

Researching PCBs in Portland Harbor: A Collaborative Approach to Community Health and Environmental Remediation

Alexis Slade's career is driven by a deep commitment to understanding and addressing environmental pollutants. Her academic journey began with an undergraduate and master's degree in agricultural engineering from Iowa State University, where she focused on water quality and the impact of contaminants like nitrates. Now pursuing her PhD in Civil and Environmental Engineering (CEE), Slade has turned to air pollution for a well-rounded education in contaminants. This wholistic approach to environmental contaminants has positioned her to tackle some of the most persistent and complex issues facing communities today, including the widespread contamination of air, water, and soil by polychlorinated biphenyls (PCBs). PCBs are a class of man-made chemicals known for their extreme persistence in the environment, making them nearly impossible to completely eliminate. They pose significant risks to both human health and the environment, contributing to cancers, endocrine disruption, and a range of other serious health problems.

Slade's current research focuses on the presence and impact of PCBs in Portland Harbor, Oregon. Between the 1960s and 1970s, the harbor was a major hub for warship production and dismantling, with PCBs utilized in ship-making materials, oil coatings, lighting systems, and more. At that time, hazardous materials were routinely dumped into the water or leached out of materials, leading to widespread contamination of the harbor's soil, water, and air.

The Portland Harbor community has long been aware of this contamination. In fact, it was the Portland Harbor Community Coalition, a nonprofit working to lead cleanup, restoration, and redevelopment of the harbor, who reached out to the Iowa Superfund Program with a crucial research question: How much PCB remains in the environment, and how much is being emitted into the surrounding community? Slade's team collaborated with the coalition, working closely with community members to assess the extent of PCB contamination and determine if the remediation efforts already underway were having a measurable impact.

Slade explained that despite significant cleanup efforts in recent years, the challenge of eliminating PCBs remains formidable. "PCBs are forever chemicals," she noted. "They don't break down easily, and while we may never get rid of them entirely, remediation efforts can reduce the amount of exposure and minimize harm to the community." However, cleanup efforts—such as dredging and digging up contaminated

soil—can stir up more PCBs, releasing them back into the air and water. This underscores the need for a careful, methodical approach to remediation and monitoring.

Slade and her team spent time in the field, working closely with the Portland community to collect environmental samples. Volunteers hosted sampling stations at their homes or other locations, and interns monitored these sites after the initial setup, when the research team had to return to Iowa City. While gathering data on contamination levels, the team also engaged with the community, explaining their research and answering questions during informal events like a picnic in the park and a canoe trip through Portland Harbor. These experiences provided Slade with the opportunity to connect personally with the community. One of the most memorable moments was the canoe trip itself, where she bonded with community members and government officials, learned about the harbor's history, and discussed the ongoing research.

One of the key takeaways from the project, according to Slade, is the importance of community engagement in scientific research. "This project really brought out that, especially within the STEM field, there needs to be more literature on the process of community engagement," she said. "It's a sustainable tool for both the community and research institutions." Through this project, Slade's team helped access additional grants for the community and connected them with other research opportunities to answer lingering questions about PCB contamination.

Looking ahead after graduation, Slade is focused on continuing to support communities in cleanup efforts. She plans to work with government agencies or environmental engineering organizations to ensure that proper disposal procedures are followed and to promote policies that protect communities from future contamination. "The more we talk about these issues, the more interest and questions we get from communities about their own contamination problems," she explained. "Proper disposal and remediation are key."

Slade is also grateful for the resources available through IIHR—Hydroscience & Engineering at the University of Iowa, where she is studying. "One of the best things about IIHR is the diversity of expertise we have. Whether it's water, air, toxicology, or something else, there's always someone to turn to for answers," she said. "For our project, when we needed to know the health impacts of exposure to PCBs, I could easily consult my colleagues in toxicology to get accurate information to share with the community."

By fostering strong relationships between researchers and local residents, Slade and her team have helped empower the Portland Harbor community to advocate for their

own health and environmental future. As cleanup efforts continue and new policies are developed, Slade remains committed to supporting sustainable, science-driven solutions that can mitigate the lasting impact of industrial pollution on vulnerable communities.