



# Barriers to Implementing Stormwater Control Measures in Communities of Color

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## Fushcia Hoover

A native of St. Paul, Minnesota, Fushcia Hoover joined Purdue University's Interdisciplinary Ecological Sciences and Engineering (ESE) Program and the Department of Agricultural and Biological Engineering (ABE) in 2011. She completed her master's degree in ESE, but came to Purdue with her bachelor's in mechanical engineering and Middle East studies from the University of St. Thomas, MN.

A 2017 recipient of the Graduate School's Most Outstanding Interdisciplinary Award, she is also a National Science Foundation Graduate Research Fellow, a Ronald E. McNair Scholar, and a Minorities Striving and Pursuing Higher Degrees of Success in Earth System Science (MSPHDs) scholar. Fushcia considers herself an enthusiastic outdoorswoman, traveler and reader. She plans to spend the month of September travelling throughout Central America before embarking on the job hunt.

A two-part study was conducted in the cities of Lafayette, IN and Chicago, IL to investigate barriers to implementing stormwater control measures (SCMs) in communities of color. In the first study, a watershed level statistical analysis incorporated monitoring data for water quality and water quantity metrics and compared a single watershed design to a paired watershed design. Two-sample t-tests and ANCOVA were conducted to measure change before and after the implementation of SCMs. Additionally, a power analysis was performed to determine sampling periods associated with detecting a minimum percent change at the watershed level. Significant changes in the urban watershed were detected for TSS load (-7%), TSS concentration (+36%), and storm volume (-4%) in the urban watershed using the ANCOVA. However, the power analysis showed that it is likely not possible to detect significant water quality changes at the watershed scale under the time, and monetary constraints of most municipalities.

This second study incorporated interviews, participant observations and GIS analysis in an environmental justice framework to determine the institutional and cultural barriers present for stormwater management in communities of color. Resident interviews were semi-structured focusing on perceptions and attitudes of the environment, experiences associated with flooding during rainstorms, and experiences with city leadership and infrastructure. City and NGO personnel interviews were structured to determine current SCM programs, strategies, and outreach methods. An evaluation of the programs, and statements of city personnel and non-profits showed intent to include socioeconomic data, and quality of life as criteria in SCM placement, in addition to prioritizing communities vulnerable to flooding. However, mapped distribution of SCMs did not align with the distribution of flooding vulnerability. The majority of practices were located in the downtown area of the city, while the most vulnerable (socially and physically) communities were in the south and west sides of the city. Economically vulnerable communities to flooding were spread throughout the north, west, and south parts of the city. Interviewed residents expressed concern for their quality of life and well-being under their current environmental conditions. They also expressed positive attitudes and interest in at least one of the SCMs shown to them during the interview.

