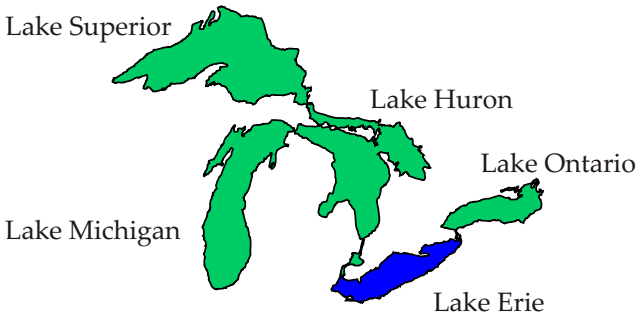
## WHAT ARE THE CURRENT PRESSURES IMPACTING LAKE ERIE?

Land use practices, nutrient inputs, and the introduction of non-native invasive species are the greatest threats to the Lake Erie ecosystem. Natural resource use and chemical and biological contaminants also continue to impact the Lake Erie basin.

### *Pressures and Actions Needed*

#### Land use

Land use changes, including urban development and sprawl, intensification of agriculture, and construction of shore structures continue to negatively impact water quality and quantity, and fish and wildlife habitats in Lake Erie and its tributaries. Unless significant changes are made, this trend is expected to continue as demand for land conversion and use in the Lake Erie basin intensifies.




In some areas of the Lake Erie watershed, over 90 percent of the land has been converted to agriculture, urban and industrial use. A major focus on the rehabilitation of remaining natural habitats and the physical processes that support them is required in order to restore Lake Erie's aquatic ecosystems. Through best management practices, we must undertake rural, urban and industrial land use activities that result in either gains or no net loss in the amount and quality of natural habitats and/or water quality improvements. Development of protected areas networks and other planning tools, will protect existing habitats and the processes that maintain them, including habitat corridors that connect lake, wetlands and upland habitats.

#### Non-native invasive species

Established non-native aquatic and terrestrial invasive species have irreversibly altered the Lake Erie ecosystem. The invasion of zebra mussels in the late 1980s triggered a tremendous ecological change in Lake Erie, as the mussels altered food web dynamics, habitats, and the cycles of nutrients and contaminants in the ecosystem. Additional invasive species such as the quagga mussel, round goby, and several large zooplankton species have further altered the Lake Erie ecosystem and may actually render the ecosystem more susceptible to future invasions. Increased water transparency due to the combined effects of nutrient control and zebra mussel filtering has reduced habitat for walleye, which avoid high light conditions. Increased water transparency combined with lower Lake Erie water levels has resulted in an increase of submerged aquatic plants.

New non-native invasive species must be prevented from colonizing the Lake Erie ecosystem. The spread of already established non-native invasive species must be controlled and reduced where feasible.

Lake Erie beach covered by zebra mussel shells. Photo: U.S. EPA Great Lakes National Program Office.

# LAKE ERIE PRESSURES

## Nutrient inputs

Although phosphorus controls have resulted in tremendous improvements in Lake Erie water quality over the past two decades, continued nutrient inputs from both point and non-point sources still reduce the use of beaches, cause changes in aquatic community structure, and increase algal blooms in Lake Erie, especially in nearshore areas and tributaries.

Nutrient inputs from both point and non-point sources must be managed to ensure that ambient-nutrient concentrations are within bounds of sustainable watershed management. Best management practices and point-source controls need to be implemented with consideration of the ecological requirements for the maintenance or recovery of healthy aquatic communities in the watershed, the hydrologic cycle, and water usage. In addition to phosphorus, nitrate inputs must be included in assessments of watershed and basin nutrient impacts.

## Natural resource use

Natural resource use, including commercial and sport fishing, hunting, trapping, logging, and water withdrawal, has negative impacts on target species and habitats of the Lake Erie ecosystem.

Natural resource use must be sustainable, managed to ensure that the integrity of existing healthy ecological communities are maintained and/or improved, while also providing benefits to consumers.

## Chemical and biological contaminants

Toxic contaminants are introduced into the Lake Erie ecosystem via combined inputs from point and non-point sources within the basin, loadings from the Detroit River, and upstream and long-range atnospheric transport from regional and global sources. Toxic chemicals degrade watersheds by impacting water quality, potentially affecting drinking water, fish and wildlife consumption by humans, and fish and wildlife populations. In addition, biological contaminants such as Type E botulism bacterium may have caused a number of fish, fish-eating bird, and mudpuppy (an aquatic salamander) die-off events in the eastern basin of Lake Erie.

The concentrations of chemical contaminants within the basin are managed according to the principle of virtual elimination. Effective management of local point and nonpoint sources and adoption of pollution-prevention practices have improved watershed and basin ecosystem quality. However, managing legacy contaminants in sediments and landfills and broad-based actions such as those promoted in the Great Lakes Binational Toxics Strategy and the United Nations Agenda 21, which address global atmospheric pollutant transport, are also required to fully reach the objective of virtual elimination of contaminants.

## *To Learn More*

For further information related to the state of Lake Erie, refer to the ***State of the Great Lakes 2005*** report, which, along with other Great Lakes references, can be accessed at **www.epa.gov/glnpo/solec**. The Lake Erie Lakewide Management Plan 2004 can be found at **www.epa.gov/greatlakes/erie.html**.

Layers of *Cladophora* algae along a Lake Erie rocky shoreline. Photo: Upper Thames River Conservation Authority.

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