

Willingness to Pay to Adopt Residential Stormwater Management Practices

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Introduction

- Urban and suburban runoff contributes to approximately 47% of polluted miles of shoreline, 22% of lakes, and 14% of rivers. (EPA 2006)
- Stormwater runoff in urban and suburban areas leads to severe flooding and distribution of nonpoint source pollutants.
- In Philadelphia, **Combined Sewer Overflow (CSO)** is used, which combines stormwater with the city's sewage system, releasing large contents of chemicals, trash, and oils into bigger water bodies.
- Homeowners can mitigate **nonpoint source pollution** by installing best management practices (BMPs), such as rain gardens and conservation landscaping, to slow down water flow and increase infiltration before entering local waterways from their yards during heavy rains.
- When analyzing willingness to pay (WTP) in stated preference surveys, **hypothetical bias** (overstating WTP in a hypothetical situation) skews results to show that consumers are willing to pay more than they actually would.



Figure 1: Result of heavy rain on a home

Objectives

- Improve understanding of homeowner's willingness to pay for different stormwater practices using an online survey of 10,000 residents in Delaware and Southeastern Pennsylvania (Brandywine, Red Clay, and White Clay watersheds).
- Analyze the effects of hypothetical bias on a consumer's decision making and suggest approaches to improve survey design.
- This survey uses choice experiments (example question) to expose which attributes to a project an individual values more: homeowner's time, advice from specialists, installation speed, and homeowner payment, given two options.

Methods

• Four randomly assigned treatment groups:

Control group	Cheap Talk	Consequentiality I	Consequentiality II
<ul style="list-style-type: none"> Participants are asked how much they are willing to pay for each practice without additional guidance. 	<ul style="list-style-type: none"> Before answering willingness to pay, the participant is prompted with a statement explaining hypothetical bias, then stating to select a price as if the participant would have to pay rather than a theoretical situation 	<ul style="list-style-type: none"> Participants are informed that if their WTP is one of the top ten highest, they will be contacted by a local stormwater conservation group to initialize installing the practice 	<ul style="list-style-type: none"> Participants are informed that if their WTP is one of the top ten highest, they will be contacted by a local stormwater conservation group to initialize installing the practice and they will have access to a specialist to answer questions about installation.

• Questions are followed by rating the importance of different factors in their decision-making, as well as indicating how the recent COVID-19 pandemic affects their decision for both rain gardens and conservation landscaping.

• Choice experiment related questions looking at valuing certain aspects of a project given two options.



Figure 2: **Rain Gardens:** A rain garden is a lower area that is filled with native plants and gravel that allows stormwater to be absorbed before moving into bigger bodies of water.

Figure 3: **Conservation Landscaping:** Conservation landscaping is the thoughtful process of placing native plants where wildlife and pollinators can thrive, as well as slow down and infiltrate stormwater runoff.



Example Question

Local conservation groups offer a Residential Rebate Program that pays a portion of the cost to install stormwater practices like Rain Gardens and Conservation Landscaping. These payments can cover a large amount of the cost of the practice.

In the following question, you will be asked to state your preference between two different Rebate Programs, which have different amounts of paperwork and other requirements, and different payment levels. You may also choose neither program.

	Option 1	Option 2
Your time spent applying for the grant and coordinating contractors	24 hours of your time	16 hours of your time
Amount of technical advice offered	Project Specialist on Call	Booklet for Reference
Speed of installation at your residence, not including planning and design	1 week installation	10 weeks installation
Payment to you	\$1000	\$2000

Next Steps

- The survey is expected to launch by mid-May.
- We expect that this survey will improve understanding of homeowners' willingness to contribute to stormwater management.
- We will identify what stormwater management practices are more favorable to urban and suburban residents.
- Explore which treatment group reduces hypothetical bias the most efficiently in order to improve stated preference survey design.
- We will learn what element of a project is valued most by individuals through comparing responses in the choice experiments.

References

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- Ando, A. W., & Netusil, N. R. (2013). A Tale of Many Cities: Using Low-Impact Development to Reduce Urban Water Pollution. *Choices*, (28), 1-2.