

SECURING SAFER WATER



A decade of action
on lead service line replacement
in the United States



Environmental Defense Fund

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About Environmental Defense Fund

With more than 3 million members, Environmental Defense Fund creates transformational solutions to the most serious environmental problems. To do so, EDF links science, economics, law, and innovative private-sector partnerships to turn solutions into action. Learn more at edf.org.



Vanessa Bly for NRDC

FROM FLINT TO A BLUEPRINT

Lead service lines have been part of many U.S. public water systems for over a century. Cities in the Northeast and Midwest came of age at the height of lead's popularity as a pipe material in the late 19th and early 20th centuries.

Prized back then for its durability and flexibility despite its known toxic effects, lead would not be fully phased out of use until it was effectively banned by Congress under the Safe Drinking Water Act of 1986. Today, millions of people still get their water through lead service lines that connect homes and other buildings to street water mains.

Lead's health impacts are vast and well-characterized. They include reproductive issues, low birth weight, high blood pressure, kidney problems, cardiovascular disease and developmental delays in children's brains. For children under age six whose brains are still developing, lead exposure can carry deep lifelong consequences.

A SOLVABLE PROBLEM WITH ENORMOUS HEALTH AND ECONOMIC BENEFITS

Lead service lines are a solvable problem with solutions that promise overwhelming returns. The benefits of replacing lead service lines are enormous, starting with billions of dollars in avoided health costs and hundreds of thousands of good paying jobs. A 2024 EPA policy to dramatically reduce lead in water is estimated to deliver $13-25 billion in annual health benefits – a 13-fold return on investment. While the process can be lengthy as well as resource- and labor-intensive, the payoff is undeniable.

Since 2016, EDF has worked closely with a range of cross-sector partners to build national momentum for lead pipe replacement. In this report, we take stock of the remarkable progress we've made together over the last decade, including a diverse national collaborative, the initiation of hundreds of city replacement programs across the country, and billions in funding secured.

While substantial progress has been made, the job is not yet done. That's why this report uplifts the most salient lessons our community has learned through this 10-year effort that can guide and intensify future action — national, state and local — needed to secure a future without lead pipes.

> Reflecting back, it is easy to forget what we didn't know (about lead service lines), but they are a big issue — and a solvable issue.

Elizabeth Cisar
The Joyce Foundation



POWERING LEAD PIPE REPLACEMENT

THANK YOU TO OUR SAFE WATER CHAMPIONS

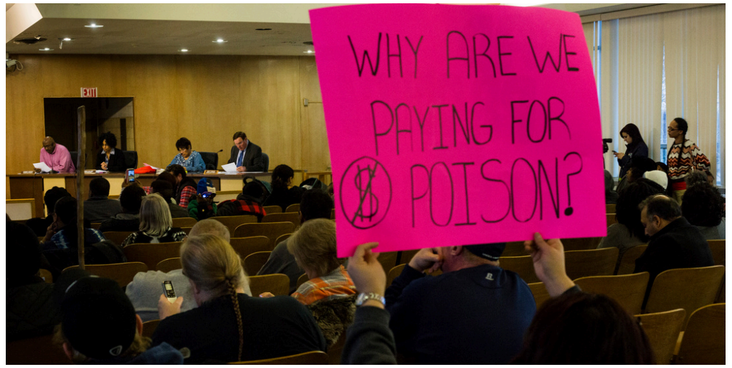
EDF is grateful to our board members and donors who have contributed essential resources over the past decade to get lead service lines out of the ground. This includes the W.K. Kellogg Foundation, whose initial grant helped establish the Lead Service Line Replacement Collaborative.

A BRIEF HISTORY OF THE U.S. APPROACH TO LEAD PIPES (1986-2015)



The US took a first step to address lead service lines in 1986 when the EPA banned the new installation of lead service lines. Then in 1991, to address the risk of lead exposure from legacy lead pipes, the agency published the Lead and Copper Rule, requiring utilities to test their water and take actions to reduce lead levels, mainly through water treatment.

The EPA did not start requiring lead service line replacement until 1994, and even then only as a last resort when lead levels remained above a set threshold — 15 parts per billion (ppb) in the 90th percentile[1] — even after water treatment.



It wasn't until the early 2000s that contamination events in U.S. cities brought national attention to the lead service line issue, making it clear that EPA's approach was leaving Americans vulnerable to harm. The first event to capture national attention was in Washington, D.C. starting in 2001 when tens of thousands of children were put at risk of developmental harm due to unsafe lead exposure in drinking water.

The second came in 2014 when Flint, Michigan changed its water source to the Flint River, leading to a public health and environmental justice crisis that devastated the city and shook the nation. The Flint water crisis — which took over a decade to fully resolve — would mark a turning point in how the country managed its lead service line problem.



Vanessa Bly for NRD.C.

Around the time the news of Flint broke in the national media, the EPA's National Drinking Water Advisory Committee (NDWAC) Lead and Copper Working Group[2] had begun pushing for a new paradigm centered on full and proactive lead service line replacement. The crisis in Flint brought unprecedented urgency to this effort.

A few cities had begun taking steps toward replacement on their own – some even before Flint – including Madison, WI; Lansing, MI; Boston, MA; and Cincinnati, OH. These cities would set an example that hundreds of others would soon follow.

1 This means that the concentration of lead must be less than or equal to the 15 ppb action level in at least 90% of the water samples collected.
2 The working group, convened in 2014, included representatives from state regulators, local health departments, public and private drinking water utilities, and national public interest/children's health organizations.



A DECADE OF PROGRESS: WHAT WE'VE ACHIEVED TOGETHER

In the decade since Flint, we've made remarkable progress in tackling lead service lines. A collaborative movement spanning public activism and litigation, industry expertise, diverse organizations, bipartisan government leadership, and philanthropic investment has made this progress possible. Let's look at some highlights.

A PARTNERSHIP EMERGES TO ACCELERATE ACTION

In 2016, EDF co-founded the Lead Service Line Replacement Collaborative, uniting national public health, water utility, environmental, labor, consumer, housing, and state and local government organizations around a shared objective: to accelerate the voluntary, full replacement of lead service lines delivering drinking water to millions of U.S. homes.

The following year, the LSLR Collaborative launched the Lead Service Line Replacement Roadmap, a digital resource for utilities, policymakers and public health practitioners, to guide them through the lead service line replacement process. With no broad federal replacement mandate at the time, the Roadmap became the primary publicly available guidance for years.

In 2016, the issue also took center stage on the presidential campaign trail as a bipartisan issue when both candidates ran on the crisis in Flint as a central topic. Lead service line replacement has remained a bipartisan issue ever since, affording it attention and progress even as other major public health and environmental issues have stalled amid rising polarization.

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IMPACT BY THE NUMBERS

$15 billion
secured in federal resources for dedicated lead pipe replacement



900,000
infants projected to be protected from low birthweight due to Lead and Copper Rule Improvements





2037
the year by which the EPA requires lead service lines to be fully replaced for most U.S. municipalities



300,000
visits to the Lead Service Line Replacement Roadmap for utilities since its launch in 2017

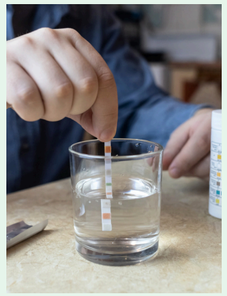
16
national leaders recognized for their excellence in an essential area of lead service line replacement by the LSLR Collaborative



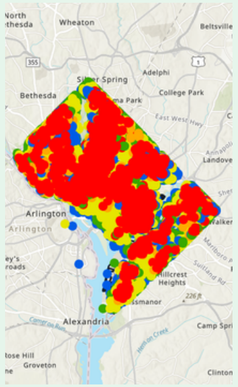
10 parts per billion
the new more protective limit set by the EPA for lead allowed in drinking water



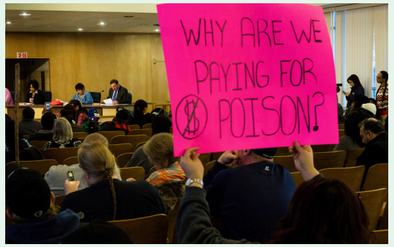
35 YEARS OF GROWING MOMENTUM TOWARD FULL REPLACEMENT



1991
Water utilities begin monitoring lead and copper under the new Lead and Copper Rule



2003
Lead in water crisis begins in Washington D.C.



2014
Lead in water crisis begins in Flint, Michigan

2014
EPA's NDWAC forms Lead and Copper Rule Working Group

2016
Lead Service Line Replacement Collaborative forms

LSLR COLLABORATIVE

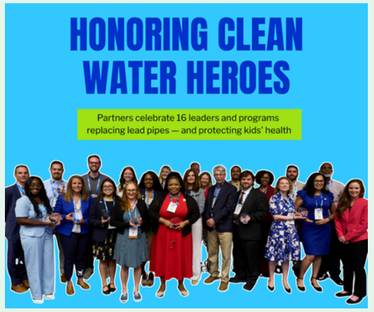


2021
Congress provides $15 billion dedicated to lead service line replacement under the Bipartisan Infrastructure Law

2021
EPA finalizes Lead and Copper Rule Revisions, requiring utilities to inventory all service lines and their material types

2017
The Collaborative launches the Lead Service Line Replacement Roadmap





2026
The Collaborative celebrates 10 years with "Honoring Excellence in Lead Service Line Replacement" awards

2023
White House launches the Get the Lead Out Initiative



2024
EPA finalizes the Lead and Copper Rule Revisions, requiring proactive replacement by 2037 in most communities

2024
Water utilities submit inventories to states under the Lead and Copper Rule Revisions



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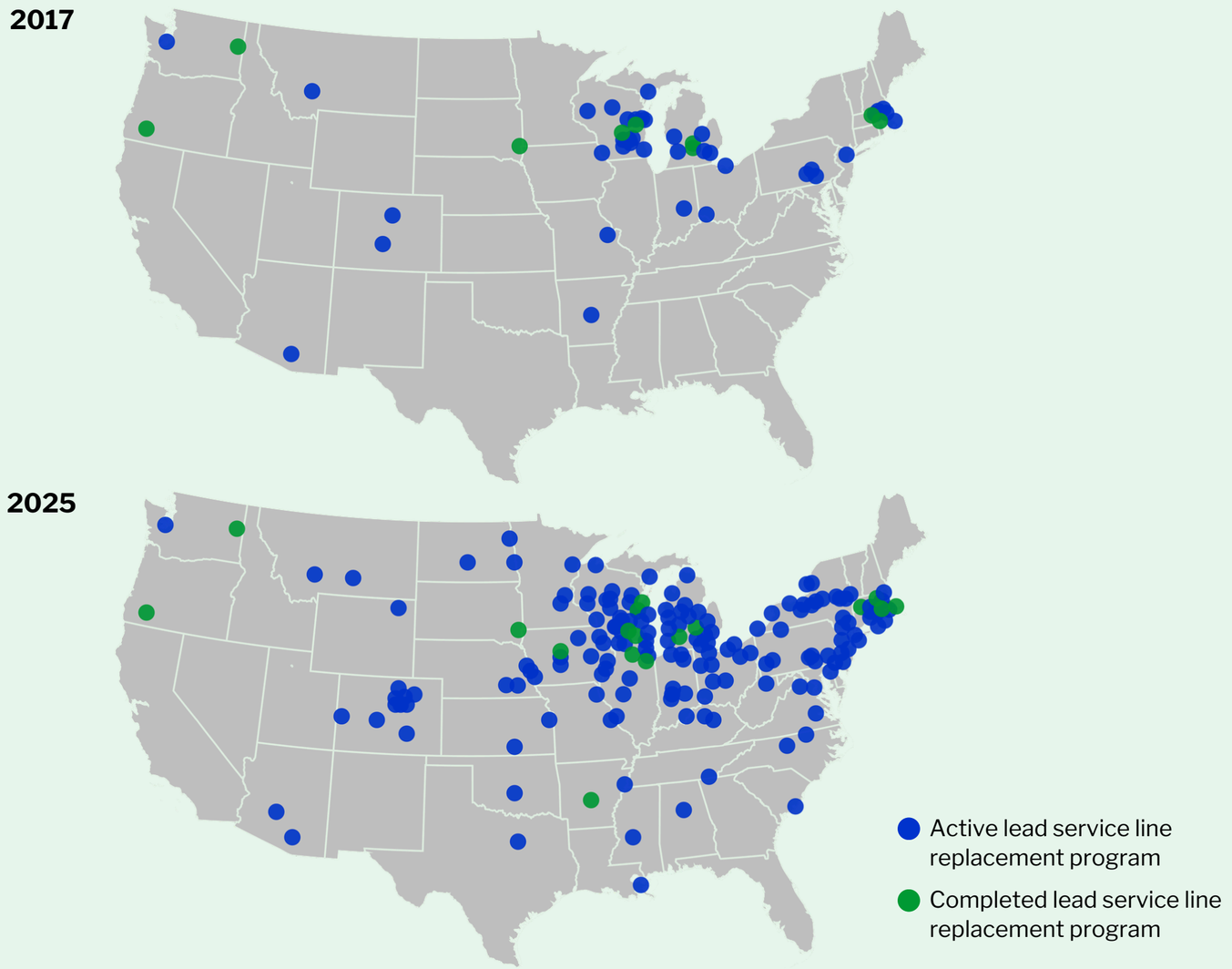
In December 2020, EPA finalized the Lead and Copper Rule Revisions, which had been on the agency's regulatory docket since 2011. While many groups — including EDF — saw major shortcomings in the revisions, especially a lack of proactive lead service replacement, the rule required utilities to develop and make public service line inventories for the first time. This was a critical step in identifying and scoping the lead service line problem.

Also in 2020, EDF and other environmental and public health groups laid the groundwork for federal investment in lead service line replacement, framing it as a critical water infrastructure issue. EDF and partners showed that 80% of voters across party lines supported federal funding. In November 2021, Congress passed the historic Bipartisan Infrastructure Law, providing an unprecedented $15 billion for full lead service line replacement and another $11 billion for general water infrastructure projects, which could also support replacement.

In January 2023, the White House launched the Get the Lead Out Partnership, uniting mayors, utilities, governments and public health and environmental groups around shared principles. By bringing mayors directly into the effort, the Partnership intensified local engagement. Later in 2023, EPA announced the Get the Lead Out Initiative to support underserved communities with technical assistance. In spring 2025, EDF and the Environmental Policy Innovation Center built on this momentum by launching the Mayors' Roadmap as part of the Lead Innovation Hub.

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CITY LEAD PIPE REPLACEMENT PROGRAMS HAVE GROWN 8X SINCE 2017



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In October 2024, EPA strengthened the Lead and Copper Rule in direct response to advocates pressure for bolder action. This stronger rule now requires most communities to proactively replace lead service lines by 2037 — regardless of water test results — and to limit harmful partial replacements.

A decade after its founding, the Collaborative continues to push to ensure the job of national lead service line replacement gets done. In June 2026, it honored 16 organizations and individuals at the nation's largest drinking water conference, signaling the movement's growing national momentum.



ENVIRONMENTAL JUSTICE AND PARTIAL LEAD SERVICE LINE REPLACEMENTS



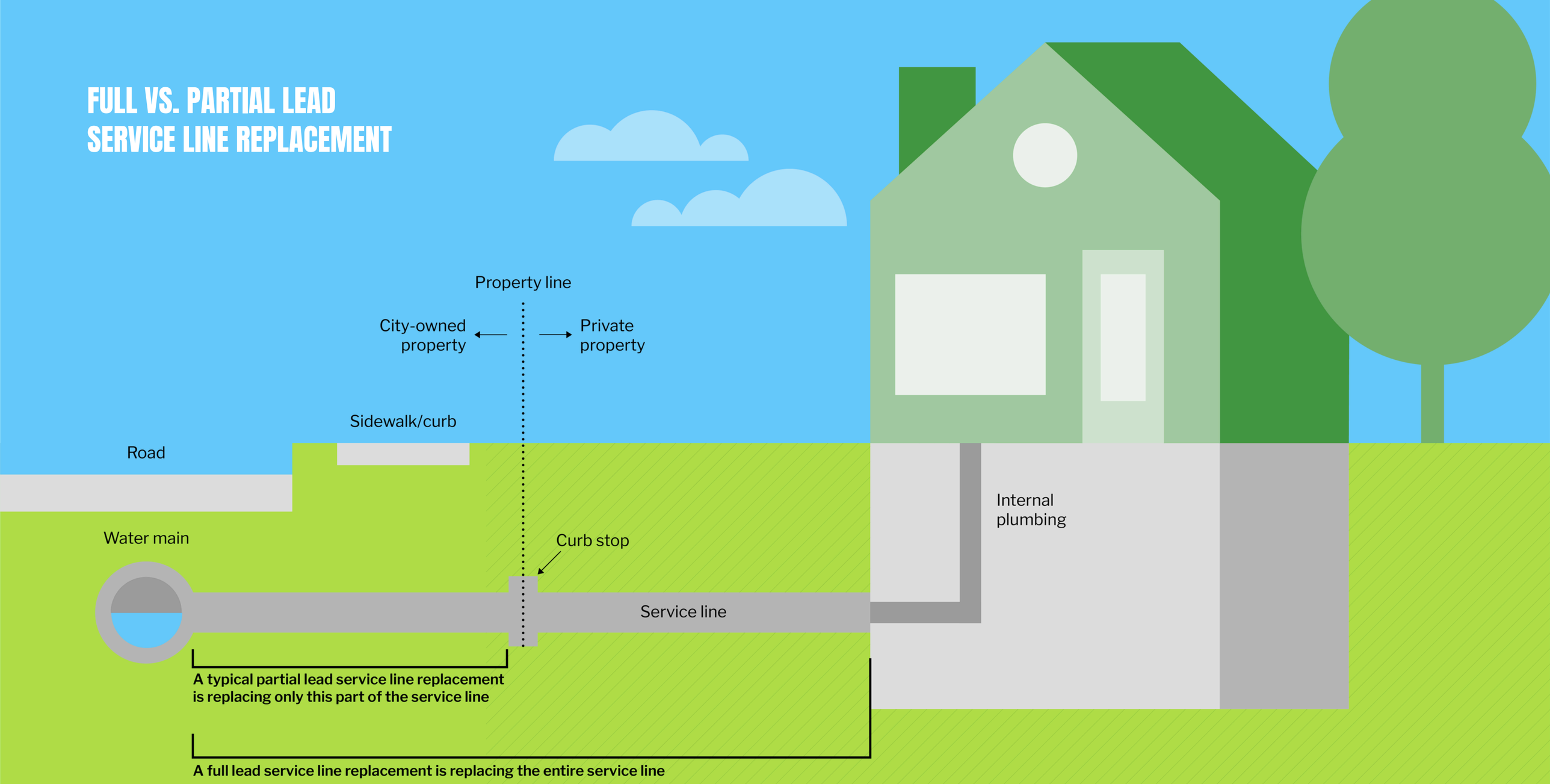
Suzanne Kreiter / The Boston Globe via Getty Images)

Anne Emerson in the basement of her home, looking at the construction site where lead pipes are being replaced. She and her husband, Peter Altman have lived at their home in Jamaica Plain for decades. They're among some 100 property owners in Boston who had been informed by the city that they had lead pipes, but they had declined previous pleas from the city to replace them. They declined because of the cost. Now that the city is covering the full costs, they're having them replaced.

Water utilities have long replaced aging infrastructure as part of routine water main projects. But because utilities often only own the portion of a service line on public property, replacing a lead service line could mean leaving the privately owned portion in place unless the property owner could afford to replace it. This created a major equity issue, particularly for low-income homeowners and renters who are also disproportionately black and brown. Worse, disturbing a lead service line without removing it entirely can temporarily increase lead levels in drinking water.

Over the past few years, lawmakers — at the urging of community advocates and civil society groups — have taken strides toward ending partial lead pipe replacements and their health hazards. For utilities using funding from the Bipartisan Infrastructure Law, it is required that the entire lead service line is to be fully replaced and EPA's Lead and Copper Rule Improvements further limit partial replacements. These changes have helped communities move toward safer, more equitable replacement programs. However, partial replacements have not yet been fully eliminated. As federal funding winds down, renewed attention and commitment will be needed to ensure partial replacements don't return.

FULL VS. PARTIAL LEAD SERVICE LINE REPLACEMENT





Vanessa Bly for NRDC

LOOKING FORWARD

SIX BIG WAYS TO ACCELERATE PROGRESS TOWARDS 2037

Drawing on EDF's work in the Lead Service Line Replacement Collaborative alongside lawmakers, city leaders and advocates nationwide, we offer six lessons that can help ramp up national and local efforts to meet the EPA's 2037 lead pipe replacement mandate. In addition to our own experience, these insights emerged from a closed roundtable discussion held at EDF's offices in June 2026 and eight expert interviews held in Spring 2026.

1. KEEP THE MISSION CLEAR AND SIMPLE

A clear goal — to eliminate lead service lines, the largest source of lead in drinking water— has kept diverse stakeholders united around an easy-to-grasp, widely supported solution over the past decade of work.

Open debate through EPA's working group helped utilities, advocates and public health leaders find common ground around that shared goal. That consensus led the American Water Works Association to unanimously support full replacement recommendations, helping launch the Lead Service Line Replacement Collaborative.

A simple, shared mission supported by sustained commitment can bridge differences, build lasting partnerships and unlock bold action.

> We started the Collaborative with no EPA involvement and did not focus on regulations. We just focused on voluntary actions to begin with, which made it easier for members to support and participate.

Tom Neltner
Unleaded Kids



2. INVEST IN BUILDING TRUST AT THE LOCAL LEVEL THROUGH CLEAR, CONSISTENT COMMUNICATION

The way programs are designed must overcome hurdles like absentee landlords, property disruption, misinformation and deep mistrust of government. Merely offering replacement to property owners is not enough.

Cities should invest in sustained, relationship-based outreach and seek local solutions such as lead service line disclosure during property sales and rentals. Utilities and local leaders also need stronger communication support and consistent messaging, endorsed by community-based organizations, faith leaders and other trusted community voices.

Transparency and trust will be essential to helping cities accelerate replacements and see them through.

> Having clear materials that can help [utilities] communicate with the public is important. They need help in creating an appropriate sense of urgency to move the needle without causing too much alarm.

Alan Roberson
Water Policy Advisor



Denver Water

3. TAKE A HOLISTIC APPROACH TO DRIVE LEAD EXPOSURE CLOSER TO ZERO

Lead service lines are only one source of exposure. Lead remains prevalent in other sources such as paint, soil, plumbing fixtures and food. More integrated programs can better mitigate these other risks while drawing on contributions from public health agencies, housing leaders, municipal planners and zoning officials.

Because lead service lines are fundamentally a health issue — not just water infrastructure — utilities must build stronger cross-sector partnerships.

Unified messaging and dedicated funding is required, particularly for public health agencies that are often already underfunded and stretched thin.

> We need to do a better job of working and coordinating with the public health sector. They are busy, and our water sector needs to figure out how we can work better with them.

Steve Via
American Water Works Association



4. SEIZE NEW OPPORTUNITIES TO SUPPORT LOCAL ACTION

In October 2027, lead service line replacement will enter a critical new phase when utilities will be required to comply with a more protective lead concentration limit of 10 ppb, as mandated by the Lead and Copper Rule Improvements.

Advocates can help local governments communicate quickly and clearly when lead levels exceed the limit, track utilities' lead service line estimates and gauge progress toward the 2037 replacement deadline. They can also play a critical role in pushing to close remaining loopholes — particularly those involving property access and control — as well as ensuring removal of lead service lines in all rental properties.

Strong national oversight and public-facing data will be vital to ensuring effective, equitable implementation.

> There is a huge opportunity to bring more folks into the trades for this type of training and work — LSLR has the ability to create more jobs and opportunities for at least the next 10 years.

Jeff Swertfeger
Arcadis



Vanessa Bly for NRDC

5. GET CREATIVE AND AMBITIOUS TO EXPAND FUNDING AND RESOURCES

The Bipartisan Infrastructure Law funding provided a runway for action on lead service line replacement, though the timing meant that many utilities were using the funds to inventory their service line material types, leaving major funding gaps for actual replacements as 2037 approaches.

Additional federal and state support should include grants and other options beyond the often burdensome State Revolving Fund loans, especially for small and rural systems.

Meanwhile, successful communities should be ready to pursue other local approaches including ratepayer funding with affordability protections, and innovative capital financing.



Tim Gutknecht and the City of Wausau

6. CONTROL COSTS AT THE LOCAL LEVEL

Local lead service line replacement costs can vary dramatically — anywhere from $5,000-$30,000 per line. Communities can help control costs by promoting greater pricing transparency, using smarter procurement and conducting research to better understand the factors that drive up replacement costs.

Policymakers should also consider cost control strategies, such as attaching a cap on the dollar amount per pipe replaced to federal funding. Other tools that lawmakers can promote include building contractor capacity and competition, national pricing guidelines and workforce apprenticeships to build up technical capacity.

> There are no guard rails on these prices [for lead service line replacement].

LaTricea Adams
Young, Gifted & Green





Vanessa Bly for NRDC

CONCLUSION

Ten years ago, we came together to tackle an intractable but clearly defined problem: replacing all lead service lines in the United States. Since then, we've come together across diverse sectors of society to drive tremendous progress.

Hundreds of communities have acted, a federal mandate has established a clear path forward and new resources are helping communities accelerate progress. There is a path forward: build on the progress to date, maintain the momentum and funding, and finish the job of removing lead service lines.

With continued support and commitment from local, state and federal government officials, civil society in affected communities, utilities, public health agencies and advocates; we can get this job done and improve hundreds of thousands of lives.

EDF'S TOP LEAD SERVICE LINE REPLACEMENT RESOURCES

Over the last decade, EDF has developed several resources to assist drinking water utilities, municipalities, regulators, advocates and the public in understanding the lead service line replacement process and best practices for implementation. We hope the the resources listed here can help guide and inform current and future leaders working to eliminate lead service lines from our drinking water systems.

EDF also helped develop foundational resources created by the Lead Service Line Replacement Collaborative and the Lead Innovation Hub. Please visit these organizations' websites for ongoing support and the latest information on lead service line replacement.

LSLR COLLABORATIVE

Lead Innovation Hub

Reports and Publications

- Grading the nation: State disclosure policies for lead pipes (2017)
- Research to Move Toward Evidence-Based Recommendations for Lead Service Line Disclosure Policies in Home Buying and Home Renting Scenarios (2019)
- Rates could fund lead pipe replacement in critical states: Laws in states with the most lead service lines support the practice (2019)
- Using online tools to publicize lead service line locations and promote replacement (2019)
- Lead Pipes and Environmental Justice: A study of lead pipe replacement in Washington, D.C. (2020)

Webpages and Tools

- Mayors' Roadmap (as part of the Lead Innovation Hub)
- EDF's Blog Repository on Lead
- Transparency in action: Map of public Lead Service Line Replacement programs
- Top 10 Cities with Most Lead Pipes
- Unleaded: Inside EDF's 50-year battle against lead

ACKNOWLEDGEMENTS

We would like to acknowledge the many stakeholders who provided insights, expertise and ideas reflected in this report, including the over 30 people who attended EDF's June 2026 roundtable representing practitioners, advocates, professional associations, water, environmental and public health experts, and more.

We want to express our gratitude to the following individuals who spent considerable time with our team providing their expertise through interviews as we pulled together this report. Thank you.

Interviewees

- LaTricea Adams, *Young, Gifted & Green*
- Elizabeth Cisar, *The Joyce Foundation*
- Tom Neltner, *Unleaded Kids (formerly with EDF)*
- Alan Roberson, *Water Policy Advisor (formerly with ASDWA)*
- Preeti Shankar, *The Joyce Foundation*
- Jeff Swertfeger, *Arcadis (formerly with Greater Cincinnati Water Works)*
- Steve Via, *American Water Works Association*
- Wendi Wilkes, *Water Environment Federation (formerly with EPA)*



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