

UNC Superfund scientists study effects of Dan River coal ash spill

By Sarah Yelton

One of the largest coal ash spills in the nation's history began Feb. 2 in Eden, N.C., at a Duke Energy containment pond on the banks of the Dan River. According to a U.S. Environmental Protection Agency (EPA) [estimate](http://www.epaosce.org/site/site_profile.aspx?site_id=9065), (http://www.epaosce.org/site/site_profile.aspx?site_id=9065) by the time the discharge was stopped, 50,000 to 80,000 tons of toxic coal ash had entered the Dan River, lining its banks and depositing waste along the riverbed for 70 miles downstream.

In response to this environmental challenge, a team of NIEHS-funded scientists led by [Damian Shea, Ph.D.](http://ea.cals.ncsu.edu/who-we-are/damian-shea/), (<http://ea.cals.ncsu.edu/who-we-are/damian-shea/>) joined forces with state and federal regulatory agencies, to help answer important questions about the toxic chemicals present in the coal ash. The information from the team's research should enable regulators to better assess potential risks to human health in communities along the river.

Shea is a University of North Carolina at Chapel Hill (UNC) Superfund Research Program (SRP) researcher and a professor of biological sciences at North Carolina State University (NCSU).

Linked Video

[Watch as Shea describes his team's NIEHS-funded work at the UNC SRP, developing passive samplers for multi-chemical detection and determination of the degree of bioavailability \(02:19\)](#)

"Our goal is to help our agency partners determine exactly what toxic chemicals are present in this coal ash, as well as to what extent these chemicals are present in water and sediment in the river," Shea explained. "There are a number of potentially hazardous chemicals contained in coal ash, primarily toxic metals, such as arsenic and selenium. Cancer-causing chemicals, including polycyclic aromatic hydrocarbons (PAHs), may also be present at lower levels."

What chemicals are present?

Shea and his lab team at NCSU are currently working with the U.S. Fish and Wildlife Service, U.S. Environmental Protection Agency, N.C. Department of Environment and Natural Resources, and N.C. Department of Health and Human Services to collect and properly store samples of coal ash, water, bottom sediments, and organisms such as fish and mussels from a number of sites along the river, for lab analysis.

"There is limited information on how quickly the metals and other chemicals are released from the coal ash to enter the water and food chain," Shea said. Using ash from the containment pond, Shea and his team will conduct experiments to determine how quickly metals, PAHs, and other chemicals are able to enter the water column.

Evaluating the potential for exposure

With passive sampling devices that remain in the river for 30-day intervals, Shea and his team are assessing the type and amount of chemicals people may be exposed to over the long term, as well as the percentage of those chemicals that are bioavailable, or absorbed by an organism.

"One of the goals of our program is to apply university resources to help governments and the public make informed decisions about reducing risk from hazardous chemicals," said Kathleen Gray, one of Shea's SRP colleagues and leader of the UNC SRP Research Translation Core. "Damian's sampling and analysis is serving a critical need for information on how this contamination may affect health in the future."



U.S. Fish and Wildlife Service and Duke Energy crews prepare to take water quality samples in the Dan River. (Photo courtesy of U.S. Environmental Protection Agency)



Coal ash was deposited on the banks of the Dan River, just downstream of the spill location. (Photo courtesy of U.S. Environmental Protection Agency)



Shea, standing, and the team analyze samples in the lab. (Photo courtesy of UNC SRP)

(Sarah Yelton is an environmental education coordinator with the Environmental Resource Program at UNC and UNC SRP Research Translation Core leader.)

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