



# A few observations on the economics of GSI (from a newcomer)

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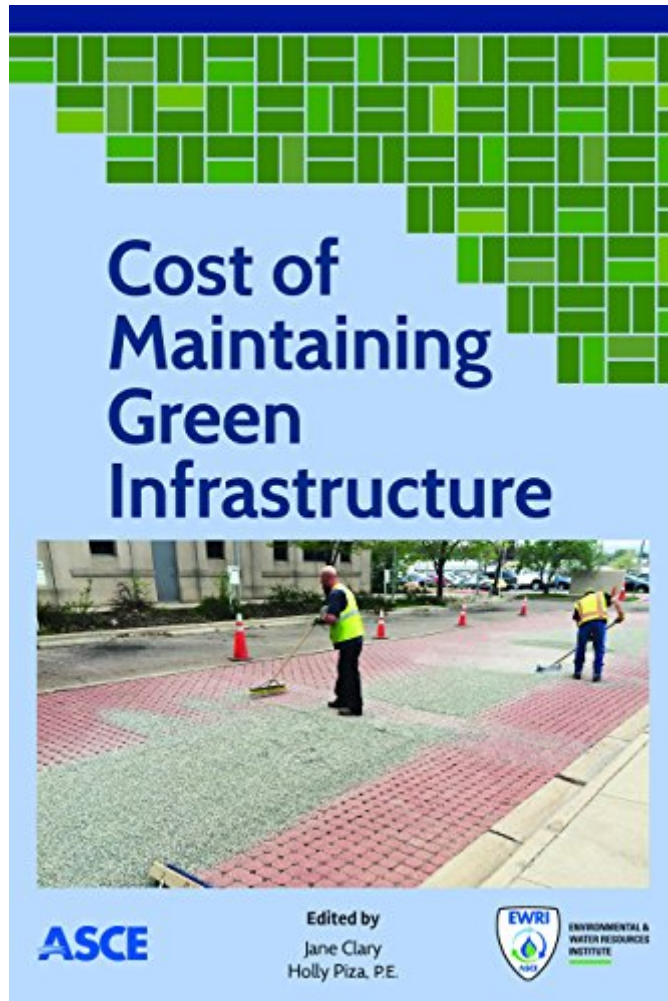
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# An applied economist's toolkit

- Demand analysis, price elasticities
- Nonmarket valuation
  - Recreation
  - Homes
  - Surveys
- Cost-effectiveness & cost-benefit analysis, “benefit transfer”

## Costs

- Capital
- Maintenance
  - Public, centralized
  - **Private, distributed?**  
**Economic vs. financial costs**



## Benefits – water quality



# “Co-benefits”

Table ES-3 100-year NPV of Evaluated Benefits

Benefit Category	Current Inventory	Low Build-Out Scenario	Medium Build-Out Scenario	High Build-Out Scenario
Stormwater Treatment	\$66,000–\$88,000	\$1.8–\$2.5 million	\$3.3–\$4.4 million	\$5.5–\$7.4 million
Water – Potable Water Conservation	\$13,000–\$22,000 per 1000 square feet of rainwater harvest.			
Energy – Household Use	\$0.2–\$0.5 million	\$15–\$37 million	\$17–\$43 million	\$20–\$49 million
Greenhouse Gas Emissions	\$0.3–\$3.3 million	\$25–\$284 million	\$29–\$331 million	\$34–\$379 million
Air Quality	< \$0.3 million	\$2.1–\$21 million	\$2.4–\$24 million	\$2.8–\$27 million
Small-scale Habitat	\$0.72 million	\$30 million	\$34 million	\$39 million
Hydrologic Function	Improved hydrology of Seattle’s waterways and promote wildlife populations that rely on those waterways. Potential for annual benefits to nearby households, and lesser benefits to regional residents.			
Mental Health	Improved mental health of residents interacting with GSI facilities and improve community cohesion throughout Seattle. Reduced healthcare costs and improved happiness.			
Ecological Literacy and Behavioral change	Improved environmental awareness and likely some improved environmental behavior.			
Embedded Energy	Reduced lifecycle greenhouse gas emissions of GSI relative to gray stormwater infrastructure.			
Economic Impacts	Increased local job and income creation from local GSI construction and operation.			
Climate Change	Decreased GHG emissions, increased carbon sequestration, and increased resilience to heightened temperature and storm variability and severity			



Beauty

EPA and EconNW 2017 “Expanding the Benefits of Seattle’s Green Stormwater Infrastructure”

# Private and social benefits - example

Private



1. Reduced water bill

2. Improved landscape amenity



Social

5. Reduction in peak flow → fewer CSOs

6. Small scale habitat?

3. Reduced costs of water production & stormwater treatment; 4. associated GHG



Suppose 1=\$300 annually and 4+5+6=\$3 annually....

# Financial incentives for distributed GSI



**Seattle.gov**  
Mayor Jenny A. Durkan

**Drainage Rates**

**Rate Schedule**

**Understanding Your Bill**

[Services](#) > [Residential Rates](#) > [Drainage Rates](#) > [Rate Schedule](#)



## Drainage Rate Schedule

### Small Residential Annual rate per parcel (1)

	2017	2018
Under 2000 sq. ft. <sup>(2)</sup>	\$140.46	\$159.68
2000-2999 sq. ft. <sup>(2)</sup>	\$231.47	\$259.68
3000-4999 sq. ft.	\$319.05	\$356.15
5000-6999 sq. ft.	\$432.45	\$480.86
7000-9999 sq. ft.	\$543.98	\$603.90

# Seattle (cont'd)

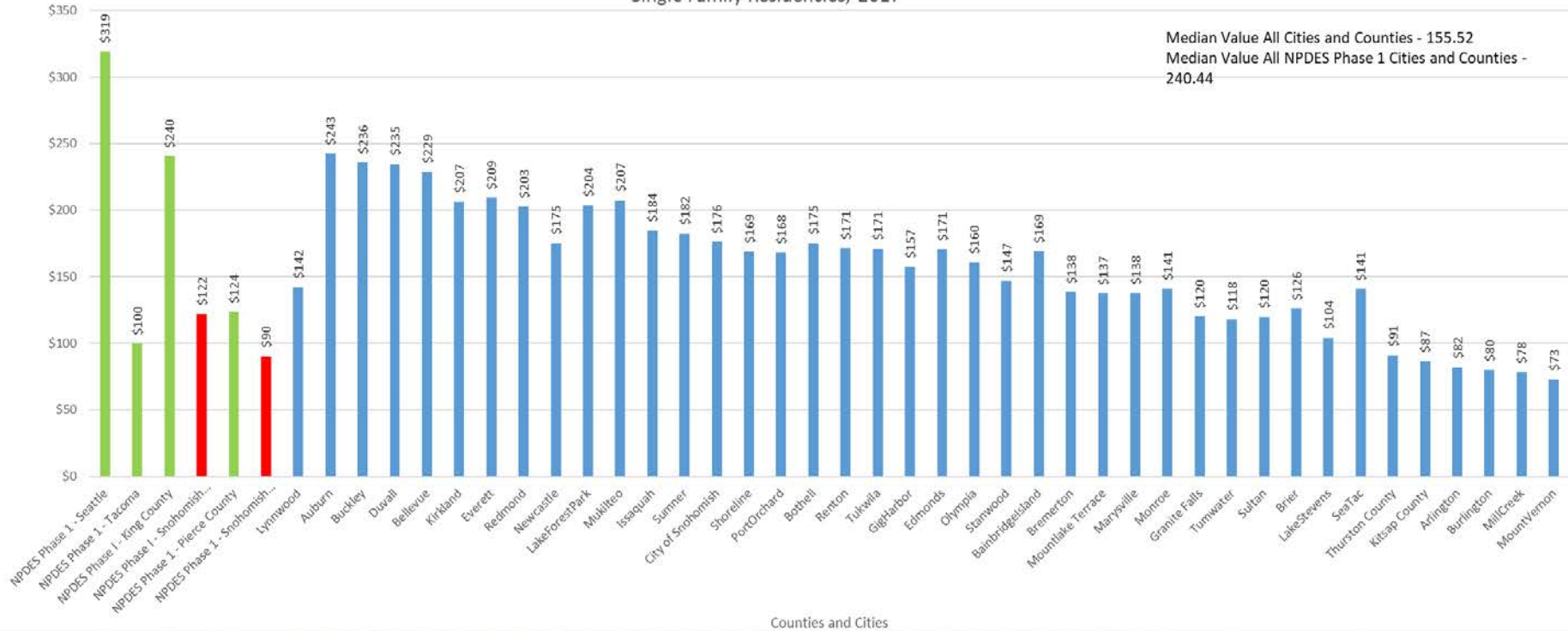
## All Other Properties Annual rate per 1,000 square feet

	2017	2018
<b>Undeveloped (0-15% Impervious)</b>		
Regular	\$34.76	\$38.78
Low Impact <sup>(3)</sup>	\$20.67	\$23.06
<b>Light (16-35% Impervious)</b>		
Regular	\$53.54	\$59.24
Low Impact <sup>(3)</sup>	\$42.26	\$46.74
<b>Medium (36-65% Impervious)</b>		
Regular	\$77.60	\$85.45
Low Impact <sup>(3)</sup>	\$62.86	\$69.28
<b>Heavy (66-85% Impervious)</b>		
	\$102.48	\$112.57
<b>Very Heavy (86-100% Impervious) <sup>(4)</sup></b>		
	\$122.94	\$134.85



# Puget Sound Stormwater Fees

Comparison of Stormwater Fees with other Agencies  
Single Family Residencies, 2017



## Fee reductions

- Seattle single family
- King Co Stormwater Facility Credit

## A few questions

- Barriers to private adoption; inspections of distributed GSI
- Vehicle speed, visually appealing corridors, GSI (Peg Staeheli (MIG|SvR))
- Cost-effectiveness: preventing CSOs vs untreated runoff to MS4s
- Lessons for small towns or low-income countries

Thanks!