

# Stewardship Footprints and Potential Ecosystem Recovery: Preliminary Data for Seattle and Puget Sound

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## Ecosystem Decline & Science Response

Natural systems across the interface landscape face ongoing threats, such as land use sprawl, air and water pollution, and climate change. Science and policy entities are responding to such conditions with initiatives for knowledge building and action. Yet fiscal shortfalls in local government and environmental resource organizations restrict the capacity to address ecosystem needs and recovery. In the face of limited and declining fiscal and technical resources for ecosystem management, society must consider new solutions to restore and sustain natural systems. The need to enhance understandings of the relationship between people, human systems, and the natural environment is widely recognized (Pickett et al. 2001, Marzluff et al. 2008).

New urban ecology research is underway in Pacific Northwest region of the United States. The ecological footprint concept is a popular representation of urbanization demands and ecosystem impacts (Wackernagel and Rees 1996). The footprint metaphor can also be applied to the positive consequences of human agency on the landscape. Environmental stewardship is an acknowledged, though little understood societal response to ecosystems decline on urbanized landscapes. This paper outlines an emerging science program about stewardship, including initial data collection.

## Puget Sound Context

The Puget Sound estuary and surrounding urbanized watersheds support a population of 4.1 million, and are expected to attract an additional three million human residents in the next 20 years (Washington State Office of Financial Management). Despite the breathtaking appearance of this estuarine system, many of the processes supporting diverse species and ecosystem services have been disrupted or severely degraded by urbanization. The decline of the Puget Sound ecosystem is alarming, and multiple organizations at the federal, state, and local levels have launched citizen-based environmental stewardship programs as a key strategy to address recovery goals. The Puget Sound Action Agenda prioritizes basin-wide as well as area-specific efforts, and creates programs that address the complex interactions across land, water, species, and human needs (PSP 2009).

The entire estuary system includes 12 counties. Of these King and Pierce counties contain 2.5 million residents, representing 42% percent of the total population of the State of Washington (U.S. Census 2000). The two counties are in the largest metropolitan region of the state, and include the cities of Seattle and Tacoma. These counties were chosen as initial study sites due to their actual and potential impacts of upland urbanization on the Puget Sound.

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## **New Research Program**

Environmental stewardship is a potentially important strategy to address both ecosystem and human community needs. Yet across the literature of urban ecosystem decline and recovery there is little recognition of the effects of stewardship. The challenge is to better understand stewardship organizations, programs, and activities and how these efforts might intersect with ecological recovery goals to provide the greatest benefit, and the means by which those benefits are accomplished. A footprint approach can be used to spatially assess and record both ecological conditions and stewardship activity across a designated region or landscape.

The Green Cities Research Alliance (GCRA) is a collaborative initiative launched in 2009, with purposes being to facilitate research, and partner and coordinate efforts to better investigate the urban environmental resources situations of our region. One science goal of the alliance is to assess and understand the role of environmental stewardship in urban ecosystem health, recovery, and reconciliation. This work regards stewardship not as isolated, occasional actions on the land, but as a set of comprehensive and diverse systems of ecosystem response that are imbedded within coupled natural and human systems. Our goal is to understand the pathways by which the ecological and social footprints of stewardship interrelate at the individual, group, and community levels.

The research will start with descriptive data collection:

1. conduct an assessment and build a database of stewardship

- organizations within the Seattle metropolitan area,
2. map and geographically display the scope and extent of stewardship programs and activities across the landscape,
3. conduct a more in-depth organizational analysis to determine the scope and extent of capacities, efficiencies, networks, and coalitions – current and potential.

This work is generally a Pacific Northwest based replicate of the STEW-Map (stewardship mapping) project conducted in New York City (Svendsen and Campbell 2008). The initial geographic focus will be the landscape of the Seattle area, and eventually may include the entire Puget Sound basin. In time, the research will be expanded to bridge and compare stewardship activity in other U.S. and international cities.

The purpose of these projects is to build a comprehensive understanding of how stewardship is and could be mobilized to address concerns of urban ecosystem health and sustainability. Our research will provide useful knowledge for governmental agencies such as Puget Sound Partnership, and other public, private, and nonprofit organizations as they implement and sustain stewardship programs and activities.

### **Initial Organization Census**

In summer 2009 a rapid census of public and non-profit organizations that sponsor environmental stewardship was conducted. The preliminary database was a compilation of organizations operating in King and Pierce Counties, with data derived from web sources.

This database will be expanded over time, and will provide the basis for future stewardship networking research. Full development of the database will enable GCRA to: identify and assess organizational resources and needs, coordinate efforts across the region, provide information to program leaders and managers, and initiate collaborative research across other U.S. regions.

### **Census Methodology**

The database was populated by Internet search using a snowball sampling method. An initial set of local organizations and agencies entities having a prominent public commitment to stewardship were identified and used to begin the sampling.

Some organizations have multiple administrative units conducting different stewardship efforts, such as departments and divisions, and programs within. A record was created for a unit but not for each sponsored program. Nested organizations having local and regional or national branches were treated as distinct records (such as Audubon Washington, and Audubon Society of Seattle). Once the list was constructed, information was then gathered for each of the organizations from their websites.

As organizations were recorded, their web-listed partners, collaborators, and contacts were also added to a search list. Data were collected on these new organizations. This snowball technique was continued until the appearance of new stewardship organizations was exhausted.

### **Database Development**

The following criteria were used to determine if an organization would be included in the census:

1. The organization conducted environmental stewardship work; where stewardship is defined as motivated physical action, education, or outreach for the purpose of improving the physical environment.
2. The organization conducted environmental stewardship work within either King or Pierce County.
3. Environmental stewardship is a clearly stated primary or secondary purpose or focus of activity.

Database records included eight fields for each organization:

- **Address:** Physical location of office or leadership
- **County:** Jurisdiction(s) of stewardship activity, King or Pierce
- **Web Address & e-Contact**
- **Legal Status:** Private, non-profit, public
- **Mission/Goal:** Publically stated purpose
- **Location Focus:** Activity area within the landscape gradient: urban, suburban, rural, wildland
- **Terrestrial or Aquatic:** General ecosystem focus: terrestrial or water
- **Activity Scope:** Single or multiple activity site(s)

### **Results and Highlights:**

The initial assessment identified 588 organizations conducting environmental stewardship in King and Pierce Counties; 16% exclusively in Pierce, 51% exclusively in King, and 33% in both.

Descriptive statistics indicate some notable patterns. Most organizations are working in multiple activity sites, rather than focusing on a single place. The types of organizations conducting efforts are highly varied. Additionally, activity on waterways and water bodies was prevalent.

Interestingly, activity location is focused neither in rural or urban areas, but is prevalent across all zones. Forty three percent of organizations work at locations throughout the landscape gradient, that is, they conduct work in either urban or suburban landscapes *and* rural or wildland areas. Fourteen percent of organizations focus strictly in rural and wildlands, with the remaining 43% active in urban and suburban areas.

Another informative grouping is to look at total organizations working in each landscape type along the gradient (Figure 1).

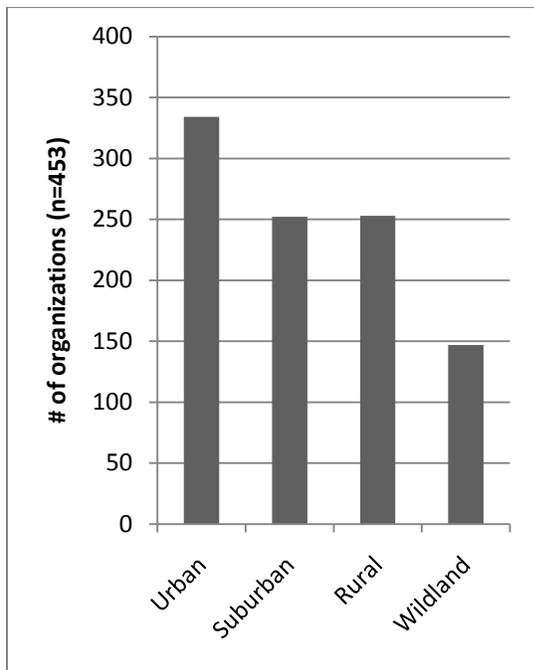


Figure 1: Tallies of organizations active across landscape locations (total count greater than 453 due to multiple responses)

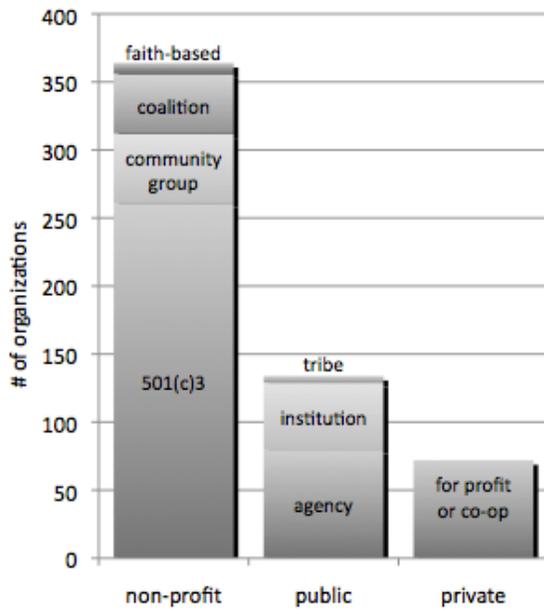
Of the 453 organizations that had accessible information about gradient work location(s), 74% are active in urban areas, 32% have programs in wildlands, with equivalent mid level rates of activity in suburban and rural areas (56%).

Within the landscape gradient organizations typically focus on or have an affiliation with specific work sites. Considering geographic scope, 82% of groups conduct stewardship in multiple project sites. This was one defining feature of the census.

There appears to be response to endangered species listings for salmon, and more general concern for the Puget Sound. While 88% of the organizations do at least some work in terrestrial ecosystems, 58% either focus on, or do some work on aquatic resources. Specifically, 22% focus their stewardship on water, with 12% working almost exclusively with water.

There is surprising diversity of legal status and affiliation within the organizational population (Figure 2). Private, environmentally affiliated business interests represented 13% of the tally, with non-profits comprising 64%. This compares to 1% and 62% respectively in the New York City results (Svendsen and Campbell 2008). Thus for-profit firms or coop based programs are more common, and public programs less numerous in the Seattle region.

Eight percent of the entities were partnerships, alliances, and collaborative organizations. These groups enable clusters of smaller organizations to combine efforts on projects, policy, or advocacy. They may be important for organizational efficacy, and offer collaborative structure for delivering stewardship resources, a situation of interest for future research.



**Figure 2: Summary of organizations' legal status (n=570)**

**Mission Statement Analysis:**

An organization's mission statement is a public statement of principle and commitment. The process of generating a statement often yields motivating sentiments and an organization's social identity. Across the web sources, 337 mission statements were collected. Statements were merged into a single text document, with derivatives (e.g., community and communities) combined, and trivial words removed (e.g., a, and, this). Table 1 lists a frequency count of the ten most used terms.

The text file was uploaded to *Wordle*, an online word analysis program that generated a visual representation of word counts (Figure 3). Word size denotes greater frequency of use across all mission statements. Considering both Table 1 and Figure 4, the term *environment* figures

prominently, as expected. The pronounced emphasis on *community* (from a social, rather than ecological perspective based on phrasing review) came as a surprise, and indicates that organizations intend a broad range of inter-related ecosystem and social community may also reflect the interests of the participant volunteer base of organizations.

community	152
environment	104
education	85
provide	76
health	72
protect	62
promote	61
people	59
sustainable	58
work	52

**Table 1. Mission statements, word tally**

**Assessment Limitations:**

There were certain inherent limitations in constructing this database. Snowball sampling may overlook some groups that are not connected with this larger network of organizations. Additionally, organization entry was limited to that available on a website; groups without websites are largely unrepresented. Nonetheless, some organizations without web presence were included as they were displayed on another organization's site with enough information to fit the sampling criteria for inclusion. The data limitations are noted, and provide useful input for more reliable data collection outcomes within their stewardship programming and action. The emphasis on of an expanded and more thorough census.



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