

EFFECTS OF SUBMERSED MACROPHYTES ON ECOSYSTEM PROCESSES

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ABSTRACT

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Both natural and managed ecosystems experience large fluctuations in submersed macrophyte biomass. These fluctuations have important consequences for ecosystem processes because of the effects of macrophytes on the physical/chemical environment and littoral biota.

The first part of this paper reviews the effects of submersed macrophytes on the physical environment (light extinction, temperature, hydrodynamics, substrate), chemical environment (oxygen, inorganic and organic carbon, nutrients) and the biota (epiphytes, grazers, detritivores, fishes). This extensive literature suggests that variations in macrophyte biomass could have major effects on aquatic ecosystems.

The second part of this paper considers the ecosystem consequence of several common changes in submersed macrophytes: replacement of vascular macrophytes by bryophytes during lake acidification; short-term biomass changes caused by invasions of adventive species, cultural eutrophication or macrophyte management; and changes in littoral grazers. These scenarios illustrate the importance of macrophytes in ecosystems, but raise many questions which cannot be answered at present. Controlled, whole-lake macrophyte experiments are needed to resolve these open questions.