Comparison of indicators used in the two methods

EJSM	ARB Proposed Screening Method
Land Use	***Land Use***
Sensitive (daycare, schools, etc) Rail Ports Refineries Airports Intermodal	****ARB Port &Rail Risk Assessment****
Point source hazards	***Point source hazards***
CHAPIS DTSC Chrome platers	
Health risk and exposure	***Health risk and exposure***
RSEI Resiratory Hazard Index (NATA) Cancer Risk (CATA) PM2.5 concentration Ozone concentration	RSEI Resiratory Hazard Index (NATA) **Cancer Risk (NATA)** PM2.5 concentration **# days exceeding ozone standard** **ARB diesel risk calculation** ****ARB Port &Rail Risk Assessment****
Social/health vulnerability	***Social/health vulnerability***
% residents of color (non-White) % < 200% national poverty level Home ownership Housing value Educational attainment Age of residents (% <5) Age of residents (% >60) Linguistic isolation Voter turnout Birth outcomes	% < 200% national poverty level

Summary Comparison of Methods

EJSM

- 24 indicators – 3 classes
  - Haz proximity and land use
  - Health risk/exposure
  - Social/health vulnerability
  - Closely follows ARB "handbook"
- Hazard proximity analysis
  - Neighborhood-sized areas
  - Distance-weighted counts
  - Population-weighted to tracts
- Scoring
  - Quintile ranking (5 classes)
  - No averaging used in scoring
  - Census tract level
  - Indicators "weighted" equally
  - Final scores mapped to tracts

ARB Proposed Screening

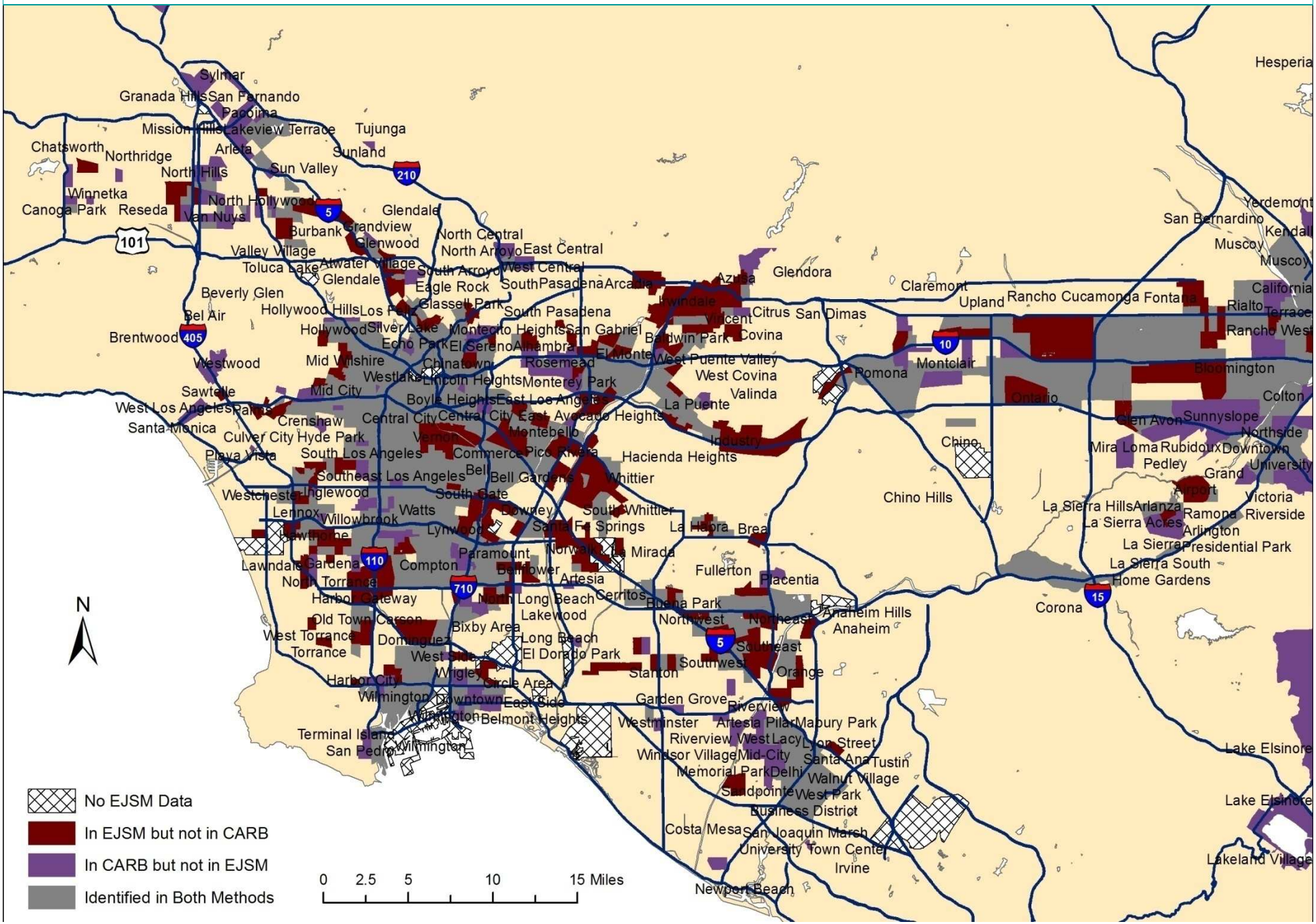
- 8 indicators – 2 classes
  - 7 health risk and exposure
  - 1 characterizes vulnerability
  - No land use indicators; port and rail risk assessment as proxy
- No hazard proximity analysis
  - Use Rail and Port risk as a proxy
- Scoring
  - Tracts decile ranked (10 classes) by risk/exposure values
  - For each tract, highest rank selected and averaged with tract's poverty rank
  - All tracts reranked by this average
  - "Worst" 20% selected
  - Tracts applied to "communities"

Comparison of EJSM to ARB Proposed Screening Method

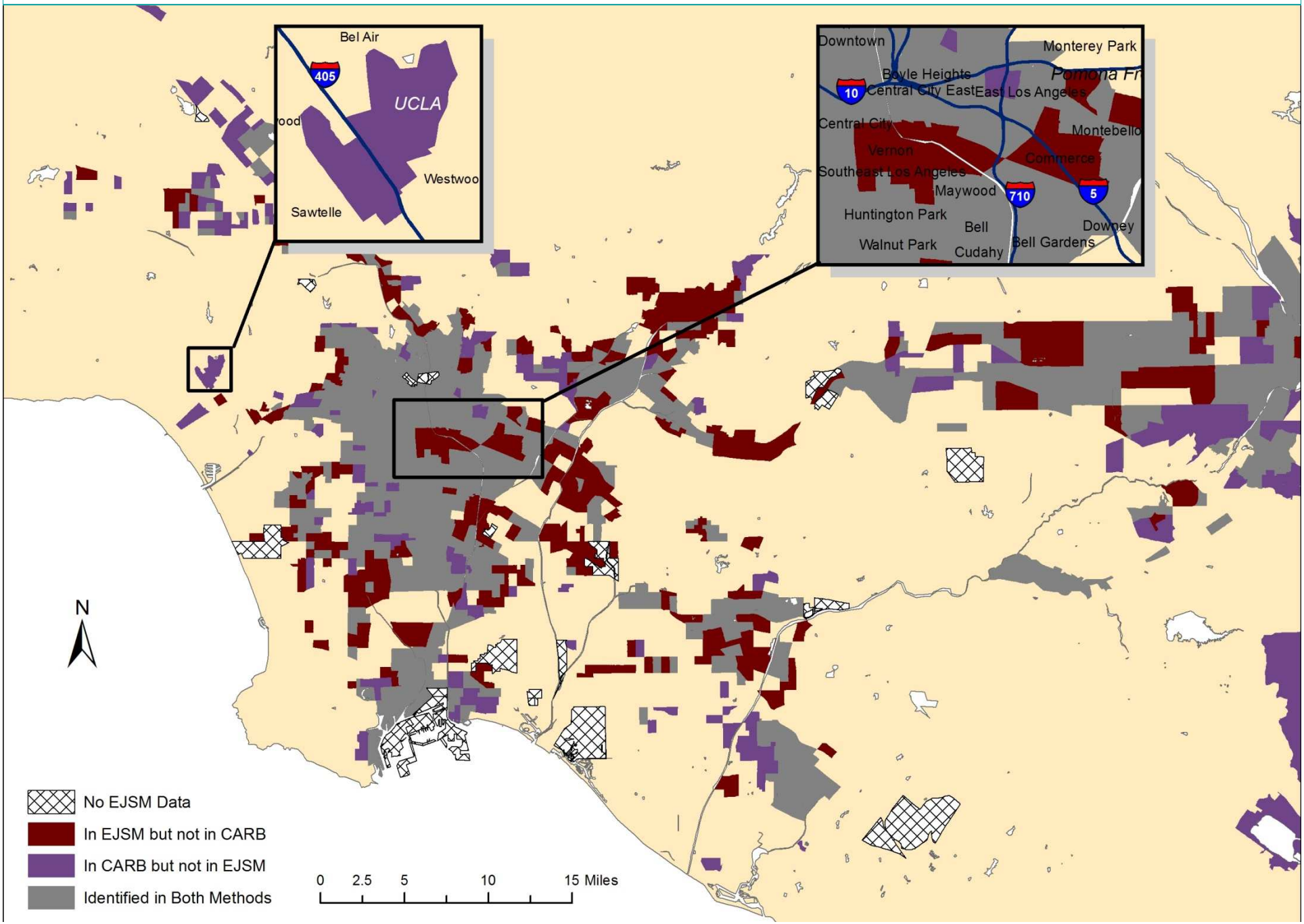
- We attempted to replicate the ARB method in order to compare maps with the EJSM approach

- However:
  - One data set not available (Port and Rail Risk Assessment)
  - Unclear how ARB method assigns tracts to “communities” in final step.

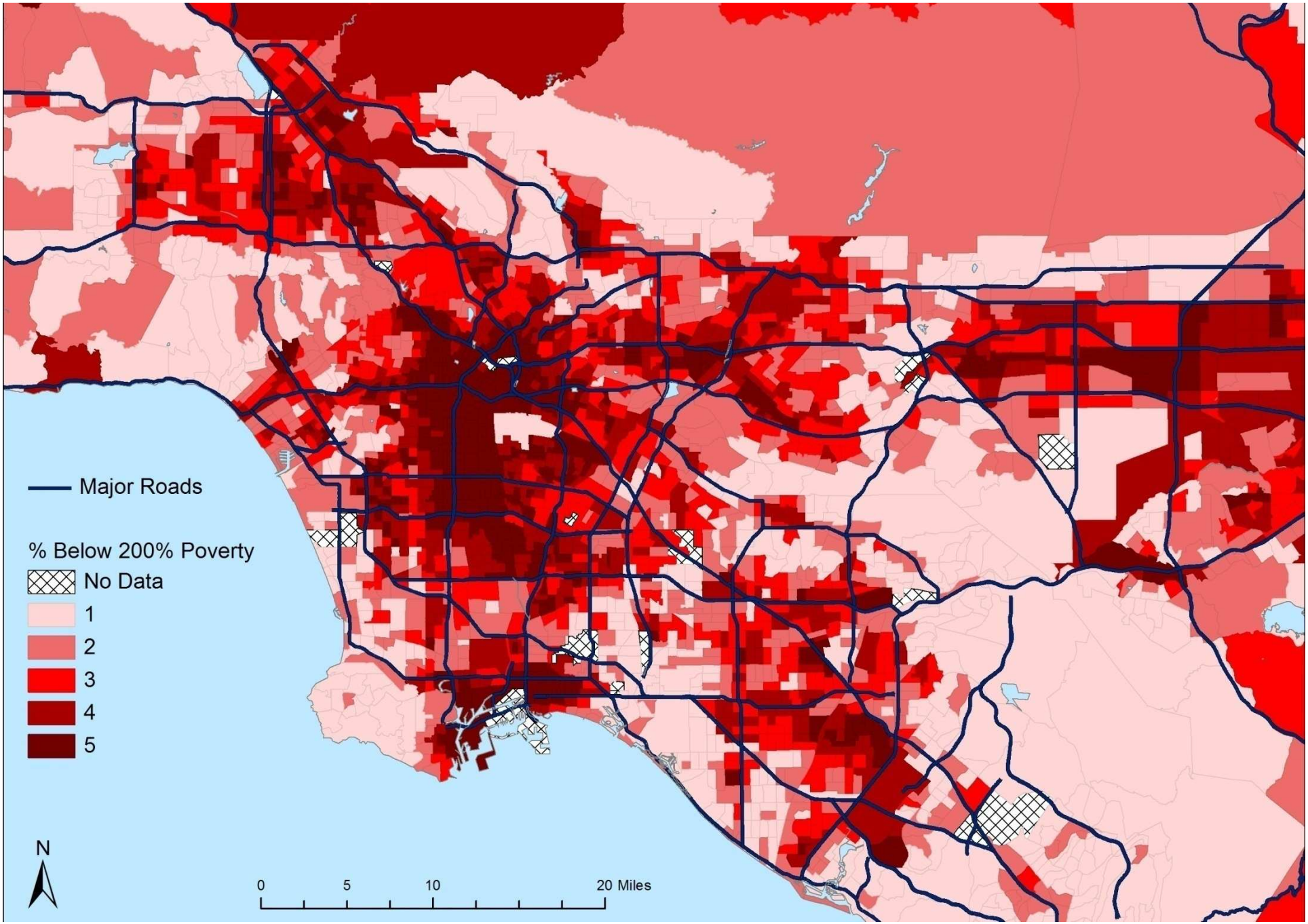
Comparison of EJSM and CARB Method



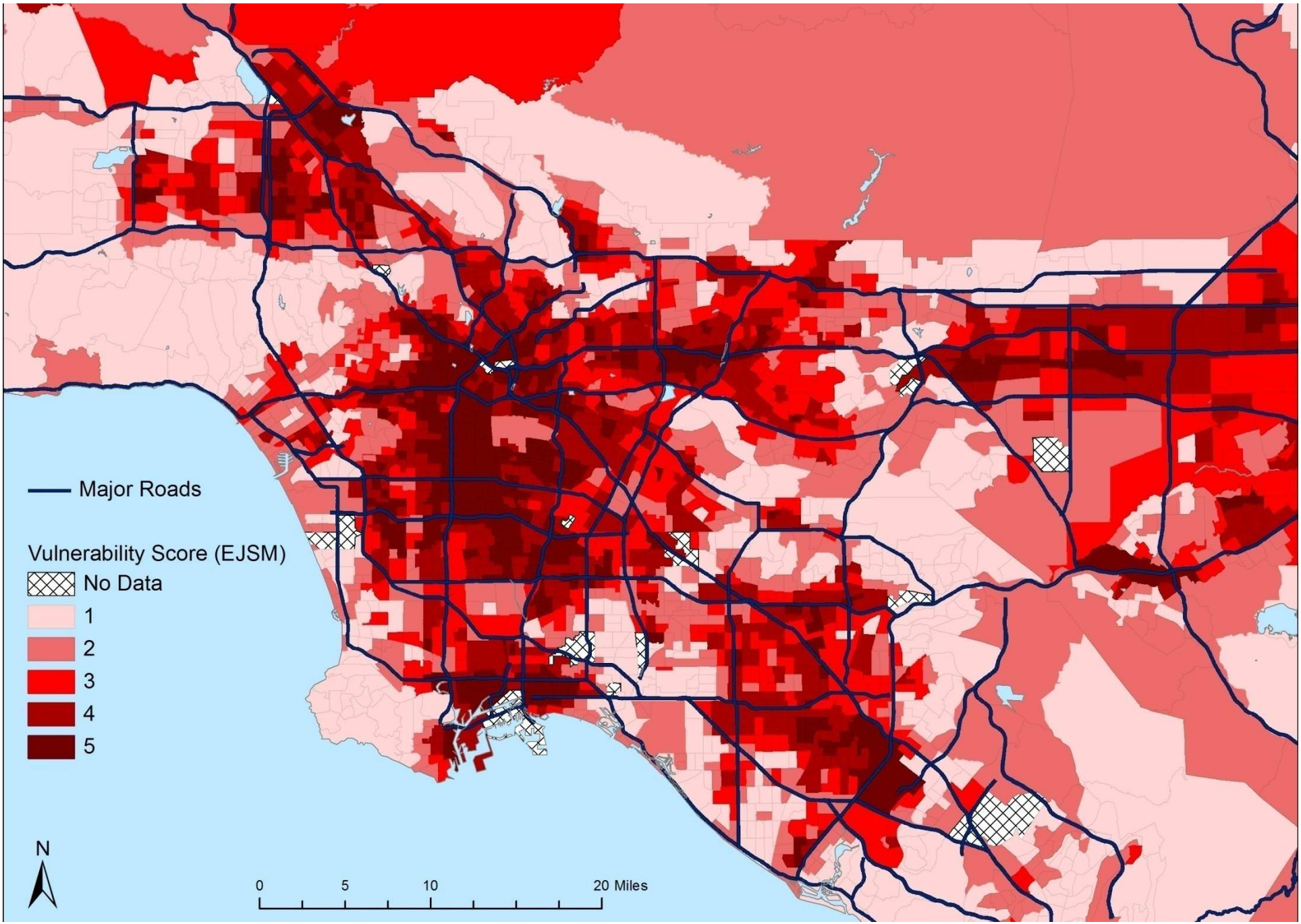
Anomalies of the CARB Method: Identifies UCLA but not Vernon and Commerce



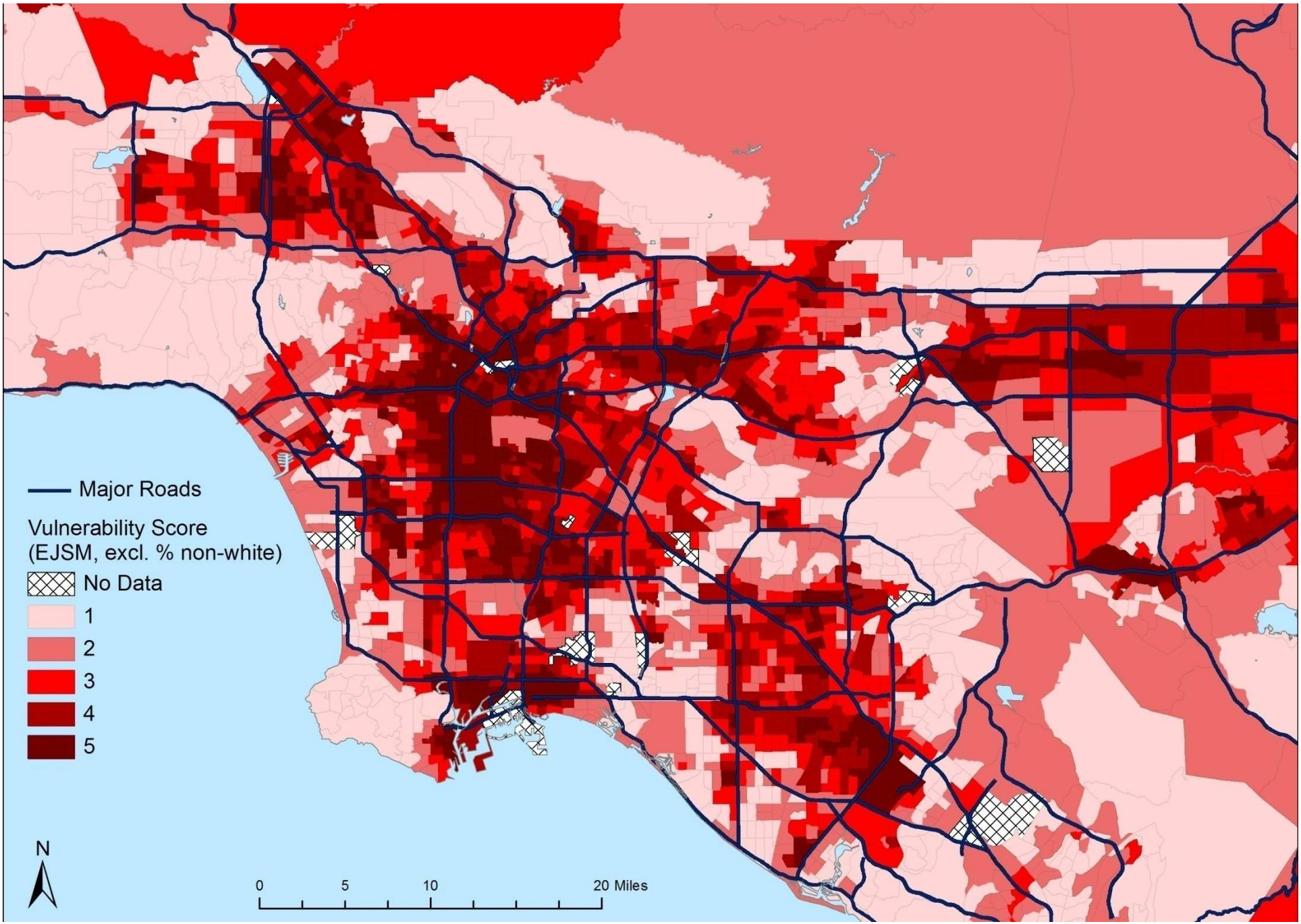
CARB Vulnerability Measure: *Percentage Population Below 200% Poverty Level*



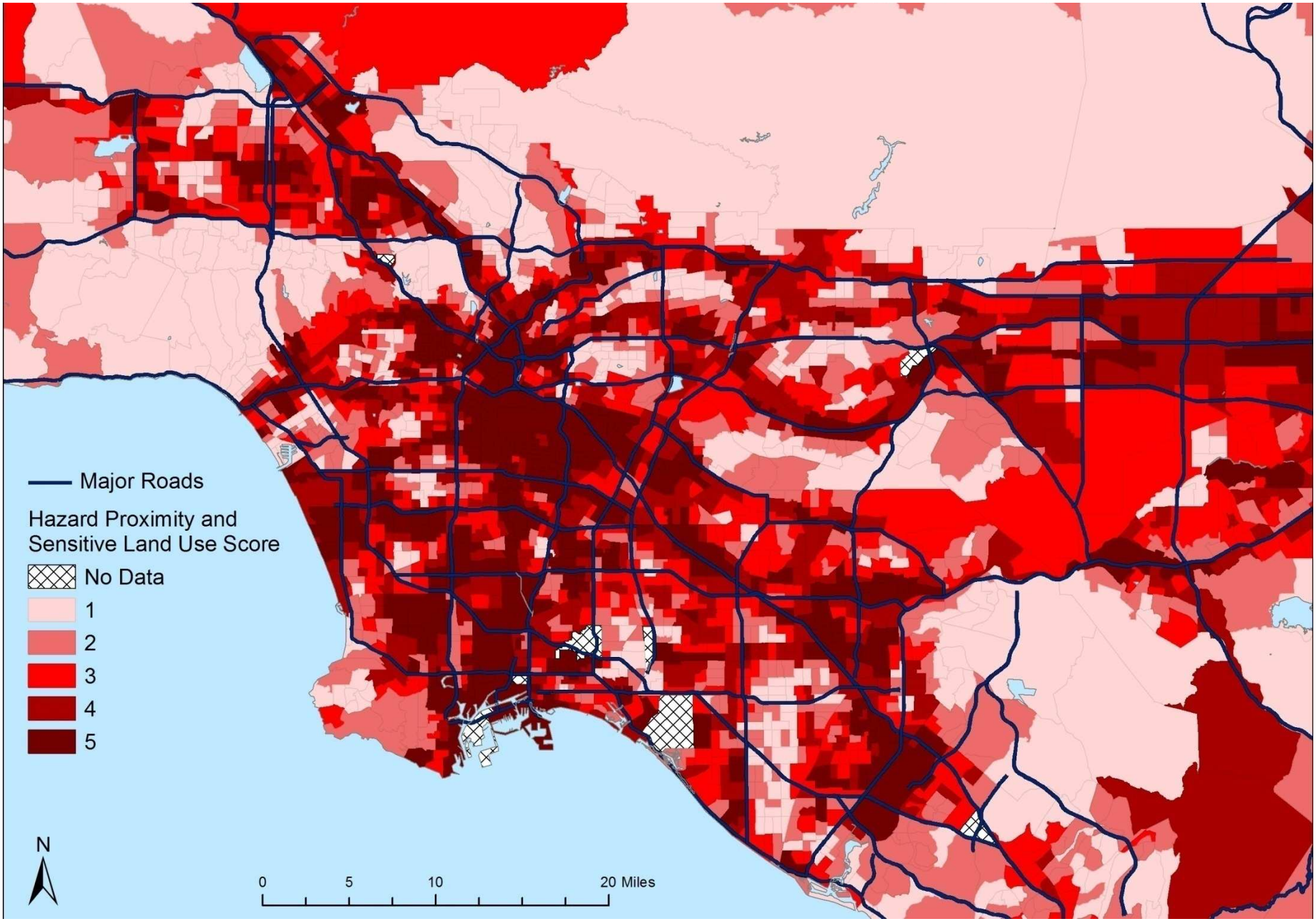
EJSM Vulnerability Measure: *Composite of 10 Different Indicators of Social/Health Vulnerability*



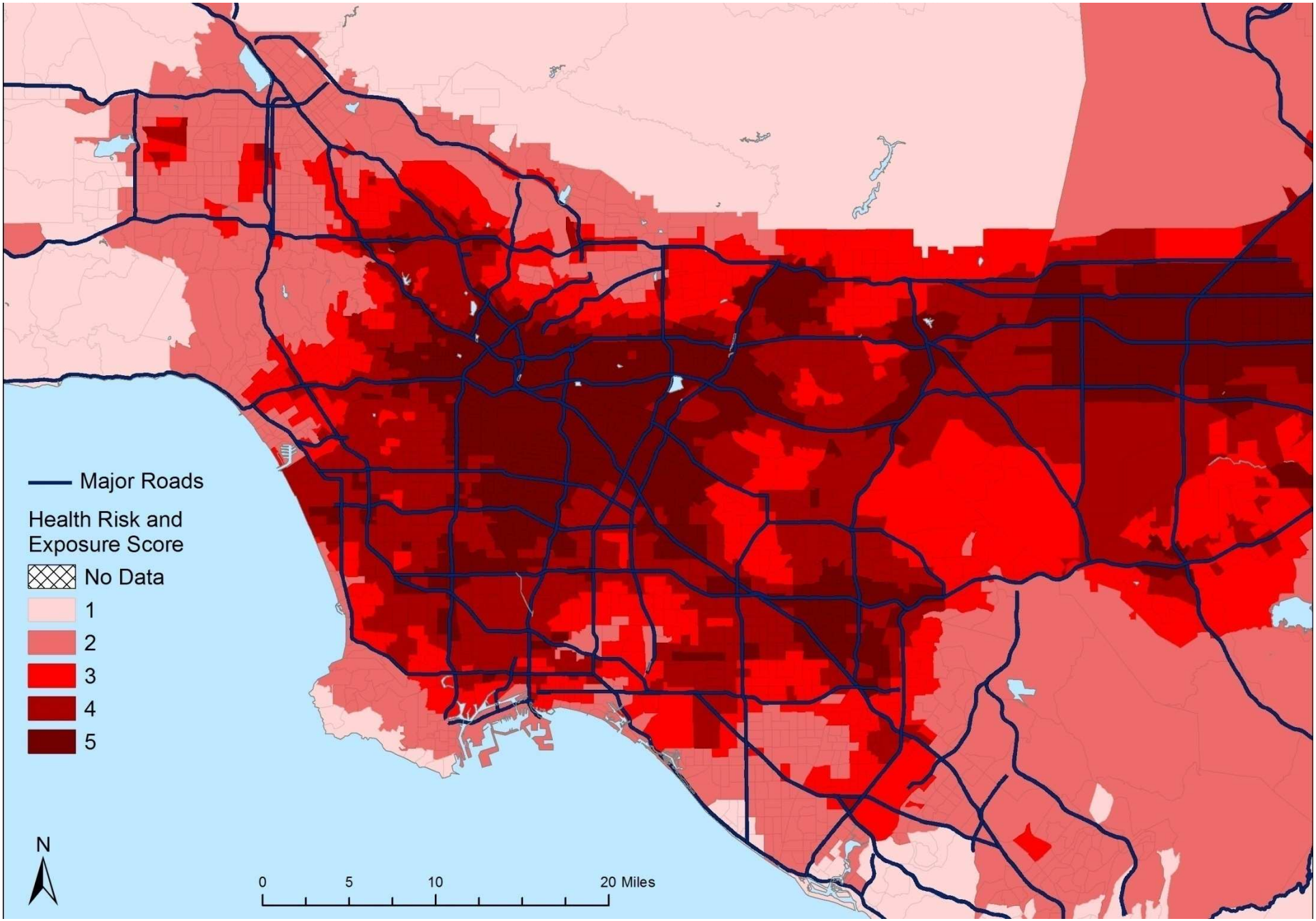
EJSM Vulnerability Measure, Excluding the Race Indicator (the Percentage People of Color)



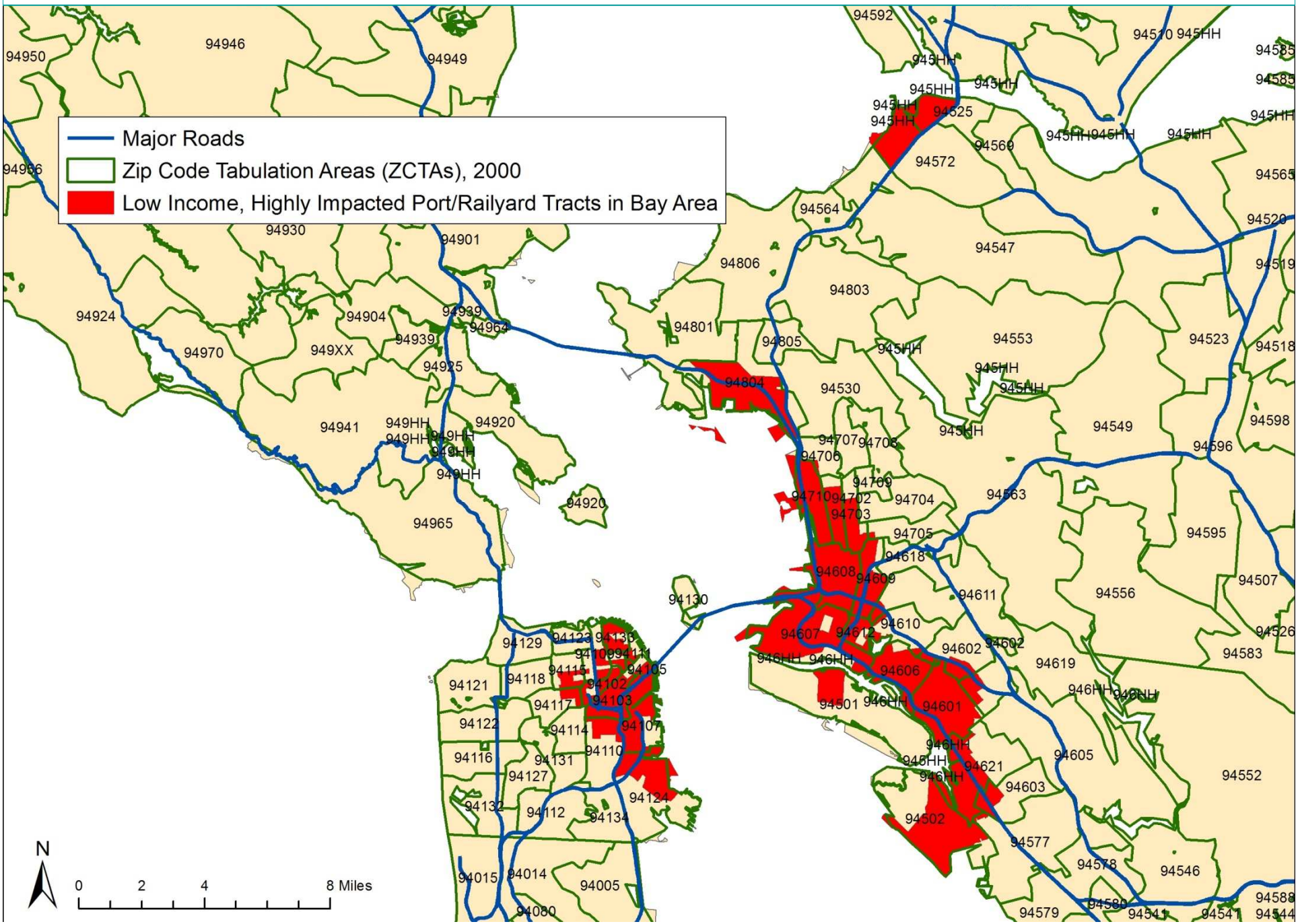
EJSM Hazard Proximity and Sensitive Land Use Measure



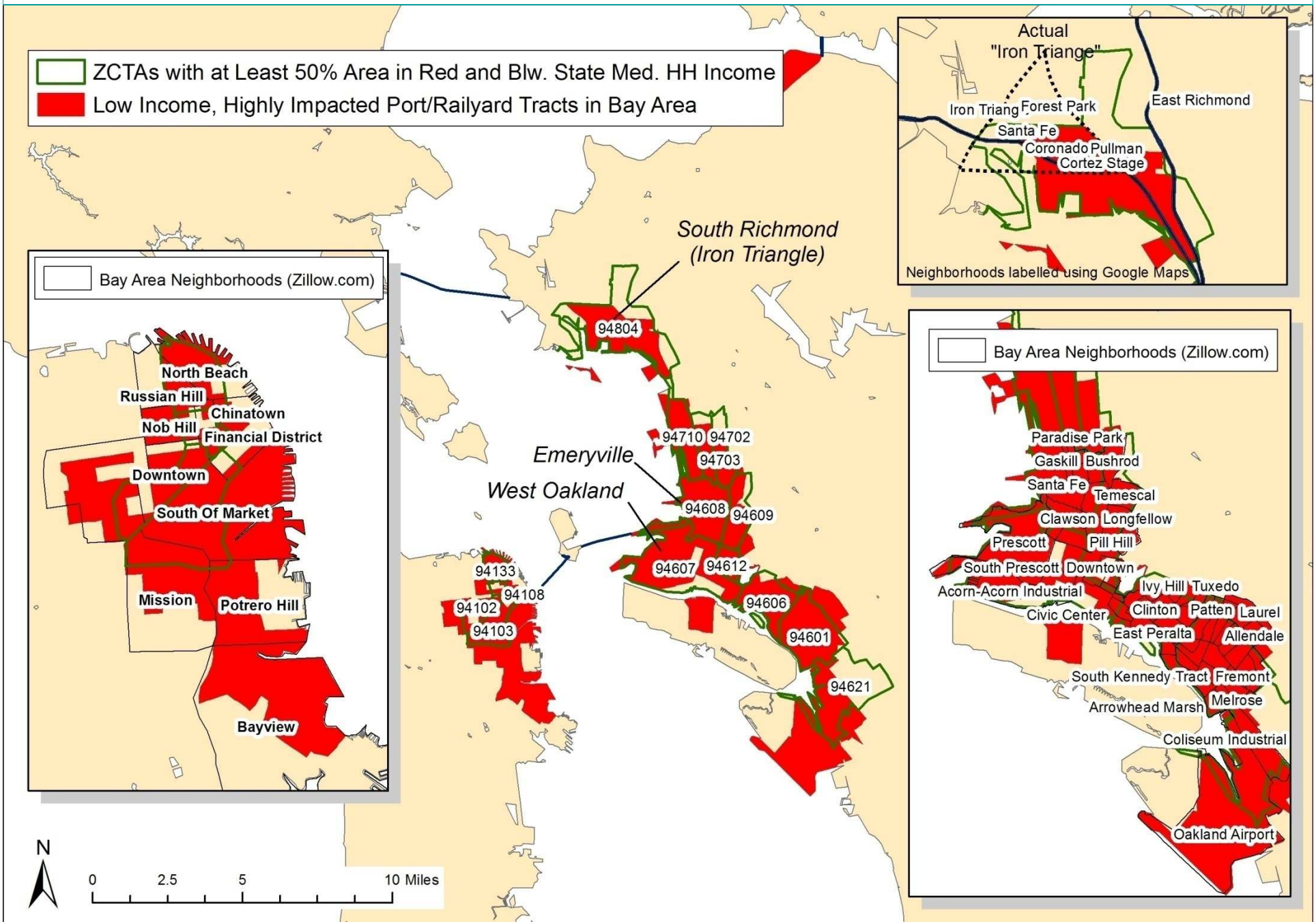
EJSM Health Risk and Exposure Measure



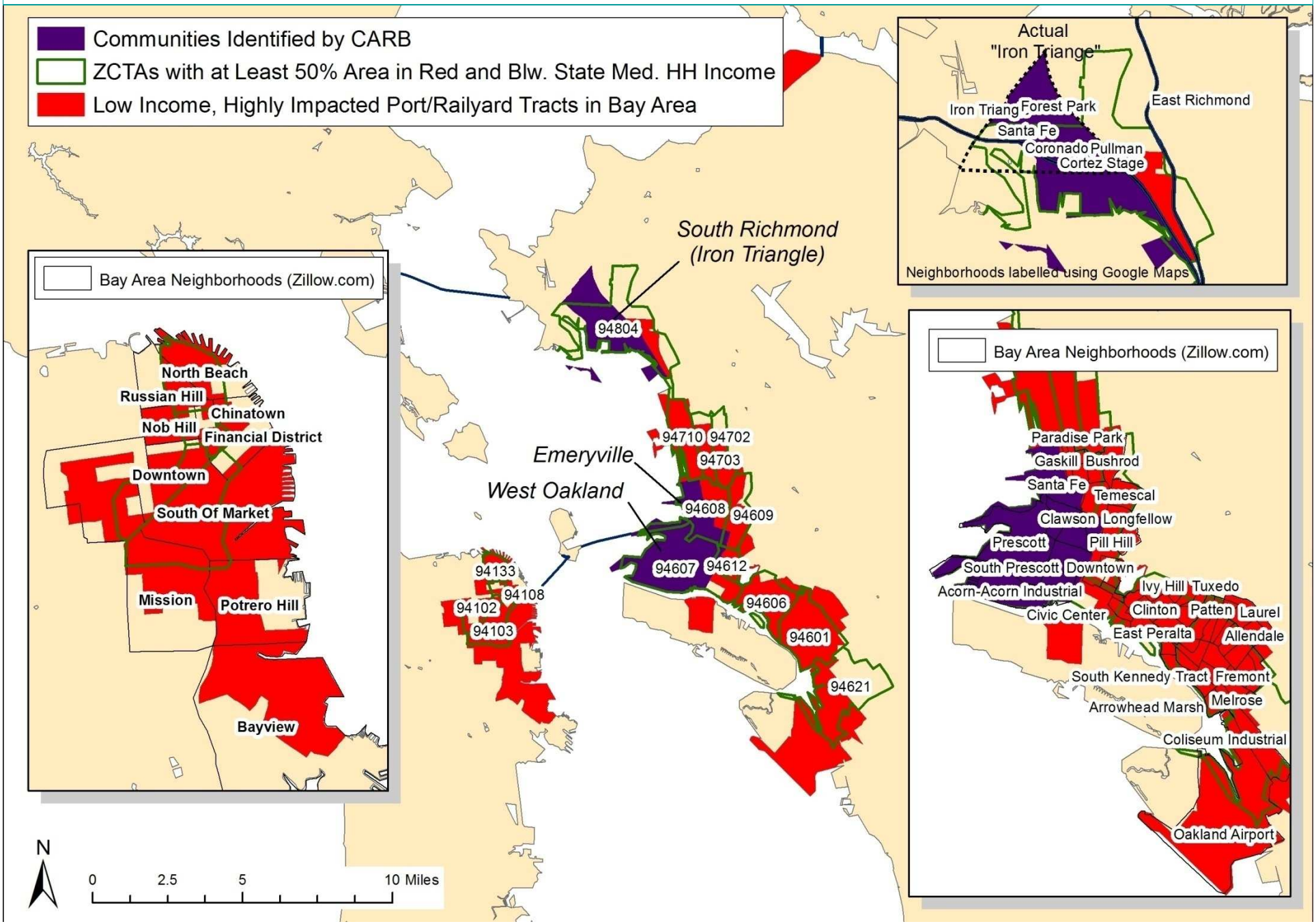
Bay Area: Tracts identified by CARB method with Zip Code Tabulation Area (ZCTA) Overlay



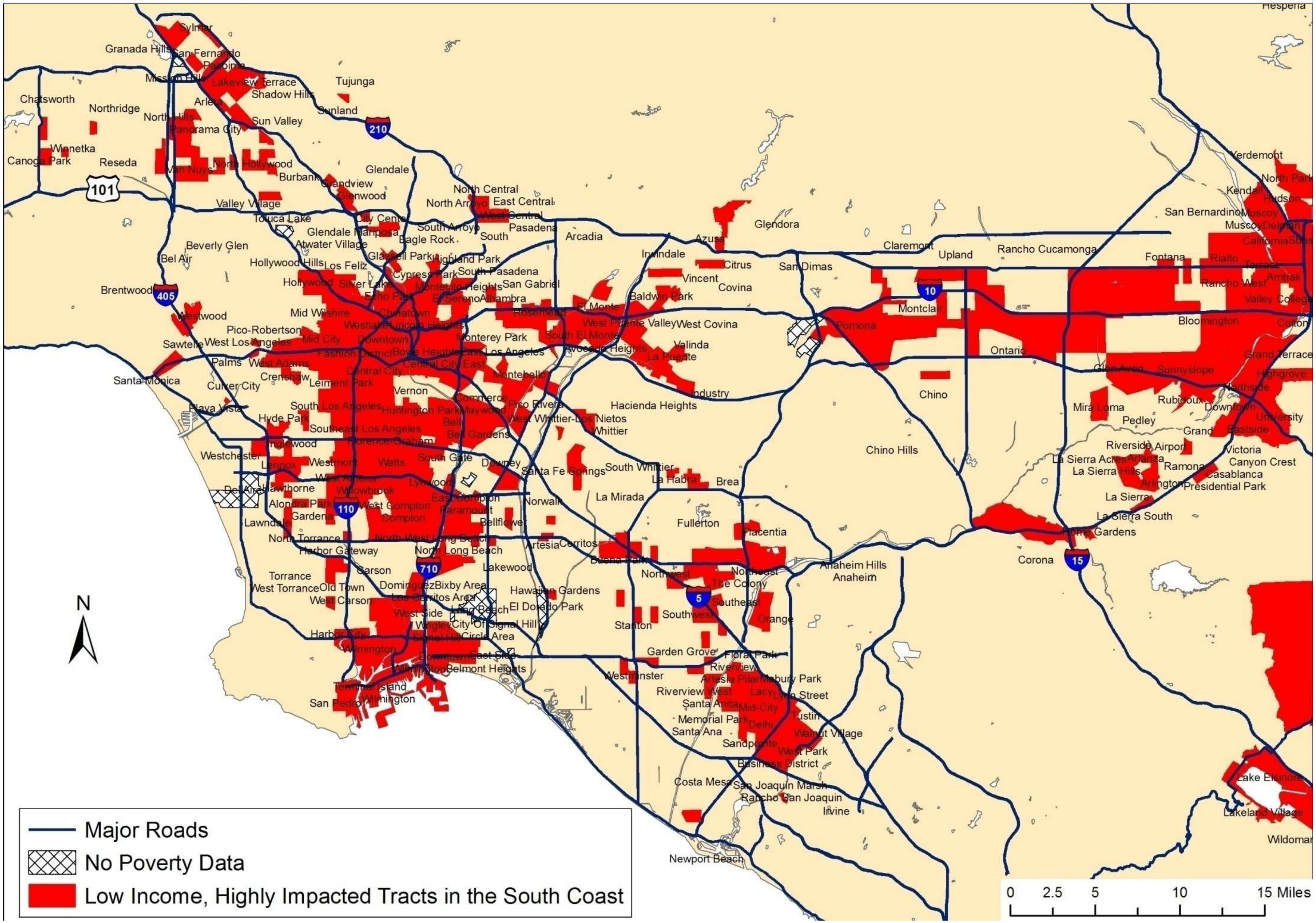
Bay Area: Identifying Communities



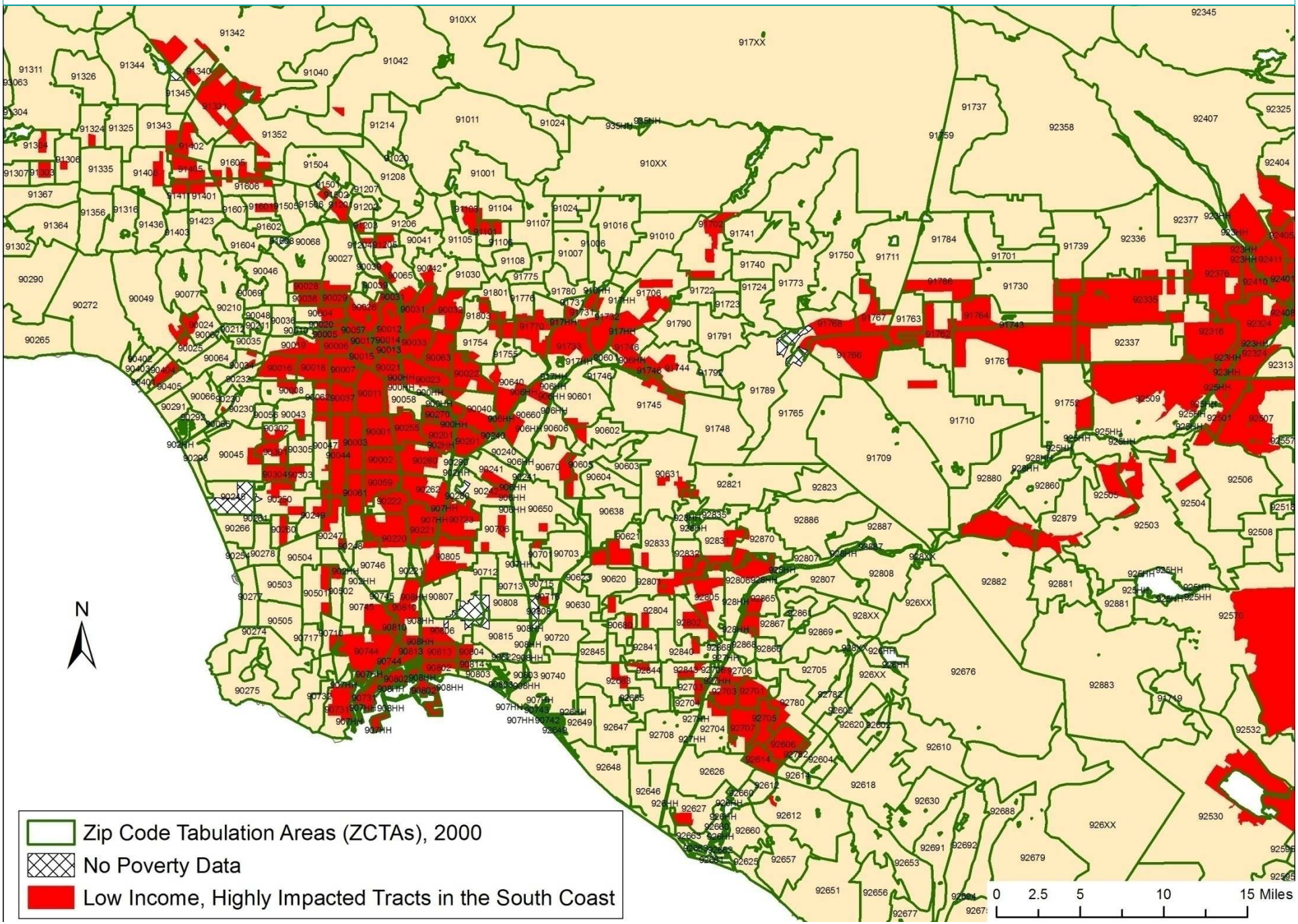
Bay Area: Issues with CARB Method Identifying Communities



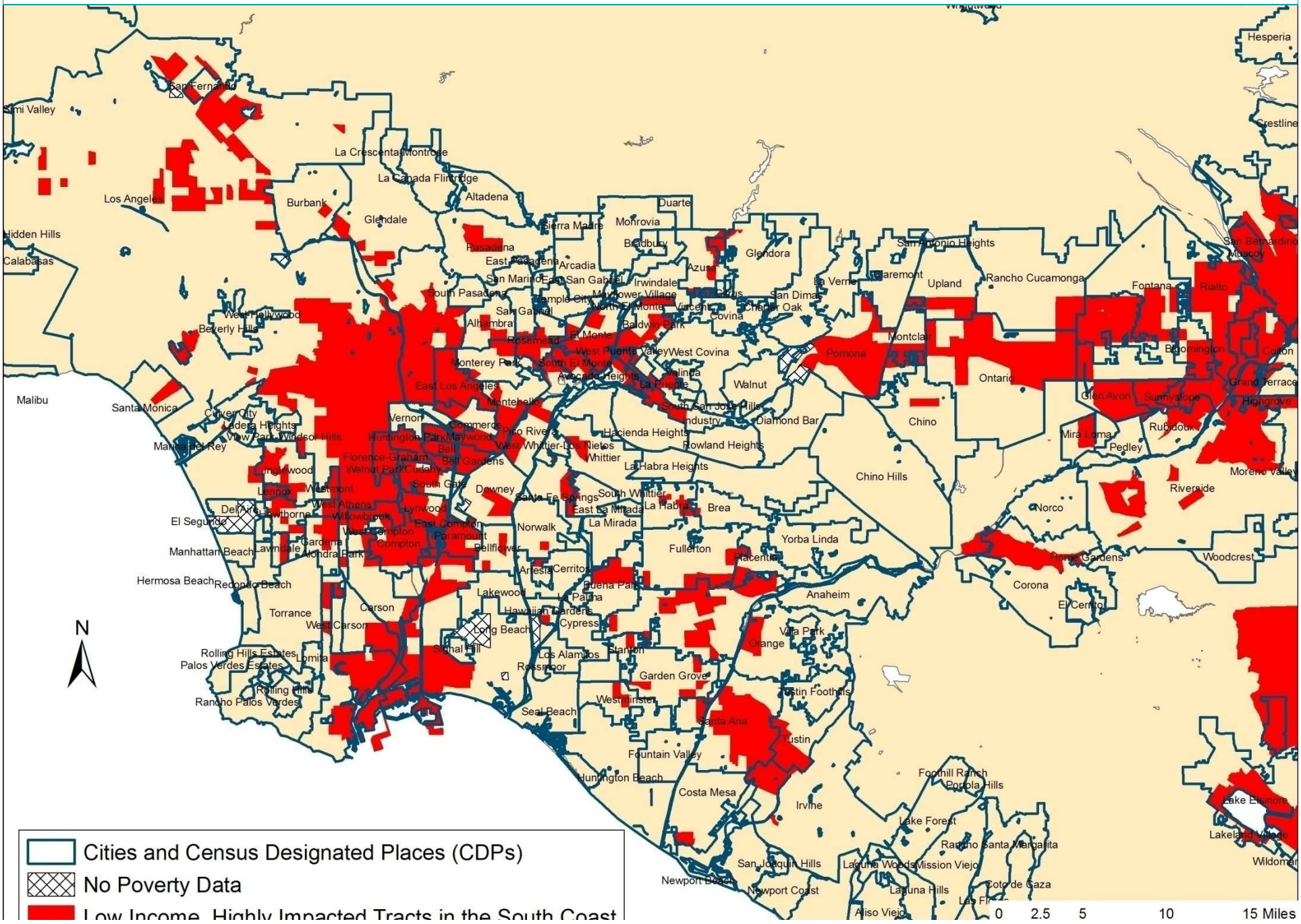
South Coast: Tracts Identified by CARB Method



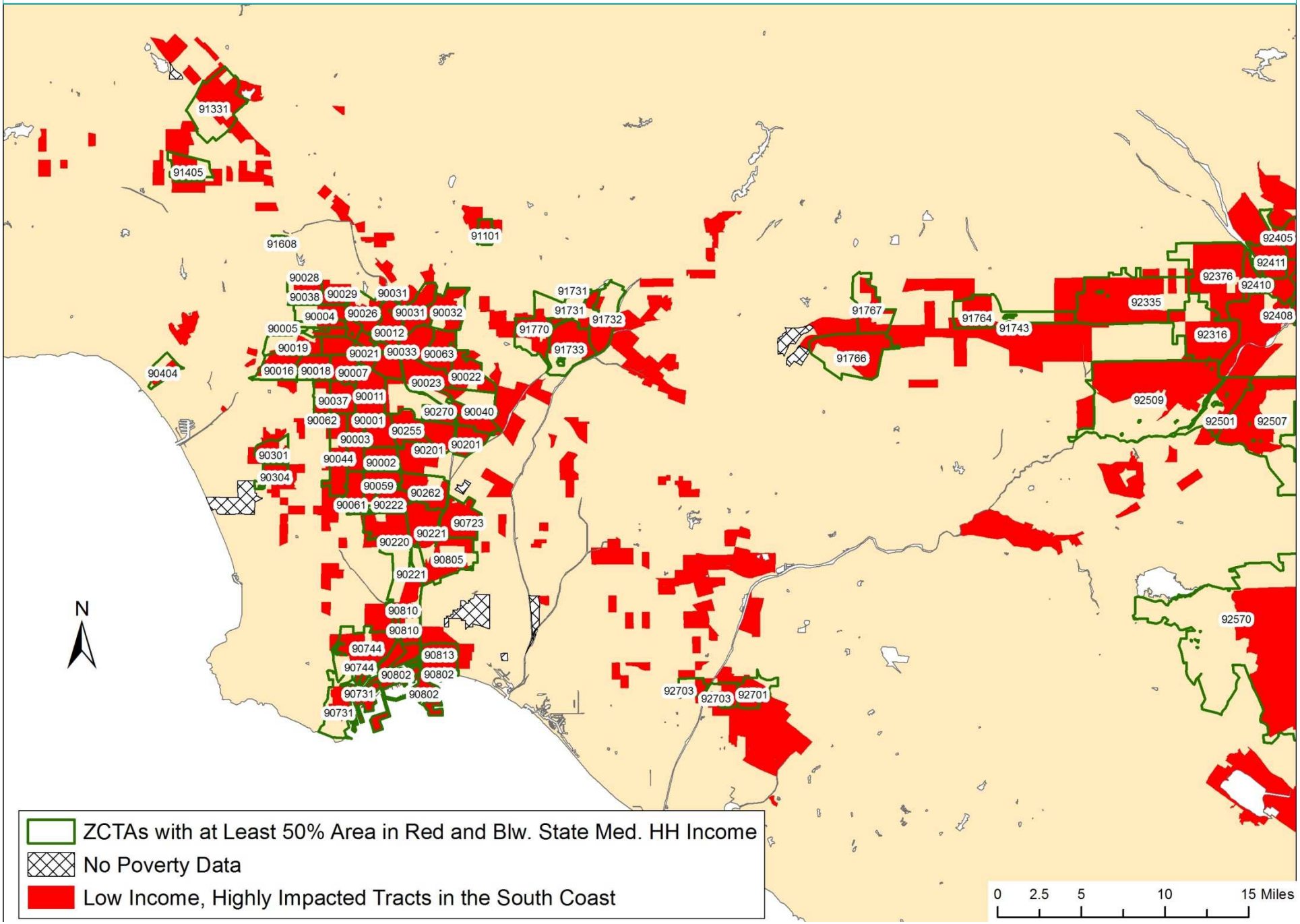
South Coast: Tracts Identified by CARB Method with Zip Code Tabulation Area (ZCTA) Overlay



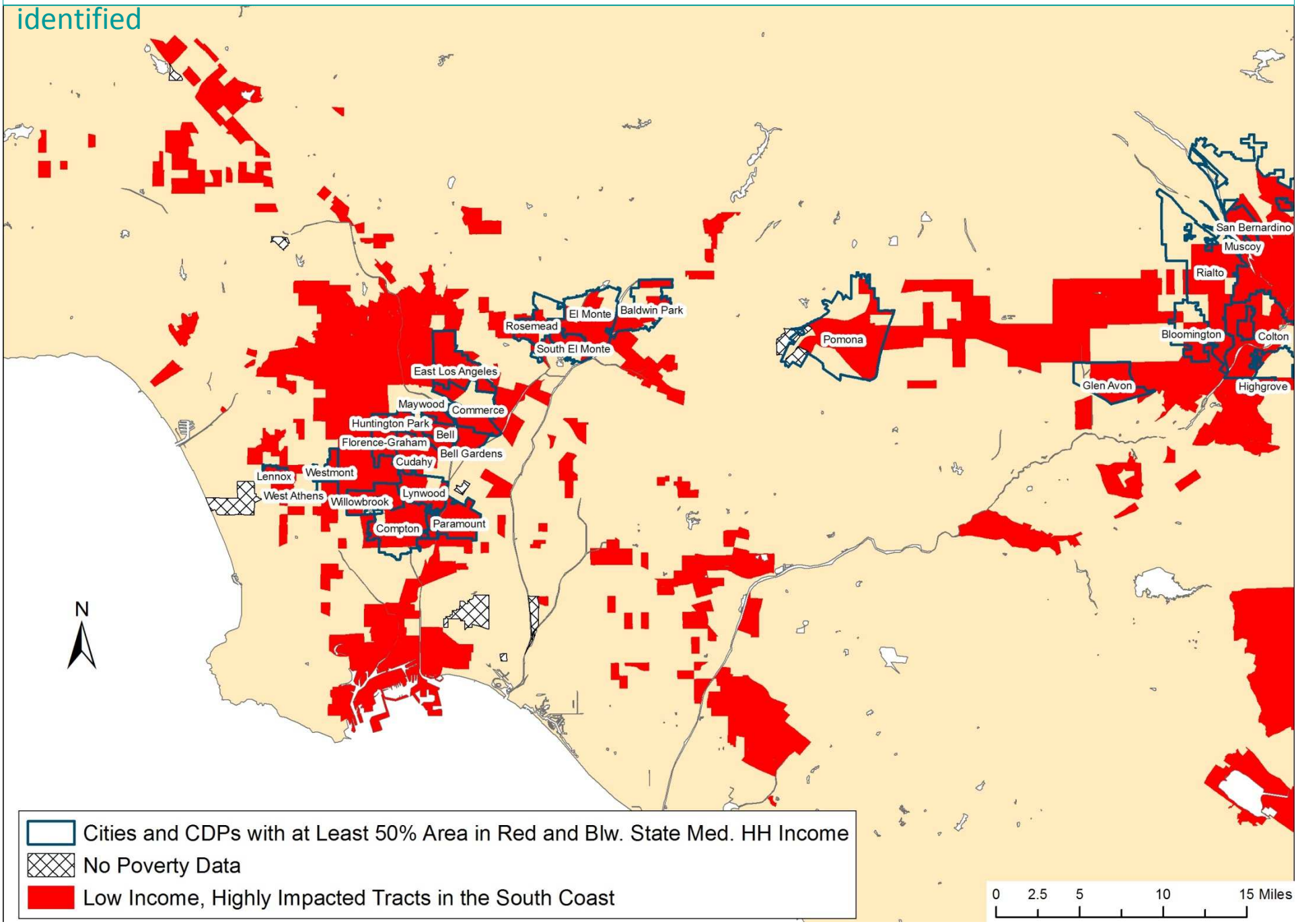
South Coast: Tracts Identified by CARB Method with Cities and CDPs Overlay



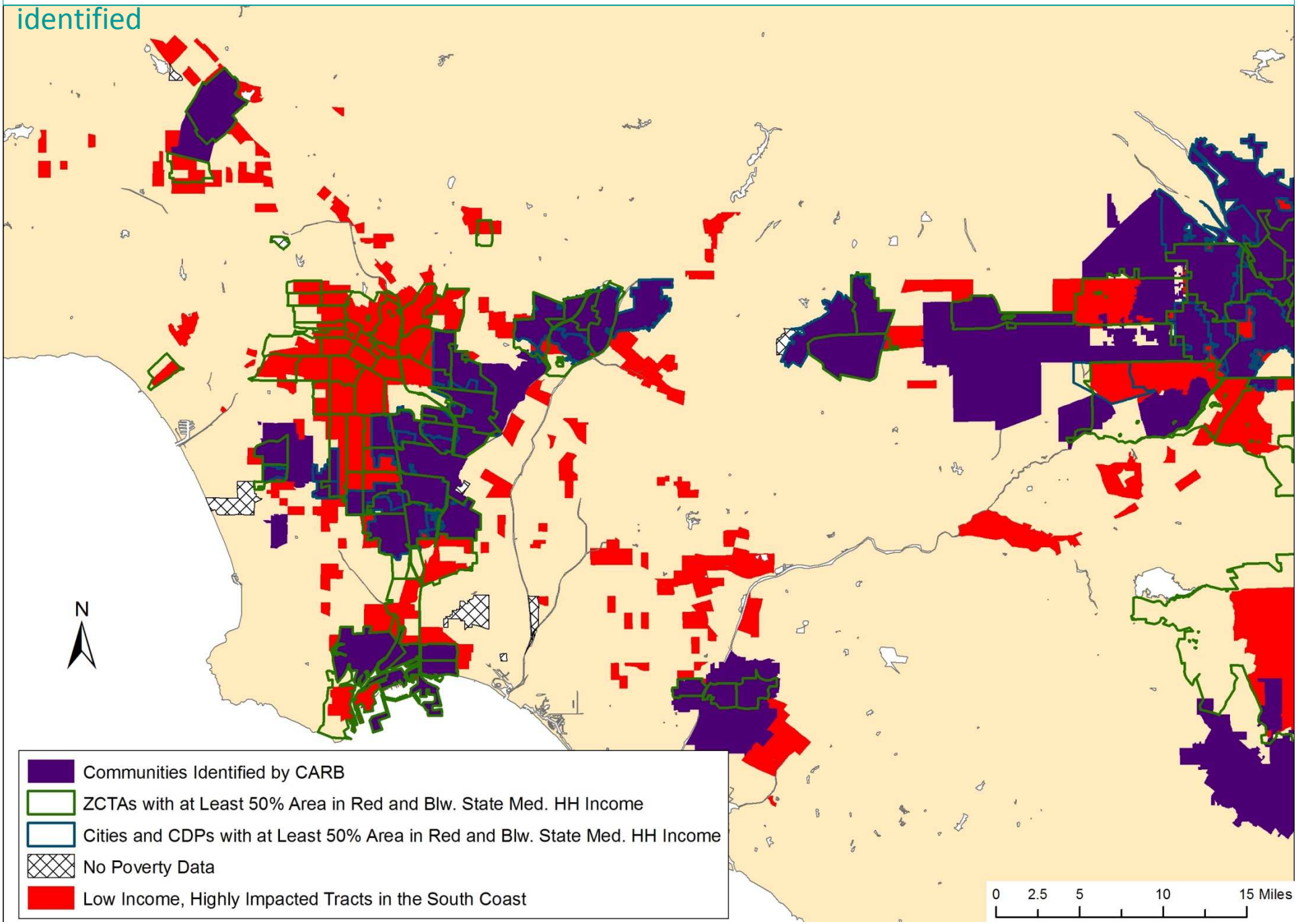
South Coast: Tracts Identified by CARB Method with ZCTAs that should have been identified



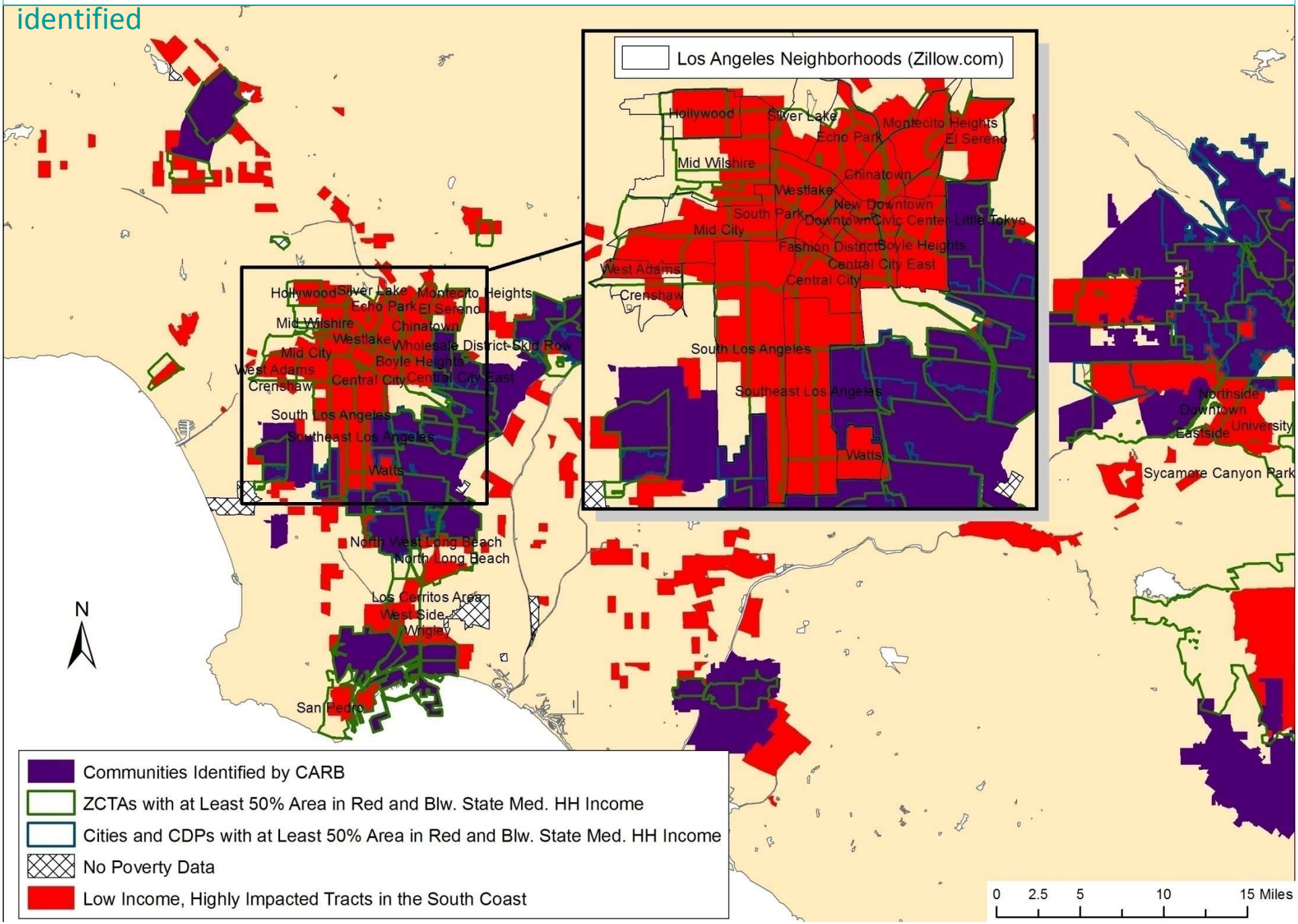
South Coast: Tracts Identified by CARB Method and Cities/CDPs that should have been identified



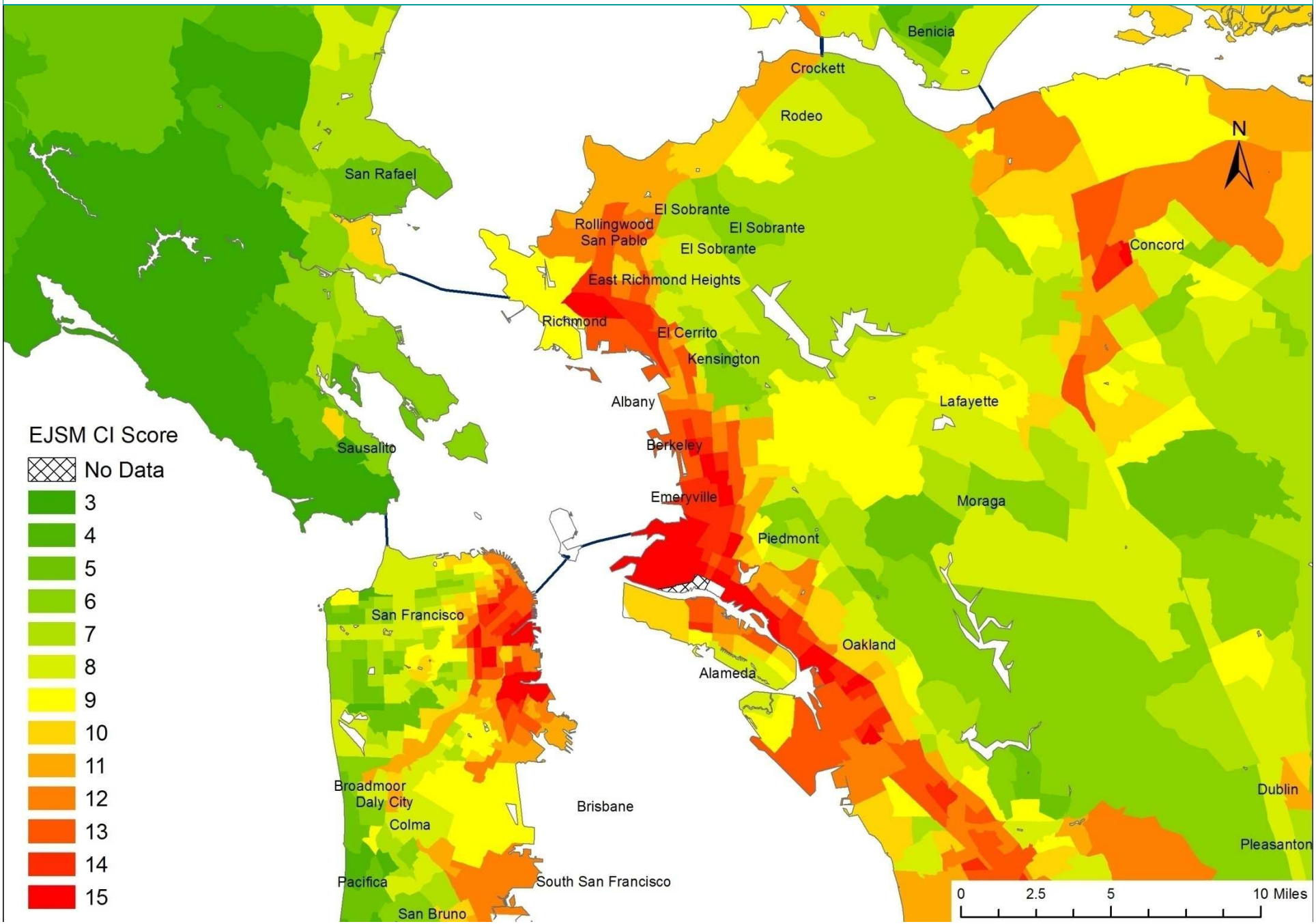
South Coast: Tracts Identified by CARB Method and Cities/CDPs that should have been identified



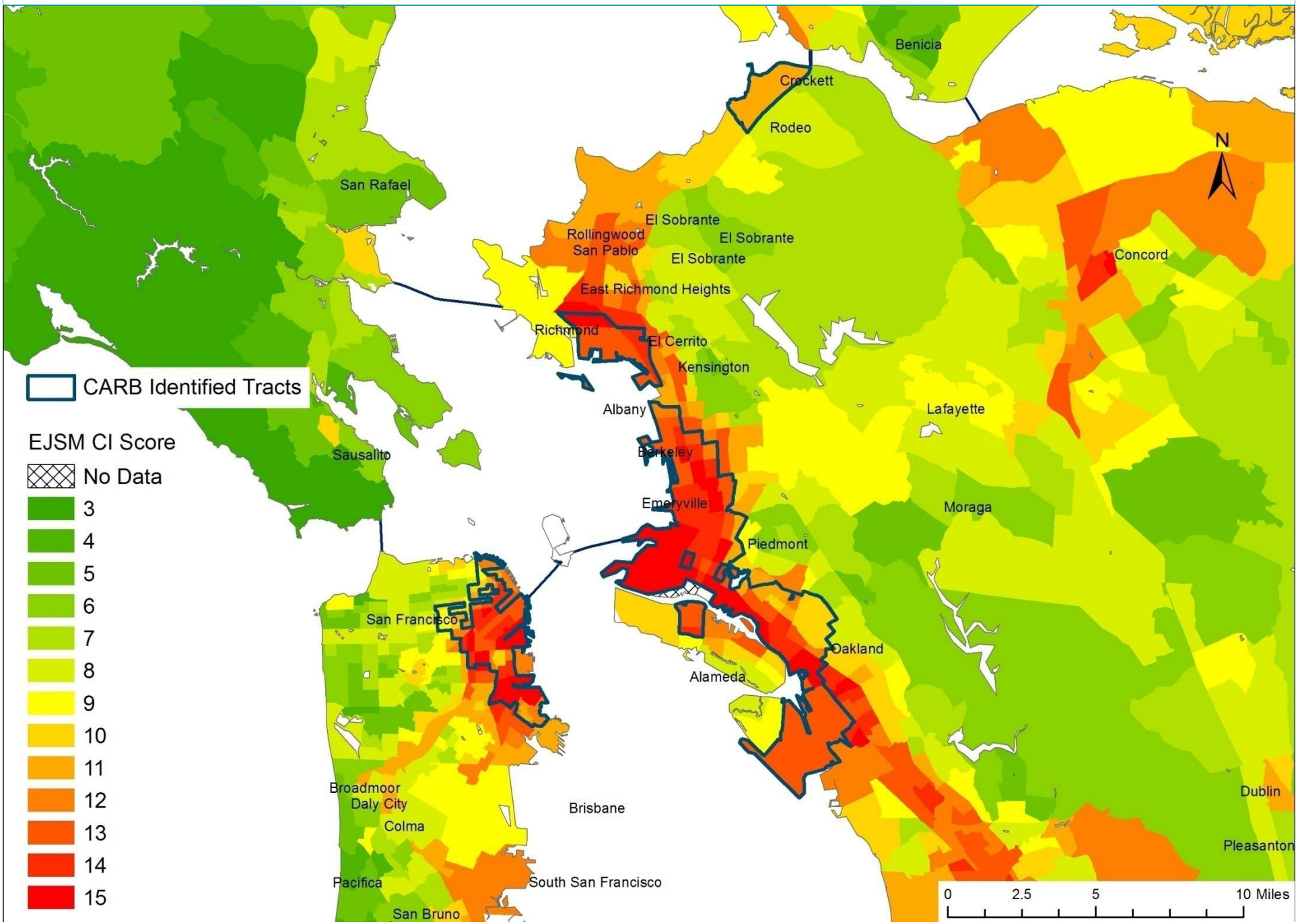
South Coast: Tracts Identified by CARB Method and Cities/CDPs that should have been identified



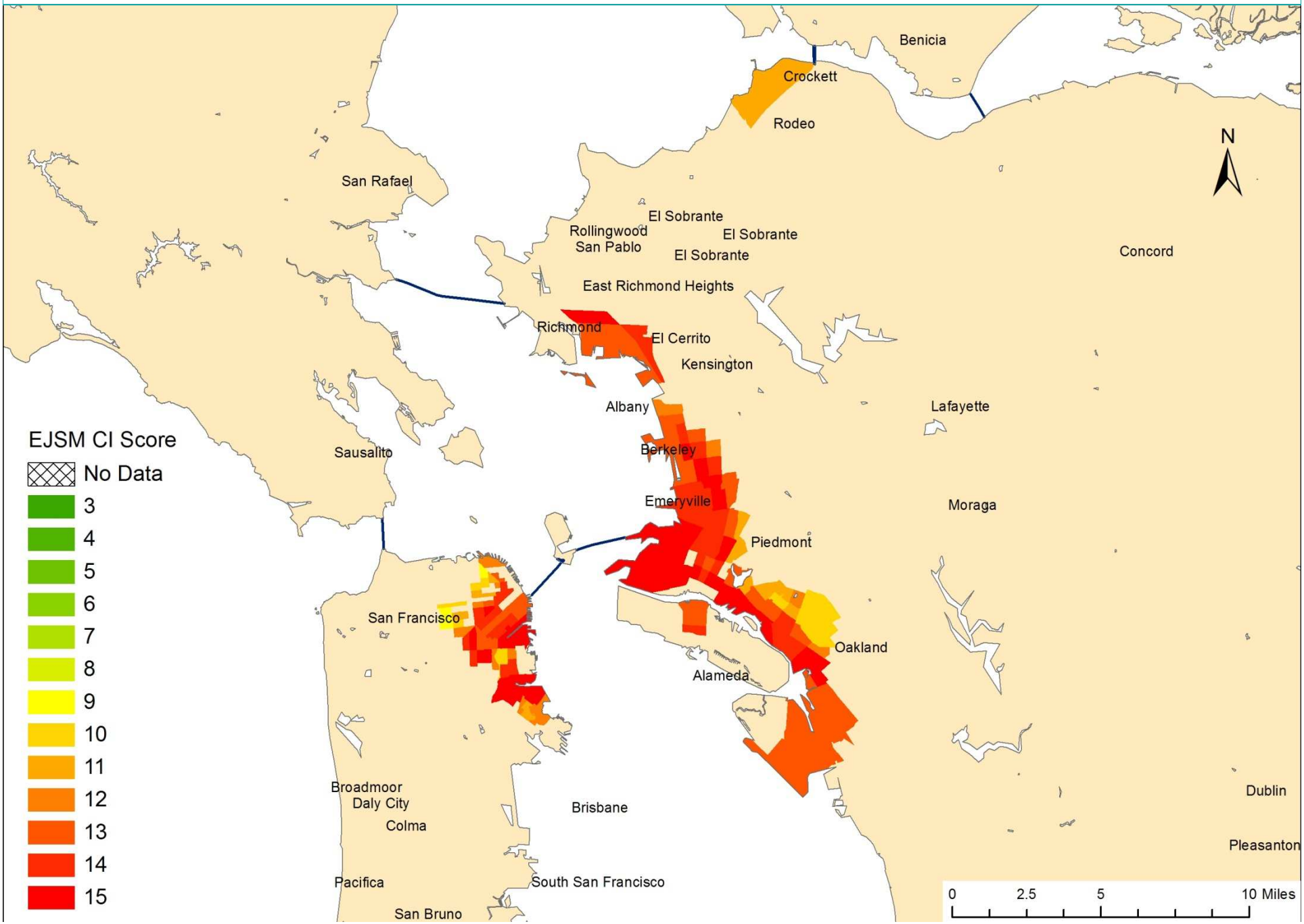
Bay Area: EJ Screening Method Cumulative Impact (CI) Score



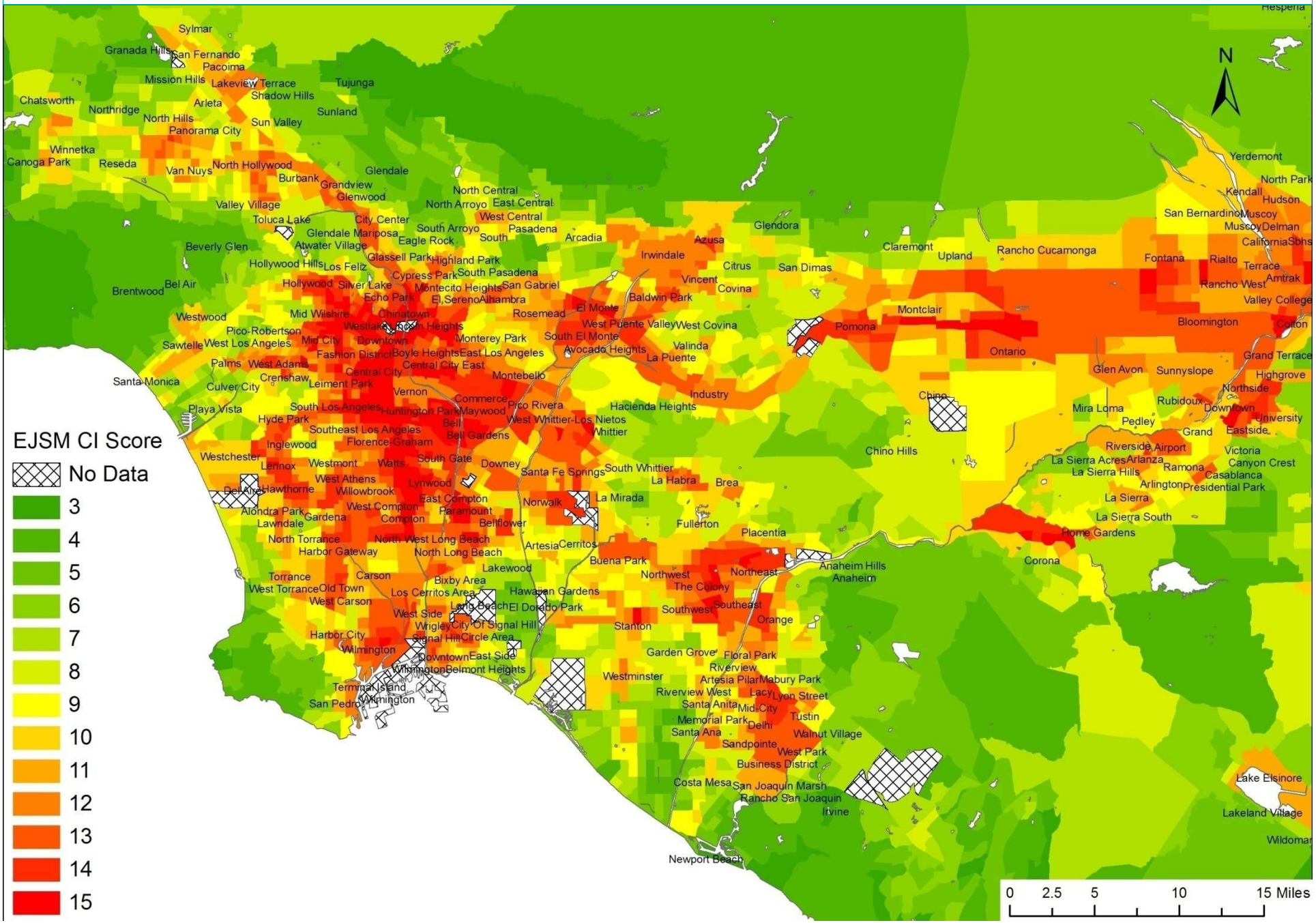
Bay Area: EJ Screening Method Cumulative Impact Score with CARB Identified Tracts Outline



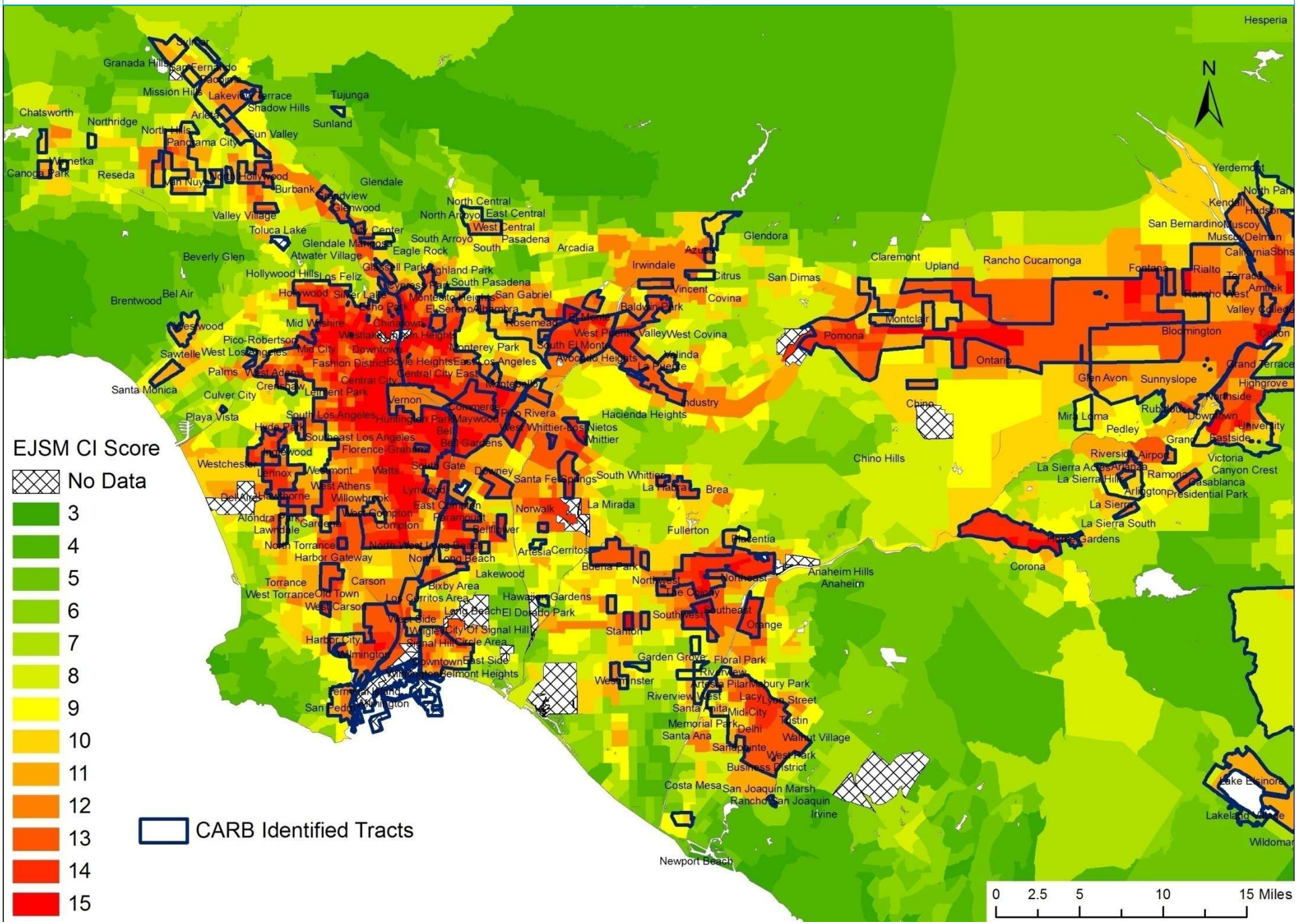
Bay Area: EJSM Cumulative Impact Score for Tracts Identified by CARB Method



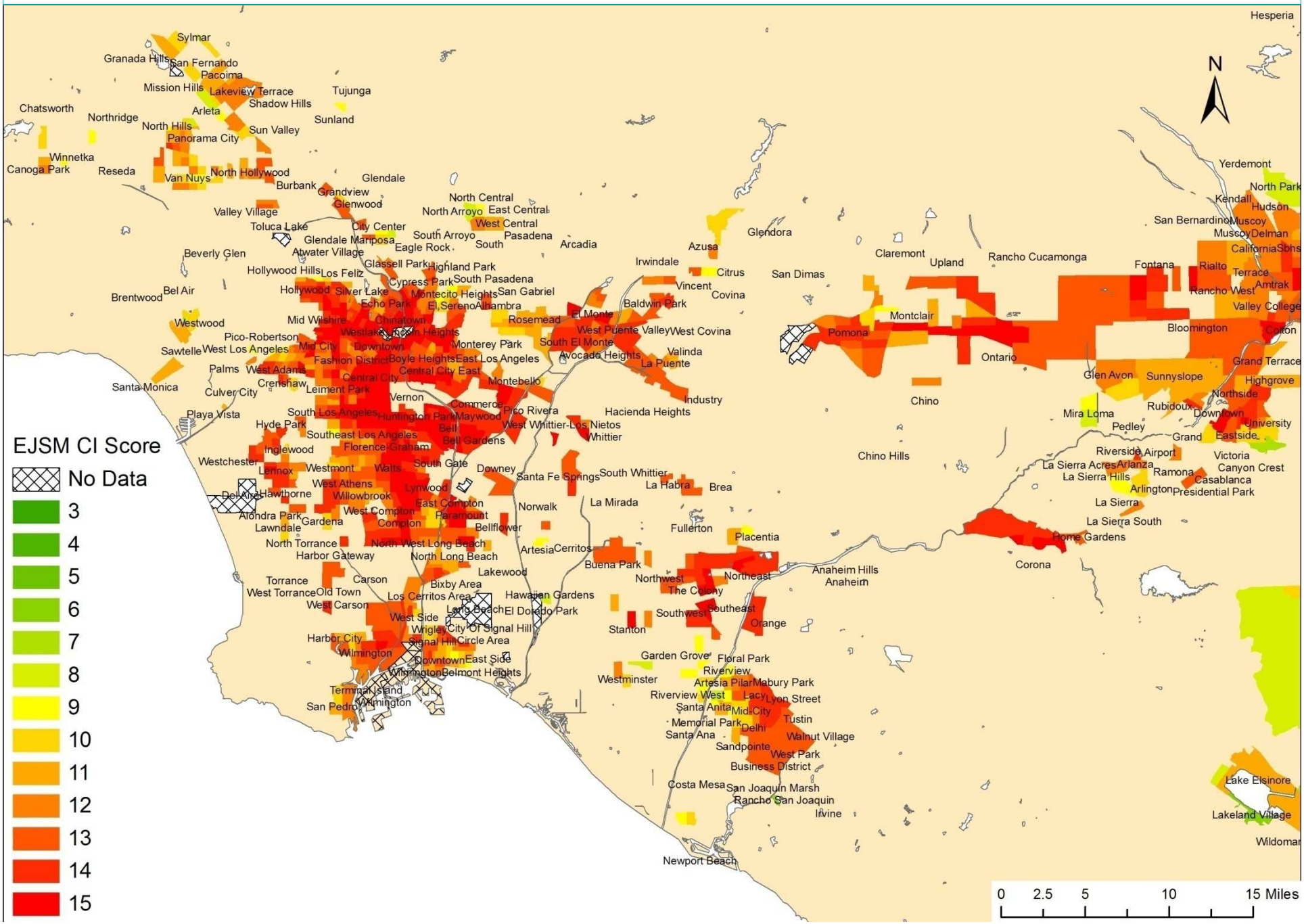
South Coast: EJ Screening Method Cumulative Impact (CI) Score



South Coast: EJ Screening Method Cumulative Impact Score with CARB Identified Tracts Outline



South Coast: EJSM Cumulative Impact Score for Tracts Identified by CARB Method



ARB Proposed Method – Metrics Used

- Why not include other scientifically relevant indicators?
  - Age
    - Indicator of potential vulnerability to negative health impacts from air pollution.
    - Central to CARB's recommendations in its 2005 Handbook
  - Linguistic isolation
    - Identified in our CARB-funded research as statistically significant in explaining current pattern of health risk inequity in the SF Bay area.
  - Race/Ethnicity
    - AB32 specifies consideration of *environmental justice* - defined in federal policy as including race/ethnicity as well as income.
    - California law defines environmental justice as *"fair treatment of people of all races, cultures, and incomes with respect to the development, adoption, implementation, and enforcement of environmental laws, regulations, and policies."*
    - EJSEAT, the US EPA EJ research screening tool includes race in its suite of SES indicators.

ARB Proposed Method – Metrics Used

- Why consider only one land use proxy (port and rail risk assessment) when ARB Handbook specifies several others?
- Concern that ARB's single land use metric is too limited.
  - For example, a cap-and-trade system that might be implemented by AB 32 may regulate such facilities as refineries, power plants and cement plants.
  - This data source appears to only apply to four small communities, which undermines the geographic consistency of the scoring method
- Data on the broader suite of land uses used in the CARB Handbook is readily available Statewide.

ARB Proposed Method - Scoring

- Method of "screening" tracts for risk and exposure does not differentiate between tracts that rank extremely high in one measure, from those that rank high across multiple measures.
- The averaging approach prevents identification of tracts that score consistently high across several metrics in terms of pollution and vulnerability
  - Averaging should be avoided, as it tends to eliminate or mask the extreme values - precisely those that need to be identified in a screening method.
- Definition of "communities"
  - In our experience, community members understand census tracts as communities.
  - Cities and CDPs vary greatly in size, and often are not good identifiers of communities (eg. Los Angeles, San Francisco)
  - How are communities identified in unincorporated areas with no CDP? (parts of Central Valley)

Recommendations

- We recognize and support CARB's need for a more parsimonious screening approach.
- However, we hope that the scientific concerns noted above will be addressed in a future version.
- We encourage more analytical comparison with EJSM and the US EPA EJSEAT screening tools.
- Our EJSM research: have identified and are comparing alternative data types that can be used for land use in this context, and are integrating them into our screening in other parts of the state (e.g. Central Valley)