



Connections between water quality and health

April 23, 2024





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MISSION

To advance evidence-informed policies that improve health, achieve equity, and lead to sustainable healthcare spending in Ohio.



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A dark red silhouette of the state of Ohio is centered above a horizontal red line that extends to the left and right edges of the text area.

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Health Policy Brief

Connections between water quality and health

March 2024

Overview

Clean air and water, safe places to walk outside and access to healthy foods—conditions of our physical environment—all affect our health and well-being. However, not all Ohioans have equal access to healthy living conditions, including clean, uncontaminated water.

For example, rural and Appalachian communities have faced environmental degradation from agricultural and industrial practices, along with a lack of public resources to reduce health harms.

Additionally, because of historical and ongoing racist policies and practices, such as disinvestment, redlining and exclusionary zoning, Black, Indigenous and Latino communities have experienced negative environmental consequences from industrial, commercial and governmental policies and practices.

Based on measures of water quality and water infrastructure, Ohio received a C-minus rating in the American Society of Civil Engineers' 2021 Infrastructure Report.¹ This rating means that Ohio's water infrastructure is in fair or good condition, but shows signs of deterioration with increasing vulnerability to risk.

Still, Ohio has invested in water quality in recent years through efforts such as H2Ohio (a comprehensive water quality initiative working to strategically address Ohio's water quality challenges) and can build off these investments to continue improving Ohio's water, health and well-being.

This policy brief focuses on the importance of clean water and the many effects that water pollution and deteriorating infrastructure can have on health throughout life, highlighting data and information for policymakers to improve Ohio's water quality, including:

- How poor water quality affects health
- Which Ohioans are most affected by poor water quality
- What Ohio has done to address water quality and additional steps the state can take

What is water pollution and how does it impact health?

Water is a foundational need for all life. Water quality describes the condition of the water and if it is usable for a variety of purposes, such as drinking or swimming, based on selected physical, chemical and biological properties.² Water pollution, on the other hand, is the contamination of bodies of water by harmful substances, such as chemicals or microorganisms.³ These harmful substances, called pollutants, can contaminate water at its source or when it is distributed or stored for consumption and use.⁴ There are three general sources of water pollution:

- Agricultural runoff
- Poor infrastructure, including lead pipes
- Industrial contaminants and pollutants

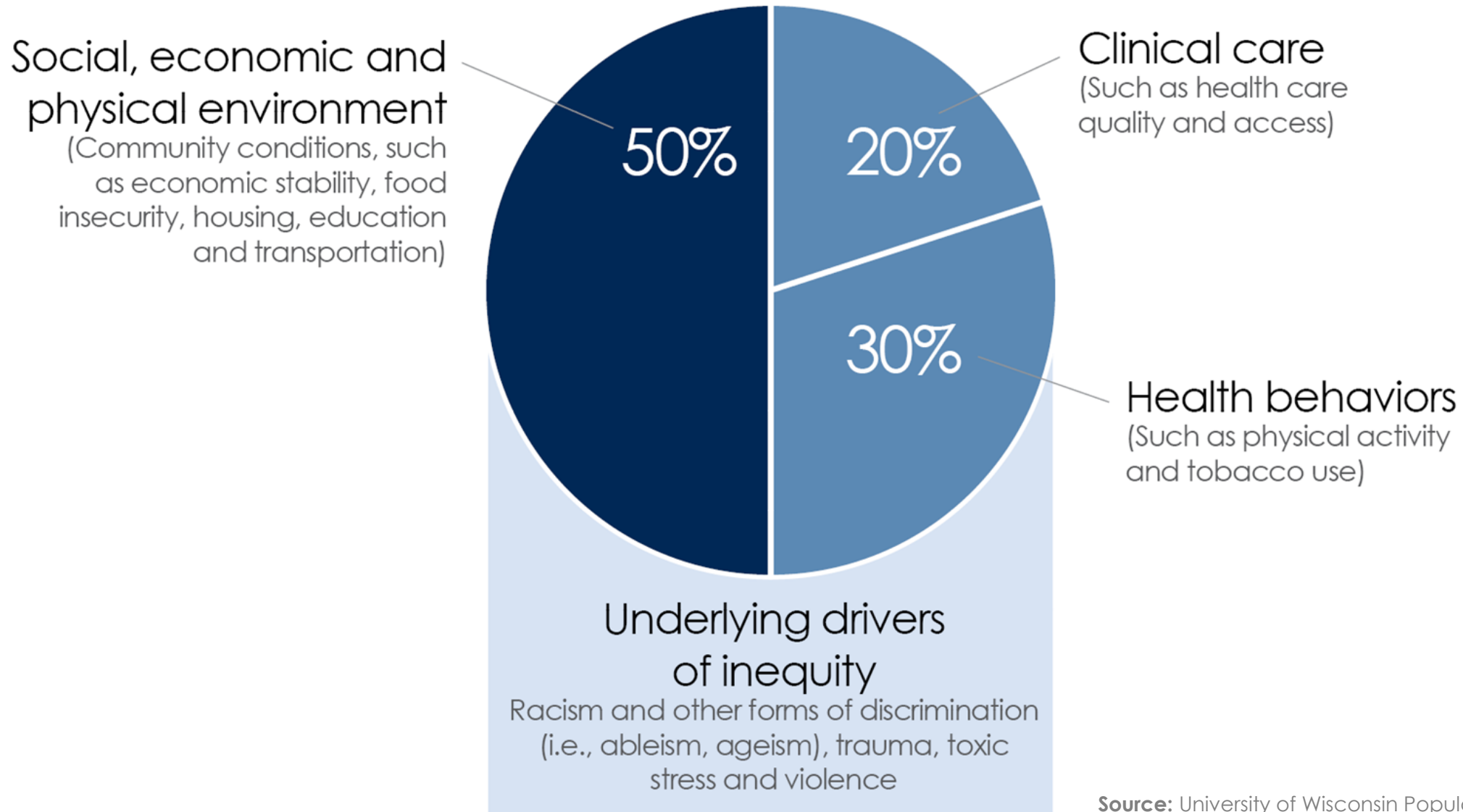
3 key findings for policymakers

- **Improving water quality**, including a reduction in lead exposure, will lead to improved health for Ohioans.
- **There is a strong policy foundation** for Ohio policymakers to build on to improve water quality, such as investments in H2Ohio, and guard against new challenges.
- **State and local policymakers have opportunities to improve water quality**, such as increasing investment in water infrastructure, ecosystem restoration and evaluating the impact of industrial and commercial development.

Connections Between Water Quality and Health

Jacob Santiago, MSW Policy and Evaluation Specialist Health Policy Institute of Ohio

Modifiable factors that influence health



Source: University of Wisconsin Population Health Institute

3 Key Findings

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- **State and local policymakers have opportunities to improve water quality**, such as increasing investment in water infrastructure, ecosystem restoration and evaluating the impact of industrial and commercial development.

Key finding # 1

Improving water quality
will lead to improved
outcomes

Sources of poor water quality

Runoff and harmful algal blooms

Including agricultural and storm runoff and harmful algal blooms

Infrastructure

Including lead pipes

Industrial contaminants

Including heavy metals, PFAS and other contaminants



Source: Ohio Environmental Protection Agency

Harmful algal bloom pathway

Conventional agricultural practices

- Overgrazing
- Excessive land use
- Improper application of pesticides, herbicides and fertilizers

Nutrient pollution

High levels of nutrients (nitrogen, phosphorus, etc.) carried by precipitation into waterways

Harmful algal blooms

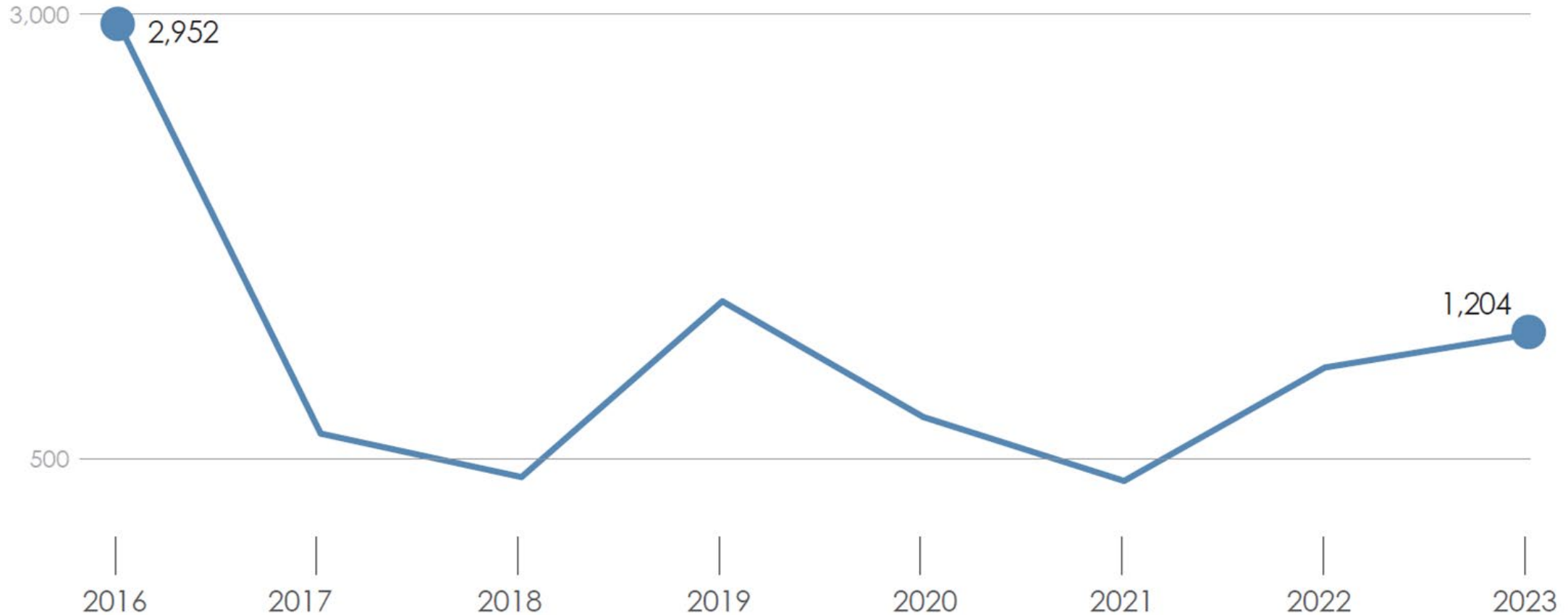
- Develop from nutrient pollution
- Hinder underwater plant growth
- Deplete the water of oxygen
- Can make it impossible for aquatic life to exist in areas

HAB exposure can negatively impact:

- Short and long-term, including liver cancer and kidney disease
- Recreation (swimming, fishing, etc.)
- Businesses
- Property values

Number of harmful algal bloom advisory days*

Ohio, 2016-2023



*The number of advisory days is the total number of days a beach was under advisory (above the sampling threshold) during the season.

Note: Advisory days are based on thresholds set by the Ohio Departments of Health and Natural Resources and Ohio Environmental Protection Agency for the amount of toxins in water samples. For more information, see HAB Response Strategy for Recreational Waters. Data as of 1/22/2024

Source: Ohio Department of Health

Ohioans most at risk of exposure to agricultural runoff and harmful algal blooms



Rural
communities



Coastal
communities



Ohio has **4,800**
public water systems delivering 1.3 billion
gallons of clean drinking water everyday.

Source: United States Environmental Protection Agency. "Drinking Water Infrastructure Needs Survey and Assessment," 2023.

Number of counties with a drinking water violation

Ohio, 2022



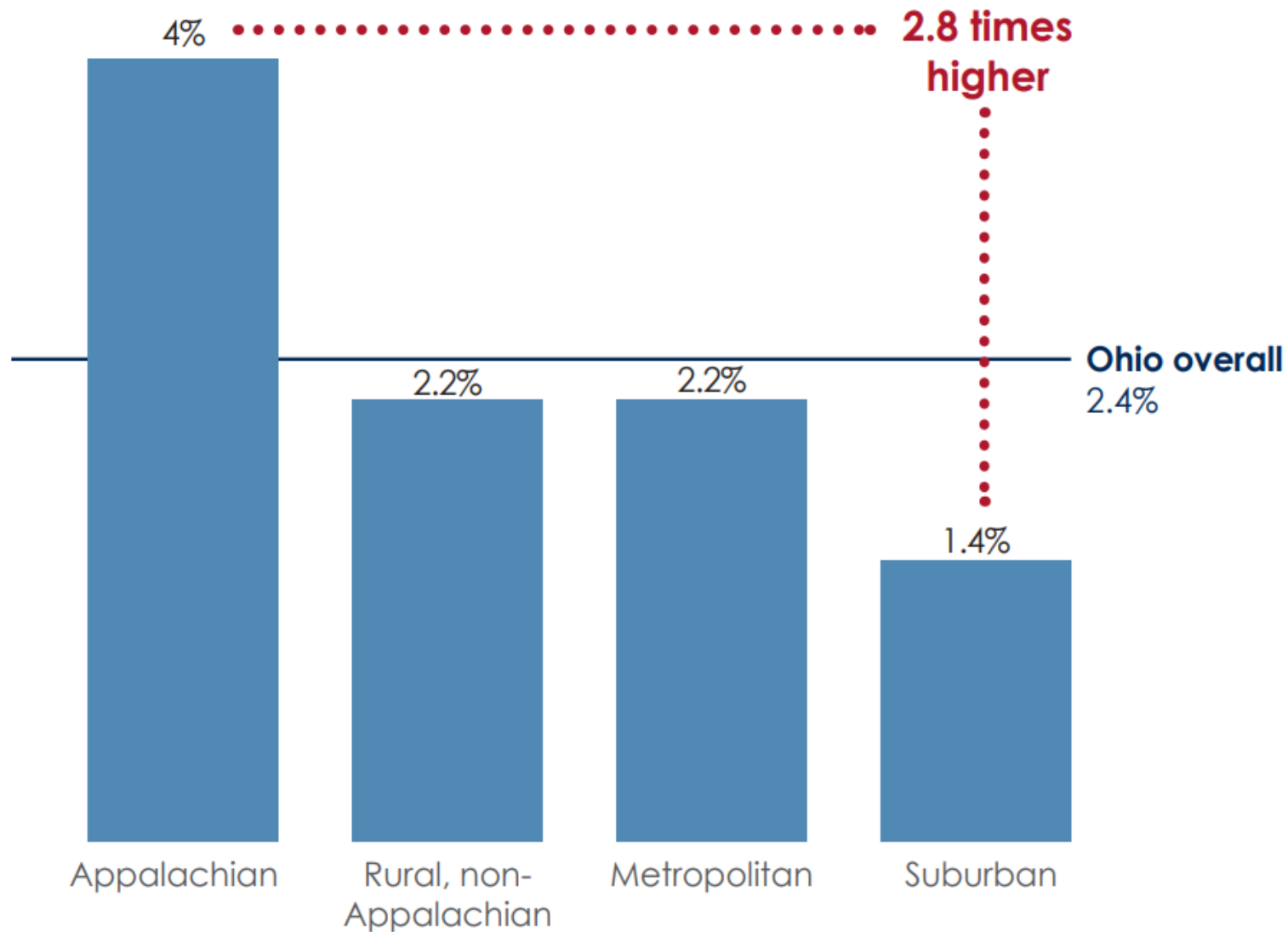
Note: Drinking water violations are issued for public water systems. Contamination in private systems (e.g., wells) are not included in this figure.
Source: Ohio Environmental Protection Agency Consumer Confidence Reports.

Percent of households without complete plumbing facilities*

By county type, Ohio, 2021

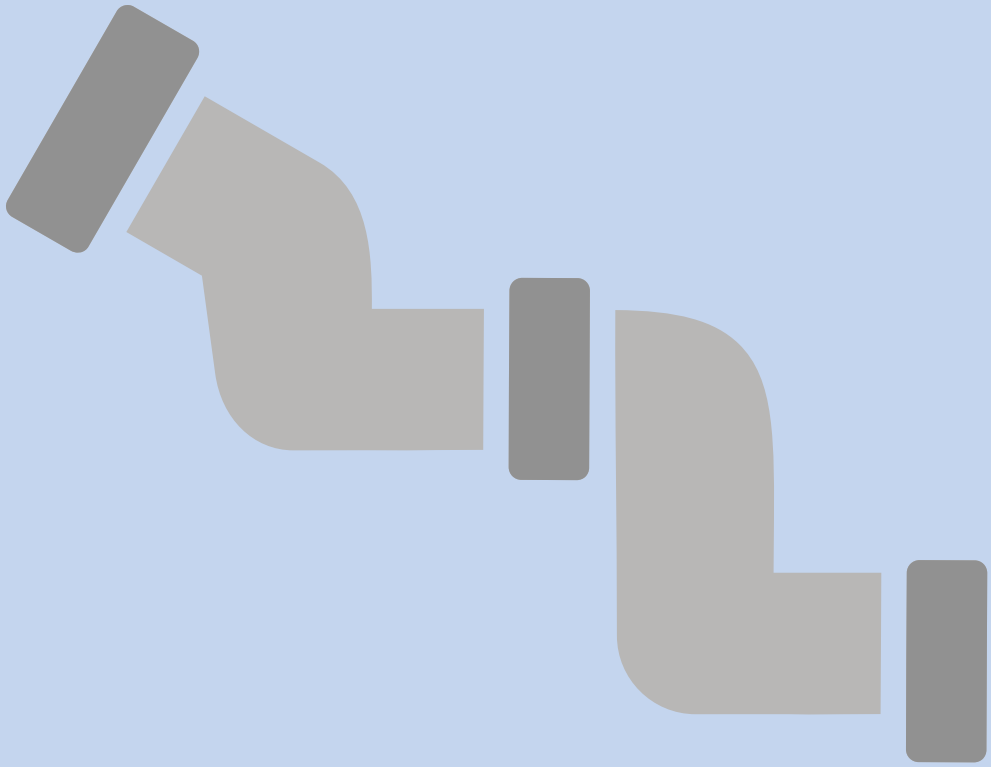
*Complete plumbing facilities include: (a) hot and cold running water and (b) a bathtub or shower. Both facilities must be located inside the house, apartment, or mobile home, but not necessarily in the same room. Housing units are classified as lacking complete plumbing facilities when either of the two facilities is not present.

Source: U.S. Census Bureau, American Community Survey 5-year estimates



Effects of lead exposure across the life course

- **Fetuses:** increased risk of poor birth outcomes and delayed fetal development
- **Infants and children under six:** increased risk of behavior and learning problems, delayed mental and physical development, hyperactivity, anemia and hearing problems
- **Ohioans over age six:** increased risk of health problems including hypertension, cardiovascular problems and kidney damage



Ohio has at least

369,077

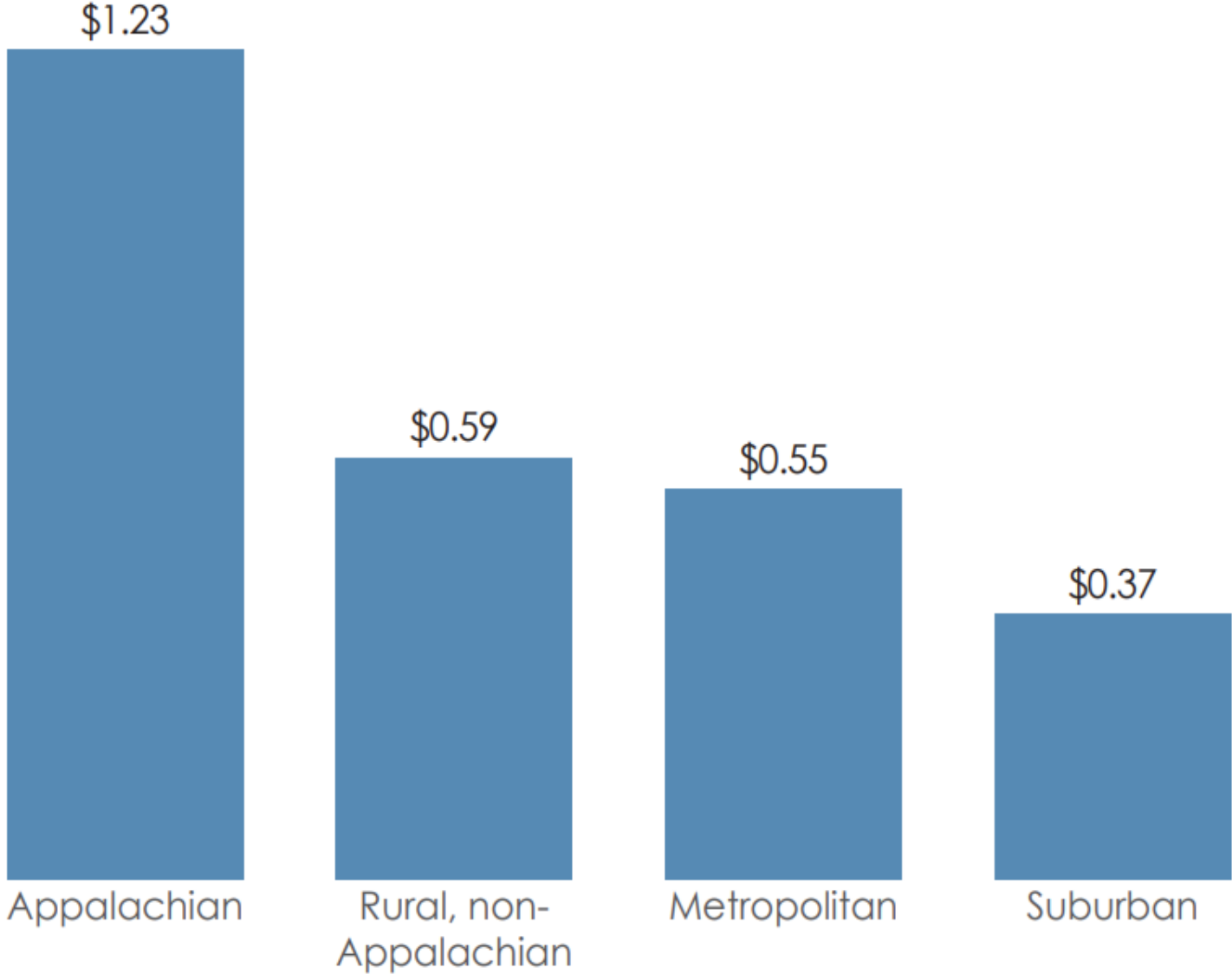
lead service lines but could
have as many as 745,061.

Source: United States Environmental Protection Agency. "Drinking Water Infrastructure Needs Survey and Assessment," 2023.

Per capita H2Ohio funding for lead service line replacements, inventory and mapping projects

By county type, Ohio, 2024*

*Includes projects that have been completed, announced or are active as of Jan. 18, 2024
Note: This figure does not include funding from the federal Infrastructure Investment and Jobs Act (Bipartisan Infrastructure Bill). Funding from the Act is distributed through the State Revolving Loan Fund, not H2Ohio.
Source: Health Policy Institute of Ohio policy brief, "Connections between water quality and health." Data from the H2Ohio Program



Ohioans affected by poor infrastructure



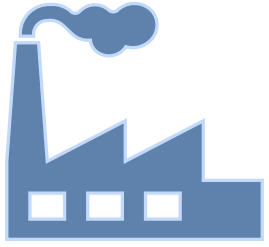
Pregnant
mothers,
infants and
children



Urban, low
income and
communities
of color



Ohioans living in
older homes
and those using
well water



Types of industrial contamination and other pollutants

PFAS

“forever chemicals”

Teflon

Fire extinguish foam

Heavy metals

Lead

Arsenic

Copper

Pharmaceuticals

Over-the-counter

Illicit substances

Common
stimulants



Source: U.S. Department of the Interior, Office of Surface Mining Reclamation and Enforcement

Ohioans affected by industrial contamination



Appalachian
communities



Ohioans with low
incomes and
communities of
color



Industrial
workers



Pregnant and
lactating
mothers, infants
and children



Source: Gahanna Weather Center

Key finding #2

There is a strong policy foundation on which Ohio policymakers can build



Example policy changes: H2Ohio

Focus areas

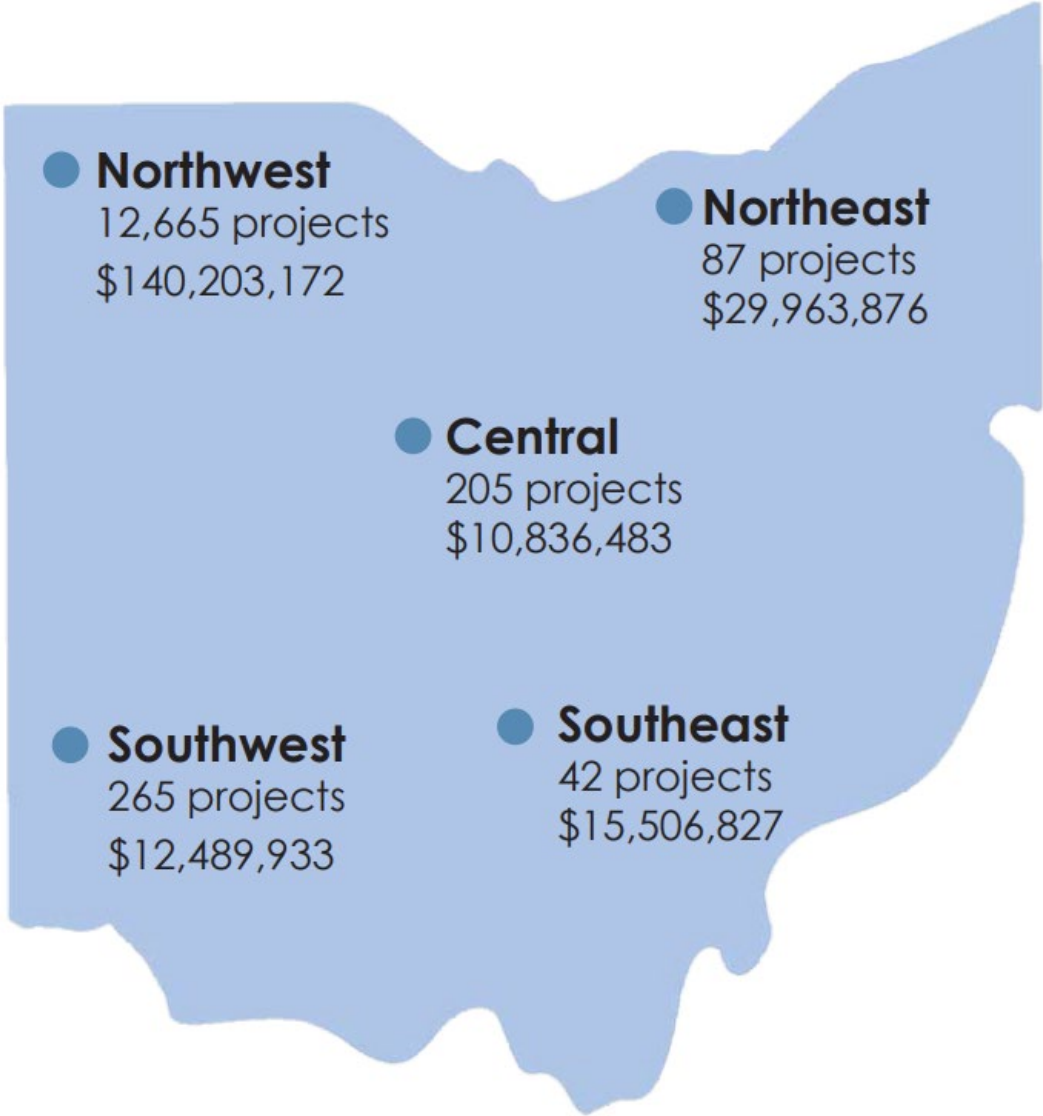
- Agricultural runoff
- Infrastructure
- Lead contamination
- Dam removal
- Land conservation
- PFAS

Partners

- Ohio Department of Natural Resources
- Ohio Department of Agriculture
- Ohio EPA
- Lake Erie Commission

H2Ohio project funding and total projects by region

Ohio, 2021-2023



Note: The figure includes H2Ohio projects and funding for lead service line inventoring, mapping and replacements; home sewage treatment system replacements; water and sewer infrastructure improvements; voluntary nutrient management plans; and wetland and floodplain reconnection and restoration. Funding amounts are rounded to the nearest dollar

Source: H2Ohio Program



Example policy changes:

HB 175 (134th GA)

Proponents

- Will decrease regulatory burden on businesses
- Will match federal protections for ephemeral streams

Opponents

- Will increase pollution of ephemeral streams and other waterways
- Will increase nutrient pollution and harmful algal blooms

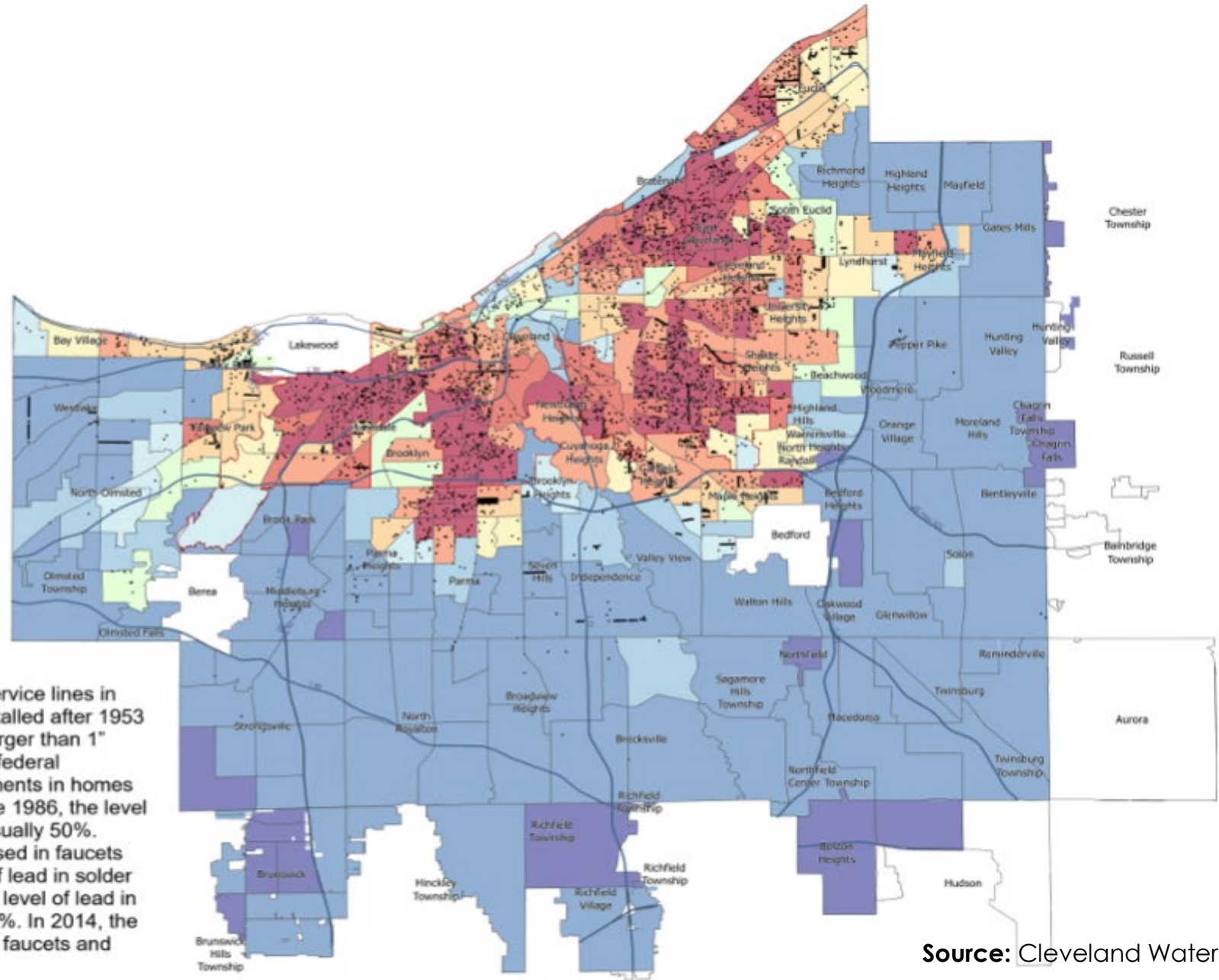


Source: Supreme Court of the United States

Percent Lead by Census Tract

- No Lead
- Under 10%
- 10% - 20%
- 20% - 30%
- 30% - 40%
- 40% - 50%
- 50% - 60%
- 60% - 70%
- 70% - 80%
- Over 80%

● Lead Replacement Locations Since 2017



Cleveland Water banned the use of lead water service lines in 1953. This means buildings with service lines installed after 1953 should not be lead. Service lines in our system larger than 1" diameter were also never known to be lead. The federal allowable levels of lead used in plumbing components in homes and buildings has been reduced over time. Before 1986, the level of lead in solder used to join copper pipes was usually 50%. There was no regulation on the amount of lead used in faucets that pre-date 1986. In 1986, the allowable level of lead in solder was reduced to less than 0.2% and the allowable level of lead in potable water faucets was reduced to less than 8%. In 2014, the allowable level of lead used in new potable water faucets and fittings was reduced to less than 0.25%.

Source: Cleveland Water



Percent of Cleveland Water City-owned Connections Suspected to be Lead

- Cleveland Municipal Boundary
- Census Tracts
- Highways

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Cleveland Water GIS

1201 Lakeside Ave | Fifth Floor | Cleveland, OH 44114
 clevelandwater.com
 Date: 12/19/2022
 Prepared By : Maria Palmisano

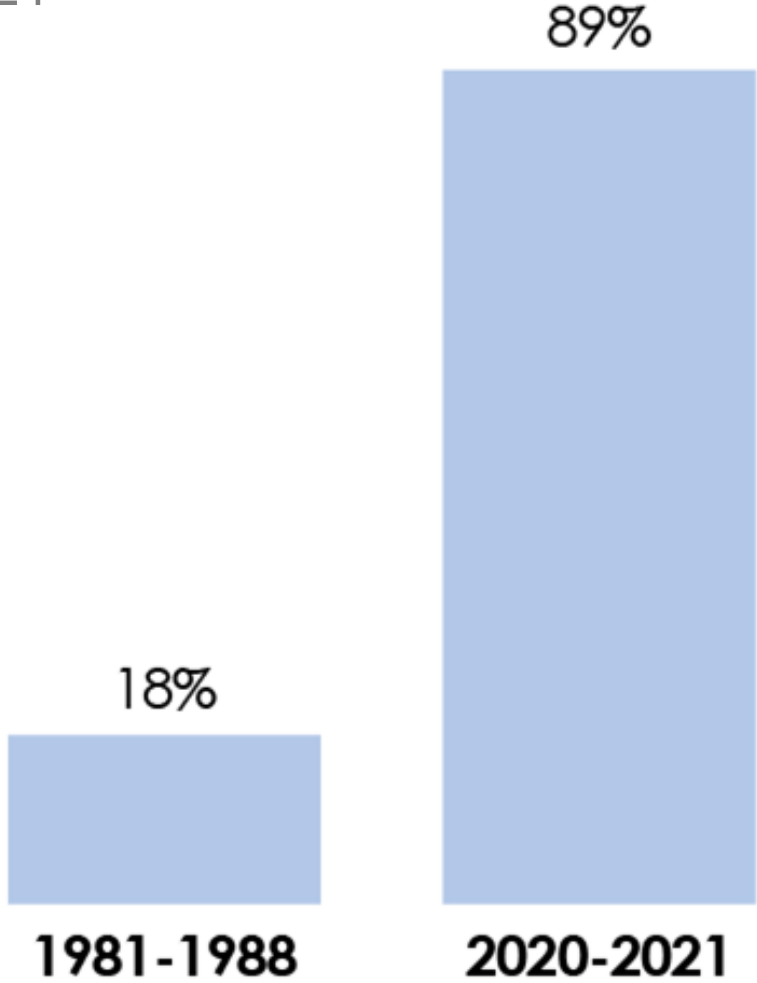




Source: True Pigments, LLC.

Percent of Ohio rivers that met water quality standards

1981-1988 and 2020-2021



Note: The study of Ohio's rivers grouped water quality surveys of the rivers from 1981-1987, prior to wastewater improvements, and from 2020-2021.
Source: Health Policy Institute of Ohio policy brief, "Connections between water quality and health." Data from the Ohio EPA (2024)

Key finding #3

State and local policymakers have opportunities to improve water quality



Example policy option:

Lead line mapping

Policy option

- Leverage federal and state grants to map and inventory lead service lines across the state
- Use maps to strategically invest in communities most impacted

Examples

Grand Rapids, Michigan developed an interactive map of lead lines.

Example policy option:



Permeable pavement

Policy option

Ohio Department of Transportation and municipal and county governments can explore the use of permeable pavement to reduce stormwater runoff.

Example

The Pennsylvania Department of Transportation has used permeable pavement in walking and bike paths and parking lots.



Example policy option:

Groundwater management

Policy option

Local policymakers can implement multi-component groundwater management plans to reduce groundwater pollution and improve water quality.

Example

The Ohio Environmental Agency has a surface and groundwater monitoring strategy to which local efforts can align.

QUESTIONS?

Ways to influence policy

- Write letters, emails or make phone calls
- Provide district specific data
- Provide analysis of a bill
- Provide testimony at a legislative hearing
- Provide a one-page fact sheet
- Organize community partners to visit key policymakers
- Invite policymakers to visits your organization or speak at a meeting you host

POLL QUESTIONS



CONTACT INFORMATION

Jacob Santiago

Policy and Evaluation Specialist

jsantiago@hpio.net

www.hpio.net



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