

Title: Urban Stormwater Flooding: Policy Solutions Addressing Chicago's Marginalized Sub-populations

Authors: Darren Christopher, Caleb Hadley, Ron Henderson, Hao Huang, David Lampert, Michael Sansone, Matthew A. Shapiro*, Brent Stephens, Maria Villalobos Hernandez

Climate change is expected to increase the frequency of heavy rainfall events over time, leading to increased flood risks and decreased water quality. There are a number of programs and initiatives to assess risks and respond to flooding events, and we assess the degree to which local and national efforts are coordinated, accounting particularly for differentiated effects among sub-populations. National policies emphasize the connection between flooding and home prices, the labor market, and the insurance market, and disaster relief is provided by the Federal Emergency Management Agency. Stormwater infrastructure is also addressed at the national level through a number of programs offered by the U.S. Environmental Protection Agency (e.g., Urban Waters Small Grants Program, Clean Water State Revolving Fund) and the U.S. Housing and Urban Development (e.g., Community Challenge Planning Grants, Community Development Block Grants). Yet, within municipalities, flooding can disproportionately affect marginalized populations due to a historic lack of investment in stormwater infrastructure. Given the dearth of research quantifying ecosystem services for socio-economically disadvantaged populations, we focus on the case of Chicago, building on research that describes the scope of physical and socio-behavioral differences across Chicago's population, as well as the potential for green infrastructure. Knowledge of the local topology is essential, as stormwater management successes in one area of Chicago's flat topology may lead to increased flooding in others, so a single goal of "reducing flood risk/propensity in South Chicago" could lead to even larger failures. We use a socio-institutional network analysis to identify the goals and influence of different types of actors and describe the linkages among them in terms of information, capacity building, and funding. We analyze which individuals and coalitions are exerting influence when framing sustainable urban stormwater goals, particularly for marginalized communities. We then conduct an economic analysis of prospective and existing initiatives, attending especially to both (1) the distribution of benefits and costs across the aforementioned Chicago sub-populations and (2) prospects for greater integration of municipal and national programs.