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Roles for government and other sectors in the governance of green infrastructure in the U.S.

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ABSTRACT

This paper argues that government leadership both at the federal and local levels remains central to implementing green infrastructure for stormwater management. We conducted interviews with more than forty city, federal, and regional staff on how and why they work to implement green infrastructure, and interpreted the material using literature from environmental governance and water management. We found that government and non-governmental actors tend to act in different ways to support green infrastructure. Government actors at federal and local levels often take the lead role in driving green infrastructure via policy and political support, and coordinating measurement of green infrastructure practices, while non-governmental actors lead in information sharing. We also found that government and non-governmental actors work together to build local capacity by providing resources to support local collaboration and partnerships. We conclude by highlighting key areas of collaboration between government and non-governmental actors to enhance the implementation of green infrastructure.

1. Introduction

The 1972 U.S. Clean Water Act gave the U.S. federal government important new regulatory powers to govern water pollution. Numerous amendments and court rulings have since modified the interpretation and exercise of these powers (see, for example, Adler et al., 1993; Boyd, 2000; Andreen, 2003). Despite gains in water quality, water pollution remains a significant problem, with more than half of assessed rivers and streams across the country remaining impaired (US EPA, 2016). Urban stormwater runoff is now recognized as one of the leading sources of water pollution and water quality impairment. Permitting programs for urban stormwater pollution began in the 1990 s and continue today (NRC, 2009).

Local governments have long been recognized as important actors in achieving environmental goals both at local and global scales. The 1992 Rio Summit of national leaders and environmental ministers stated that:

> "… the participation and cooperation of local authorities will be a determining factor in [Agenda 21] fulfilling its objectives. Local authorities construct, operate and maintain economic, social, and environmental infrastructure, oversee planning processes, establish local environmental policies and regulations, and assist in implementing national and subnational environmental policies. As the level of governance closest to the people, they play a vital role in educating, mobilizing, and responding to the public to promote sustainable development" (United Nations Environmental Programme, 2000).

Current approaches to stormwater management illustrate the wide-ranging roles for local governments. Local governments can commit to sustained and coordinated stormwater management through plans that last twenty years or more (see, for example, PWD, 2009; NYC DEP, 2016). Local governments can use unique financial resources and capacity to implement environmental policy and action: the municipal governments of New York, Philadelphia, and Washington D.C., announced $5.3, $2.0, and $2.6 billion stormwater plans, respectively (NYC, 2010; PWD, 2011; DC Water, 2016). In tandem with local government investments, the U.S. Environmental Protection Agency (EPA) provides funding to states via Section 319 funds, often supplemented by additional state funds (Hardy and Koontz, 2007). Even within a single municipality, multiple government agencies are often engaged in active partnerships to address stormwater management.

Given the authority, jurisdiction, and financial capacity of governments, examining how government works with other sectors on stormwater management yields useful insights for practice and scholarship in two areas. First, how government and non-governmental actors work together in practice is relevant to the scholarship on adaptive governance, and to environmental governance more broadly.

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This literature has recently sought to incorporate approaches that emphasize the flexibility of legal instruments (Cosens et al., 2017), recognize how different modes of governance emerge and overlap (Driessen et al., 2012), and articulate the ways that social organizations can support more effective environmental management (Allen et al., 2011). Second, how government and non-governmental actors work together is relevant to the literature on green infrastructure, which frequently emphasizes the different roles of multiple actors (Shandas and Messer, 2008; Keeley et al., 2013; Flynn and Davidson, 2016; Chaffin et al., 2016).

To show how government actors work with non-profits and other organizations, we interviewed more than forty city, federal, and regional staff on how and why they implement green infrastructure. These interviews describe a national view of stormwater management approaches. This complements the deeper but narrower approach of Keeley et al. (2013), which is based on interviews with a range of actors in two cities. Applying the existing literature on governance and environmental management to the implementation of green infrastructure in the U.S., we find that government – from the federal to the local level – plays a necessary leadership role in how stormwater agencies and managers adapt to new ideas and opportunities. In particular, we focus on three roles for government and other sectors in the governance of green infrastructure in the U.S.: as driver, as coordinator, and as a capacity-builder. From our interviews, we conclude that government and non-governmental actors tend to act in different ways: government actors often take the lead role in driving green infrastructure via policy and political support, as well as coordinating the measurement of green infrastructure practices, while non-governmental actors often lead in information sharing. Government and non-governmental actors often work together to build local capacity by providing resources to support local collaboration and partnerships. In this paper, we show how government and non-governmental actors take on different roles in leading and supporting the governance of green infrastructure for urban stormwater management. Where previous scholarship on adaptive governance emphasizes non-governmental actors, we show that government actors continue to play multiple important roles in the governance of green infrastructure for stormwater management.

In the next section we examine the literature on environmental governance, with a focus on adaptive governance. We then discuss our research methods, analysis, and results. We conclude by highlighting key areas of collaboration between federal and local government and non-governmental actors on green infrastructure.

2. Literature review

In this section we first describe the importance of local government to concepts of governance, and then examine the ways in which government and non-governmental actors work together to achieve environmental and water quality goals. Finally, we discuss adaptive governance and illustrate the link between modes of action and the effective implementation of green infrastructure.

Local governments play a critical role in implementing environmental goals, with responsibility ranging from infrastructure development to planning processes to implementing national and state environmental policies (United Nations Environmental Programme, 2000). Scholars use the concept of environmental governance to describe more effective ways to manage environmental problems by emphasizing the networks of, and partnerships between, government and non-governmental organizations. The definition of governance continues to be refined and applied to new areas, but the term governance has historically been used in three ways: first, in referring to international cooperation managed by organizations other than formal states; second, as policy implementation (such as "good governance"); and third, as domestic networks of actors tasked with achieving public goals (Fukuyama, 2016). Such governance networks include government and non-governmental actors, or in some cases, can be networks between governments, such as municipal networks aimed at addressing climate change (Bulkeley, 2005). Given our domestic focus, we use the third definition of governance, that "'*governance' is about establishing, promoting and supporting a specific type of relationship between governmental and nongovernmental actors in the governing process*'" (Howlett and Ramesh, 2014, p. 318, italics in the original).

Embedded in the concept of governance is a normative argument about the most effective way to achieve public goals: "such as 'network governance' or 'collaborative governance' combin[e] the best of both governmental and market-based arrangements by bringing together key public and private actors in a policy sector in a constructive and inexpensive way" (Howlett and Ramesh, 2014, p. 318). Gunningham and Holley (2016) chart out the recent history of Anglo-Saxon environmental governance – and its relationship to regulation and law – to provide context for how government and non-governmental organizations, such as business and NGOs, can work together. For complex environmental challenges, the approaches in "New Environmental Governance" emphasize "flexibility, participation, collaboration, learning, and adaptation" (Gunningham and Holley, 2016, p. 283). These approaches range from pragmatism to adaptive management (Holling, 1978; Walters and Holling, 1990) and aim to bridge the gap between traditional approaches to regulation and implementation challenges. More flexible and collaborative environmental governance aims to enable "problem solving that is inclusive of local circumstances and able to capitalize on the unique local and other knowledges and capacities of multiple public and private actors" (Gunningham and Holley, 2016, p. 284). Among these multiple definitions and approaches, scholars highlight the challenge of differentiating between different types of governance especially when "modes of governance tend to build on rather than completely replace one another" (Driessen et al., 2012, p. 157). Scholars are beginning to examine the layering of governance mechanisms, such as incorporating legal tools in adaptive approaches (Cosens et al., 2017; Craig et al., 2017).

We identified three different roles that government and non-governmental actors play in order to achieve local stormwater goals (going forward, we use the terms "roles" and "modes of action" interchangeably to describe how different actors pursue their goals). We focus on implementation and the perceptions of those actors responsible for translating stormwater and water quality policy goals into local green stormwater infrastructure programs. In Table 1, we show three modes of action for government and non-governmental actors, and how they relate to examples in implementing green infrastructure.

2.1. Achieving water quality goals: government and non-governmental actors

Scholars have discussed the actors and actions involved in environmental policy and management for decades (Driessen et al., 2012). Environmental governance in a broad sense emphasizes "interventions aiming at changes in environment-related incentives, knowledge, institutions, decision making, and behaviors" (Lemos and Agrawal, 2006, p. 298), although more specific formulations focus on processes, mechanisms, organizations, and networks that influence environmental outcomes. This broadening of actors and responsibilities plays an important role in how scholars assess the processes and mechanisms related to achieving environmental goals, such as in the ways that global environmental goals are rooted in key local and subnational actors and networks (Betsill and Bulkeley, 2006; Bulkeley and Betsill, 2005). Governance of water goals – water quality and quantity goals – relies on actions at different scales given that challenges may be appropriate to examine at a project, catchment, basin, or even, global scale (Moss and Newig, 2010).

Collaborative partnerships help address the complexity within environmental policymaking and management. This complexity can stem from the multiplicity and mix of institutions governing resource management, mixed motivations, and the interconnected nature of many