

Floating Wetland Islands in Restoration Ecology in Fresh, Brackish and Salt Water

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Floating Wetland Islands are man-made replicas of natural peat based systems found around the world. Using a fibrous recycled material (matrix), Floating Islands are manufactured to any shape and size. Floating Islands can be installed in fresh, brackish and saltwater environments. The interstitial spacing of the recycled materials allows naturally occurring microbes to colonize the fibrous surfaces creating a wetland where denitrification occurs. The amount of denitrification has been tested and verified in lab tests at a rate of 759 mg/day/ft² island in both fresh and brackish water without the use of aeration. The Naor project at Harborview East and 4 other locations around the Inner harbor involves installing 18 acres of Floating Wetland Islands. The project is divided into 2 phases. Phase 1 involves 2 acres and phase 2 involves installing the remaining 16 acres. If the nutrient rates from the lab study were to hold true in an outdoor environment, installing 2 acres (8,092 m²) of Floating Wetland Islands in Baltimore's Inner Harbor would effectively remove ~145 lbs/day of N or 52,925 lbs/year. The cost per pound of N removed is \$2.19/lb over 30 years. Installing the full 18 acres of Floating Wetland Islands would remove ~1312 lbs/day N and 478,880 lbs/year.

Habitat is also created both above and below the surface of the water. During a 3 month period in the Fall of 2010, several 4" round, 2" thick sections of the Island matrix were left hanging approximately 3 ft below the water surface. These pieces of matrix were pulled and observations showed that on one piece, 644 native Dark False Mussels were colonizing the matrix. This species was not found on adjacent pier pilings or bulkheads indicating a preference for attachment to the matrix substrate. Given the surface area of the 2 acres in phase I, there is the potential capacity of 168,315,840 Dark False Mussels colonizing the Island matrix to enhance the nutrient uptake and TSS removal above and beyond the numbers listed above, cleansing the waters of the Inner Harbor and helping the City of Baltimore and the State of Maryland to meet the TMDL requirements under the newly promulgated laws pushed down by EPA.

Other benefits include robust fish habitat, shading of deep water reducing thermal pollution, reflect wave energy reduction (82%) from boat traffic, safety platforms for egress from the water during accidents (current bulkhead heights are 5-10' with no egress ladders).

The Naor project is a capital improvement project creating acres of floating wetland parks reconnecting waterside promenades, creating dozens of green jobs, eco-tourism and enhancing the quality of life of the citizens of Maryland. The multiple benefits this project brings to Baltimore and the State of Maryland drives the cost per unit of value down to pennies per square foot. Using Floating Wetland Islands as a restoration tool is both cost effective and environmentally sound.

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