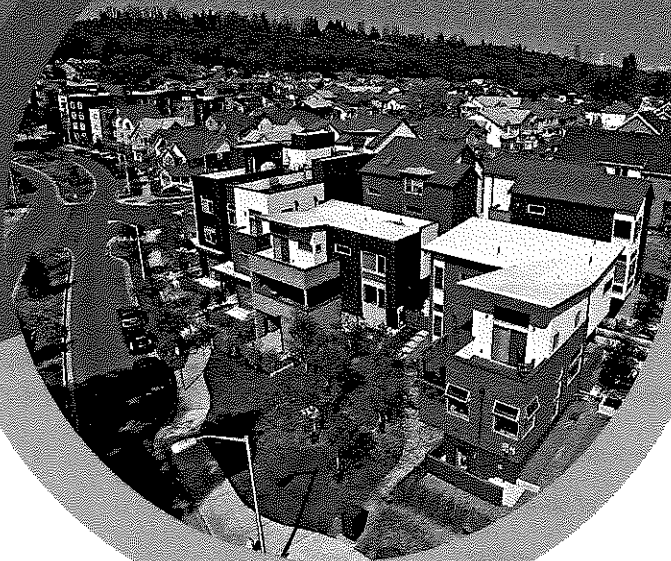


GREEN INFRASTRUCTURE IN PUGET SOUND MUNICIPALITIES

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.

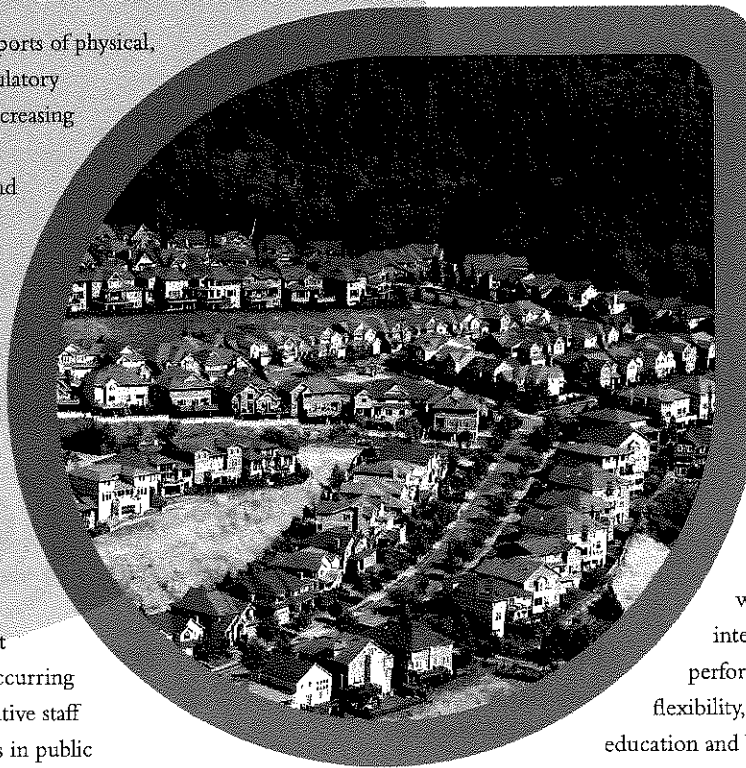
FUNCTIONALITY OF INSTITUTIONS AND CORRESPONDING EFFECTS ON GREEN INFRASTRUCTURE

- ▶ **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

“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.”

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.

- ▶ **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:

pspsa.box.com/green and at
www.academia.edu/21427153/

Clustering of Key Findings

MAINTENANCE

- Maintenance, especially when public agencies need to ensure that it is occurring on private property, is the most persistent barrier to green infrastructure implementation.
- Line staff found maintenance training for private property holders to be more helpful than did executive or middle management.

RISK

- Uncertainties in cost and performance increase risk and liability and drive up project costs, posing another widely recognized barrier.
- Reduction of risk and uncertainty with cost, benefit, and performance analysis, making developers responsible for environmental damage, and better enforcement are widely desired.
- County staff found more value than city staff in lifetime maintenance cost and performance analyses, holding developers accountable for environmental damage, more regulatory flexibility when the spirit of the law is being met, and the development of best practices for LID in agricultural settings.
- Insufficient enforcement of codes and regulations and not holding developers accountable for environmental damage are more persistent barriers in counties than in cities.
- Insufficient enforcement is more of a barrier in jurisdictions that include rural areas versus those serving only urban areas.

SOILS

- Legacy infrastructure and the suitability of some soils to infiltration are reported to be common barriers across all methods of analysis.
- Considering stormwater at the outset of a project and incorporating LID techniques appropriate to a site's soils and water are broadly desirable solutions to concerns about soil suitability.
- Soil suitability for infiltration is perceived as more of a barrier for Phase I than Phase II and non-permitted jurisdictions.
- Staff in natural resources and executive offices view using LID designs that do not require infiltration as more helpful than employees in other departments.

CONFLICTING PRIORITIES

- Implementation of green infrastructure occurs within a context of conflicting priorities such as protecting human safety and cultural resources, and access for emergency, solid

waste, disability, and parking. These varied priorities are reflected in conflicting codes, mandates, and regulations that municipalities are engaged in removing.

- Reports of physical, technical, legal, and regulatory barriers appear to be decreasing over time relative to financial and community and institutional barriers which may be rising more to the forefront as municipalities address technical and regulatory barriers.
- Conflicting priorities across municipal divisions plague very large, large, and medium-sized municipalities much more so than small ones.

FINANCIAL SUPPORT

- Municipal staff would like to see more grants and other financial support, especially for retrofitting legacy infrastructure but also for staff, training, and green infrastructure projects.
- Incentives for retrofits of existing infrastructure are most appealing to staff in education and outreach and natural resources.

RESISTANCE TO CHANGE

- Line staff were much more likely to view municipal staff resistance to change as a barrier than were middle and executive management.
- Executive and line staff reported fragmented jurisdictions and responsibilities, management vision and priorities, and unequal ability of some social groups to access incentives as larger barriers than do middle management.

EDUCATION AND BEHAVIOR CHANGE EFFORTS

- Local education and behavior change efforts were most appealing to staff in education and outreach and natural resources.
- Phase I and Phase II permittees found local education and behavior change efforts more helpful than did non-permitted municipalities.
- Large jurisdictions found green certification programs, inter-jurisdictional collaboration, and region-wide education and behavior change efforts more helpful than other municipalities.

COMMUNICATION SILOS

- Silos are apparent in municipal governments with some of the largest communication gaps between line and executive staff and between employees in public works and those engaged in planning and community development. These communication challenges are greatest in counties and Phase I permittees.
- Coordination with other jurisdictions and the fragmentation of responsibilities are more frequent problems in municipalities that serve both urban and rural areas than in ones that serve just urban or just rural constituencies.

- While all departments valued bringing staff together to address communication challenges, staff in parks, roads, and natural resources viewed this interdepartmental communication as the most helpful.
- Ineffective communication is reported most consistently by line staff, while executive staff and middle management paint much rosier images of communication. The biggest differences in perception between executive and line staff is concentrated in the effectiveness of communication involving planning, permitting, and community development.
- Responsibility for water quality, stormwater, and LID is concentrated in public works and shoreline master programs are typically in planning and community development while responsibility for endangered species and habitat is more equitably dispersed between public works and community and development planning.
- Most green infrastructure functions are concentrated in public works, community development, and planning divisions of municipal governments.
- Barriers to implementing green infrastructure appear more frequently in permitting, planning, community development, municipal management, and elected officials than elsewhere.
- Municipal staff view governmental reorganization as the least helpful internal change that might be applied while efforts to improve communication are viewed much more favorably and broadly across and within municipal governments.

OTHER

- An ecosystem services approach that integrates ecology and economics into municipal and infrastructure project accounting is one of the least adopted and most promising approaches to addressing concerns about cost and providing municipal employees with tools for protecting the functionality of ecosystems upon which human well-being depends.
- Staff from municipalities with rural constituencies found development of best practices for LID in agricultural settings significantly more helpful than those from exclusively urban areas.
- County staff found more frequent inspections of stormwater facilities to be a more helpful solution than did city staff.
- Very large and large jurisdictions found expedited permits to be more helpful than in medium or small ones.

Policy Integration in Municipalities – Phase 1

Background:

Cursory evidence suggests that some structures, processes, and practices across local governments can be barriers to implementation of Action Agenda priorities. For example, regular and standard implementation of LID practices may be impeded by permitting policies and procedures, staff capacity, staff training, and communications between local agency natural resources programs and permit staff.

To date, there has been no known comprehensive examination of these barriers and the extent of their effect on Action Agenda implementation. In two phases of work, this project examines in those barriers in a more comprehensive and structured manner:

Phase 1 Research: Using established ethnographic methods, the Phase 1 analysis will look for patterns of barriers across local governments in the Puget Sound geographic region, across jurisdictions of different sizes, across cities and counties, across programs (e.g., planning, permitting, public works, natural resources) within local governments, and across staff hierarchies within local governments.

Phase 2 Future Planning: Based on the Phase 1 findings, PSP will later develop potential solutions to identified barriers to Action Agenda implementation.

Preliminary Research Questions:

- What are the barriers to municipal implementation of LID standards for new development?
- What are the barriers to implementation of LID in municipal operations (e.g., ROW management)?
- What are the barriers to municipal SMP (Shoreline Master Program) implementation?
- What is the nature of communications and coordination between municipal planning, permitting, and public works (including stormwater management) divisions?
- How and where are stormwater management, endangered species, habitat, water quality, and low impact development activities housed in municipal organizations? How effective are those divisions?
- What internal changes could improve municipal management of those areas?
- What kinds of external support would improve municipal management of those areas?
- Do municipalities tend to manage these program areas to the minimum necessary for regulatory compliance, or do they go beyond required minimums toward more comprehensive approaches?
- To what degree do municipalities collaborate on these issues?
- To what degree are municipalities aligned in their approached on these issues?
- How do these issues vary between cities and counties? Between large, mid-sized, and small jurisdictions? Between urban and rural jurisdictions? Stormwater permittees versus non-permittees?
- How are views on these issues consistent between executive staff, middle managers, and line staff?

Phase 1 Completion Date: August 15, 2015

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