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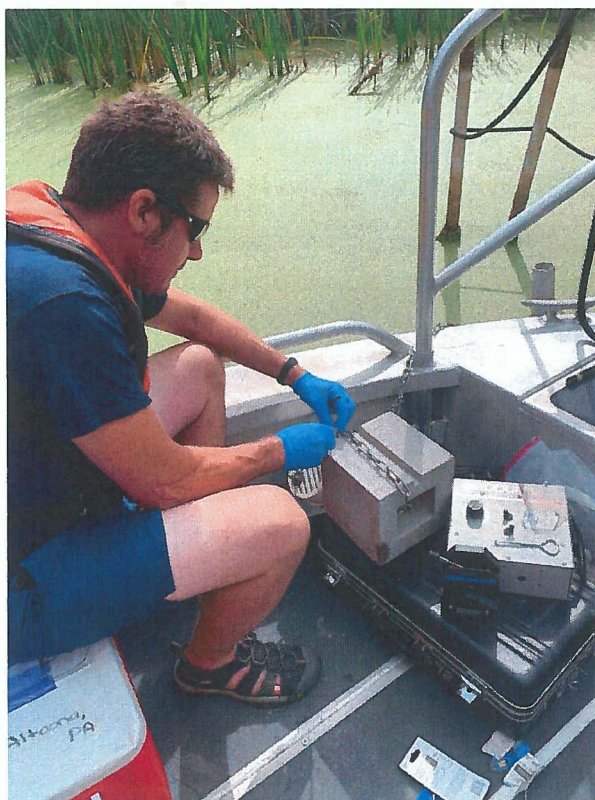
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Feature Story

# ERDC expertise helps determine origin of PCBs at Eighteenmile Creek

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U.S. Army Engineer Research and Development Center Research Physical Scientist Brett Hayhurst works with a semipermeable membrane device in Lake Ontario at the Oak Orchard Creek embayment June 2020, part of U.S. Army Corps of Engineers Buffalo District project to evaluate the origin of polychlorinated biphenyls (or PCBs) in Eighteenmile Creek in Niagara County, New York.

VICKSBURG, Miss. — The U.S. Army Engineer Research and Development Center (ERDC) conducts research on everything from bats to explosives, but customers frequently call upon ERDC for technical expertise as well.

This was the case when ERDC Environmental Laboratory Research Physical Scientist Brett Hayhurst joined a team led by U.S. Army Corps of Engineers (USACE) Buffalo District Project Manager Tim Noon to evaluate the origin of Polychlorinated biphenyls (PCBs) in Eighteenmile Creek Area of Concern (AOC) in Niagara County, New York.

"Brett did the hydrologic analysis and was the physical research scientist who set up the path of water column sampling, deployed the samplers and collected the data," Noon said. "Brett was really technically knowledgeable about the complicated geography and set of programs."

The geography that Noon is referring to is the region in and around the Great Lakes that encompasses 43 AOCs. According to the Restoring Great Lakes AOC website, these regions were identified by the International Joint Commission under the 1987 U.S.-Canada Great Lakes Water Quality Agreement as having high levels of environmental harm resulting from human activities at the local level to the extent that impairment of beneficial uses has occurred; Eighteenmile Creek is one of 26 remaining AOCs slated to be restored under the U.S. Environmental Protection Agency's (EPA) Great Lakes Restoration Initiative.

The EPA's Superfund program has had part of this site on a priority list since March 2012.

"From the creek's headwaters at the Barge Canal to Harwood Street in Lockport, there is a corridor that contained legacy contaminants," Hayhurst said. "The New York State Department of Health issued an 'don't eat' advisory for any fish caught in the area because PCBs were found in the fish."

Superfund is the informal name of the 1980 Comprehensive Environmental Response Compensation and Liability Act, U.S. legislation that gives the EPA the authority and the funding to clean up contaminated sites.

"Contamination from the Superfund site moves downstream into the AOC and ultimately into Lake Ontario, so that's the nexus of the two," Noon said. "And that's partially why it's an AOC, but the Superfund and the AOC are administratively separate from one another."

"We started the investigation to determine conditions in the AOC, how do we get to cleanup and what does that look like," Hayhurst said. "USACE was asked to do a data gap analysis, which is collection and analysis of existing data from Superfund, Federal, state and local sources. We worked with a team to see what data was missing and to evaluate results and future steps."

As the data gap analysis continued over years, recommendations were made to collect some sediment samples and create a map that depicts what type of contaminants are in the various sediments. The ultimate goal for the data gap analysis was to determine what was driving the Beneficial Use Impairments in the Eighteenmile Creek AOC.

"We were evaluating the sediment and benthic macroinvertebrate community data — bottom-dwelling small aquatic animals and insect larvae to see what kind of contaminant concentrations were present," Hayhurst said. "Then we went up the food web to look at fish and mink data. Data

analysis within the AOC indicated very low PCB concentrations within the benthic community, and the sediments were not driving a need for any specific management action related to the AOC.”

After the team completed the evaluation, they reassessed the situation and thought about how the PCBs were accumulating in fish.

“We proposed that the fish are not bioaccumulating PCBs from the lower diet, but instead uptaking PCBs from the whole water column through bioconcentration,” Hayhurst said. “Elevated PCB concentrations are not coming from AOC sediment. The whole water column contains both the particulate and the dissolved phase of PCBs, but the dissolved PCBs are the most concerning.”

“USACE is one of the critical federal partners in the Great Lakes Restoration Initiative in that we provide a lot of unique capacity and subject matter expertise to help ultimately delist these AOCs,” Noon said. “USACE and ERDC bring our expertise in service to the EPA and in partnership with our federal and state partners for the purposes of restoring the Great Lakes.”

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