

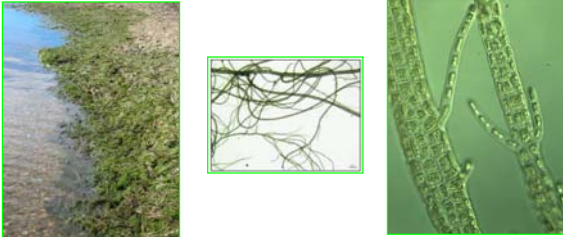
An exotic, invasive macroalga (*Enteromorpha flexuosa*) in Muskegon Lake and its potential for food web disruption in the Great Lakes.

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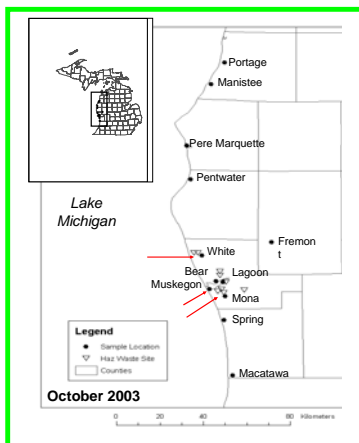
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A new exotic macroalgae, *Enteromorpha flexuosa* (subspecies *flexuosa* and *paradoxa*), was discovered creating nuisance blooms and washed up on beaches in Muskegon Lake, a coastal lake of Lake Michigan, in late summer and fall 2003.



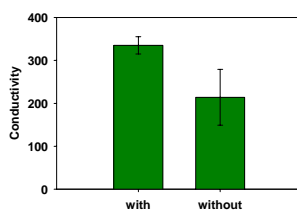
In nutrient enriched marine or estuarine coastal environments, *Enteromorpha* is highly invasive. It can form nuisance blooms that cover benthic areas, foul boats, litter beaches and disrupt littoral zone food webs by replacing indigenous algae, smothering aquatic plants, and altering redox conditions.

Of 11 sites visited, *Enteromorpha* was found in 3 coastal lakes along the eastern shore of Lake Michigan: Mona, White and Muskegon Lake (indicated by red arrows).

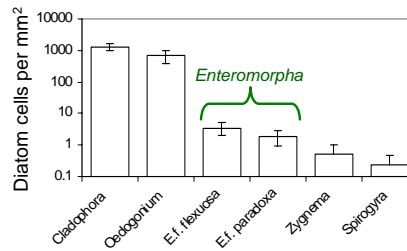


(Lougheed & Stevenson, 2004)

The 3 inland lakes with *Enteromorpha* were associated with hazardous waste sites, many contaminated by chlorinated compounds, and had higher water conductivities than lakes without this exotic alga.



Enteromorpha had low epiphyte load relative to several other macroalgal taxa, and thus provided less food for grazers of epiphytes.

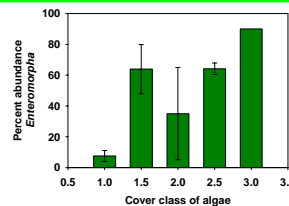


(Lougheed & Stevenson, 2004)



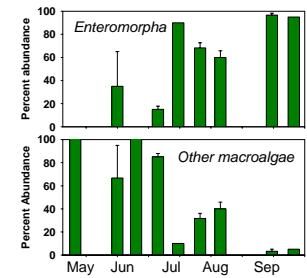
One site in Muskegon Lake was monitored for macroalgal cover and species composition over the summer of 2004.

Enteromorpha abundance increased over the summer, while other macroalgal taxa (mostly *Cladophora*) declined to near-zero levels.



Total cover of macroalgae increased with *Enteromorpha* abundance.

Cover classes: 1: 0-5%, 2: 5-25%, 3: >25% cover



Conclusions:

1. Industrial activity resulting in increased salinity of associated waters, may have facilitated the invasion of this marine taxon.
2. Exotic *Enteromorpha* provides a poorer epiphytic food source than many native macroalgae.
3. As the summer progressed, growth of *Enteromorpha* replaced native taxa and led to increased macroalgal cover. This may have important consequences for reducing availability of food and in causing bloom related anoxia in Great Lakes littoral areas in later summer and fall.

Acknowledgements

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