

# Cladophora, mussels, and the nearshore phosphorus shunt in Lake Michigan



## CORE QUESTION:

How do invasive mussels affect the growth of nuisance algae in Lake Michigan?

## A DIFFERENT KIND OF ALGAE BLOOM

Since invading the Great Lakes, filter-feeding zebra and quagga mussels have increased water clarity in Lake Michigan, Lake Huron, and Lake Ontario. However, clear water lets in more light, boosting the growth of bottom-dwelling algae like filamentous Cladophora. As managers at Sleeping Bear Dunes National Lakeshore know all too well, stringy green Cladophora can wash ashore in thick mats to foul beaches and harbor harmful bacteria.

In the past, Cladophora bloomed in waters polluted with excess phosphorus, a nutrient that feeds algal growth. Blooms waned after phosphorus control measures in the 1970s and 80s limited the level of nutrients entering the Great Lakes through urban and industrial wastewater. Yet stubborn blooms persist today in some areas with no onshore sources of excess phosphorus — such as Sleeping Bear Dunes.

## HIDDEN NUTRIENT SOURCES

Pengfei Xue, an assistant professor in the Michigan Technological University Department of Civil and Environmental Engineering, has a theory about what causes these blooms. While mussel-driven increases in

water clarity have expanded the area of lake bottom where Cladophora grows, phosphorus remains the stimulant of nuisance growth. Phosphorus is supplied by mussel excretion (recycling) within the Cladophora beds and by currents transporting it to the beds from elsewhere in the watershed. It is difficult to separate and quantify the importance of these two sources through field studies alone. Dr. Xue and his team will apply mathematical models to untangle the web of processes supplying nutrition to Cladophora at Sleeping Bear Dunes, providing managers with the insight necessary to eliminate nuisance conditions.

## CONTACT

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