Morgan State testing tool could predict future sewer spills, researcher says

By Karl Hille

A unique circular DNA molecule found in human feces can be used to monitor leaks from aging sewer infrastructure and predict future collapses, such as the one that contaminated the Potomac River in January, researchers at Morgan State University say.

"If you want to find out if it's coming from a human source, you can target this marker," said Samendra Sherchan, professor of environmental biotechnology and environmental health sciences at Morgan State. "This new molecular test is highly efficient and cost-effective compared to lab culture tests," which measure which bacteria grow over time from a sample.

His work focuses on a specific plasmid, a circular strand of DNA found commonly in human digestive tracts that bacteria use as a sort of biological survival toolkit. The plasmid, known as pBI143, is common in human digestive systems, but not found in waste from birds or animals.

Sherchan said the technology for identifying this molecule returns results in less than a day, compared to 24-hours for Environmental Protection Agency-mandated bacterial culture tests used to validate the safety of beaches and waterways for recreation. The testing is also similar to near-real-time monitoring technology installed in the Baltimore Inner Harbor in April, he added, though that technology does not identify the source of the bacteria.

Public utilities could test for this molecule to prevent future spills like the one that dumped 243 million gallons of sewage into the Potomac in January, he said. By efficiently monitoring water downstream from aging sections of sewer systems, Sherchan said, a utility could keep tabs on old pipes that are likely to leak long before they collapse.

Announcing Maryland's lawsuit over the Potomac spill in April, Attorney General Anthony Brown said in a statement that "DC Water knew this aging infrastructure was corroding, yet it delayed repairs and failed in its duty to protect this treasured waterway."

The new test would also help monitor the success of the Potomac cleanup, he said. "If you want to find out if the contamination is coming from human sources, we can target this marker."

Sherchan, who also directs Morgan State's Center of Research Excellence in Wastewater Based Epidemiology, continues to refine testing for the plasmid. He and colleagues published their initial findings in Total Environment Microbiology last June. More testing is needed to confirm the plasmid as a reliable human-specific marker, they wrote.

Have a news tip? Contact Karl Hille at 443-900-7891 or khille@baltsun.com.