

FEATURES

Long Beach

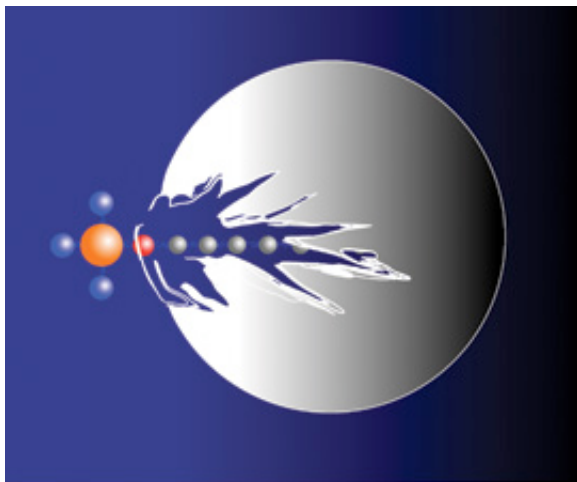
Nonpoint-Source Solutions

A stormwater manager describes how one coastal urban community is protecting its waterways.

By Judy I. Shane

Protecting a municipality's receiving waters from nonpoint-source pollution is a formidable task in any community. In the urban-coastal community of Long Beach, CA, with a population of about 490,000 and a storm drain system of about 395 miles of pipes, it involves a comprehensive program and the commitment of every department and employee in the city.

Tom Leary, stormwater management program officer with the Long Beach Public Works Department, explains that the city occupies a land area of about 50 square miles; operates and maintains an international deep-water harbor; manages close to 2,000 oil wells; and has 11 miles of beaches covering 541 acres, two city-owned and -operated marinas, 468 acres of navigable waterways, a Southeast Resource Recovery Facility (SERRF), and a regional airport.



Example of an antimicrobial agent destroying the cell wall of a bacteria molecule.

As if these environmental challenges are not enough, Leary points out that the Los Angeles and San Gabriel rivers run along the east and west borders of the city carrying urban and stormwater runoff and pollutants from over 80 southern California cities directly to its ocean and beaches. "Our stormwater management program must implement best management practices [BMPs]--structural and nonstructural--that address a multitude of issues. We can't look to just one approach for a solution, and we can't effectively address this critical environmental issue by just treating the symptoms. We need to address underlying causes through a massive environmental educational outreach program; we need to change behaviors; and what's more, we need to find funding sources to implement innovative solutions," Leary says.

Trap Nets and Underground Treatment

Long Beach's Stormwater Management Program continues to become more effective on all levels--structural, nonstructural, and educational. As far as recent structural solutions go, Leary says that one of the most cutting-edge structural BMP projects is the installation of storm drain pollution trap nets at several city-owned pump stations. "This project is possibly the first of its

kind in the nation," Leary notes. "The trap nets are designed to capture and remove trash and debris prior to entering the pumps, thereby significantly reducing contaminants discharged into the Los Angeles River." The project involves removing existing trash racks; constructing storm drain pollution trap nets; installing a hoist-crane structure, steel grated pump house doors, and low channel steel screens; and constructing reinforced concrete pads, chainlink fences and gates, a hoist cover, and a vandal-proof control.

Other grant-funded projects involving structural BMPs include two underground Continuous Deflective Separation (CDS) units installed in-line--one in a tributary to the county-owned Hamilton Bowl detention basin and the other adjacent to a city-owned pump station that discharges to the Los Angeles River. Both units are strategically located in the watershed area that is tributary to the Los Angeles River where a large amount of trash and debris is generated. Leary explains that CDS technology is particularly effective in capturing first flush trash and debris, treating large volumes of stormwater at or near the point of discharge from the storm drainage system to the receiving water. The technology uses fluid dynamics in a balanced system to effect a natural separation of solids from liquids. The units are designed to set up a continual flow of liquid that passes over the face of a special perforated separation screen in a hydraulically balanced separation chamber. Solids are captured and retained within a central chamber and the fluid passes through the screen and exits through an outlet pipe. Solid pollutants including trash, debris, and sediments are retained in a centrally located chamber with the heavier solids settling into the base of the unit or sump.

"Even with these excellent structural solutions to help prevent pollution, we have found in our learning curve that any given solution can create another challenge," Leary notes. "For example, if a structural solution results in any standing water in a curbside or gutter, it could become the breeding ground for mosquitoes--and then we have a health issue. Public safety, maintenance, and flood control are also of major concern when selecting and installing these types of structural devices. We've learned that when you solve one problem, you may be creating a whole new one. Because of this, we are always evaluating solutions that are based on sound science, cost-effectiveness, and flexibility whenever possible."

A Pilot Program to Reduce Beach Advisories

In 2004, the Long Beach City Council unanimously approved a contract of up to \$1 million for installing and monitoring AbTech's Ultra-Urban Filter series with Smart Sponge Plus antimicrobial technology. According to Leary, the filtration systems are flexible: "The filters can be installed very quickly. If we find they are needed more critically in a different area, we can easily relocate them. After the filters reach saturation, they can simply be replaced. Fortunately, I am told that they are fully recyclable, and they will not add to the toxic waste problem," he adds.



Ultra-Urban Filters near the Santa Monica Pier capture sediment and debris but still allow a large amount of water to flow through.

Leary explains that the contract would provide for a pilot program designed to protect local waterways that are threatened by the highest level of pollutants. The pilot program involves installing the filtration systems in the areas that were most needed throughout the community and then monitoring their performance to measure effectiveness. "Our number-one priority is to install the Ultra-Urban Filters in drains that are tributary to waters used for recreation. We aim to improve the water quality in the beaches and recreational areas where people swim and play. We've had advisory postings and some beach closures in the past. The presence of bacteria and other harmful pathogens in stormwater, particularly after rain, poses the greatest risk to

human health."

The filters are designed to encapsulate and remove harmful substances, including hydrocarbons, oil, grease, and other toxins, before they enter local waterways. The antimicrobial element adds the capability to destroy disease-causing microorganisms, such as

Staphylococcus aureus , *E. coli* , and fecal coliforms.



A storm drain outfall pipe near Santa Monica empties runoff directly onto the beach.

The contract includes installing the filter systems and monitoring them for one year. The contractor will take samples of the runoff just before it enters the filtration units and again as the runoff exits. "This type of monitoring will continue throughout the year to gain insight on this best management practice and to measure the filtration systems' effectiveness. Because of the size of Long Beach's storm drain system and the fact that this is a demonstration project, not all catch basins will be covered. We've selected a wide variety of installation locations based on land use, projected pollutant loads, and beneficial-use designation. We need to make sure that we install these units properly and maintain them to achieve maximum performance," Leary says.

The City of Long Beach selected the filter because it is patented to capture bacteria and pathogens in addition to trash, sediment, and hydrocarbons. Rodolfo Manzone, AbTech's executive vice president and chief technology officer, explains that Smart Sponge Plus, on which AbTech Industries holds a US patent, employs an antimicrobial agent, chemically bound to the polymer filtration material, which deactivates microorganisms without releasing chemicals or leaching. Independent field testing has validated the effectiveness of the Smart

Sponge Plus in multiple locations with a variety of microorganisms found in stormwater runoff.

"Unlike other antimicrobials that act by poisoning harmful microorganisms, Smart Sponge Plus technology is based on the antimicrobial agent's interaction with the microorganism's cell membrane. Simply put, it acts by rupturing cell membranes--preventing potentially harmful microorganisms from functioning, developing, or reproducing. Because no chemical or physical change occurs in the antimicrobial agent, the filtration system maintains long-term effectiveness," Manzone says.

Long-Term Commitment

Leary, who has been with the City of Long Beach since 1991, notes, "Even without the pressure of meeting NPDES requirements, the city is committed to cleaning up the waterways. We exist to make life better in the community." Facing the same pressures as many other stormwater management professionals who compete with other departments for funding, Leary says, "We have to make this program work--with or without the piece of the pie [budget] we think we should have."

The stormwater pollution prevention programs cost the City of Long Beach about \$19 million a year. With current budget challenges, most municipalities across the country can't count on receiving all they need to restore and keep the waterways clean. Leary quickly found an innovative solution to potential funding challenges through the city's participation in the Adopt-A-Waterway program. Adopt-A-Waterway is a nationally recognized environmental effort that raises funds for stormwater pollution prevention projects and educational outreach. The effort involves recruiting environmentally minded businesses willing to sponsor signs and other advertising and directing the money toward changing behaviors and solutions to stormwater and urban runoff pollution.

"This is a great opportunity to bring in non-taxpayer dollars for protecting our waterways and receiving waters," Leary says. "Businesses can show that they support an environmental cause and be publicly recognized for their efforts. Most importantly, the funds that are generated will

help us comply with environmental regulations regarding stormwater runoff, and put us in a better position to protect and enhance our natural resources." Adopt-A-Waterway is a simple yet effective concept that is loosely modeled after the Adopt-A-Highway program. Businesses purchase, or sponsor, an integrated mix of media, including custom-designed signs that are placed in high-traffic areas along city-owned roads, providing them with a unique venue to subtly advertise their name and logo. Each sign also includes an environmental BMP reminder such as "Please Do Not Litter." Adopt-A-Waterway gives 50% of the signage revenue directly back to the city to clean up the waterways.

In addition to the signs, the Adopt-A-Waterway program will provide the city with a multimedia public education campaign--which includes cable television and radio advertisements and a quarterly magazine--encouraging consumers to be part of the solution. The educational components of Adopt-A-Waterway help the city meet mandated requirements under the federal Clean Water Act regarding public education and outreach. The Port of Long Beach, Colonial Buffet, Catalina Express, Island Sunfish Grill, Timmons Volkswagen, Waste Management, and SERRF/Onyx are among the sponsors that provide funding for the city's stormwater management activities through their participation in Adopt-A-Waterway.

One of the aspects of Adopt-A-Waterway that Leary favors is that all of the media products it offers provide environmental education, as well as funding sources. "The best line of defense for our nation's waterways is public education and outreach," says Leary. "I'm looking forward to the day when littering in Long Beach is socially unacceptable."

The City of Long Beach's stormwater program and Tom Leary have been widely recognized by a number of accomplishments. Its stormwater Web site, <http://www.lbstormwater.org/>, received the 2001-2002 International Golden Web Award. The city's volunteer watershed cleanup project was awarded the prestigious H. David Nahai 2003 Water Quality Award-Water Body Conservation from the Los Angeles Regional Water Quality Control Board. The Adopt-A-Waterway program (formerly Adopt-A-Stormdrain) was given honorable mention in the National League of Cities Howland Award in 2002. Leary has been elected to the Board of Directors of the Long Beach Management Association, the California Stormwater Quality Task Force, and the Save Our Beach organization.

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