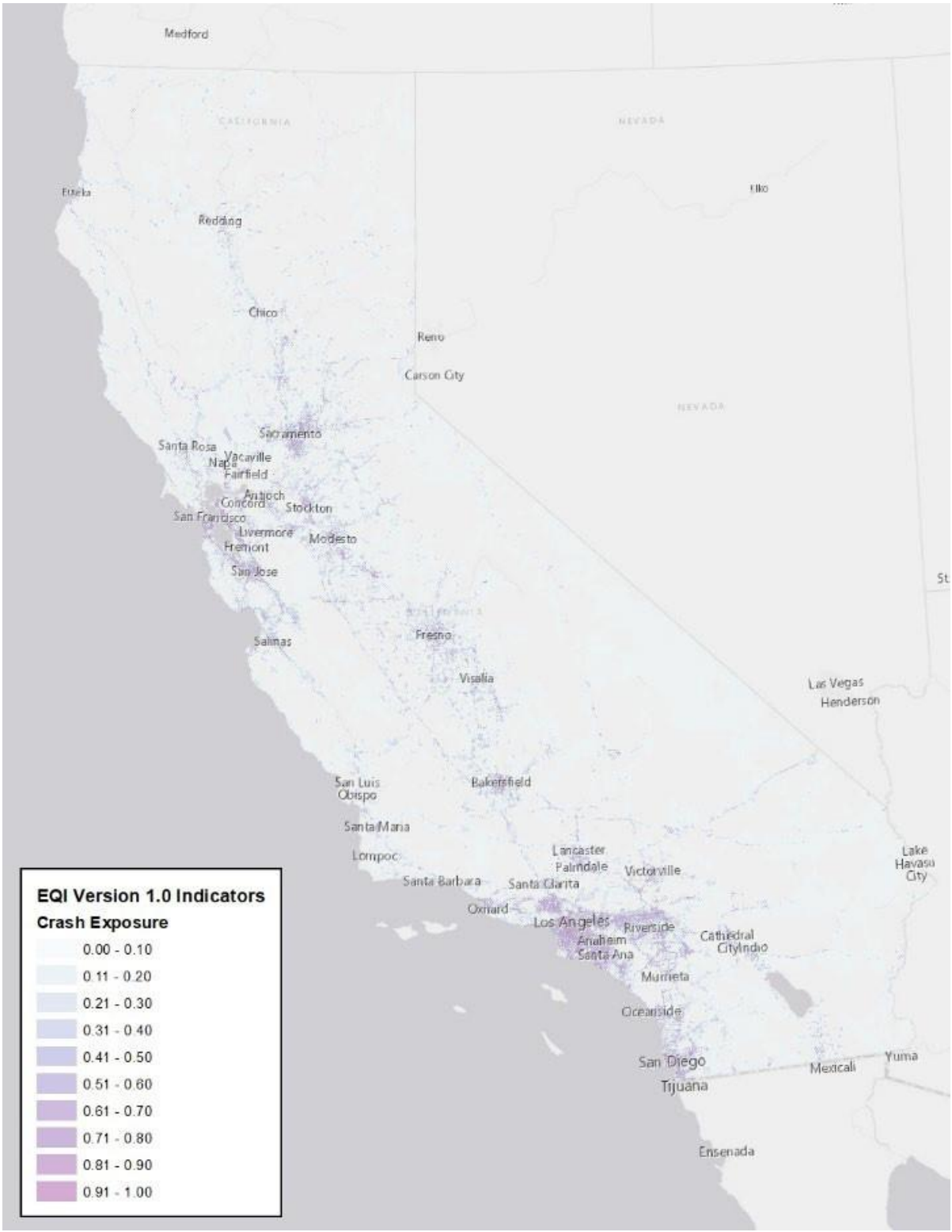

Figure A1-4. EQI Crash Exposure Indicator Statewide

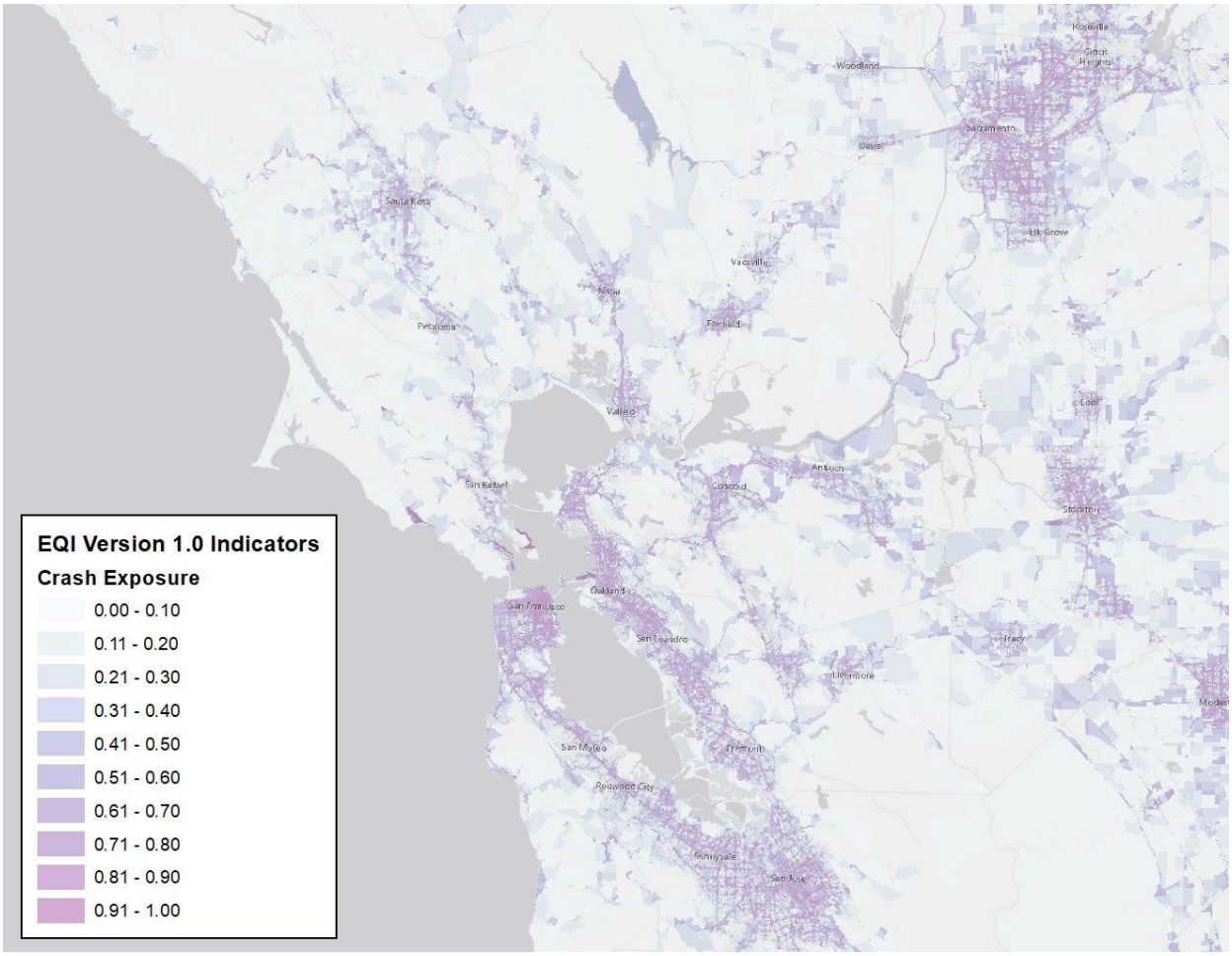

Figure A1-5. EQI Crash Exposure Indicator Northern California

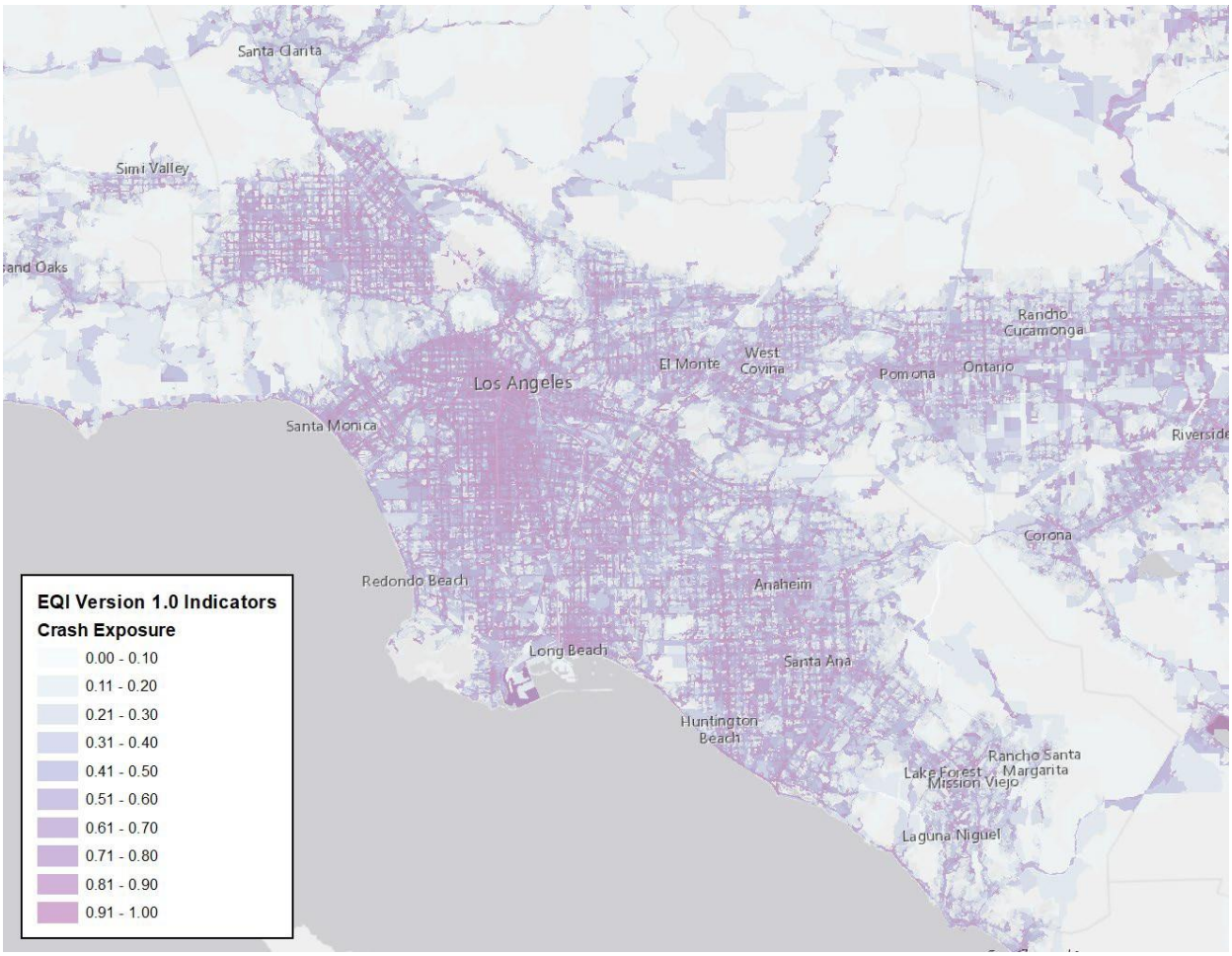

Figure A1-6. EQI Crash Exposure Indicator Southern California

Transit Access to Work Destinations

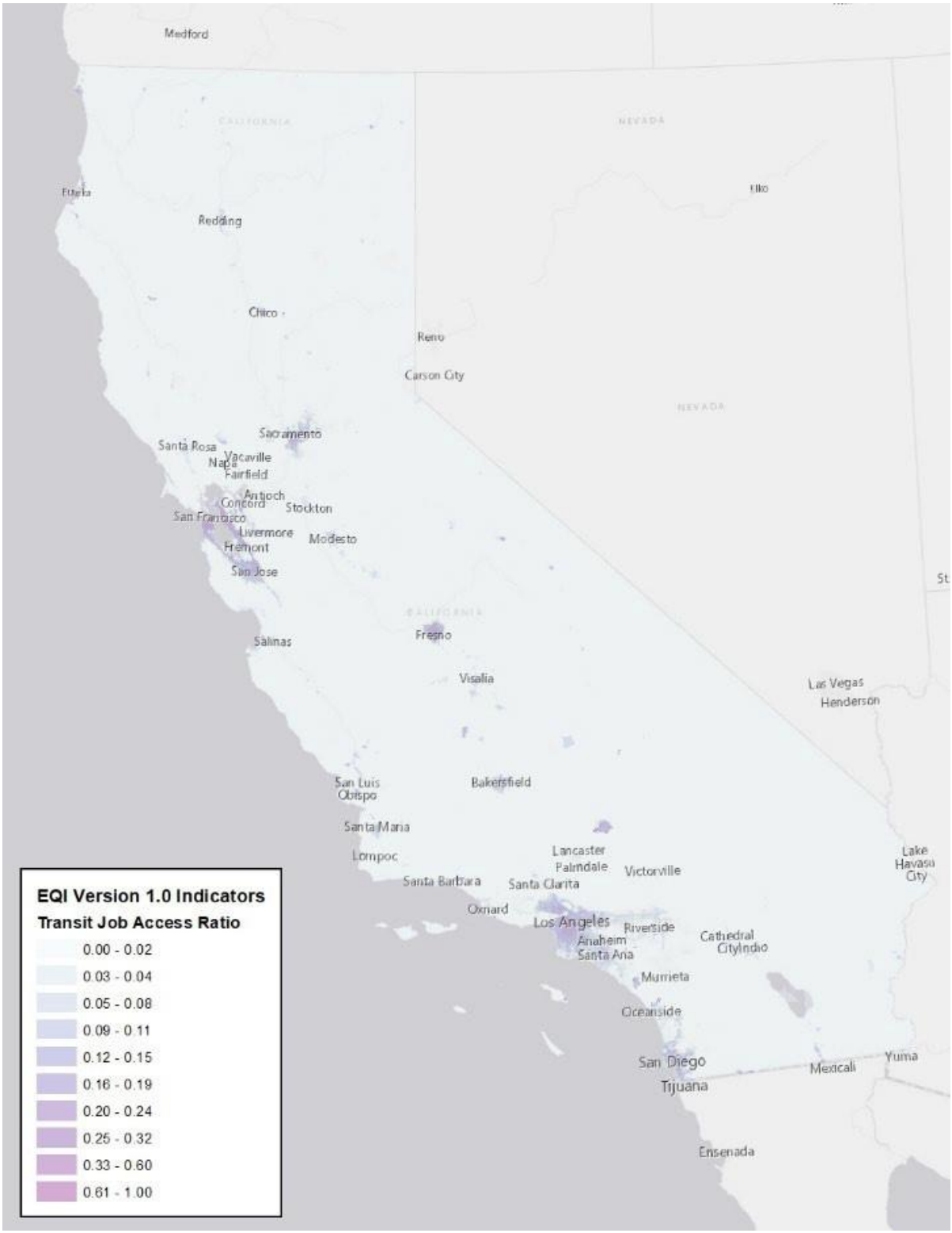

Figure A1-7. EQI Transit Access to Work Destinations Indicator Statewide

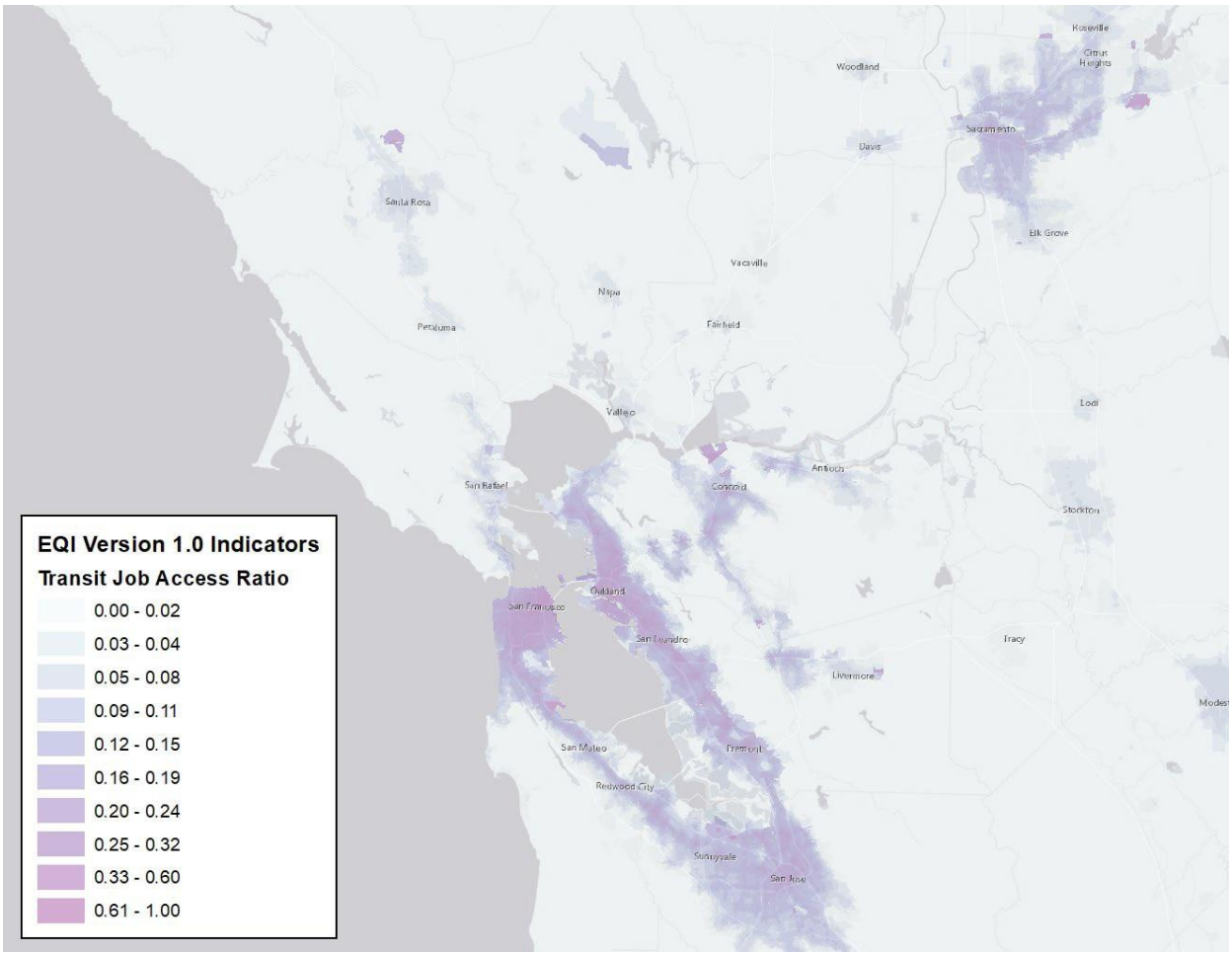

Figure A1-8. EQI Transit Access to Work Destinations Indicator Northern California

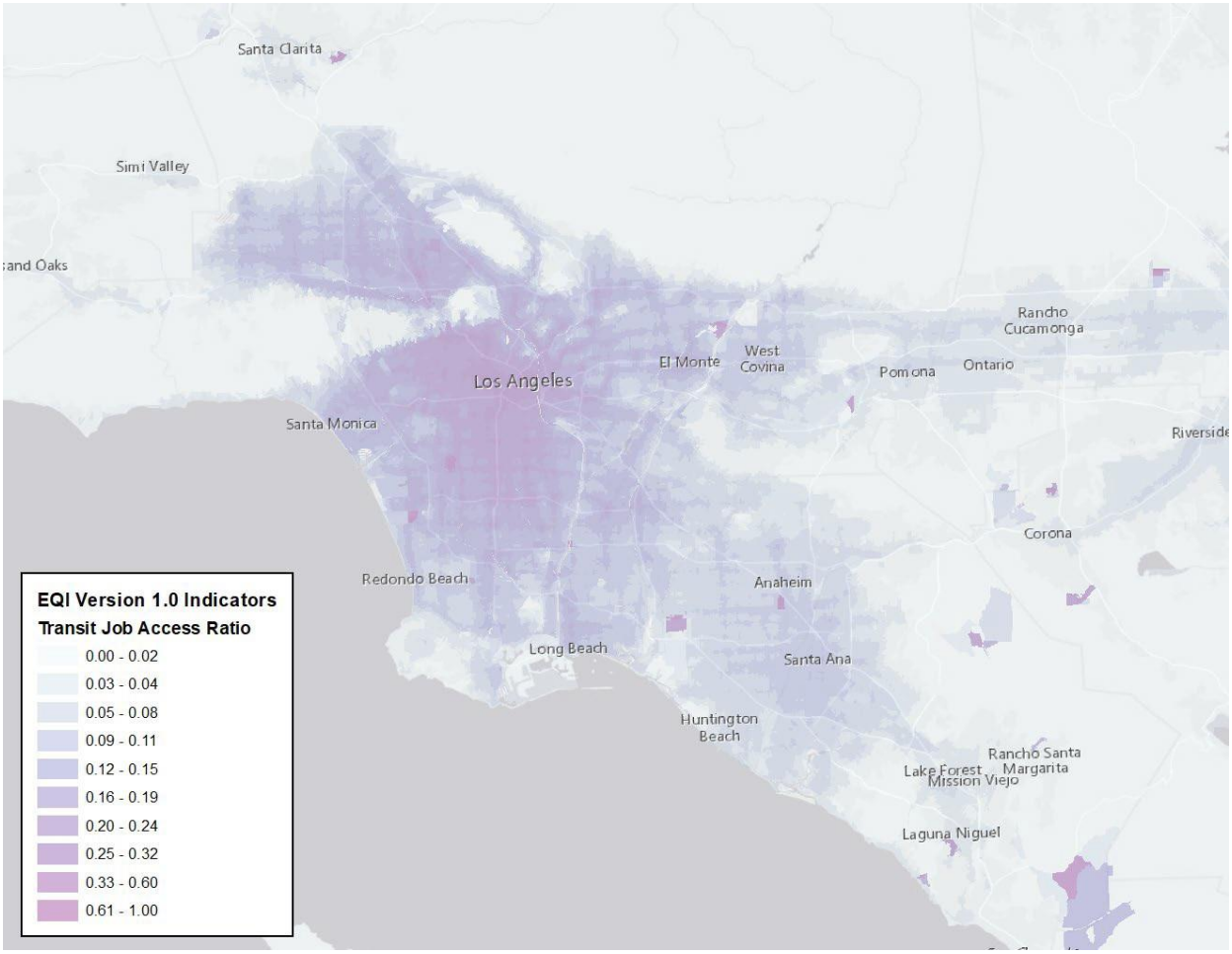

Figure A1-9. EQI Transit Access to Work Destinations Indicator Southern California

Transit Access to Non-Work Destinations

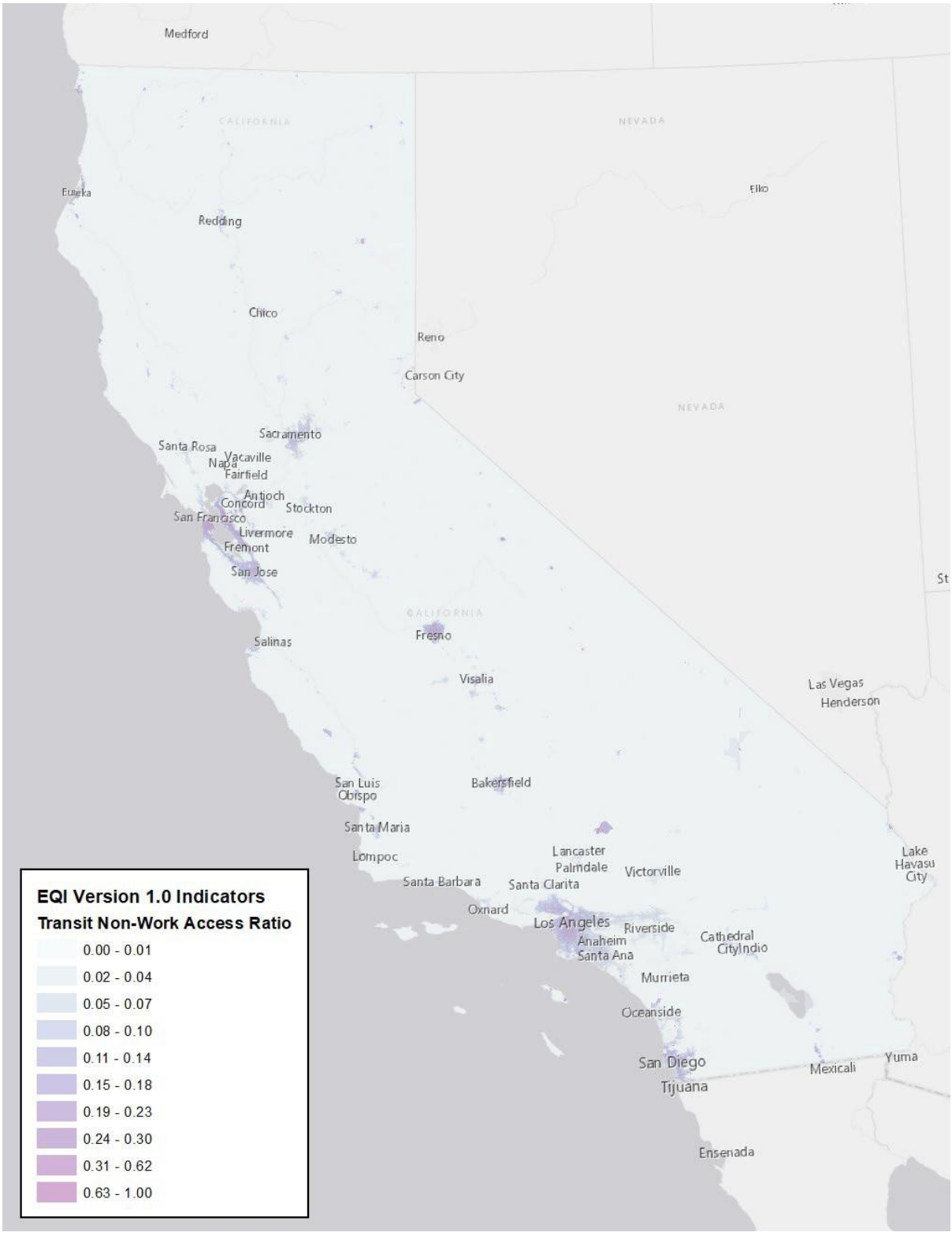

Figure A1-10. EQI Transit Access to Non-Work Destinations Indicator Statewide

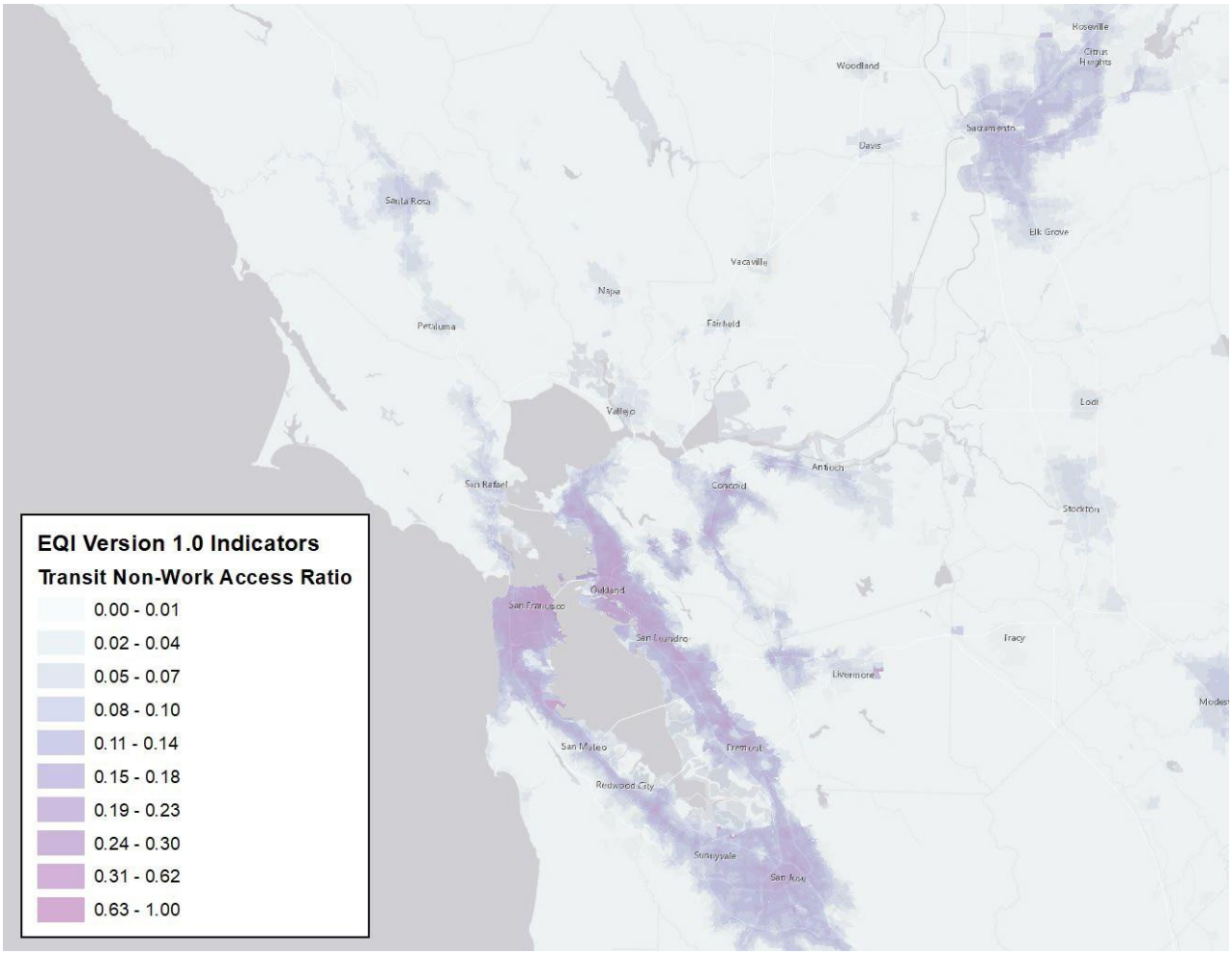

Figure A1-11. EQI Transit Access to Non-Work Destinations Indicator Northern California

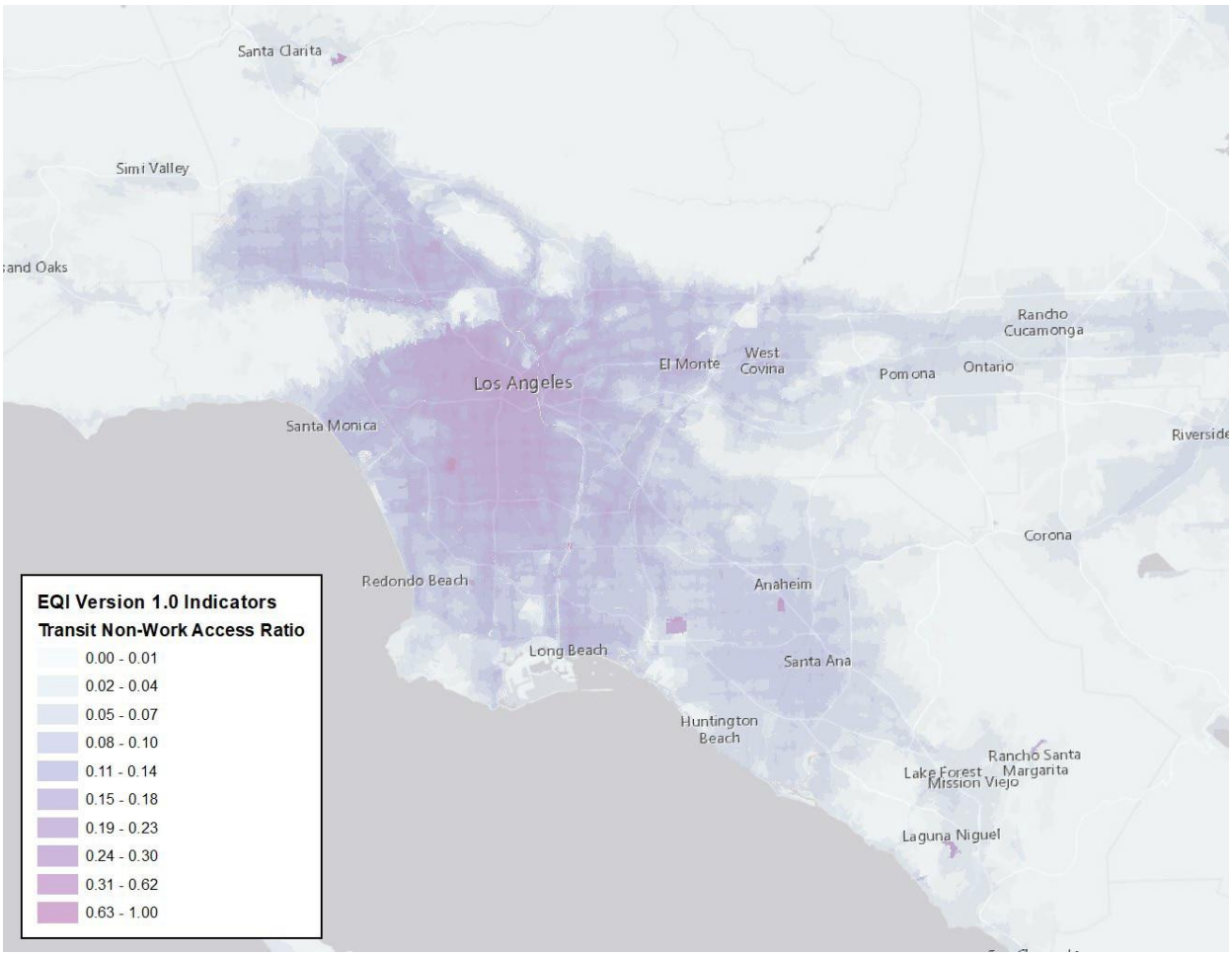

Figure A1-12. EQI Transit Access to Non-Work Destinations Indicator Southern California

Bicycle Access to Destinations

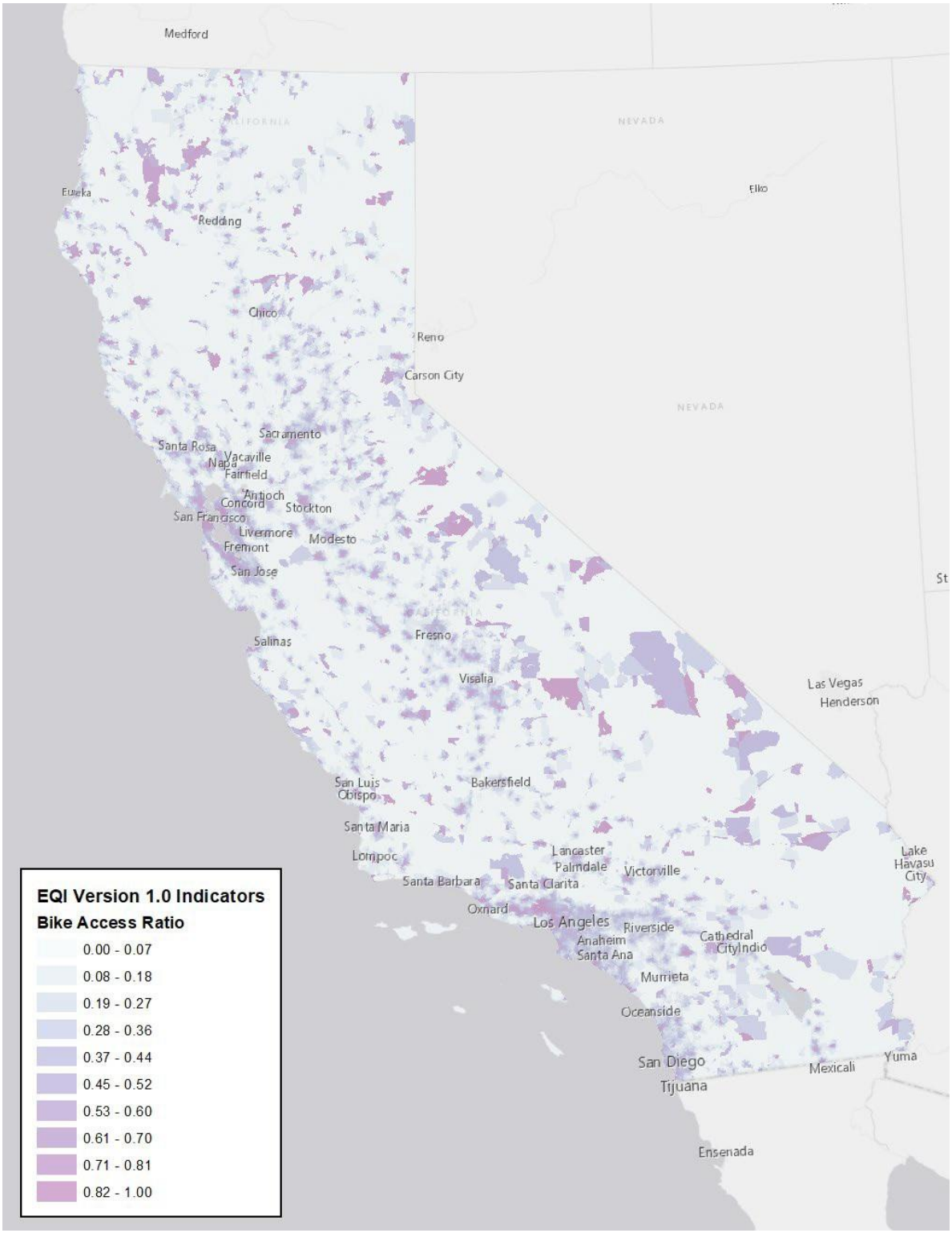

Figure A1-13. EQI Bicycle Access to Non-Work Destinations Indicator Statewide

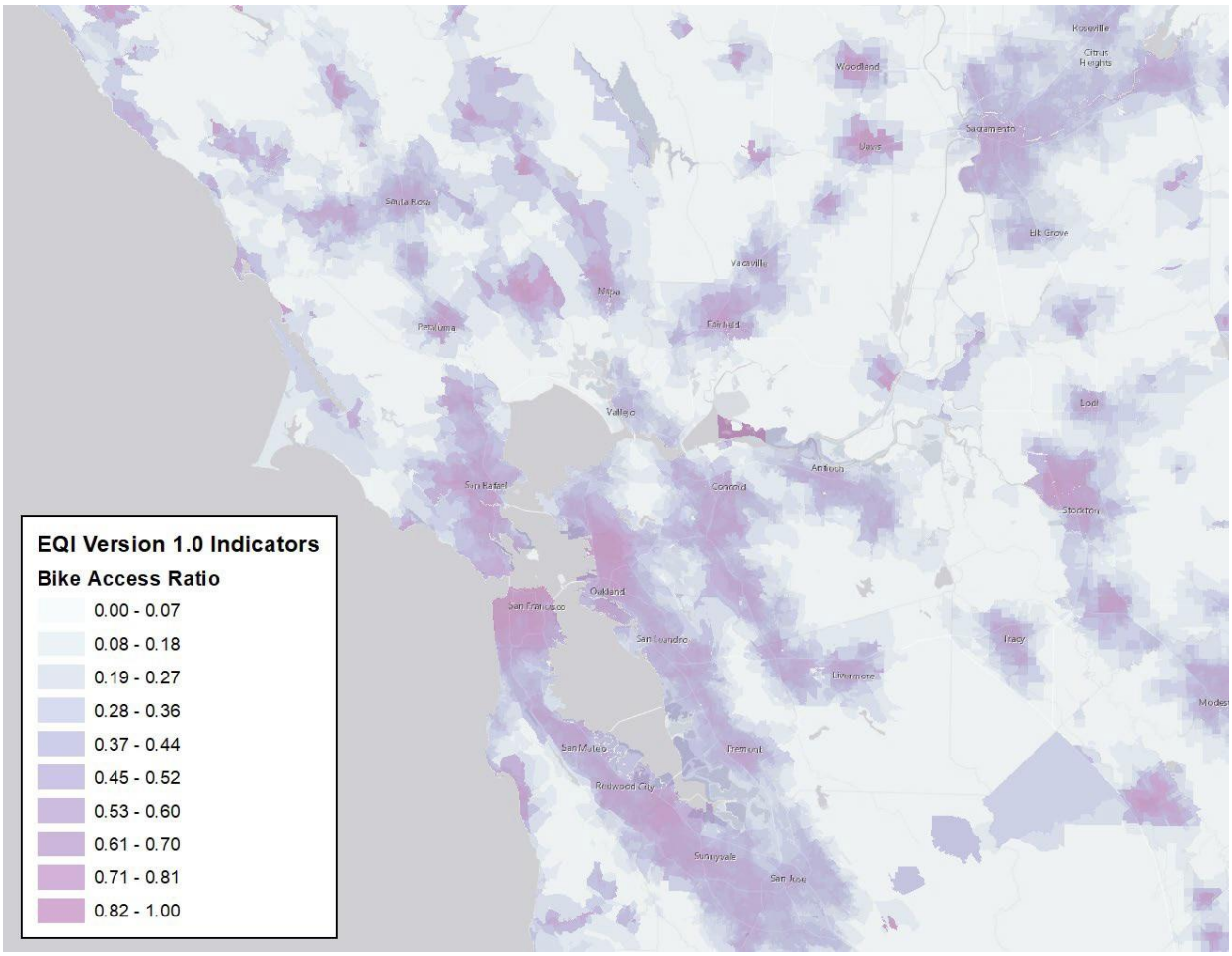

Figure A1-14. EQI Bicycle Access to Non-Work Destinations Indicator Statewide

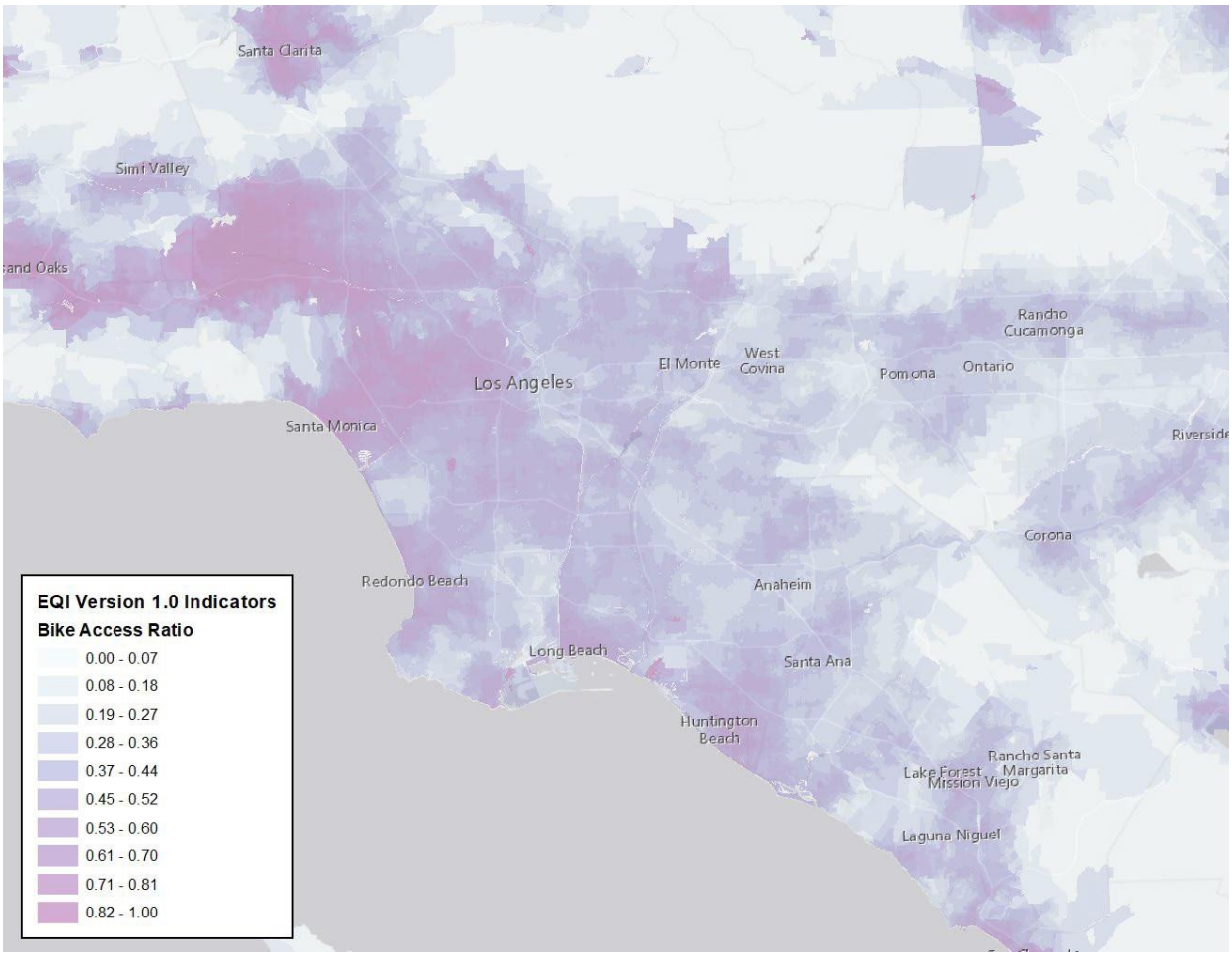

Figure A1-15. EQI Bicycle Access to Non-Work Destinations Indicator Southern California

Pedestrian Access to Destinations

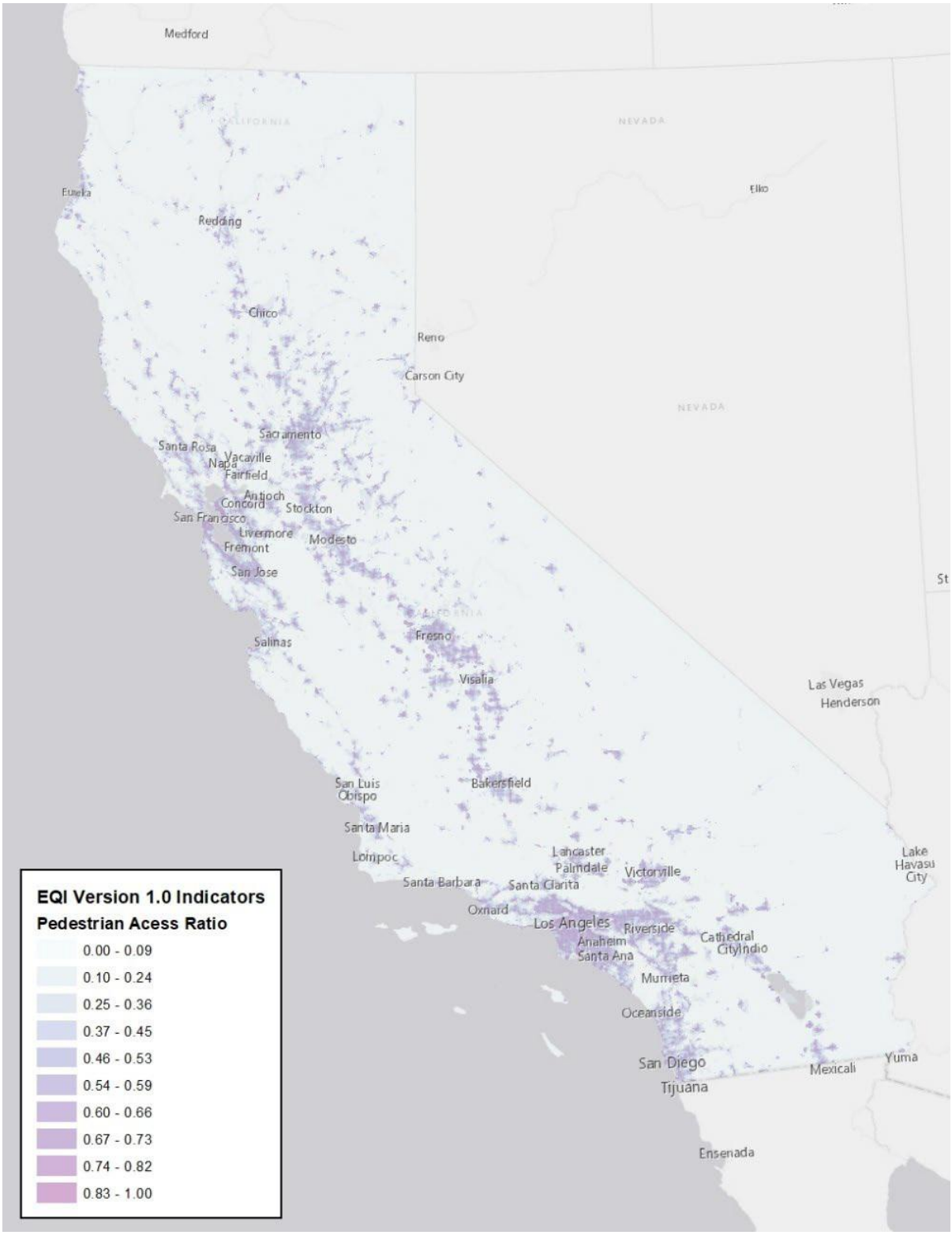

Figure A1-16. EQI Pedestrian Access to Non-Work Destinations Indicator Statewide

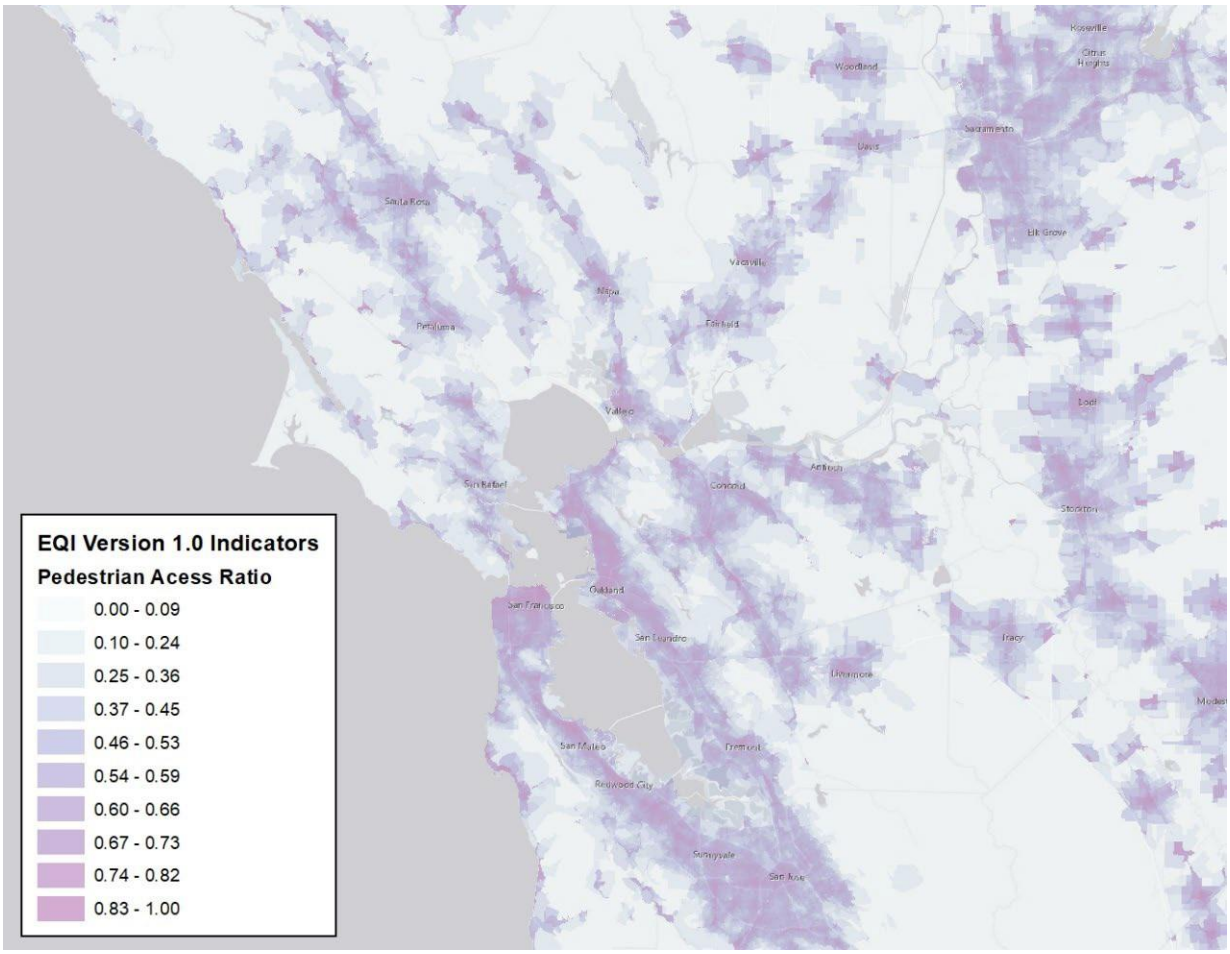

Figure A1-17. EQI Pedestrian Access to Non-Work Destinations Indicator Northern California

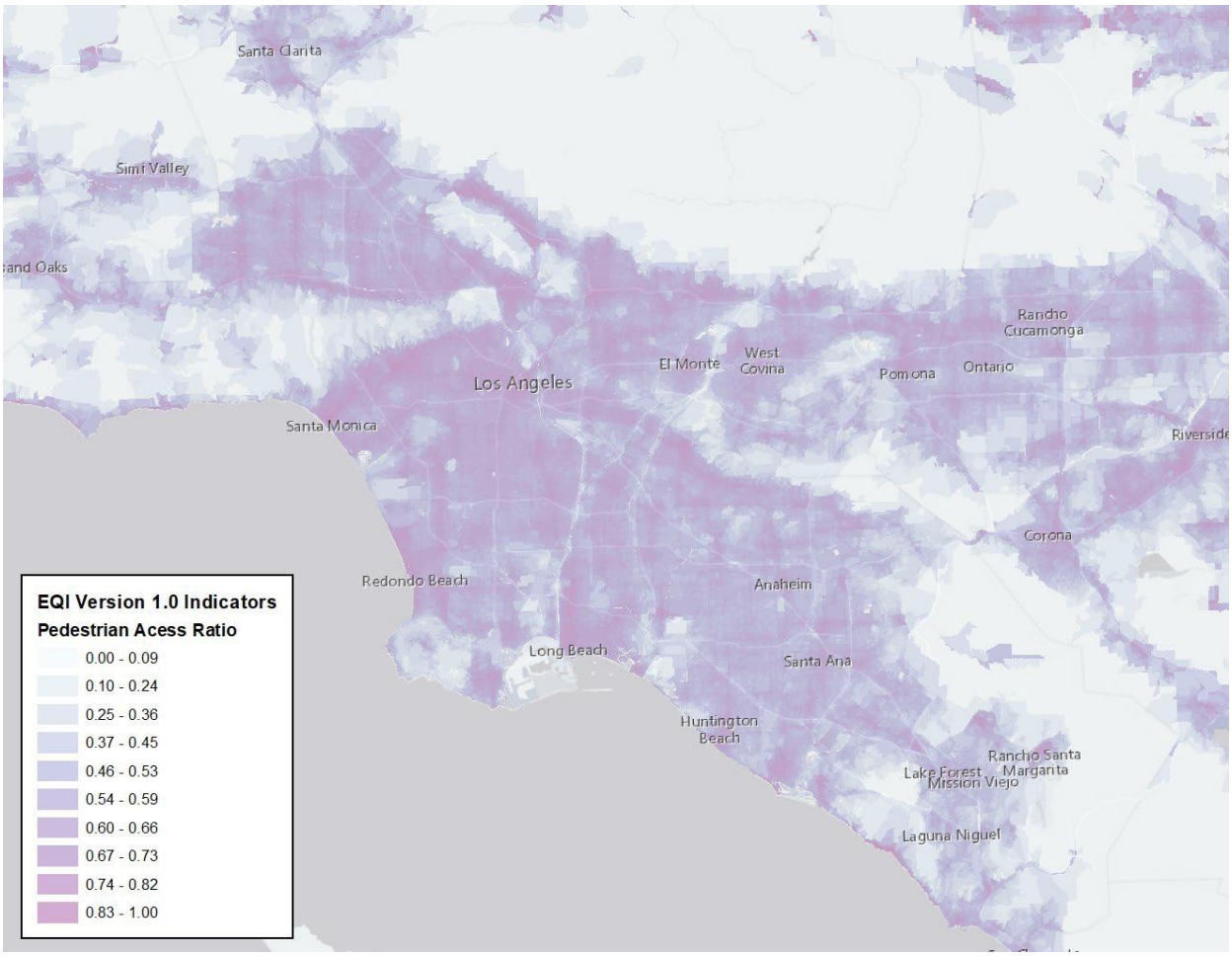

Figure A1-18. EQI Pedestrian Access to Non-Work Destinations Indicator Southern California

Appendix 2: Categories of Non-Work Access to Destinations

Table A2-1: Categories of Non-Work Access to Destinations

Category	Destination Type	Count	Status	Source
Medical Service	Healthcare	57,823	Core	HERE
Grocery Store/Convenience Store	Grocery	24,390	Core	SNAP
School	Education	15,543	Core	HERE
Park/Recreation Area	Recreation	8,928	Core	HERE
Pharmacy	Healthcare	5,874	Core	HERE
Post Office	Public Service	1,848	Core	HERE
Government Office	Public Service	1,784	Core	HERE
Library	Public Service	1,145	Core	HERE
Hospital	Healthcare	700	Core	HERE
Higher Education	Education	532	Core	HERE
City Hall	Public Service	429	Core	HERE
Court House	Public Service	244	Core	HERE
Civic/Community Center	Public Service	181	Core	HERE
Restaurant	Food & Drink	79,208	Other	HERE
Specialty Store	Shopping	27,464	Other	HERE
Place of Worship	Other	18,522	Other	HERE
Clothing Store	Shopping	15,664	Other	HERE
ATM	Bank	12,632	Other	HERE
Petrol/Gasoline Station	Shopping	9,531	Other	HERE
Bank	Bank	8,510	Other	HERE
Coffee Shop	Food & Drink	7,496	Other	HERE
Consumer Electronics Store	Shopping	6,577	Other	HERE
Home Improvement & Hardware Store	Shopping	6,108	Other	HERE
Home Specialty Store	Shopping	5,114	Other	HERE
Sporting Goods Store	Shopping	3,971	Other	HERE
Office Supply & Services Store	Shopping	3,788	Other	HERE
Department Store	Shopping	3,388	Other	HERE
Shopping	Shopping	1,341	Other	HERE
Bookstore	Shopping	584	Other	HERE

Appendix 3: Income Limits

Table A3-1: Low Income Limit by County

	Household Size							
County	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Alameda	$ 76,750	$ 87,700	$ 98,650	$109,600	$118,400	$127,150	$135,950	$144,700
Alpine	$ 46,600	$ 53,250	$ 59,900	$ 66,550	$ 71,900	$ 77,200	$ 82,550	$ 87,850
Amador	$ 44,100	$ 50,400	$ 56,700	$ 62,950	$ 68,000	$ 73,050	$ 78,100	$ 83,100
Butte	$ 39,600	$ 45,250	$ 50,900	$ 56,550	$ 61,100	$ 65,600	$ 70,150	$ 74,650
Calaveras	$ 45,750	$ 52,300	$ 58,850	$ 65,350	$ 70,600	$ 75,850	$ 81,050	$ 86,300
Colusa	$ 39,150	$ 44,750	$ 50,350	$ 55,900	$ 60,400	$ 64,850	$ 69,350	$ 73,800
Contra Costa	$ 76,750	$ 87,700	$ 98,650	$109,600	$118,400	$127,150	$135,950	$144,700
Del Norte	$ 39,150	$ 44,750	$ 50,350	$ 55,900	$ 60,400	$ 64,850	$ 69,350	$ 73,800
El Dorado	$ 50,750	$ 58,000	$ 65,250	$ 72,500	$ 78,300	$ 84,100	$ 89,900	$ 95,700
Fresno	$ 39,150	$ 44,750	$ 50,350	$ 55,900	$ 60,400	$ 64,850	$ 69,350	$ 73,800
Glenn	$ 39,150	$ 44,750	$ 50,350	$ 55,900	$ 60,400	$ 64,850	$ 69,350	$ 73,800
Humboldt	$ 39,150	$ 44,750	$ 50,350	$ 55,900	$ 60,400	$ 64,850	$ 69,350	$ 73,800
Imperial	$ 39,150	$ 44,750	$ 50,350	$ 55,900	$ 60,400	$ 64,850	$ 69,350	$ 73,800
Inyo	$ 42,100	$ 48,100	$ 54,100	$ 60,100	$ 64,950	$ 69,750	$ 74,550	$ 79,350
Kern	$ 39,150	$ 44,750	$ 50,350	$ 55,900	$ 60,400	$ 64,850	$ 69,350	$ 73,800
Kings	$ 39,150	$ 44,750	$ 50,350	$ 55,900	$ 60,400	$ 64,850	$ 69,350	$ 73,800
Lake	$ 39,150	$ 44,750	$ 50,350	$ 55,900	$ 60,400	$ 64,850	$ 69,350	$ 73,800
Lassen	$ 40,450	$ 46,200	$ 52,000	$ 57,750	$ 62,400	$ 67,000	$ 71,650	$ 76,250
Los Angeles	$ 66,250	$ 75,700	$ 85,150	$ 94,600	$102,200	$109,750	$117,350	$124,900
Madera	$ 39,150	$ 44,750	$ 50,350	$ 55,900	$ 60,400	$ 64,850	$ 69,350	$ 73,800
Marin	$102,450	$117,100	$131,750	$146,350	$158,100	$169,800	$181,500	$193,200
Mariposa	$ 39,150	$ 44,750	$ 50,350	$ 55,900	$ 60,400	$ 64,850	$ 69,350	$ 73,800
Mendocino	$ 40,500	$ 46,300	$ 52,100	$ 57,850	$ 62,500	$ 67,150	$ 71,750	$ 76,400
Merced	$ 39,150	$ 44,750	$ 50,350	$ 55,900	$ 60,400	$ 64,850	$ 69,350	$ 73,800
Modoc	$ 39,150	$ 44,750	$ 50,350	$ 55,900	$ 60,400	$ 64,850	$ 69,350	$ 73,800
Mono	$ 45,300	$ 51,800	$ 58,250	$ 64,700	$ 69,900	$ 75,100	$ 80,250	$ 85,450
Monterey	$ 56,950	$ 65,100	$ 73,250	$ 81,350	$ 87,900	$ 94,400	$100,900	$107,400
Napa	$ 63,050	$ 72,050	$ 81,050	$ 90,050	$ 97,300	$104,500	$111,700	$118,900
Nevada	$ 50,300	$ 57,500	$ 64,700	$ 71,850	$ 77,600	$ 83,350	$ 89,100	$ 94,850
Orange	$ 75,300	$ 86,050	$ 96,800	$107,550	$116,200	$124,800	$133,400	$142,000
Placer	$ 50,750	$ 58,000	$ 65,250	$ 72,500	$ 78,300	$ 84,100	$ 89,900	$ 95,700
Plumas	$ 40,950	$ 46,800	$ 52,650	$ 58,500	$ 63,200	$ 67,900	$ 72,550	$ 77,250
Riverside	$ 44,250	$ 50,600	$ 56,900	$ 63,200	$ 68,300	$ 73,350	$ 78,400	$ 83,450
Sacramento	$ 50,750	$ 58,000	$ 65,250	$ 72,500	$ 78,300	$ 84,100	$ 89,900	$ 95,700

Household Size								
County	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
San Benito	$ 57,150	$ 65,300	$ 73,450	$ 81,600	$ 88,150	$ 94,700	$101,200	$107,750
San Bernardino	$ 44,250	$ 50,600	$ 56,900	$ 63,200	$ 68,300	$ 73,350	$ 78,400	$ 83,450
San Diego	$ 67,900	$ 77,600	$ 87,300	$ 97,000	$104,800	$112,550	$120,300	$128,050
San Francisco	$102,450	$117,100	$131,750	$146,350	$158,100	$169,800	$181,500	$193,200
San Joaquin	$ 42,000	$ 48,000	$ 54,000	$ 60,000	$ 64,800	$ 69,600	$ 74,400	$ 79,200
San Luis Obispo	$ 54,800	$ 62,600	$ 70,450	$ 78,250	$ 84,550	$ 90,800	$ 97,050	$103,300
San Mateo	$102,450	$117,100	$131,750	$146,350	$158,100	$169,800	$181,500	$193,200
Santa Barbara	$ 70,050	$ 80,050	$ 90,050	$100,050	$108,100	$116,100	$124,100	$132,100
Santa Clara	$ 82,450	$ 94,200	$106,000	$117,750	$127,200	$136,600	$146,050	$155,450
Santa Cruz	$ 78,050	$ 89,200	$100,350	$111,500	$120,450	$129,350	$138,300	$147,200
Shasta	$ 39,800	$ 45,450	$ 51,150	$ 56,800	$ 61,350	$ 65,900	$ 70,450	$ 75,000
Sierra	$ 47,350	$ 54,100	$ 60,850	$ 67,600	$ 73,050	$ 78,450	$ 83,850	$ 89,250
Siskiyou	$ 39,150	$ 44,750	$ 50,350	$ 55,900	$ 60,400	$ 64,850	$ 69,350	$ 73,800
Solano	$ 54,350	$ 62,100	$ 69,850	$ 77,600	$ 83,850	$ 90,050	$ 96,250	$102,450
Sonoma	$ 65,150	$ 74,450	$ 83,750	$ 93,050	$100,500	$107,950	$115,400	$122,850
Stanislaus	$ 39,950	$ 45,650	$ 51,350	$ 57,050	$ 61,650	$ 66,200	$ 70,750	$ 75,350
Sutter	$ 39,150	$ 44,750	$ 50,350	$ 55,900	$ 60,400	$ 64,850	$ 69,350	$ 73,800
Tehama	$ 39,150	$ 44,750	$ 50,350	$ 55,900	$ 60,400	$ 64,850	$ 69,350	$ 73,800
Trinity	$ 39,150	$ 44,750	$ 50,350	$ 55,900	$ 60,400	$ 64,850	$ 69,350	$ 73,800
Tulare	$ 39,150	$ 44,750	$ 50,350	$ 55,900	$ 60,400	$ 64,850	$ 69,350	$ 73,800
Tuolumne	$ 41,650	$ 47,600	$ 53,550	$ 59,500	$ 64,300	$ 69,050	$ 73,800	$ 78,550
Ventura	$ 63,250	$ 72,300	$ 81,350	$ 90,350	$ 97,600	$104,850	$112,050	$119,300
Yolo	$ 51,800	$ 59,200	$ 66,600	$ 74,000	$ 79,950	$ 85,850	$ 91,800	$ 97,700
Yuba	$ 39,150	$ 44,750	$ 50,350	$ 55,900	$ 60,400	$ 64,850	$ 69,350	$ 73,800

Data Source: https://www.hcd.ca.gov/grants-funding/income-limits/state-and-federal-income-limits/docs/income-limits-2021.pdf

Appendix 4: Tribal Lands

Table A4-1: List of Tribal Lands

Name	Component
Agua Caliente Indian Reservation	R
Agua Caliente Indian Reservation	T
Alturas Indian Rancheria	R
Auburn Rancheria	R
Auburn Rancheria	T
Augustine Reservation	R
Barona Reservation	R
Barona Reservation	T
Benton Paiute Reservation	R
Benton Paiute Reservation	T
Berry Creek Rancheria	R
Berry Creek Rancheria	T
Big Bend Rancheria	R
Big Lagoon Rancheria	R
Big Pine Reservation	R
Big Pine Reservation	T
Big Sandy Rancheria	R
Big Sandy Rancheria	T
Big Valley Rancheria	R
Bishop Reservation	R
Blue Lake Rancheria	R
Blue Lake Rancheria	T
Bridgeport Reservation	R
Bridgeport Reservation	T
Cabazon Reservation	R
Cahuilla Reservation	R
Campo Indian Reservation	R
Capitan Grande Reservation	R
Cedarville Rancheria	R
Cedarville Rancheria	T
Chemehuevi Reservation	R
Chicken Ranch Rancheria	R
Chicken Ranch Rancheria	T
Cold Springs Rancheria	R
Colorado River Indian Reservation	R

Name	Component
Colusa Rancheria	R
Cortina Indian Rancheria	R
Coyote Valley Reservation	R
Dry Creek Rancheria	R
Dry Creek Rancheria	T
Elk Valley Rancheria	R
Elk Valley Rancheria	T
Enterprise Rancheria	R
Enterprise Rancheria	T
Ewiiaapaayp Reservation	R
Fort Bidwell Reservation	R
Fort Bidwell Reservation	T
Fort Independence Reservation	R
Fort Mojave Reservation	R
Fort Mojave Reservation	T
Fort Yuma Indian Reservation	R
Greenville Rancheria	R
Grindstone Indian Rancheria	R
Guidiville Rancheria	R
Guidiville Rancheria	T
Hoopa Valley Reservation	R
Hopland Rancheria	R
Inaja and Cosmit Reservation	R
Jackson Rancheria	R
Jamul Indian Village	R
Karuk Reservation	R
Karuk Reservation	T
La Jolla Reservation	R
La Posta Indian Reservation	R
Laytonville Rancheria	R
Likely Rancheria	R
Lone Pine Reservation	R
Lookout Rancheria	R
Los Coyotes Reservation	R
Lytton Rancheria	R
Manchester-Point Arena Rancheria	R
Manzanita Reservation	R
Manzanita Reservation	T
Mesa Grande Reservation	R

Name	Component
Middletown Rancheria	R
Montgomery Creek Rancheria	R
Mooretown Rancheria	R
Mooretown Rancheria	T
Morongo Reservation	R
Morongo Reservation	T
North Fork Rancheria	R
North Fork Rancheria	T
Pala Reservation	R
Paskenta Rancheria	R
Pauma and Yuima Reservation	R
Pechanga Reservation	R
Picayune Rancheria	R
Picayune Rancheria	T
Pinoleville Rancheria	R
Pit River Trust Land	T
Quartz Valley Reservation	R
Quartz Valley Reservation	T
Ramona Village	R
Redding Rancheria	R
Redwood Valley Rancheria	R
Resighini Rancheria	R
Rincon Reservation	R
Rincon Reservation	T
Roaring Creek Rancheria	R
Robinson Rancheria	R
Robinson Rancheria	T
Rohnerville (Rancheria) Trust Land	T
Round Valley Reservation	R
Round Valley Reservation	T
Rumsey Indian Rancheria	R
San Manuel Reservation	R
San Manuel Reservation	T
San Pasqual Reservation	R
San Pasqual Reservation	T
Santa Rosa Rancheria	R
Santa Rosa Reservation	R
Santa Ynez Reservation	R
Santa Ysabel Reservation	R
Sherwood Valley Rancheria	R

Name	Component
Sherwood Valley Rancheria	T
Shingle Springs Rancheria	R
Shingle Springs Rancheria	T
Smith River Rancheria	R
Smith River Rancheria	T
Soboba Reservation	R
Soboba Reservation	T
Stewarts Point Rancheria	R
Stewarts Point Rancheria	T
Sulphur Bank Rancheria	R
Susanville Indian Rancheria	R
Susanville Indian Rancheria	T
Sycuan Reservation	R
Sycuan Reservation	T
Table Bluff Reservation	R
Table Mountain Rancheria	R
Table Mountain Rancheria	T
Timbi-Sha Shoshone Reservation	R
Timbi-Sha Shoshone Reservation	T
Torres-Martinez Reservation	R
Trinidad Rancheria	R
Trinidad Rancheria	T
Tule River Reservation	R
Tule River Reservation	T
Tuolumne Rancheria	R
Twenty-Nine Palms Reservation	R
Twenty-Nine Palms Reservation	T
Upper Lake Rancheria	R
Viejas Reservation	R
Viejas Reservation	T
Washoe Ranches Trust Land	T
Woodfords Community	R
XL Ranch Rancheria	R
Yurok Reservation	R

Component type: "R" is Federally recognized American Indian Reservations (AIRs) and "T" is Off-Reservation Trust Lands (ORTL). Note: On-reservation trust lands are included as part of the reservation "R" boundary.

Data source: OEHHA SB 535 Disadvantaged Communities (2022)

Appendix 5: Raster to Census Block Interpolation Methodology

Access-to-destinations indicators are calculated by aggregated access-to-destinations data from a statewide grid made up of cells measuring 216 by 216 meters. For this data to be used in the EQI, it must be interpolated to Census block geometries. Figure A5-1 shows data for non-auto, non-work access to destinations as both raw raster output and interpolated Census block data.

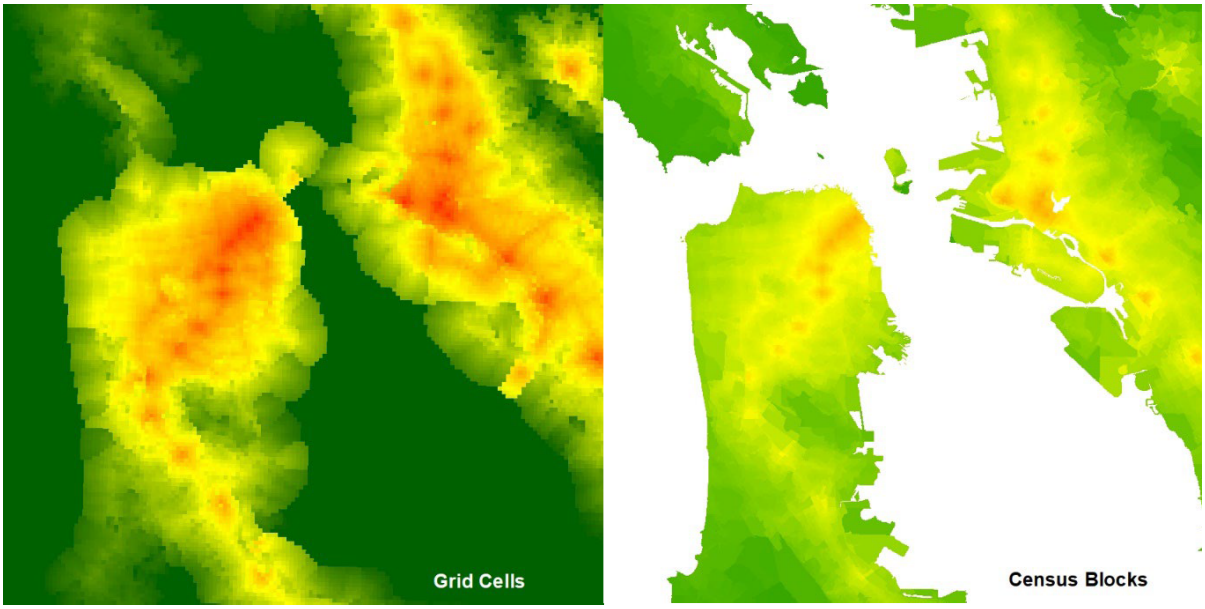

Figure A5-1. Raster to Census block data conversion maps.

The following steps are used to interpolate access-to-destinations data from raw raster output to Census block geometries:

1. Resample raster cells to a finer-grained resolution. This analysis resamples raster cells to 5 by 5 meters, from 216 by 216 meters. This is necessary to ensure that there are enough raster cells within each Census block to calculate summary statistics. However, resampling raster cells to a finer-grain resolution significantly increases computation time.
2. The ArcGIS Zonal Statistics as Table tool is used to calculate the mean access-to-destinations score of all raster cells that fall within each Census block. Figure A5-2. shows the ArcGIS workflow used to process raster inputs.
3. This table is attached to the 2020 Census blocks dataset.
4. The process is repeated for all access-to-destinations indicators.

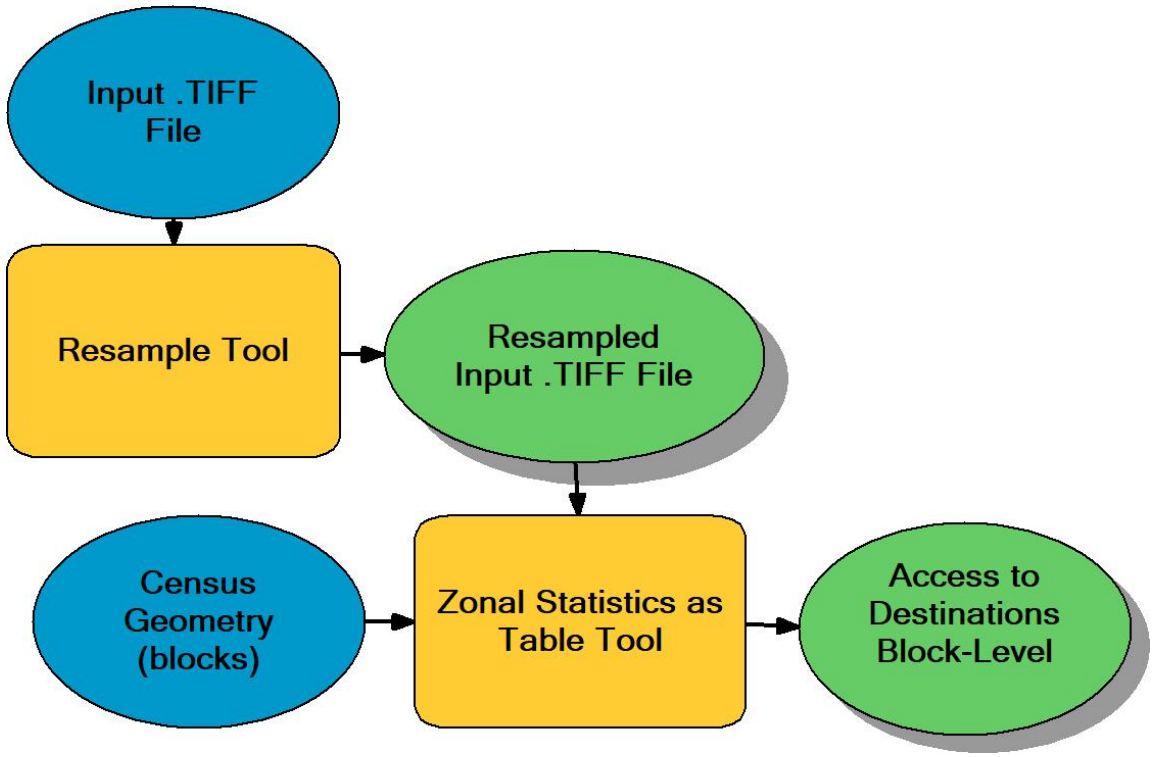

Figure A5-2. Raster to Census block data conversion workflow.

Appendix 6: Comparison of Spatial Equity Screening Tools

Introduction

There are several equity-focused spatial screening tools being used in practice today. In California, two of the most common are the California Communities Environmental Health Screening Tool (CalEnviroScreen) developed by the California Office of Environmental Health Hazard Assessment and the Climate and Economic Justice Screening Tool (CEJST) developed by the Council on Environmental Quality as part of the federal government's Justice40 Initiative. This analysis will focus on these two screening tools, and how they compare to the Caltrans Transportation Equity Index (EQI).

Tool Comparison

The two most important differences between the three tools are their spatial granularity and intended purpose.

Spatial Granularity

CalEnviroScreen and CEJST both use Census tracts, while EQI uses Census blocks. Both CalEnviroScreen and CEJST include a much higher number of indicators than EQI, many of which lack datasets sufficient for block-level analysis. EQI uses a narrower set of transportation-specific indicators, all of which are operationalized by Caltrans and can be calculated at any level of geographic granularity. These indicators---traffic proximity and volume, crash exposure, and multimodal access to destinations---are all most useful when measured granularly. For example, traffic proximity and volume impacts do not occur equally across a large Census tract but instead are generally most-significant within approximately five-hundred meters of a point source. The same can be said of crash exposure, where crashes can cluster around a specific dangerous intersection. Multimodal access to destinations is similarly sensitive to geographic granularity and can vary greatly within the bounds of a given Census tract.

With these considerations in mind, the EQI uses Census blocks as its unit of geographic measurement as they are more granular (especially in rural areas) and are easily compatible with demographic data from the Census. Figures A6-1 and A6-2 below illustrate the difference between Census tracts and blocks in two different place types: dense and highly urbanized San Francisco and rural Tehama County. In San Francisco, many Census tracts are granular, but blocks are still better suited to analyze transportation indicators. In Tehama County, and many other areas of the state, a Census tract can be miles across (40 miles

in the Tehama County example). In areas of the state with Census tracts of this size, it is necessary to use more granular Census blocks to accurately analyze transportation indicators.

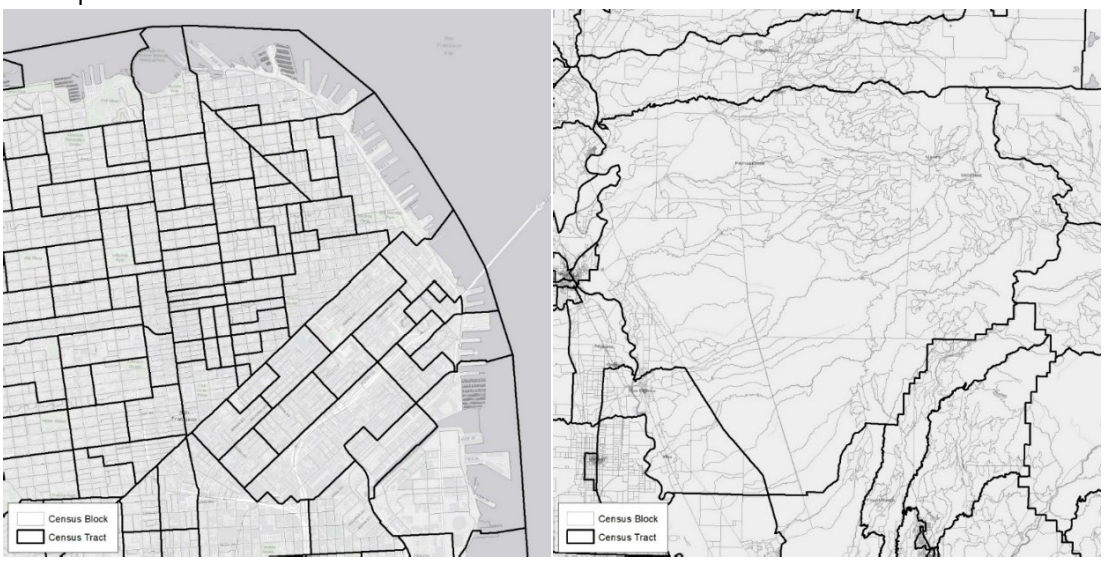

Figure A6-1 Comparison between Census tracts and blocks in San Francisco, CA and Tehama County, CA.

Tool Purpose

Another key difference between EQI and other equity-oriented spatial screening tools is the intended purpose and use of each tool. While EQI narrowly focuses on transportation burdens and benefits, other tools such as CalEnviroScreen and CEJST were designed for broader applications and thus include more indicators. In the case of CalEnviroScreen, indicators are grouped as either pollution burdens or population characteristics, and a score is derived indicating where the most vulnerable populations are the most exposed to pollution burdens. CEJST employs a somewhat simpler methodology where geographies are identified as disadvantaged if they exceed a threshold on a certain number of indicators. EQI is somewhat similar to CEJST in terms of its methodology, but only uses indicators with a direct transportation nexus that can be analyzed on a more granular spatial level. Table A6-1 compares the indicators across CalEnviroScreen, EQI, and CEJST.

Table A6-1: Comparison of Indicators Across Equity Screening Tools

CalEnviroScreen	Justice40 CEJST	EQI	EQI Rationale/Notes
Air Quality: Ozone			The EQI measures the transportation point source of these indicators as traffic proximity and volume.
Air Quality: PM2.5	PM2.5 in the air		
Diesel Particulate Matter	Diesel Particulate Matter Exposure		
Drinking Water Contaminants			No direct transportation nexus.
Children's Lead Risk from Housing	Lead Paint		
Pesticide Use			
Toxic Release from Facilities	Underground Storage Tanks and Releases		
Traffic Impacts	Traffic Proximity and Volume	Traffic Proximity and Volume	The EQI provides a more-granular measurement of impacts resulting from traffic proximity and volume.
Cleanup Sites	Abandoned Mine Land		No direct transportation nexus.
	Formerly Used Defense Sites		
Groundwater Threats			
Hazardous Waste Generators and Facilities	Proximity to Hazardous Waste Facilities		
	Proximity to Superfund Sites		
	Proximity to Risk Management Plan Facilities		
Impaired Water Bodies	Wastewater Discharge		
Solid Waste Sites and Facilities			
Asthma	Asthma		The EQI measures areas with high traffic impacts

CalEnviroScreen	Justice40 CEJST	EQI	EQI Rationale/Notes
Cardiovascular Disease	Heart Disease		(i.e., traffic proximity and volume) and poor multimodal opportunities (i.e., access to destinations). These transportation indicators, in part, can explain some of these negative health outcomes.
Low Birth Weight Infants			
	Diabetes		
	Low Life Expectancy		
Educational Attainment	High School Education		For screening purposes, the broad definition of low-income communities and Tribal land status largely overlaps with the additional socioeconomic indicators used by other tools. If an indicator such as linguistic isolation was added, it would definitionally only be adding in wealthy communities that are linguistically isolated.
Housing-Burdened Low-Income Households			
Linguistic Isolation	Linguistic Isolation		
Poverty	Low Income	Low Income	
	Low Median Income		
	Poverty		
Unemployment	Unemployment		
	Race and Ethnicity (for informational purposes only, not used in actual methodology)		
	Historic Underinvestment		
	Expected Agricultural Loss Rate		No direct transportation nexus.
	Expected Building Loss Rate		
	Expected Population Loss Rate		
	Projected Flood Risk		

CalEnviroScreen	Justice40 CEJST	EQI	EQI Rationale/Notes
	Projected Wildfire Risk		Important relation to transportation but out of scope for the EQI.
	Energy Cost		Non-transportation energy cost.
	Housing Cost		The EQI measures the transportation component of these indicators with the access-to-destinations indicators.
	Lack of Green Space		
	Lack of Indoor Plumbing		No direct transportation nexus.
	Transportation Barriers	Access to Destinations	The EQI measures transportation barriers more directly and granularly with the access-to-destinations indicators.
		Crash Exposure	The EQI is the only tool to include crash data.
	Tribes	Tribes	The EQI includes all Tribal lands in the demographic overlay by default.

Spatial Coverage

Given the unique methodological approach of EQI, both in terms of spatial granularity and selected indicators, the screening maps look different than those produced by CalEnviroScreen or CEJST. It is important to note that EQI includes three screens: the Traffic Exposure Screen, the Access to Destinations Screen, and the Transportation-Based Priority Populations screen. The following maps compare the SB 535 Census tracts (highest 25% scoring CalEnviroScreen tracts) with the EQI's Transportation-Based Priority Populations Screen.[19]

Looking at the following maps (Figures A6-2 – A6-5), there is some overlap between the geographies screened by CalEnviroScreen and EQI. However, the

[19] In Figure A6-5, the EQI's traffic exposure screen is shown instead of the priority populations screen. In the Bay Area, multimodal access to destinations is fairly high compared to the rest of the state, so fewer geographies are screened. However, many Bay Area geographies are screened for high traffic exposure (traffic proximity and volume and crash exposure) so that screen was shown instead to better illustrate coverages relative to CalEnviroScreen.

spatial difference between Census tracts and blocks is also apparent. Within each screened tract (shown in yellow) there are usually screened blocks (shown in red). Given the size of Census tracts, it is useful for transportation planning purposes to identify where specifically within a given tract certain impacts are occurring, which is what EQI is designed to do. There are other cases where geographies are screened by EQI that aren't screened by CalEnviroScreen or CEJST, or vice versa. These differences can be explained by the differences in spatial granularity[20], but mostly the difference in chosen indicators.

In the Sacramento region, most of the Census tracts screened by CalEnviroScreen also have some overlapping coverage from the EQI's Transportation-Based Priority Populations Screen. However, the EQI's Transportation-Based Priority Populations Screen brings in additional geographies as well, where traffic exposure is high and access to destinations is low.

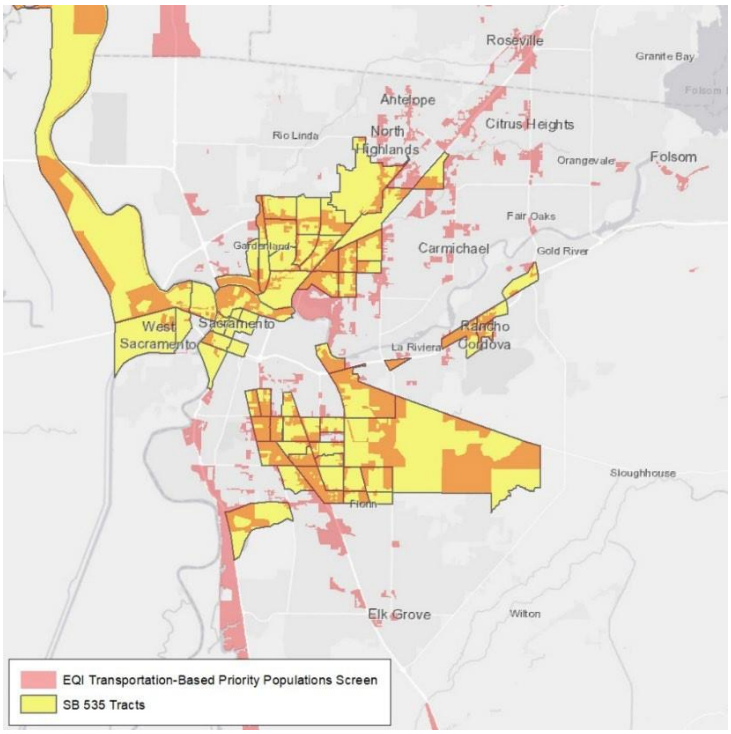

Figure A6-2: EQI/CalEnviroScreen comparison in Sacramento, CA.

[20] When indicators are measures at the Census tract level, it is highly unlikely---especially for transportation indicators---that each Census block within the tract would have the same measurement. That is to say that indicators typically have variance within a given Census tract. In that case, it is possible that a Census tract could be screened as crossing the threshold for a given indicator, when only some of the blocks within the tract cross the same threshold when measured individually.

In Bakersfield, CA, the overlap between CalEnviroScreen and EQI coverage is also relatively high. However, many of the areas with less overlap are more outlying, with much larger Census tracts, making the difference in coverage appear more extreme on a map.

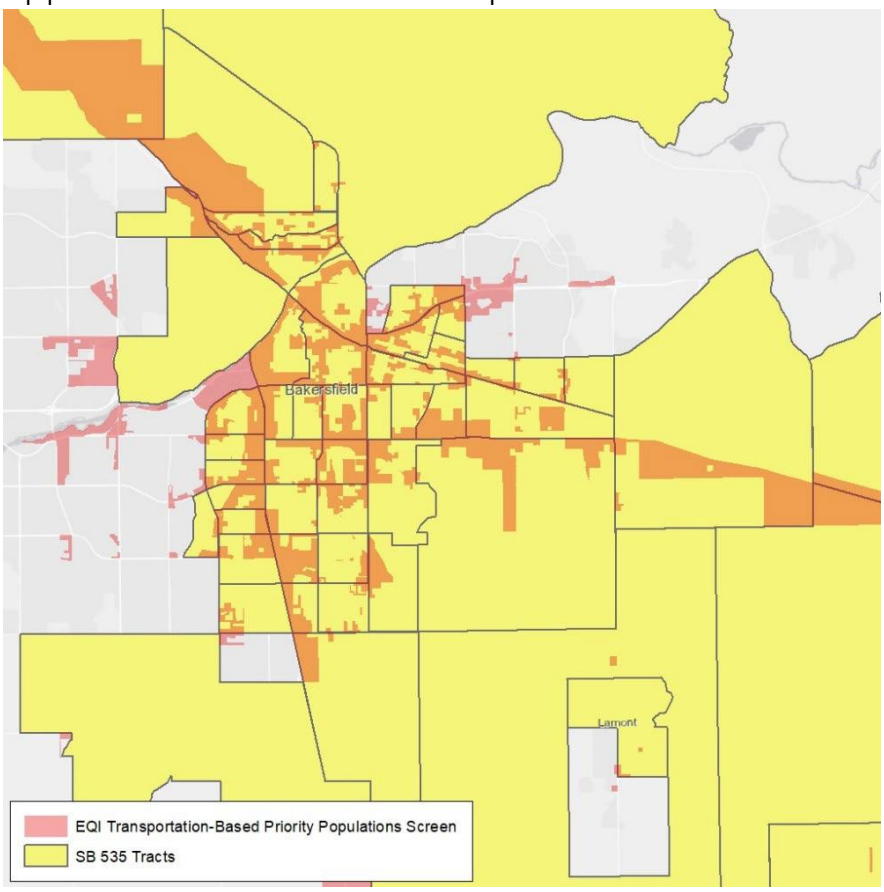

Figure A6-3: EQI/CalEnviroScreen comparison in Bakersfield, CA.

The Los Angeles example below (Figure A6-4) shows a fair amount of overlap between CalEnviroScreen and EQI as well, although EQI provides significantly more coverage in Orange County, and somewhat-less in Los Angeles County.

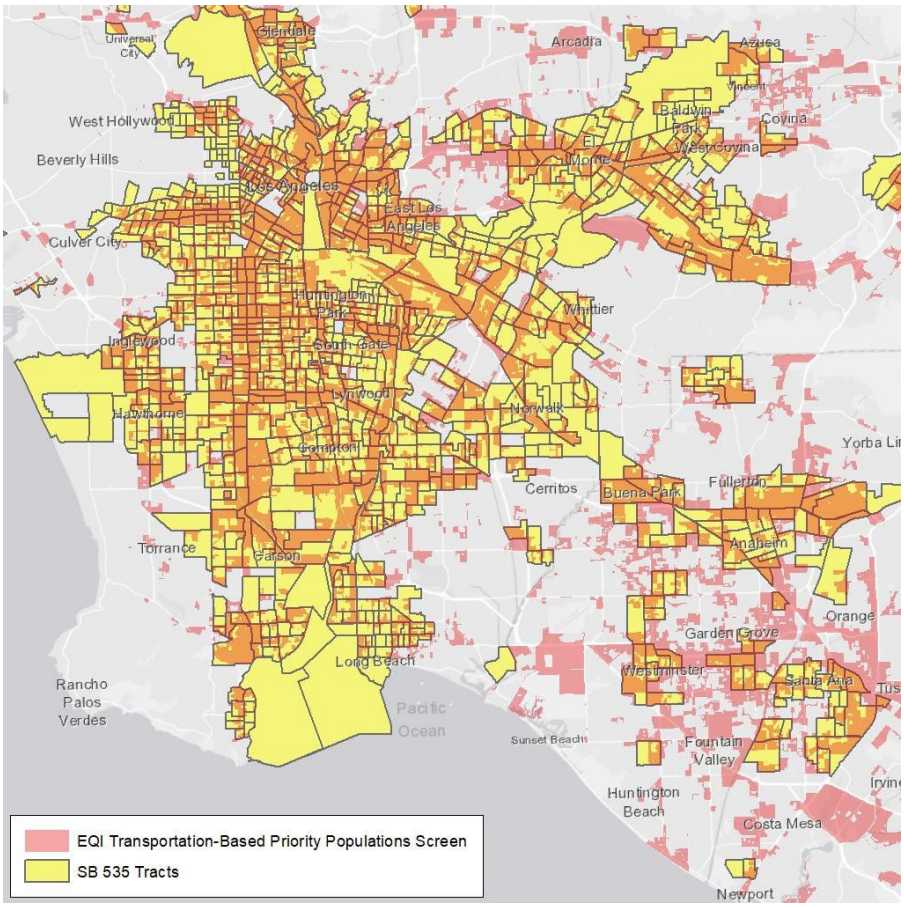

Figure A6-4: EQI/CalEnviroScreen comparison in Los Angeles, CA.

Lastly, the San Francisco Bay Area example (Figure A6-5) shows the overlap between CalEnviroScreen Census tracts and the EQI Traffic Exposure Screen. The EQI Traffic Exposure Screen was shown here instead of the Transportation-Based Priority Populations Screen since the Transportation-Based Priority Populations Screen has lower Bay Area coverage due to its relatively high multimodal access to destinations. This was also true with CalEnviroScreen, where only a few Census tracts in San Francisco were covered. However, the EQI Traffic Exposure Screen---which looks at socioeconomic data, traffic proximity and volume data, and crash data---screens many Bay Area geographies.

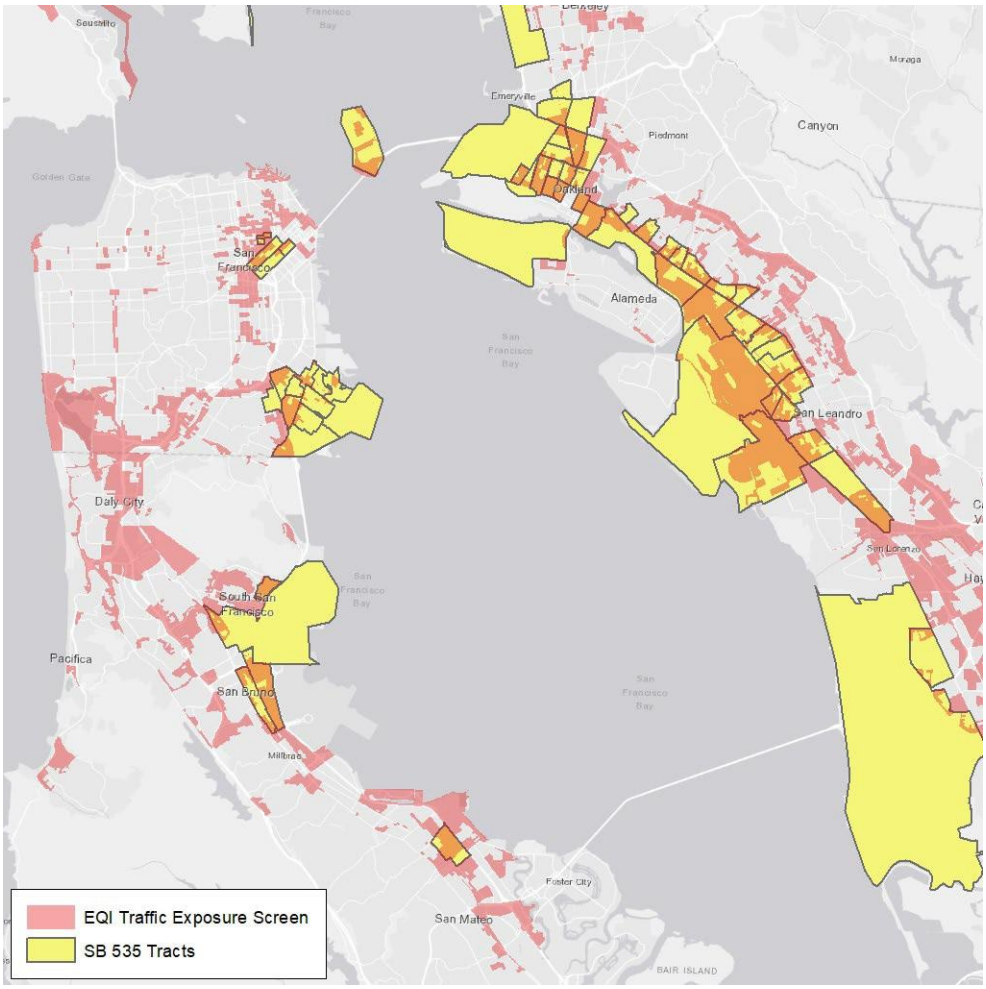

Figure A6-5: EQI/CalEnviroScreen comparison in the bay area, CA.

At the statewide level, EQI's Transportation-Based Priority Populations Screen and CalEnviroScreen's SB 535 tracts cover 16% and 25% of the state's population respectively. CEJST covers approximately 38% of the state's population given its broader range of indicators. Figure A6-6 shows how these population coverages vary by county between the three tools[21]. Overall, the EQI Transportation-Based Priority Populations Screen covers a smaller share of each county's population than the other two tools. There are also counties (especially in more rural parts of the state) where CalEnviroScreen and CEJST provide much higher coverage than EQI due to their non-transportation indicators.

[21] This comparison shows the EQI's Transportation-Based Priority Populations Screen, which is one of three screens developed for the tool. The other screens would show different results.

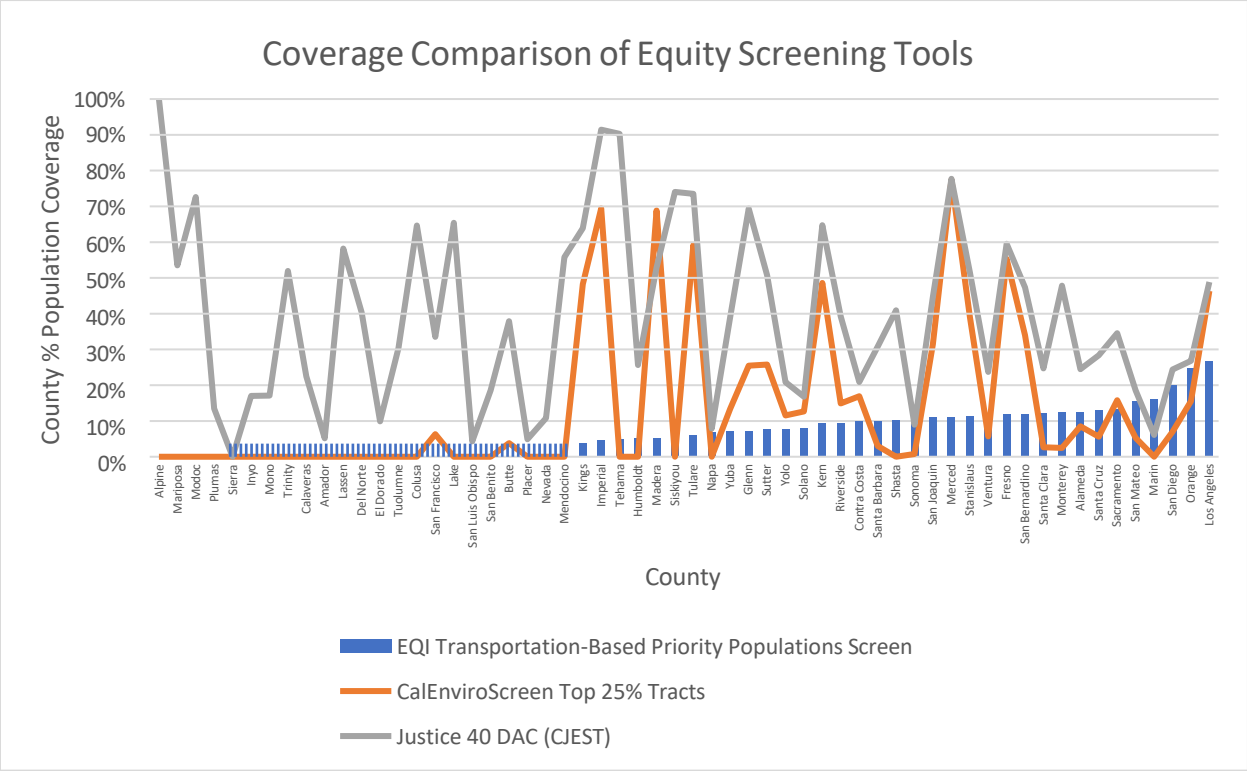

Figure A6-6: Population coverage comparison between spatial equity screening tools by county.