

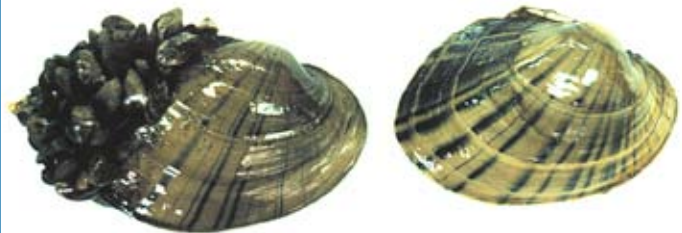
Changes in Mussel Populations in the Great Lakes



Native Mussels Eliminated from Open Waters of Lake St. Clair

The invasion of the zebra mussel (*Dreissena polymorpha*) into the Great Lakes has led to dramatic changes in many groups of aquatic organisms. While organisms from bacteria to fish have likely been affected to some degree by the filtering activity and habitat alterations of large zebra mussel populations, one of the groups most negatively affected has been the native freshwater mussel (*Unionidae*). Zebra mussels attach to the shells of these native mussels and alter normal life-sustaining activities such as feeding, breathing, and eliminating waste products. In addition, large populations of zebra mussels substantially reduce the amount of food available to the native mussels.

NOAA's Great Lakes Environmental Research Laboratory (GLERL) has monitored populations of native mussels in Lake St. Clair since 1986. In the first survey of that year, GLERL found a diverse native mussel community that had changed little since the early 1900's. The lake receives high-quality water from Lake Huron and has a rapid flushing rate resulting in habitat conditions that support a diverse aquatic animal community.

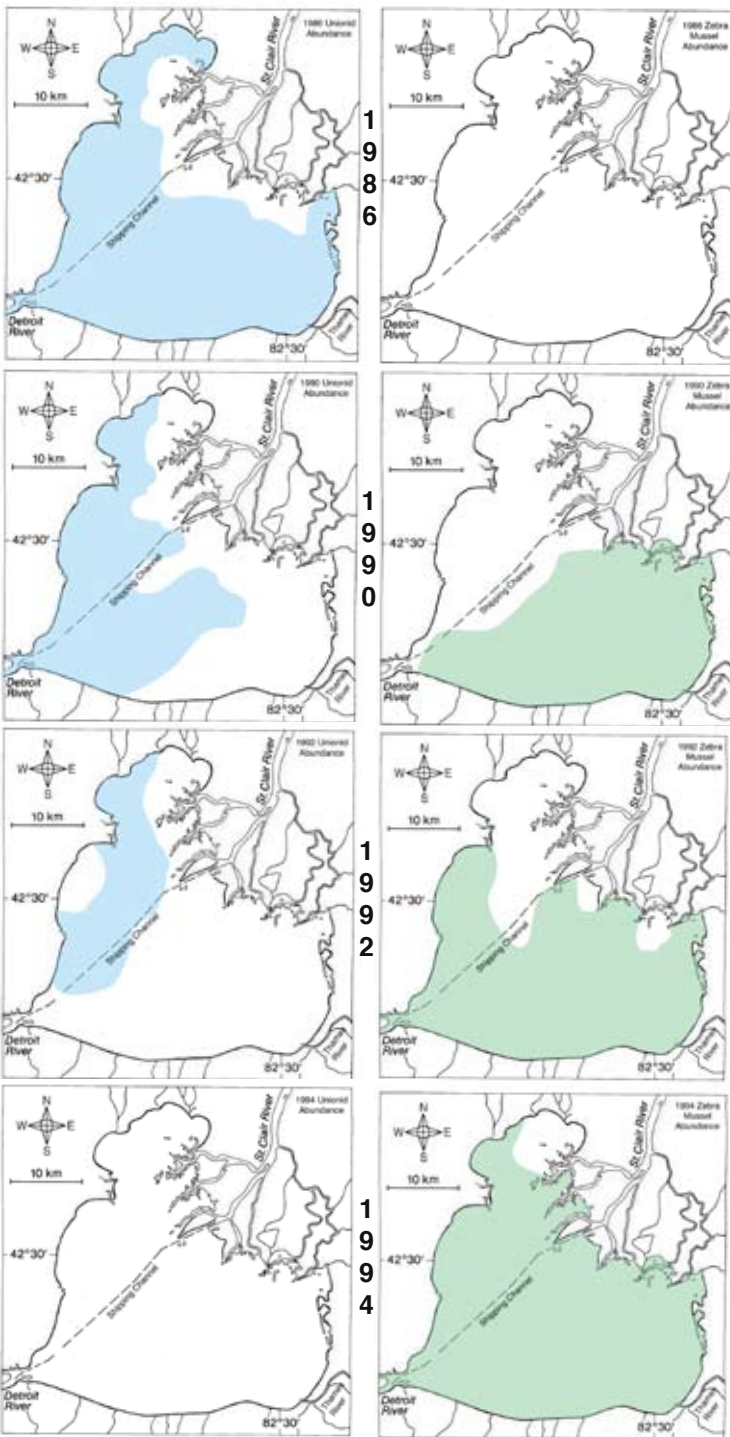


Native mussels, *Lampsilis* sp., burrow part way into the sediments. Zebra mussels attach to the exposed portion of the native mussel's shell.

Two years after the 1986 survey, the first zebra mussel reported in North America was discovered in the southeastern portion of the lake. Thereafter, GLERL documented abundances of both native mussels and zebra mussels in 1990, 1992, and 1994. Native mussel populations first began to decline in the southeastern portion of the lake and then declined in the northwestern portion. This trend closely paralleled the expansion of the zebra mussel from the southeast to the northwest over the same time period. In the first survey in 1986, GLERL collected 18 species and 281 individual native mussels from 30 lake-wide sampling sites. This number declined to 248 in 1990, to 99 in 1992, and to 6 in 1994. Further, while native mussels were found at 29 of 30 sites in 1986, they were collected from only 5 sites in 1994. All five sites were located in the northwestern region of the lake. Mean population densities of zebra mussels in the southeastern portion of the lake had stopped increasing by 1994, but were still increasing in the northwestern portion.

In 1997, GLERL scientists conducted a less extensive survey of both native mussels and zebra mussels, focusing on sites in the northwestern portion of the lake.

Zebra mussels attach to the shell of native mussels and alter normal life-sustaining activities such as feeding, breathing, and eliminating waste.



Native Mussel Distribution

Zebra Mussel Distribution



Divers were used for sample collection.

In the 1997 survey, no live native mussels were collected despite a sampling effort specifically modified from prior surveys to locate live individuals. Based on these results, it can be stated that native mussels have been completely eliminated from the open waters of Lake St. Clair. Zebra mussel populations appear to have levelled off in the northwest as evidenced by a decrease in average density from 2,247 per square meter in 1994 to 1,237 per square meter in 1997, and a decrease in the mean size of individuals in the population.

For more information on this subject or other GLERL research programs, please contact Information Services, NOAA GLERL 4840 S. State Rd., Ann Arbor, MI, 48108 734-741-2262 or visit our web site at www.glerl.noaa.gov

◀ These figures show the spread of zebra mussels (green highlighted area, which represents >100 mussels per m²) and the simultaneous decline of native mussels (blue highlighted area, which represents >1 mussel per m²) for 1986 (top panel) through 1994 (bottom panel).

In summary, no live native mussels were collected in the open waters of Lake St. Clair in 1997 despite sampling efforts that were specifically designed to locate living individuals. Native mussels began to decline in 1990, within 2 years of when the zebra mussel was first recorded in the lake in 1988, and the latest survey seems to confirm that their elimination from open waters is now complete. Other scientists have recently found native mussels in shallow, wetland areas along the lake's shoreline. These "refuges" are not readily colonized by zebra mussels. Surviving native mussels may serve as brood stock to recolonize open lake areas if zebra mussel populations ultimately decline. While populations of zebra mussels have now apparently levelled-off in Lake St. Clair, future surveys will determine if populations decline from present levels and, if so, whether the decline would be sufficient to allow the native mussels to recolonize.

