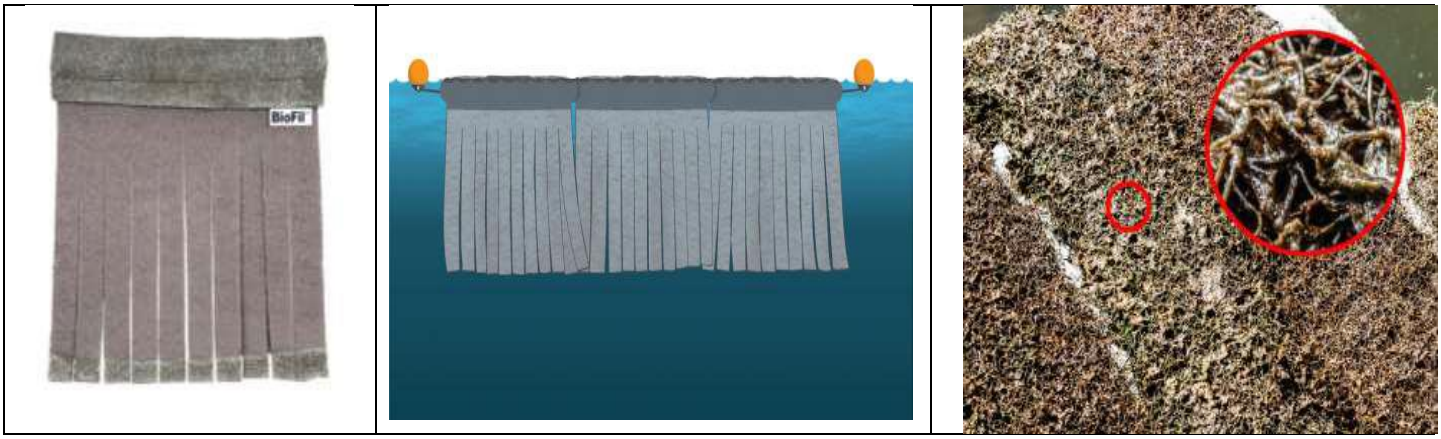
FLOATING
WETLAND
SOLUTIONS

BioFil™ Filter

The **BioFil™ Filter** is a water quality stewardship tool that provides a unique platform for reducing coliform indicator bacteria and ammonia. The BioFil Filter targets the colloidal particles that cause water turbidity, provide transport to coliform bacteria, heavy metals, and other pollutants, and degrade habitat for fish and other aquatic life. The open water deployment creates microbial habitat in the most oxygenated portion of the water column, enhancing aerobic processes such as nitrification, the oxidation and removal of ammonia.



Deployable at the surface or just below the surface.

The standard BioFil is 60” wide and extends 60” into the waterz column. The filter has panes that can move independently, enhancing self cleaning and also serving as a pressure relief mechanism in high flow events. The panes are designed to have limited side to side movement, maintaining their position. Custom sizes are available.

Biofilms have a self-cleaning/ regeneration ability via sloughing. This anti-fouling process entails the removal of unwanted biofilms after which new biofilms develop. The Biofil’s strategically placed slits allow a gentle movement that facilitates mass transfer.

COLIFORM BACTERIA

The BioFil represents a unique platform for reducing pathogenic microorganisms via:

i) filtration of colloidal particles that cause turbidity and provide transport of pathogenic microorganisms,
ii) enhanced penetration of sunlight into the water column due to reduced turbidity,
iii) robust habitat for protozoan predators, and
iv) wave dampening effect reduces re-suspension of sediments.

The mechanisms and processes involved in eliminating coliform bacteria in aquatic ecosystems are well documented. Numerous investigators have documented the dominant roles of sunlight and protozoan predators. When both naturally occurring microbial predators and solar radiation are applied together, they killed significantly more E. coli than the sum of when sunlight and predators are operating independently. The BioFil vertical deployment places nitrifying bacteria in the most favorable oxygen conditions in the water column. Periphytic biofilms, such as the ones that grow on the BioFil, contain abundant numbers of protozoa that prey on coliform bacteria.

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REMOVAL OF AMMONIA
The BioFil creates microbial habitat in the most oxygenated portion of the water column, enhancing aerobic processes such as nitrification, the oxidation and removal of ammonia. The BioFil vertical deployment places nitrifying bacteria in the most favorable oxygen conditions in the water column.

The BioFil does not have plants, which is beneficial to nitrification in two ways. The absence of plant litter means oxygen is not consumed by microbial decomposition activities, thus making more oxygen available to nitrifiers. Secondly, the lack of organic carbon food source from plant litter inhibits fast growing heterotrophic bacteria from dominating slow growing autotrophic nitrifying bacteria. While plants are beneficial in many ways, the absence of plants in the BioFil establishes a microbial habitat that favors autotrophic nitrifiers over heterotrophic bacteria.

BIOHAVENS FLOATING WETLANDS & BIOFIL - AN INTEGRATED NITROGEN REDUCTION SOLUTION
It is well understood that aerobic/anoxic zones may exist within a biofilm, allowing both nitrification and denitrification to occur in the same environment. While the the BioFil supports denitrification at some level, the fact that it has the optimum conditions for the aerobic nitrifying processes also means it is not the optimum tool for the anaerobic denitrification processes. For total nitrogen removal, pairing **BioHaven islands** with the BioFil creates a complete solution based on optimum efficiencies for both processes.

BioHaven islands create an anoxic zone based on blocking diffusion of oxygen from the air/water interface and by blocking oxygen generation from algal photosynthesis. Oxygen consumption by microbial metabolism associated with the islands further reduces DO, creating the anoxic environment required for nitrate removal. The other requirement for nitrate removal is a source of organic carbon, which is supplied by the litter form the island plants. Thus, the BioFil Filter and BioHaven islands create a synergistic
pairing for highly efficient total nitrogen reduction.

Note: literature to reference studies available upon request.

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