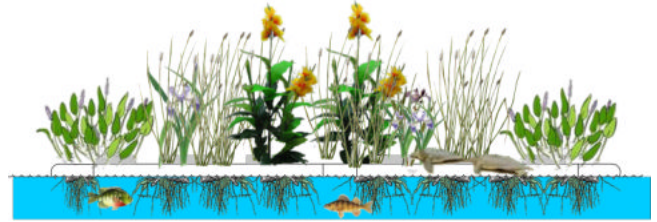


Artificial Wetland Cells For The Absorption of Excess Nutrients



CONCEPT: The Artificial Wetland Cell will form a full sun, stable moist habitat for the plants allowing the plants to flourish. Each of the resulting components, plants, algae, and bacteria will begin consuming the excess nutrients. As the level of nutrients are reduced, so will the excessive growth of harmful algae. Water clarity will improve and the outflow to the rivers lakes and streams will have both a reduced nutrient content and algae count.

Watersheds continue to flush nutrient rich storm water into retention ponds, lakes streams and bays. Storm water officials are unable to abate the flow of nutrients. Even with legislation or laws restricting the use of nitrogen as a fertilizer, I predict that the flow will be only slightly reduced.



Retention pond along Henderson Road just north of Waters Ave, February 2009

The presence of these excess nutrients have caused a significant increase in the growth of various types of algae. Existing plants are unable



to consume these excess nutrients due to wide tidal ranges in water levels. Marginal plants are often left high and dry due to low level water in the water bodies. If the plants migrate to the new water's edge, when the summer rains do arrive, they often drown due to the rising water levels. These plants are often too stressed and unable to flourish, which is the state they need to be in to help absorb the excess nutrients.

Waste water systems are heavy industrial complexes that concentrate the flow of waste in tanks, lagoons and chambers to process the solids, disinfect the water that delivers the waste.

Using this waste water concept, this project focuses on the storm water retention pond as the starting point to begin the treatment of storm water. The artificial wetland cell will use nature to harness the power of the sun in the form of photosynthesis to begin absorbing the excess nutrients. Plants (hydrophytes) will begin to absorb the excess nutrients, in turn

their root systems will form the stabilizing environment for beneficial bacteria and algae. In return, herbivore animals tend to feed on this rich blanket of algae that will form on the root system. Some of the plants root systems will give off oxygen fostering beneficial bacteria growth. This bacteria will break down nitrogen into nitrite and ammonia. These components will then be absorbed by not only the plants but the algae. Some forms of bacteria will convert the nitrite into nitrogen gas which will be released into our atmosphere.

In the second year of growth the Artificial Wetland Cells will function at optimal performance. These islands can begin absorbing pounds of nitrogen each year. Actual calculation of consumption is difficult to measure. Some studies do exist on the consumption of nitrogen by plants in soil. It is far more difficult predict the consumption activity by algae and bacteria. What is known is that when conditions are right, bacteria can reproduce at an massive rate, from hundreds to thousands.

While this project focuses on absorbing excess nutrients, the side benefit will also be recognized in the form of its habitat for wildlife. Birds, fish and amphibians will use the islands for foraging and habitat.

Our first Artificial Wetland Cell is now in its 3rd year. This 100 sq ft island is located on Trucious Pond in Logan Gate Village in Northwest Hillsborough County. Trucious pond is a 2.5 acre retention pond that serves a watershed that involves almost 200 homes. In year 1, the pond was covered with duckweed. In October of that year the island was launched. The following two summer seasons the duckweed growth was thwarted with only minimal presence. We believe that the plants, algae, and bacteria reduced the nutrient levels that made the pond a less desirable environment for the duckweed. A report on this project is provided under a separate cover.

