GREEN INFRASTRUCTURE IN PUGET SOUND MUNICIPALITIES

A TECHNICAL MEMORANDUM SUMMARY

BACKGROUND

Recovery of Puget Sound is more than a scientific and technological endeavor. Sustainable solutions also require attention to the human factors that affect the Puget Sound ecosystem and an understanding of how human institutions function.

In institutional settings, barriers to change can be complex and deeply rooted within organizational structures. The Puget Sound region is home to a network of 124 local governments, including counties, cities, and towns. Evidence suggests that some institutional structures, processes, and practices across local governments may impede implementation of Puget Sound Action Agenda priorities. For example, use of low-impact development practices may be impeded by permitting procedures, staff capacity, staff training, and communication barriers between municipal departments.

PARTNERSHIP

Until recently, there has been no known comprehensive examination of these barriers and the extent of their effect on Action Agenda implementation. To develop a better understanding of the problem, the Puget Sound Partnership worked with a research team at Edmonds Community College (EDCC) to use an ethnographic approach to look for patterns of barriers across local governments.

RESEARCH

Ethnography is the systematic study of people and cultures. Once the exclusive domain of cultural anthropologists, ethnography is now used in a variety of ways to inform decisions in the public and private sectors. Ethnographic techniques can be particularly helpful when issues and problems are unclear or ill-defined, complex, or embedded across multiple social sectors.

Ethnographic research is well-suited to identifying patterns of barriers across local governments, jurisdictions of different sizes, cities and counties, and programs within local governments (such as planning, permitting, public works, and natural resources). This research looked for patterns of barriers in order to distinguish common problems from one-off problems.

- Research goals were aimed at improving the systemic function of local government and enhancing regional capacity to manage green infrastructure, including:
- Stormwater
- Water quality and flow
- Recovery of threatened and endangered species
- Habitat
- Low-impact development
- Freshwater and marine shorelines

The research included the following methods:

- A review of prior, relevant research
- A demographic analysis
- A review of National Pollutant Discharge Elimination System (NPDES) municipal stormwater permit reports from 63 cities and six counties, submitted to the Washington State Department of Ecology
- *In situ* participant observation
- 54 in-depth interviews with municipal staff
- 37 cognitive concept maps developed by municipal staff
- A web-based survey of 216 municipal staff
- Statistical analysis of survey results

WHY CITIES AND COUNTIES?

Barriers to change likely exist in state and federal agencies, nonprofit organizations, and business sectors. Cities and counties, however, play unique and critical frontline roles in natural resource management, which directly influences implementation of the Action Agenda:

- **Habitat Strategic Initiative:** through land use planning, critical areas management, salmon planning, and infrastructure development

- **Stormwater Strategic Initiative:** through stormwater program and non-point source pollution management, flood control, and use of stormwater infrastructure

- **Shellfish Strategic Initiative:** through shellfish protection district management, control of bacterial contamination of waterbodies, and septic system oversight

An *Analysis of Organizations Engaged in Puget Sound Ecosystem Recovery* prepared by the Evans School of Public Affairs for the Puget Sound Partnership concluded, "County governments form the backbone of Puget Sound restoration and recovery efforts" (Thomas and Scott, 2013).

In short, cities and counties are at the center of Action Agenda implementation.

WHAT WE LEARNED

BARRIERS TO THE USE OF GREEN INFRASTRUCTURE PRACTICES

- **Maintenance.** Concerns about maintenance appear to be the most persistent barrier to green infrastructure, especially when public agencies need to ensure the maintenance can occur on private property. Maintenance affects infrastructure function, and lack of function increases uncertainty and risk. Public education, social marketing and behavior change, and private property maintenance training are all cited by staff as potential methods for overcoming this barrier.
- **Uncertainty.** Uncertainty in cost and performance of green infrastructure increases risk and liability and drives up project costs, posing another widely recognized barrier to the use of green infrastructure practices. Staff identified many ways to manage risk, including maintenance training for landowners, improved enforcement of land-use regulations, regulatory flexibility, higher accountability for environmental damage, and lifetime cost and performance analyses.
- **Retrofits.** The challenge of retrofitting legacy infrastructure appears persistently across all methods of analysis. Municipal staff would like to see more financial support, especially for retrofitting legacy infrastructure, but also for staff, training, and green infrastructure projects.

- **Soil Unsuitability.** The unsuitability of some soils for infiltration is reported to be a common barrier. Considering stormwater at the outset of a project and incorporating low-impact development techniques appropriate to a site's soils and water are broadly desired solutions.

FUNCTIONALITY OF INSTITUTIONS AND CORRESPONDING EFFECTS ON GREEN INFRASTRUCTURE

- **Conflicting Priorities.** Implementation of green infrastructure occurs within a context of conflicting priorities, such as protecting human safety and cultural resources, access for emergency vehicles, management of solid waste, accessibility, and parking. These varied priorities are embedded in conflicting codes, mandates, and regulations.

- **Shifting Barriers.** Reports of physical, technical, legal, and regulatory barriers appear to be decreasing over time relative to financial, community, and institutional barriers. Institutional barriers may be rising more to the forefront as municipalities address technical and regulatory barriers.

- **Segregated Communications.** Silos are apparent in municipal governments with some of the largest communication gaps occurring between line and executive staff and between employees in public works and those in planning and community development.

- **Segregated Responsibilities.** Responsibility for water quality, stormwater, and low impact development is concentrated in public works. Shoreline master programs typically reside in planning and community development, while responsibility for endangered species and habitat is more equitably divided between public works and community and development planning.

- **Ecosystem Services.** An ecosystem services approach that integrates ecology and economics into municipal and infrastructure project accounting is cited as one of the least adopted and most promising approaches. Such approaches can better address cost concerns and provide municipal employees with tools to protect the functionality of ecosystems upon which human well-being depends.

"I think a dedicated team for LID that goes beyond design and planning and gets into maintenance and inspection is needed to make LID successful over time."

- **Training.** Insufficient staff training is consistently identified as a barrier. Likewise, staff training is also identified as a method to overcoming barriers to the use of green infrastructure.

- **Challenges Related to Scale.** Many challenges, including conflicting priorities and segregated communication, tend to plague larger municipalities much more so than smaller ones. Likewise, approaches to overcome these challenges are perceived to be more valuable within larger jurisdictions. Such interventions include cost and performance analyses, regulatory flexibility, expedited permits, and education and behavior change programs.

INERTIA: THE FINAL BARRIER

- **Public Demand.** Lack of public demand is frequently identified as a barrier to implementing green infrastructure. Because public demand is rarely a prerequisite for other infrastructure technologies, this barrier deserves further investigation. It may be a proxy for more challenging barriers, such as internal resistance or organizational inertia. The desire for public demand may also represent a desire by frustrated staff to assert external pressure on executive management or on elected officials to stimulate change.

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See the full report (301 pages) at:
pspwa.box.com/green and at
www.academia.edu/21427153/

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