Sound Logic: Smart Ways to Reduce Stormwater Runoff in the Long Island Sound

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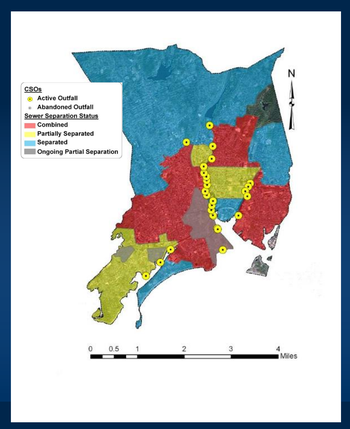
Abstract

Stormwater runoff and combined sewer outputs have been contributing to nitrogen excesses leading to "dead zones" in the Long Island Sound for over 100 years. Our project aims to slow and possibly neutralize the cause of these nitrogen excesses to aid in the effort to clean the Sound. Our goal was to provide evidence in favor of small scale stormwater runoff reduction solutions in the city of Bridgeport, Connecticut as an additive measure to the separation of combined sewers that run within the city's boundaries. We found these measures to be effective and therefore recommend their implementation.

Background

Combined sewer systems that handle both sewage and stormwater regularly overflow into the Long Island Sound during period of moderate rainfall. This affects the 20 million people who live near the Long Island Sound, as well as the aquatic life that lives in the sound. High amounts of nitrogen and heavy metals have been correlated to sewage water overflows. Bridgeport has 73.3% impervious surfaces that contribute to the amount of water that is put in to the sewer system.



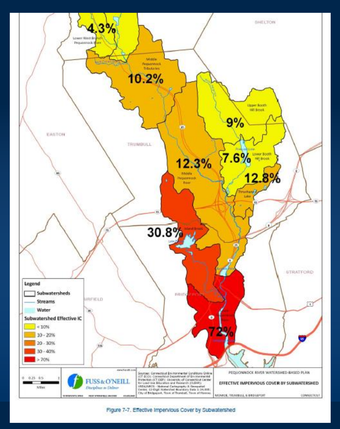


Figure 7-7. Effective Impervious Cover by Subwatershed

Implementations

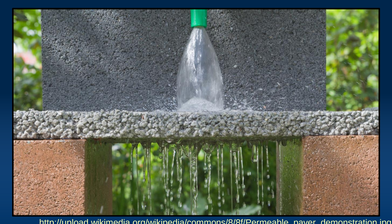
Green Roofs
Vegetation is added to a roof to improve water retention and insulation


http://upload.wikimedia.org/wikipedia/commons/a/a0/20080708_Chicago_City_Hall_Green_Roof_edit_2.jpg


http://www.emmitsburg.net/gardens/articles/adams/2008/rain_garden.htm

Rain Gardens
Plot of vegetation surrounding impervious surfaces that absorbs excess runoff

Pervious Pavement
Soaks up stormwater through surface, traps solids, and filters pollutants from the water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Infiltration Gardens
Collects water from surrounding impervious surfaces or disconnected downpipes

Grass Pavers
Combination grass and pavement used for overflow parking


http://upload.wikimedia.org/wikipedia/commons/b/ba/Rasenpflasterstein_1.jpg


http://farm3.staticflickr.com/2744/4473654420_ef4dd7b146_b.jpg

Rain Barrels & Detached Spouts
Barrels that collect rain water runoff that can be stored and repurposed for later use

Outcomes

Our solution calls for the city of Bridgeport to:

- Install green roofs on large buildings
- Rain gardens in open spaces
- Grass pavers on lightly used parking lots
- Rain barrels can be used to collect rain water from gutters outside of residential homes
- Pervious pavements can be installed in place of concrete
- Infiltration gardens can be added where pervious concrete cannot

We believe that each of these will contribute to the reduction of stormwater runoff.

Conclusions and Recommendations

Green infrastructure improves urban aesthetics, increases property values, and provides wildlife habitat and recreational space for urban residents. Implementation of such infrastructure is a massive undertaking and is far from an easy solution. The key is to create a climate where developers want to be "green." We recommend that the city of Bridgeport add small, but impactful changes to their public works projects out of its Engineer's office to have some modification for stormwater reduction. The solution is a mindset; every new project is an opportunity to better the quality of the city's environmental rapport.

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