

Exotics Species and Ecosystem Management

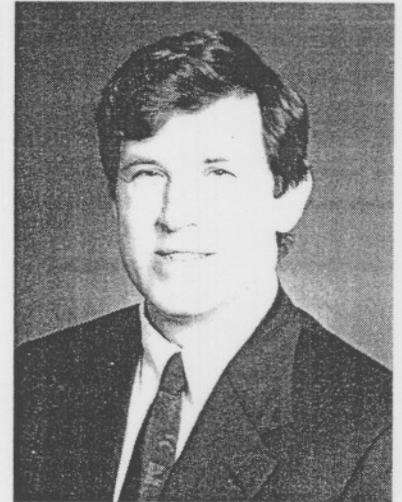
by *Thomas F. Nalepa*

In the 1980s, the Great Lakes became home to the zebra mussel, quagga mussel, ruffe, roundnose goby, tubenose goby, and spiny water flea. These species are just the most recent additions to a list of 139 species that have been introduced into the Great Lakes since the 1800s. Of these species, not all have, or will have, a significant ecological impact. Yet based on past experience, we know that the introduction of a single key species, as for instance the sea lamprey, can have widespread ecological consequences that will alter all previous strategies of resource management.

As scientists, we study ecosystems to understand how species interact within the realm of physical and chemical forces. Such information is then used to wisely manage living resources associated with that ecosystem. Recent introductions, such as the zebra mussel and ruffe, dramatically change interactions between species, creating ecosystems that are unstable and therefore difficult to predict. As a result, previously-known relationships between a management action and a corresponding ecosystem response may no longer be valid. For example, a considerable effort has been made in Saginaw Bay to reduce nutrient loads. We know such a reduction will improve water clarity and reduce blooms of nuisance algae in the water. However, based on our recent studies, we also know that the filtering activities of the zebra mussel, at least up through 1993, can achieve the same end. Therefore, how can improvements resulting from nutrient abatement programs be truly evaluated? To be sure, a new set of assessment tools will need to be developed. In 1994 and 1995, a bloom of nuisance algae occurred in the bay for the first time in almost two decades, and for the first time since mussels became established. In 1995, a similar bloom also occurred in western Lake Erie. These blooms were totally unpredicted and are changing our perceptions on how zebra mussels impact ecosystems over the long term.

Presently, besides the role of zebra mussels in causing nuisance blooms, we are faced with many other ecosystem uncertainties resulting from this recent wave of exotics. What will happen to perch populations in the lower lakes now that the spread of the ruffe is imminent? The quagga mussel is colonizing the soft sediments found in deeper waters of the Great Lakes. Will this lead to a decline in other bottom-dwelling organisms that serve as an important source of food to many forage fish? Now that zebra mussels are found throughout Lake St. Clair and the lake's waters are much clearer, how often will we experience an aquatic weed problem as in 1994?

There has been progress in efforts to decrease the number of exotic species entering the Great Lakes. Ocean-going vessels are now required to exchange their ballast water at sea. This practice



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Before You Use Your Boat in Another Lake or River

Clean your boat — Clean all mud and plant debris from your boat, trailer, propeller, live well and anchors before leaving the landing. Even canoes should be checked inside and out.

Dry or wash your boat and equipment — Drain live wells, bait buckets, and bilge areas. Inspect and clean fishing tackle. Let your boat and trailer dry in the sun for at least three days before you use it again in another lake or river. Or wash your boat and equipment with very hot water (at least 105°F). Make sure tackle and fishing lines are free of aquatic organisms.

Please follow these guidelines to protect Michigan's waters and Remember:

- Young adult mussels can be hard to see.
- One spiny water flea egg in the mud on your anchor can start a new population, even if you don't use your boat again for months.
- A single leaf of milfoil can infest a lake.
- If you catch a ruffe, report it to the nearest Department of Natural Resources office.

kills freshwater organisms contained in the ballast water system before the water is released into the lakes. Also, discussions are underway on how to deal with residual ballast water in ships entering the lakes loaded with cargo. Although the ballast tanks in these ships are "empty", the small amount of water that remains may still contain organisms. Preventing the entry of new species into the lakes is an essential first step in dealing with the exotic species problem. This will at least allow us the chance to understand the long-term ecological implications of species already introduced.

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Zebra mussels colonizing a rock.

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