

**Wastewater nitrogen is linked to changes in submerged
aquatic vegetation and invertebrates in
Oyster Pond**

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Abstract

In order to assess the affect of wastewater nitrogen on submerged aquatic vegetation (SAV) and its associated invertebrates we took six random core samples from established stands in each of six recharge zones in Oyster Pond, a coastal estuary in Cape Cod, Massachusetts. We measured the biomass (g m^{-2}) of the plants and abundance ($\# \text{ m}^{-2}$) of invertebrates, as well as the $\delta^{15}\text{N}$ values of plant tissues. The dominant plant *Ceratophyllum demersum* showed an increased $\delta^{15}\text{N}$ signature in areas with higher rates of wastewater N loading. *C. demersum* and other plant species changed their contribution to total biomass with higher wastewater N input, with *C. demersum* comprising up to 80% in the areas of highest N loading. Midges and phantom midge larvae increased in abundance with increasing wastewater input and this was not a function of increasing plant biomass. Sensitive taxa, mayflies and caddisflies, had higher abundances in the macrophyte *Chara vulgaris* and not *C. demersum*. We estimate that *C. demersum*, found at depths of up to 3 m could be holding 32% of the annual N load of Oyster Pond.

Introduction

Submerged aquatic vegetation (SAV) has an important structuring role in the dynamics of shallow eutrophic lakes. Aquatic macrophytes may out-compete phytoplankton (a major component of turbidity) for nutrients directly, as well producing allelopathic substances that affect phytoplankton growth (Sheffer et. al. 1993). Additionally, SAV canopies create suitable conditions for denitrification, and supply shelter for zooplankton which may graze on phytoplankton (van Donk and van de Bund. 2002).

Oyster Pond is a shallow, estuarine kettle pond in the southwestern portion of Cape Cod, Massachusetts. In recent years, local residents have become concerned because of increases in

