



# Pooled Monitoring Initiative's Restoration Research Award Program

## Project Title

Influence of Historic and Current Land Use Practices on PCB Contamination of Soils and Stormwater Sediments in the Chesapeake watershed.

## Lead Entity

University of Maryland



PCB TMDL Watersheds in Anne Arundel County

## Research question(s)

- Does the land use and development age impact on the concentrations and congener distributions of PCBs in soils and stormwater sediments?
- What are the potential sources of PCBs in different urban environments?
- Is there microbial potential for in situ PCB biodegradation in stormwater sediments?

## Issue addressed

Despite the PCB production ban in 1979, PCBs persist in Maryland's watersheds and urban sediments, impairing water quality. Legacy infrastructure and ongoing sources such as stormwater continue to contribute. There is a lack of understanding of how land use and development age shape PCB contamination and how that impacts TMDL efforts.

The Pooled Monitoring Initiative pools resources to support scientists who answer key restoration questions posed by the regulatory and practitioner communities. The research teams then provide the answers back to those who asked the questions for direct application. The goal of the program is to answer these key restoration questions that serve as a barrier to watershed restoration project implementation.

**Questions?** See [cbtrust.org/grants/restoration-research/](http://cbtrust.org/grants/restoration-research/)



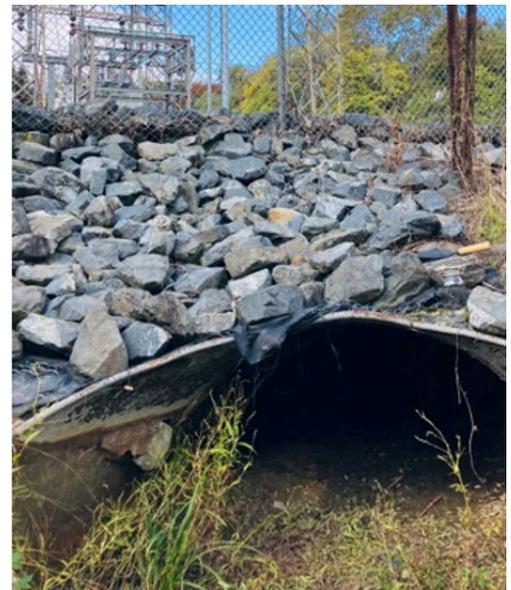
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Stormwater sediment from stormwater gutters along roadways (left) and stormwater tunnel (right)

## Project findings

- Total PCB concentrations ranged from 1.27 to 381 ng/g, with industrial and residential areas showing the highest levels.
- Pre-1970s developments had higher median PCB levels, consistent with legacy contamination.
- A non-Aroclor congener, PCB-11, was detected in all developed sites except greenspace, indicating ongoing urban sources.
- Homolog analyses revealed partial matches to legacy Aroclors in older sites, while newer sites showed degraded or mixed signatures.
- Bacteria capable of anaerobic PCB dechlorination were detected in 44% of samples, supporting potential natural bioremediation.

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## Recommendations

- Prioritize PCB mitigation efforts in older industrial and residential areas, especially those developed before the 1970s.
- Target stormwater BMPs (street sweeping, sediment capture) in hotspots with high PCB loads.
- Monitor and manage current PCB sources such as road paint and pigment runoff.
- Leverage natural attenuation in locations where dechlorinating bacteria are present, potentially integrating bioremediation strategies into SCMs.

## Why does this study matter?

PCBs are toxic, persistent and bioaccumulative organic pollutants that have negative impact on environment and human health. This study provides critical local evidence to support more targeted, effective stormwater and watershed management under Maryland's PCB TMDL framework.

## What should we do with this information?

- Identify and prioritize remediation hotspots by focusing on industrial and residential areas, especially those developed before 1970es
- Encourage removal of contaminated stormwater sediment via street sweeping and clean outs

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## What should we do with this information?

- Incorporate land use and development era into stormwater management planning to better predict and control PCB transport.
- Enhance stormwater BMP design and placement, using findings on PCB concentrations and congener profiles to improve interception of contaminated sediments.
- Monitor current PCB sources, like road paint and pigments, and consider source control strategies to reduce ongoing inputs.
- Integrate microbial monitoring in future projects to assess the potential for natural attenuation and support the use of bioremediation.

## What will the end-user (regulator/manager and practitioner) do with this information?

- County stormwater managers can apply these findings to optimize TMDL compliance strategies.
- Environmental planners can incorporate land use and development age into risk assessments.
- Regulatory agencies may consider updating source tracking protocols and BMP performance standard.

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## For more information: Please contact

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