

Brownfield Redevelopment: Communities in Transition



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Lesson Goals

(Hazardous waste)

- Recognize various types of hazardous waste related to Brownfields
- Describe landfills (including Superfund sites) and their impacts
- Illustrate *Cradle-to-Grave* Hazardous Waste Management System

(Brownfields)

- Summarize meaning of brownfields, their history and types, and their environmental and social consequences
 - Distinguish challenges and opportunities around brownfields in communities
 - Design (conceptual) and compare brownfield redevelopment options
 - Analyze environmental and social consequences of brownfield redevelopment, focusing on environmental justice and public participatory planning
-

Solid vs. Hazardous Waste

Common Waste Types

Liquid Waste:
Waste Generated
After Cleaning
Floors & Toilets,
Rain Water Run
Off

Organic :. Food Waste, Fruit and Vegetable
Peels, Flowers and Animal Waste
(Biodegradable Broken Down by Organisms
Over Time and Turned Into Manure)

Recyclable Type:
Aluminium Foil,
Plastics, Glass ,Paper
Products Cardboard
boxes etc

Solid Waste::
Old tires, Plastic Covers,
Bottles, Boxes,
newspapers, broken
furniture and even food
waste(include any waste)

Hazardous Type:
Cleaning Agents,
Acids, DDT, Phenyls



Hazardous Waste



Household Waste

Hazardous Waste



E-Waste

<https://www.pbs.org/newshour/science/america-e-waste-gps-tracker-tells-all-earthfix>

Hazardous Waste



Nuclear Waste

Hazardous Waste

WHAT IS HAZARDOUS WASTE?

Simply put, hazardous waste is any material that has served its purpose, but still presents a danger to human health or to the environment. Because of this threat, it is important to handle and dispose of hazardous waste carefully.

Types of Hazardous Wastes

- TOXIC WASTE** (Skull and crossbones icon)
- CHEMICAL WASTE** (Molecular structure icon)
- NUCLEAR WASTE** (Radiation symbol icon)
- MEDICAL WASTE** (Biohazard icon)

The infographic also features a person in a full orange hazmat suit and respirator mask handling a green barrel, with a line connecting the text 'it is important to handle and dispose of hazardous waste carefully' to the person.

WHAT IS IT?

Industrial hazardous waste is a byproduct of manufacturing, farming, construction and various other industries.

However, even household items can be classified as hazardous waste, such as batteries, cosmetics and cleaning products.

EXAMPLES:

- Pesticides
- Heavy metals
- Chemicals
- Radiation



Nuclear Waste

Hazardous Waste



Natural: arsenic, cadmium, chromium, copper, lead, mercury, zinc

Man-made: synthetic organic chemicals (e.g., dioxin, solvents, pesticides, CFC, POP), radioactive waste from nuclear power plant, uranium use of hospital X-ray equipment, medical waste (e.g., blood bags, PVC plastics), pharmaceutical waste, other toxic chemicals from burning fossil fuels.

Challenge of Toxic Substances

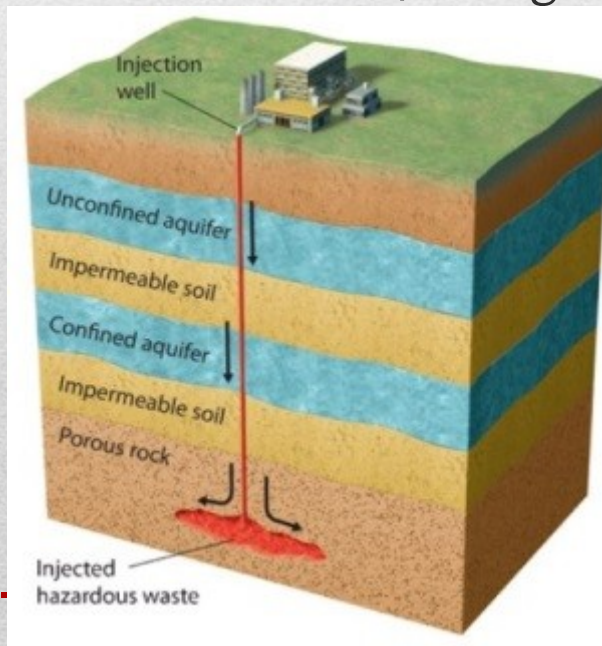
- Toxic chemicals released into air, land, surface/ground water
 - ✓ Purposely (e.g., pesticide)
 - ✓ By mistake (e.g., chemical spill caused by a train or truck accident)
- Consequences:
 - ✓ Water – killing fish/ other wildlife
 - ✓ Soil – unfit for human habitation or crop production
 - ✓ Air – can turn deadly

Bhopal (India) Gas Disaster

<https://www.youtube.com/watch?v=bxdm3JIN3IM>

Challenge of Toxic Substances

- 35 million lbs hazardous waste are disposed of each year
- 5 ways to dispose:
 - ✓ Burial
 - ✓ Deep-well injection
 - ✓ Incineration to generate electricity
 - ✓ Fly-ash storage
 - ✓ Treatment/storage in liquid form in containers



Challenge of Toxic Substances

- Very difficult to recycle
 - Do not quickly or easily break down in the environment
 - Can pose severe health threats:
 - ✓ Cancer
 - ✓ Respiratory and neurological damage
 - ✓ Birth defects
 - ✓ Miscarriages
 - ✓ Death
-

Challenge of Toxic Substances

- Lead poisoning in kids

<https://www.youtube.com/watch?v=62dVw7QQVJ8>



<https://www.youtube.com/watch?v=1hPNZVNWf5s>

Challenge of Toxic Substances

- Hazardous when people are exposed to certain levels of concentration
 - Risk assessment
 - ✓ Inexact science
 - ✓ Can human tolerate trace amount? Where is that threshold? Does tolerance vary person to person?
 - ✓ EPA establishes tolerance level
 - Strict tolerance levels may burden industry and local governments
 - Liberal tolerance levels may expose many people to serious and unnecessary harm
-

Challenge of Toxic Substances

- Dumping
- For much of the 20th century, most wastes were dumped in
 - ✓ Wells
 - ✓ Landfills
 - ✓ Vacant lots
 - ✓ Wetlands
 - ✓ Waterways
 - ✓ Sewers
 - ✓ Rural roads



Superfund Sites

A **Superfund site** is any land that has been contaminated by hazardous waste and identified by the EPA as a candidate for cleanup because it poses a risk to human health and/or the environment.

These **sites** are placed on the National Priorities List (NPL).

Superfund Sites

CONSEQUENCES OF IMPROPER WASTE HANDLING

MORE THAN
21,000 TONS
OF HAZARDOUS WASTE WERE DISPOSED OF
BETWEEN 1920-1953

Hooker Chemical - Love Canal Landfill - Niagara Falls, New York

The City of Niagara Falls purchased the land in 1953 for \$1. Homes & two schools were built on top of the buried toxic waste.

August 7th, 1978 Declared a Federal Health Emergency due to Toxic Waste

U.S. President Carter declared the Love Canal neighborhood an emergency and provided funds to permanently relocate the 239 families.

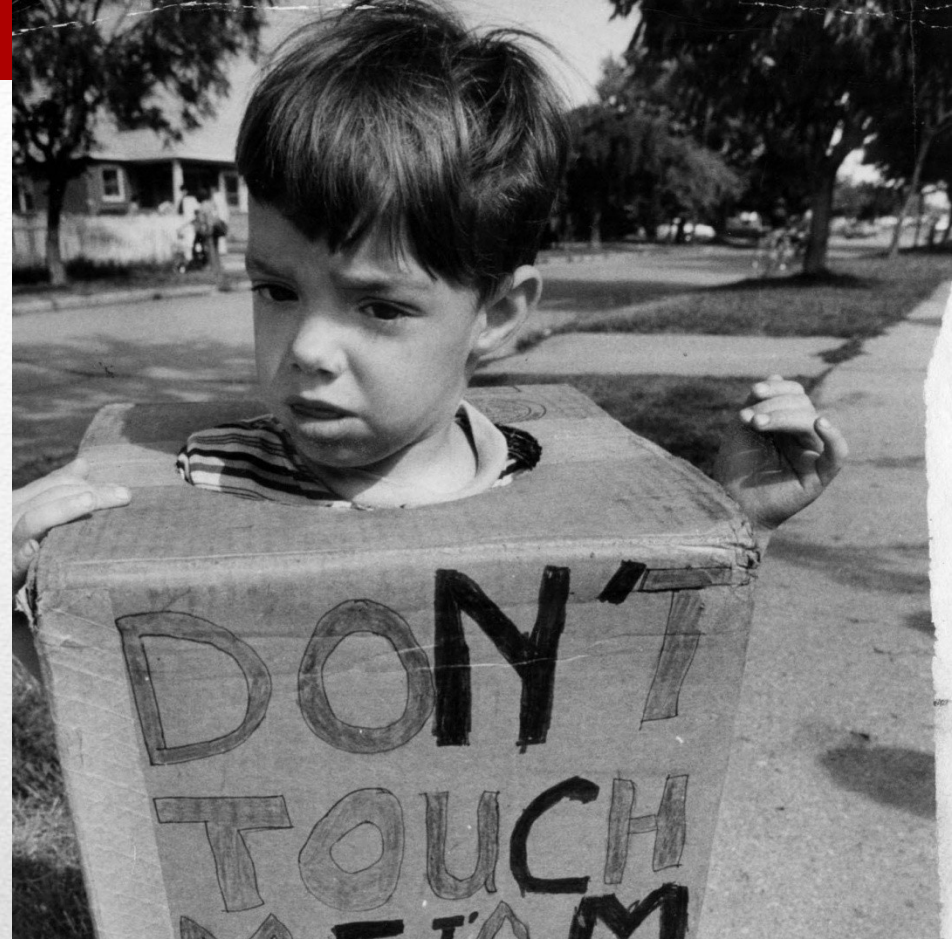
Superfund Sites

Niagara Falls Board of Education bought the land in 1953.

In 1970 problems started occurring in the area. Rain started exposing PCB's, dioxins, pesticides and other dangerous chemicals that were once deeply buried. **Chemicals appeared in basements, and on the playgrounds** where children received chemical burns. Birth defects, cancer cases, and miscarriages increased.

The Love Canal (Niagara Falls, NY)





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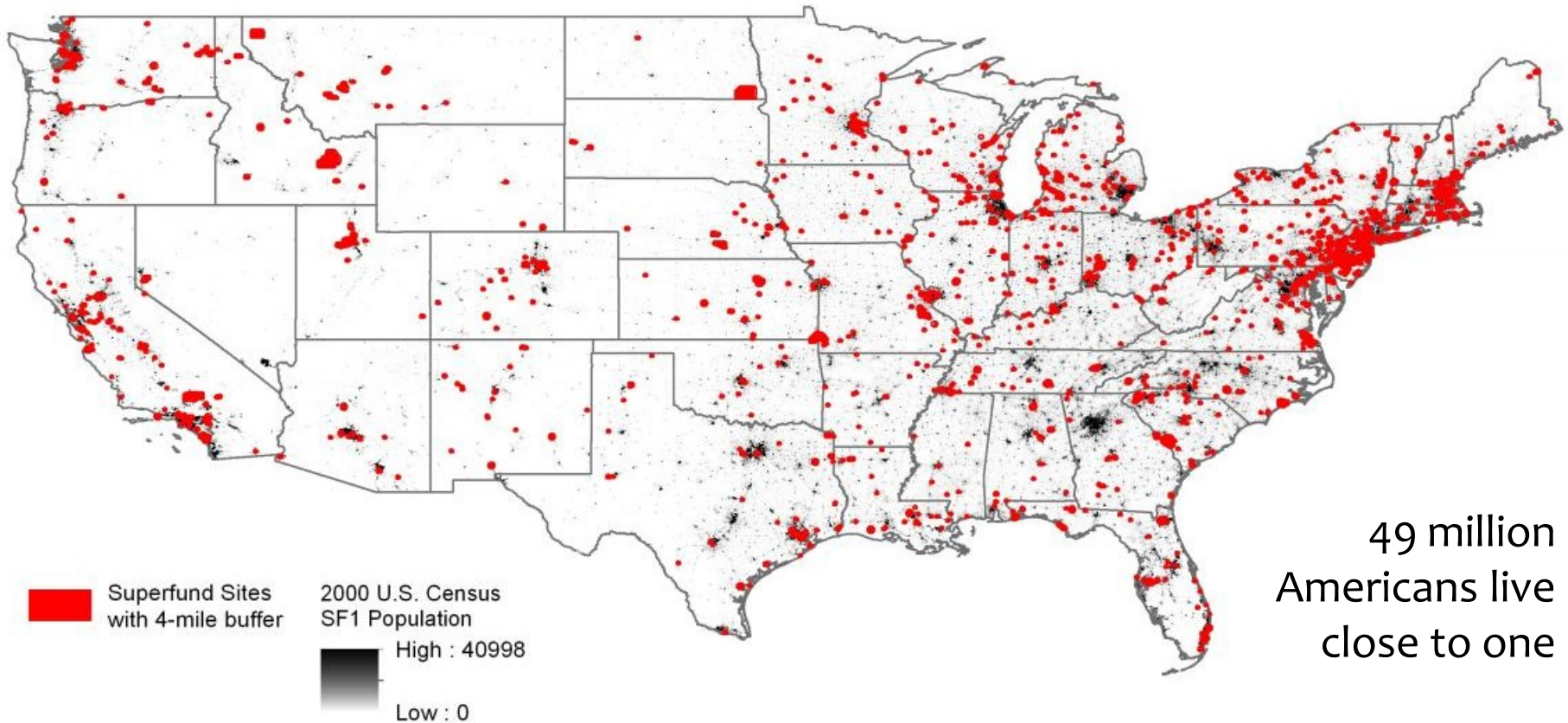


[Image Source](#)



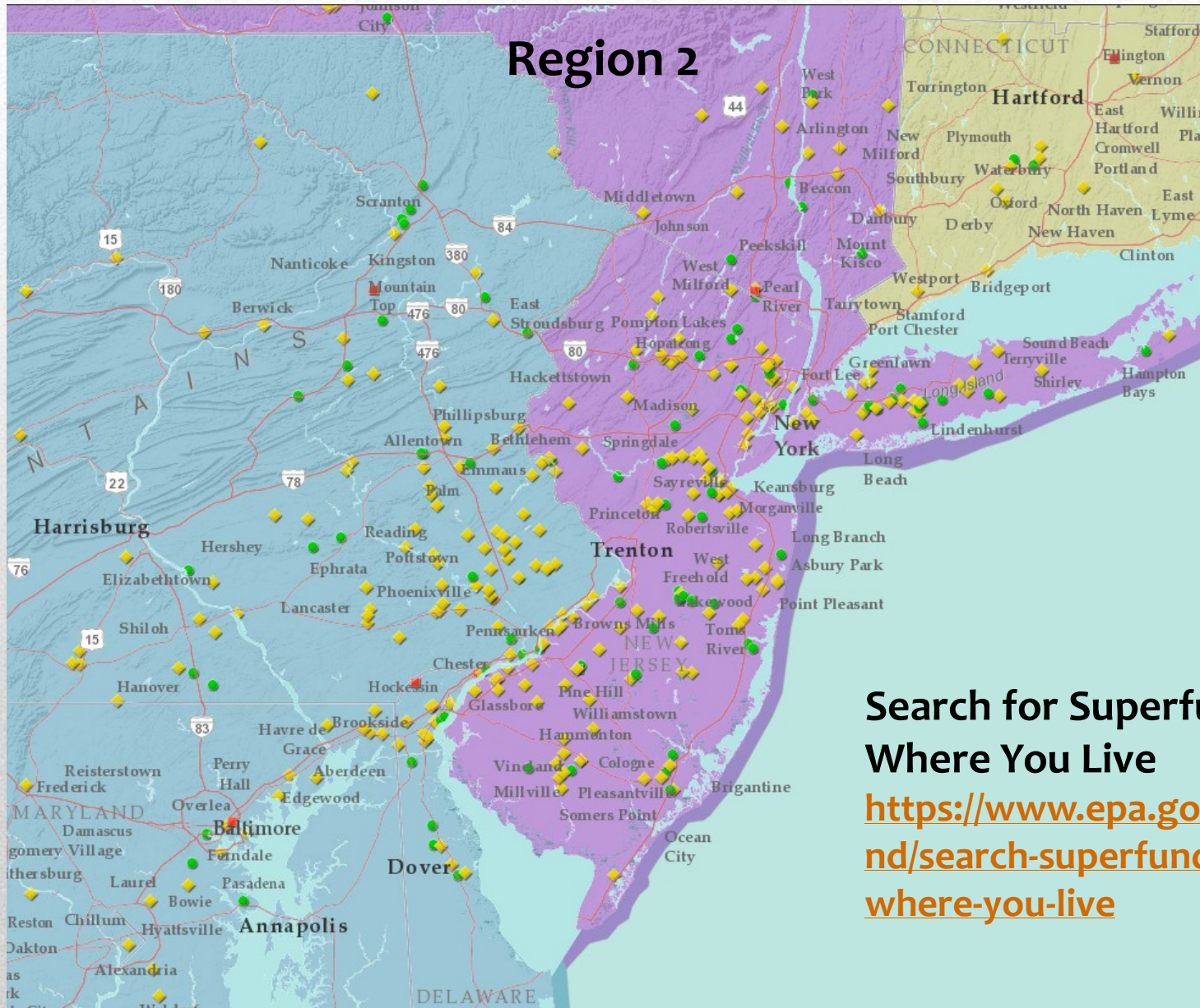
Superfund Sites

In 1980 Congress created the Superfund to pay for the cleanup of the country's most hazardous waste sites. There are currently more than 1,700 of these waste sites.



[Map Source](#)

Superfund Sites



**Search for Superfund Sites
Where You Live**

<https://www.epa.gov/superfund/search-superfund-sites-where-you-live>

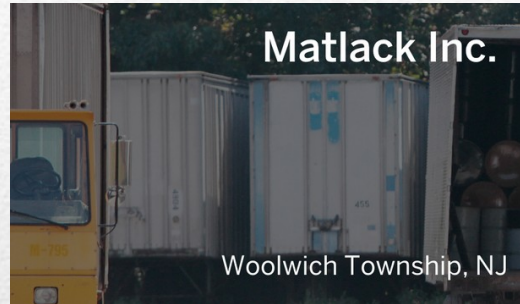
Superfund Sites

Gloucester County, NJ

Lipari Landfill, Pitman

History: Nearly 3 million gallons of liquid wastes, semi-solid chemical waste and household waste was disposed of between 1958 and 1971. **Soil, surface water and ground water at the landfill, as well as nearby marshlands and Alcyon Lake were contaminated. The air was also contaminated as vapors from volatile organic compounds leaked from the landfill.**

http://www.nj.com/gloucester-county/index.ssf/2016/03/the_danger_next_door_gloucester_countys_7_most_pol.html



Cradle-to-Grave

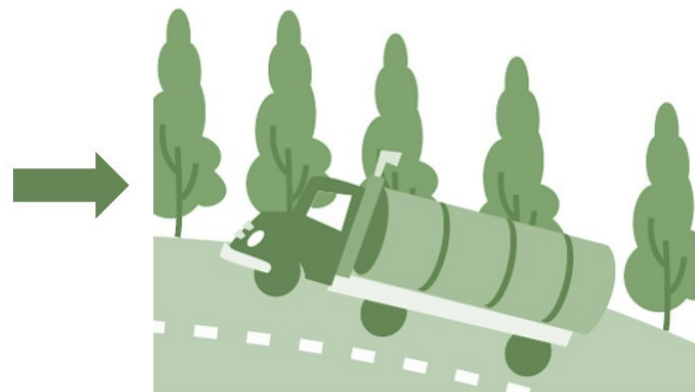
The Resource Conservation and Recovery Act (RCRA), passed in 1976, was established to set up a framework for the proper management of hazardous waste

RCRA's Cradle-to-Grave Hazardous Waste Management System

Hazardous Waste
Generation



Hazardous Waste
Transportation



Recycling



Treatment



Disposal



What is a Brownfield?



Packard Automotive Plant, Detroit

What is a Brownfield?



Old Reid Hospital, Richmond, Indiana

What is a Brownfield?



Brownfield, Detroit

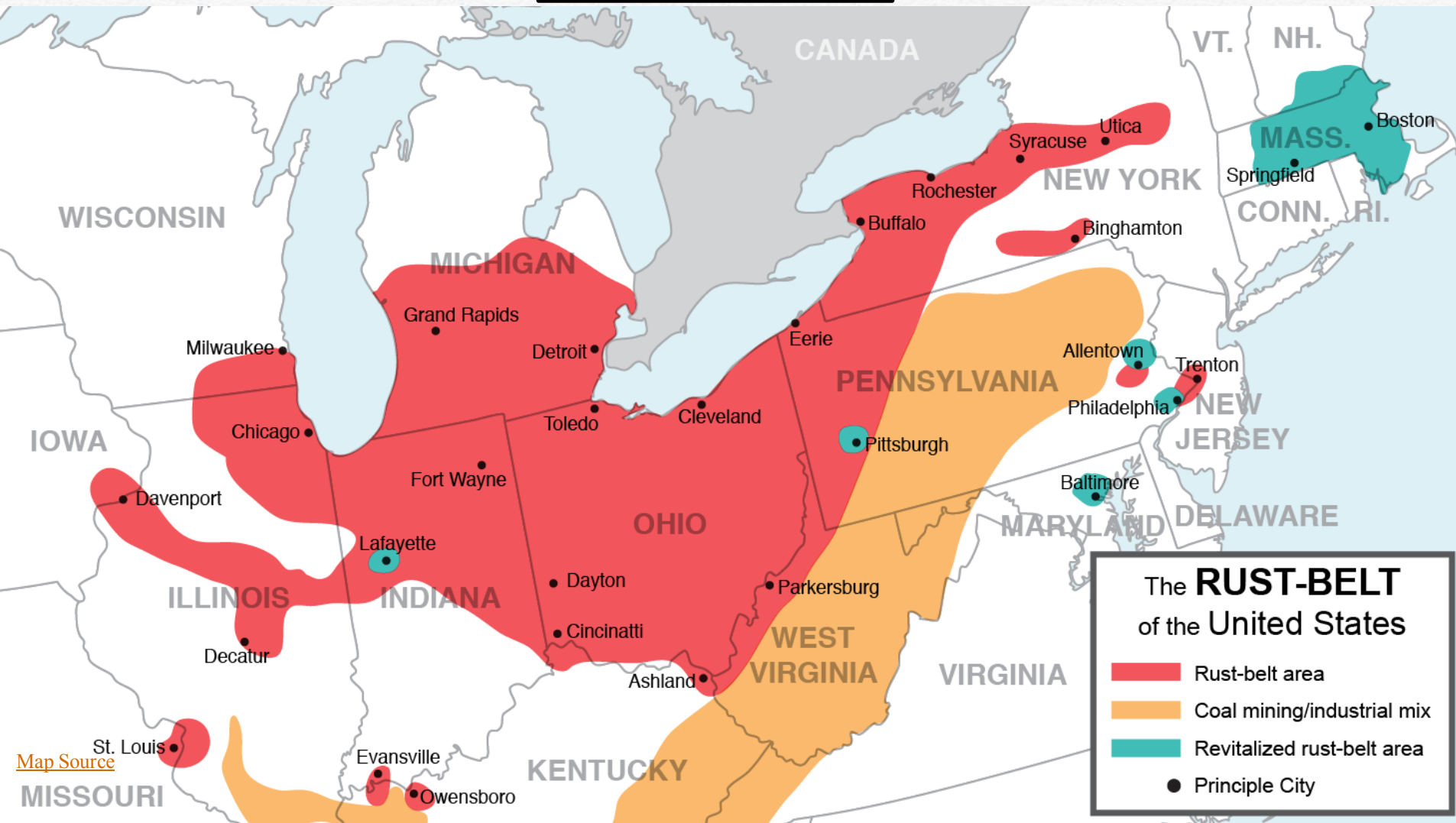
What is a Brownfield?

Real property, the expansion, redevelopment, or reuse of which may be complicated by the presence or **potential presence** of a hazardous substance, pollutant, or contaminant – USEPA



Brownfield Locations

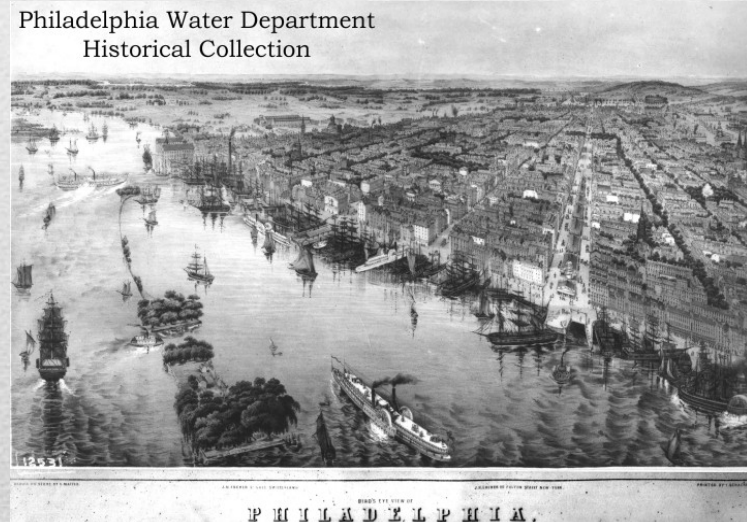
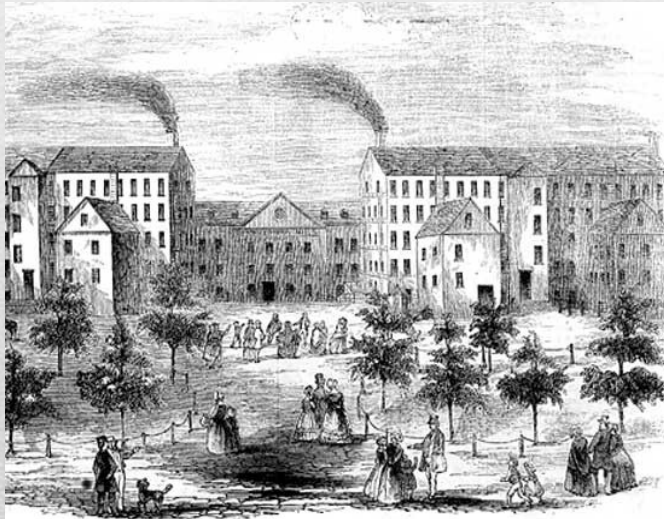
Rust Belt Cities



History of Brownfields

18th Century – Industrial Revolution:

- Societal shifts from rural to urban
- New technologies: chemical manufacturing, iron production, mass-production factories
- Inefficient sewage and waste management systems
 - Buried and dumped in waterways



History of Brownfields

19th and 20th Centuries :

- Industry-specific neighborhoods emerged around urban growth
 - Meat packaging, metalworks, ship yards, etc.
- Industrial wastes such as paints, solvents, coal, and plastics and pesticides are disposed in waterways and buried in drums



History of Brownfields

Mid- 1900's:

- Economic changes due to white flight from cities
- Abandoned industries and infrastructure
 - Factories, rail yards, warehouses, etc.
- Soil and water contamination



History of Brownfields

1960s: Environmental Regulatory Framework



[Video: Flaming pollution on the Ohio's Cuyahoga River](#)

History of Brownfields

1960s:

The environmental rights movement gains national attention and support

- ✓ The National Environmental Policy Act of 1969
 - ✓ Clear Air Act of 1970
 - ✓ Clean Water Act 1972
 - ✓ Federal Water Pollution Control Act Amendments of 1972
 - ✓ Superfund or Comprehensive Environmental Response, Compensation, and Liability Act of 1980
 - ✓ Small Business Liability Relief and Brownfields Revitalization Act ("the Brownfields Law"), 2002
-

"All the News
That's Fit to Print"

The New York Times

LATE CITY EDITION

Weather: Clouds, with light rain and drizzle. Partly sunny tomorrow. Temp. range today 49-65; Wed. 47-64; Fri. 53-69 on Page 14.

POL. CHIX ... No. 46,317

© 1970 The New York Times Company

NEW YORK, THURSDAY, APRIL 24, 1970

10 CENTS

**PRICES CLIMB 0.4%
BUT RATE OF RISE
APPEARS TO SLOW**

**Gain in the Consumer Index
for March Lags Behind
the 4 Previous Months**

INCREASE IS STEEP HERE

**Medical Care and Mortgage
Interest Are the Major
Elements in Changes**

By EDWIN L. DALE Jr.,
Special to the New York Times

WASHINGTON, April 23—Consumer prices rose strongly again in March but there were signs that the pace of inflation was slowing, the Labor Department reported today.

After adjustment of the data to reflect seasonal price changes, the Consumer Price Index rose last month by 1.3 per cent in March, less than the five-month rise in February and the six-month rate of six three months before that.

What is more, components of the index March increase in the index was attributed to

Millions Join Earth Day Observances Across the Nation



Thousands joining 17th Avenue yesterday in response to a call for the registration of a political movement. View is north from 15th Street, with Central Park in background.

CAMBODIAN CRISIS GROWS AS TROOPS SEEM TO FALTER

**With Reds Near, Phnompenh
in Gloomy Over Limited
Response to Aid Pleas**

CIVIL AVIATION CURBED

**Aide Declines to State How
Long Army Can Hold Out
With the Arms It Has**

By BERRY KADRE,
Special to the New York Times

Phnompenh, Cambodia, April 23—An atmosphere of helplessness and emergency is enveloping Cambodia.

It is difficult to estimate that the Cambodian Army is capable of withstanding the Vietnamese Communist forces, which at one point are within 50 miles of the capital, and so the United States is expected to continue for some time.

The military authorities issued the Phnompenh airport was closed to all civilian traffic. According to military sources, it is to remain closed

Today's Common Brownfield Sites



<http://ocnjdaily.com/blighted-former-gas-station-in-ocean-city-is-demolished-2/>

<http://tspr.org/post/both-macombs-dry-cleaners-going-out-business>



Brownfields – Disadvantages

- Degrades environment (e.g., soils, water, air)
- Negatively impacts human health
- Reduces local employment opportunities, limits economic growth, lowers surrounding property values
- Contributes to negative perception of the neighborhood
- Contributes to neighborhood deterioration, attracts vandals, open dumping, or other illegal or unwanted activity



Brownfields – Advantages

Triple bottom line benefits:

- Have access to existing infrastructure (e.g., transportation, sewer, water)
- Have access to population concentration
- Can become a community asset
- Attracts new business investment, new jobs, new places to live, increases property values
- Can address Environmental Justice issues
- Reduces area crime
- Improves health & safety hazard
- Improves environmental quality

riverfront park in Fitchburg, Mass.





YouTube

Search



What are Brownfields?

<https://www.youtube.com/watch?v=MpE2wKtdroc>

Brownfield Redevelopment Options

Parks, Recreation, and Open Space



Before



After

Lawrence, MA

Lawrence, MA



Before



After

The HighLine,
NYC

Brownfield Redevelopment Options

Commercial, Light Industrial



Bronx Terminal Market, New York



FedEx Facility, Newark, NJ

Brownfield Redevelopment Options

Commercial, Light Industrial



Raritan Hollow
& Porous Brick
Company,
Woodbridge
Township

Bayshore Recycling in the Keasbey section of Woodbridge Township, NJ, represents a unique Brownfields redevelopment

Brownfield Redevelopment Options

Residential



[Rainier Court](#), Seattle, Washington

Brownfield Redevelopment Options

Mixed Use and Transit-Oriented



Harrison Commons, Harrison, NJ

Brownfield Redevelopment Options

Public/Government



Camden ECDC School, Camden, NJ



Mercer County Criminal Courthouse, Trenton, NJ

Brownfield Redevelopment Options

Energy



Solar Farm, [PSE&G](#), Trenton, NJ

Brownfield Redevelopment Options

Urban Agriculture

Urban Tree Connection, Philadelphia, PA



Greensgrow Farm,
Philadelphia, PA



Bio-remediation

https://www.asla.org/sustainablelandscapes/Vid_Brownfields.html
