

# EPA Tools to Assist Small & Rural Water Utilities with Lead Service Line Inventories

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## POLICY RECOMMENDATIONS

To support small and rural water utilities in meeting ongoing LCRR & LRCI requirements, we recommend that the Environmental Protection Agency:

- » Develop a digital service area boundary management system
- » Implement a national lead service line inventory database
- » Integrate data modernization requirements into existing grant programs
- » Expand Training and Support for Rural Water Utilities

## WHAT ARE SERVICE AREA BOUNDARIES?

Service Area Boundaries are the geographic region in which the utility provides water services to customers. These boundaries define the extent of a utility's responsibility and coverage.

## WHAT ARE DIGITAL SERVICE AREA BOUNDARIES?

Digital Service Area Boundaries are digital representations of a water utility's service area. They allow utilities to digitally map, create, maintain, and share this information electronically, enhancing their ability to meet regulatory requirements, pursue funding, improve emergency preparedness, and support informed decision-making.

## INTRODUCTION

The Environmental Protection Agency's (EPA) [2021 Lead and Copper Rule Revisions \(LCRR\)](#) require all community and non-transient non-community water systems to develop an inventory identifying the potential presence of lead within each service line connection by October 16, 2024.<sup>1</sup> Building upon this foundation, the EPA has proposed the [Lead and Copper Rule Improvements \(LCRI\)](#), which is currently in the public comment phase with the intent to be finalized in October 2024.<sup>2</sup> The LCRI would require water systems to regularly update these inventories over time.<sup>3</sup> This ongoing mandate poses significant challenges for many water utilities, especially smaller and rural ones that lack resources and technical capacity. To ensure widespread compliance and protect public health, the EPA should build upon its existing efforts and provide additional accessible tools and resources to assist under-resourced utilities in creating, maintaining, and updating accurate service area boundaries and lead service line inventories.

## BACKGROUND

Lead exposure through drinking water poses severe health risks, especially to vulnerable populations like children and pregnant women. To mitigate this risk, the EPA's LCRR requires water systems to identify and inventory service lines, with the proposed LCRI adding requirements for regular inventory updates, creation of publicly available service line replacement plans, and identification of materials for all service lines of unknown material. The proposed LCRI would also require the vast majority of water systems to replace lead service lines within 10 years.<sup>4</sup> However, many utilities, particularly small or rural ones, face substantial data-related barriers that make it challenging to comply with even the initial requirement of the LCRR and LCRI: identifying and inventorying lead service lines and maintaining those inventories over time.

Common barriers include:

- **Lack of Comprehensive Datasets:** Many utilities lack reliable data, such as those indicating the year of construction for a home or building, which is critical in identifying potential properties that are likely to have lead service lines. Data inaccuracies and inconsistencies pose significant challenges; for instance, an extensive review in North Carolina found more than half of tax parcel datasets either missing or inaccurate.
- **Limited Access to Geographic Information System (GIS) Software:** While GIS software is essential for managing digital service area boundaries and inventories, such software is often cost-prohibitive for smaller utilities. Financial constraints limit their capacity to purchase necessary software and hire skilled personnel, making it difficult to create and maintain accurate geospatial inventories.
- **Absence of Digital Service Area Boundaries:** Small and rural utilities frequently rely on paper maps and address lists of customers instead of digital boundaries. Digital service area boundaries are essential for efficiently intersecting utility data with other datasets to identify lead service lines and address numerous other water management challenges. Given the limited capacity of these small utilities, manually performing such analyses is often not feasible and diverts scarce employee resources from other critical activities.
- **Reliance on Outdated Paper Records:** Transitioning from paper-based systems to digital formats is operationally challenging for many utilities. Legacy systems and the lack of technical capacity hinder the accurate documentation and updating of service line materials.

Various organizations have been working to address these challenges, recognizing the critical importance of accurate utility data not just for lead service line inventories, but for a wide range of water management issues including source water protection, water affordability, and equitable infrastructure investment.

## EXISTING SOLUTIONS AND EPA EFFORTS

The EPA has recognized the importance of accurate service area boundaries and has taken significant steps to address this need. In 2023, the agency published the [Community Water System Service Area Boundary Dataset](#), a crucial step towards creating a national repository of this information. This dataset contains over 44,000 unique service areas across all 50 states, covering 99% of the population served by community water systems. Over 40% of the systems' boundaries were sourced from state databases, while the remaining systems were modeled using machine learning techniques due to the absence of state-supplied boundaries.<sup>5</sup> While this dataset is a valuable resource to better understand community water system service areas, it requires continued refinement and expansion to capture all water systems and enhance data accuracy.

The Environmental Policy Innovation Center (EPIC) played a pivotal role prior to EPA's work on this dataset. [EPIC's efforts](#), in collaboration with the Internet of Water Coalition (IoW Coalition) and SimpleLab, to collect and standardize service area boundary data across multiple states helped raise awareness about the need for a federal water utility service area boundary dataset and provided service area boundary data that helped inform such efforts. In response to the LCRR and demand from utilities, a marketplace of innovative tools has emerged to address some of the remaining challenges. **The Internet of Water Coalition maintains two such tools:**

- **[BoundarySync](#):** A free mapping platform, developed by Duke University's Nicholas Institute for Energy, Environment & Sustainability (the Nicholas Institute) and the Lincoln Institute's Center for Geospatial Solutions (CGS) that enables utilities to digitize their service area boundaries. Users can update and refine existing digital boundaries or digitize paper-based boundary images and files such as PDFs without the need for expensive software subscriptions or special skill sets.
- **[The North Carolina Lead Service Line \(LSL\) Inventory Tool](#):** Developed by the Nicholas Institute in collaboration with the North Carolina Rural Water Association, this application leverages publicly available data to help North Carolina utilities develop their lead service line inventories. The tool integrates utility digital service area boundaries, tax parcel data, the National Address Database, and the Global Human Settlement Layer to identify structures within a given utility's service area that are likely to have lead service lines.

These tools, along with many others developed by various organizations and companies,<sup>6</sup> represent progress in addressing the challenges faced by utilities. However, many utilities across the United States still lack access to such resources, hindering their ability to comply with the LCRR and protect public health effectively. Challenges also remain in data accuracy, particularly in rural areas, and in adapting to state-specific inventory requirements.

Moreover, lead service line inventory creation and maintenance is not a one-time effort, but an ongoing process. The LCRI will require utilities to maintain and update these inventories over time as they gather more information and replace lead service lines. This ongoing requirement underscores the need for cost-effective, user-friendly tools that utilities can use not just for initial compliance, but for long-term inventory management.

## POLICY RECOMMENDATIONS

To address common challenges and support small and rural water utilities in meeting ongoing LCRI requirements, we recommend that the EPA:

- 1. Develop a digital service area boundary management system:** The EPA should develop or adopt a user-friendly, web-based tool that enables utilities to easily contribute, update, and maintain their service area boundary data in real-time, seamlessly integrating with and enhancing the existing [Community Water System Service Area Boundary Dataset](#). To support small, rural, and under-resourced utilities, this tool should enable utilities to not only edit and update existing digital service area boundaries but, crucially, to digitize and georeference scanned images of paper maps and other image or pdf files.
- 2. Implement a national lead service line inventory database:** The EPA should develop a national lead service line inventory data management system that stores data from initial Lead Service Line Inventory submissions, enables ongoing updates by utilities, and shares best practices and state-specific guidelines. This tool would also support data standardization, enhancing the reliability and interoperability of the data collected. To maintain data privacy, sensitive information would be accessible only to authorized users, not the public.
- 3. Integrate data modernization requirements into existing grant programs:** The EPA should integrate a requirement into its existing grant programs for water utilities to allocate a portion of awarded funds toward data modernization initiatives, including the digitization of legacy data and implementation of modern data management systems. This requirement will enhance operational efficiency, improve regulatory compliance, and enable more effective decision-making in water management across the United States. Potential grant programs could include the Water Infrastructure Improvements for the Nation Act ([WIIN Reducing Lead in Drinking Water Grants](#)) and the [Training and Technical Assistance to Improve Water Quality and Enable Small PWSs to Provide Safe Drinking Water grant program](#).
- 4. Expand Training and Support for Rural Water Utilities:** Enhance collaboration with rural water associations by partnering with organizations such as USDA Rural Development, the Rural Community Assistance Partnership (RCAP), and the

National Rural Water Association (NRWA), along with state rural water associations, to expand outreach and training efforts. This initiative would involve attending regional trainings and providing hands-on support to help rural water systems learn and adopt new EPA tools for data management and infrastructure modernization. By leveraging these partnerships, the EPA can equip rural utilities to modernize their systems and meet regulations efficiently, while maximizing the adoption and impact of EPA-developed tools.

## BENEFITS OF ENHANCED EPA TOOLS

By building upon its existing efforts and providing comprehensive tools for service area boundary mapping and lead service line inventory development and maintenance, the EPA could:

- **Increase Compliance:** Make it feasible for under-resourced utilities to meet initial and ongoing LCRR requirements, improving overall compliance rates.
- **Enhance Public Health Protection:** Enable faster identification and replacement of lead service lines, reducing lead exposure risks across the country.
- **Promote Equity:** Level the playing field between well-resourced and under-resourced utilities, ensuring all communities benefit from improved water infrastructure.
- **Improve Data Quality:** Standardize data collection and management practices, leading to more accurate and reliable inventories nationwide.
- **Facilitate Long-term Planning:** Provide utilities with the information needed to develop comprehensive lead service line replacement strategies.
- **Support Environmental Justice:** Integrate data on disadvantaged communities, allowing for targeted interventions in line with the Justice40 Initiative.
- **Strengthen Community Trust:** Transparent and accurate data management can improve public trust in water utilities by demonstrating proactive efforts to address lead contamination.
- **Operational Efficiency Gains:** Digital tools could streamline data management, reducing the administrative burden on utility staff and freeing resources for other essential tasks.
- **Enhance Crisis Management:** Accurate, up-to-date service line inventories will better equip utilities to respond quickly to lead contamination incidents, minimizing public health risks.
- **Integrate Data Across Sectors:** Improved service area data can facilitate collaboration with other sectors, such as public health and housing, to address broader community issues related to water quality and infrastructure.

## CONCLUSION

The EPA's Lead and Copper Rule Revisions and Improvements represent a critical step in protecting public health from lead exposure through drinking water. However, the success of this initiative depends on the ability of all water utilities, regardless of size or resources, to comply with initial and ongoing inventory requirements. By building upon its existing efforts and collaborating with various organizations and stakeholders, the EPA can develop and provide comprehensive tools for service area boundary mapping and lead service line inventories. This would significantly reduce the burden on under-resourced utilities, improve compliance with the LCRR and LCRI, and ultimately enhance the protection of public health from lead exposure through drinking water. These efforts align with broader goals of environmental justice and equitable infrastructure improvement, ensuring that all communities benefit from advances in water quality management for years to come.

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### Endnotes

- 1 U.S. Environmental Protection Agency. (n.d.). Revised lead and copper rule. <https://www.epa.gov/ground-water-and-drinking-water/revised-lead-and-copper-rule>
- 2 U.S. Environmental Protection Agency. (2024, April). Revised lead and copper rule compliance fact sheet (EPA 816-F-24-001). [https://www.epa.gov/system/files/documents/2024-04/revised-508\\_lcr-compliance-fact-sheet\\_4.17.24.pdf](https://www.epa.gov/system/files/documents/2024-04/revised-508_lcr-compliance-fact-sheet_4.17.24.pdf)
- 3 U.S. Environmental Protection Agency. (n.d.). Proposed lead and copper rule improvements. <https://www.epa.gov/ground-water-and-drinking-water/proposed-lead-and-copper-rule-improvements>
- 4 U.S. Environmental Protection Agency. (n.d.). Proposed lead and copper rule improvements. <https://www.epa.gov/ground-water-and-drinking-water/proposed-lead-and-copper-rule-improvements>
- 5 U.S. Environmental Protection Agency. (n.d.). Community water system service area boundaries. <https://www.epa.gov/ground-water-and-drinking-water/community-water-system-service-area-boundaries>
- 6 Lead Service Line Inventory Tools: [120 Water](#), [Blue Conduit](#), [ESRI](#), [Trinnex](#)