MARYLAND PORT ADMINISTRATION

Dundalk Marine Terminal Algal Turf Scrubber®

Baltimore, Maryland

from top: Baltimore port's Algal Turf Scrubber® with 2 meter x 100 meter floway; Attached algal "turf" pulls nutrients and traps sediment from inflow while pumping dissolved oxygen into outflow

Maryland Port Administration's Dundalk Marine Terminal uses the power of algae driven by photosynthesis to efficiently remove nutrients and other pollutants from impaired water sources.

Operated by the Maryland Port Administration (MPA), the 13-berth, 570-acre Dundalk Marine Terminal is the largest general cargo facility at the Port of Baltimore. In 2014, as part of an effort to reduce the impact of stormwater runoff from Baltimore's public marine terminals, the MPA installed an Algal Turf Scrubber® (ATS), a technology developed by Dr. Walter Adey of the Smithsonian Institution, at the Dundalk Marine Terminal. The Algal Turf Scrubber® harnesses the power of algae to improve water quality. The ATS was awarded first place in the Innovative Best Management Practices (BMP) category for the Best Urban BMP on the Bay Award in 2014.

The 300 foot-long turf scrubber works by pumping water from Baltimore's Patapsco River into a shallow, screened floway. The water flows by gravity down the floway, where the controlled natural growth of attached filamentous algae occurs through nutrient and carbon uptake and the use of the sun as an energy source. The algae not only removes nitrogen and phosphorous from the water, but its photosynthetic activity releases dissolved oxygen, which further improves the quality of the water before it re-enters the river.

After helping to install the scrubber, Biohabitats collaborated with researchers from the University of Maryland Department of Environmental Science and Technology (ENST) to monitor its effectiveness. Twelve months of monitoring data show that the technology is highly effective at reducing nitrogen, phosphorous and sediment loads. Based on the monitoring results, the MPA plans to upscale the technology from 200 square-meters to up to 0.5-1.0 acre.

In addition to its effectiveness at reducing nutrient and sediment Total Maximum Daily Loads (TMDLs), the scrubber proved a useful tool for research and education. University of Maryland ENST senior capstone students successfully tested samples of the harvested algae in an anaerobic digester to determine its ability to make methane and thus its viability as an energy source. Another capstone group tested the use of the harvested algae in concrete as a form of nutrient and carbon sequestration.

SERVICES

Post-construction Monitoring
Green Infrastructure Design

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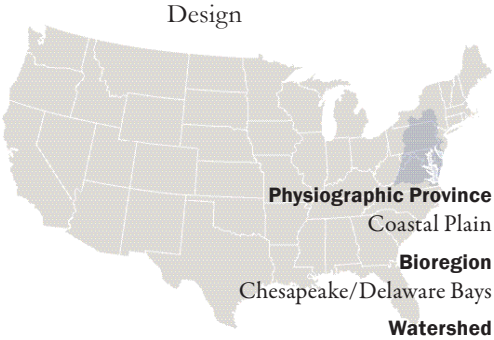

Physiographic Province
Coastal Plain

Bioregion
Chesapeake/Delaware Bays

Watershed
Patapsco River

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800.220.0919
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