EPA United States Environmental Protection Agency

EPA Tools and Resources Webinar: Understanding Environmental Justice through two EPA tools – EJScreen and EnviroAtlas

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Environmental justice is 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.

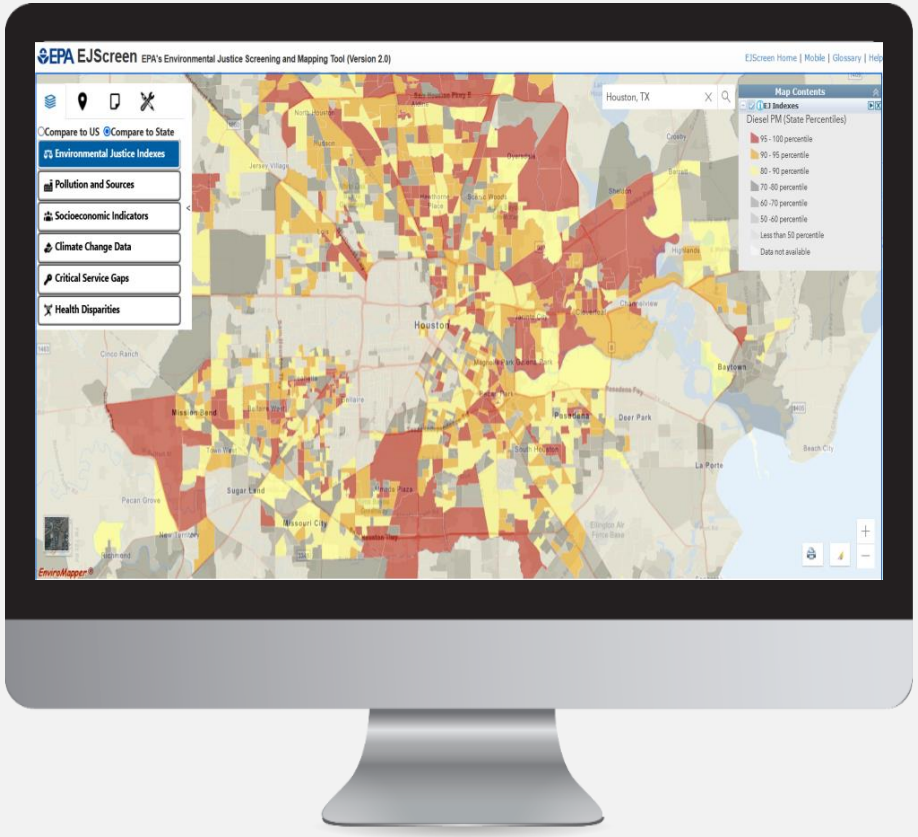
This goal will be achieved when everyone enjoys:

- The same degree of protection from environmental and health hazards,
- Equal access to environmental benefits, and
- Equal access to the decision-making process to have a healthy environment in which to live, learn, and work.

Tools like EJScreen and EnviroAtlas can provide the information to help move us towards this goal!

What is EJScreen?

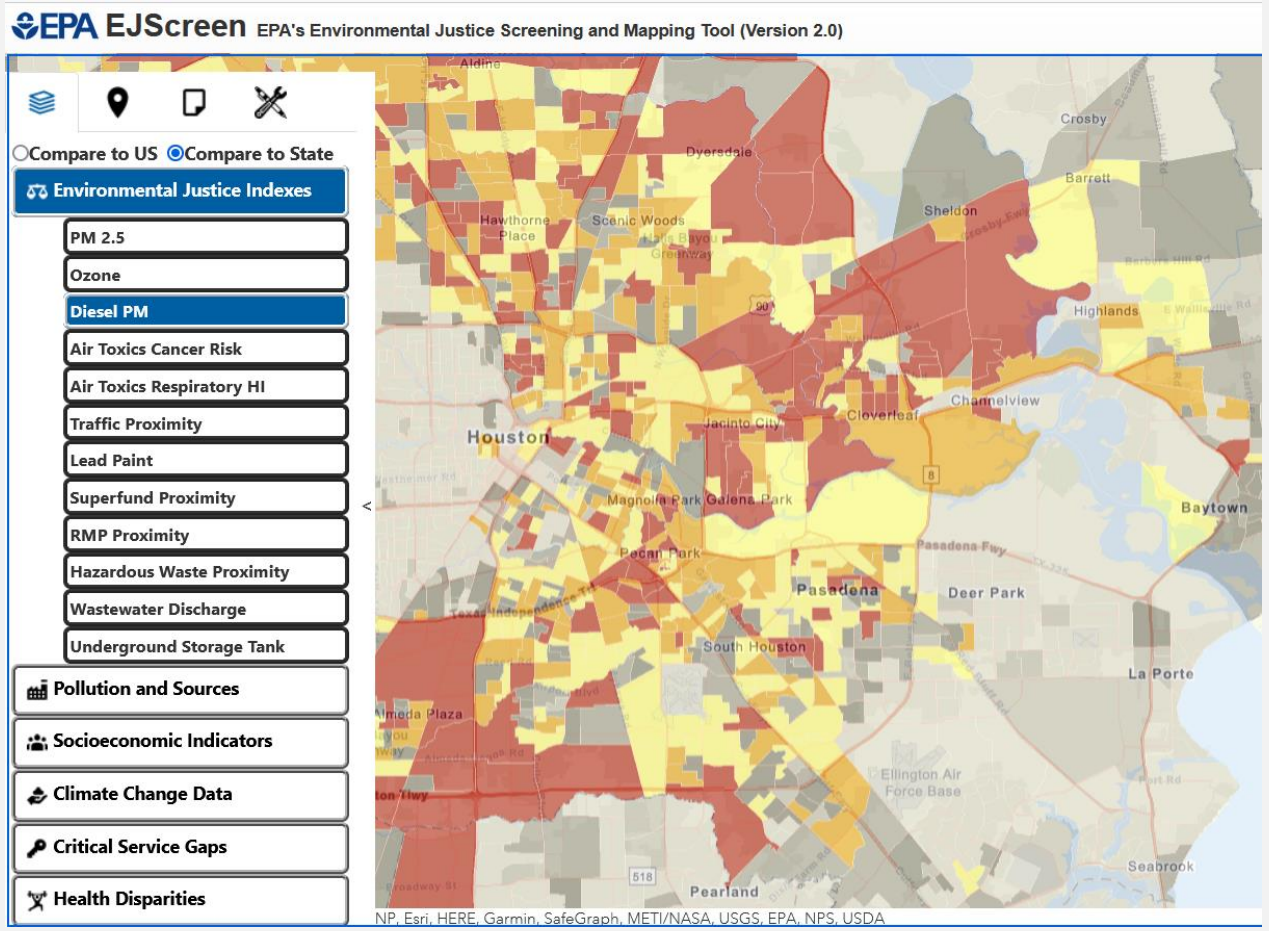
- EPA's web-based GIS tool for nationally consistent EJ screening and mapping
- Combines environmental and demographic data to highlight areas where vulnerable populations may be disproportionately impacted by pollution
- Starting point for agency considerations of environmental justice



Click to access EJScreen Tool

EJScreen Key Features

- 12 EJ Indexes – one for each environmental indicator
- Annually updated environmental data
- Annually updated demographics – from most recent US Census Bureau American Community Survey (ACS)
- Highest resolution data available
- Ability to download data
- Accessibility / ease of use



EPA United States Environmental Protection Agency

Caveats & Limitations

EJScreen does not cover all environmental or EJ issues

Environmental indicators are mostly screening-level proxies for actual exposure or risk

Indicators vary in vintage

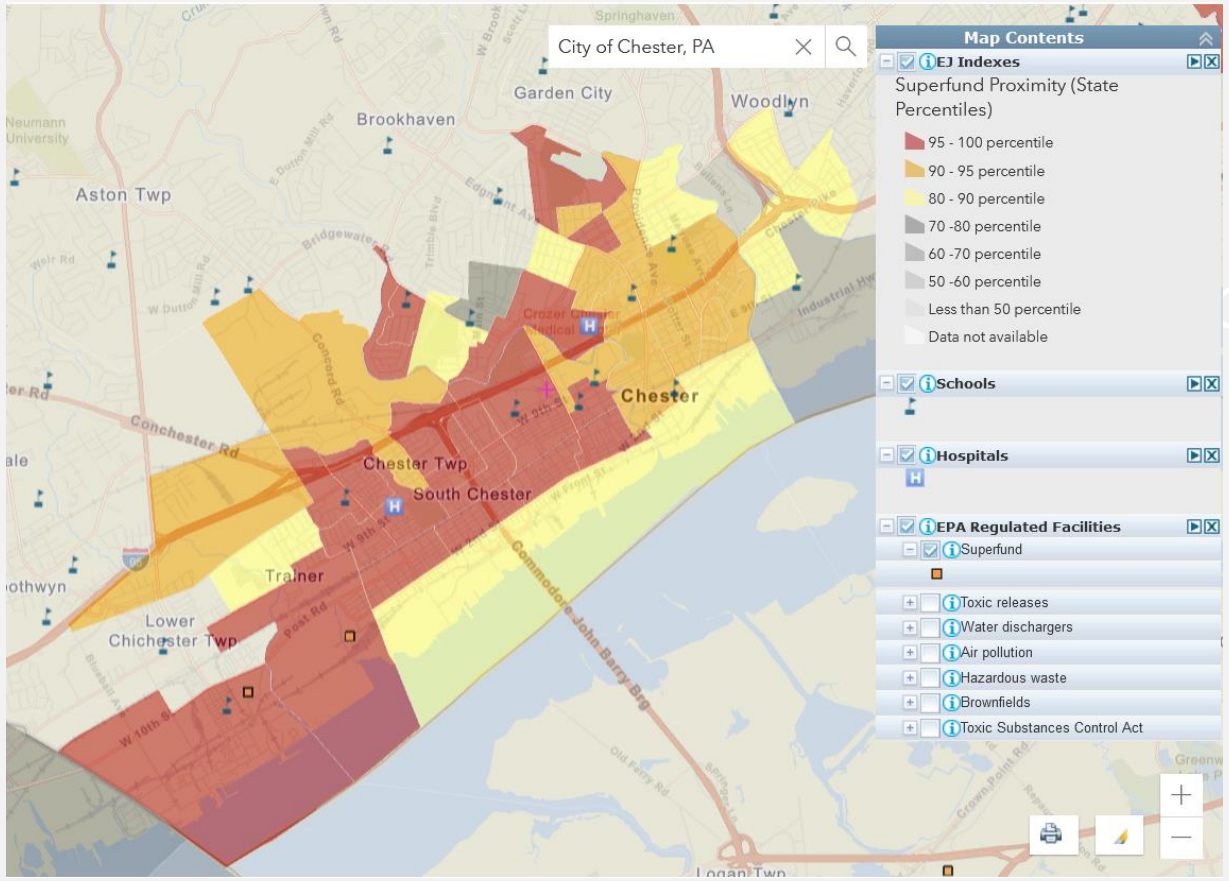
Census data has limitations and can obscure small communities

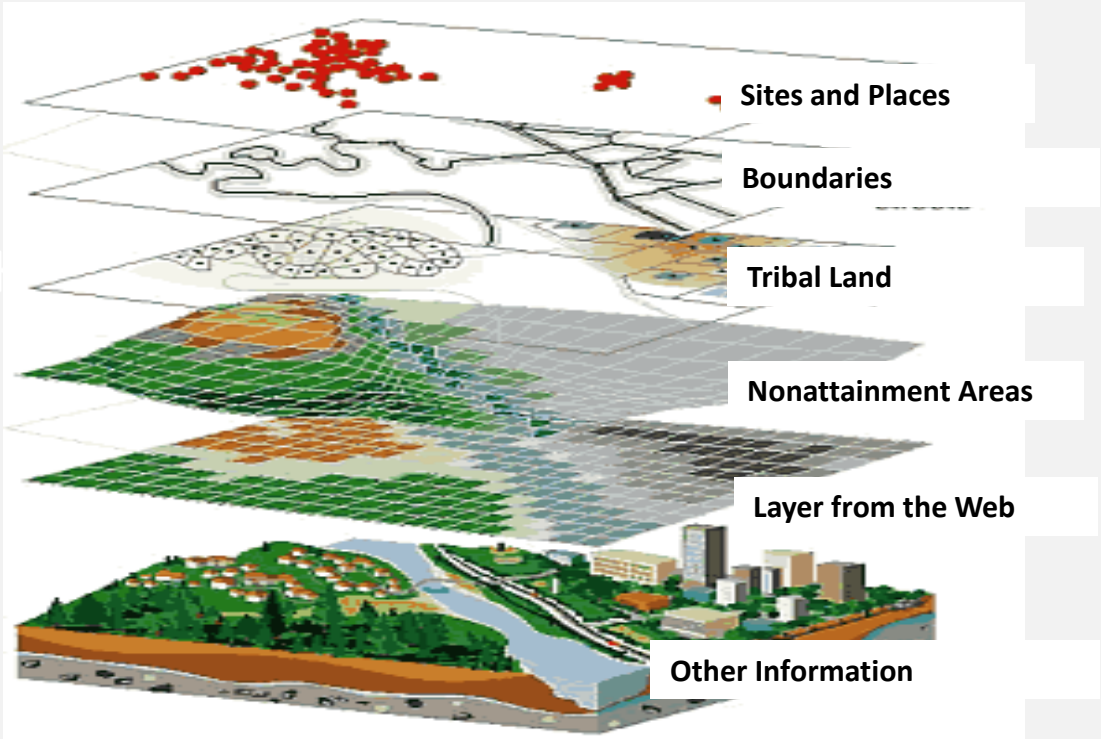
Results should be verified on the ground when possible

EJScreen does not label EJ communities

EJScreen Data

EJScreen adds many types of data
by overlaying various datasets or “layers”





UNITS OF ANALYSIS

United States

State

primary governmental divisions of the United States.

County

Largest divisions within states.

Census Tract

Collection of Census block groups, mostly between 1,200 and 8,000 people.

Block Group

Collection of residential blocks, mostly, between 600 and 3,000 people.

Block

Residential block, bounded on all sides by streets.

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Environmental Indicators

Indicator	Description	Year
Particulate matter 2.5	Annual average of PM 2.5 levels in the air	2018
Ozone	Ozone summer seasonal avg. of daily maximum	2018
Diesel particulate matter	Diesel particulate matter level in air	2017
Air toxics cancer risk	Lifetime cancer risk from inhalation of air toxics	2017
Air toxics respiratory hazard index	Air toxics respiratory hazard index (ratio of exposure concentration to health-based reference concentration)	2017
Traffic proximity and volume	Count of vehicles on major roads, divided by distance in meters	2019

Environmental Indicators (cont'd)

Indicator	Description	Year
Lead paint	Percent of housing units built pre-1960, as indicator of potential lead paint exposure	2015 - 2019
Superfund proximity	Count of proposed or listed NPL - also known as Superfund - sites within 5 km, each divided by distance in kilometers	2021
Risk management plan facility proximity	Count of RMP (potential chemical accident management plan) facilities within 5 km, each divided by distance in kilometers	2021
Hazardous waste proximity	Count of hazardous waste facilities (TSDFs and LQGs) within 5 km, each divided by distance in kilometers	2021
Underground storage tanks (UST) and leaking UST (LUST)	Count of LUSTs (multiplied by a factor of 7.7) and the number of USTs within a 1,500-foot buffered block group	2021
Wastewater Discharge Indicator	RSEI modeled Toxic Concentrations at stream segments within 500 meters, divided by distance in kilometers	2021

Socioeconomic Indicators *(New ACS)*

Indicator	Definition
People of color	Individuals who list their racial status as a race other than white alone and/or list their ethnicity as Hispanic or Latino
Low-Income	Household income is less than or equal to twice the federal “poverty level”
Unemployment	All those who did not have a job at all during the reporting period, made at least one specific active effort to find a job during the prior 4 weeks, and were available for work (unless temporarily ill)
Linguistic isolated	Households in which all members aged 14 years speak English less than “very well” (have difficulty with English)
Less than high school education	People aged 25 or older whose education is short of a high school diploma
Under age 5	People in a block group under the age of 5
Over age 64	People in a block group over the age of 64
Demographic index	(Low income + People of Color) / 2

Health Indicators

Indicator	Definition
Low Life Expectancy	Average life expectancy
Heart Disease	Heart disease prevalence among adults aged 18 years or older
Asthma	Asthma prevalence among adults aged 18 or older

All Health indicators come from the CDC and are at the Census tract level

Climate Indicators

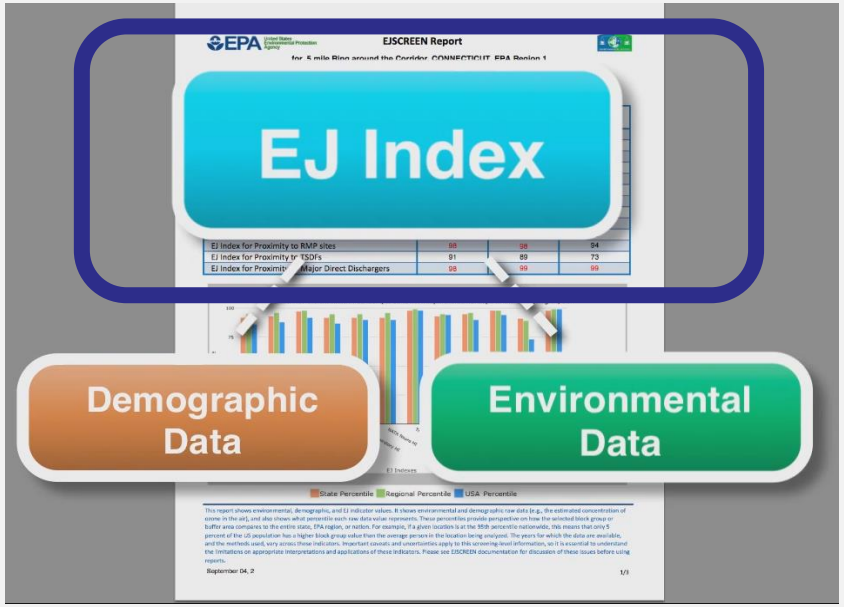
Indicator	Definition
Wildfire Hazard Potential*	Relative potential for wildfire that may be difficult to control
Drought*	Change in drought conditions across the contiguous 48 states from 1900 to 2020
Coastal Flood Hazard	Areas in coastal counties that are most prone to coastal flood hazards
100-year Flood Estimates	Estimated 100-year floodplains for the Conterminous US for 2016
Sea Level Rise	Land at risk of permanent flooding when sea level rises

*New indicators in 2022

Critical Service Gaps Indicators

Indicator	Definition
Food Desert	Low income and low access to food (USDA data)
Medically Underserved	Areas having too few primary care providers, high infant mortality, high poverty or a high elderly population.
Broadband Internet	Areas where less than 50% of population has broadband

What does the EJ Index mean?



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

EJ Index Calculation:

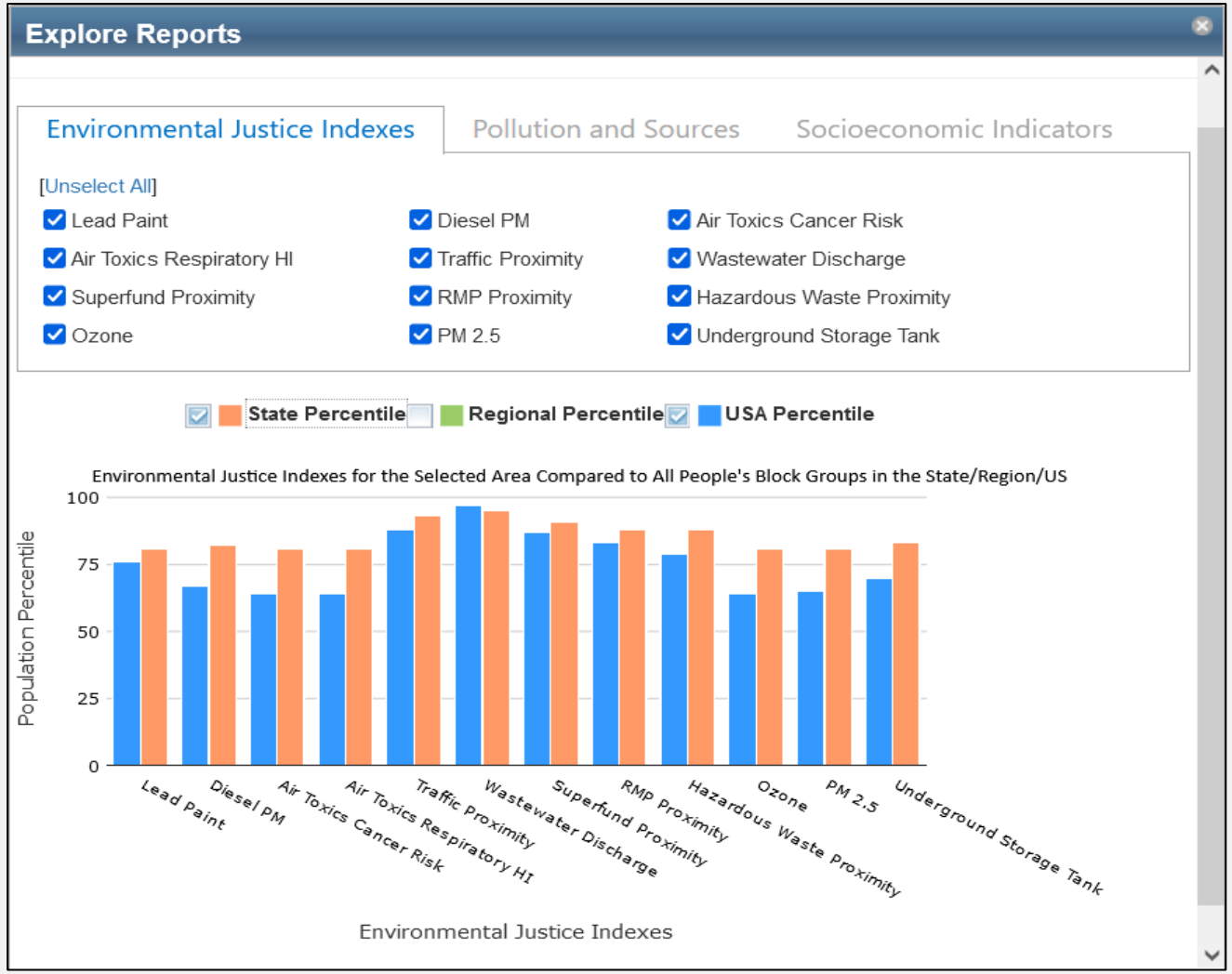
Single Environmental Indicator

X (Demographic Index – US Average Demographic Index)

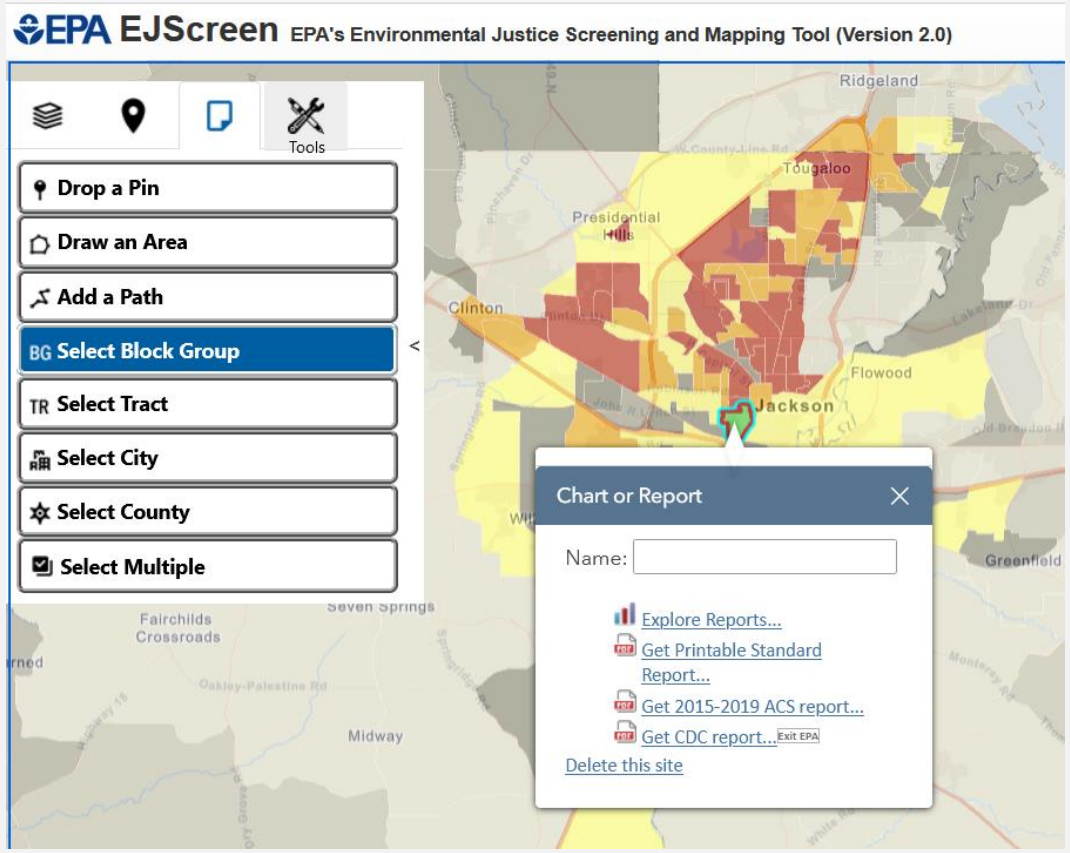
X Block Group Population

Results are Ranked as Percentiles

- Percentiles put indicators into common units of 0 – 100.
- 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 Reports

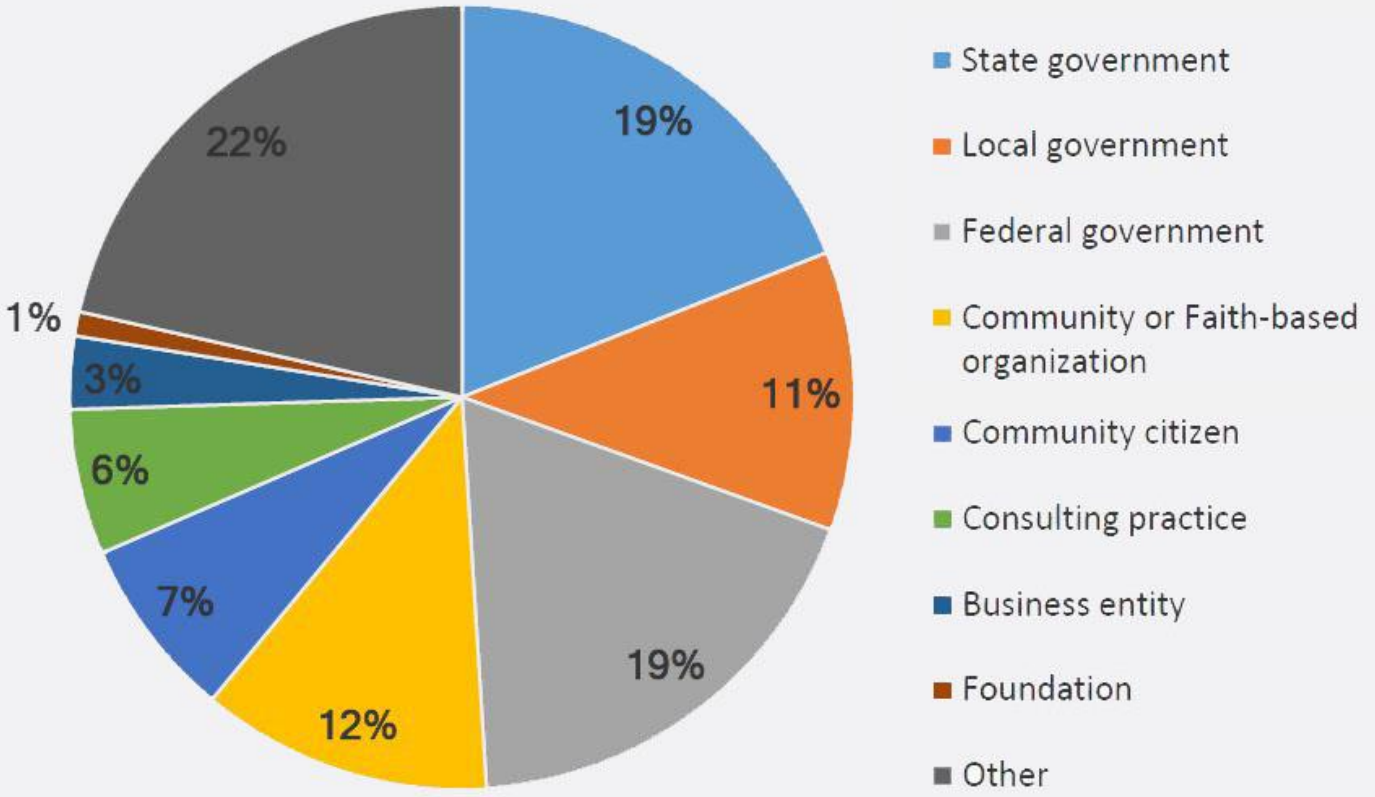


- User to define areas of assessment
  - Various ways to define area
- Multiple reports available in EJScreen
  - Printable Standard Report
  - American Community Survey Report
  - CDC Health Report

EJScreen in Action: External Users

- EJ analyses
- Community outreach
- Prioritization
- Retrospective reports
- Environmental analysis
- Education and teaching
- Research

Who is using EJScreen?

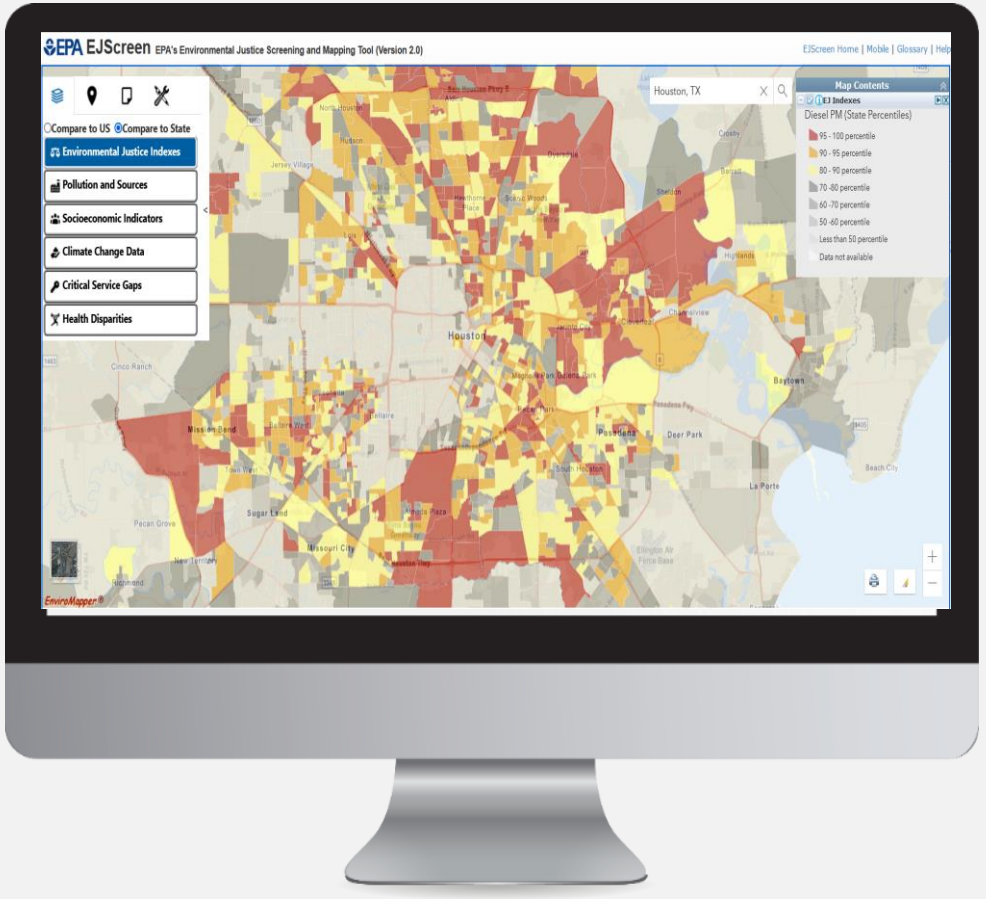


Future of EJScreen

- Examining EJ relevant data to incorporate (water, CAFOs, pesticides)
- Potential for addressing cumulative impacts
- Considering inclusion of an alternative EJ index with different demographics
- Continued work with states to address local needs/data
- Development of threshold maps that make the tool easier to use
- Focus on incorporation into EPA programs and activities

EJScreen Tool Learning Resources

- EJScreen website
- Guidance documents
- Video tutorials
- Technical information
- Understanding results
- Other tools and resources



Click to access EJScreen Tool

Climate and Economic Justice Screening Tool

- In Executive Order 14008 on *Tackling the Climate Crisis at Home and Abroad*, President Biden directed the Council on Environmental Quality (CEQ) to create a Climate and Economic Justice Screening Tool (CEJST).
- CEJST's clear and singular purpose is to help federal agencies identify disadvantaged communities that have been historically marginalized, underserved, and overburdened by pollution.
- The tool provides important information for the Justice40 Initiative.

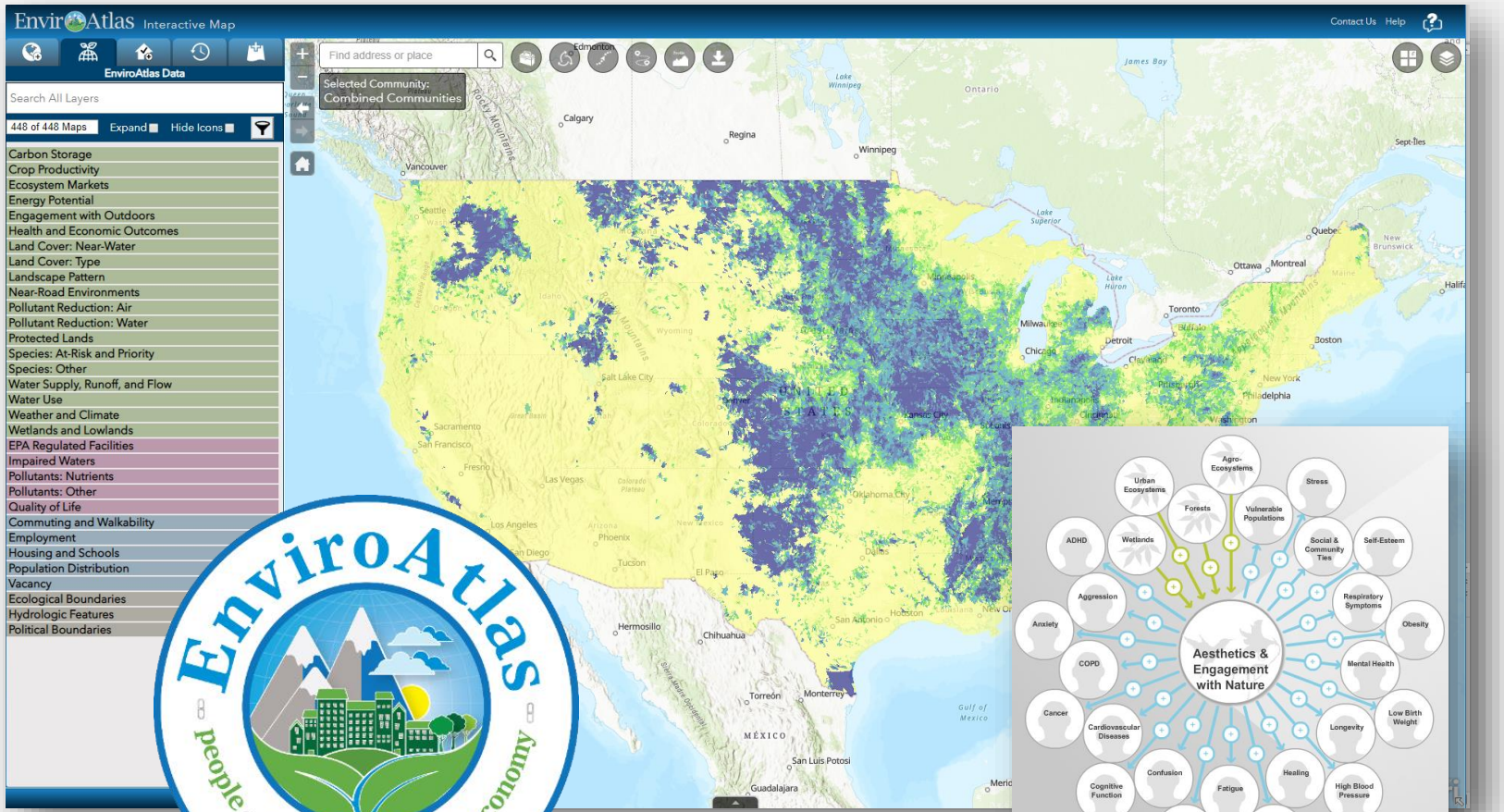
EJScreen & CEJST

- CEJST is currently beta and will only be used for Justice40 implementation when finalized.
- CEJST is largely based on the same datasets featured in EJScreen.
- CEJST and EJScreen serve different functions and have very different abilities.
- EJScreen will continue to be used by EPA and our partners to screen for areas with potential environmental justice concerns.
- CEJST will not replace EJScreen.

What is EnviroAtlas?

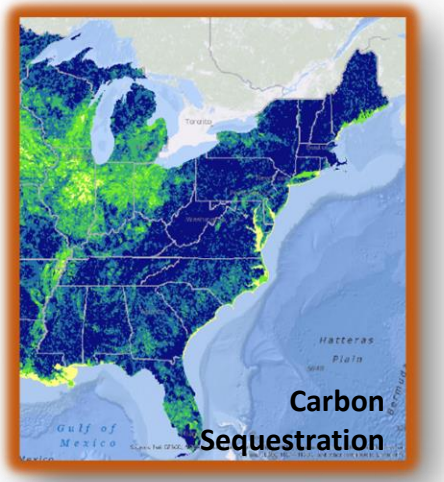
EnviroAtlas is an online resource providing geospatial data, easy-to-use tools, and other resources related to ecosystem services, their chemical and non-chemical stressors, connections to human health, and equity.

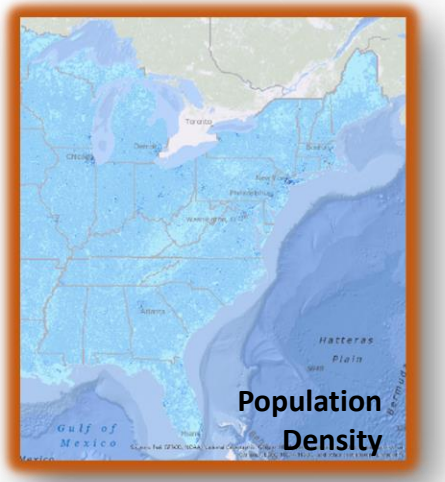
- Over 500 map layers, environmental and demographic
- Tools for finding relevant data
- **Interactive Mapping Application**
- **Eco-Health Relationship Browser**
- Tools for analysis



[Click here to access EnviroAtlas]

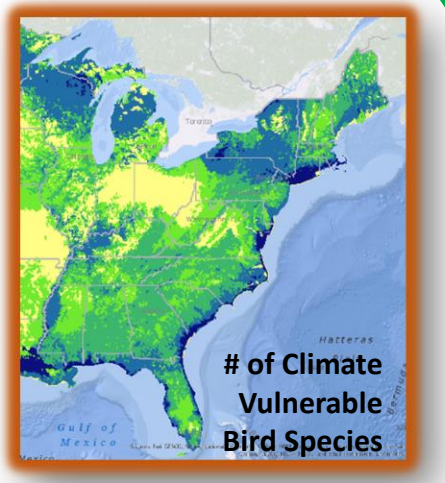

Clean Air
Clean & Plentiful Water
Biodiversity Conservation
Food, Fuel & Materials
Natural Hazard Mitigation
Climate Stabilization
Recreation, Culture & Aesthetics
Ecosystem Services Benefit Categories





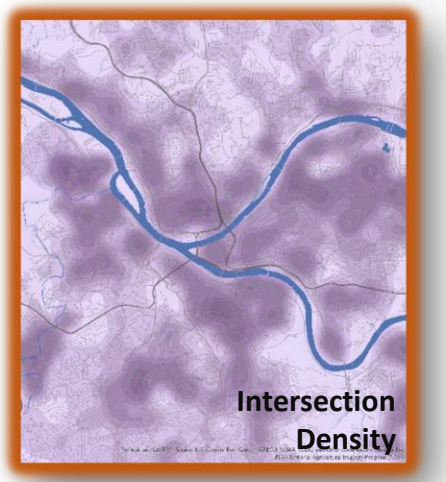
National Data

30-meter land cover
400+ unique data layers
Consistent data for the conterminous US



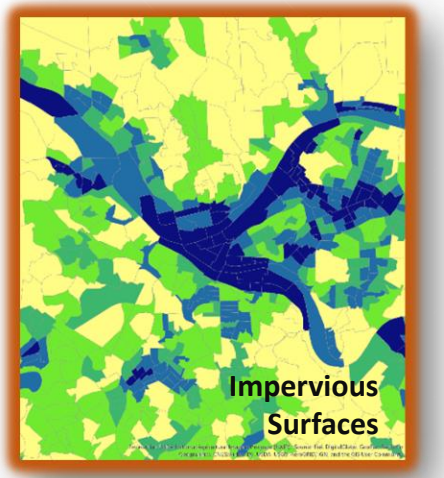
EnviroAtlas

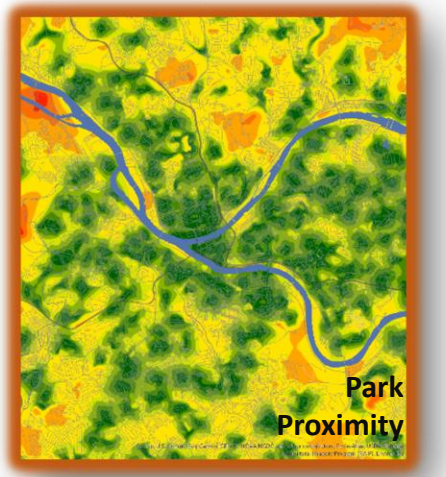
Data Fact Sheets
Peer-reviewed
Standard Metadata
Open access



Community Data

1-meter land cover
100+ unique data layers
30 metropolitan areas
1450 cities & towns (65+ million people)



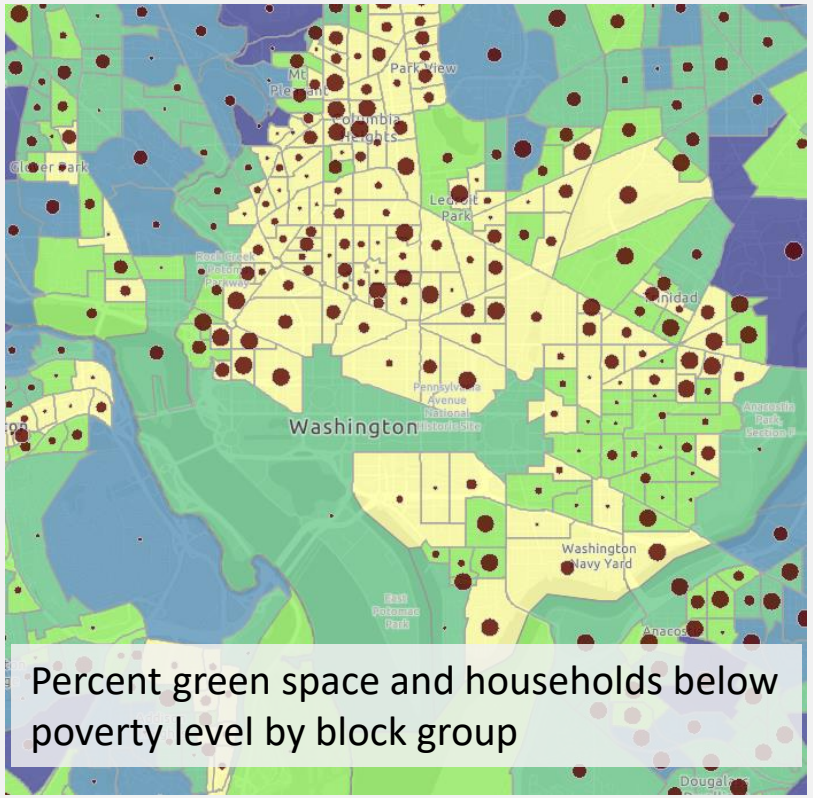


Data in EnviroAtlas

- EnviroAtlas provides data at multiple extents and scales

Summaries by Census block group, Census tract, watersheds

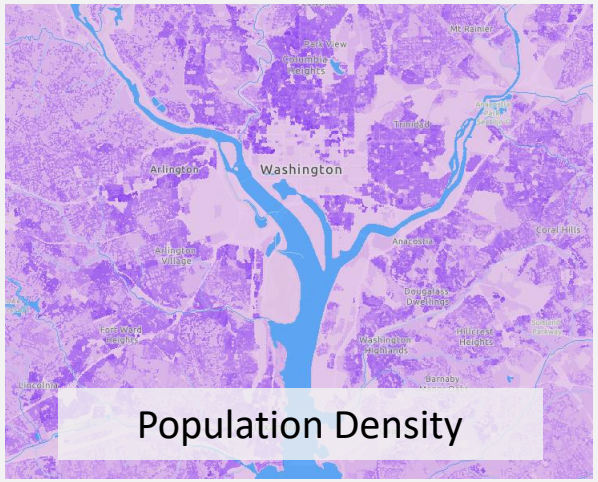
- Allows for data overlays



Percent green space and households below poverty level by block group

Pixel based / Raster

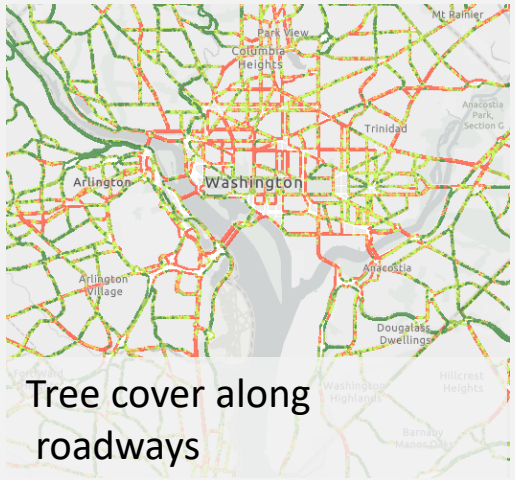
- Fine detail



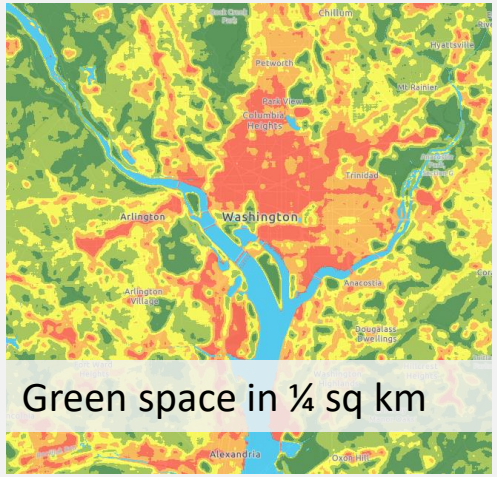
Population Density

Lines/Vectors

- Individual features

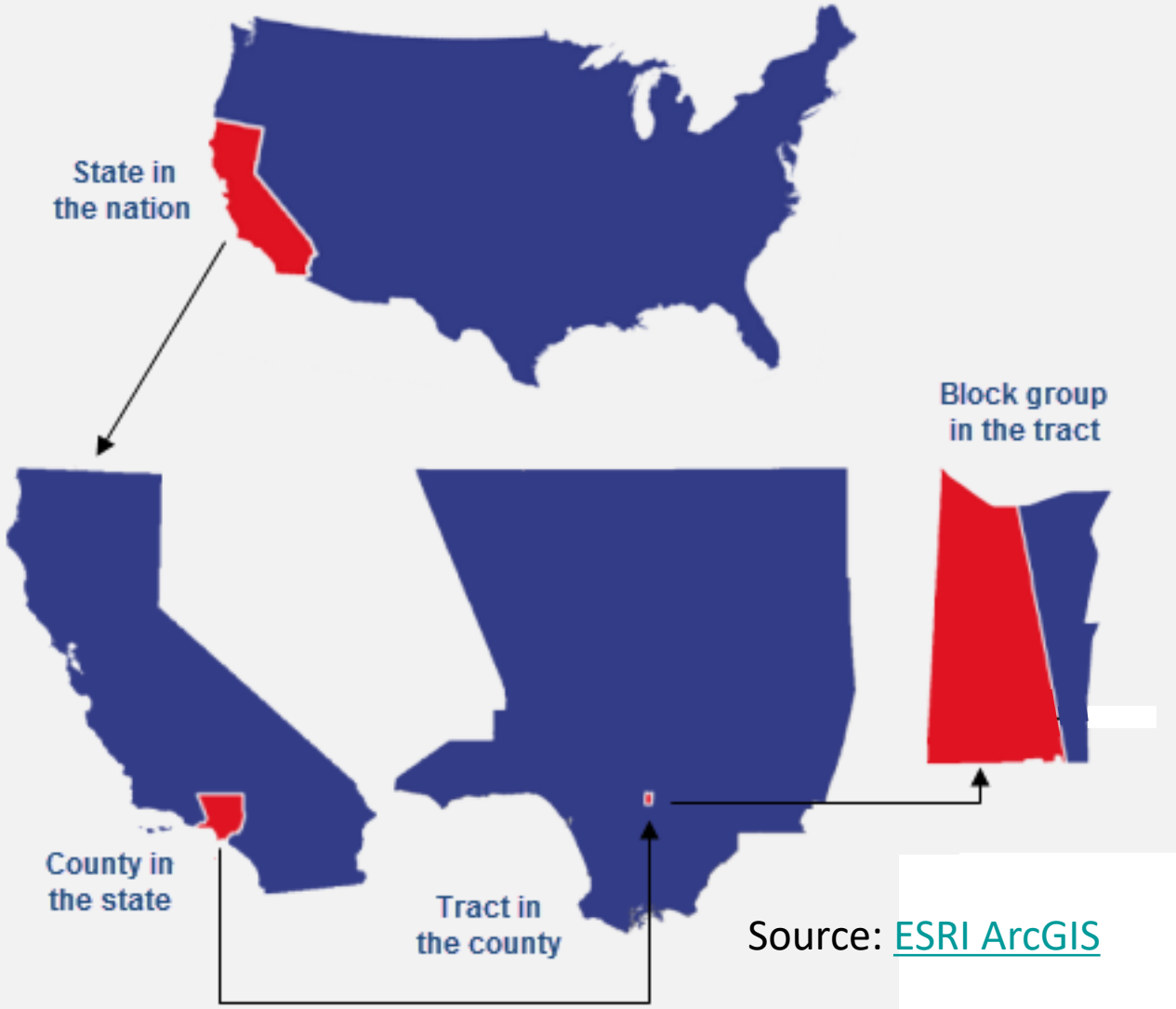


Tree cover along roadways



Green space in ¼ sq km

Summarized Data



Source: [ESRI ArcGIS]

Source: [USGS]

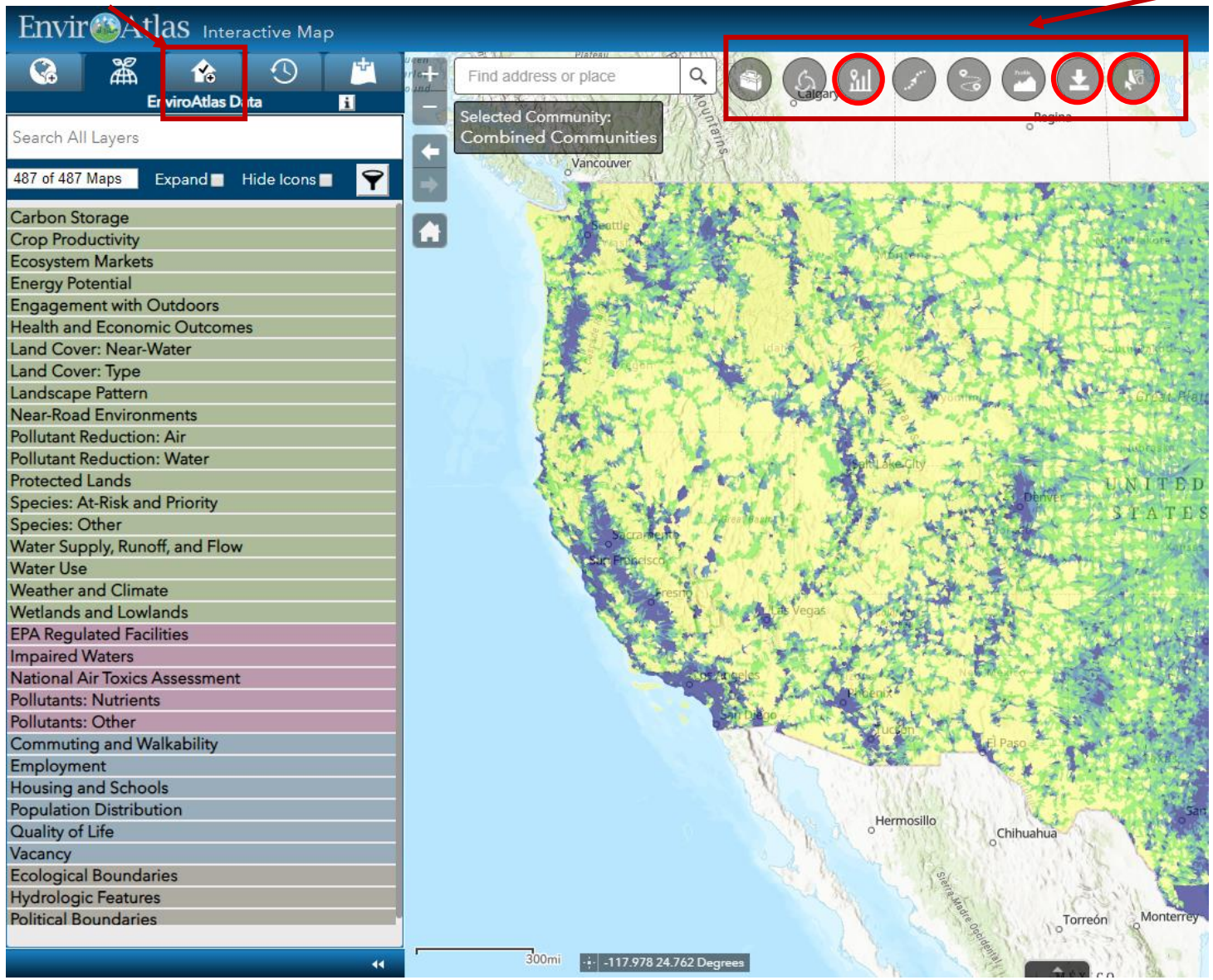
~100,000 HUC12 units in US

~218,000 block groups in US

EnviroAtlas Interactive Map

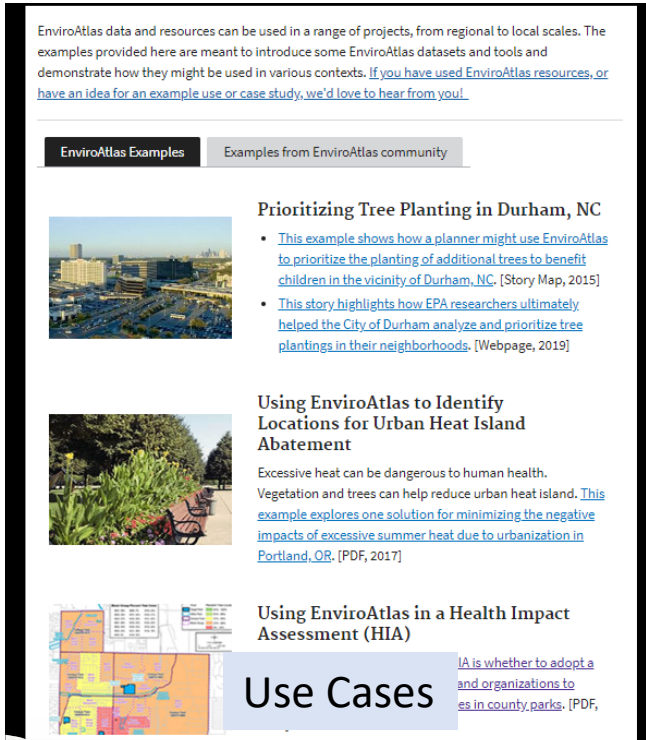
US Census Demographic Data

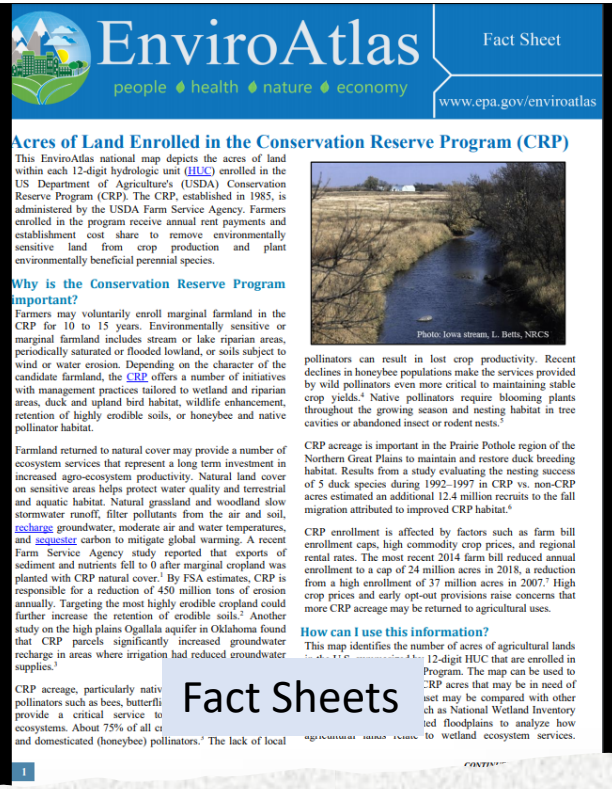
Built-in analysis tools

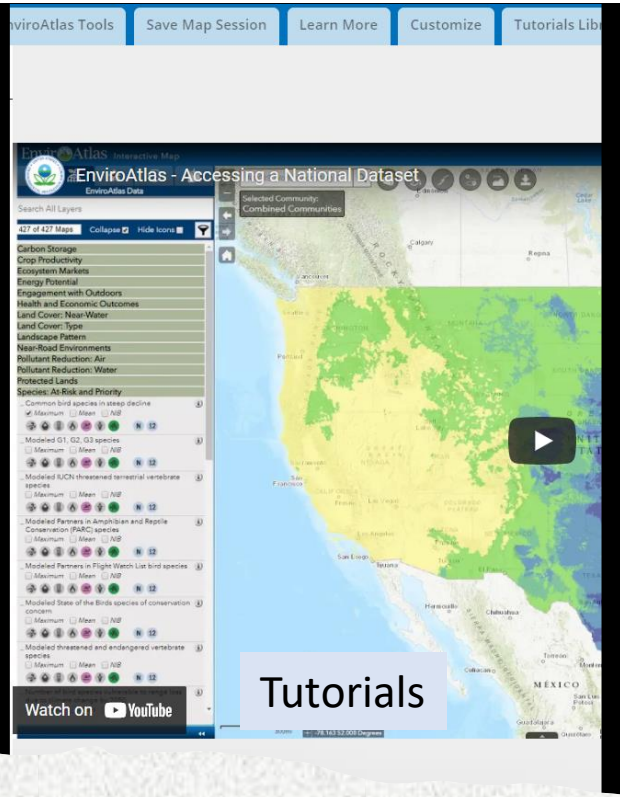


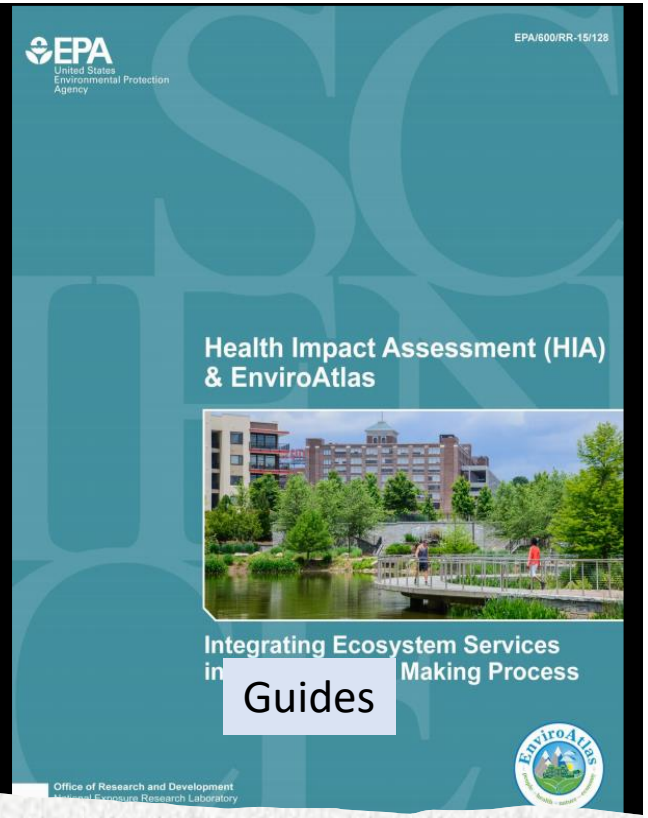
Data Topics

- Access EnviroAtlas Data:
  - Via our Interactive Map
  - Use web services
  - Download data
- Users can add their own data to our map for a session
- Users can search for data from the internet and add to map
- Save your session and return to it









Data and tools are not enough

Educational materials

K- 6
Exploring Your Watershed

4 - 6
Introduction to Ecosystem Services

4 -12+
Connecting Ecosystems and Human Health

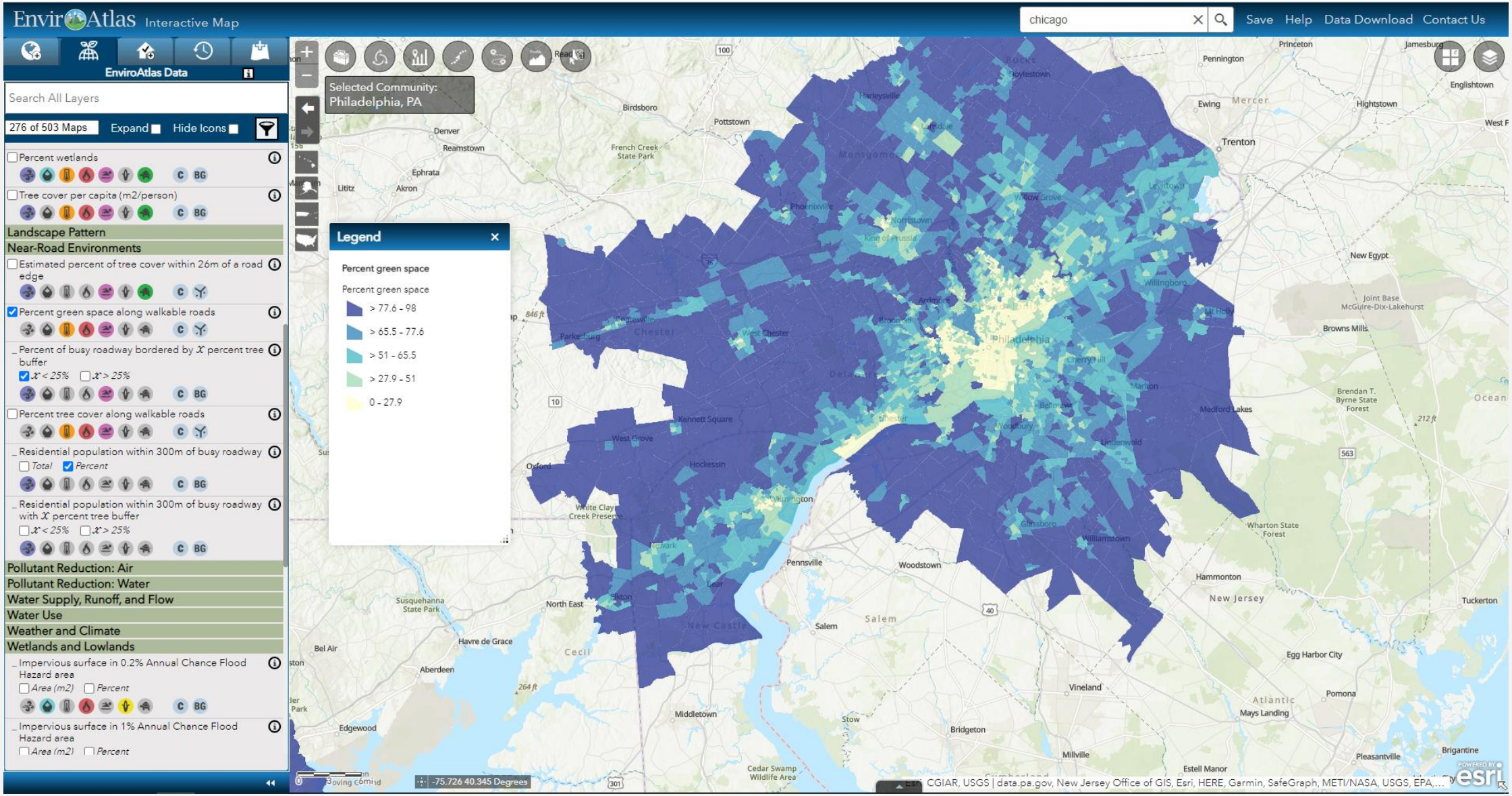
9 - 12+
*Building a Greenway Case Study**

*With new environmental justice component

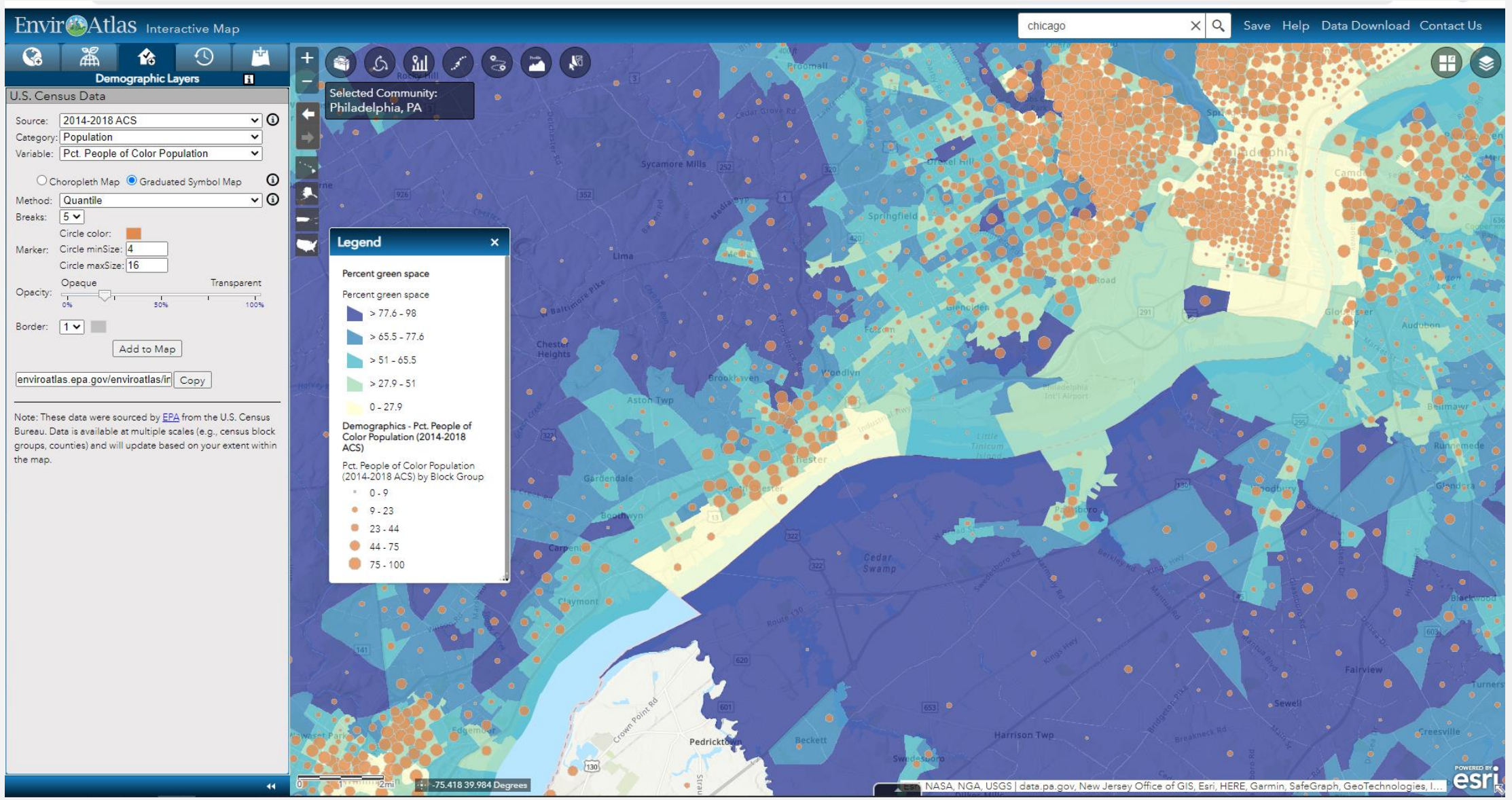
EnviroAtlas and Environmental Justice

- Environmental injustice can be related to inequity associated with exposure to stressors as well as access to assets.
- Includes data relevant to environmental justice, such as:
  - Demographic data
  - Opportunity zones
  - Climate scenarios, flooding, park access, green space, exposure, proximity to pollution sources and others
  - Redline maps (coming soon)
- Add data function allows for inclusion of:
  - EJSCREEN indices
  - Local / national data of interest
- Educational lesson plan targeted to high school, undergraduate, other audience, '*Considering Environmental Justice in Building a Greenway*' incorporating EJ concepts and data from EJSCREEN
- Some EnviroAtlas data incorporated into EJScreen

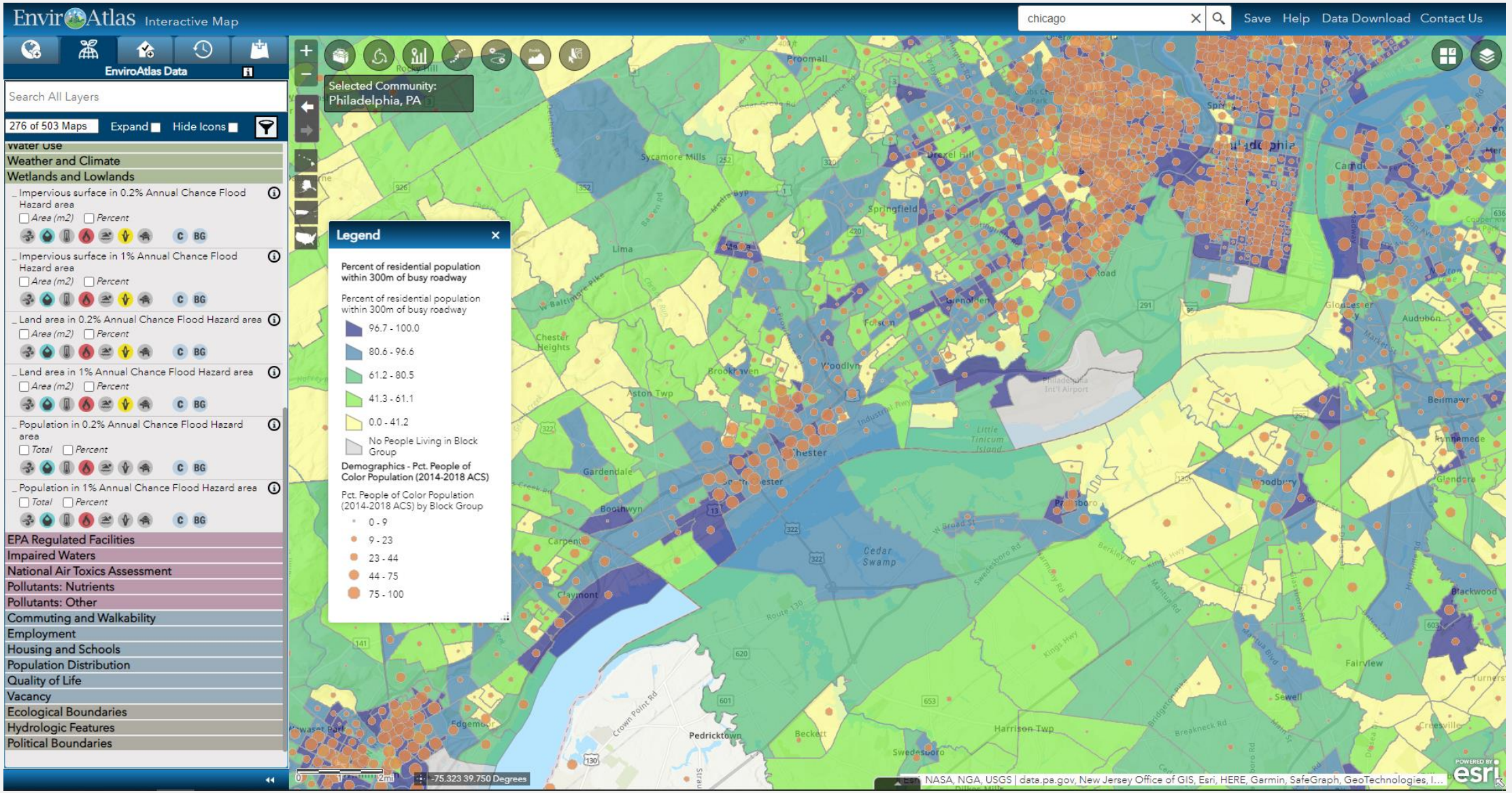
EnviroAtlas – Percent green space across Philadelphia



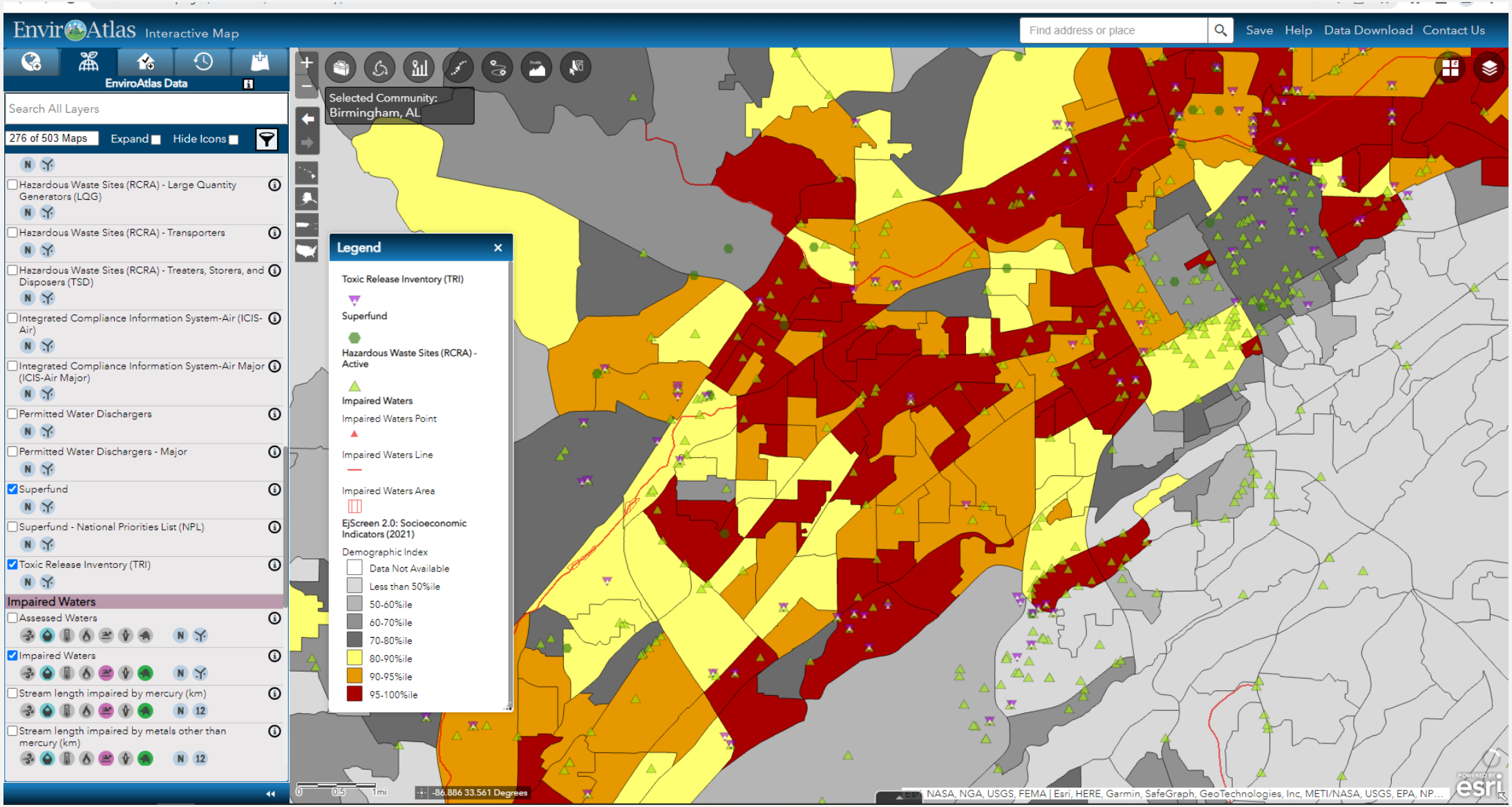
Enviroatlas – Percent green space in area of Philadelphia overlaid with percent people of color



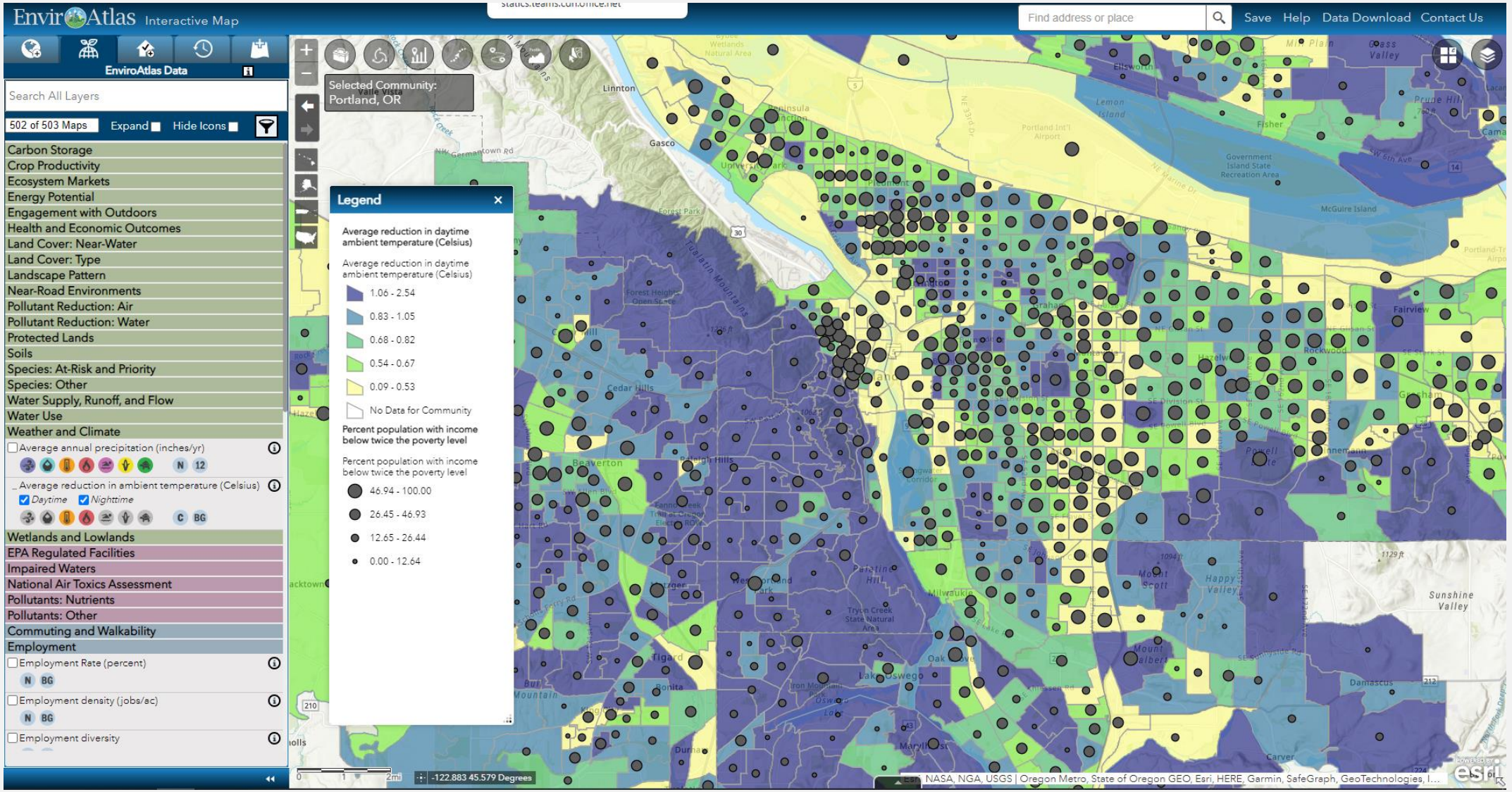
EnviroAtlas – Percent of population living within 300 m of a busy roadway overlaid with percent people of color



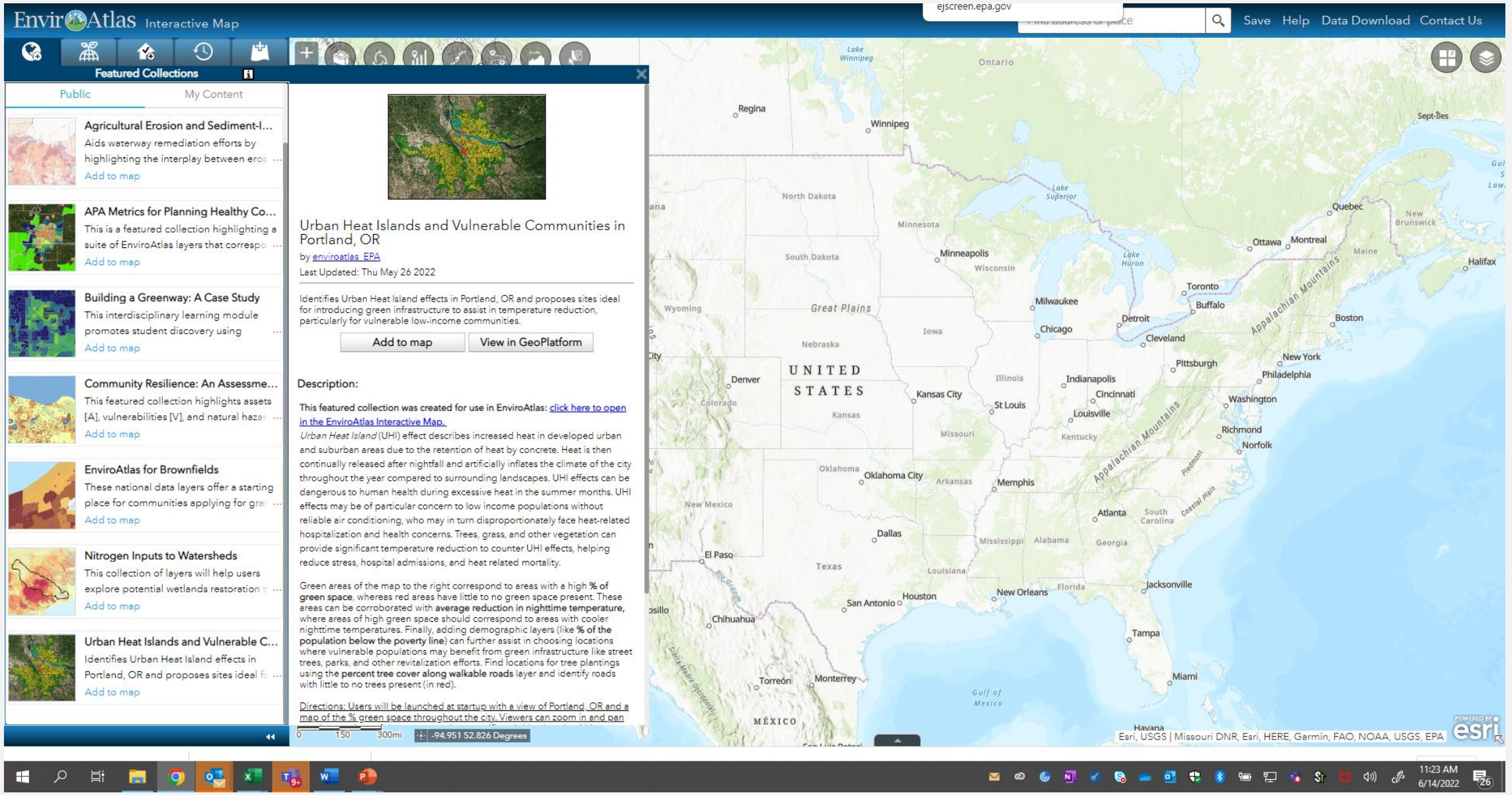
EnviroAtlas – EJScreen Demographic Index overlaid with RCRA Hazardous Waste Sites, Superfund Sites, and Impaired Waters



EnviroAtlas – Average reduction in daytime temperature due to tree cover, overlaid with percent with income below twice the poverty level



EnviroAtlas – Featured collection illustrating urban heat islands in the context of vulnerable communities



EnviroAtlas Educational Module – Considering Environmental Justice in Building a Greenway

EnviroAtlas

CONTACT US

- EnviroAtlas Home
- About Us
  - Ecosystem Services
  - Frequent Questions
  - Project Status
- Web Apps
  - Interactive Map
  - Eco-Health Browser
- How to Use
  - Tutorials
  - Example Uses
  - For Brownfields
  - Health Impact Assessment
- Data
  - About the Data
  - Dynamic Data Matrix
  - Download
- Resources & Publications
  - Educational Materials
  - Fact Sheets
  - Publications
- Technical Resources
  - GIS Toolboxes
- Related Links

Building a Greenway: A case study

Case Study Overview

These interdisciplinary learning modules promote student discovery using available maps and data, engaging students to be collaborative decision-makers. These case studies are intended for secondary education, undergraduate, and community education/engagement programs. There are two case study activities available here: (1) The original Greenway activity gives educators the option to assign stakeholder roles, and (2) the EJ Greenway adaptation includes additional environmental justice concepts and students must take on one of the provided stakeholder roles.

	(1) Building a Greenway: A Case Study	(2) Considering Environmental Justice in Building a Greenway NEW
For Teachers	• Greenway: Teacher Guide (pdf) • Greenway: PowerPoint for Teacher Use (pdf) • Greenway Powerpoint Script (pdf)	• EJ Greenway: Instructor Summary Sheet & Master Links (pdf) • PowerPoint Slides and Script - *coming soon*
Student Handouts	• Greenway: Case Study Synopsis (pdf) • Greenway: Student Map Set (pdf) • Greenway: Understanding Maps Worksheet (pdf) • Greenway: Student Stakeholder Roles (pdf) (optional) • Greenway: Glossary (pdf) (optional)	• EJ Greenway: Participant Instruction Sheet & Master Links (pdf) • EJ Greenway: Background Reading (pdf) • EJ Greenway: Student Map Set (pdf) • EJ Greenway: Understanding Maps Worksheet (pdf) • EJ Greenway: Stakeholder Roles (pdf) • EJ Greenway: Glossary & References (pdf)

Recent EJScreen and EnviroAtlas Publication

Empowering Environmental Justice Decision Makers: Increasing Educational Resources for US Environmental Protection Agency's Mapping Tools

Jenna M. Hartley, Stacey Lobatos, Jessica L. Daniel, and Tai Lung

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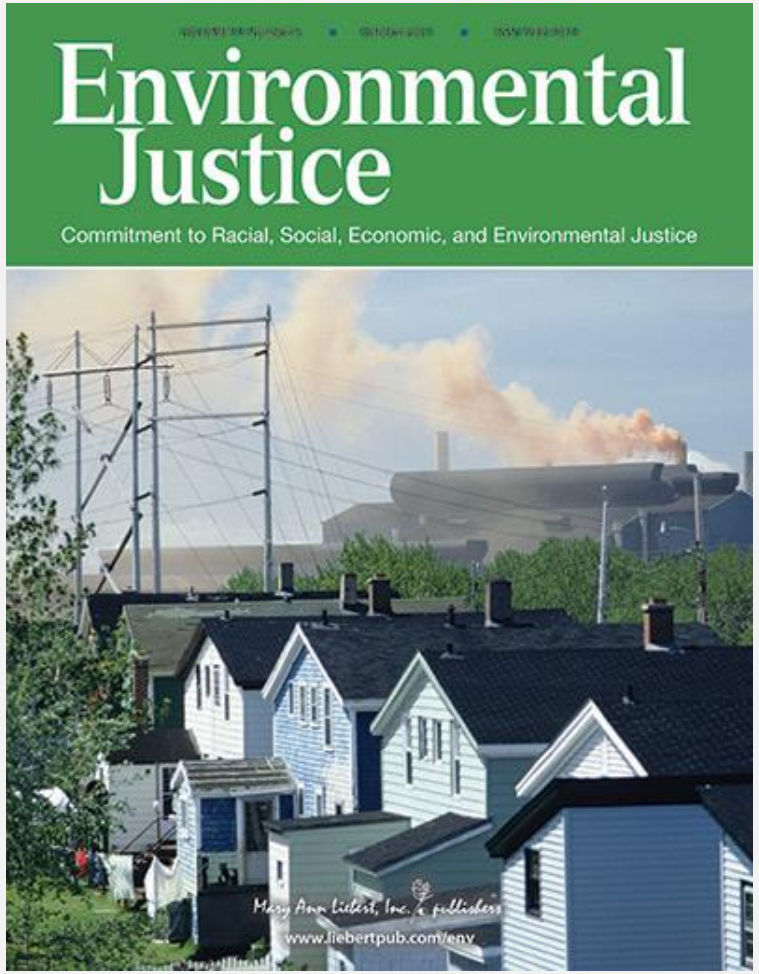

EPA United States Environmental Protection Agency

Conclusion

- EJScreen is an environmental justice mapping and screening tool. Its sole purpose is environmental justice.
- EnviroAtlas is a mapping tool built around the concept of all the benefits we receive from nature. It can be used in an environmental justice context.
- The tools can be used separately or together.
- The data from EJScreen can be easily viewed in EnviroAtlas and vice versa.

Conclusion

I am interested in	EJScreen	EnviroAtlas
Screening for environmental justice	X	
Environmental justice indices	X	
A specific environmental or demographic dataset	X	X
Environmental assets and environmental justice		X
Linkages between ecosystems and human health and EJ		X
Viewing data in an easy-to-use map	X	X
Overlaying demographic variables over environmental variables	X	X

Contacts

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