ARB Research Project Overview

EJ Screening Method

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

Overview

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

Scoring

- Three maps equally scored
- Each map scored 1.5
- Land Use and Hazard Proximity
  More complex scoring methodology
- Combined map scored 3.15

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

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
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

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

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

Social and Health Vulnerability Map

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

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

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
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

Example 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

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