

Stormwater Solutions

Introduction:

As stated by the Environmental Protection Agency:

Storm water discharges are generated by precipitation and runoff from land, pavements, building rooftops and other surfaces. Stormwater runoff accumulates pollutants such as oil and grease, chemicals, nutrients, metals, and bacteria as it travels across land. Heavy precipitation or snowmelt can also cause sewer overflows, which, in turn, may lead to contamination of water sources with untreated human and industrial waste, toxic materials, and other debris.⁵

New Haven produces considerable waste material that is hazardous to aquatic environments as an industrial city with more than 124,829 (county with 845,694) residents according to the 2004 census.¹¹ Stormwater filtration could combat the transfer of urban pollution to the water upon which New Haven residents depend for drinking, recreation, and economic ventures.

While many cities have created successfully passed legislation that requires installation of stormwater filtration systems, other cities remain hesitant to such legislation, as they perceive stormwater filtration as excessively costly. However, the adoption of a stormwater treatment initiative provides economic benefits to communities that outweigh such a system's capital and maintenance costs.

The following report outlines the economic advantages to communities that install stormwater filtration systems, a policy recommendation for stormwater filtration in New Haven, and an outline of potential technologies and funding sources to meet this policy recommendation.

Economic Benefits of Stormwater Management

Drinking Water

After pollution from runoff contaminates source drinking water, a filtration system adequate to reclaim water for consumption can cost billions of dollars – a cost generally translated into inflated taxes⁹. The EPA determined that 83% of Connecticut's estuaries, bays, and coasts are affected by urban runoff and water from storm sewers. New Haven obtains municipal drinking water from Lake Gaillard, located in North Branford, CT – which is particularly susceptible to contamination from runoff¹³. In New Haven County, urban runoff, largely through storm sewers, was the number one cause of contamination for each body of water where a source of pollution could be established. In a nationwide comparison by Environmental Defense, New Haven County ranked among the top 10% of counties in the country in percentage of surface waters with impaired or threatened

uses. Section 303(d) of the Clean Water Act defines a water body as impaired if it does not attain water quality standards. Standards may be violated due to an individual pollutant, multiple pollutants, thermal pollution, or unknown causes. The EPA considers a water body threatened if it currently attains water quality standards, but is predicted to violate standards by the time of submission of the next 303(d) list.²

Public Health

Toxic chemicals, organic pollutants, and bacteria, often found in stormwater, pose a substantial public health risk, and treating pollutant-related illnesses entails significant financial investment. The EPA developed an analysis of potential economic benefits associated with avoided health problems from exposure to contaminants in stormwater, which was based on a study of illnesses among people who swam within one yard of storm drains in Santa Monica Bay. Instances of viral infections, earaches, sinus problems, fever, flu, skin rashes, hepatitis, and more increased markedly in those exposed to storm drain runoff. Depending on assumptions about the number of exposures to contaminants and the contaminant concentrations, benefits from stormwater filtration in that area ranged from \$8.7 million to \$37.4 million. Considering the scale of such a filtration program in New Haven, if one assumed 80% program effectiveness, the benefits could be from \$7 million to \$29.9 million dollars in prevented medical care⁴.

Flooding

Unmanaged stormwater also increases risk of flooding. New Haven's low elevation exacerbates this risk, and as a result, some New Haven communities flood during each significant storm. In a recent comment on the subject of recurring area flooding Ward 18 Alderwoman Arlene DePino stated, "Action needs to be taken by the City of New Haven so that we minimize the property damage that's being done here and also it's a public safety hazard."⁷ Frequent flooding leads to thousands of dollars in property damages.

Water Recreation

Water recreation including swimming, boating and fishing play a major role in New Haven's economy. Lighthouse Point Park exemplifies potential revenue from water-based activities in the region. Thousands visit the park's public beach, while a number of fishermen take advantage of the fishing pier and a public boat launch.⁶ Pollution from stormwater poses a significant threat to the viability of these water-based activities. Runoff water from New Haven flows into Long Island Sound. This fragile water body, is used by over 20 million people annually, and generates more than \$5 billion dollars for the regional economy. During this summer alone, polluted water led to more than three local beach closings.¹

Commercial Fishing

Another significant financial consequence of runoff pollution is damage to commercial fishing industries. Both New Haven Harbor and Long Island Sound potentially provide significant economic opportunity for fishermen, largely due to their large populations of oysters. Beginning in the 1880's, million of oysters were harvested from New Haven

Harbor, and in later years, the industry generated millions of dollars annually and employed thousands of New Haven residents. Today, pollution precludes the accessibility of the oyster industry in New Haven. If locally harvested oysters are to be eaten safely, they must sit in clean water for at least two weeks. This increases the cost of oyster-production, and their price, thereby lowering local oyster demand. Only two large companies, neither of which base in New haven, have overcome the financial barrier to processing and cleaning local oysters. Pollution currently also threatens the flounder industry, which is significant to New Haven. In just four years, from 1989 to 1993, the amount of winter flounder caught annually fell 80%, considerably diminishing a major source of revenue for the city. The EPA attributes flounder decline to NPS (non point source) pollution; stormwater runoff falls within this category. Flounder face high risk of pollutant poisoning because they spend much of their time buried in sediment, where contaminants are likely to concentrate. Several studies have found elevated levels of copper, zinc and DDT in flounder tissues, which can cause sterility in the fish. These contaminants are also dangerous to the humans who ingest contaminated fish.¹⁴

Filtration Systems and Maintenance

Storm drain filters are passive flow-through filtration systems that reduce pollutants in urban runoff before it returns to local watersheds. Stormwater filters can block 80% of the total suspended solids and 90-95% of the petroleum and oil compounds contained in runoff water.³

The most common stormwater filtration system entails a replaceable filter cartridge in a concrete structure lying beneath the storm drain. A siphon draws water in through the filter. The filter cartridge physically traps large particles. Additionally, through mechanical filtration, ion exchange, and absorption, the filter targets oil, grease, soluble metals, soluble phosphorous, nitrates, PCB's, and organics.¹⁰

As these concrete structures are installed underground, and thereby require no land area, there are few physical site constraints. The specific filtration system can be selected according to its anticipated scale of use and the content of on-site pollution. The following basic system categories mitigate concerns specific to area conditions:

The Precast Storm Filter

For low to medium water flow, this system is engineered simply, to lower costs and increase the ease of installation.¹²

The High Capacity Storm Filter

These more complex systems can treat and filter flow from large sites.¹²

The Catch Basin Storm filter

These systems are ideal for roadways.¹²

The Curb-inlet Storm Filter

These can be installed on street curves with inlets from 3' to 10' long.¹²

The Environmental Protection Agency (EPA) has not indicated advantages of any specific drain system or maker, but the official EPA website (<http://www.epa.gov/NE/assistance/ceitts/stormwater/techs/stormfilter.html>) provides detailed information on all major storm drain filter systems and manufacturers. Reports on these systems, include verification reports from independent sources.³

After installation, the systems should be monitored quarterly. Cartridges should be replaced once a year.

Payment Options for Filtration Systems on Public Land

A variety of funding options are available for stormwater filtration systems. While this proposal recommends that New Haven require private firms and builders to install and pay for their own capitol and maintenance costs for stormwater filtration systems, New Haven would still be responsible for systems on public land.

Bond Financing

Several cities currently utilize this source of funding, similar to a constituent loan, for stormwater filtration systems and maintenance. In Los Angeles, a bond measure provided \$500 million in funding for stormwater programs.¹ The success of such a program involves public education, as voters must essentially support taxing themselves.⁹

Development Fees

Development fees are one-time charges that can take several forms, including permit fees or assessment fees. Generally, these pertain to the impacts of property owners' actions upon the land they use. Because these fees are not ongoing, this source of funding is appropriate for capitol, instead of maintenance costs.⁹

Enterprise Funds

Enterprise funds commonly provide the funding for stormwater programs, generally for drain maintenance.⁹

Special Districts

This involves assessment of districts within legally described physical boundaries, leading to differential fees based on the costs and benefits of the stormwater filtration system in each district. This form of payment could provide both capitol and maintenance costs.⁹

Grants

Many grants are available from private sources and state and federal agencies. EPA provides information about available grants for stormwater systems in New England on their official website (<http://www.epa.gov/NE/grants/index.html>). Most stormwater grants offer only partial funding, and require that an alternative source of funding be secured for maintenance. A city's willingness to push forward with stormwater programs provides competitive advantage in the grant application process.⁹

Policy Recommendation

We recommend New Haven adopt legislation mandating that an EPA-approved stormwater filtration system be built into the storm drains in the areas of each new construction or major renovation project (both public and private) greater than one acre within New Haven's city limits. Additionally, this legislation should ensure the maintenance of these systems. Private owners should be responsible for the maintenance of stormwater filtration systems on their land, and the city of New Haven should be responsible for maintenance of stormwater filtration systems on public land.

Citations

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