EJSCREEN: Environmental Justice Screening Tool

EPA
United States
Environmental Protection
Agency

Background

- EPA's new tool for EJ screening and mapping
- Web-based GIS tool and data for EPA and the public
- Plan EJ 2014 announced EPA's plan to create a new, nationally consistent EJ screening tool
- Builds upon NEJAC report on EJ screening, and prior work across EPA programs and Regions
- Peer reviewed by experts on geospatial tools and EJ

Combines environmental & demographic data

- EJSCREEN provides:
  - 1. environmental indicators
  - 2. demographic indicators
    (predictors of health status and of
    potential vulnerability to environment)

    and combines them as an index…
  - 3. “EJ index”
    for each environmental factor, in each location.

Key Features

- **12 different environmental factors, including several new or improved metrics (e.g., traffic score)**
- **Updated demographics – every 1 year, not every 10 years**
- **A consistent, quantified approach to EJ, not just "overlays" – numerical indexes that combine environmental and demographic indicators**
- **Accessible and transparent to anyone with a web browser**
- **Standard printable reports and bar graphs**
- **Higher resolution maps – 3 times as many data points**
- **A wealth of additional data maps; can add more from the Web**
- **Raw data downloads will also be available**

Using EJSCREEN

- **A tool for everyone**
  - Available to all EJ stakeholders and general public
    - But no requirement that state/tribal/stakeholders use it
  - Basis for further dialogue
- **EPA uses EJSCREEN in various contexts**
  - Outreach and engagement
  - Many aspects of environmental programs
  - Geographically-based initiatives
- **What does EJ screening show?**
  - Helps show which places may be candidates for further review – where to take a closer look, where to start.

Important Notes About How EPA Uses EJSCREEN

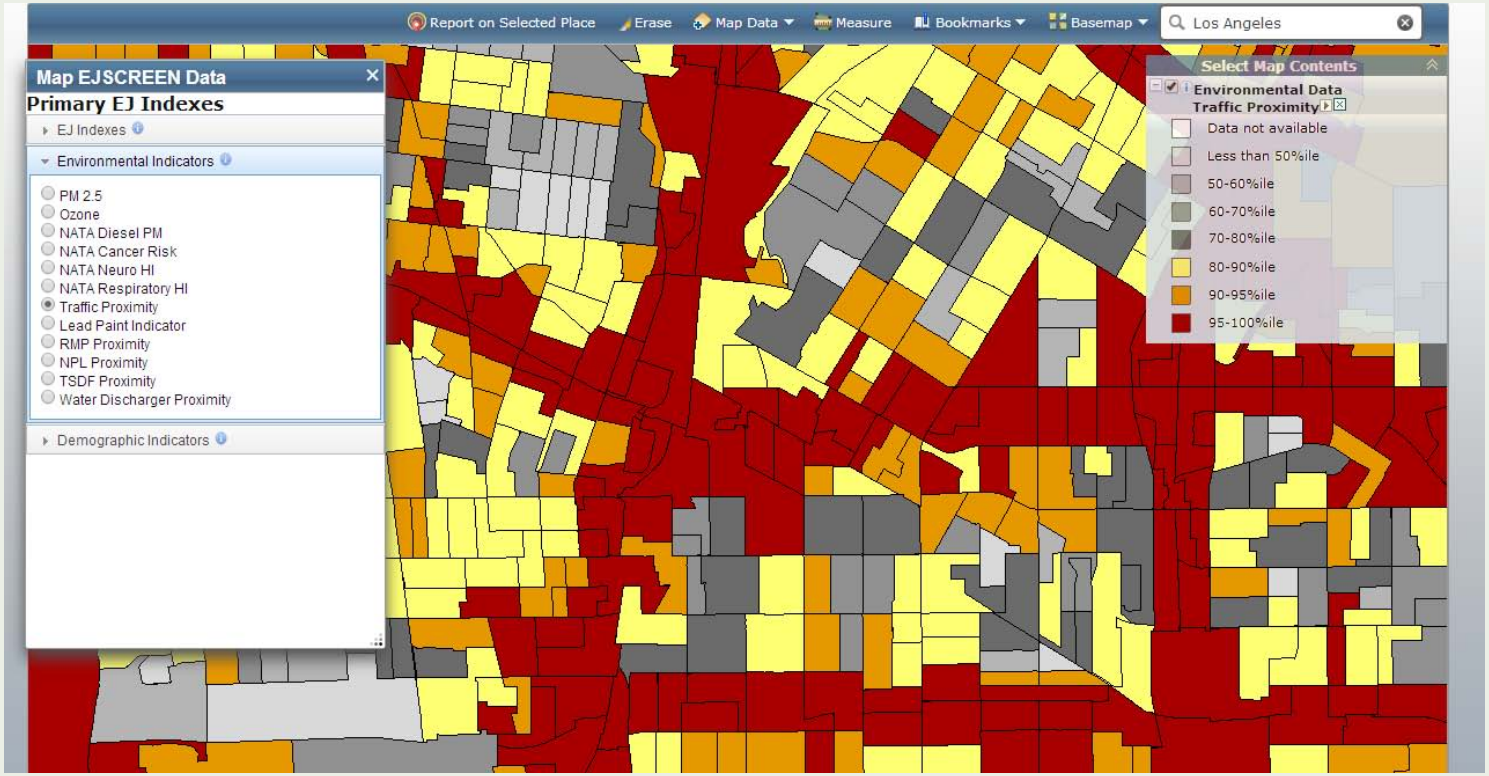
- **Tool and data to be shared with States, Tribes, public, etc.**
- **Highlights areas that may be candidates for further review**
- **Pre-decisional screening tool**
- **Does not direct final outcomes**
- **Baseline screening should be supplemented with local information and experience**
- **Should not be used to label areas as "EJ community"**

Caveats

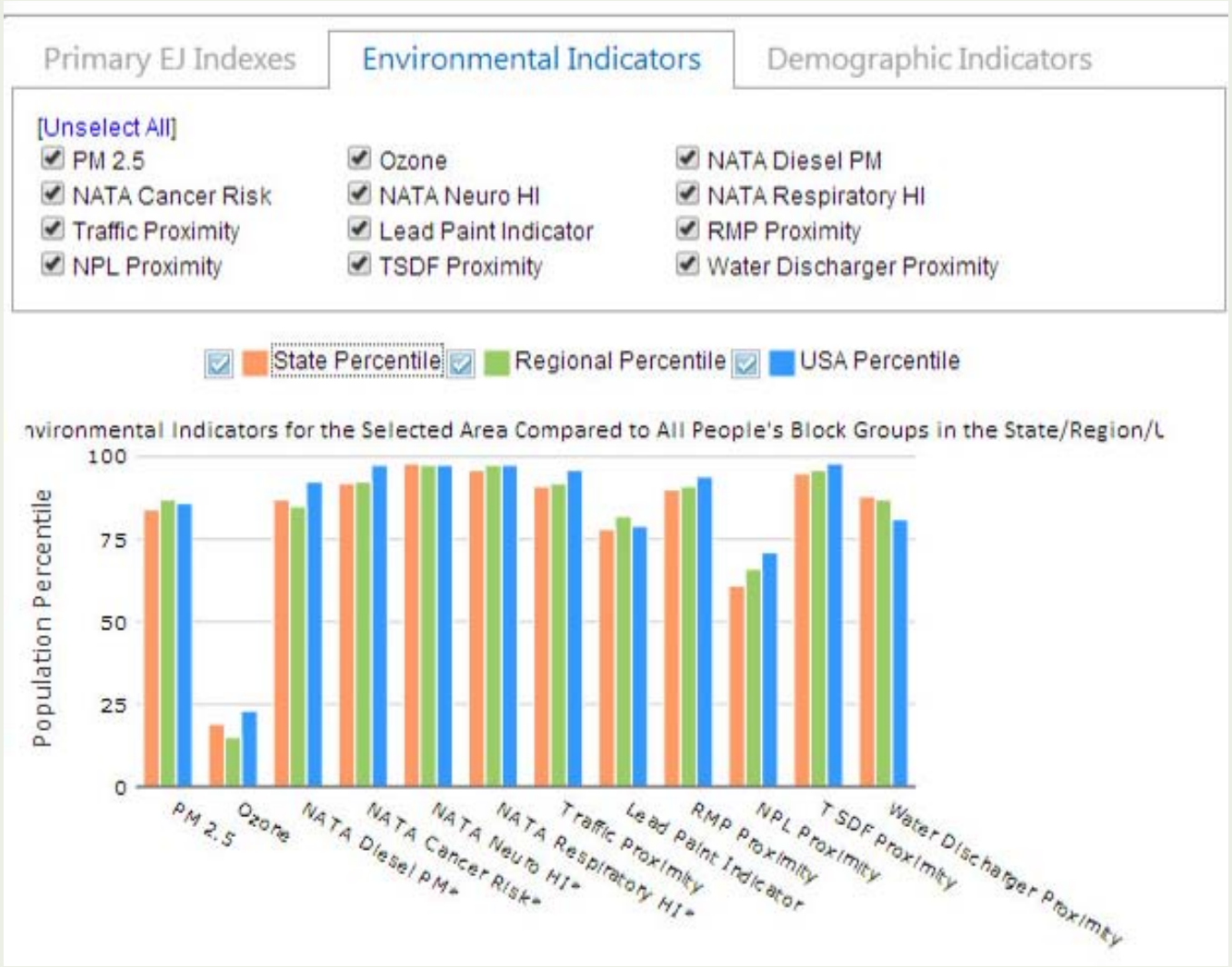
- **Demographic and environmental indicators for a single block group may have high uncertainty**
- **Small differences may not be true or meaningful ones**
- **EJSCREEN does not cover all environmental issues.**
- **Other local data and concerns may be very important.**

Based on Census Block Groups

- Over 217,000 Block Groups in the U.S.
- The average block group has a population of about 1,400 residents, and most have between 900 and 1,800 residents.



Twelve Environmental Indicators



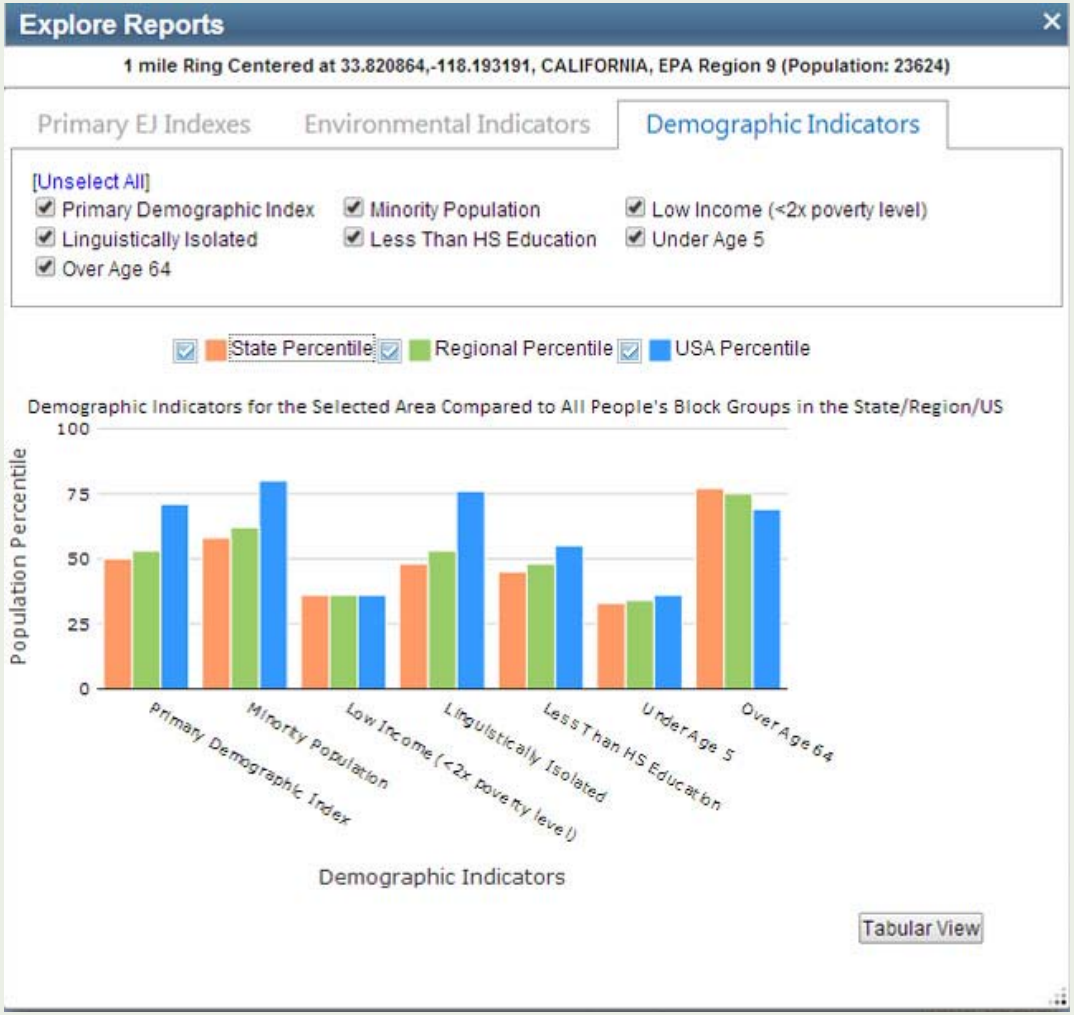
12 Environmental Indicators

Environmental Indicator Raw Data Type (Units)	Raw Data Description	Indicator Descriptor
Particulate Matter (PM2.5 in µg/m3)	PM2.5 levels in air, µg/m3 annual average	Potential Exposure
Ozone (ppb)	Ozone summer seasonal average of daily maximum 8-hour concentration in air in parts per billion	Potential Exposure
National Air Toxics Assessment (NATA) Diesel PM in (µg/m3)	Diesel particulate matter (PM) level in air, µg/m3	Potential Exposure
NATA Air Toxics Cancer Risk (risk per million people)	Excess lifetime cancer risk from inhalation of air toxics	Hazard/Risk
NATA Respiratory Hazard Index	Air toxics respiratory hazard index (ratio of exposure concentration to health-based reference concentration)	Hazard/Risk
NATA Neurological Hazard Index	Air toxics neurological hazard index (ratio of exposure concentration to health-based Reference Concentration (RfC))	Hazard/Risk

12 Environmental Indicators

Environmental Indicator Raw Data Type (Units)	Raw Data Description	Indicator Descriptor
Lead Paint Indicator (% pre-1960s Housing)	Percent of housing units built before 1960, as indicator of potential exposure to lead-based paint	Potential Exposure
Traffic Proximity (daily traffic count/distance to road)	Count of vehicles (average annual daily traffic) at major roads within 500 meters, divided by distance in kilometers (km)	Proximity
Proximity to National Priority List (NPL) sites (count/km distance)	Count of NPL (Superfund) facilities within 5 km (or nearest one beyond 5 km), divided by distance in km	Proximity
Proximity to Risk Management Plan (RMP) facilities (count/km distance)	Count of RMP (potential chemical accident management plan) facilities within 5 km (or nearest one beyond 5 km), divided by distance in km	Proximity
Proximity to Treatment Storage Disposal Facilities (TSDF) (count/km distance)	Count of TSDFs (hazardous waste management facilities) within 5 km (or nearest one beyond 5 km), divided by distance in km	Proximity
Proximity to Major Direct Dischargers (count/km distance)	Count of NPDES major direct water discharger facilities within 5 km (or nearest one beyond 5 km), each divided by distance in km	Proximity

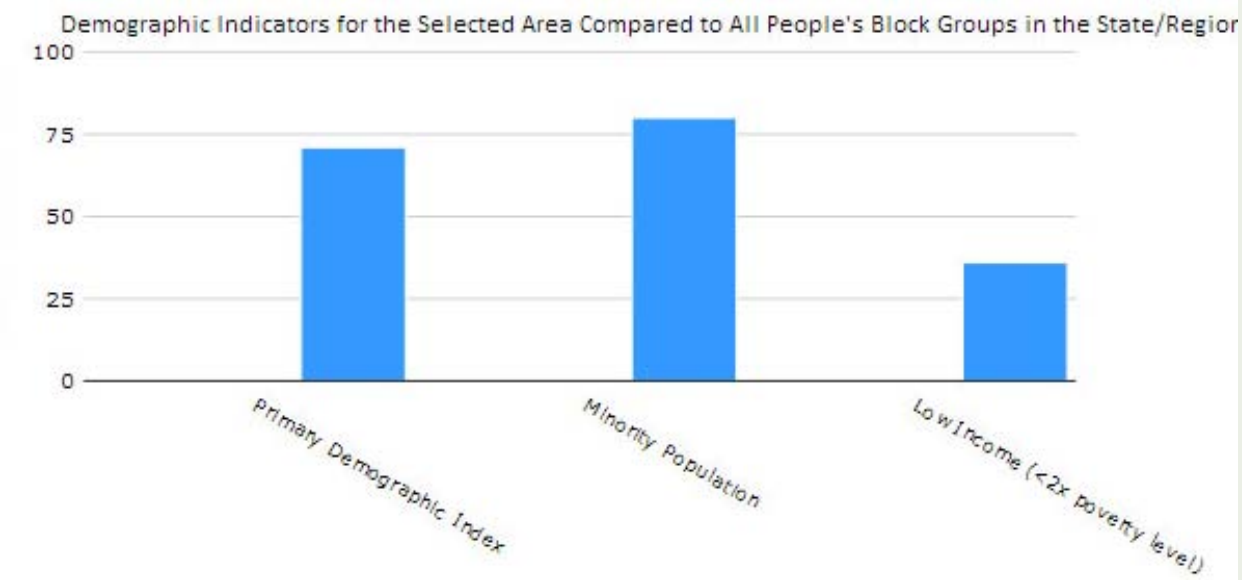
Seven Demographic Indicators



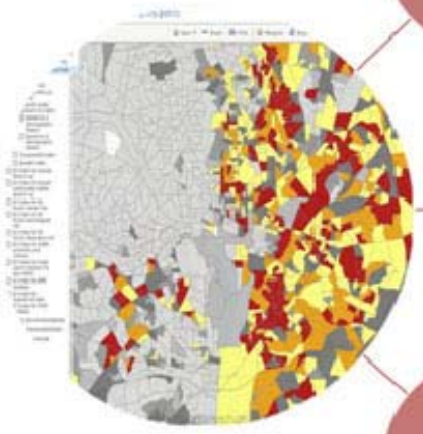
- Demographic Index
- Minority Population
- Low-income
- Linguistically isolated
- Less than high school education
- Under age 5
- Over age 64

Demographic Index

= (% low-income + % minority) / 2



Twelve EJ Indexes



Hazard / Risk
- Air Toxics Cancer Risk
- Air Toxics Respiratory Hazard
- Air Toxics Neurodevelopmental Hazard

Potential Exposure
- Diesel PM
- PM 2.5
- Ozone
- Lead Paint

Proximity
- Traffic and Volume
- RMPs
- TSDs
- NPL Sites
- NPDES Majors

Each of the 12 Environmental Indicator

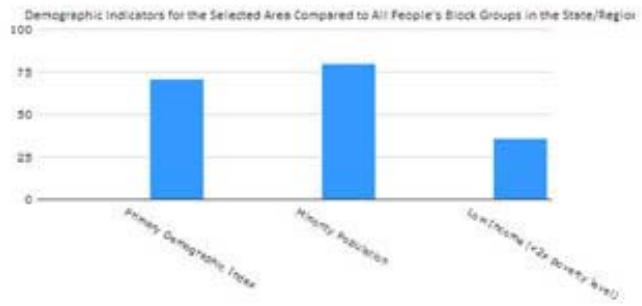
X

(Demographic Index for Selected Area – Average Demographic Index for US)

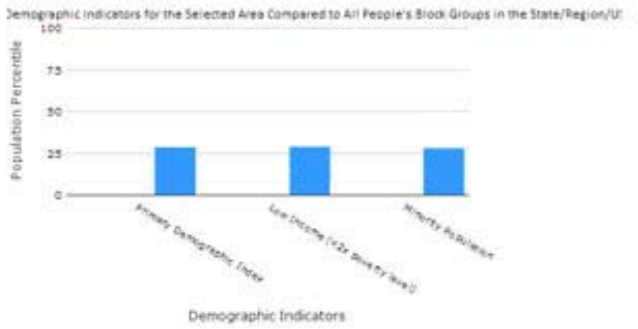
X

Block Group Population

Twelve EJ Indexes



Minus



Each of the 12
Environmental Indicator

X

(Demographic Index for Selected Area
– Average Demographic Index for US)

X

Block Group/Area of Study Population

Twelve EJ Indexes

EJSCREEN Report

for 1 mile Ring Centered at 33.820864,-118.193191, CALIFORNIA, EPA Region 9

Approximate Population: 23624

Selected Variables	Raw Data	State Avg.	%ile in State	EPA Region Avg.	%ile in EPA Region	USA Avg.	%ile in USA
Environmental Indicators							
Particulate Matter (PM 2.5 in µg/m³)	13.3	10.8	84	10.3	87	10.7	86
Ozone (ppb)	41.9	51.6	19	52.4	15	46.3	23
NATA Diesel PM (µg/m³)*	2.57	1.29	87	1.2	80-90th	0.824	90-95th
NATA Cancer Risk (lifetime risk per million)*	130	76	92	69	90-95th	49	95-100th
NATA Respiratory Hazard Index*	7.4	3.9	96	3.5	95-100th	2.3	95-100th
NATA Neurological Hazard Index*	0.18	0.072	98	0.068	95-100th	0.063	95-100th
Traffic Proximity and Volume (daily traffic count/distance to road)	610	210	91	190	92	110	90
Lead Paint Indicator (% Pre-1960 Housing)	0.57	0.3	78	0.26	82	0.3	79
NPL Proximity (site count/km distance)	0.088	0.13	61	0.11	66	0.096	71
RMP Proximity (facility count/km distance)	1.1	0.46	90	0.41	91	0.31	94
TSDF Proximity (facility count/km distance)	0.51	0.13	95	0.12	96	0.054	98
Water Discharger Proximity (facility count/km distance)	0.33	0.18	88	0.19	87	0.25	81
Demographic Indicators							
Primary Demographic Index	47%	47%	50	46%	53	35%	71
Minority Population	71%	60%	58	57%	62	36%	80
Low Income Population	23%	35%	36	35%	36	34%	36
Linguistically Isolated Population	7%	11%	48	10%	53	5%	76
Population With Less Than High School Education	13%	20%	45	19%	48	15%	55
Population Under 5 years of age	5%	7%	33	7%	34	7%	36
Population over 64 years of age	16%	12%	77	12%	75	13%	69

* The National-Scale Air Toxics Assessment (NATA) is EPA's ongoing, comprehensive evaluation of air toxics in the United States. EPA developed the NATA to prioritize air toxics, emission sources, and locations of interest for further study. It is important to remember that NATA provides broad estimates of health risks over geographic areas of the country, not definitive risks to specific individuals or locations. More information on the NATA analysis can be found at: http://www.epa.gov/ttn/atw/natamain/index.html.

Each of the 12
Environmental Indicator

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Block Group/Area of Study Population

What does the EJ Index mean?

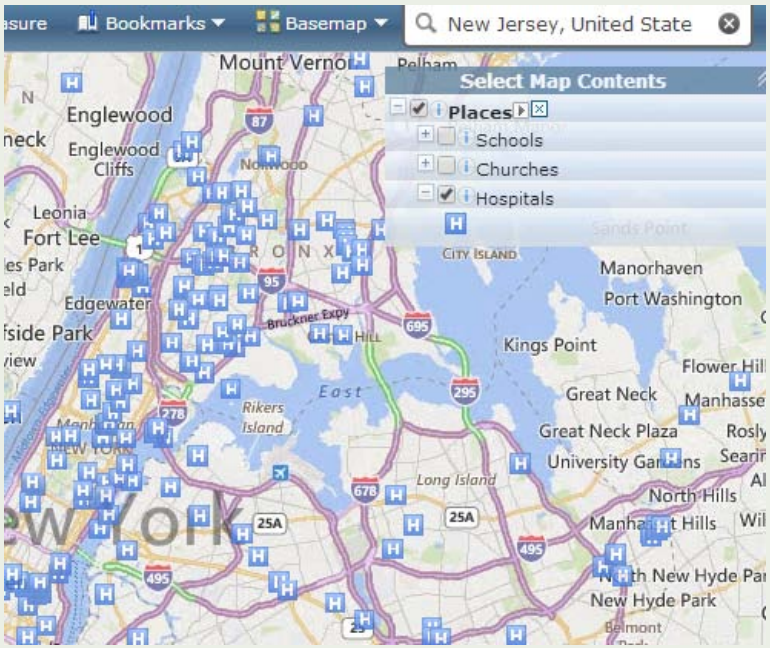
- **The EJ index combines environmental and demographic data**
- **It shows how much a block group contributes to the nation's overall disparity (between demographic groups) in that environmental indicator.**
- **In other words,**
  - Nationwide overall, the average low-income and/or minority individual in the US has a higher lead paint indicator score than the rest of the US population.
  - The EJ index shows how much this block group contributes to that disparity.
  - If the block groups with the highest EJ index values (for lead paint) were "cleaned up" first, that would be the fastest way to reduce the disparity in average lead paint scores.

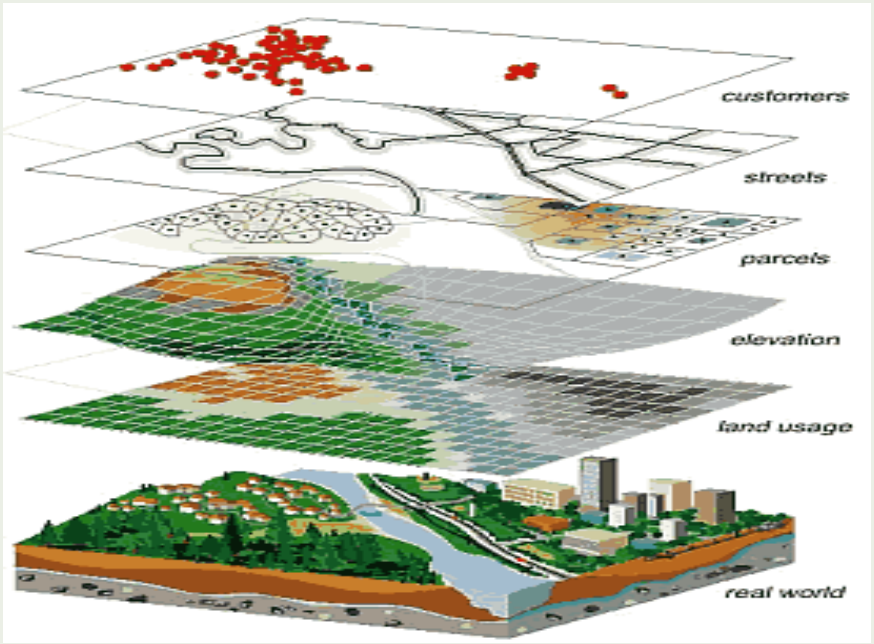
Maps – Drilling down to explore one indicator at a time

- **A Report:**
  Gives you all the indicators at once,
  for a single, specified location
  (e.g. within 1 mile of a facility)
  - » e.g., looking at all the indicators for residents nearby
- **A Map:**
  Gives you one indicator at a time,
  for each of the block groups within a wider area
  (e.g. across several miles)
  - » e.g., for a single indicator like lead paint, exploring and prioritizing hot-spots, or drilling down from a report to compare neighborhoods or small communities

EJSCREEN PROVIDES MANY OTHER MAP FEATURES

- **The mapping tool adds many other types of data by overlaying various datasets (called “layers”)**





Questions?