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Towards a Civic Ecology of Green Infrastructure:

Opportunities for expanding public involvement in stormwater management

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ABSTRACT

Integrated stormwater management using green infrastructure shows promise in saving money and mitigating environmental impacts caused by urban development. Equally important are the potential community benefits, including better understanding of ecological systems, increased access to urban green spaces, safer and healthier neighborhoods, and informed residents that are equipped to take action to improve watershed health. As a partnership between the City of Portland Environmental Services, Portland State University, and residents of the Tabor to the River (T2R) neighborhood, we conducted a survey to understand the role of civic ecology in green infrastructure projects. The survey results indicate a high interest in certain stormwater

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strategies and highlights information gaps among T2R residents. Supportive strategies that might improve the civic capacity for residents to steward green infrastructure project include financial incentives and technical assistance, and reducing costs and limiting time commitments. Outreach through classes and hands on training also seem appealing to respondents. These results help to frame an outreach strategy that leverages involvement from multiple partners to advance our understanding of the role civic ecology in large-scale, urban, green infrastructure projects.

INTRODUCTION

Integrated stormwater management using green infrastructure shows promise in saving money and mitigating environmental impacts caused by urban development. Equally important are the potential community benefits, including better understanding of ecological systems, increased access to urban green spaces, safer and healthier neighborhoods, and informed residents that are equipped to take action to improve watershed health. While many municipalities are developing stormwater management strategies using green infrastructure, the scope and extent of Portland's stormwater programs are unprecedented; notably the Tabor to the River Program (T2R) wherein 500 green streets & 3,800 trees, pipework and a robust education program are being implemented to manage street runoff (www.portlandonline.com/bes/tabortoriver).

This report summarizes the results of a partnership between the City of Portland Environmental Services, Portland State University, and residents of the Tabor to the River neighborhood. The partnership focuses on understanding perceptions of green infrastructure by residents of the T2R area of Portland. Specifically we report key findings from a neighborhood survey which focused on household perceptions of stormwater systems, and the likelihood of

residents to manage stormwater on their properties. The household survey, conducted in May 2009, was mailed to 2,215 households in the T2R area of the city. The area consists of 6.5km² of predominately residential neighborhoods in the Southeast quadrant of the City.

Areas within the T2R were further categorized based on City-defined project boundaries – these are referred to as TGDs. Information about the social and built conditions in the study neighborhood, prior to survey administration, allowed for the selection of two comparable control neighborhoods, one located North (Control 1) and one South (Control 2) of the study area. To assess differences between TGD and control areas, each survey was color-coded according to location. To increase response rates, the survey administrators sent each household a preemptive postcard one week prior to mailing the survey, a reminder postcard a week after the surveys arrived, a reminder notice in the local newspaper and offered several prize drawings for respondents if they returned the survey within three weeks. The survey contained 28 questions and four sections including: (1) awareness of the Tabor to the River stormwater project; (2) perceptions of their neighborhood; (3) understanding of and interest in stormwater management; and (4) general demographics of respondents. The survey responses were examined using qualitative and quantitative analysis with a focus on the social determinants of stewardship.

Response rate for the survey was 26% (582); however response rates varied across the different TGDs, from as low as 14% (TGD 20) to as high as 65% (Control Area 1). The demographic profile of respondents were generally educated (78% greater than a Bachelor's Degree), and above the median income for the City (65% greater than \$50,000/year). The age of respondents was the most variable of all demographics considered, with approximately an even break-down of those between 25 and below 64. A smaller proportion (14%) was above 65. The sections below provide findings from key sections of the survey.

INFORMATION SOURCES

Outreach efforts to inform residents in the study area appear to be successful. While over half the respondents knew about the project, direct mailings by the City were cited as the primary information source for 73% of the respondents. Respondents also reported that the information they had received about stormwater projects did not affect what they did on their own property, although the majority (62%) reported not having stormwater problems on their property. When respondents were asked about sources of stormwater management information in general, many (20%) stated they looked for information from city-sponsored mailings (20%), the internet (17%), friends, family and neighbors (14%), technical experts (7%), and regional newspaper (5%). Approximately 30% of respondents stated they don't look for information on stormwater management.

Overall residents across both TGDs and control areas would like to know more about similar types of information and have similar statements of interest. The most popular response was a desire to know more about rain gardens, rainwater harvesting, native plants, and managing stormwater on private property. Overall, statements of interest regarding stormwater management were met with neutral levels of agreement: "I would take a course on managing stormwater" had the highest level of agreement, while the statement with the least agreement was "I would like more vegetation on my street."

NEIGHBORHOOD PERCEPTIONS

Survey respondents were asked to rate their perception of neighborhood conditions based on several categories, including aesthetics, safety, walking and biking facilities and greenery. While responses contained variation across perceived neighborhood conditions, the largest variation occurred between study neighborhoods and control areas. Respondents from the study

TGDs rated their neighborhoods higher on each neighborhood characteristic than the respondents from the control areas. Overall, however, survey respondents rated the following neighborhood provisions positively: walking facilities, greenery/trees, parks and open spaces, biking facilities, parking, and neighborhood associations. Respondents rated lower street-cleaning services, community centers, and public art. For nearly every neighborhood characteristic respondents from the study areas rated their neighborhoods higher than the respondents from the control areas. The exceptions are community centers and parks and open spaces, where control area respondents rated their neighborhoods slightly higher than those in the TGDs. Control Area 2 respondents once again consistently gave their neighborhood lower ratings than Control Area 1 respondents.

STORMWATER MANAGEMENT STRATEGIES

Responses to implementing stormwater management strategies on individual property contained minimal variation between TGDs and the control areas. Of the stormwater strategies identified in the survey, those already being implemented by survey respondents include: disconnection of downspouts (58%), planting trees (44%), naturoscaping (31%), and removal of lawns (28%). The responses contained a high level of correlation between those strategies already being implemented with those that had a high probability for implementation. On the other hand, those strategies that respondents had little knowledge about or were unlikely to implement included: infiltration planter (73%), flow-through planter (67%), ecoroofs (53%), bioswales (51%), drywells (45%), and removal of paved areas (43%). Respondents cited financial (28%) and technical (27%) assistance as the most helpful potential resources for installing stormwater management strategies.

In terms of respondent willingness to help maintain vegetation on their street (e.g. trees and shrubs in the stormwater facility), the majority of respondents (51%) described that they would be willing to spend one to three hours per month, while 10.8% said they would not spend any time maintaining vegetation on their street. On average, respondents in the TGDs were more likely to spend time maintaining vegetation on their street than those in the control areas. When asked what would encourage respondents to get more involved with stormwater management in their neighborhood and on their property, most respondents identified a “how-to guide” about caring for stormwater management facilities or an “in-person tutorial.” Other common responses included having the city install a green street in their neighborhood and seeing neighbors take similar actions.

In an additional analysis of the likelihood of maintaining stormwater facilities, responses to specific questions were assessed against demographic and other factors using a linear regression technique (Ordinary Least Square). Respondent willingness to help maintain stormwater facilities varied extensively between TGDs and control areas. TGD respondents were more likely to help maintain facilities if they (1) were younger; (2) were involved in other environmental projects and kids groups; (3) perceived a high quality neighborhood association and low access to parks or other open space; (4) considered their neighborhood lacking in greenery; (5) and had greater involvement with community meetings. Those in the control groups were more likely to help maintain stormwater facilities if they were higher educated (graduate degrees), and perceived a lack of street cleaning services in their neighborhood.

CONCLUSION

Residents who responded to the survey seem to be well informed of current stormwater projects by the City of Portland and, in general, have favorable perceptions of their

neighborhoods. While the level of knowledge and interest in stormwater management varies, a significant group of residents are already involved with stormwater management on their individual property. Those who reported being aware of upcoming stormwater projects in their neighborhood have a greater and more nuanced understanding of managing stormwater systems. The survey results indicate an interest in certain stormwater strategies and highlights information gaps among respondents. Supportive strategies that appeal most to respondents are financial incentives and technical assistance; reducing costs and keeping time commitments down can overcome obstacles to involvement. Outreach through classes and hands on training also seem appealing to respondents.

The T2R program is a long term investment in green infrastructure and has a high potential for involving residents in stewarding newly installed stormwater facilities. To further stormwater management on private property, our analysis suggests a need to engage residents through different mechanisms, including workshops, classes, and neighborhood projects. After the installation of the various green infrastructures is complete, further research will be conducted to measure awareness and knowledge of stormwater management strategies and benefits. As the Bureau of Environmental Services continues to expand the application of stormwater facilities across Portland, the partnership between the City and the University will be actively examining the opportunities for understanding the social determinants of environmental management.