Brownfield Contaminants and Human Health

February 29, 2024

Presented By:

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Brownfield Redevelopment Specialist
NJIT Technical Assistance to Brownfield Communities

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Thank you for joining us today!

This webinar will be starting soon.

But first, some helpful information:

- Today's session will be recorded.
- The recording for this session will be available on our website: https://www.njit.edu/tab/
- Use the Q&A box to queue up questions. Use the chat to share your thoughts.
- Experiencing technical issues? Reach out to fm392@njit.edu
- We want to know your thoughts! Fill out our feedback survey after today's session.
- Continue the conversation on our LinkedIn page! https://bit.ly/3UYkHPR

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Brownfield Contaminants & Human Health

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Joseph M. Reiner
Brownfield Redevelopment Specialist
Center for Community Systems

Agenda

- Background on Brownfields
- Brownfield Contaminants
- Exposure and Health Risks
- Community Screening Tools
- Takeaways/Discussion

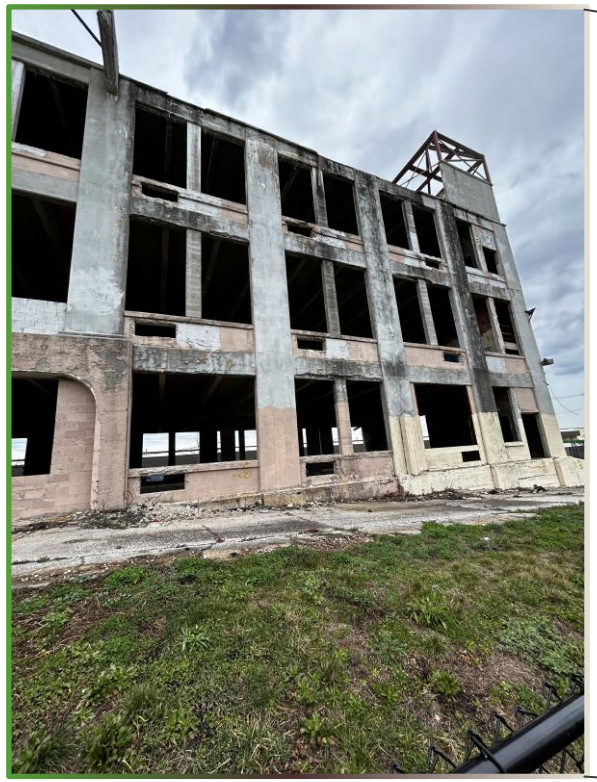
"A **brownfield** is a property,
the expansion, redevelopment, or reuse
of which may be complicated
by the presence or potential presence
of a hazardous substance, pollutant, or contaminant."

Overview of EPA's Brownfields Program

Brownfield Sites

Designation not determined by size of site or contaminant type.

Brownfield sites can be urban, industrial, or rural.



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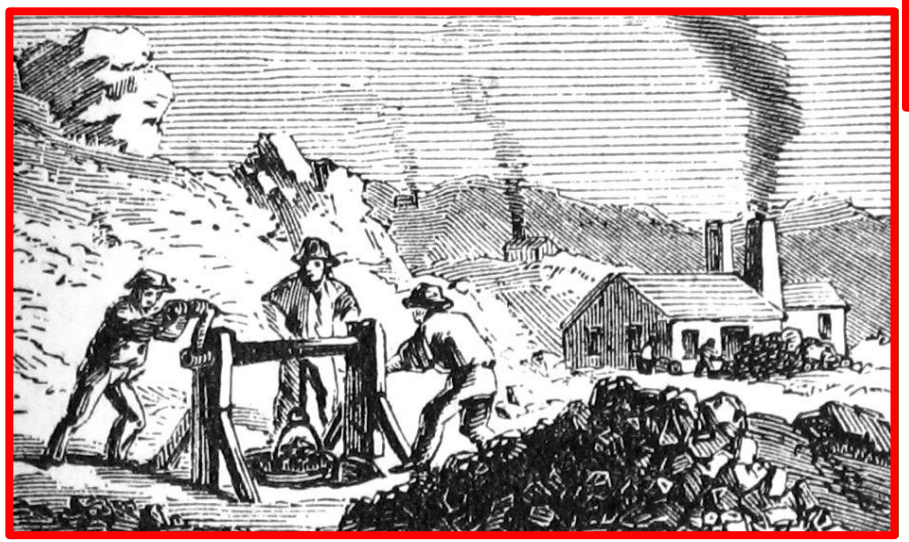
"A **pollutant** or **contaminant** is any element, substance, compound, or mixture, which after release into the environment and upon **exposure**...into any organism, either directly from the environment or indirectly by ingestion...will or may reasonably be anticipated to cause death, disease, etc."

CERCLA hazardous substances, pollutants, and contaminants as defined in CERCLA sections 101(14) and 101(33)

Examples of Brownfield Contaminants

Environmental Contaminants Often Found at Brownfield Sites

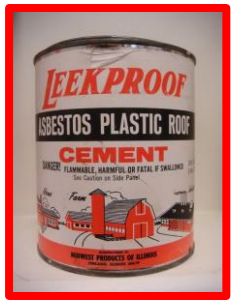
Lead (Pb)

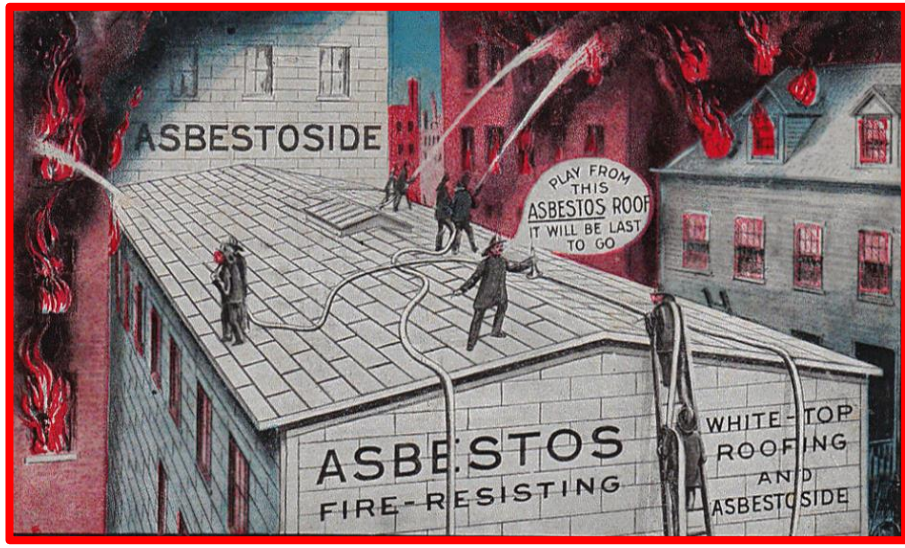


Some sources:

- Mining and processing
- Lead-based paints
- Leaded gasoline (TEL)
- Corroded plumbing

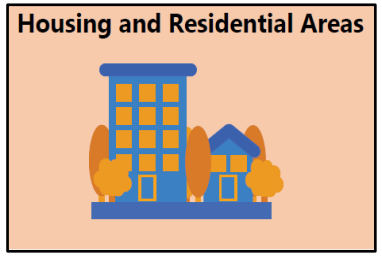
Asbestos





Some sources:

- Insulation, roofing
- Construction
- Old vehicle brakes
- Mining



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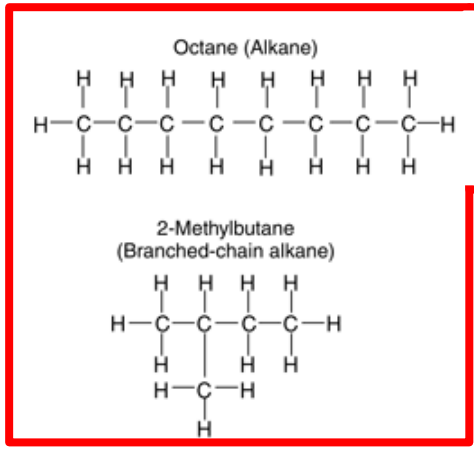
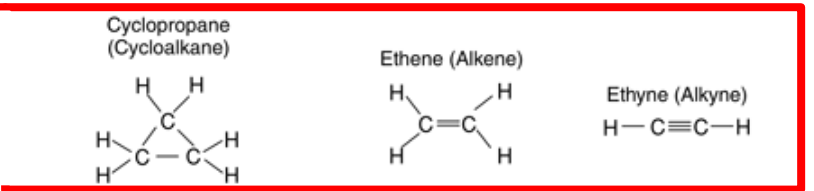
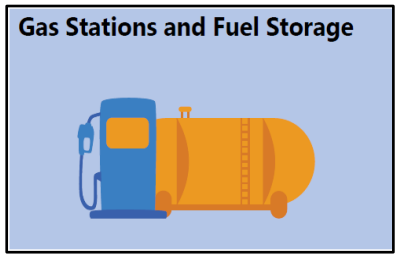
Petroleum Products

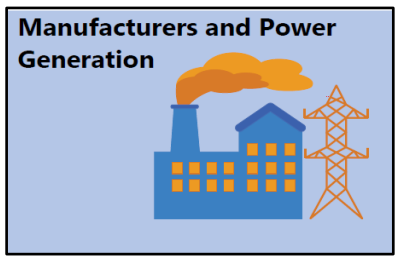




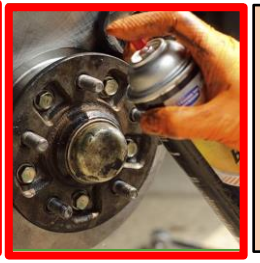
Some sources:

- Spills
- Fuel tank leaks
- Heating systems

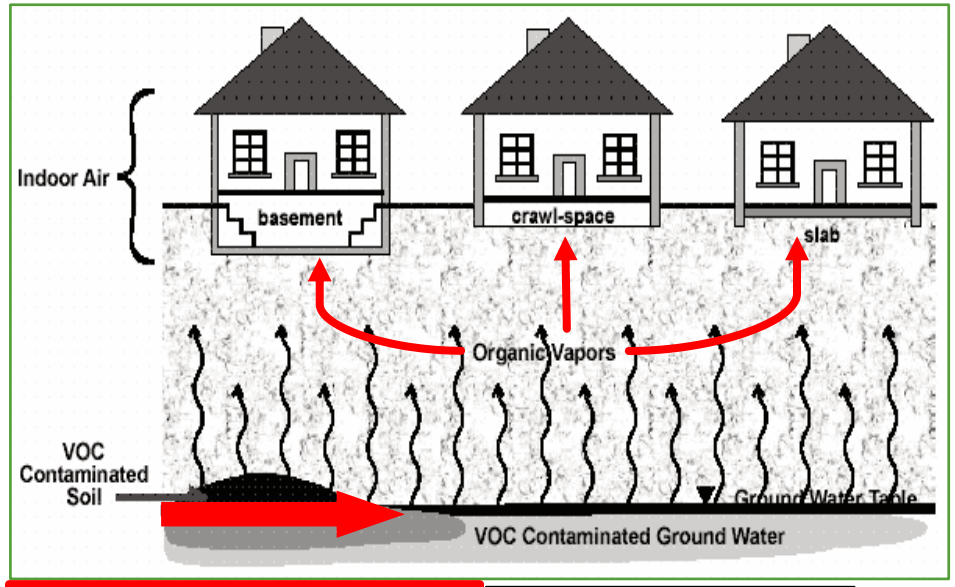




Volatile Organic Compounds (VOCs)



Housing and Residential Areas



Manufacturers and Power Generation

Public and Commercial Buildings

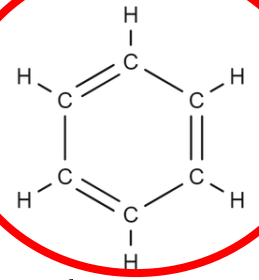
Automotive Repair

Dry Cleaners and Industrial Laundry

Gas Stations and Fuel Storage

Metal Salvage and Recycling

Benzene

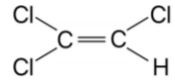


Agricultural Land and Facilities

Some sources:

- Drycleaning solvents
- Petroleum products
- Leaking sewer pipes
- Stormwater runoff
- Pesticides
- Paint, paint thinners

Trichloroethene



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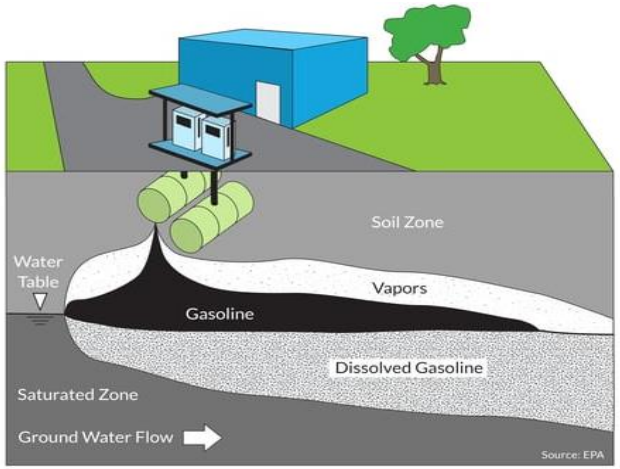
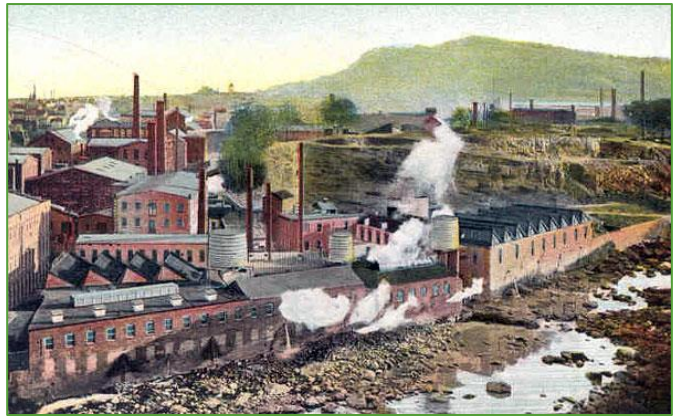
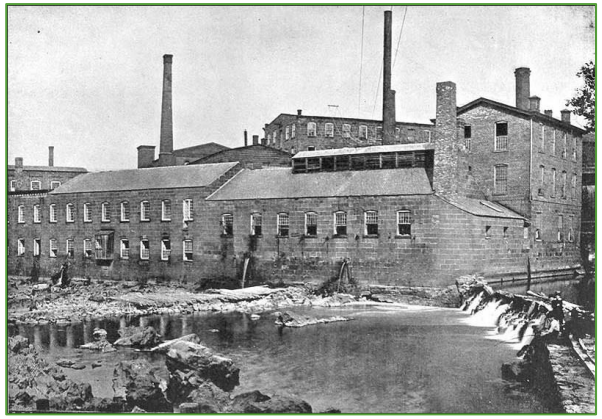
Site History & Past Uses

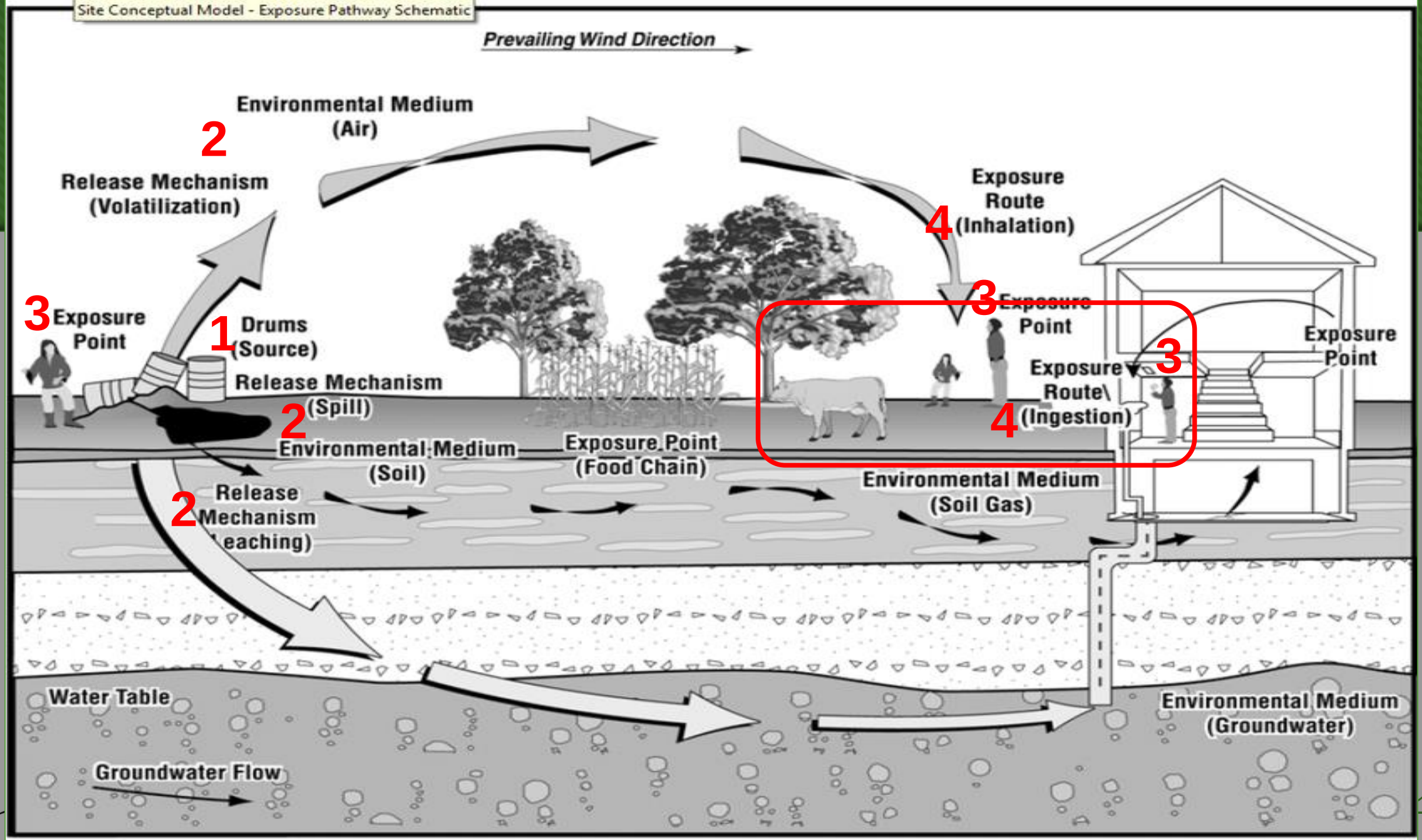
Past Property Uses May Result in a Brownfield

- **Environmental contamination can be complex and costly to address.**
- One site can have multiple types of contamination present.
- Site history informs what contamination type may be present, what risks may be posed.

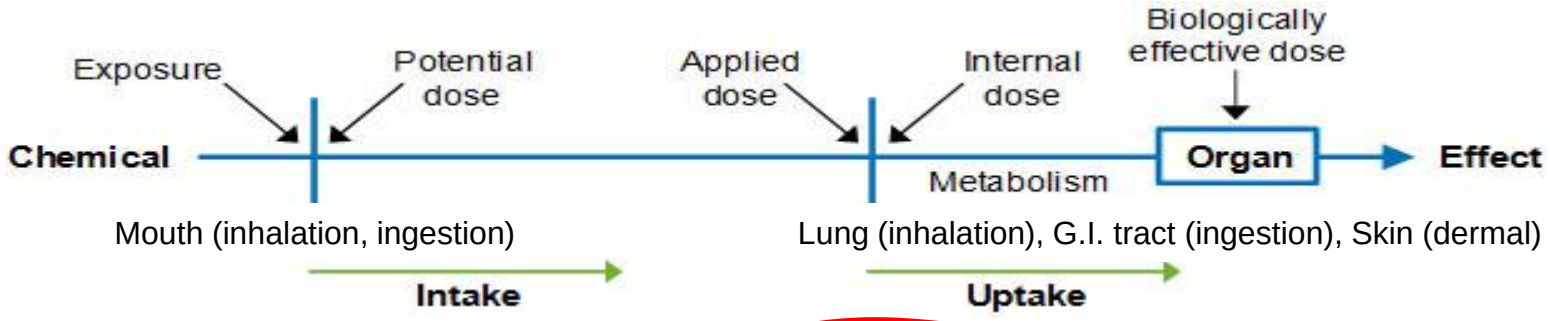




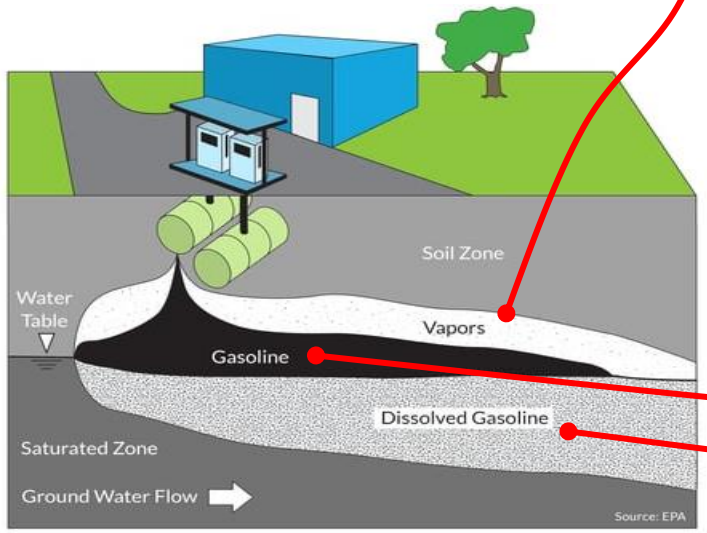


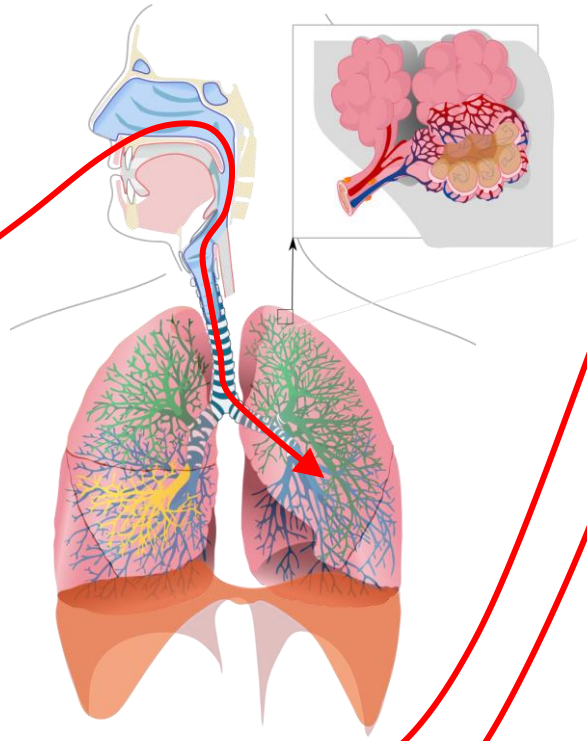

Site Conceptual Model - Exposure Pathway Schematic
Prevailing Wind Direction
Environmental Medium
(Air)
2
Release Mechanism
(Volatilization)
Exposure
Route
4 (Inhalation)
3 Exposure
Point
1 Drums
(Source)
Release Mechanism
(Spill)
3 Exposure
Point
Exposure
Route\
4 (Ingestion)
3
Exposure
Point
2 Environmental Medium
(Soil)
Exposure Point
(Food Chain)
Environmental Medium
(Soil Gas)
2 Release
Mechanism
eaching)
Water Table
Environmental Medium
(Groundwater)
Groundwater Flow
N

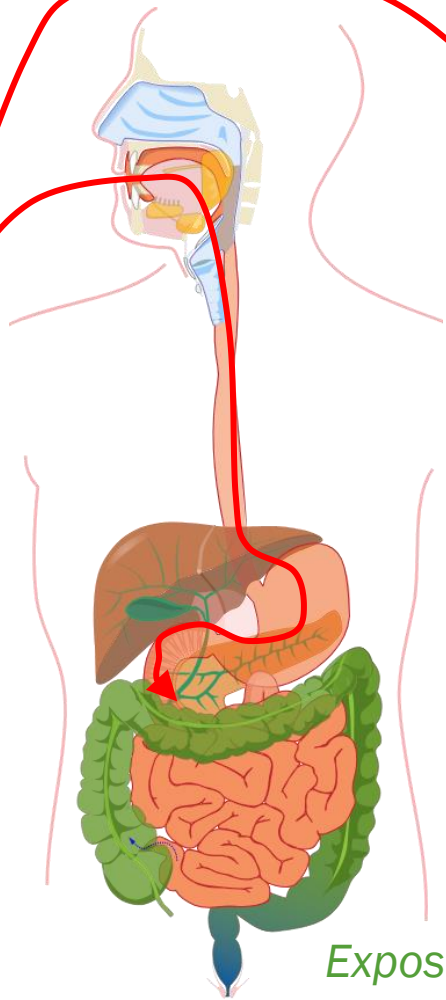
Exposure Routes



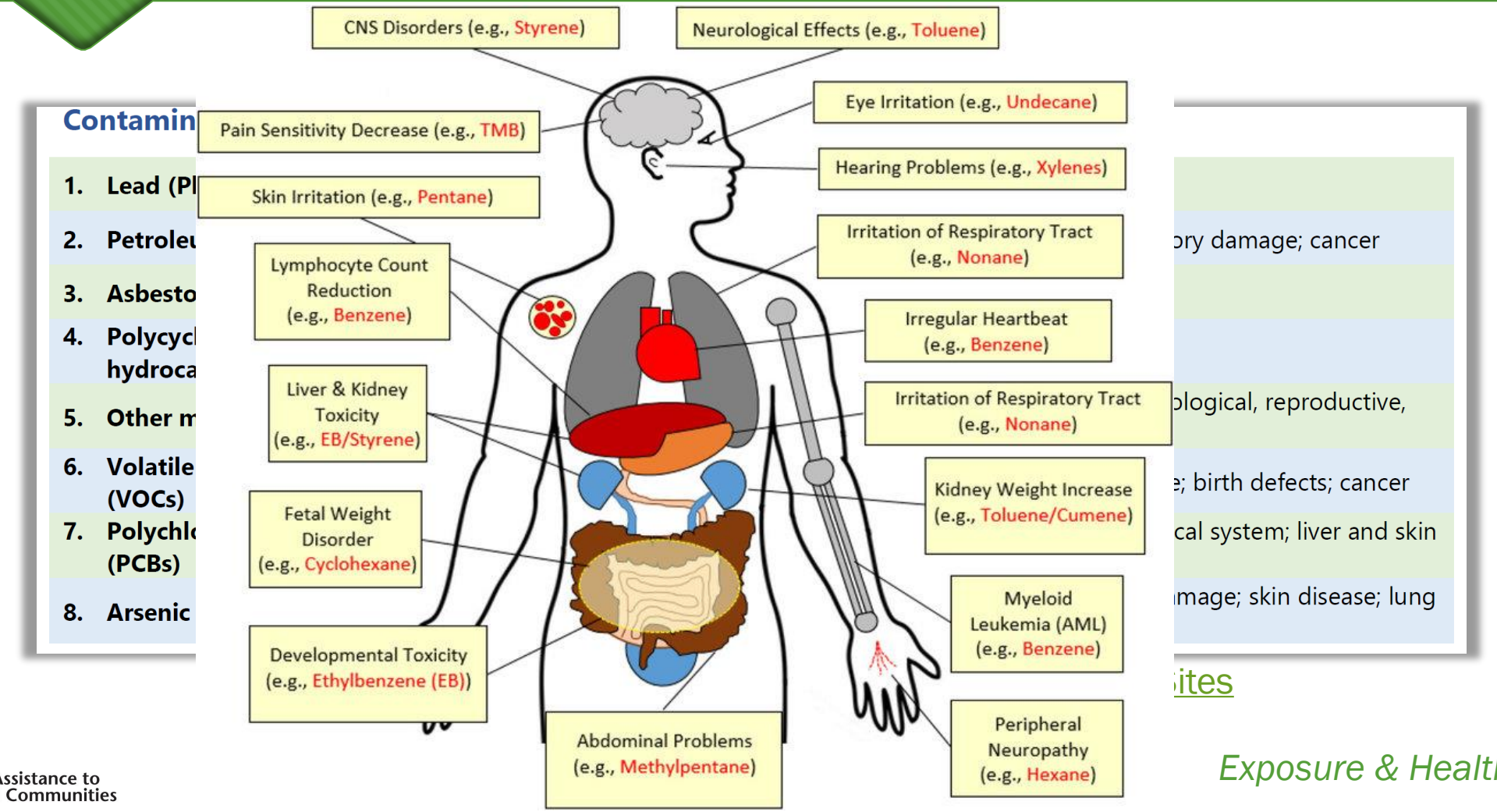
- **Inhalation** *(breathing)*
- **Ingestion** *(drinking or eating)*
- **Dermal Contact** *(touching)*



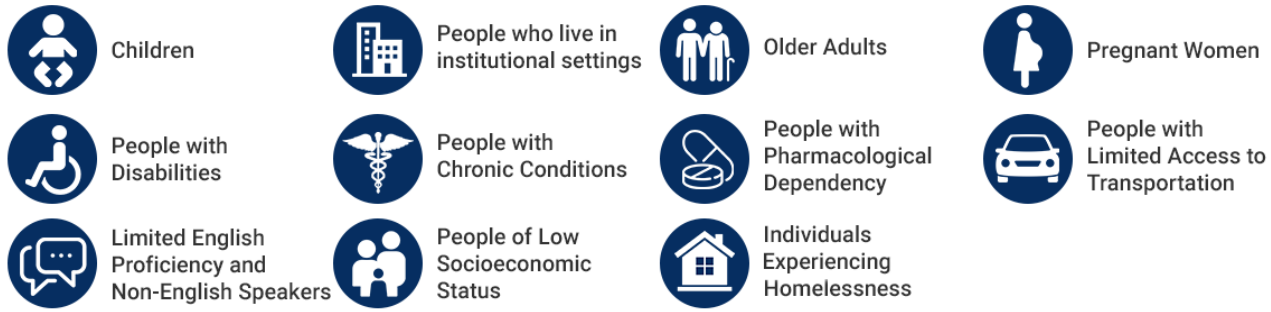


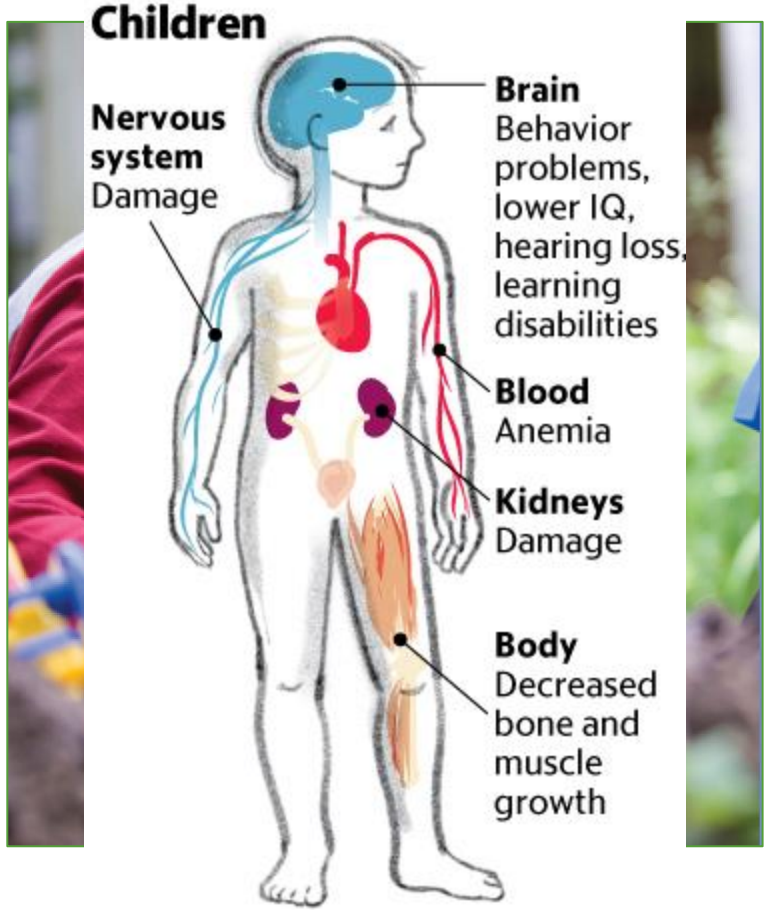


Health Risks of Brownfield Contaminants



Sensitive Populations





- Usually, the amount of contamination we are exposed to is far less than the amount that causes health problems.
- Some people can't tolerate chemical exposure as well. These groups are known as **sensitive populations**.

Sensitive Populations & Chemical Exposure

Health impacts are not equally felt by all.

Spatial relationships between lead sources and children's blood lead levels in the urban center of Indianapolis (USA)

Deborah Morrison, Qing Lin, Sarah Wiehe, Gilbert Liu, Marc Rosenman, Trevor Fuller, Jane Wang & Gabriel Filippelli

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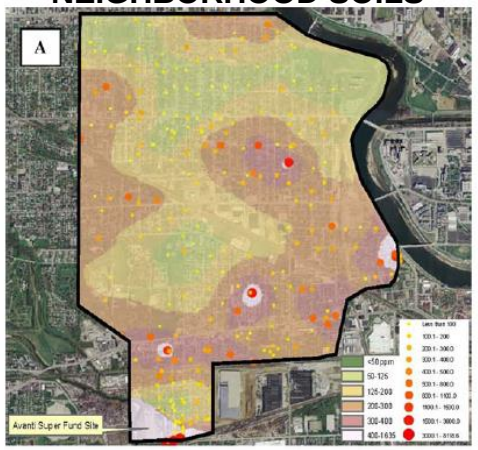
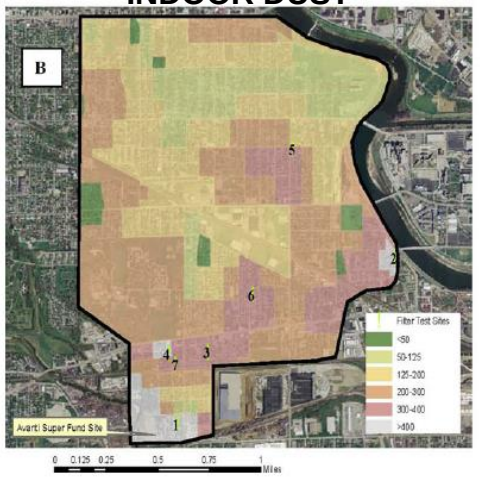
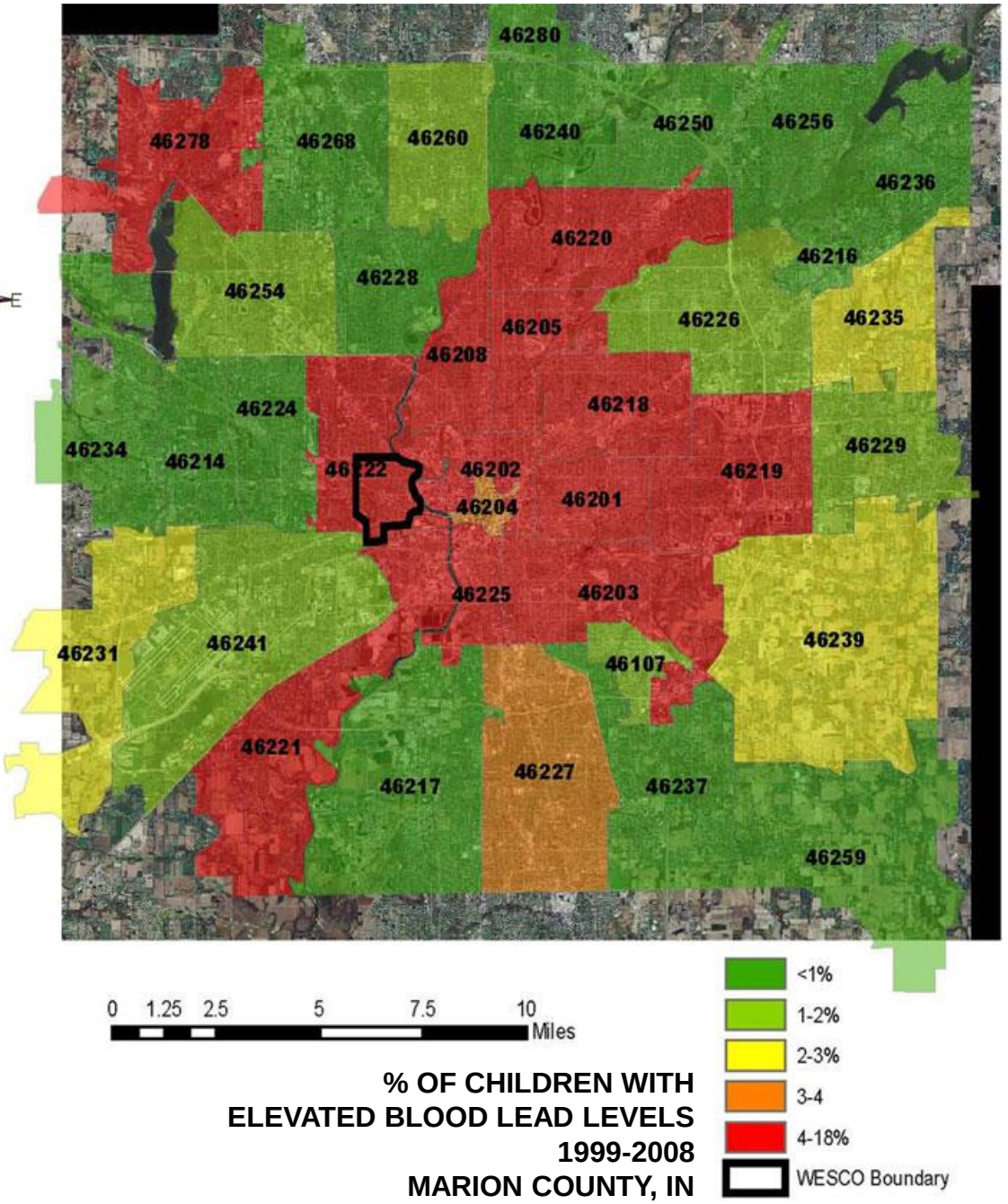
35:171-183
DOI 10.1007/s10653-012-9474-y

NEIGHBORHOOD SOILS



INDOOR DUST





% OF CHILDREN WITH ELEVATED BLOOD LEAD LEVELS 1999-2008 MARION COUNTY, IN

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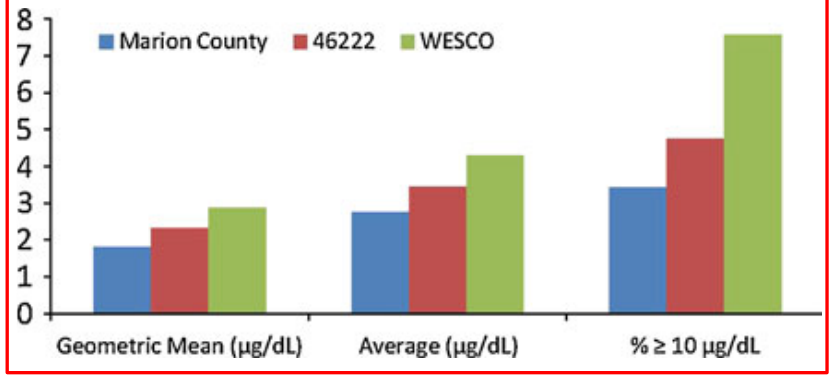
Morrison et al. Study Findings

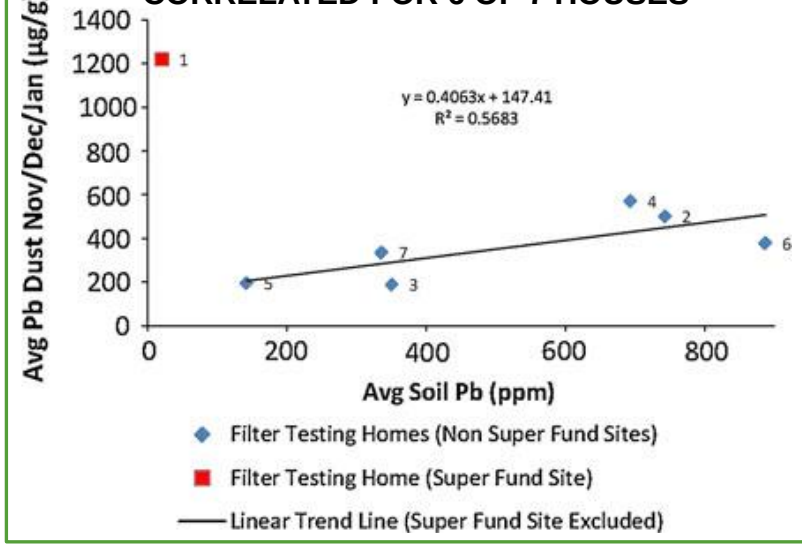
Spatial relationships between lead sources and children's blood lead levels in the urban center of Indianapolis (USA)

Deborah Morrison · Qing Lin · Sarah Wiehe · Gilbert Liu · Marc Rosenman · Trevor Fuller · Jane Wang · Gabriel Filippelli

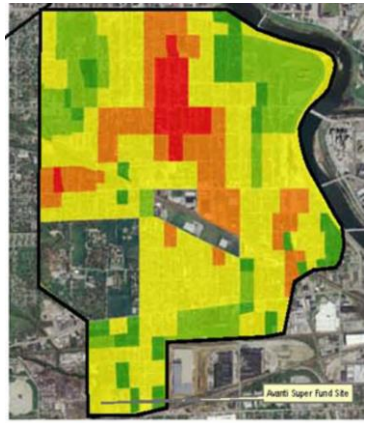
BLOOD LEAD LEVELS ABOVE COUNTY & ZIP AVERAGE FOR NEIGHBORHOOD CHILDREN



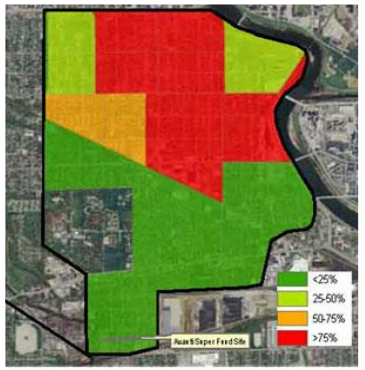
INDOOR DUST & SOIL LEAD LEVELS ARE CORRELATED FOR 6 OF 7 HOUSES



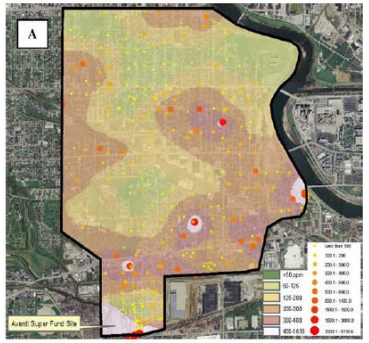
RACE INDICATED HIGH BLOOD LEAD LEVEL MORE THAN SOIL LEAD CONCENTRATIONS AT BLOCK/BLOCK GROUP SCALE



% ELEVATED BLOOD LEAD LEVELS IN CHILDREN AGES 0-5 1999-2008



% NON-HISPANIC BLACK POPULATION



SOIL LEAD CONC.

Exposure & Health Risks, 19

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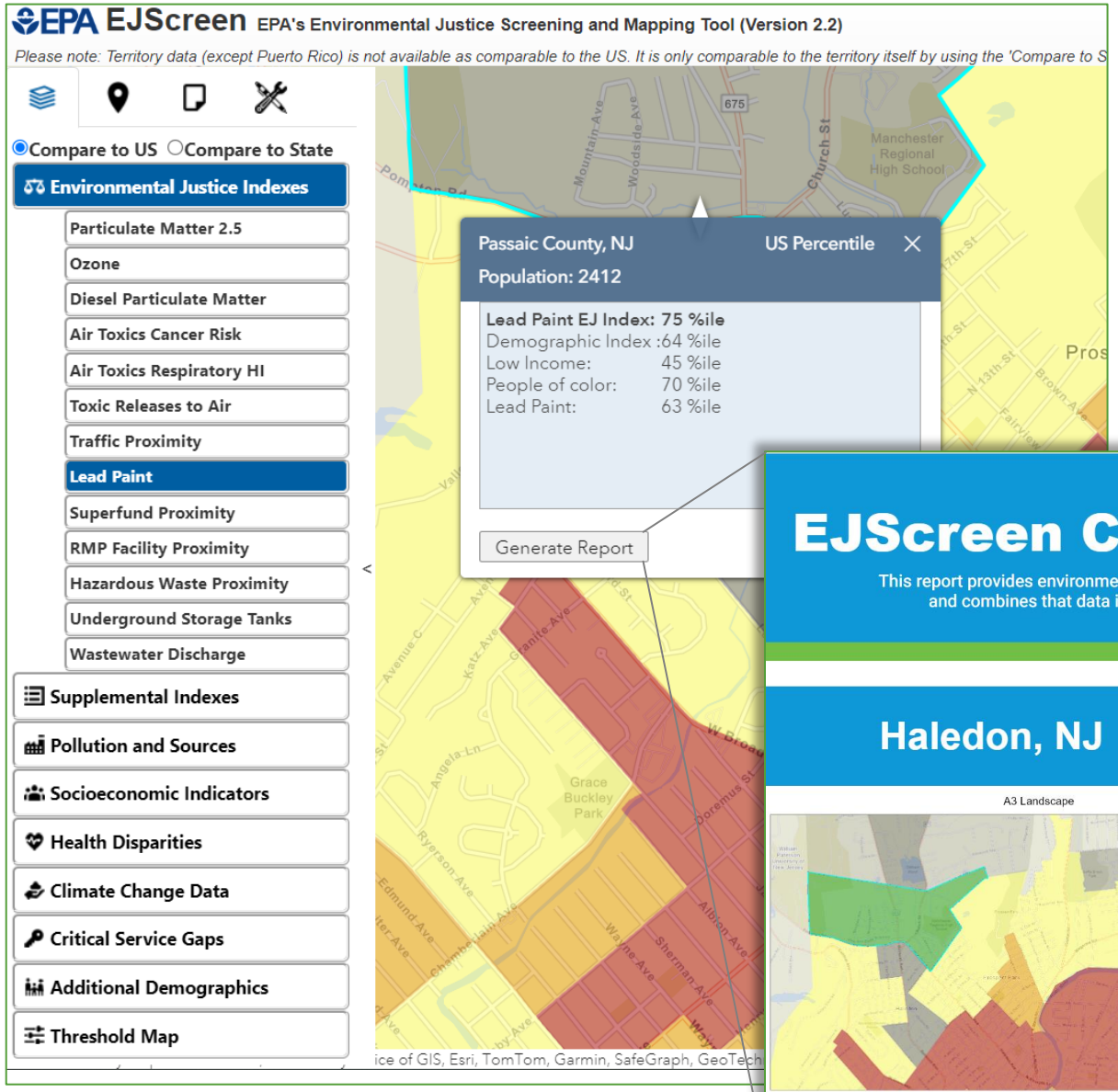
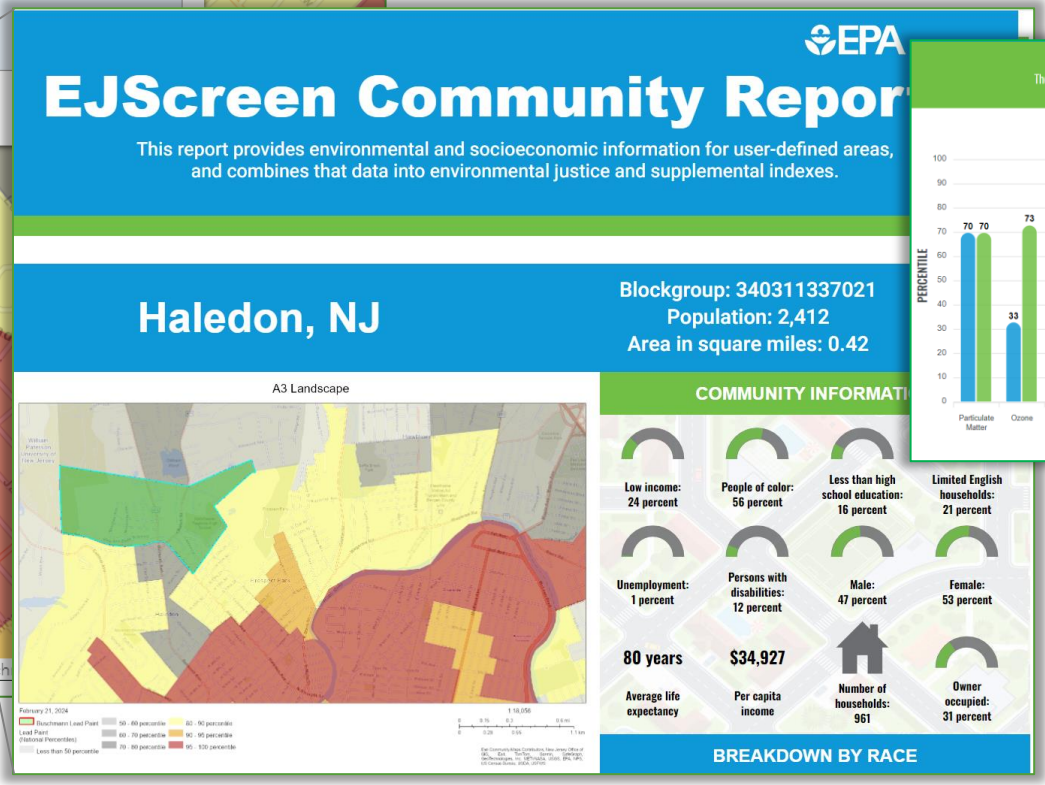
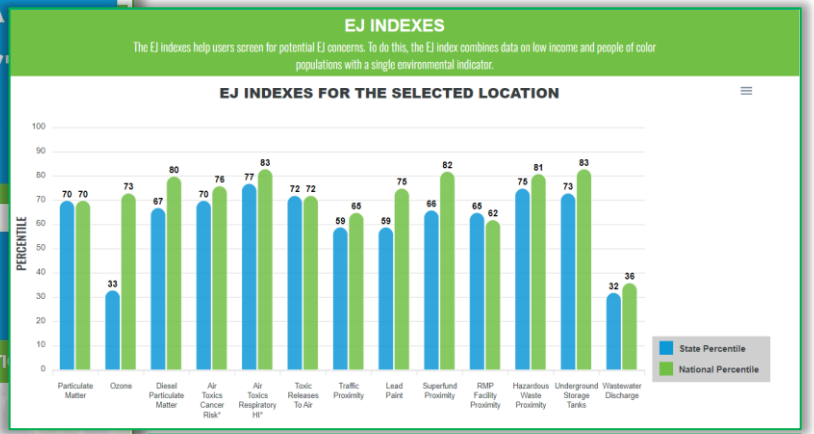
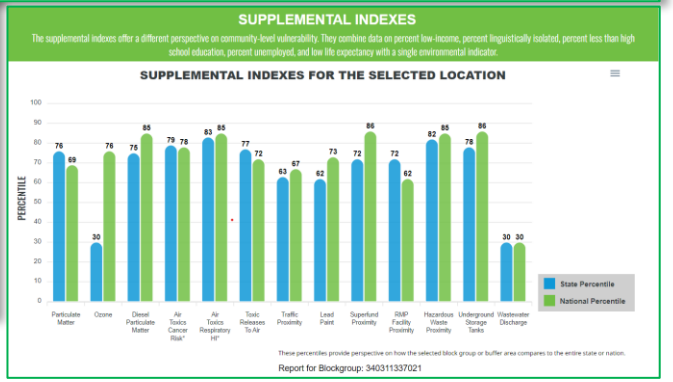
EPA's EJScreen

https://ejscreen.epa.gov/mapper/









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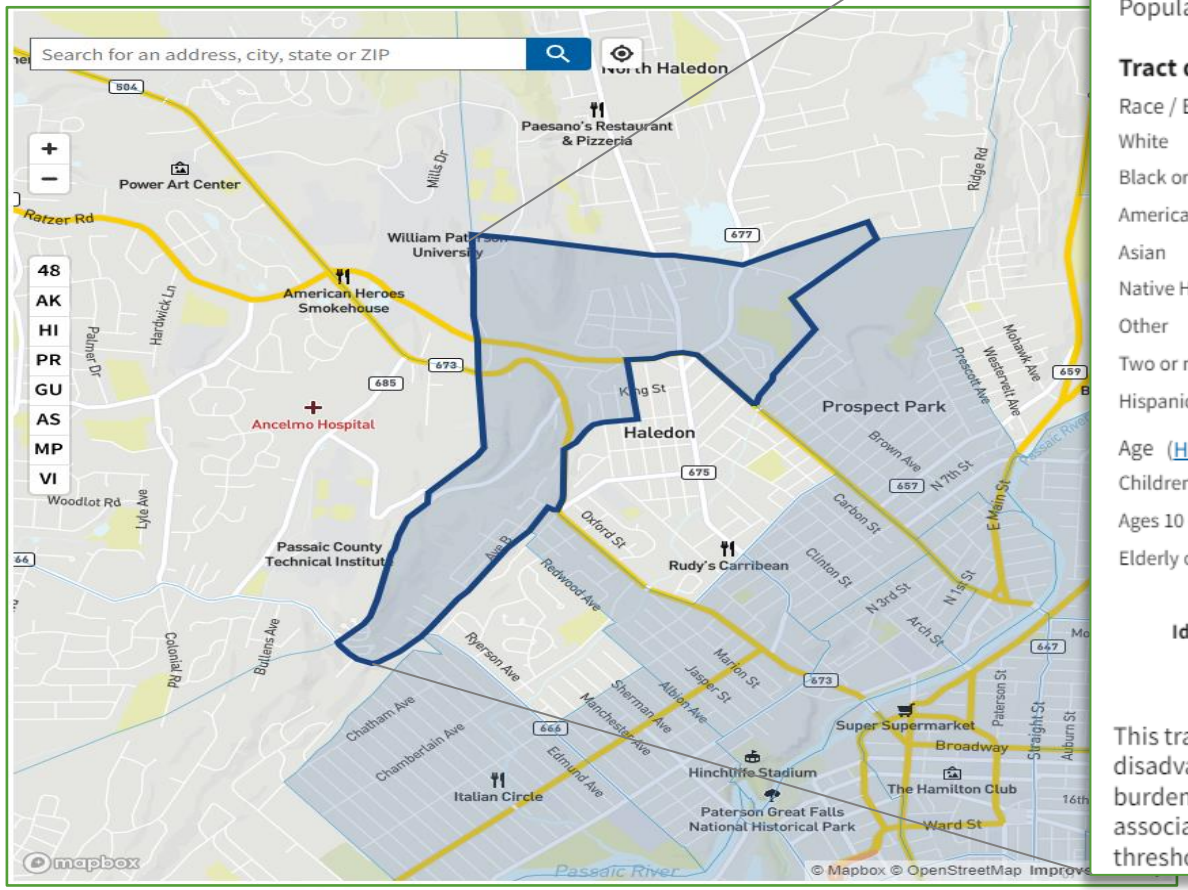
CEQ's Climate and Economic Justice Screening Tool (CEJST)

https://screeningtool.geoplatform.gov/



Tract information
Number: 34031133702
County: Passaic County
State: New Jersey
Population: 3,282

Tract demographics

Race / Ethnicity (Hide)

White	46%
Black or African American	13%
American Indian and Alaska Native	0%
Asian	1%
Native Hawaiian or Pacific Islander	0%
Other	5%
Two or more races	3%
Hispanic or Latino	36%

Age (Hide)

Children under 10	12%
Ages 10 - 64	71%
Elderly over 65	15%

Identified as disadvantaged?

YES

This tract is considered disadvantaged because it meets 1 burden threshold **AND** the associated socioeconomic threshold.

Legacy pollution

Abandoned mine land — No
Presence of one or more abandoned mine land within the tract

Formerly Used Defense Sites — -- missing data
Presence of one or more Formerly Used Defense Site within the tract

Proximity to hazardous waste facilities — 89th not above 90th percentile
Count of hazardous waste facilities within 5 kilometers

Proximity to Risk Management Plan facilities — 56th not above 90th percentile
Count of Risk Management Plan (RMP) facilities within 5 kilometers

Proximity to Superfund sites — 86th not above 90th percentile
Count of proposed or listed Superfund (or National Priorities List (NPL)) sites within 5 kilometers

AND

Low income — 40th not above 65th percentile
People in households where income is less than or equal to twice the federal poverty level, not including students enrolled in

Workforce development

Linguistic isolation — 90th above 90th percentile
Share of households where no one over age 14 speaks English very well

Low median income — 68th not above 90th percentile
Comparison of median income in the tract to median incomes in the area

Poverty — 45th not above 90th percentile
Share of people in households where income is at or below 100% of the Federal poverty level

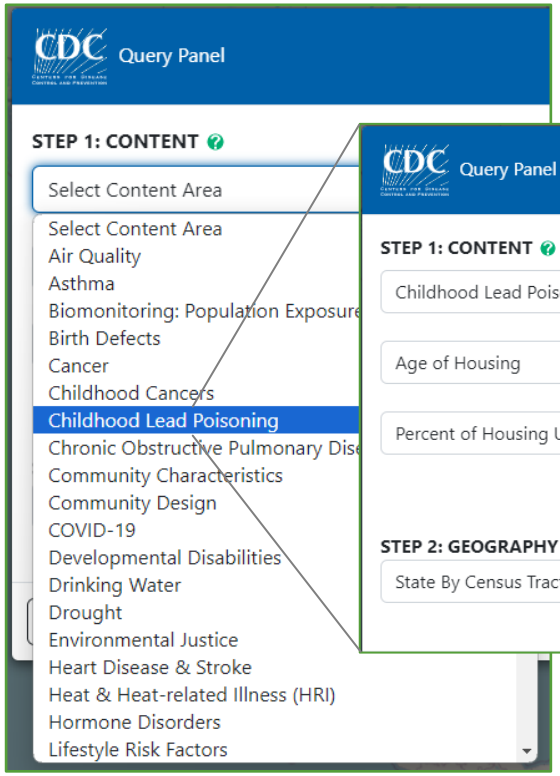
Unemployment — 57th not above 90th percentile
Number of unemployed people as a part of the labor force

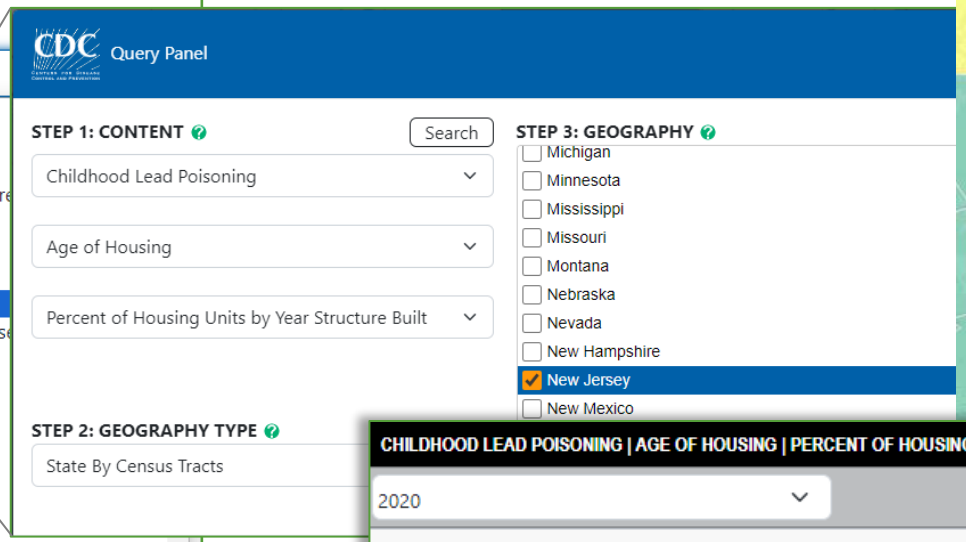
AND

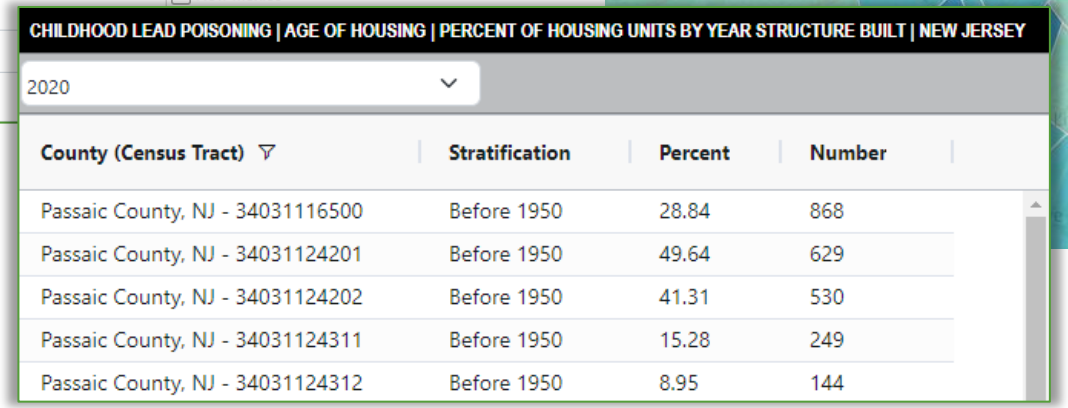
High school education — 12% above 10% percent
Percent of people ages 25 years or older whose high school education is less than a high school diploma

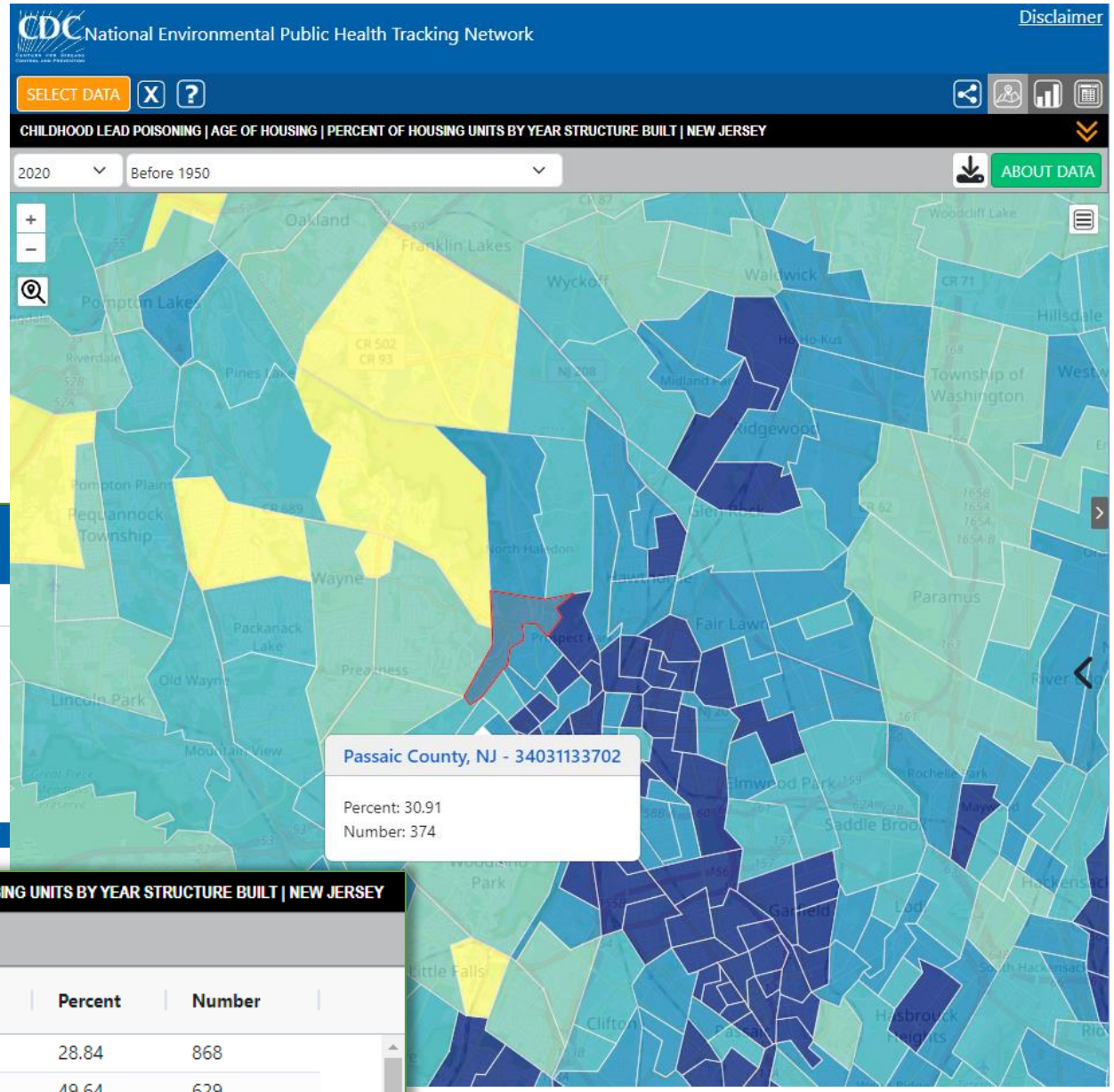
CDC's Environmental Public Health Tracking Network

https://www.cdc.gov/nceh/tracking/









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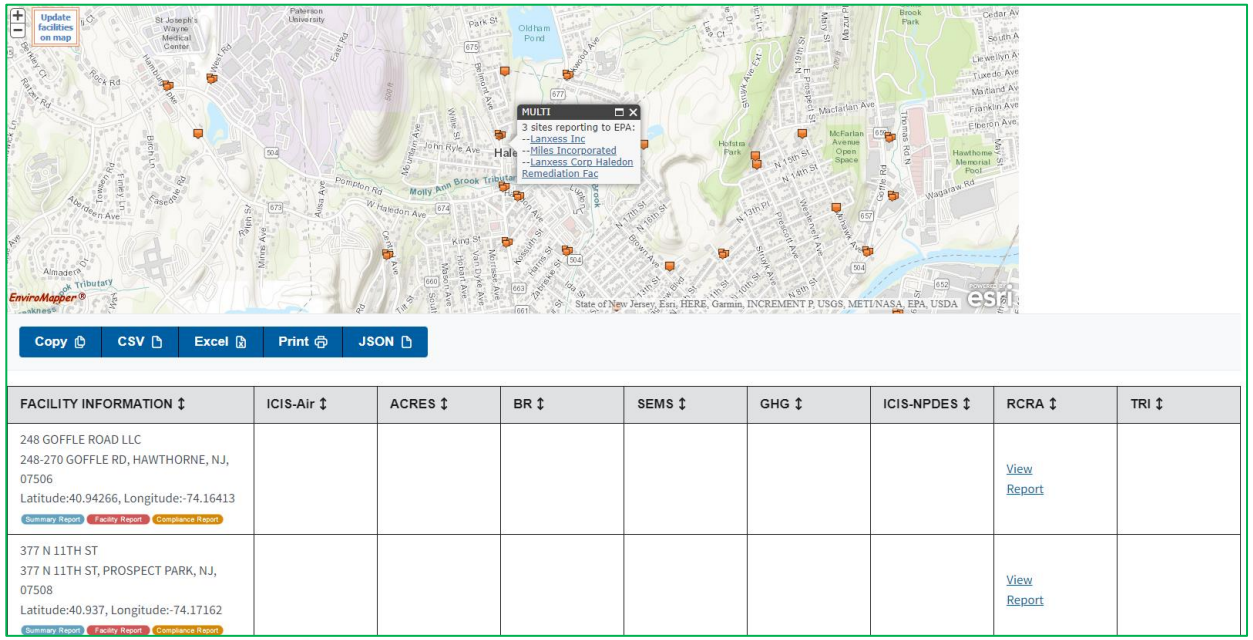
More Screening Tools

Envirofacts
Your one-stop source for Environmental Information

https://enviro.epa.gov/

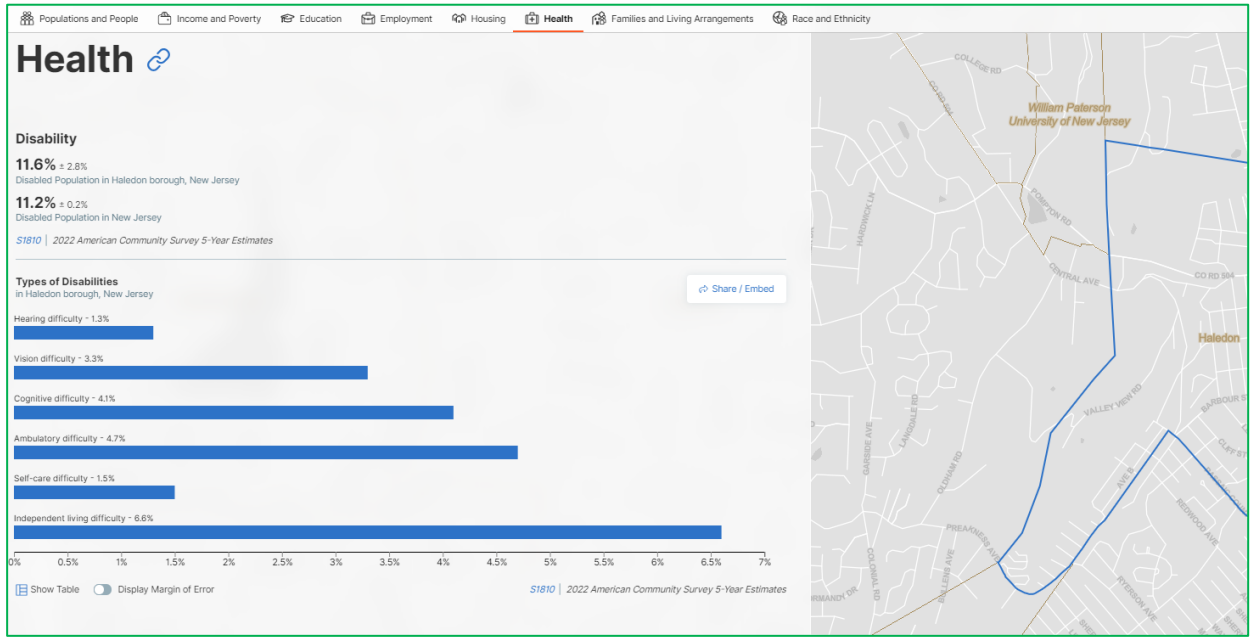


Copy | CSV | Excel | Print | JSON

FACILITY INFORMATION	ICIS-Air	ACRES	BR	SEMS	GHG	ICIS-NPDES	RCRA	TRI
248 GOFFLE ROAD LLC 248-270 GOFFLE RD, HAWTHORNE, NJ, 07506 Latitude:40.94266, Longitude:-74.16413 Summary Report Facility Report Compliance Report							View Report	
377 N 11TH ST 377 N 11TH ST, PROSPECT PARK, NJ, 07508 Latitude:40.937, Longitude:-74.17162 Summary Report Facility Report Compliance Report							View Report	

United States® Census Bureau

https://www.census.gov/programs-surveys/acs



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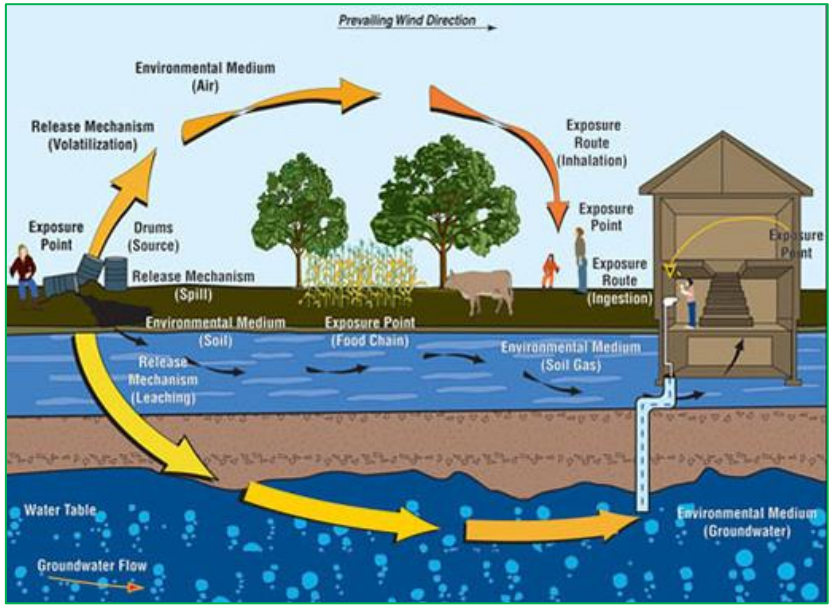
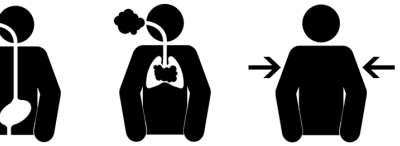
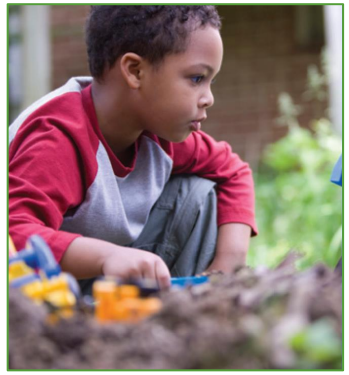
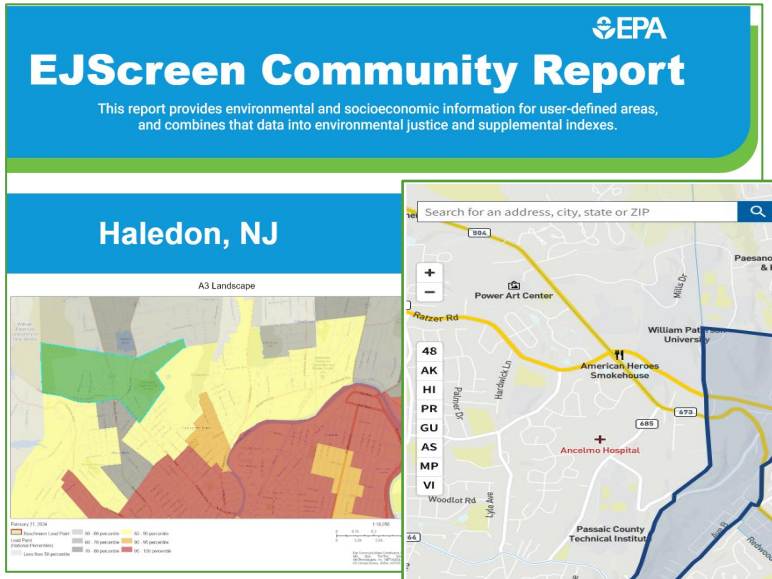
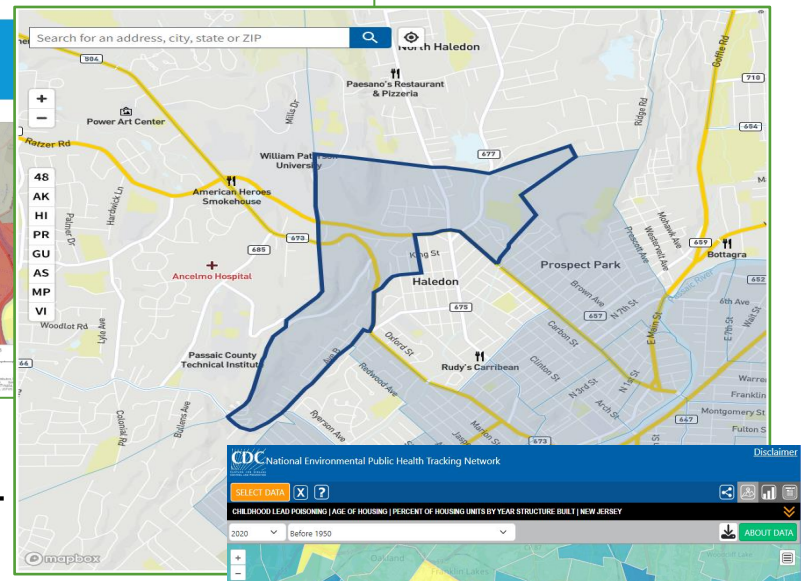
Takeaways

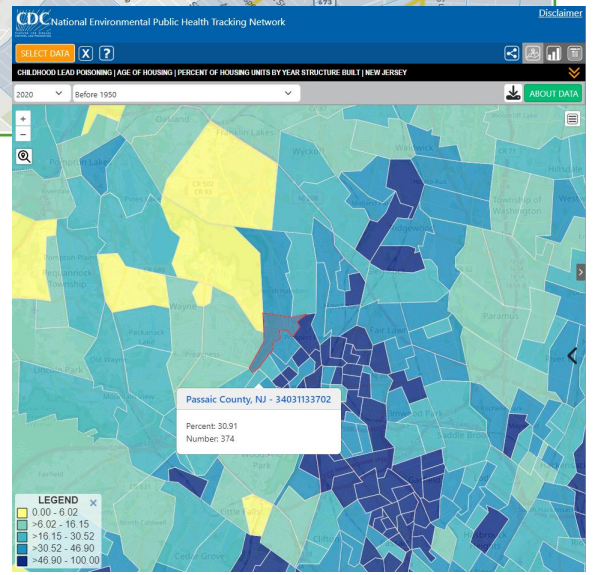












NJIT | TAB Technical Assistance to Brownfield Communities

TAB can help!

NJIT | TAB Technical Assistance to Brownfield Communities

EPA Region 2 EPA Region 4

NJIT TAB serves as an independent resources to state, territory, regional, county, tribal, and local government entities, and non-profits attempting to learn about, identify, assess, cleanup, and redevelop brownfields.

Thank you!

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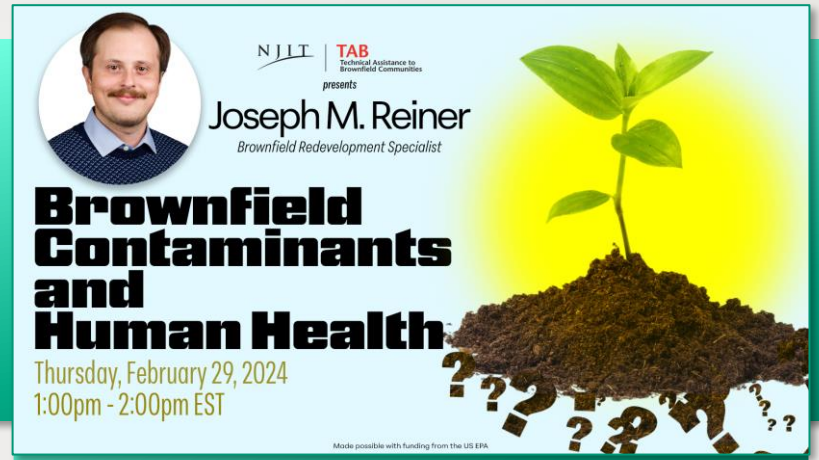
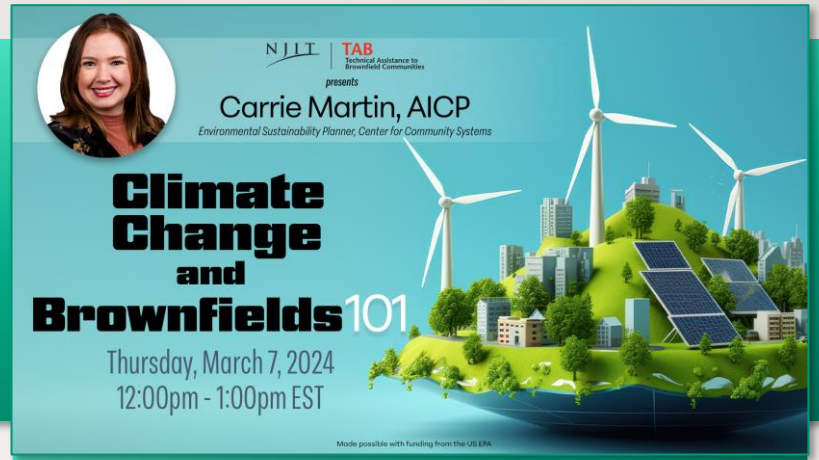
NJIT | TAB
Technical Assistance to Brownfield Communities

Upcoming Events 2024



February 29, 2024

LinkedIn Event Page
https://bit.ly/3UYkHPR



March 7, 2024

LinkedIn Event Page
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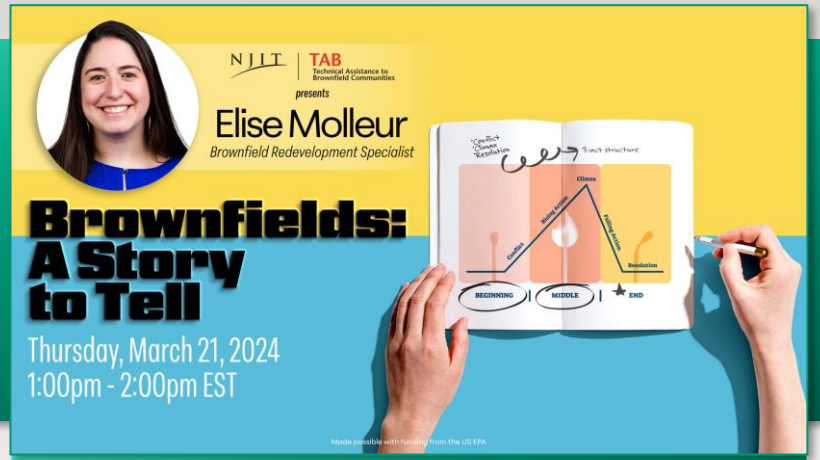

March 21, 2024

LinkedIn Event Page
https://bit.ly/30X08zJ

NJIT | TAB Technical Assistance to Brownfield Communities

What is NJIT | TAB Technical Assistance to Brownfield Communities ?

NJIT provides free technical assistance to state, regional, county, tribal, and local government entities and nonprofit organizations interested in learning about, identifying, assessing, cleaning up, and redeveloping brownfield sites in EPA Regions 2 & 4.

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