SCERP Stony Brook Soutl n
Assessing the function a nt populations

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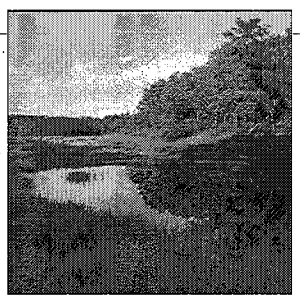
2008 SCERP
Environmental Symposium
Stony Brook-Southampton
Duke Lecture Hall
Friday May 2, 2008
7:00pm- 9:00pm



2007/2008 Research Projects

Linking the dynamics of nutrient cycling and primary producers to hypoxia in the Forge River, Mastic, NY

Amanda M. Burson, Stephanie C. Talmage, and Christopher J. Gobler

As coastal human populations expand globally, adverse environmental impacts are being observed in estuaries. The Forge River in Mastic, NY, is a brackish riverine estuary that has gained recent attention due to reports of seasonal hypoxia and deaths of multiple marine species. A major cause of hypoxia can be eutrophication and anthropogenic nutrient loading. Research was conducted to understand the role of eutrophication and primary producers in the occurrence of hypoxic conditions of the Forge River ecosystem. Bi-weekly time series water sampling, light-dark respiration experiments, and a submerged water quality probe were used to collect information about the water column's physical structure, phytoplankton community biomass, diversity, productivity, and nutrient concentrations. Surveys and experiments were conducted to understand the role of Ulva lactuca in nutrient cycling and hypoxia in the Forge River. From 2006 - 2008, the Forge River experienced chlorophyll a levels exceeding 120 μg L-1 and ammonium levels peaked at levels 47.0 μM, nitrate levels at 20.0 μM, and phosphate at 4.50 μM through the summer months. Bottom waters of the Forge remained hypoxic and/or anoxic for extended periods of time during summer (i.e. several weeks during July and August). In April, Ulva abundance peaked with percent cover ranging from 45 - 97%. Ulva abundance then declined dramatically at all sites during the summer months and then displayed a minor increase peak in September and October (~2% coverage). The decline in Ulva abundance during summer occurred when temperatures exceeded 25°C and when less light was unable to penetrate to the bottom of the water column due to high pelagic chlorophyll a levels. Experimental incubations demonstrated that decaying Ulva both released nutrients and contributed to oxygen consumption. Therefore, the seasonal decline in Ulva may supply regenerated nutrients to pelagic algal blooms and may directly and indirectly promote hypoxia in the Forge River.

Quantification of nutrient loads and their impact on cyanobacteria blooms in a hyper-eutrophic freshwater system, Lake Agawam, Southampton, NY, USA.

Matthew Harke, Tim Davis and Christopher Gobler

Nuisance cyanobacteria blooms have plagued Lake Agawam, Southampton, NY, for a number of years. Recent monitoring has shown that during May through October, blooms are dominated by Microcystis spp., and become nitrogen limited. Recent studies have found toxins produced by Microcystis spp. and other cyanobacteria within the lake and fish kills from low oxygen levels have also been documented to follow bloom crashes. Here we report on a nutrient budget constructed to quantify point and non-point sources for nutrients entering the lake to assist in guiding lake remediation efforts. Dissolved nitrogen was found to primarily originate from groundwater, a storm drain at the north end of the lake and benthic fluxes from sediments. Phosphorus inputs, both organic and inorganic, mainly originated from sediments. These findings suggest that remediation efforts should focus on relieving groundwater inputs but as this can often prove too costly or politically difficult, significant changes can be made by reducing storm water input and possible dredging of the lake bottom. Nutrient dilution experiments performed in 2007 demonstrated that reducing nutrients will not only reduce algal biomass, but may also yield a shift in the phytoplankton community away from cyanobacteria and toward non-blue green algal species. Since cyanobacteria blooms are the cause of many environmental problems in Lake Agawam, including fish kills, a focus on nutrient reduction should be a part of any future management plan for Lake Agawam.

The effect of water column circulators on algal blooms and water quality in Mill Pond, Watermill, NY

Timothy W. Davis and Christopher J. Gobler

Harmful cyanobacteria blooms have become common occurrences in some Long