



UNH Engineers Seek "Multi-Symptom" Remedy For Sediment Pollution

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DURHAM, N.H. -- University of New Hampshire engineers are designing a "sniffing, sneezing, aching, fever, so you can rest" remedy for polluted river sediment. Jeff Melton and Kevin Gardner are part of a bi-coastal team that received a \$1.1 million grant from the Department of Defense's Strategic Environmental Research and Development Program (SERDP) to combine different remediation strategies into one "prescription" for sediments contaminated by a range of pollutants.

"Sediment often contains a variety of pollutants, but there's no silver bullet to treat all of them," says Melton, a research assistant professor in the Environmental Research Group, a division of UNH's [College of Engineering and Physical Sciences](#). "One technology might address heavy metals, while another treats PCBs. We're combining different approaches into a single delivery system to address several pollutants at once."

Which, given the condition of sediment in many urban waterways, may be just what the doctor ordered. Years of auto emissions, stormwater runoff, and industrial waste have polluted sediment with heavy metals like lead and mercury, and toxic organic chemicals like Polychlorinated Biphenyls (PCBs) and Polycyclic Aromatic Hydrocarbons (PAHs).

Dredging out polluted hot spots or capping them with several feet of sand are common responses to this problem, but they have drawbacks. Dredging disrupts habitats, releases pollution into the water column, and poses the problem of where to put all that toxic sediment. Since sand caps must be thick enough to slow the spread of pollution, they are expensive to maintain, can hinder boat traffic, and put a damper on aquatic life.

Melton and Gardner are experimenting with a new class of treatments for the sediment remediation toolkit—reactive caps made from absorbent materials that treat pollution, rather than just remove it or cover it up.

"Sand caps are physical barriers that only slow the spread of pollution," explains Melton. "Reactive caps, like the ones we're using in this project, bind and stabilize pollutants, effectively removing them as a threat. These caps are much thinner, so they are potentially more cost-effective and may be used where sand caps are not practical."

Melton and Gardner's multi-pollutant remedy consists of activated charcoal, apatite, and organoclays all mixed together and spread between two layers of geotextile fabric. The thin, engineered mats will be rolled out over stretches of polluted sediment.

UNH researchers first explored apatite, a natural form of phosphorus that treats heavy metals,

and the organoclays—which tackle PCBs—independently, with funding from the Cooperative Institute for Coastal and Estuarine Environmental Technology ([CICEET](#)), a partnership of UNH and the National Oceanic and Atmospheric Administration.

"This project was a natural evolution of CICEET's technology transfer grant to develop apatite as a practical tool for sediment clean up," says Melton. "What we learned from that work led to using mats as a delivery system. Now we're exploring how different treatments can work together. Ultimately, the goal is to design treatments that address the idiosyncratic profile of pollutants in a given place."

Editors: A photo is available here:

<http://www.unh.edu/news/img/ciceet/riversedimentpic.jpg>.

Caption: Jeff Melton, research assistant professor of UNH's Environmental Research Group, and researcher Deana Aulisio work on a remedy for the many causes of river sediment pollution.