Highlighting assumptions of community engagement in urban stream restoration

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Abstract: Restoration practitioners experience mixed results when they try to engage community members in urban stream restoration projects. In some cases, practitioners make presumptions about community responses to restoration that lead to unsuccessful engagement and detract from restoration goals. During the 5th Symposium on Urbanization and Stream Ecology, we noticed that participants repeatedly discussed community stakeholder engagement as a tool for effective urban stream restoration. However, most presenters did not acknowledge that typical engagement strategies do not consider how the target community's social, economic, and political dynamics will influence stakeholder response. As a result, many practitioners make assumptions about communities that can be counterproductive to engagement efforts. Here, we discuss 4 underlying assumptions that many researchers make when trying to engage community stakeholders: 1) community members and researchers have the same project goals, 2) educating residents is essential in garnering community support, 3) the community will benefit from the restoration effort, and 4) the community has solutions to contribute to the technical aspects of the restoration effort. We present and develop these assumptions in the context of relevant urban stream restoration projects and highlight the complexity represented across communities where urban stream restoration projects can take place. Land managers and researchers must first cultivate a thoughtful understanding of the community and its existing socioeconomic capacities before integrating community stakeholders into urban stream restoration projects. We believe highlighting these societal complexities will promote a deeper consideration of appropriate engagement strategies for urban stream restoration projects.

Key words: urban stream, stream restoration, community engagement, community response, assumptions, sociodemographics

Most urban stream restoration projects hinge on community stakeholder engagement to achieve restoration goals like improved flood mitigation, enhanced connectivity of aquatic habitats, and increased stewardship of urban waterways by residents (Bernhardt et al. 2007, Kondolf and Yang 2008, Campbell et al. 2010, Kenney et al. 2012). Additionally, community stakeholder engagement is widely used to increase the likelihood of achieving restoration objectives (Gregory et al. 2011). Engaging with community stakeholders during the early stages of stream restoration projects can help establish relevant and realistic expectations for practitioners to guide the restoration process (Larson and Lach 2008, Phalen 2009, Yocom 2014). However, we lack studies that thoroughly document the process of community engagement in urban stream restoration projects (Tunstall et al. 2000, Eden and Tunstall 2006 Alam 2013, Lave 2016, Vermaat et al. 2016). Moreover, guidelines or best practices that describe how to effectively integrate community stakeholders are not translatable across certain social, political, and economic contexts, which has led to an incomplete understanding of how communities may respond to restoration projects. This lack of standardized guidelines can create

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obstacles for restoration practitioners when designing projects that depend on community stakeholder involvement.

At the 5th Symposium on Urbanization and Stream Ecology (SUSE5), participants discussed ways to involve community stakeholders in urban stream restoration projects in the Austin, Texas, USA, area. Participants included engineers and scientists from academic institutions, nonprofit organizations, and local, state, and federal agencies. During the conference, participants identified several common yet misguided practices many practitioners use to integrate community input into restoration design. Participants also discussed the common assumption that community stakeholders generally respond positively to restoration projects. These conversations brought about collective attention to the need for scientists to develop novel ways to engage stakeholders that consider the social, political, and economic characteristics of the community.

Our objective is to address specific assumptions that practitioners often make when trying to involve community members in urban stream restoration projects. The assumptions we consider were inspired by discussions held during SUSE5 (Table 1) including: 1) community members and researchers have the same project goals, 2) educating residents is essential in garnering community support, 3) the community will benefit from the restoration effort, and 4) the community has solutions to contribute to restoration design. We highlight examples of urban stream restoration projects in which practitioners directly considered socioeconomic outcomes in their plans and address the diverse community responses that might arise when engaging local stakeholders. These examples were selected as they allow us to disentangle the social, political, and economic characteristics of a community that may intersect with stream restoration projects. Additionally, we call attention to societal and economic considerations that will help project managers better understand the complexities of stakeholder engagement.

ASSUMPTIONS

Community members and researchers have the same project goals

In several stream restoration projects, restoration practitioners achieved the most beneficial outcomes when they

Table 1. Well-intentioned statements of 5th Symposium on Urbanization and Stream Ecology (SUSE5) participants, the associated underlying assumption, and potential awareness topics to combat assumptions.

Statement[a]	Assumption[b]	Awareness topics[c]	Source
"The community will want to help us restore the stream."	Community members and researchers have the same project goals.	The community may not support the urban stream restoration project.	Campbell et al. 2010
		Different stakeholders may have opposing goals.	Alam 2013
			Heldt et al. 2016
		Sociodemographics may play a role in a community's varying level of support.	Pradhananga et al. 2019
"If people only knew about this issue, they'd do more."	Educating residents is essential in garnering community support.	Individual barriers can influence environmental awareness and attitudes towards urban restoration projects.	Wamsler et al. 2020
		Factors such as time or money may limit consistent community engagement.	Campbell et al. 2010 Smith et al. 2016
"We want the community to be happy."	Community will benefit from the restoration effort.	Unacknowledged consequences can negatively impact communities.	Johnson Gaither 2019
		Urban stream restoration can lead to environmental gentrification.	Ranganathan and Bratman 2021
"We would ask the community for ideas on how to restore the stream."	Community has solutions to contribute.	The suggestions may not be suitable for addressing ecological concerns for a restoration area.	Brikke 2009
		Not all voices within the community will be heard or given equal weight.	Allan and Lovett 1997
			Díaz-Pascacio et al. 2022

[a] Well-intentioned statements on how to engage communities in urban stream restoration projects made by participants during the closing discussions of SUSE5 (15 February 2020).

[b] Underlying assumption within the statement that fails to consider how social, economic, and political dynamics will influence stakeholder response.

[c] Specific examples as to why the statement may be inappropriate within the context of existing community dynamics.

agreed with community stakeholders on project objectives (Eden and Tunstall 2006, Campbell et al. 2010, Buchanan et al. 2014, Yocom 2014). Establishing a consensus on project goals is particularly important for projects in dense urban areas near the focal stream or river (Campbell et al. 2010, Buchanan et al. 2014). Effectively integrating community input into restoration projects has been shown to improve project success and leads to long-term stewardship within the local community (Larson and Lach 2008, Phalen 2009, Smith et al. 2016). However, community support is not guaranteed, and local opinion on restoration initiatives may be in direct conflict with those of restoration managers and practitioners. Because urban stream restoration is a highly collaborative and integrative process, we must address the goals and expectations of the many stakeholder groups involved (Heldt et al. 2016).

Conflict between the interests of community stakeholder groups and other involved parties is common, particularly in the preliminary stages of stream restoration planning (Alam 2013, Riley 2016). Such conflicts often arise because of a perceived lack of interest by community stakeholders or because of the occurrence of undesirable community-wide changes that result from the project (Heldt et al. 2016, Pradhananga et al. 2019). For example, during restoration of Minnehaha Creek in Hennepin County, Minnesota, USA, researchers found that low-income communities and communities of color faced several barriers to engagement in restoration planning, including cultural differences in water use and recreation (e.g., popular activities within Minnehaha Creek such as boating and swimming were not highly valued among community members of different ethnic backgrounds) as well as feeling disenfranchised and excluded from decision making with respect to local environmental issues (Pradhananga et al. 2019). In addition, commonplace methods of engaging communities, such as through the use of printed materials and websites, were not culturally aligned with methods of communication preferred by different ethnic groups within the community, who were more accustomed to oral and interpersonal communication. Such barriers ensure that community needs and concerns surrounding urban stream restoration and water use remained unaddressed throughout the decision-making process. As such, the perception of lack of interest by residents or community stakeholders could be remedied by employing varying methods of engagement, particularly when involving groups who have been historically marginalized from environmental decision making and may feel their opinions are not valued. Similarly, community stakeholders may also feel that restoration will result in a loss or restriction of previously enjoyed cultural services, such as some recreational activities, as certain allowances may be reappropriated following restoration (Alam 2013).

Sociodemographic factors can influence whether community stakeholders support urban stream restoration projects. For example, in both developed and developing countries, individual demographics like age, race, gender, education level, socioeconomic status, and neighborhood transiency influenced public perception towards stream restoration (Campbell et al. 2010, Alam 2013). A study examining factors affecting community engagement of urban river restoration in Bangladesh found that male-headed households with high incomes showed greater concern towards river restoration. Also, in certain restoration projects, education level is a leading indicator that predicts a resident's willingness to engage in restoration (Alam 2013). Likewise, case studies of urban stream restoration in New Zealand found that communities with high residential turnover consistently expressed disinterest in stream restoration projects (Campbell et al. 2010). We expect that the influence of demographic factors on community support will be highest in urban settings with greater levels of social diversity.

Practitioners can reduce conflict with community members by integrating the input and perspectives of all community stakeholders early in the planning process (Alam 2013, Murphy et al. 2022). Furthermore, the success of urban stream restoration projects is contingent on establishing methods of engagement that are reflective of the community (Campbell et al. 2010, Heldt et al. 2016). For example, in the restoration of Taiaotea Creek in North Shore City, New Zealand, practitioners used a combination of volunteer programs, workshops, public meetings, and outreach activities, which successfully increased community involvement in restoration activities (Campbell et al. 2010).

Educating residents is essential in garnering community support

Restoration practitioners have used education and outreach activities as a tool to promote awareness of restoration efforts and encourage sustained community engagement (Williams and Stewart 1998, Egan et al. 2011, Smith et al. 2016). One common outreach activity is citizen science projects, in which researchers train citizens to collect data relevant to a project. For example, the Upper Oconee Watershed Network in Athens, Georgia, USA, has been training citizens to monitor local streams for more than 2 decades (Little et al. 2007). In North Carolina, USA, the nonprofit organization Mainspring Conservation Trust encourages citizens to sample local waterways to promote watershed conservation efforts (Brownson et al. 2020). Practitioners design these initiatives to draw community attention and support to restoration efforts. Citizen science projects are particularly effective in areas where stream burial and piping practices have blinded the community to the stream's existence, such as the Taiaotea Reserve area in New Zealand (Campbell et al. 2010). In these cases, practitioners use citizen science projects to bring awareness to areas where streams are not visible in the hope that once residents learn that there is a stream in peril in their neighborhood, they will be more likely to invest effort into restoration (Booth et al. 2004).

Education and outreach activities can be resource expensive and often do not target the entire community. One drawback to education and outreach activities is that they require additional resources that may not be available. Restoration projects that include outreach activities as a form of community engagement require a large investment of time and financial resources (Smith et al. 2016). Additionally, the cost of stream restoration projects can vary widely depending on the scale of the restoration and the desired level of community engagement (Campbell et al. 2010). For example, if resources are limited, practitioners may not be able to consistently engage with the community on a long-term basis. Additionally, outreach activities may not be the best method to engage the whole community because only certain members may participate. A study in the United Kingdom found that those from white ethnic groups were more likely to participate in citizen science activities, and that men were more likely to participate than women (Pateman et al. 2021).

Barriers at the individual, family, and community level can affect environmental awareness and support for ecological projects (Cogut et al. 2019). These barriers can include education level, income, length of residency, political orientations, and individual perception and influence (Wamsler et al. 2020). At the community level, demographic factors related to income and neighborhood transiency influence both public interest and awareness towards environmental issues (Campbell et al. 2010). Cultivating a greater awareness of a community's socioeconomic state will likely be more effective in engaging the community on urban stream restoration projects than educational or outreach efforts alone. A lack of awareness may not be the main factor inhibiting community involvement in urban stream restoration projects because other community concerns, such as crime or housing quality, may be more pressing to stakeholders.

The community will benefit from the restoration effort

Many community stakeholders resist restoration projects because they fear potential negative impacts (Alam 2013). Community members are commonly concerned that restoration initiatives will directly conflict with their livelihood and that ecological productivity will be valued over community well-being (Kenney et al. 2012, Alam 2013, Heldt et al. 2016). For example, Heldt et al. (2016) surveyed resident opinion towards restoration projects implemented in the Emscher River, Germany. Residents noted issues such as noise disturbance, property damage, and a loss of privacy caused by increased interest in the surrounding areas (Heldt et al. 2016). Additionally, urban stream restoration projects can be strongly tied to issues of equity surrounding social and environmental justice, which, if left unacknowledged, will disproportionately benefit some residents and further marginalize others.

Green infrastructure and sustainable development practices can lead to environmental gentrification, a process in which greening projects attract wealthier residents to a previously disenfranchised neighborhood, increasing property values and pushing out longtime residents (Smardon et al. 2018, Ranganathan and Bratman 2021). In the Proctor Creek Watershed in northwest Atlanta, implementation of green infrastructure and other restorative practices to mitigate intense flooding events have led to increased rent and higher property taxes for longtime residents (Johnson Gaither 2019, Jelks et al. 2020). In Washington, DC, USA, the restoration of the Anacostia River, following decades of illegal dumping and toxic pollutant inflows, resulted in attractive economic opportunities and the gentrification of underserved and historically marginalized communities in neighborhoods east of the river (Ranganathan and Bratman 2021). Residents of communities in southeastern Chicago, Illinois, USA, situated alongside the Calamet River were hesitant to support future propositions of environmental restoration due to previous occurrences of green gentrification that took place in surrounding neighborhoods, despite assurances from city officials that restoration will ultimately be beneficial for those in the area (McKendry and Janos 2015).

If we hope to manage inclusive restoration projects that benefit the entire community, we must consider restoration objectives in the context of a community's existing social, economic, and political dynamics. For example, using the just-green-enough approach, practitioners design restoration projects that effectively address ecological restoration goals and improve residential quality of life but do not generate new buildings and investments (Curran and Hamilton 2012, Wolch et al. 2014). In other cases, practitioners try to help current residents retain affordable housing prices via housing trust funds or rent sharing (Pearsall 2012, Wolch et al. 2014).

The community has solutions to contribute

One of the main activities of SUSE5 was to explore local urban streams in interdisciplinary groups and present possible solutions to specific restoration issues raised by the City of Austin, Texas. It was suggested by several groups that one of the best options to address this complexity in stream restoration would be to ask the community for technical restoration advice. This suggestion assumes that the community will have solutions to contribute and that practitioners have enough resources to effectively solicit these solutions from stakeholders.

Assuming practitioners achieve effective engagement, recommendations by community stakeholders concerning urban stream restoration may not be technically suitable or ecologically relevant (Kondolf and Yang 2008, Murphy et al. 2022). In asking the community to weigh in on an issue that is grounded in ecological understanding, community stakeholders are idealized as knowing what is best for the community. This may not be an appropriate approach, as a community's cultural norms or desires for an urban

stream restoration project may not align with conservation values (Brikke 2009). For example, if the primary objective of an urban stream restoration project is to minimize flood risks, the solutions advocated by the community may not specifically address this issue.

Soliciting appropriate feedback from the community

Although community engagement is widely encouraged, initiating contact to solicit feedback remains a challenge (Crawford et al. 2017). Typical meeting times may accommodate residents outside the community but could result in the underrepresentation of actual community members (Allan and Lovett 1997). For example, non-residents with recreational or financial interests in the community may have more free time to attend community meetings than lower-income residents. Practitioners should also consider whether those who use the urban stream are the same as those who live near the stream and may be more directly affected by restoration activities. Additionally, not all voices will be given equal weight, even if the community is asked to contribute ideas. For example, technological methods of receiving feedback, like through email or phone, may be inappropriate as some stakeholders may not have access to these or other forms of communication (Reed 1997). The most effective way to engage all members of the community may be to use a combination of methods, given the limitations of in-person meetings and electronic communication (Hall et al. 2021).

One way to manage these issues is to design urban restoration projects that benefit the established community and do not aim to create new economic opportunities for investors (Clark 1995). Restoration projects that benefit the established community could incorporate community feedback at all stages of the project and would incentivize managers to seek out community members. Community members would be more likely to participate in a project that prioritizes the community's immediate and long-term input.

MOVING FORWARD IN COMMUNITY ENGAGEMENT

Our goal was to address assumptions regarding community engagement in urban stream restoration initiatives, as informed by discussions held during SUSE5. We also highlighted overlooked community considerations related to urban stream restoration. The 4 assumptions we discussed are all influenced by the social, political, and economic conditions of a community—areas which may lie outside the expertise of most natural scientists (Murphy et al. 2022). By exploring these assumptions, we illustrate that restoration practitioners face many challenges in effectively engaging communities in urban stream projects. Researchers must be forthcoming about the challenges of integrating community stakeholders in restoration design if freshwater science is to be more inclusive and equitable to urban communities that rely on freshwater resources. Ultimately, we must design effective engagement strategies that give equal weight to the nuanced characteristics of both the stream and the community. Solutions such as prioritizing community engagement, collaborating with local organizations, and investing resources in communication can help restoration projects address these underlying community engagement assumptions.

Prioritize community engagement from the beginning

Practitioners can overcome some of these assumptions by effectively engaging the community at the start of a restoration project. Ideally, the location of an urban stream restoration project would be decided by both the practitioners and the community. However, practitioners would need to spend a substantial amount of time with the community to achieve high levels of trust with stakeholders, a level of engagement which requires significant financial and time investments (Crawford et al. 2017, Golladay et al. 2021). We can also avoid making false assumptions by equipping natural scientists with community engagement skills, which, despite growing interest, is not prioritized in traditional natural science education and training (Burdett et al. 2021, Hopfensperger et al. 2021). Another option is to create an interdisciplinary practitioner team. As researchers are typically not trained to effectively engage with the public, including practitioners that have a background in social science may be helpful to interact effectively with the local community.

Collaborate with local grassroots organizations and government agencies

To improve community engagement, researchers could collaborate with local grassroot environmental organizations made up of community members that discuss ways to navigate local ecological concerns. In stream restoration projects in Austin, Texas, and Atlanta, Georgia, historically marginalized citizens formed their own coalitions to advocate for their inclusion in restoration efforts (Boggs 2016). Researchers trying to understand the concerns and social dynamics of a focal community should start by communicating with these organizations.

Increased involvement in restoration efforts from groups that typically manage urban streams, such as local governments, can help ensure that practitioners consider community concerns with ecological issues when designing restoration plans (Murphy et al. 2022). Individuals tasked with restoration implementation could fully engage with the community and foster trust through long-term engagement. Researchers whose preferred restoration outcomes may prioritize preserving stream structure and function could contribute to the restoration project as stakeholders. This type of collaboration also reduces the time investment of academic researchers, who are often already overtaxed by multiple time demands (Hopfensperger et al. 2021).

Invest resources in communication

Researchers facilitating community engagement must acknowledge that the existing power and socioeconomic dynamics of a community can skew communication efforts (Few et al. 2007, Wamsler et al. 2020). Additionally, as examples of environmental gentrification become more widespread, communities that have been historically marginalized may be even more hesitant to engage in discussions to improve stream management (Anguelovski et al. 2018, Johnson Gaither 2019). Consequently, restoration managers that hope to engage the local community and solicit input on a stream restoration project may need to compensate for previously failed attempts to interact with the community. During SUSE5, participant recommendations to integrate community stakeholders ranged from completing a race and class analysis, to compensating community members for their time, to understanding the region's sociohistorical development before undergoing restoration (Yocom 2014). Overall, most of the recommendations put greater emphasis on the engagement process rather than technical restoration solutions, demonstrating a positive attitude towards community involvement. Before we can realize a path towards effective engagement, we must address any misguided assumptions concerning community responses to restoration projects.

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