

# Engineers filter runoff water polluting city beaches

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(PhysOrg.com) -- It is an annual rite of summer in Chicago: heavy or persistent rain causes a water backup from runoff and sewage that pollutes Lake Michigan, forcing officials to close beaches as a health precaution.

Chicago is exceptionally prone to the problem, but the U.S. [Environmental Protection Agency](#) knows it is exacerbated to greater or lesser extent by runoff from cities and communities of all sizes lining the shores of the Great Lakes. In response, they have asked engineers to propose ways to fix the problem.

One team led by University of Illinois at Chicago civil and environmental engineering professor Krishna Reddy thinks the best solution is a dose of prevention.

"There are lots of studies that include monitoring, but not much is being done about preventing the problem. We know pollution is caused by various sources, a major one being surface water runoff," Reddy said.

"Our idea is to design a filter that the runoff passes through. Whatever comes out will be generally clean. As engineers, we wanted to come up with a solution to prevent the problem from happening."

Reddy and co-investigator Krishna Pagilla, professor of civil, architectural and environmental engineering at the Illinois Institute of Technology, received a two-year, \$239,000 grant from the USEPA to

examine the feasibility of such an approach.

Their focus is [polluted water](#) running off hard surfaces such as roads and parking lots adjacent to city beaches. A hard rain can wash away a witch's brew of contaminants that often flow directly into the lake.

"It's generally E. coli bacteria and nutrients such as nitrates, phosphorous, plus [heavy metals](#) such as mercury, zinc, copper, nickel and cadmium," said Preethi Chinchoud, a UIC engineering doctoral student working with Reddy. "The nutrients come from landscape runoff. A lot of [organic contaminants](#) come from nearby gas stations or parking lots," she said.

Other pollutants include salts, nanoparticles, leached plastic stabilizers and other chemicals that are often not monitored, but which pose potential risks to public health and lake ecosystems.

Reddy and Pagilla will test various filter media at UIC and IIT labs to determine which pull out the contaminants that commonly wash into the Great Lakes off paved surfaces. The goal is to come up with various pre-beach catch systems that use effective filter material that is relatively cheap and easy to maintain. Following lab tests, the researchers will work with the Chicago Park District to build an actual test site near a Chicago public beach.

"Ultimately our tests will result in a filter system design that's hydraulically efficient with a lot of water flowing through it, but at the same time can retain a lot of types of contaminants."

Reddy thinks if such a system proves effective, governmental agencies may deploy them along threatened lakes and waterways around the country.

"We see large-scale application," he said.

Provided by University of Illinois at Chicago

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