The Water Center ◆ Fact Sheet January 2007

Coping with stormwater—how much does it cost?

Across the country, jurisdictions have struggled with stormwater management for decades and will likely face even greater challenges in the future. Jurisdictions also struggle with allocating limited funds among competing programs. Thus, understanding the damages due to stormwater, and the benefits of stormwater management, can help to target funding more effectively.

Puget Sound Region: A Case Study

An in-depth investigation of the Puget Sound region identified and assessed the damages and costs of stormwater, and the potential benefits of stormwater management. Major impacts that could be quantified in economic terms are presented below.

Types of Costs	Reported Costs
Flooding and Property Damage	
Property damage	Flood insurance claim payments have totaled $56 million since 1978; however, this underestimates the total flood losses borne by property owners.
Stormwater facilities	Capital improvement plans indicated annual expenditures of more than $115,333 to $5 million for individual jurisdictions; however, many millions of dollars in shortfalls exceed this reported value.
Stormwater programs	Annual stormwater program budgets range from hundreds of thousands to millions of dollars, with annual costs around $100/person within a stormwater utility district.
Degradation of Water Quality	
Clean-up of polluted water	Reported costs for NPDES Phase I permits average more than $5 million per permittee per year. Water-quality improvement in a single watershed due to a single stormwater-related contaminant, fecal coliform, cost $1.5 million.
Stormwater treatment	Reported treatment costs for stormwater discharges range from $172,000 to $6.8 million.
Loss of Fish and Wildlife Habitat	
Habitat restoration and protection	Individual restoration projects associated with stormwater discharges have cost $100,000 to $100 million, with one project costing $25.8 million in 2005 alone.
Loss of Marine Habitat—Closure of Shellfish Growing Areas	
One harvest area lost over $3 million in shellfish sales due to closed shellfish harvest areas.	Most urban shoreline areas are permanently closed to harvest. For shellfish harvest areas recently closed or inhibited by contaminants, pollution-prevention and clean-up can cost hundreds of thousands of dollars.

Types of Costs	Reported Costs
Loss of Marine Habitat—Closure of Shellfish Growing Areas *cont'd*	
Lost revenues and lost jobs	One harvest area lost over $3 million in shellfish sales due to closed shellfish harvest areas.
Lost recreation opportunities	Fishing and shellfishing generate more than $16.9 million in license sales and over 700,000 customers, indicating the high potential losses from closed areas.

In aggregate, current expenditures and unfulfilled needs likely exceed $1 billion for the region over the next decade. However, the reported benefits of stormwater management, primarily avoided damages, were far greater than the expenditures. Although some benefits and losses cannot be easily quantified in economic terms, they are nonetheless significant, and often have long-term social and environmental consequences. One of the most prominent losses is the local collapse of aquatic ecosystems. For example, studies in the Puget Sound region have shown that individual stormwater pollutants are linked to adverse health and behavioral effects in Coho salmon. Degradation is also expressed by the lost opportunities from damages that, once imposed, may never be fully reversed.

Recommendations for Stormwater Management Programs

Results from this study led to recommendations for more effective stormwater management programs:

1. Expenditures should be evaluated for their effectiveness in addressing critical problems, and monitoring should be implemented to assess overall project effectiveness. In some cases, the programmatic component that receives the greatest funding may not be the greatest problem. Also, monitoring before, during, and after project implementation can provide information to assess and improve project outcomes.

2. Stormwater programs need to acknowledge and dedicate more resources to mitigating ecological and social impacts. While citizens frequently recognize, and most frequently complain about, immediate flooding and drainage problems, they may have little awareness of the longer-term ecological and social impacts of stormwater, which typically receive much less funding, but may carry equivalent (or greater) long-term costs.

Stormwater programs as a whole require greater attention and dedication of resources. Stormwater problems tend to be neglected and under-funded compared to other public works programs, such as transportation or wastewater. Public education on the need for stormwater mitigation, and the benefits of effective stormwater management, could provide motivation for increased efforts and investments in stormwater programs.

Based on Visitacion, B. J., D. B. Booth, and A. C. Steinemann, "Costs and Benefits of Stormwater Management" Journal of Water Resources Planning and Management – ASCE (in review), and Booth, D. B., B. J. Visitacion, and A. C. Steinemann (2006), "Damages and Costs of Stormwater Runoff in the Puget Sound Region," prepared for the Puget Sound Action Team, Olympia, WA (http://www.psat.wa.gov/Programs/Stormwater.htm).

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