

The Environmental Justice Index

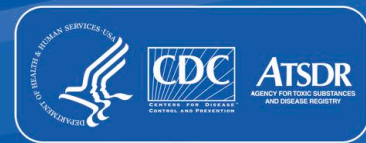
Advancing Environmental Justice and Health Equity Through Data Visualization

April 6, 2023

Benjamin McKenzie, M.S. (he/him)
Geospatial Epidemiologist, CDC/ATSDR



**National Center for Environmental Health
Agency for Toxic Substances and Disease Registry**

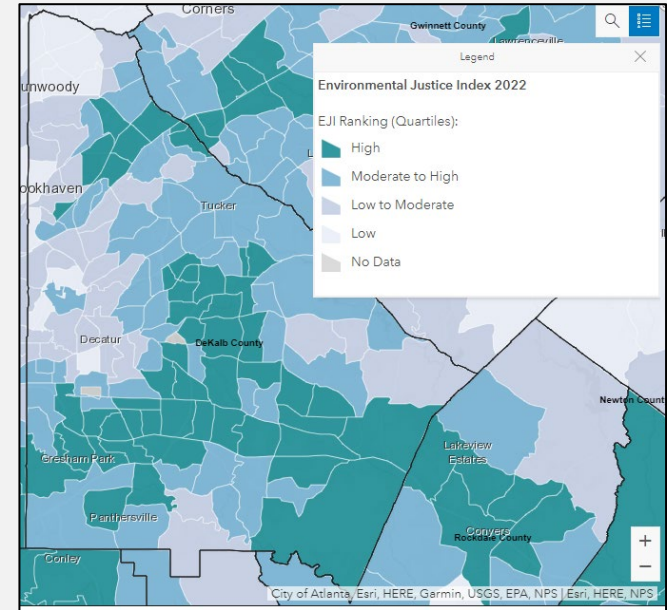


Definitions

- **Environmental justice** is the fair treatment and meaningful involvement of all people, regardless of race, color, national origin, or income.
 - This goal will be achieved when everyone enjoys the same degree of protection from environmental and health hazards, and equal access to the decision-making process to live, learn, and work in a healthy environment.
- **Health Equity** is the state in which everyone has a fair and just opportunity to attain their highest level of health.
 - Achieving this requires focused and ongoing societal efforts to address historical and contemporary injustices, overcoming economic, social, and other obstacles to health and healthcare, and eliminating preventable health disparities.

Environmental Justice Index 2022

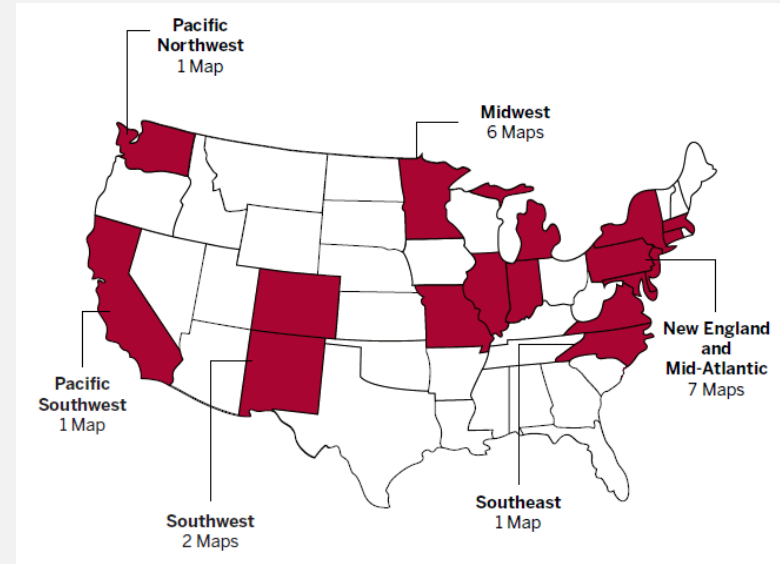
- First national, geographic-driven tool designed to measure the cumulative impacts of environmental burden through the lenses of human health and health equity
- Delivers a single, cumulative impacts score for each census tract in the U.S.
- Developed by CDC/ATSDR in partnership with the Department of Health and Human Services (HHS) Office of Environmental Justice
- Builds on existing environmental screening tools and methods



EJI scores for DeKalb County, GA. A high EJI score indicates that at least 75% of tracts in the U.S. experience less severe cumulative impacts than the tract in question.

Environmental Justice Mapping and Screening Tools

- These tools provide data on demographic and environmental factors – often with the aim of characterizing the most vulnerable, most burdened communities
- Used to contextualize communities and to inform prioritization of actions aimed at alleviating environmental injustice – environmental remediation, public health interventions, etc.

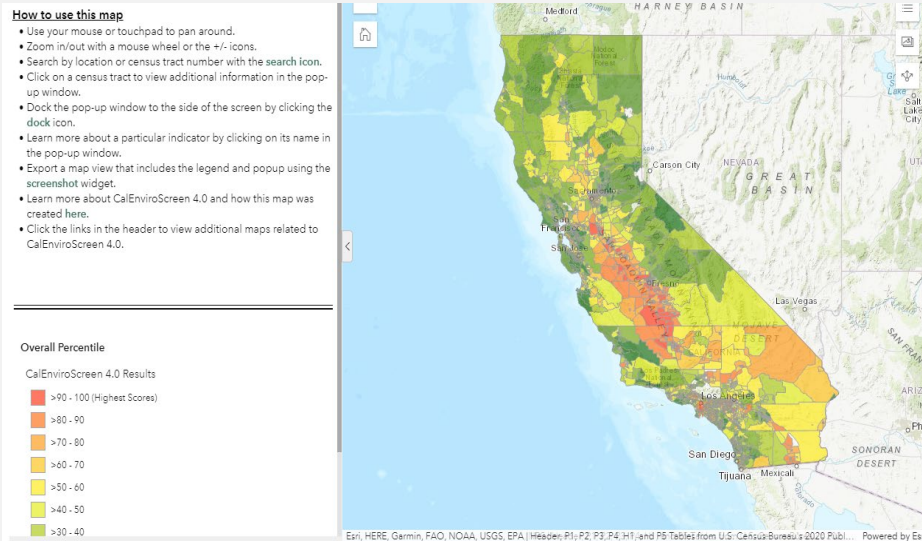


States with EJ mapping/ screening tools.

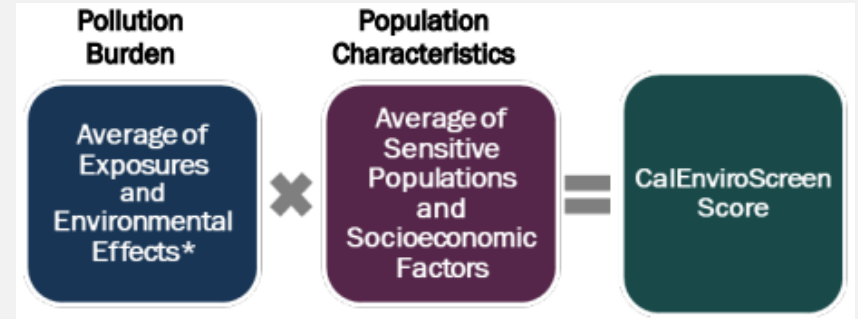
Figure from Konisky et al. 2021.

<https://eri.iu.edu/documents/ej-mapping-tools-report.pdf>

CalEPA's CalEnviroScreen 4.0



Developed by the California Environmental Protection Agency. Provides a composite index comprised of 21 indicators related to pollution burden and population characteristics.



The CalEnviroScreen index assesses cumulative impacts at the census tract level by multiplying a tract's average scores for pollution burden by its average scores for population characteristics.

The Call for Cumulative Impacts

- Implementing cumulative impacts screening has been a priority for many EJ advocates in recent years
- Cumulative impacts screening is being implemented as part of EJ policies in several states such as California, New Jersey, and Washington
- U.S. EPA also committed to developing and implementing a cumulative impacts framework to advance EJ in their FY 22-26 Strategic Plan <https://www.epa.gov/system/files/documents/2022-03/fy-2022-2026-epa-strategic-plan.pdf>

About the EJI

■ What is the EJI?

- A comprehensive place-based index that identifies and characterizes the cumulative impacts of environmental, social, and chronic health conditions facing communities across the U.S.

■ What are cumulative impacts?

- Cumulative impacts are a measure of the total harm to human health of environmental burdens, chronic health conditions, and social stressors
- Not a detailed assessment of exposure or risk

EJI Framework



Environmental
Burden



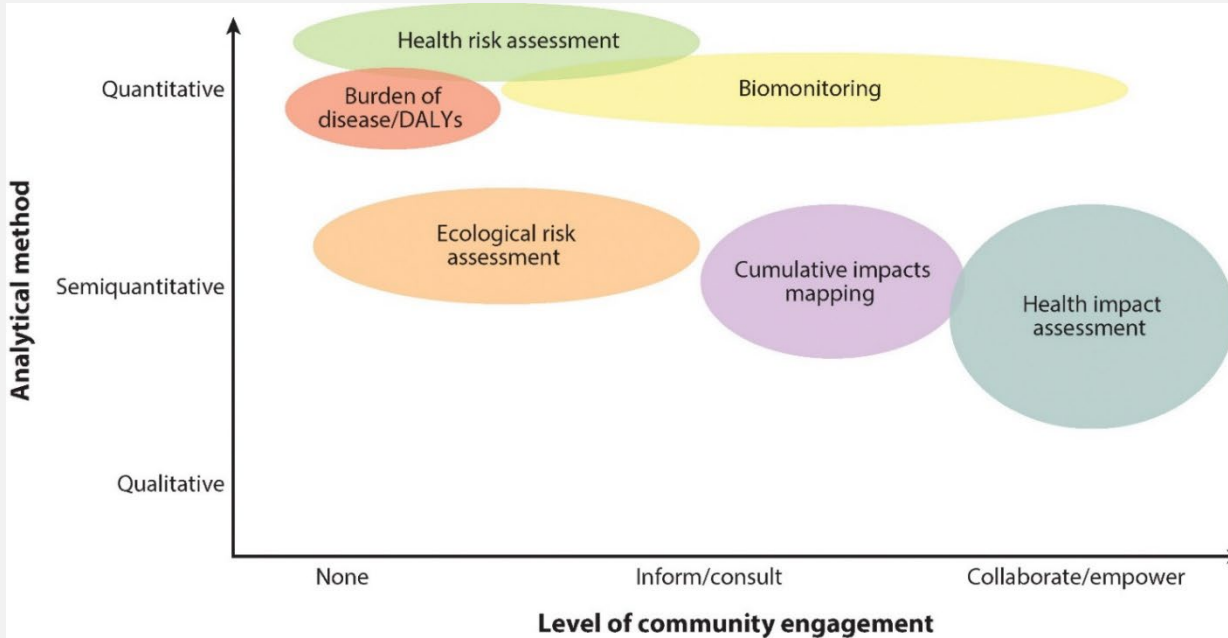
Social
Vulnerability




Health
Vulnerability

Cumulative Impacts and Risk Assessment

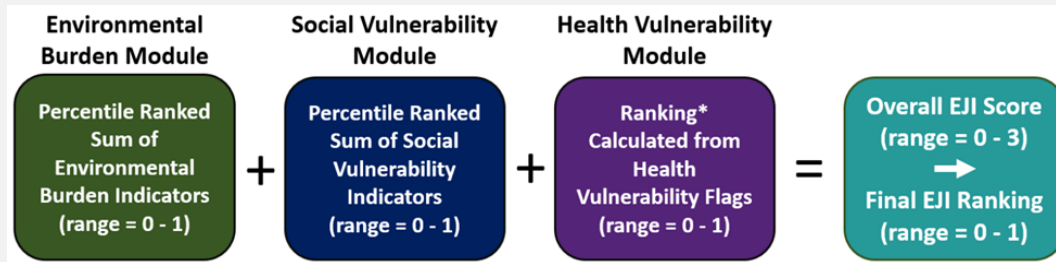
DALYs = Disability-Adjusted Life Years



 Solomon GM, et al. 2016.
Annu. Rev. Public Health 37:83–96

EJI Model Methods

- Unit of analysis – U.S. census tract
- Percentile ranking methods:
 - Peer-reviewed and tested
 - Simple and effective
 - Easy to communicate and adapt to meet stakeholder needs
- **EJI = SVM + EBM + HVM**



**Ranking calculated by multiplying the sum of health vulnerability flags ($n = 5$) by 0.2 to produce a number between 0 - 1.*



EJI Online

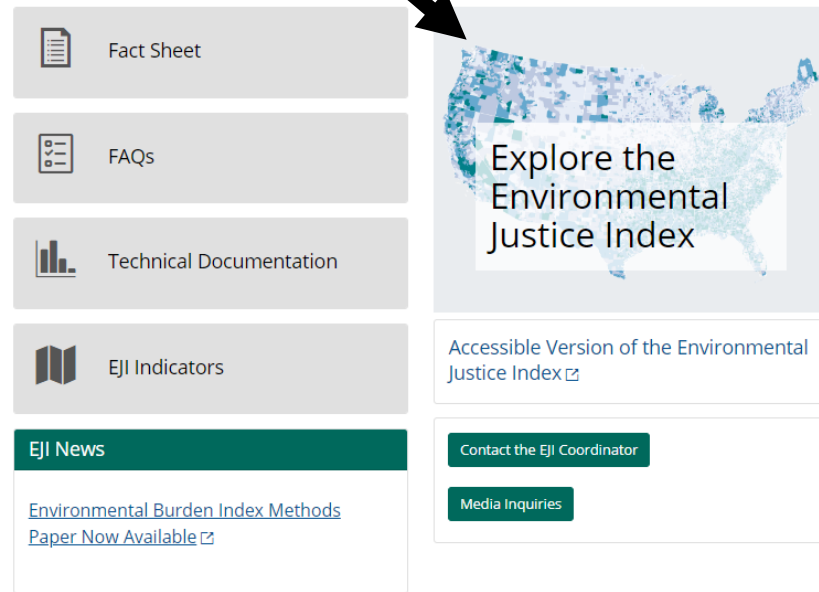
- EJI landing page available at eji.cdc.gov
- EJI data is accessible through the National Environmental Public Health Tracking Program's EJ Dashboard at <https://ephtracking.cdc.gov/Applications/ejdashboard/>

Environmental Justice Index

Environmental Justice Index (EJI)

Environmental justice is the fair treatment and meaningful involvement of all people, regardless of race, color, national origin, or income, to develop, implement, and enforce environmental laws, regulations, and policies. This goal will be achieved when everyone enjoys the same degree of protection from environmental and health hazards, and equal access to the decision-making process to live, learn, and work in a healthy environment.

The **Environmental Justice Index** uses data from the U.S. Census Bureau, the U.S. Environmental Protection Agency, the U.S. Mine Safety and Health Administration, and the U.S. Centers for Disease Control and Prevention to rank the cumulative impacts of environmental injustice on health for every census tract. Census tracts are subdivisions of counties for which the Census collects statistical data. The EJI ranks each tract on 36 environmental, social, and health factors and groups them into three overarching modules and ten different domains.



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FAQs

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EJI Indicators

EJI News

[Environmental Burden Index Methods Paper Now Available](#)

Explore the Environmental Justice Index

Accessible Version of the Environmental Justice Index

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Media Inquiries

The Environmental Justice Index measures cumulative impacts of environment and vulnerability to build towards a cleaner, healthier, and more equitable future for all.

Web Accessibility Tool

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Explore the EJI Map

The **Environmental Justice Index (EJI)** scores census tracts using a percentile ranking which represents the proportion of tracts that experience cumulative impacts of environmental burden and injustice equal to or lower than a tract of interest. For example, an EJI ranking of 0.85 signifies that 85% of tracts in the nation likely experience less severe cumulative impacts on health and well-being than the tract of interest, and that 15% of tracts in the nation likely experience more severe cumulative impacts from environmental burden. Click [here](#) for more information on EJI background and methods.

1. Select State All States
2. Select County All Counties

Quick Start Guide

To display the legend:

- Select the Legend icon.

To select a specific location, you can:

- Use the Select State and Select County filters, in that order.

1. Select State All States

2. Select County All Counties

(To reset the map, toggle the filters back to 'All States' and 'All Counties'.)

Use the Search tool for a specific geographic location like an address:

Q

To view the responsive 'Domain Rankings' bar graph:

- Select the Domain Rankings tab (currently under this Quick Start tab). The bar graph will update with average rankings of the EJI domains based on the map extent or state/county selected.

To read more about the data and how to interpret these maps:

- Select About EJI tab in the list of map tabs.

Legend

Environmental Justice Index 2022

EJI Ranking (Quartiles):

RPL_EJI

- Low
- Low to Moderate
- Moderate to High
- High
- No Data

Quick Start
Domain Rankings

EJI Cumulative Impacts
About EJI

Esri, HERE, Garmin, USGS, EPA | Esri, HERE



1. Select State GA 2. Select County DeKalb

Quick Start Guide

To display the legend:

- Select the Legend icon.



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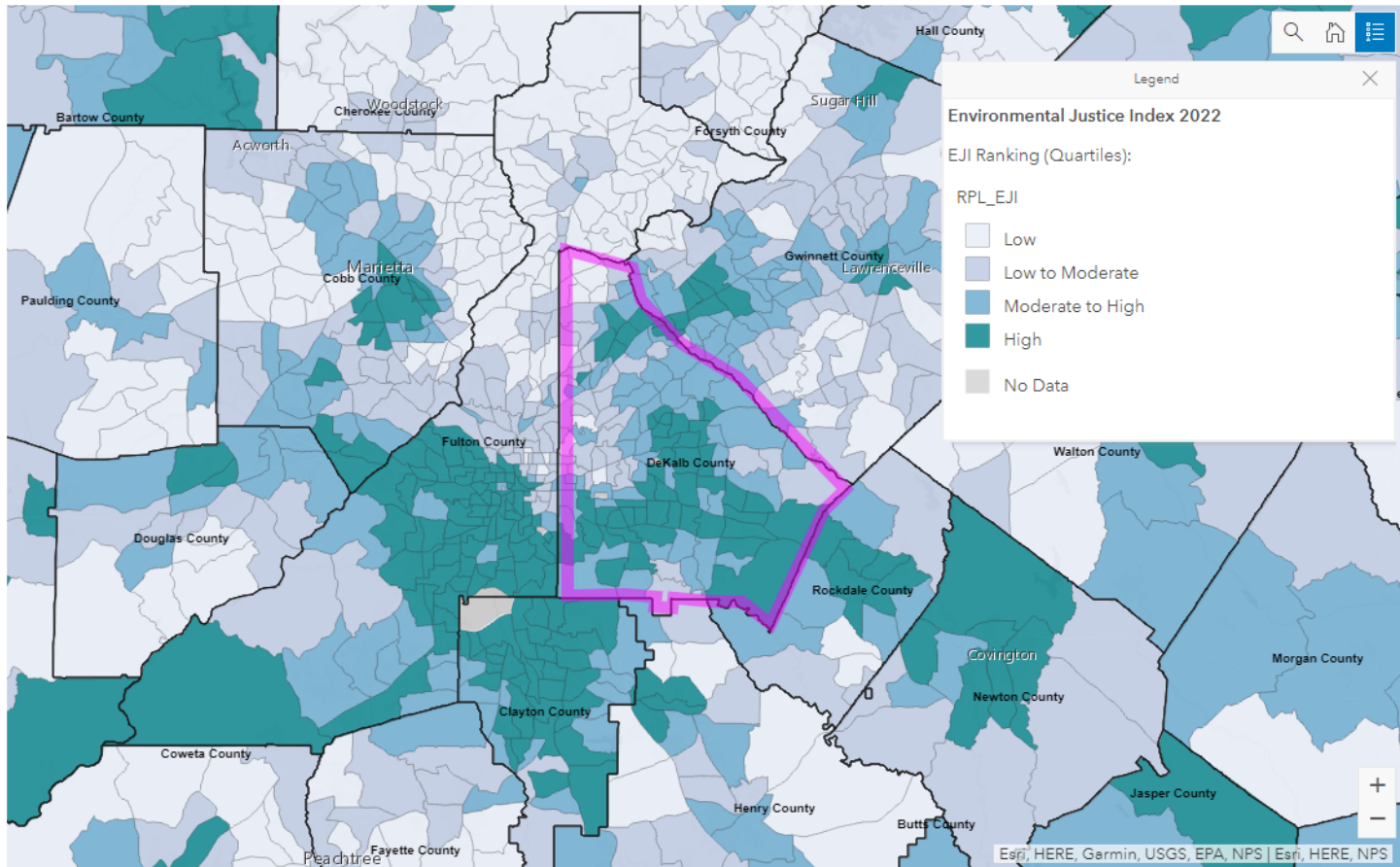
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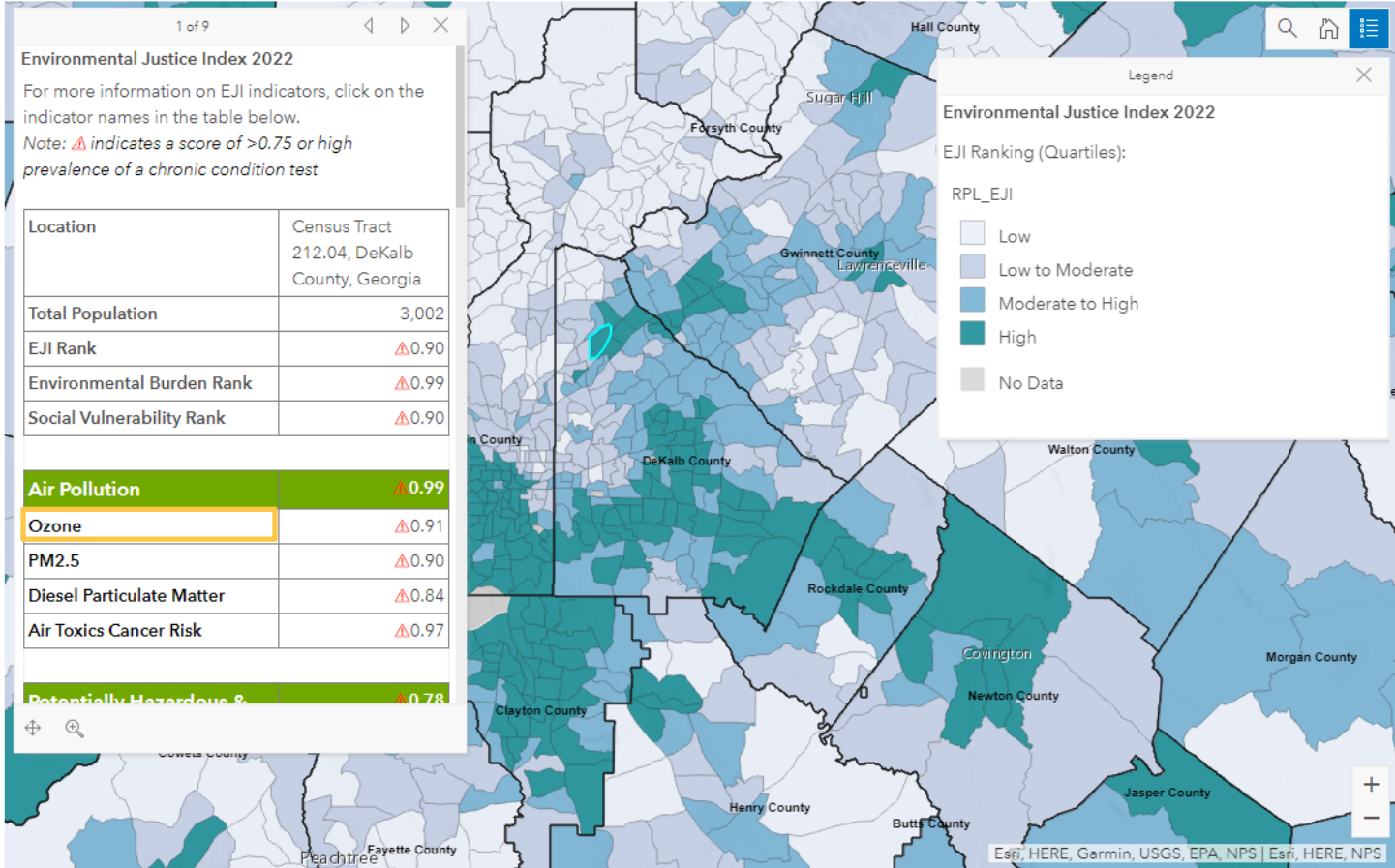
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Environmental Justice Index 2022

For more information on EJI indicators, click on the indicator names in the table below.
Note: ▲ indicates a score of >0.75 or high prevalence of a chronic condition test

Location	Census Tract
	212.04, DeKalb County, Georgia
Total Population	3,002
EJI Rank	▲0.90
Environmental Burden Rank	▲0.99
Social Vulnerability Rank	▲0.90

Air Pollution	▲0.99
Ozone	▲0.91
PM2.5	▲0.90
Diesel Particulate Matter	▲0.84
Air Toxics Cancer Risk	▲0.97
Potentially Hazardous &...	0.78



Legend

Environmental Justice Index 2022

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- High
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Environmental Justice Index Indicators

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Learn more about the EJI indicators below.

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Environmental Burden Module

Air Pollution: Ozone

Indicator: Mean annual number of days with maximum 8-hour average ozone concentration over the National Ambient Air Quality Standard (NAAQS), averaged over three years (2014-2016)

Data Year: 2014-2016

Data source: U.S. Environmental Protection Agency Air Quality System (AQS; combined monitoring and modeled data)

Rationale:

Both acute and long-term exposure to elevated levels of ozone in air are associated with negative health effects ranging from increased morbidity and mortality due to respiratory and cardiovascular disease (Crouse et al., 2015; Last et al., 2017). Together with PM2.5, ozone is a major contributor to air pollution-related morbidity and mortality, with an estimated 4,700 ozone-related deaths in the United States in 2005 (Fann et al., 2012).

For more information on indicator calculation and for a full list of references, please view [Technical Documentation for the Environmental Justice Index 2022](#).

Overall Environmental Justice Rank	Social Vulnerability	Socio/Ethnic Minority Status	Minority Status
		Education	No High School Diploma
		Income	Less than \$10,000
		Housing	Public Housing
Environmental Burden	Air Pollution	Particulate Matter	PM2.5
		Ozone	8-hour average
		Carbon Monoxide	CO
		Lead	Pb
Health Vulnerability	Pre-existing Chronic Disease	Diabetes	Diabetes
		Heart Disease	Heart Disease
		Stroke	Stroke
		Other	Other

[\[PDF - 702 KB\]](#)

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Environmental Justice Index

Fact Sheet

Overview

The Environmental Justice Index (EJI) is the first national, place-based tool designed to measure the cumulative impacts of environmental burden through the lens of human health and health equity.

The EJI delivers a single score for each community so that public health officials can identify and map areas most at risk for the health impacts of environmental burden. Social factors such as poverty, race, and ethnicity, along with pre-existing health conditions may increase these impacts. This tool helps public health officials prioritize action for those communities most at need.

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Indicators

All Close All

Overall Environmental Justice Rank		Social Vulnerability	Health Vulnerability	Environmental Burden
Social Vulnerability	Social/Ethnic Minority Status	Minority Status		
	Socioeconomic Status	Health Insurance		
		Age 65 and Older		
		Household Crowdedness		
Health Vulnerability	Pre-existing Chronic Disease	Pre-existing Chronic Disease		
	Health Insurance			
	Age 65 and Older			
	Household Crowdedness			
Environmental Burden	Air Pollution			
	Water Pollution	Drinking Water Contamination		
		Surface Water Contamination		
		Wastewater Treatment		
	Land Use	Urban Sprawl		
		Highway Proximity		
Industrial Proximity				

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Environmental Justice Index Frequently Asked Questions

General

How can individuals and community-based organizations, public health officials at local, state, and federal levels, scientists, and researchers use the EJI?

The EJI can be used to

- identify and prioritize areas that may require special attention or additional action to improve health and health equity,
- educate and inform the public about their community,
- analyze the unique, local factors driving cumulative impacts on health to inform policy and decision-making, and
- establish meaningful goals and measure progress towards environmental justice and health equity.

State public health officials can use the EJI to prioritize communities to take action to address environmental and health hazards.

Researchers can use data from the EJI to generate hypotheses. For example, researchers might want to determine whether social vulnerability or environmental burden are associated with overall life expectancy at the census tract level. Please see the section below entitled "Using the Data" if you are using the EJI for secondary analysis.

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Indicator: Mean annual ground-level ozone concentration (NAAQS), average

Data Year: 2014-2016

Data source: U.S. Environmental Protection Agency's combined monitoring network

Rationale:

Both acute and chronic exposure to ozone is associated with respiratory and cardiovascular mortality due to air pollution (Last et al., 2017). Ground-level ozone is a pollution-related environmental burden that is associated with related deaths in communities of color.

For more information on this indicator, please view [Technical Documentation](#) (2022).

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Public health officials at local, state,

and federal levels work to improve health and

community health policy and decision-making, and address environmental and health equity.

Public health officials address environmental and health equity.

Public health officials might want to determine the community health equity expectancy at the census tract level. This is a secondary analysis.

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Data Year: 2014-2016

Data source: U.S. Environmental Protection Agency Air Quality System (AQS; combined monitoring and modeled data)

Rationale:

Both acute and long-term exposure to elevated levels of ozone in air are associated with negative health effects ranging from increased morbidity and mortality due to respiratory and cardiovascular disease (Crouse et al., 2015; Last et al., 2017). Together with PM2.5, ozone is a major contributor to air pollution-related morbidity and mortality, with an estimated 4,700 ozone-related deaths in the United States in 2005 (Fann et al., 2012).

For more information on indicator calculation and for a full list of references, please view [Technical Documentation for the Environmental Justice Index 2022](#).

Overall Environmental Justice Rank	Social Vulnerability		State
	Social Vulnerability	Race/Ethnic Minority Status	Minority Status
		Socioeconomic Status	<ul style="list-style-type: none"> Has High School Diploma Unemployed Homeless Homeless Burden Lowest Health Insurance Coverage Lack of Broadband Access Age 65 and Older Age 17 and Younger Disability or Disability Foreign-Born Language Barrier Grouped Quarters Mobile Homes
	Environmental Burden	Air Pollution	<ul style="list-style-type: none"> PM2.5 Ozone Lead Mercury National Priority Pollutants Trace Metals and Heavy Metals Fluorides, Organics and Pesticides Radon Other Air Quality
Water Pollution		<ul style="list-style-type: none"> Drinking Water Surface Water Groundwater Wastewater Stormwater Other Water Quality 	
Land Use		<ul style="list-style-type: none"> Urban Sprawl Green Space Open Space Recreation Other Land Use 	
Health Vulnerability	Pre-existing Chronic Disease Burden	<ul style="list-style-type: none"> Diabetes High Blood Pressure Asthma Other Chronic Disease 	
	Health Vulnerability	<ul style="list-style-type: none"> Age Sex Race/Ethnicity Language Disability Other Health Status 	

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For more information, contact the EJI Coordinator at ejj_coordinator@cdc.gov.

Media inquiries may be sent to placeandhealth@cdc.gov.

Suggested citation: Centers for Disease Control and Prevention and

EJI and Community Engagement


- CDC/ATSDR, in partnership with HHS, is committed to engaging with communities, EJ advocates, public health partners, and academic subject matter experts as part of the development and improvement of this tool
- CDC/ATSDR will host live demos, webinars, and provide other opportunities for users and community members to provide structured feedback



Photo credit: Adam Sarvana

Environmental Justice Index Purpose

- **Advance HHS and CDC environmental justice and health equity goals by empowering the public health community to identify US communities experiencing adverse health effects associated with environmental injustice to**
 - **Focus** on communities most in need
 - **Shape** public health interventions of all types
 - **Guide** hypothesis development supporting research
 - **Track** change through time against meaningful goals

- 
- **Focus**
 - **Shape**
 - **Guide**
 - **Track**

Questions?

Visit us at eji.cdc.gov OR

Contact us at eji_coordinator@cdc.gov

The findings and conclusions in this presentation have not been formally disseminated by the Centers for Disease Control and Prevention/the Agency for Toxic Substances and Disease Registry and should not be construed to represent any agency determination or policy.



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