Key Features of EJSCREEN

- Website and web-based tool
- Standard printable buffer reports, maps, and bar graphs
- Higher resolution maps
- Raw data downloads
- Consistent set of annually updated demographics – from U.S. Census Bureau’s American Community Survey (ACS)
- EJ Indexes – combines environment & demographics, based on technical analysis and policy decisions
- Percentiles and bar graphs help put numbers in perspective
- Many additional layers or user’s layers can be mapped
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/
Uses

- A tool for everyone – basis for further dialogue, engagement, and examination
- EPA is not requiring state and tribal partners to use it
- 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 in Uses

• Highlights places, for further review
• Supplement with local information and experience
• A starting point. Pre-decisional screening. Does not direct final outcomes.
• **Not** to label areas as “EJ Communities.”
Data Limitations

- Demographics uncertain for a single block group.
- Environmental indicators are mostly screening-level proxies – not actual exposure or risk.
- Indexes do not cover all environmental or community issues. Consider additional, local information.
- Estimates based on historical data may not reflect current or future conditions.
EJSCREEN Data

• 12 EJ indexes
  • Each combines one environmental issue and the demographic index.
• 12 environmental indicators
• 1 demographic index (and details on 6 key indicators)
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
Percentiles help interpret scores

- Percentiles put ranked 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.
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).
EJSCREEN has Many Other Map Layers

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

- Sites and Places
- Boundaries
- Tribal Land
- Nonattainment Areas
- Layer from the Web
- Real World Information
Steps in Building the Tool and Lessons Learned
Overview of Timeline

- End of 2010: Identified need
- 2011: Core team, workgroups, senior management, & contractors reviewed prior efforts and National Environmental Justice Advisory Committee report, compiled datasets, made the policy decisions, developed the indicators, created strawman/prototype maps.
- 2012: Beta internal launch.
- 2013: Official internal launch.
- 2014: Expert peer review, partner outreach, changes made. Public website developed.
- 2015: Public launch in June
2010 Convergence

- EJ became an Administrator priority
- Multiple, differing tools existed - Senior management interested in consolidation
- Some criticism over need for consistency
- NEJAC report on need to do better screening
- Policy/ scientific questions about prior approaches
- Office willing to work on a solution
- Interoffice workgroup formed, management council subcmte. charged.
- Senior management briefed in December.
Getting Started: Senior-level Support

• We obtained key senior-level supporters very early, which helped greatly.
• Obtaining unanimous senior-level support took longer.
• Turnover meant slowly rebuilding support
Starting: Successful Prototyping

• We created strawman approaches (options for datasets and methods) in-house, from day 1, in the first 6 months. This greatly facilitated decision-making.

• We created a proof-of-concept / demo version within the first 12 months, to have something to show people. This built demand and support.

• The prototype (2011), then beta (2012), then internal launch (2013) all went fairly quickly.
Starting: A Challenging Schedule

• Greatly underestimated time needed for public launch.
• Unfortunate choice of original technology platform delayed us in 2013-2014.
• Peer review in 2014 went very well, but took time.
• Resolving all concerns from numerous parties was extremely time-consuming in 2013-2015.
Assembling the Team

• Everything has already been done by someone to some extent – keep searching for expert(s) on each aspect of the project. (e.g., other tools, lead paint indicator, widgets like search, etc.)

• Ensure many skillsets & perspectives on team ideally (e.g., interface design, outreach, GIS, each dataset), but also find and talk to people with experience. Clarify who does which work.

• Funding – who pays for what, at least this FY

• Don’t skip who will do the website, demos, training, and lots of hand-holding. Not just a tool.
Getting Input: “Keep it Simple”??

• Get input, opinions, feedback... but about what, from whom?
  • Don’t ask a coder to design the user interface or documents!
  • Don’t count on a scientifically-valid index to come out of a committee.
  • Distinguish between technical, usability, policy and values-based decisions.

• “Keep It Simple”??
  • KISS is great for the interface and communications
  • But, do you really want to “simplify” substance, and lose technical/scientific validity?
    (e.g., simple bright lines or bins, unitless scores, an “unweighted” summary index).
“Mistakes were made”

• QC data – every part of it, at every stage!
  • We did 100% replication of the entire dataset using independent methods/code.

• Test the tool with multiple users, at each stage!
  • Manual checks of buffer reports identified issues the replication could not.

• Peer review

• Will get more public input

• Many mistakes will be made, so look for them.

• Examples of what we found and corrected via QC/testing:
  • Jan 2013 (weights had not been applied)
  • April 2013 (buffer calculations error)
  • May 2014 (NA handling, rounding, changed FIPS issues)
  • Mid-2014 (testing/debugging new interface)
  • Sep 2014 (Regional bounds error in some Tribal areas)
  • Oct 2014 (bug in supplementary maps)
  • Early 2015 (correcting denominators for State averages)
  • Typographical errors in documentation or website
To learn more

• [http://www.epa.gov/environmentaljustice](http://www.epa.gov/environmentaljustice)
• [http://www.epa.gov/ejscreen](http://www.epa.gov/ejscreen)
• [http://www.ejanalysis.com](http://www.ejanalysis.com)
• [Corrales.Mark@epa.gov](mailto:Corrales.Mark@epa.gov)
Thank You
Extra Slides
Summary of Lessons

1. Starting
   1. Have an under-the-radar strawman/proposal, and create a proof of concept to show people.
   2. Get senior buy-in early and often, but carefully.
   3. Just start – It takes more time and $ than expected, but support grows if you have a clear vision of something doable, and proof of concept to show.

2. The right team
   1. Everything has already been done by someone to some extent – keep searching for expert(s) on each aspect of the project.
   2. Ensure many skillsets & perspectives on team ideally, but also find and talk to people with experience. Clarify who does which work.
   3. Funding – clarify who pays for what, at least for the FY
   4. Don’t skip the website, demos, training, and lots of hand-holding. Not just a tool.

3. Input and Simplicity
   1. Get input, opinions, feedback, but about what, from whom? Don’t ask a coder to design the user interface or training, and don’t count on a scientifically-valid index to come out of a public meeting. Distinguish between technical, usability, policy and values-based decisions.
   2. “Keep It Simple” for the interface and communications, but be careful about pressure to “simplify” substance and lose technical/scientific validity (e.g., simple bright lines or bins, unitless scores, an “unweighted” summary index).

4. QC data, test the tool, at each stage! Many mistakes will be made, so look for them.
## Environmental Indicators

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

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

Demographic Index = (% low-income + % minority) \( \div 2 \)

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 that may result in vulnerable populations being disproportionately impacted by pollution.

It helps identify areas that have a combination of higher pollution burdens and more potentially vulnerable individuals, in the same place.