Science & Technology

Absorbing the Runoff

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Like most coastal cities with aging storm-water drainage systems, New York routinely spews contaminants into its waterways when it rains. Even a quarter inch of rain can overwhelm New York's drainage system, which funnels storm runoff into the same pipes that carry sewage to water-treatment plants, causing the whole system to back up and resulting in millions of gallons of contaminated water spilling into local rivers.

Patricia Culligan, a Columbia professor of civil engineering and engineering mechanics, says there is a relatively cheap and easy way to address this problem: replace some of the concrete and asphalt that covers 80 percent of the city's total land area with grass, gardens, and trees that will absorb rainwater before it ever reaches the city's overburdened drainage system.

This past fall, Culligan and a team of twenty other investigators won a five-year, $3 million grant from the National Science Foundation to determine what kinds of "urban green infrastructure" can absorb the most rainwater. The research team, which includes several Columbia urban planners, earth scientists, biologists, and data scientists, is working on a test site along the Bronx River. They hope their findings will inform urban-design projects across the city.

"The New York State Department of Environmental Conservation and the city are proposing to collaborate on a $2.7 billion investment in green infrastructure over the next two decades, so this grant is particularly timely," says Culligan, who is leading the project.

The research could ultimately have implications for coastal cities around the world. "We're working with the city to offer a new vision for dealing with storm-water runoff," she says. "Rather than trying to handle it all with a big, centralized public

infrastructure system, we believe it may be smarter to support the construction of thousands of smaller, neighborhood-based interventions that will add up to something big.”

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