Importance of Filter Feeding Organisms for Water Quality

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Natural Significance of Filter Feeding Organisms
- Eutrophication, or the depletion of oxygen (e.g., by excessive algae) in water, is a serious environmental problem that impacts the world.
- Reduce nitrogen inputs (nitrogen encourages the growth and decomposition of oxygen-depleting planktonic life) by cultivating filter feeding organisms, such as blue mussels, which remove nitrogen while creating seafood, fodder, and agricultural fertilizer, so recycling nutrients from sea to land.
- Demonstrated on mussel farm that the net transport of nitrogen was reduced by 20%.

Effects of Zebra Mussel Invasion
- Water transparency in Hatchery Bay, measured using a Secchi disk, was found to be 100% higher in the post-zebra mussel period.
- Mean numbers of total planktonic diatoms in the full post-zebra mussel year were 86% lower than in 1984-1986 and 92% lower than in 1961-1965 pre-zebra mussel periods.
- The recent increase in water transparency and decrease in planktonic diatoms in Hatchery Bay are most likely the direct result of the filtering activities of the zebra mussel, *Dreissena polymorpha*. The changes alter the food web in western Lake Erie.
- *Microcystis aeruginosa*, a toxic planktonic colonial cyanobacterium, was not abundant in the 2-year period before zebra mussel establishment in Saginaw Bay of Lake Huron but became abundant in three of five summers after the mussel invasion.
- Clearance, capture, and assimilation rates were determined for zebra mussels feeding on natural and lab *M. aeruginosa* strains offered alone or in combination with other algae. Results were consistent with the hypothesis that zebra mussels promoted blooms of toxic *M. aeruginosa* through selective rejection in pseudofeces.
- Selective rejection depended on "unpalatable" toxic strains of *M. aeruginosa* occurring as large colonies that could be rejected efficiently while small desirable algae were ingested.
- This movement of seston from the water column to the benthos can induce large changes in all aspects of aquatic ecosystems. The accumulation of pseudofeces is capable of affecting water chemistry and creating a foul environment for other aquatic organisms. In the benthos, however, other macroinvertebrates use pseudofeces as food.