Community Engagement for Integrated Stormwater Management Implementation

Project Motivation: The effective implementation of green infrastructure in an urban setting necessitates stormwater control measures on private property, and thus, requires significant community buy-in. This study investigates the role of community engagement in the successful implementation of green infrastructure on private property. The overreaching question guiding this research is: does the magnitude and type of community engagement help explain variation in the implementation of green infrastructure projects on private property?

Research Methods: This project used semi-structured interviews to explore topics such as structure, frequency and type of community engagement projects, relationships with and between town agencies, and willingness to implement a range of stormwater management practices on private property. Interviews were conducted in Granville, Person, and Wake Counties and Hillsborough (Orange Co.), Stem, Creedmoor, Butner, Roxboro.

Findings: Key emergent themes from this study include the 1) persistent challenges arising from geographic location and scale despite regional collaborative efforts, 2) narrow problem definitions that artificially separated related topics, and 3) the reliance on public awareness to motivate behavioral change. The collaborative efforts underway in the Falls Lake watershed do not occur in isolation from larger tensions around development and capacity. Efforts to address underlying root causes of these tensions can help improve water quality and other regional development challenges. Participants discussed the creation of hierarchies where nuisance flooding and/or climate change took a backseat to nutrient loading. These issues are interconnected and resonate with community residents. Unfortunately, stormwater infrastructure investments did not fare well in cost-benefit analyses, but these calculations did not account for long-term cost savings, or benefits that are difficult to monetize. Finally, current community engagement strategies emphasize increasing awareness, but currently lack content and programming to move residents towards action.

Management Implications and Recommendations: Regional collaborations must acknowledge power differentials in the structure and facilitation, and regional and state agencies can help address tension arising from limited resource availability. Programs that augment the financial resources and further build capacity in rural and small jurisdictions may address multiple barriers to collective action to protect water quality. We also recommend programs focused on moving from awareness to action.

Researcher: Danielle Spurlock, PhD, MRP, MPH, Department of City and Regional Planning, University of North Carolina at Chapel Hill

Student Researchers: Dylan Burkett, Duncan Dodson, Eunbi Ko, Katie Koffman, Siri Nallaparaju, Kelsey Peterson, and Amy Sechrist

Project Motivation: Traditional systems of moving stormwater away from development can mitigate flooding, but not without creating unintended consequences. The rapid conveyance of urban stormwater through networks of pipes can transport large volumes of untreated stormwater into receiving waters, which poses a threat to current environmental standards and the health and safety of downstream communities. Some jurisdictions are augmenting this traditional approach with parcel level stormwater management practices that utilize green infrastructure. Green infrastructure seeks to reduce and treat stormwater at its source and includes stormwater control measures such as rain gardens, cisterns, green roofs, permeable pavers, bioswales, and wetlands.

The benefits of public participation in planning processes include higher rates of plan and policy implementation (Burby, 2003), cultivation of social networks and social capacity (Innes, 1996), and increased trust between government, institutions, and community members (Laurian & Shaw, 2008). Public participation often relies on techniques that facilitate unilateral flow of information (i.e., to educate or garner community support) (Arnstein, 1969). However, techniques that strive to build consensus through a bilateral flow of information have gained recognition amongst planners as they can foster more inclusive processes and better solutions (Innes, 1996; Laurian & Shaw, 2008). The effective and efficient implementation of green infrastructure in an urban setting necessitates the placement of stormwater control measures on private property, and thus, requires significant community buy-in. This study investigates the role of community engagement in the successful implementation of green infrastructure on private property.

Methods: The project conducted 35 semi-structured interviews with elected officials, staff, nonprofit stakeholders, community residents, and developers in Granville, Person, and Wake Counties[1] as well as Hillsborough (Orange Co.), Stem, Creedmoor, Butner, Roxboro. While we prioritized our efforts in identifying, recruiting, and conducting interviews with community residents from a range of socio-demographic backgrounds, the Covid-19 pandemic and the rural nature of the watershed presented challenges in recruitment and we encountered barriers to creating a more complete picture of resident perspectives on green infrastructure in the region. During the initial months of COVID-19, we moved delayed interviews, and then conducted them remotely via Zoom. However, difficulties persisted in recruiting community residents for interviews even after exploring new methods (Facebook and NextDoor) of identifying potential participants. This discrepancy may account for some of the differences observed through our comparison with Jordan Lake interviewees.

The interview guide explores specific information about the depth of engagement activities and their effectiveness in avoiding the pitfalls of unilateral communication as well as familiarity with different types of green infrastructure and reactions to their aesthetics. It also covered cover topics such as structure, relationships with and between municipal agencies, and willingness to implement a range of stormwater management practices on private property.

[1] A portion of six counties (Person, Granville, Franklin, Orange, Durham, Wake) make up the Fall Lake watershed. This research team has previously conducted interviews in Durham, Orange, and portions of Wake.

Findings: Key emergent themes from this study include the 1) persistent challenges arising from geographic location and size despite regional collaborative efforts, 2) narrow problem definitions that artificially separated related topics, and 3) the reliance on public awareness to motivate behavioral change.

Location and Size. There is continued tension related to geographic scale (rural versus urban) and the related topic of financial resources and capacity. Even with the long-term, collaborative efforts led by the Upper Neuse River Basin, interviews shared the perspectives that smaller, rural jurisdictions were seen as a barrier to improved water quality despite their efforts. We do not believe this tension reflects the quality of the collaborative efforts. Rather, it may be an artifact of the pressure felt by smaller, rural areas given available resources. For example, the persistent beliefs about the role of agriculture in nutrient loading contribute to underlying conflicts. Farmers and agriculture advocates discussed a multitude of practices adopted to reduce nutrient loading, but feel as though urban jurisdiction overlooked/dismissed by urban jurisdictions and continue to place the burden of nutrient loading disproportionately on agriculture.

Resource availability exacerbates this tension, which is tied to the size and past growth trajectory of jurisdictions. Larger, more urban jurisdictions have the staff and budget to advance their interests, while smaller, rural locales have less money and staff to work with. Smaller jurisdictions do not want larger jurisdictions dictating their land use, but larger, downstream jurisdictions want/need action to protect their drinking water quality. Interviews from individuals within smaller jurisdictions stated they want the same pathway to growth used by larger jurisdiction and they resent restrictions to economic prosperity promised by development.

Non-governmental actors cited challenges in working with larger jurisdictions on water quality issues. It can be more difficult to get answers or have a decision made without it going through several layers of bureaucracy. It can also be difficult to determine who to work with on projects. Implementation was also a concern in smaller jurisdictions due to a lack of resources and staff capacity. Multi-jurisdictional arrangements can be helpful in creating tools for all governments to use, but even these collaborations create disproportionately more work for the smaller jurisdictions. Many of the locales already rely on consultants to take care of larger issues, and these added responsibilities exceed their capacity and may make it costly to find more consultants who can help.

Narrow Problem Definition. Several interviews suggest that local problem definitions around water quality tend to narrow and silo issues when a systems approach is necessary. A lot of emphasis is on meeting nutrient loading targets with less time and energy devoted to holistic water quality and quantity management, with more benefits than just a lower nutrient load. There is data on water quality but less widespread understanding of how it affects public safety, fishing, ecology, tourism, and recreation. For example, flooding or climate change taking backseat to nutrient loading in conversation, but these issues are linked and resonant with community residents. With a narrow set of goals (often around nutrient loading) that are quantitatively measured, there is a disconnect between the data and the variety of policies that need to be implemented to address the underlying issue.

There were recurring concerns that short-term, economic cost/benefit drove decision-making. Interviewees shared that stormwater infrastructure projects were not approved because of their price tag, but politicians and officials did not always consider

the long-term cost savings of implementing the infrastructure. Although the economic impact of tourism (especially water-related tourism) has the potential to change the minds of numerous legislators, interviewees cautioned that the conversation cannot remain solely an economic issue.

Public Engagement. Most efforts sought to raise awareness of water quality issues, with extensive programming focused on students' awareness of water resources at a variety of educational levels. Jurisdictions could expand and tailor this programming to adults to help create a shared problem definition. The research team cautions that while public awareness campaigns were successful in increasing support for new behaviors like recycling and use of 911 by focusing on students, the behaviors around water resource protection are complicated, so may need to expand beyond awareness campaigns.

Interviewees shared that many of the metrics they used to measure public engagement and the data they received about water quality are quantitative and may not get to the hows and whys of behavior. For example, trust remains an issue in historically marginalized communities. The current focus on these communities can further undermine trust as communities experiencing gentrification and displacement wonder why there is current interest in address flooding, water quality, and water accessibility.

Finally, in the era of COVID, there was a widespread assumption online engagement would create more access when people do not have to attend meetings in person. However, there is a persistent digital divide experienced by both rural and urban residents and the challenges of presenting technical data clearly and concisely on a virtual platform.

Management Implications and Recommendations:

Address power dynamics in regional collaboration. There is continued tension related to geographic scale (rural versus urban) and the related topic of financial resources and capacity. Larger jurisdictions can have an outsized influence on regional processes and shape how smaller jurisdictions manage development. Smaller jurisdictions are hesitant to restrict development, as it is the pathway that larger jurisdictions used to become economically prosperous.

Incentivize jurisdictions to take a systems approach to water quality. There are often very clear targets that need to be met with relationship to nutrient management. However, there are also more benefits that could be secured if jurisdictions were supported in adopting a more holistic view of benefits, including efforts that address nuisance flooding and climate change. Be cautious of recreating the dynamic stated above and provide financial resources and capacity building support.

Creating programing aimed at shifting individuals and households from awareness to action. Based on our interviews in Jordan Lake and Falls Lake, we believe there is a tendency to espouse environmental protection values and attitudes and resist changes to individual behaviors or the use of private property to protect water quality. Future programming must move beyond awareness at the household level to motivate changes in behavior and increasing the willingness to take action on private property.