

# Baltimore Harbor Algal Turf Scrubber Pilot Project

Baltimore, Maryland



**A**lgal Turf Scrubber® (ATS™) technology involves the controlled use of natural algae to remove nutrients from water and convert them into easily harvested biomass. At the same time, ATS™ technology injects high concentrations of oxygen into the water and removes CO<sub>2</sub> from the water and atmosphere. Biohabitats and the University of Maryland constructed a pilot-scale ATS™ system (300' x 1') along Baltimore's Inner Harbor to determine how effective this technology is in partially addressing the city's nutrient reduction goals and in supplying oxygen to receiving waters to prevent or ameliorate fish kills during low oxygen events.

The ATS™ system consists of an attached algal community growing on screens in a shallow trough or raceway through which water is pumped in a manner that mimics a controlled stream ecosystem. The algal community provides water treatment by uptake of inorganic compounds in photosynthesis. Nutrients that are removed from the waterway are stored in the biomass of the algae growing on the screens. During the growing season, the algae are harvested weekly, thus removing nutrients from the waterway in their biomass. Because of the fast growth rate of algae on the ATS™, this technology can remove nutrients at a high rate.

*Mimicking a stream ecosystem, this unique, algae-based water treatment eco-technology proves effective for pollutant removal and oxygen enrichment in Baltimore Harbor.*

Baltimore Harbor, an extension of the Patapsco River on the Chesapeake Bay, is impaired by high nutrient loadings associated with human impacts to the estuary. While ATS™ technology has been shown to be an effective tool for the treatment of eutrophic waters, this pilot seeks to better understand process factors influencing performance and the potential for a system scale-up, as well as additional benefits such as oxygen enrichment for aquatic biota and the potential for creating biofuel from algal biomass.

Started in January 2011, the Baltimore Harbor ATS™ system has been operated, maintained and monitored by Biohabitats consistently through 2012. Preliminary results demonstrate the feasibility of using ATS™ systems to remove nutrients from

harbor water. Significantly, the system delivered high concentrations of oxygen to receiving waters during several low dissolved oxygen fish kill events on the harbor during the operational run.

Working with researchers at the University of Maryland and the NOAA Sea Grant Extension Program, Biohabitats plans to scale the pilot system up to several sites around the harbor to achieve several goals. These goals include cost-effective and verifiable reduction of nutrients in support of the city's required nutrient loading limits, creation of oxygen-rich aquatic refugia to reduce the impact of low oxygen-driven fish kills, and potential for the creation of a carbon neutral biofuel.

## SERVICES

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