

Measuring What Matters:

Environmental and Public Health Indicators

Environmental Justice Rulemaking



Connecticut Department of Energy
and Environmental Protection

March 2025

Welcome & Rules of Engagement



- Introduce yourself in the chat (Name, Location, Affiliation/Organization)
- Microphones of all attendees will be muted unless the attendees raises their hand to ask a question live.
- Please feel free to use the chat throughout the meeting.

Today's Presenters

From DEEP:

- **Sarah Huang**, Director of Office of Equity & Environmental Justice
- **Eliza Heins**, Staff Attorney for Environmental Quality Branch

Guest Speakers:

- **Jen Wang**, Executive Director, Yale Center on Climate Change and Health; Yale University Lecturer in Public Health
- **Devin Brown**, Environmental Justice Project Manager, Connecticut Department of Public Health

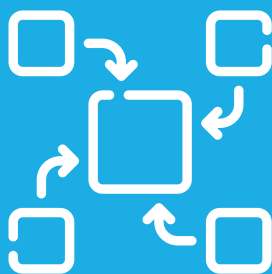
Overview of Agenda

Rulemaking Review



Cumulative Impacts

Jen Wang,
Yale University



Public Health

Devin Brown,
*Department of
Public Health*



Environmental and Public Health Indicators



Ranking Exercise



Who is DEEP?



- State Agency
- Issues air, waste, water permits
- The Environmental Justice Law (Conn. Gen. Statutes § 22a-20a) applies to Affecting Facilities in Environmental Justice Communities



Affecting Facilities

- electric generating facilities
- major sources of air pollution
- sewage treatment plants
- sludge or solid waste incinerators or combustors
- medical waste incinerators
- solid waste intermediate processing facilities
- recycling facilities
- landfills



Environmental Justice Communities

- census block groups, for which 30% or more of the population consists of low-income persons who are not institutionalized and have an income below 200% of the federal poverty level
- distressed municipalities (as defined by the Connecticut Department of Economic and Community Development)



Rulemaking Timeline



What Have We Done So Far?

September 2024: Kickoff Meeting

December 2024: Meaningful Public Participation Meeting

Next slides: Summary of comments received and
incorporated into regulations draft



A photograph of a person's hands holding a document, with a large white number '1' overlaid on the left side. The document appears to be a form with various fields and text. The background is a dark, textured surface.

1

Information to include on one page summary:

- **Name** of applicant (current and any other names going back 5 years)
- Location and nature of proposed activities, written in **plain language**



2

Timing and Process:

- **Clarify** when applicants should publish notice of the EJ informal public meeting
- Write out process for **approval** of Public Participation Plan and Report





3

Individuals and entities to notify:

- **Municipal boards and commissions** (Planning & Zoning Commission, Inland Wetlands and Watercourses Commission, Water Pollution Control Authority)
- **All** local elected officials



4

Time, Date & Location for Informal Public Meeting:

- After 6pm on a **weekday**
- **No holidays**, plus blackout days
- **Near** proposed Affecting Facility





5

Applicant's Website:

- **Recording** of Informal Public Meeting
- **Transcript** of Informal Public Meeting
- Reply to **Public Comments**



A large, white, stylized number '6' is superimposed over a dark, atmospheric photograph of an industrial facility. The facility features several tall smokestacks, with one in the foreground emitting a thick, billowing plume of white smoke that rises into the sky. The background shows more industrial structures and smaller smokestacks, all set against a dark, overcast sky. The overall tone is somber and industrial.

6

Environmental and Public Health Indicators:

- Will be in **another part** of the regulations
- Topic of **today's meeting**



Today's Focus:

The identification and measurement
of environmental and
public health indicators



Rulemaking



Environmental Justice Law

General Statutes § 22a-20a



Definition of
“Environmental or Public
Health Stressor”:
*any source of
environmental pollution
that causes a potential
public health impact*



Requirement to develop
regulations about “*the
identification and
measurement of the
relative impact of
environmental and public
health stressors across
communities*”





Cumulative Impacts

Jen Wang,
Yale University



A photograph of several tall industrial smokestacks against a blue sky with white clouds. The smokestacks are emitting thick white smoke. The image is partially obscured by a blue overlay on the right side of the slide.

Definition & Significance

EPA definition: “Cumulative Impacts are defined as the **totality of exposures** to combinations of chemical and nonchemical stressors and their effects on health, well-being, and quality of life outcome”

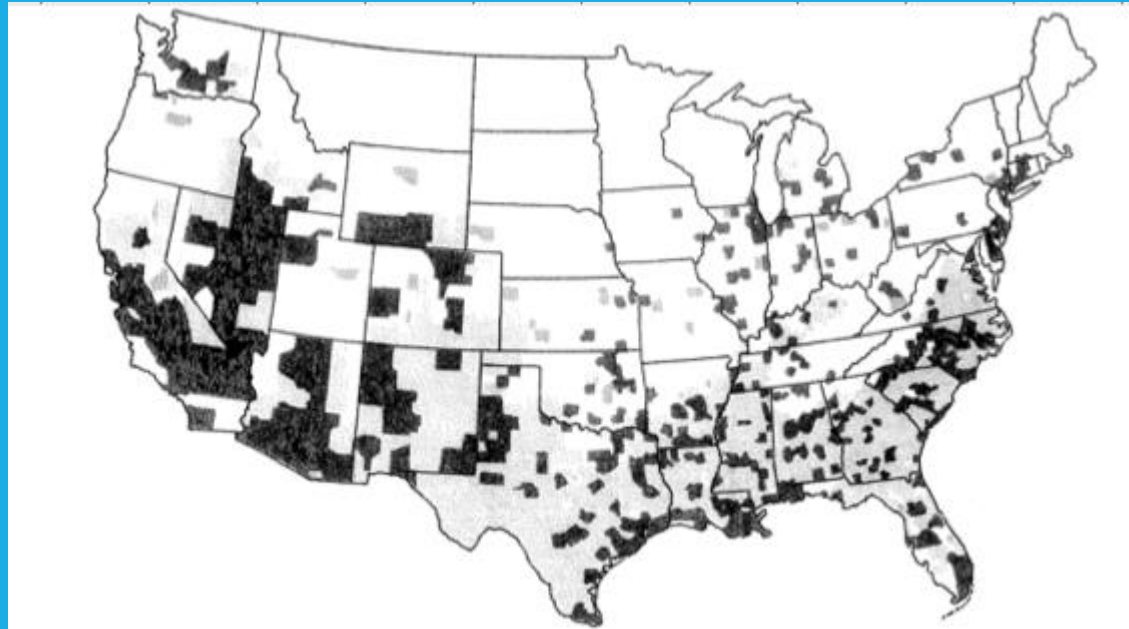
Significance:

- Allows EJ communities and regulated industries to understand broader context
- Acknowledges disproportionality of environmental burdens on certain communities (often indigenous, people of color, and/or low-income)
- Acknowledges that burdens accumulate over time, exacerbating health and environmental disparities



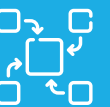


Race was not just a factor in the location of hazardous waste sites—it was “**the most significant among variables tested.**”



“Toxic Wastes and Race in the United States”

United Church of Christ's Commission for Racial Justice, 1987



By Rachel Morello-Frosch, Miriam Zuk, Michael Jerrett, Bhavna Shamasunder, and Amy D. Kyle

Understanding The Cumulative Impacts Of Inequalities In Environmental Health: Implications For Policy

DOI: 10.1377/hlthaff.2011.30.5
HEALTH AFFAIRS 30, NO. 5 (2011): 879-887
©2011 Project HOPE—The People-to-People Foundation, Inc.

ABSTRACT Racial or ethnic minority groups and low-income communities have poorer health outcomes than others. They are more frequently exposed to multiple environmental hazards and social stressors, including poverty, poor housing quality, and social inequality. Researchers are grappling with how best to characterize the cumulative effects of these hazards and stressors in order to help regulators and decision makers craft more-effective policies to address health and environmental disparities. In this article we synthesize the existing scientific evidence regarding the cumulative health implications of higher rates of exposure to environmental hazards, along with individual biological susceptibility and social vulnerability. We conclude that current environmental policy, which is focused narrowly on pollutants and their sources, should be broadened to take into account the cumulative impact of exposures and vulnerabilities encountered by people who live in neighborhoods consisting largely of racial or ethnic minorities or people of low socioeconomic status.

Rachel Morello-Frosch (rmorello@berkeley.edu) is an professor in the Department of Environmental Science, Policy, and Management in the School of Public Health at the University of California, Berkeley.

Miriam Zuk is a graduate student in city and planning at UC Berkeley.

Michael Jerrett is an associate professor in the Division of Environmental Health Sciences at the University of California, Berkeley.

Bhavna Shamasunder is a graduate student in the Department of Environmental Science, Policy, and Management at UC Berkeley.

Amy D. Kyle is an adjunct professor in the Division of Environmental Health Sciences, School of Public Health, UC Berkeley.

The persistence of health disparities and environmental inequalities in the United States has placed environmental health science and policy at a crossroads. Innovative scientific and regulatory approaches are needed to understand and address the cumulative, and potentially synergistic, effects of environmental and social stressors on the health of communities whose populations are mostly composed of racial or ethnic minorities or people of low socioeconomic status.

Advocates for such communities have long argued that their neighborhoods are beset by multiple environmental stressors, which could include air and water pollution and substandard housing. These community leaders also contend that existing regulations fail to protect residents adequately because the regulations are focused narrowly on pollutants and their sources.¹ Growing evidence shows that social stressors—including

poverty, racial discrimination, crime, malnutrition, and substance abuse—also affect these communities.² Research is beginning to show how the cumulative effects of social and environmental stressors can work in combination to produce health disparities.³

With encouragement from scientists, policy makers, and environmental justice groups, regulatory agencies are beginning to consider the methodological challenges of addressing cumulative impacts in science and decision making.⁴⁻⁶ These methodological challenges include how to evaluate and characterize the combined health effects of multiple environmental and social stressors on vulnerable populations, including the stressors' sources and the pathways of diseases. For example, the US Environmental Protection Agency has proposed a model for including psychological and social factors as integral components of cumulative risk assessment for predicting the potential health effects of pollu-

“We conclude that current environmental policy, which is focused narrowly on pollutants and their sources, should be broadened to take into account the cumulative impact of exposures and vulnerabilities encountered by people who live in neighborhoods consisting largely of racial or ethnic minorities or people of low socioeconomic status.”



A photograph of an industrial cityscape with several tall smokestacks emitting thick plumes of white smoke that rise into a hazy sky. The foreground shows the silhouettes of buildings and utility poles.

Cumulative Impacts: 4 Key Concepts

1. Health disparities
2. Inequalities in exposures to environmental hazards
3. Intrinsic biological and physiological factors
4. Extrinsic social vulnerability factors





Public Health

Devin Brown,
Department of Public Health





WHO KEEPS
CHUCKING
THESE KIDS
IN THE RIVER?



Downstream actions (reactive)

Upstream actions (proactive)





Medicine v. Public Health

	Medicine (doctors)	Public Health
Who	one patient	neighborhood, community, population
When	when you get sick	before you get sick
How	pills, treatment, surgery	education, laws, programs
Focus	heal/cure patient	prevent illness or injuries



Structural and Social Determinants

Structural and Social Determinants of Health

STRUCTURAL DETERMINANTS

GOVERNING PROCESSES

ECONOMIC AND SOCIAL POLICIES

RACISM, DISCRIMINATION, BIAS, AND SEGREGATION



EXPERIENCE OF SOCIAL DETERMINANTS

INCOME/POVERTY/WEALTH

EDUCATION

EMPLOYMENT

TRANSPORTATION

HOUSING

FOOD SECURITY

EXPOSURE TO TOXINS

HEALTH INSURANCE

DISTANCE TO SERVICES



Graphic Source: Adapted from Healthy People 2030, U.S. Department of Health and Human Services, Office of Disease Prevention and Health Promotion. Retrieved 02/11/2021, from <https://health.gov/healthypeople/objectives-and-data/social-determinants-health>





Risk (Environmental Indicators)

- The probability of harm occurring
- Hazard-centered

Vulnerability (Public Health Indicators)

- The ability (or inability) to cope with or recover from harm
- People-centered, considers broader social determinants



Massachusetts

law; regulations



FACILITIES: AIR ONLY

INDICATORS

Air Quality/ Climate	Nearby Regulated Facilities	Health	Socioeconomic	Nearby Sensitive Receptors
Fine Particulate Matter (PM2.5)	Hazardous waste treatment, storage and disposal	Asthma prevalence in schools	English language isolation household	Schools (K-12)
Ozone summer average	Facilities under the EPA Toxics Release Inventory	Elevated blood lead levels prevalence	Minority population percent	Long-term care residences
Air Toxics Cancer Risk	Freight rail yards	Low birth weight	Income	Public housing
Traffic proximity	Port facilities	Premature deaths	Young (<5 years old)	Childcare facilities
Diesel particulate matter	Facilities with DEP air permits	COPD	Older (>65 years old)	Prisons
Air Toxics Respiratory Hazard Index	Facilities under the Toxics Use Reduction Act	Coronary heart disease		
Impervious Surface	Airports			
	Large quantity hazardous waste generators			
	Wastewater treatment plants			
	Solid waste diversion and disposal			



New Jersey law; regulations



FACILITIES: AIR, WASTE, WATER

INDICATORS

Concentrated Areas of Air Pollution	Mobile Sources of Air Pollution	Contaminated Sites	Solid Waste Facilities	Point Sources of Water Pollution	May Cause Public Health Impacts	Density/ Proximity Stressors	Social Determinants of Health
Ground-Level Ozone	Traffic – Cars, Light- Medium-Duty Trucks	Soil Contamination Deed Restrictions	Solid Waste Facilities	Surface Water Pollution	Drinking Water Well Testing	NJ Pollutant Discharge Elimination System Sites	Education
Fine Particulate Matter (PM2.5)	Traffic – Heavy-Duty Trucks	Ground Water Classification Exception Areas	Scrap Metal Facilities	Combined Sewer Overflows	Lack of Recreational Open Space	Permitted Air Sites	Unemployment
Air Toxics Cancer Risk	Railways	Known Contaminated Sites			Potential Lead Exposure	Emergency Planning Sites	
Air Toxics Non-Cancer Risk					Lack of Tree Canopy		
					Impervious Surface		
					Flooding (Land Use Cover)		







Connecticut

2023 Law



FACILITIES: AIR, WASTE, WATER

INDICATORS (from [CIRCA EJScreen 2.0](#))

Potential Pollution Exposure 	Potential Pollution Sources 	Socioeconomic 	Health Sensitivity 
Diesel PM Emissions	Brownfields	Housing Burden	Asthma Emergency Department Visits
Noise	Facilities Managing Chemicals	Linguistic Isolation	Coronary Heart Disease
Ozone	Impervious Area	Poverty/Low Income	COPD Emergency Department Visits
Particulate matter 2.5	Incinerators/Resource Recovery Facilities	Unemployment	Childhood Elevated Lead Levels
Facilities Releasing Toxins	Landfills	Race/People of Color	Depression
Traffic Density	Lead Paint Risk in Housing	Median Income	Diabetes
Permitted Major Air Pollution Sources	Municipal Transfer Station	Young Population	Mental Health
Permitted Minor Air Pollution Sources	Potentially Contaminated Sites	Elderly Population	Low Birth Weight Rate Infants
Minor Facilities with Permit-Limited Emissions Potential	Recycling Processing Facilities	Health Insurance	
Urban Heat Index	Proximity to Superfund Site	Mobile Home	
EPA Respiratory Hazard Index	Significant Environmental Hazards	Multi-Unit Home	
EPA Cancer Risk	Underground Storage Tanks	Educational Attainment	
	Wastewater Discharge	Rent-Ownership Ratio	
		Single Parent	
		Food Security	
		Energy Burden	
		Disability	
		Tree Canopy	



Pollution Sources



Air pollution

Diesel PM Emissions
Ozone
Particulate matter 2.5

Contaminated sites

Brownfields
Potentially Contaminated Sites
Proximity to Superfund Site
Significant Environmental Hazards
Facilities Releasing Toxins

Facilities and other sources of air pollution

Permitted Major Air Pollution Sources
Permitted Minor Air Pollution Sources
Minor Facilities with Permit-Limited Emissions Potential

Incinerators & landfills

Incinerators/Resource Recovery Facilities
Landfills

Noise & traffic

Noise
Traffic Density

Sites that store potentially hazardous materials

Facilities Managing Chemicals
Underground Storage Tanks

Transfer stations & recycling facilities

Municipal Transfer Station
Recycling Processing Facilities

Water quality

Wastewater Discharge

Social Factors



Age

Young Population
Elderly Population

Built environment

Impervious Area
Tree Canopy
Urban Heat Index

Education

Educational Attainment

Family Structure

Single Parent

Housing

Housing Burden
Energy Burden
Lead Paint Risk in Housing
Multi-Unit Home
Mobile Home
Rent-Ownership Ratio

Income/poverty/unemployment

Median Income
Poverty/Low Income
Unemployment

Language

Linguistic Isolation

Limited or uncertain access to adequate and nutritious food

Food Security

Public Health



Asthma/COPD

Asthma Emergency Department Visits
COPD Emergency Department Visits
EPA Respiratory Hazard Index

Cancer

EPA Cancer Risk

Depression/mental health

Depression
Mental Health

Diabetes

Diabetes

Disability

Disability

Heart Disease

Coronary Heart Disease

Health Insurance

Lack of Health Insurance

Low birth weight

Low Birth Weight Rate Infants



Categories for Discussion

Pollution Sources



Air pollution

Contaminated sites

**Facilities and other
sources of air pollution**

Incinerators & landfills

Noise & traffic

**Sites that store potentially
hazardous materials**

**Transfer stations &
recycling facilities**

Water quality

Social Factors



Age

Built environment

Education

Family Structure

Housing

**Income/poverty/
unemployment**

Language

**Limited or uncertain
access to adequate and
nutritious food**

Public Health



Asthma/COPD

Cancer

**Depression/
mental health**

Diabetes

Disability

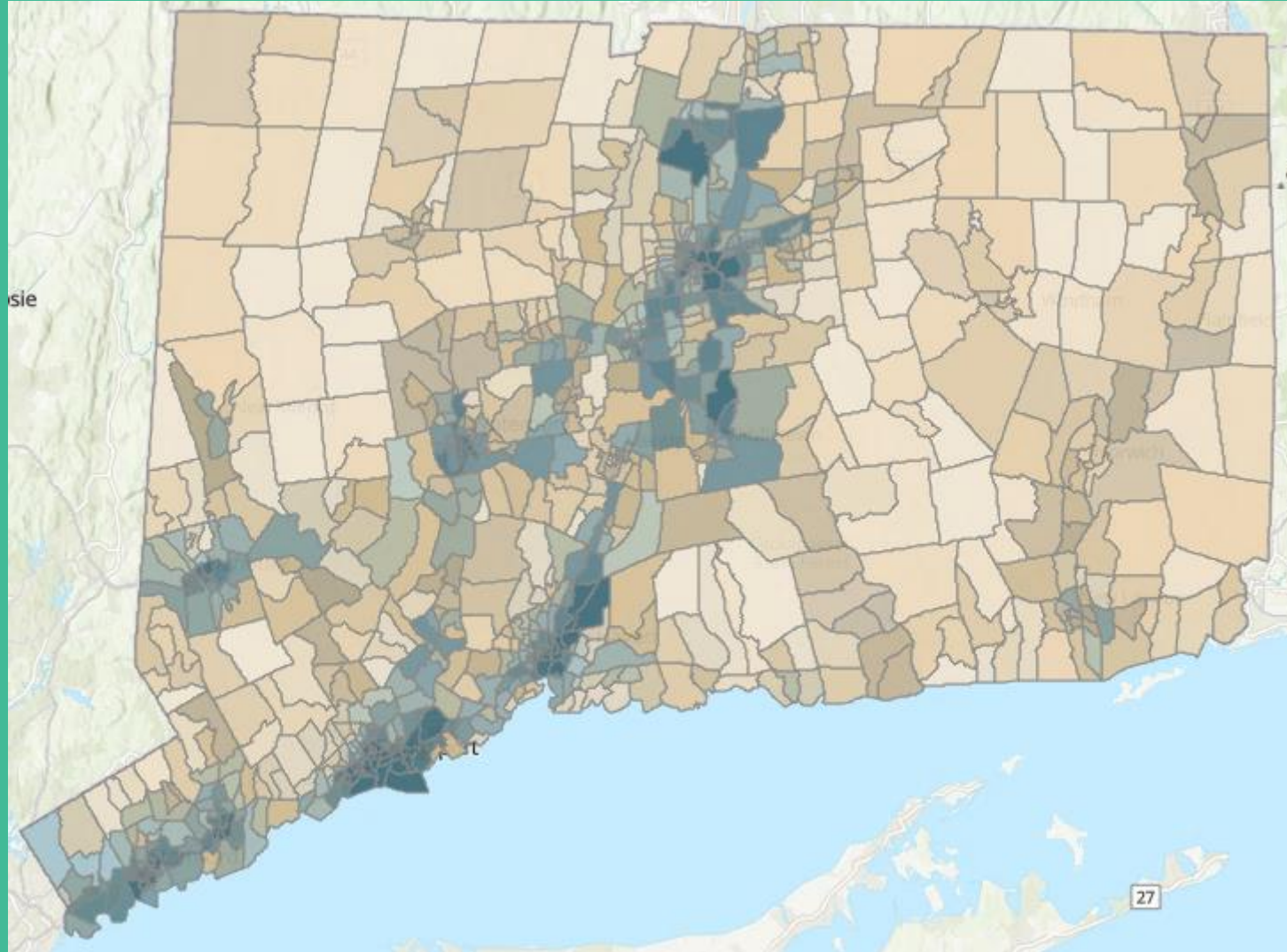
Heart Disease

Health Insurance

Low birth weight

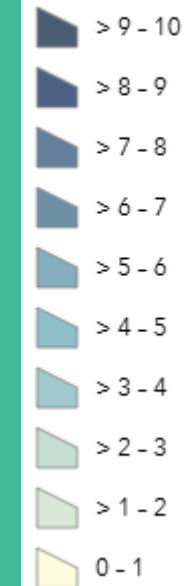


All Pollution Sources

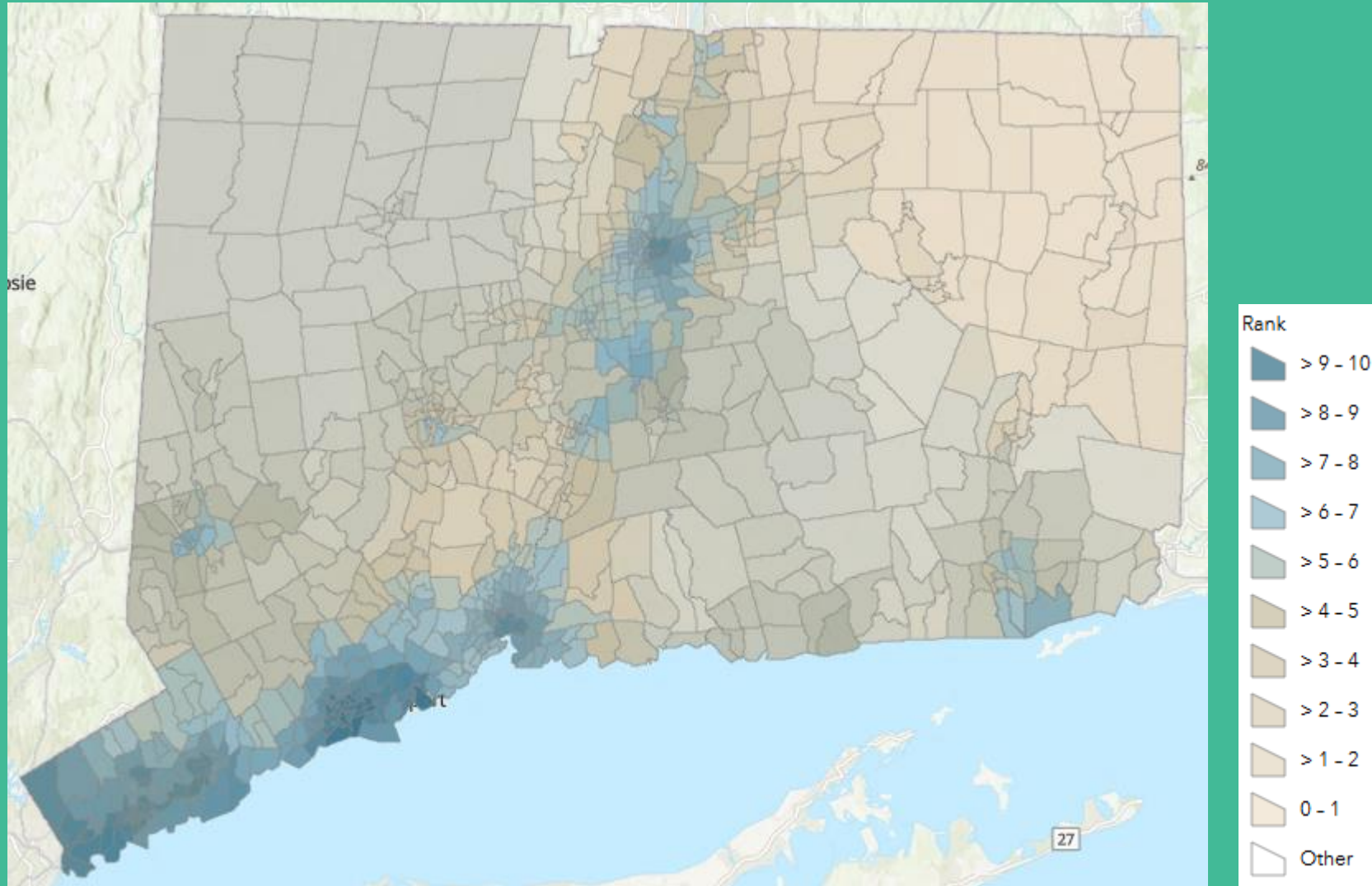


Pollution Burden

Rank



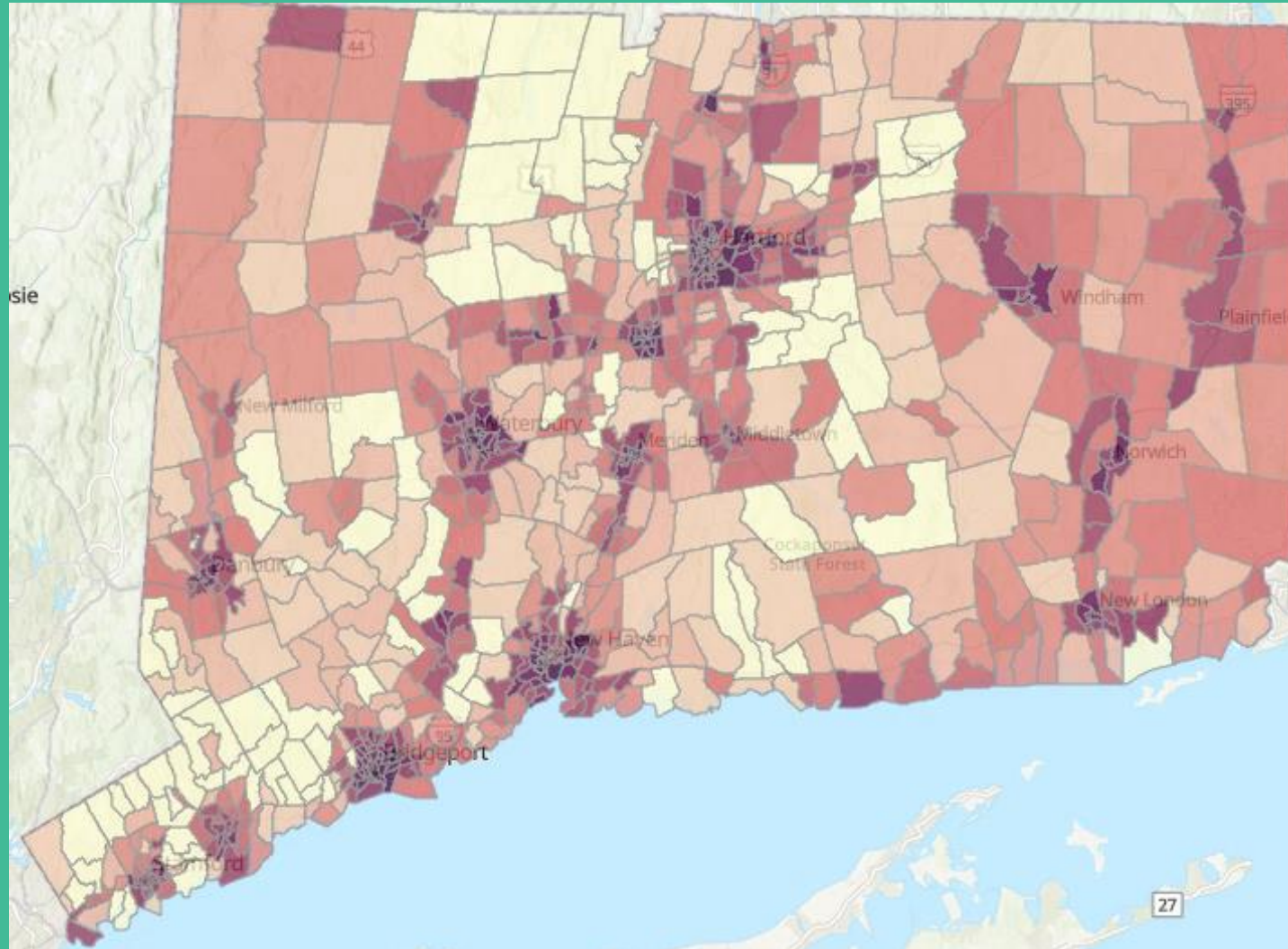
Indicator: Air Pollution*



*Particulate Matter (PM) 2.5, Ozone, Diesel Particulate Matter

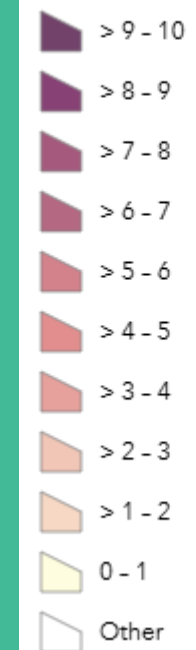


All Social Factors

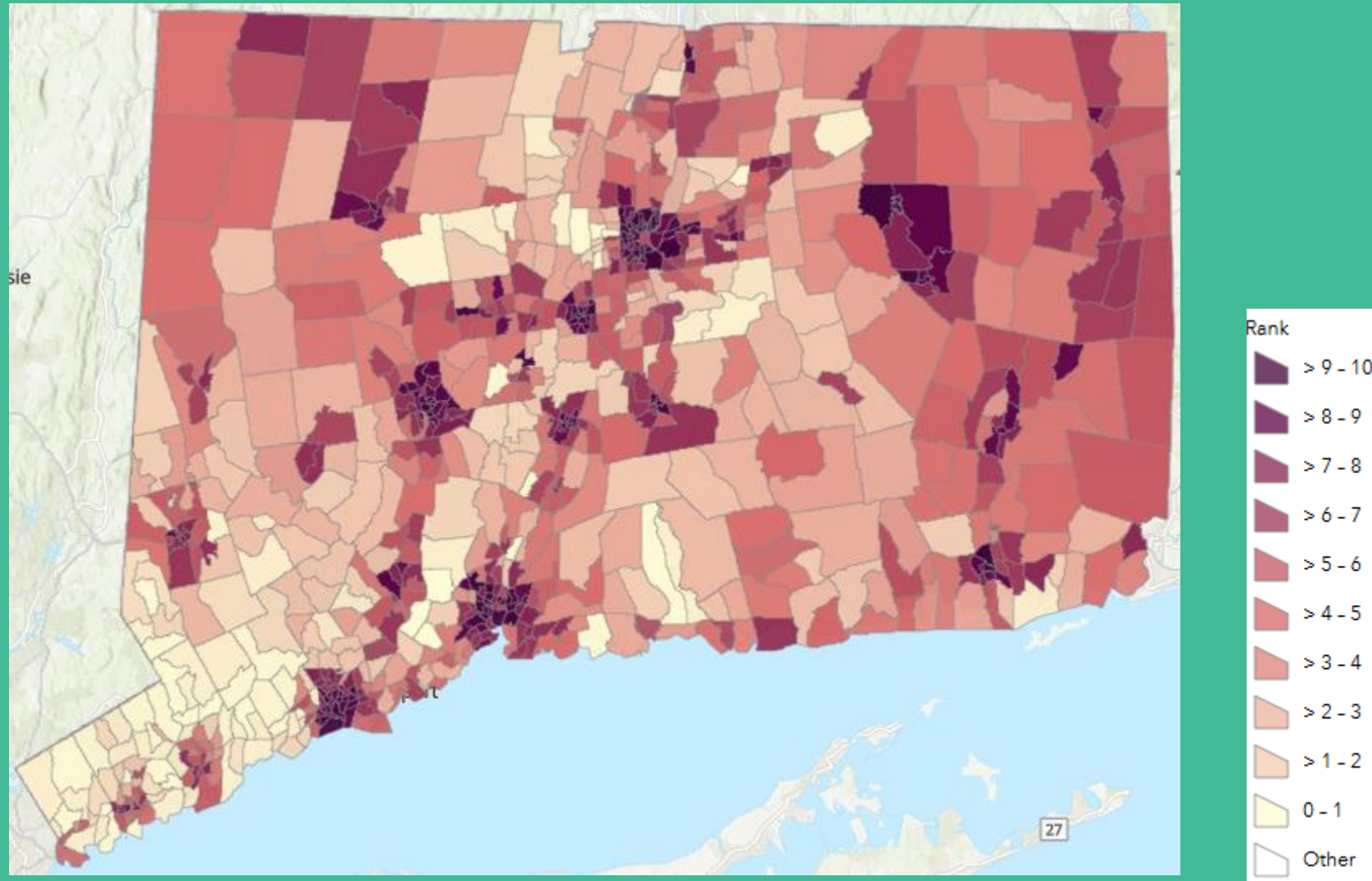


Socioeconomic Factors

Rank



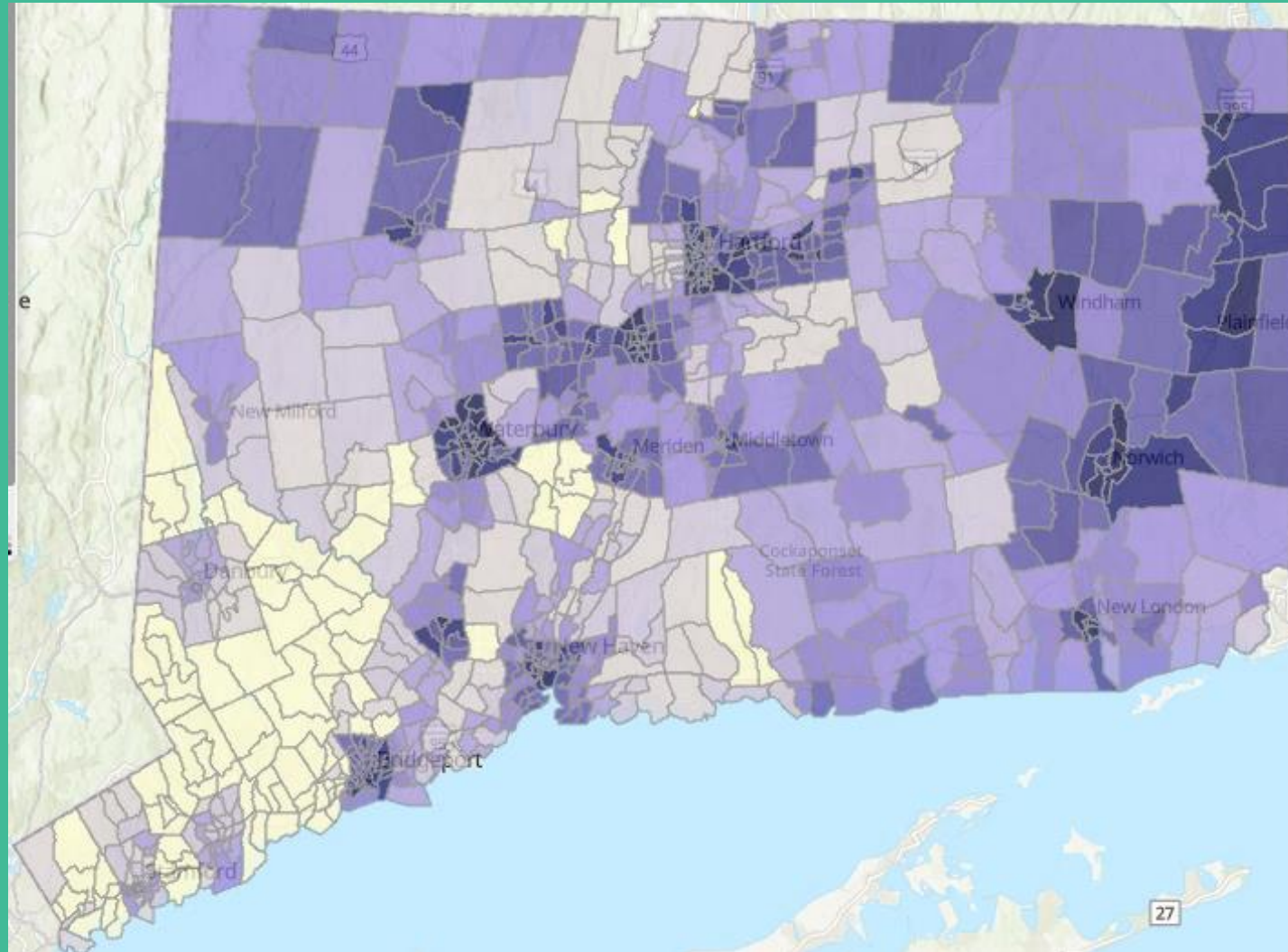
Indicator: Income/Poverty/Unemployment*



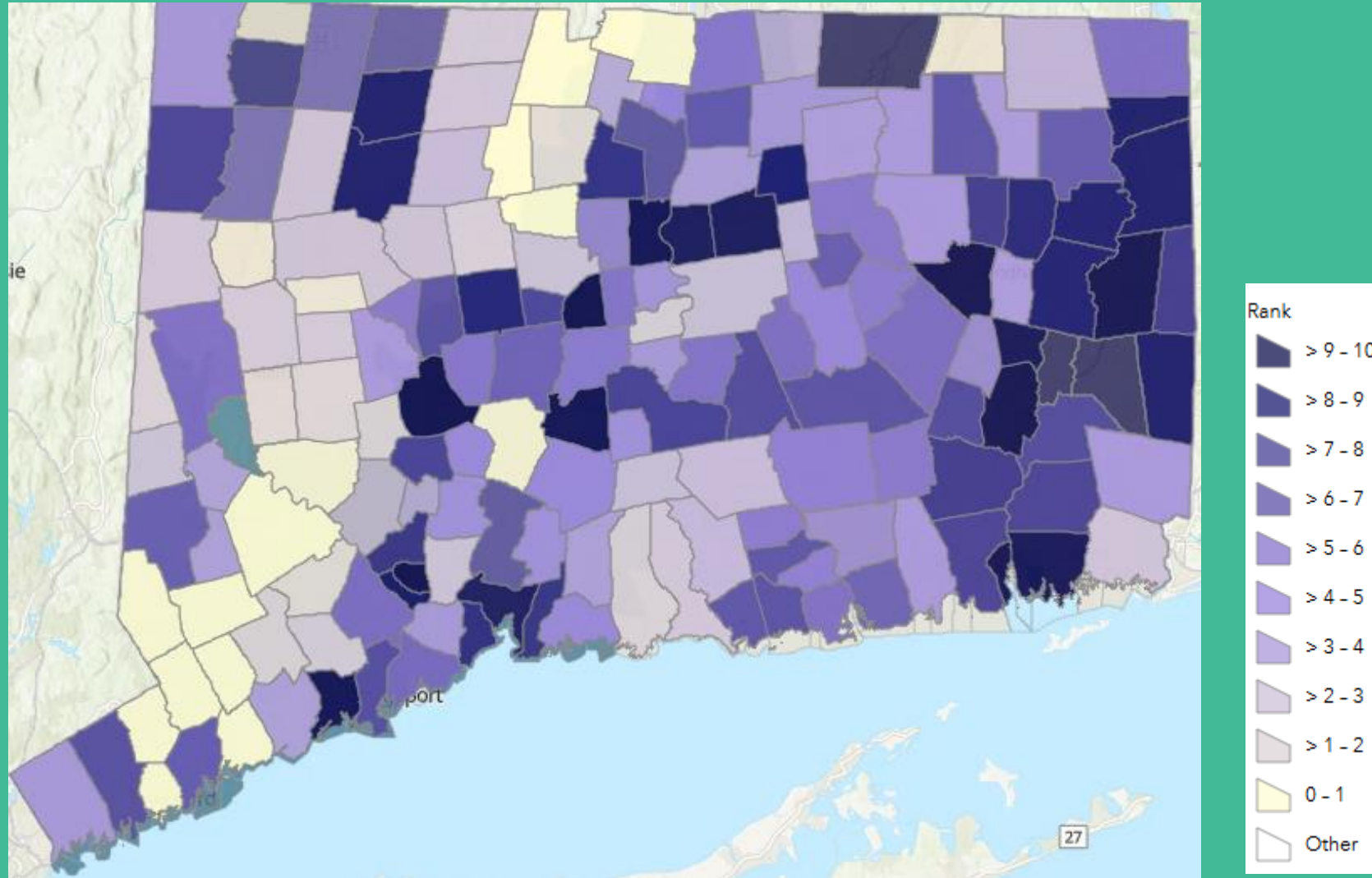
*Median income, Poverty, Unemployment rates



All Public Health



Indicator: Asthma/COPD*



*Asthma E.D. visits, COPD E.D. visits, EPA Respiratory Risk



Clarifying Questions

Breakout Rooms: Ranking Exercise

**Which indicators are important
and why**






Breakout Rooms: Ranking Exercise

Measuring What Matters

Most Important

↑

Less Important

 Pollution Sources			 Social Factors			 Public Health		
Factories and other sources of air pollution	Noise & traffic	Contaminated sites like brownfields, superfund sites	Income/poverty/unemployment			Asthma		
Air pollution: diesel P.M., ozone, P.M. 2.5	Incinerators & landfills	Transfer stations & recycling facilities						
Water quality	Sites that store potentially hazardous materials							



Upcoming Meetings

Next EJ Rulemaking Meeting:

Cumulative Impacts Tool & Geographic
Points of Comparison
Summer 2025

Join us at other EJ events:

Connecticut Equity & Environmental
Justice Advisory Council (CEEJAC)
Thu. June 26, 2025 | 5:30-7:30 PM
Hybrid Meeting
295 Meridian St. Groton, CT

Contact us:

deep.EJrulemaking@ct.gov

Take our survey!



Scan or click to receive
email updates