Assessment of Nutrient Reduction Capabilities of an Algal Based Technology for Pollution Control.

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Eutrophication of water bodies has long been identified as a state-wide issue in Florida, recently garnering national headlines and debate with the EPA's Numeric Nutrient Criteria. Recognition of the need to abate ground and surface water nutrient loading has led to significant research into technologies aimed at reducing nutrients from stormwater and natural systems. The focus of this study is the proprietary Algal Turf Scrubber®, which is an actively managed system where flow is continually introduced over a sloped floway with a growth stabilization grid for the establishment of algal mats or "turf". The algal turf is routinely harvested for the purpose of keeping the system in a maximum growth phase as a way to maximize nutrient reduction. Six pilot studies were conducted at five geographically distinct locations with six different source waters. This investigation of process dynamics aims to assess trends in nutrient reduction and determine which influent water quality and ambient parameters most significantly drive total phosphorus and nitrate reduction. Nutrient reduction for the pilot studies ranged from -1% to 31% for total phosphorus and 2.6% to 59% for nitrate. Mean influent water concentration ranged from 35 µg/L to 259 µg/L for total phosphorus and 0.02 mg/L to 0.13 mg/L for nitrate-nitrate; while mean influent concentrations for micro-nutrients were orders of magnitude in difference between sites. Regression analysis shows a strong relationship between influent and effluent concentrations for TP despite these differences (R^2= 0.88). Effluent nitrate concentrations were not as well correlated to influent nitrate concentrations (R^2= 0.47).