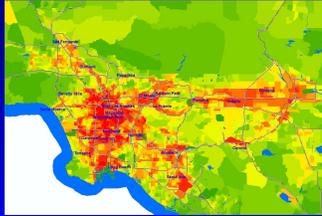


## ARB Research Project Overview EJ Screening Method



Climate Action Team  
Public Health Workgroup

June 18, 2009

Air Resources Board



California Environmental Protection Agency

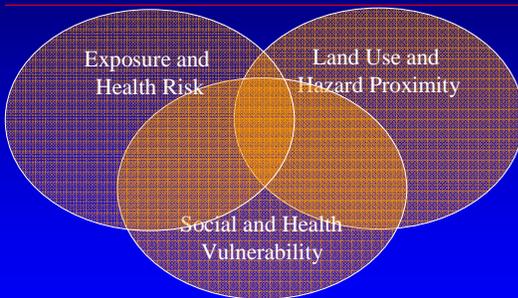
## Screening Method

- Research contract: To provide an approach for integrating the cumulative impact and risk from air pollution with measures of socioeconomic vulnerability
- Review Process
  - Consultation with scientific Peer Review Committee (PRC)
  - Presentation to PRC on December 18, 2009
  - PRC Comments
    - Researchers made reasonable choices
    - Some double counting, but unavoidable
    - Add sensitivity analysis
  - Presentations to environmental justice organizations, research conferences, and government agencies



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## Overview



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## Scoring

- Three maps equally scored
- Each map scored 1-5
- Land Use and Hazard Proximity
  - More complex scoring methodology
- Combined map scored 3-15



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## Elements of Screening Method

- Exposure and Health Risk
  - State and federal data
  - Modeling from emissions inventories
- Social and Health Vulnerability
  - Based on epidemiological literature
  - EJ literature on community vulnerability
- Land Use and Hazard Proximity
  - ARB land use guidelines



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## Exposure and Health Risk

- Fine Particulate Matter
  - 2004-2006 annual average
- Ozone 2004-2006 annual exceedances
- Cancer Risk
  - ARB modeled estimate
  - Mobile and stationary sources for 2001
- Respiratory Hazard
  - Air toxics for 1999
  - National Air Toxics Assessment
- Toxic concentration-based hazard scores
  - Toxic Release Inventory facilities for 2005



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## Exposure & Health Risk Overview

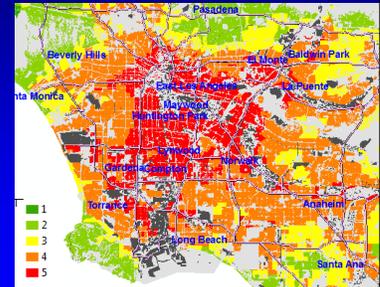
- Data layer selection
  - Monitored exposure data
  - Modeled cancer and non-cancer risk
- Advantages
  - Reflects actual exposures
- Limitations
  - May not detect local hotspots



7

## Exposure and Health Risk Map

- Each exposure and health risk parameter scored 1 to 5
- Scores added together and normalized to scale from 1 to 5



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## Social and Health Vulnerability

- Race/Ethnicity
- Poverty
- Homeownership
- Educational attainment
- Age of residents – children, seniors
- Linguistic isolation
  - % households where English not spoken well
- Voter turnout
- Birth outcomes



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## Social and Health Vulnerability Overview

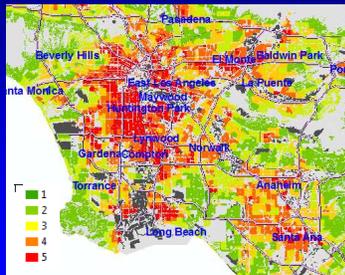
- Data layer selection
  - Demographic and socioeconomic data
  - Social determinants of health
- Advantages
  - Indicators of socioeconomic status
- Limitations
  - Proxy variables for health vulnerability



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## Social and Health Vulnerability Map

- Each vulnerability parameter scored 1 to 5
- Scores added together and normalized to scale from 1 to 5



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## Land Use and Hazard Proximity

- Residential land use
- Locations of sensitive land uses
  - schools, day care centers, playgrounds, urban parks, and health care facilities
- Hazardous land use
  - Railroads, airports, ports, petroleum refineries, and intermodal facilities
- Proximity to potential air pollution hazards
  - CHAPIS facilities
  - chrome plating facilities
  - Hazardous waste treatment, storage and disposal facilities



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## Land Use & Hazard Proximity Overview

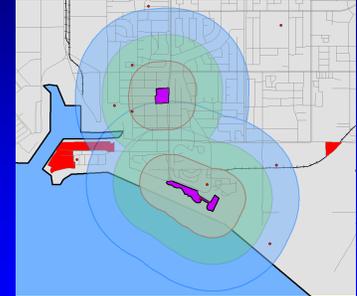
- Data layer selection:
  - Identify sensitive receptors
  - Identify potential health hazards
- Advantages:
  - Consistent with ARB Land Use Handbook
  - Indicative of hotspots and potential exposure
- Limitations:
  - May not reflect actual exposure or most toxic exposure



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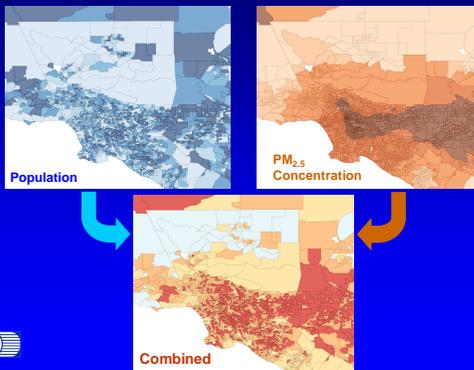
## Land Use and Hazard Proximity Map

- Buffers around residents and sensitive land uses
- Score based upon facilities inside buffer
  - 1000 feet = 1
  - 2000 feet = 0.5
  - 3000 feet = 0.1



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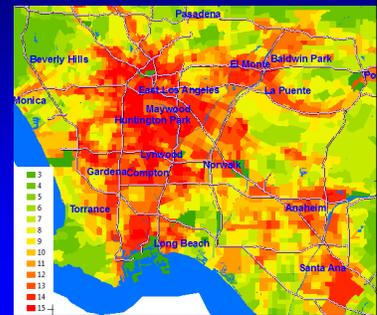
## Example Map



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## Combined Map

- Exposure and Health Risk
- Land use and Hazard Proximity
- Social and Health Vulnerability



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## Conclusion

- This research project attempts to identify where actual and potential exposure to pollutants overlaps with social and health vulnerability
- Double-counting is an issue
- It represents a snapshot in time
- Near roadway exposure not included
- Basic GIS method can be adapted to program needs



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