

# EJSCREEN: EPA's Environmental Justice Screening Tool

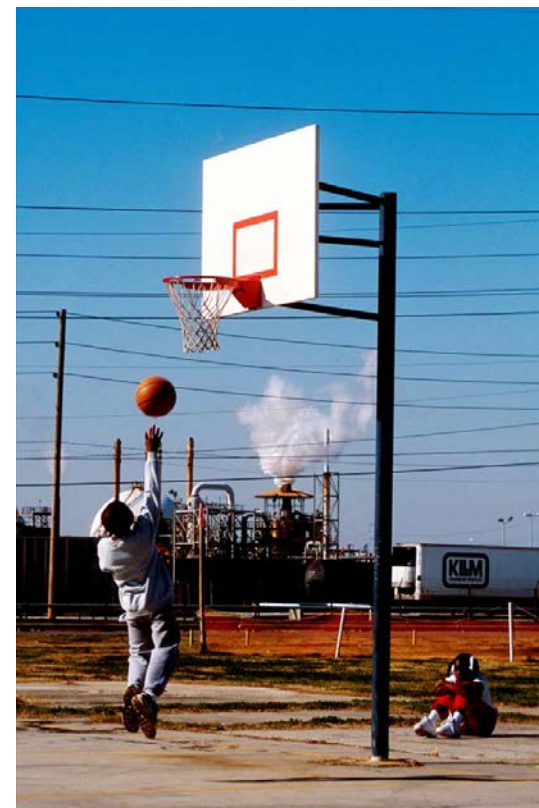


May 10, 2015

# Environmental Justice Defined

EPA has defined environmental justice as, “the **fair treatment and meaningful involvement** of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies.”

<http://www.epa.gov/environmentaljustice/>



# Background of EJSCREEN

- EPA's new tool for nationally consistent EJ screening and mapping
- Web-based Geographic Information System (GIS) tool and data
- Product of Plan EJ 2014
- Builds upon [National Environmental Justice Advisory Committee report](#) on EJ screening, and prior EPA experience
- Peer reviewed by experts in 2013



# Key Features

- 12 EJ Indexes – one for each environmental indicator
- Annually updated demographics – from most recent U.S. Census Bureau American Community Survey (ACS)
- Web accessible
- Standard printable reports, maps, and bar graphs
- Higher resolution maps
- Raw data downloads will also be available



# How Can EJSCREEN Be Used?

- A tool for everyone – a basis for further dialogue, engagement, and examination
- EPA is not requiring our state and tribal partners to use EJSCREEN in any context
- EPA uses EJSCREEN in various contexts
  - Outreach and engagement
  - Many aspects of environmental programs
  - Geographically-based initiatives



*EPA outreach meeting after Hurricane Katrina (2006)*



# Limitations For Using EJSCREEN

- EJSCREEN is a starting point. It is a pre-decisional screening tool; does not direct final outcomes for EPA.
- EJSCREEN highlights places for further review for the potential for EJ concerns.
- Baseline screening should be supplemented with local information and experience.
- Should **not** be used to label areas as “EJ Communities.”





# Limitations For EJSCREEN Data



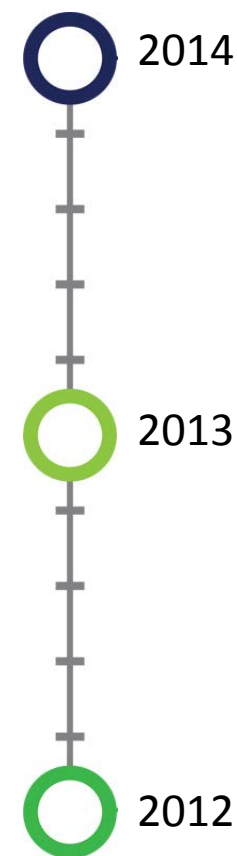
*Potential pesticide exposure is one of many environmental issues that is not in EJSCREEN because of insufficient data coverage.*

- Demographics are based on 5-year averages of US Census American Community Survey data.
- Environmental and proximity indicators are screening-level proxies for exposure or risk – not actual exposure or risk.
- EJ Indexes do not cover all environmental or community issues. Always consider additional local information.



# Understand the Age of Data Vary by Indicator – Especially with Air Data

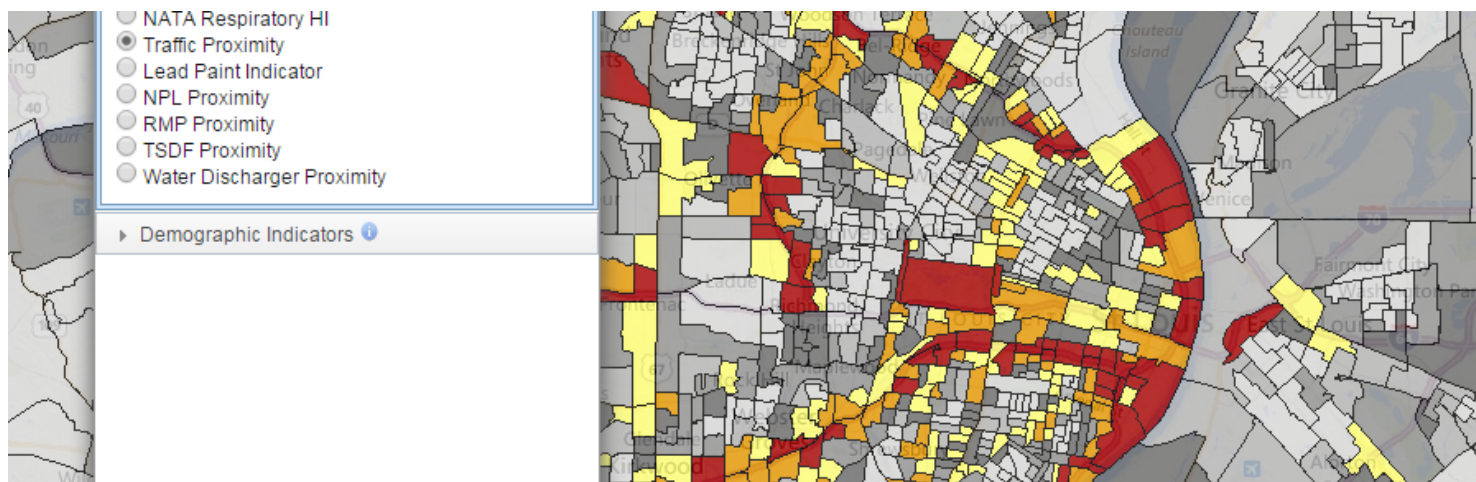
- The inclusion of a dataset in EJSCREEN does not imply it is the newest, best, or primary estimate of actual conditions or risks.
- **Estimates** are based on **historical data** and may not reflect current or future conditions.
- Percentiles are much more likely to be reasonably representative of today's conditions in most locations than raw values.





# Geographic Unit is the Block Group

- Over 217,000 block groups in the U.S.
- The average block group has about 1,400 residents.
- Highest resolution available for most EJSCREEN data.

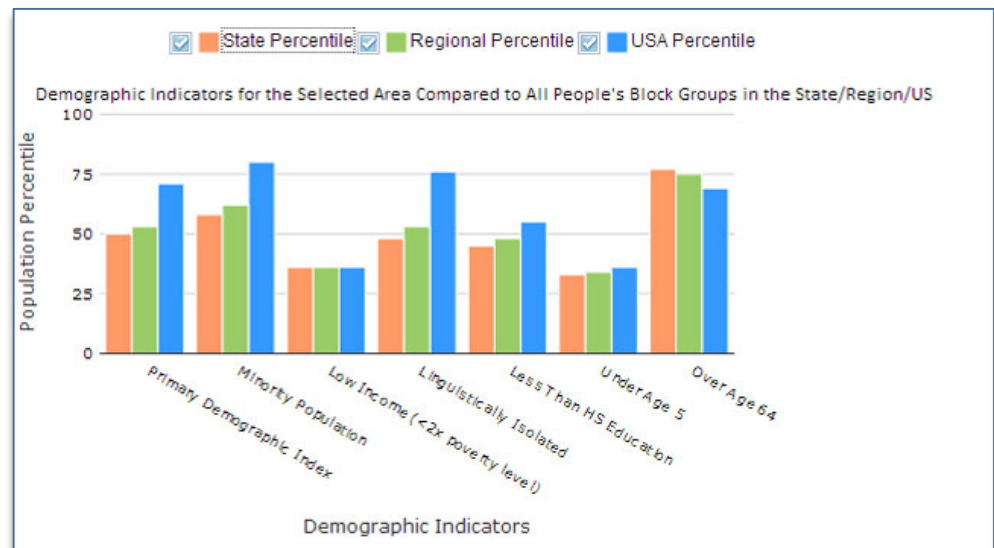


*The small colored irregular polygons are block groups*



# Results Are Ranked as Percentiles

- Percentiles put indicators into common units of 0 – 100.
- For example, a place at the 80th percentile nationwide means 20% of the US population has a higher value.
- Ranking values as percentiles allows comparison of indicators measured with different units. It does not mean the risks are equal or comparable.



# EJSCREEN Data

- 12 EJ indexes, which combine environmental data and the demographic index.
- 12 environmental indicators that measure potential exposure, hazard/risk, and proximity.
- 6 demographic indicators from the ACS 5 Year Annual Survey.



*Proximity to traffic is one of the 12 environmental indicators*



# Environmental Indicators

<u>Environmental Indicator Raw Data Type (Units)</u>	<u>Indicator Descriptor</u>	<u>Year Data published</u>
<b>Particulate Matter (PM2.5 in µg/m3)</b>	Potential Exposure	2011
<b>Ozone (ppb)</b>	Potential Exposure	2011
<i>* National Air Toxics Assessment (NATA) Diesel PM in (µg/m3)</i>	Potential Exposure	N/A
<i>* NATA Air Toxics Cancer Risk (risk per million people)</i>	Hazard/Risk	N/A
<i>* NATA Respiratory Hazard Index</i>	Hazard/Risk	N/A
<i>* NATA Neurological Hazard Index</i>	Hazard/Risk	N/A
<b>Lead Paint Indicator (% pre-1960s Housing)</b>	Potential Exposure	2008-2012
<b>Traffic Proximity (daily traffic count/distance to road)</b>	Proximity	2011
<b>Proximity to National Priority List sites (count/km distance)</b>	Proximity	2013
<b>Proximity to Risk Management Plan facilities (count/km distance)</b>	Proximity	2013
<b>Proximity to Treatment Storage Disposal Facilities (count/km distance)</b>	Proximity	2013
<b>Proximity to Major Direct Water Dischargers (count/km distance)</b>	Proximity	2013



# Why is the NATA Data Greyed Out?

- In an effort to make the tool as up-to-date as possible, the 2005 National-scale Air Toxics Assessment (NATA) data have been temporarily removed from the interim public version of EJSCREEN.
- The updated 2011 NATA dataset will be put into the tool upon the next update to EJSCREEN.



# Demographic Indicators

<u>Demographic Indicator</u>	<u>Description</u>	(Source: 2008-20012 ACS Estimates)
<b>Low-Income</b>	% of block group population at or below twice the federal “poverty level.”	
<b>Minority</b>	All people other than non-Hispanic white-alone individuals.	
<b>Less than high school education</b>	% of people age 25 or older without a high school diploma.	
<b>Linguistic isolation</b>	% of people in household in which all members over age 14 years speak English less than “very well.”	
<b>Individuals under age 5</b>	% of people in a block group under the age of 5.	
<b>Individuals over age 64</b>	% of people in a block group over the age of 64.	

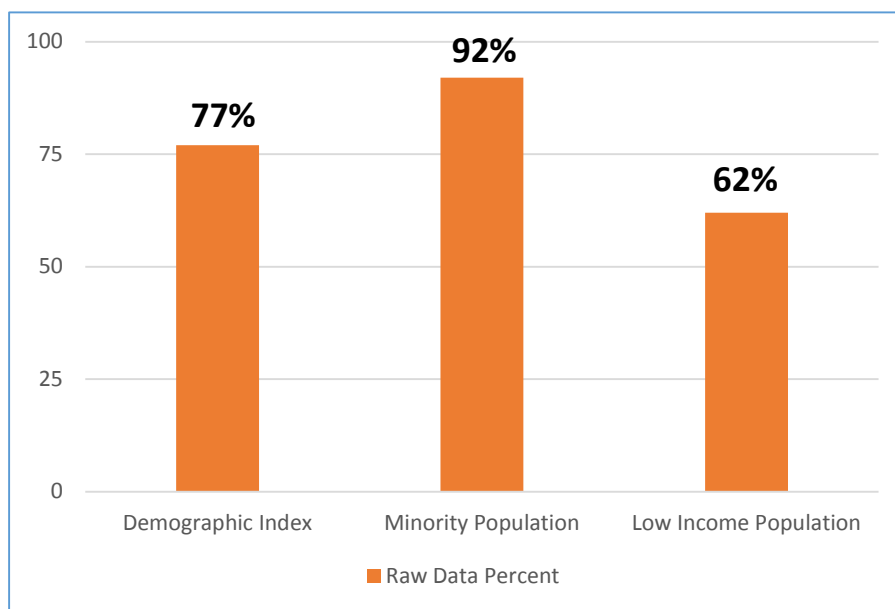




# Demographic Index

$$\text{Demographic Index} = \frac{(\% \text{ low-income} + \% \text{ minority})}{2}$$

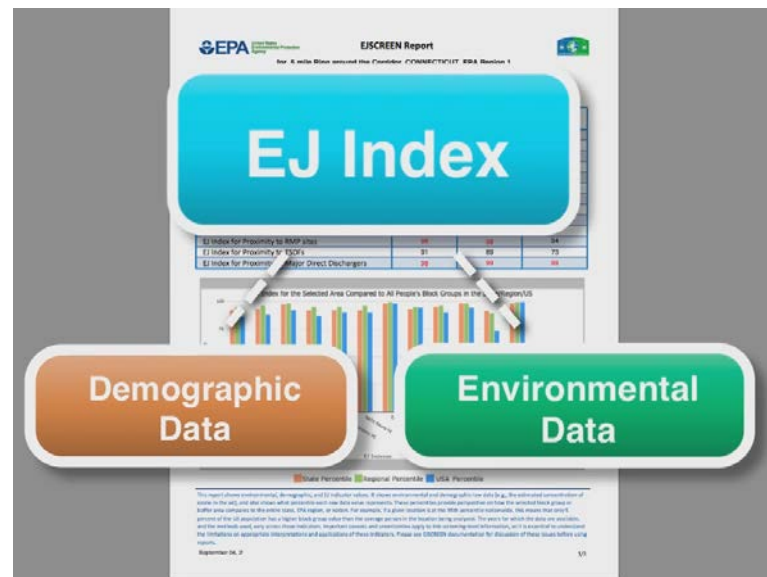
Example Calculation - Demographic Index  $77\% = (92\% + 62\% = 144\%)/2$



# What does the EJ Index mean?

The EJ index combines environmental and demographic data to highlight areas where vulnerable populations may be disproportionately impacted by pollution. It also considers the population of the block group.

It helps identify areas that may have higher pollution burdens and vulnerable populations present.



# Components of EJ Indexes

One Environmental Indicator

X (Demographic Index – US Average Demographic Index)

X Block Group Population

EJ Index for Given Environmental Indicator

EJ indexes can be calculated to compare to the rest of the nation, EPA region, or state for each block group.



# Viewing EJSCREEN Data

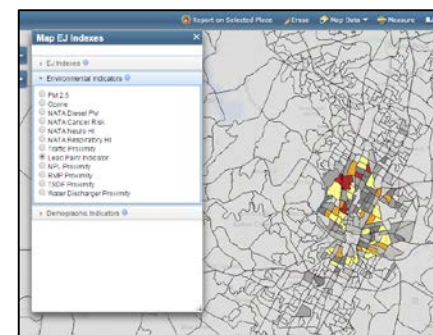
You can view all of the indicators in EJSCREEN within reports or on maps.

- A standard report gives you all the indicators at once for a single specified location
- A map gives you one indicator at a time, for each of the block groups within a wider area (e.g. across several miles)

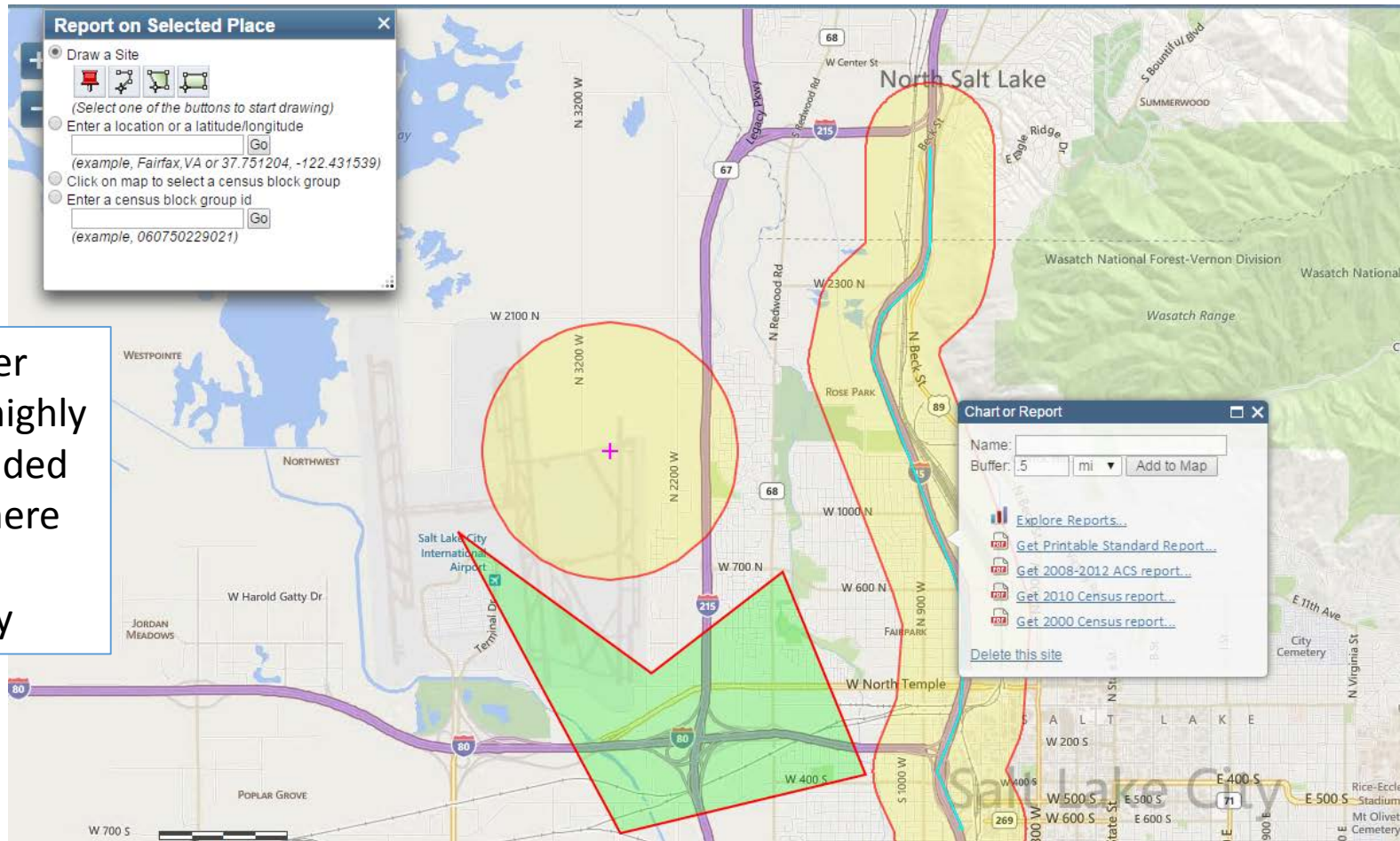
**EPA** U.S. Environmental Protection Agency **EJSCREEN Report**  
for 1 mile Ring Centered at 33.420864, -118.193191, CALIFORNIA, EPA Region 9  
Approximate Population: 23424

Selected Variables	Raw Data	State Avg.	Value in State	EPA Region Avg.	Value in EPA Region	USA Avg.	Value in USA
<b>Environmental Indicators</b>							
Particulate Matter (PM 2.5 in $\mu\text{g}/\text{m}^3$ )	13.3	10.6	84	10.3	87	10.7	86
Ozone (ppb)	41.6	31.6	19	32.4	15	40.3	23
NATA Ozone PM $\text{PM}_{2.5}$	2.87	1.26	87	1.1	90.0th	0.524	90.0th
NATA Cancer Risk (Ozone risk per meter)	195	76	82	69	90.0th	49	90.0th
NATA Respiratory Hazard Index	7.4	3.8	88	3.3	95.10th	2.3	95.10th
NATA Neurological Hazard Index	0.18	0.072	88	0.066	95.10th	0.033	95.10th
Traffic Proximity and Volume (avg. traffic count/distance to road)	610	210	81	190	82	110	80
Lead Paint Indicator (in few 1000 housing)	0.67	0.3	79	0.29	82	0.3	79
NPS Proximity (low machine distance)	0.085	0.13	81	0.11	86	0.061	71
RMP Proximity (facility count/distance)	1.1	0.46	89	0.41	91	0.31	94
TSD Proximity (facility count/distance)	0.51	0.13	88	0.12	88	0.054	89
Water Discharge Proximity (facility count/distance)	0.33	0.18	88	0.13	87	0.25	81
<b>Demographic Indicators</b>							
Primary Demographic Index	47%	47%	83	46%	53	39%	71
Minority Population	71%	65%	88	67%	82	59%	80
Low Income Population	23%	25%	88	25%	86	34%	76
Linguistically Isolated Population	7%	11%	48	10%	53	5%	70
Population With Less Than High School Education	13%	20%	45	19%	48	15%	55
Population Under 5 years of age	6%	7%	53	7%	54	7%	55
Population over 64 years of age	16%	12%	77	12%	75	13%	80

\* The National Survey for Toxic Exposure (NSTE) is EPA's ongoing, comprehensive evaluation of air toxic in the United States. EPA developed the NSTE to provide air toxic emission estimates and exposure of areas for further study. It is important to understand the NSTE provides broad estimates of health risk, not geographic areas of the country, nor definitive data to identify individuals or locations. More information on the NSTE analysis can be found at <http://www.epa.gov/nste/about/index.html>.



# You Can Specify User-Defined Areas to Generate Standard Reports




Note: Buffer areas are highly recommended because there is less data uncertainty



# The EJSCREEN Standard Report

## Report has 3 pages:

- Page 1 – The first place to look:
  - 12 EJ indexes as a table (as percentiles)
  - Bar graph of the 12 EJ indexes
- Page 2:
  - Map (selected area of interest)
- Page 3 – for more details:
  - Environmental indicators
  - Demographic indicators


**EJSCREEN Report**  
 for 1 mile Ring around the Corridor, ILLINOIS, EPA Region 5  
 Approximate Population: 14801

Selected Variables	Raw Data	State Avg.	%ile in State	EPA Region Avg.	%ile in EPA Region	USA Avg.	%ile in USA
<b>Environmental Indicators</b>							
Particulate Matter (PM 2.5 in $\mu\text{g}/\text{m}^3$ )	14.4	13.4	94	13.3	87	10.7	96
Ozone (ppb)	42.7	42.8	52	45	31	48.3	28
NATA Diesel PM ( $\mu\text{g}/\text{m}^3$ ) <sup>*</sup>	1.28	0.968	99	0.712	80-90th	0.824	70-80th
NATA Cancer Risk (lifetime risk per million) <sup>*</sup>	54	48	67	42	70-80th	49	60-70th
NATA Respiratory Hazard Index <sup>*</sup>	2	1.8	63	1.5	70-80th	2.3	50-60th
NATA Neurological Hazard Index <sup>*</sup>	0.11	0.073	88	0.067	90-95th	0.083	90-95th
Traffic Proximity and Volume (daily traffic count/distance to road)	77	66	75	66	76	110	68
Lead Paint Indicator (% Pre-1980 Housing)	0.38	0.43	45	0.39	52	0.3	64
NPL Proximity (site count/km distance)	0.18	0.069	94	0.085	88	0.066	88
RMP Proximity (facility count/km distance)	0.78	0.43	83	0.33	88	0.31	89
TSDF Proximity (facility count/km distance)	0.12	0.037	96	0.051	92	0.054	91
Water Discharger Proximity (facility count/km distance)	0.16	0.27	51	0.23	59	0.25	59
<b>Demographic Indicators</b>							
Demographic Index	62%	34%	82	28%	89	35%	83
Minority Population	85%	36%	88	24%	93	36%	88
Low Income Population	39%	31%	67	32%	66	34%	62
Linguistically Isolated Population	3%	6%	82	3%	70	5%	64
Population With Less Than High School Education	15%	14%	67	12%	73	15%	63
Population Under 5 years of age	5%	6%	35	0%	38	7%	35
Population over 64 years of age	11%	13%	48	13%	42	13%	46

\* 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/natmain/index.html>.

For additional information, see: [www.epa.gov/environmentaljustice](http://www.epa.gov/environmentaljustice)

EJSCREEN is a screening tool for pre-decisional use only. It can help identify areas that may warrant additional consideration, analysis, or outreach. It does not provide a basis for decision-making, but it may help identify potential areas of EJ concern. Users should keep in mind that screening tools are subject to substantial uncertainty in their demographic and environmental data, particularly when looking at small geographic areas. Important caveats and uncertainties apply to this screening-level information, as it is essential to understand the limitations on appropriate interpretations and applications of these indicators. Please see EJSCREEN documentation for discussion of these issues before using reports. This screening tool does not provide data on every environmental impact and demographic factor that may be relevant to a particular location. EJSCREEN outputs should be supplemented with additional information and local knowledge before taking any action to address potential EJ concerns.

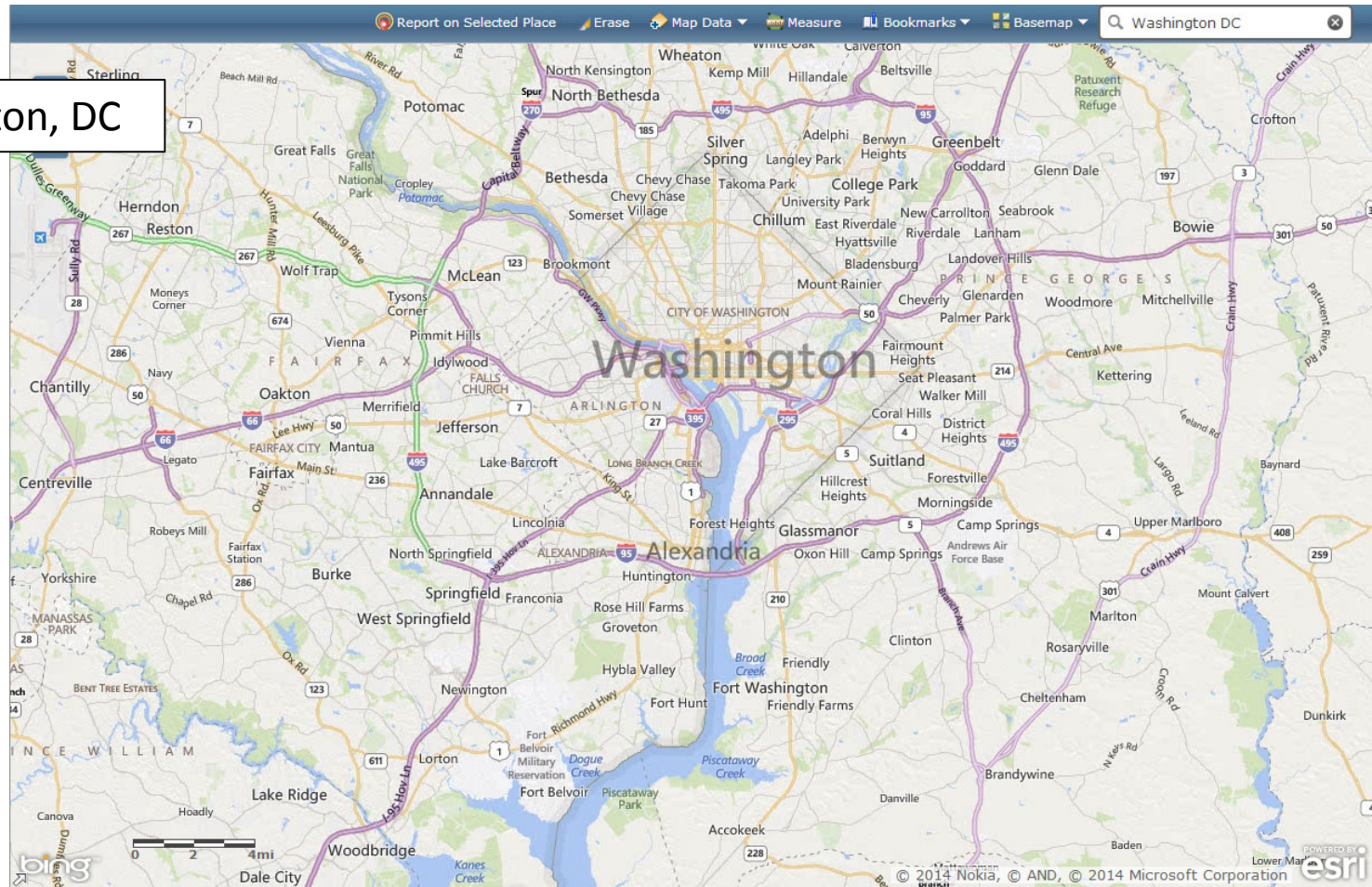
August 20, 2014 3/3





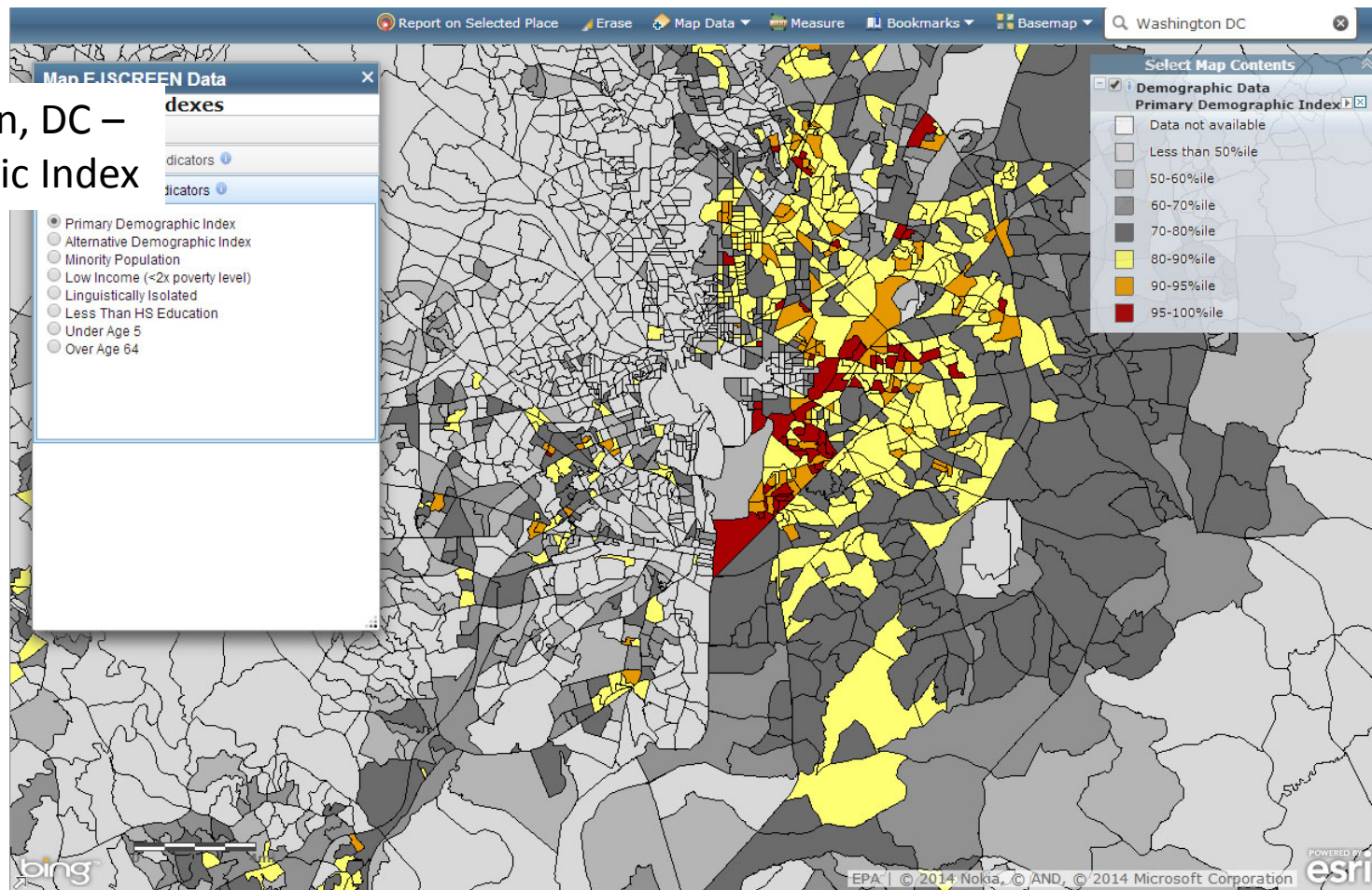
# Maps of Environmental Indicators, Demographic Indicators, and EJ Index Data

Washington, DC



# Maps of Environmental Indicators, Demographic Indicators, and EJ Index Data

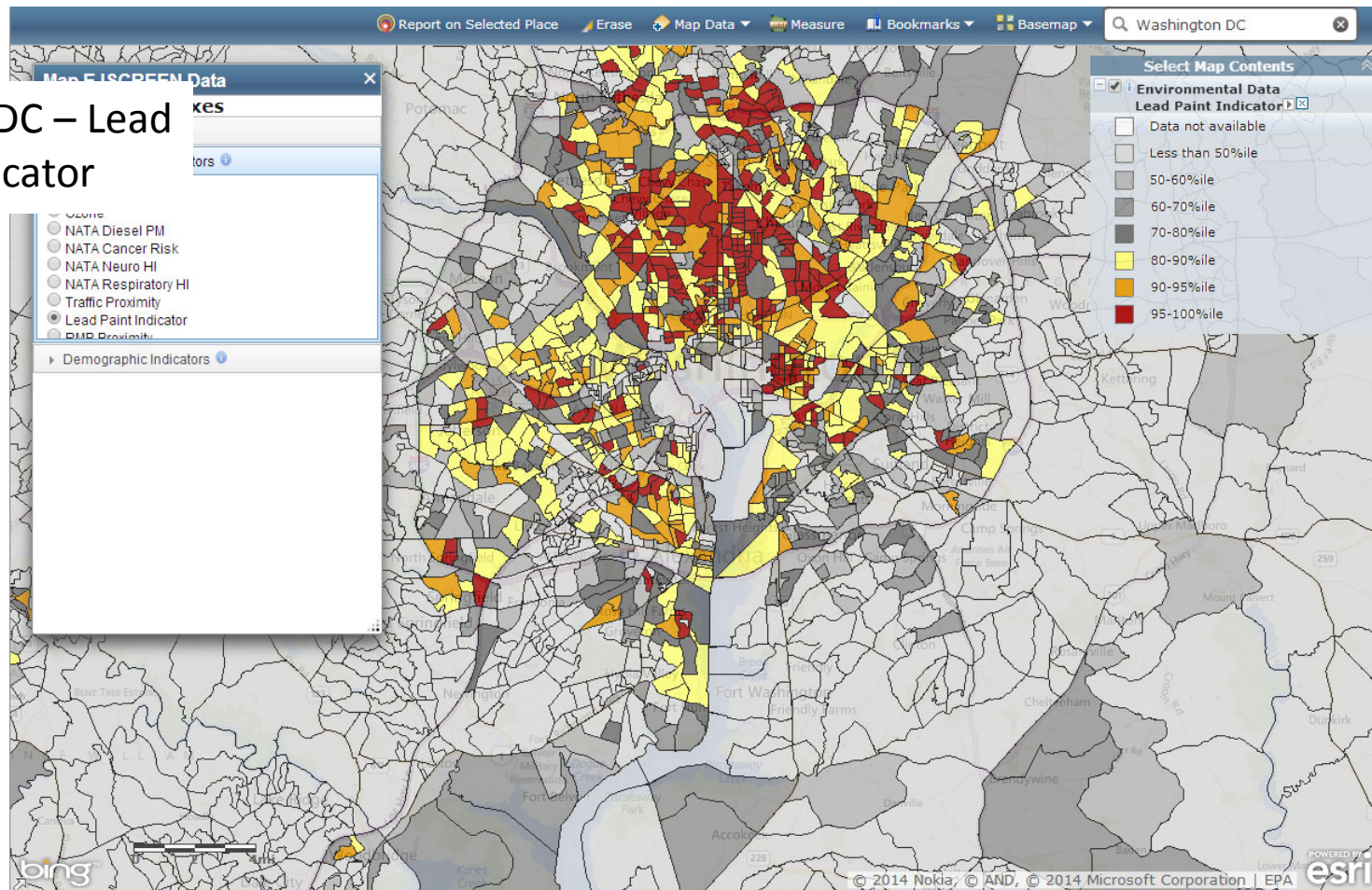
## Washington, DC – Demographic Index





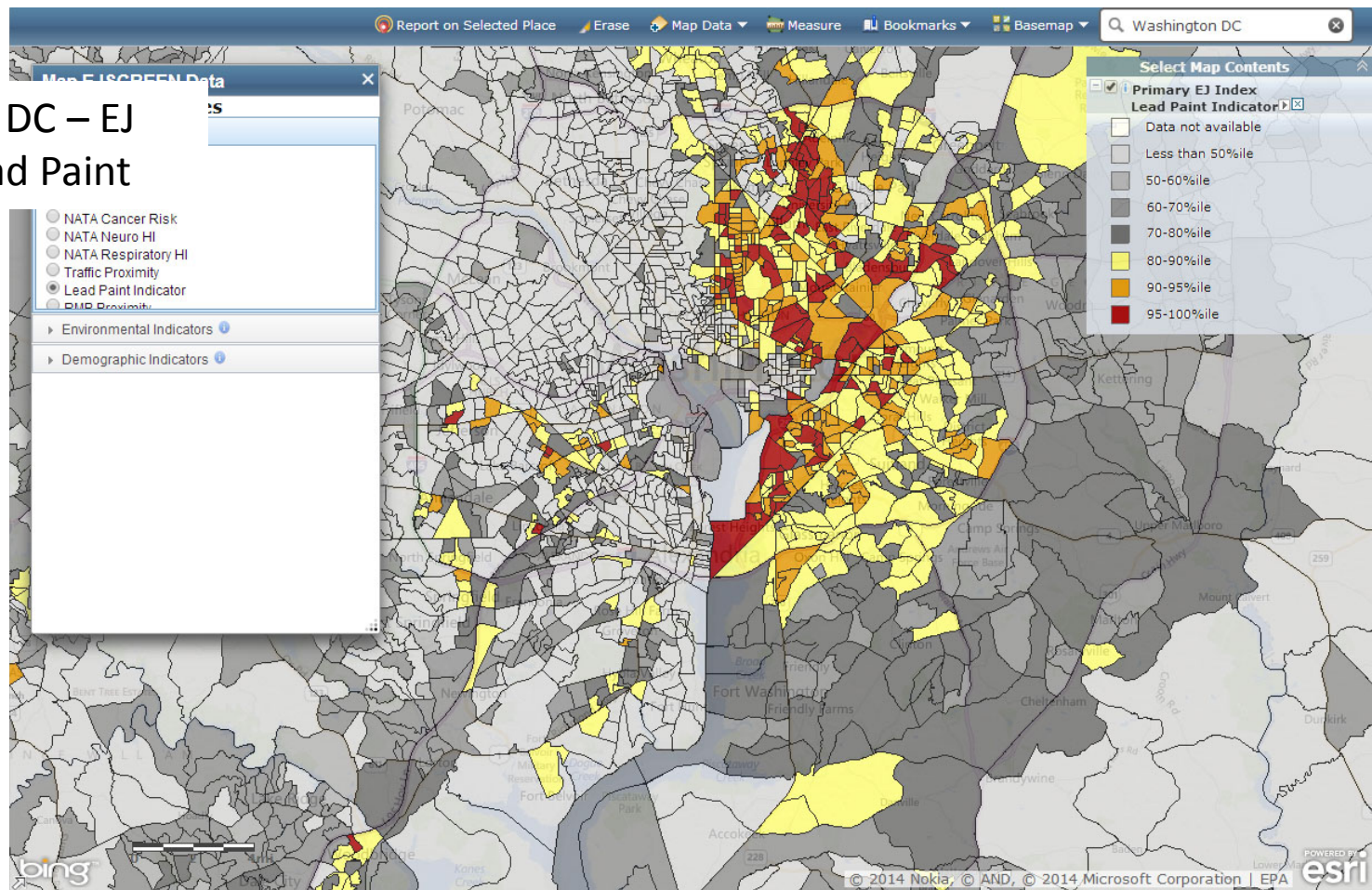
# Maps of Environmental Indicators, Demographic Indicators, and EJ Index Data

## Washington, DC – Lead Paint Indicator



# Maps of Environmental Indicators, Demographic Indicators, and EJ Index Data

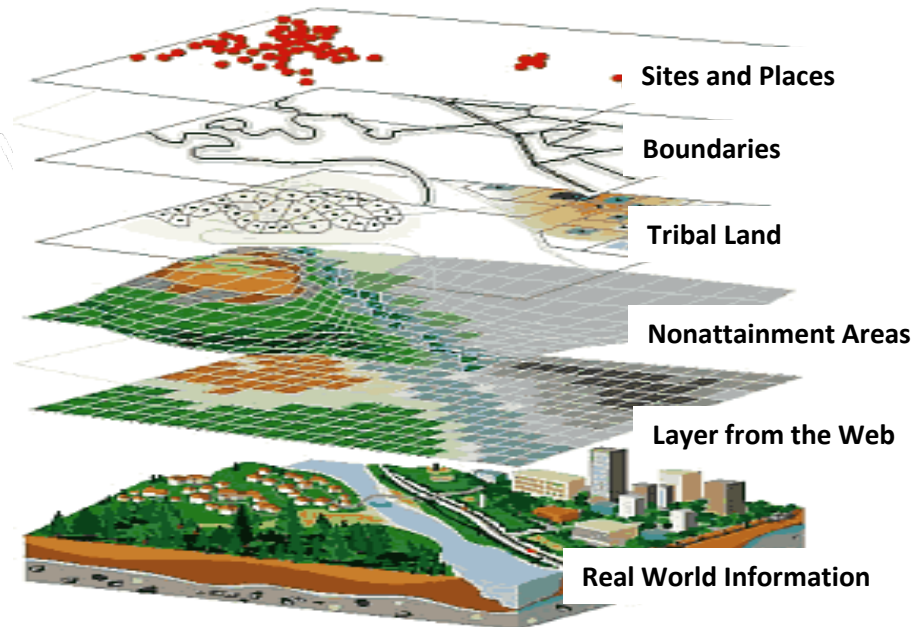
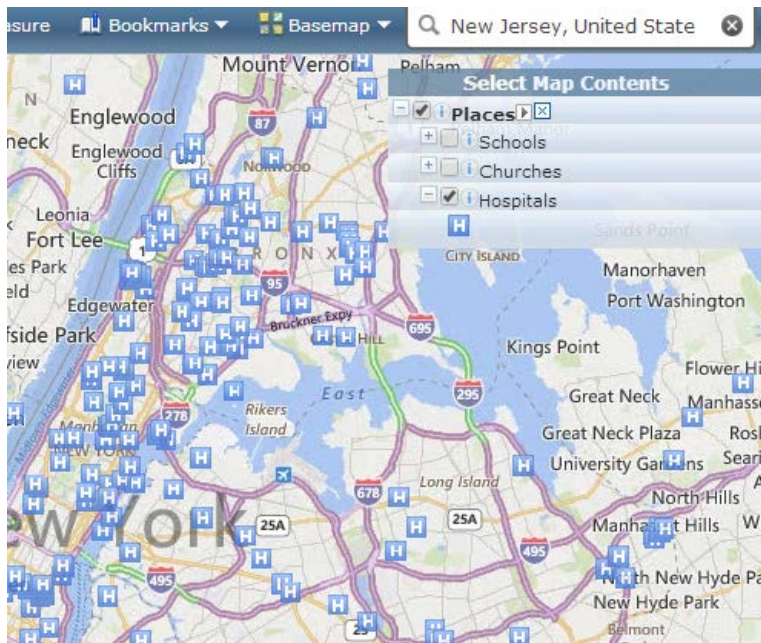
## Washington, DC – EJ Index for Lead Paint





# EJSCREEN has Many Other Map Layers

EJSCREEN adds many other types of data by overlaying various datasets (called “layers”)



# Types of Additional Layers

## Additional Demographic 'Layers'

- Education
- Geography
- Households
- Housing
- Income/Poverty
- Language
- Marital Status
- Place of Birth
- Population

## Additional Supplementary Map Layers

- Facilities Reporting to EPA
- Places (i.e. churches, hospitals, schools)
- Transportation
- Water Features
- EPA Tribal Areas
- Nonattainment Areas
- Boundaries





# Understand These Caveats Before Using the Tool

- Demographics and environmental indicators for a single block group may have high uncertainty.
- Environmental indicators are mostly screening-level proxies for actual exposure or risk.
- Some indicators may be outdated – conditions change.
- EJSCREEN does not cover all environmental issues.
- Other local data and concerns may be very important.
- Read the technical documentation for more caveats!



# Questions?

