# Each zebra mussel may spawn 30,000 to 50,000 eggs annually

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of 61,5000 eggs behind. Because larvae burrow in the bottom of rivers and streams for three to 14 years, treatment must be staggered over several years to stop new intrusions of the species. While the sea lamprey has been controlled for the past decade at ten percent of peak population levels, the invader still kills more lake trout each year than do humans through recreational or commercial fishing.

Over the past decade, at least three other exotic species have begun to thrive in the Great Lakes environment. The spiny water flea, first discovered in 1984 in Lake Huron and now found throughout the ecosystem, likely entered the region as a stowaway on a Soviet grain ship in the late 1970s, when U.S. President Carter embargoed grain shipments to the USSR. The Soviets turned to Canada for grain and probably transported the shrimplike crustacean from Lake Ladoga, the flea's native environment.

The flea feeds on smaller organisms such as Daphnia, an important food source for small, forage fish. Initial studies found a decrease in some forage fish in Lake Michigan as a result of smaller food supplies; this decrease affects the lakes' established food chain. The spiny water flea is expected to spread rapidly throughout the continent since its eggs can survive from several days to weeks and in a wide variety of conditions.

The ruffe, a small perch-like fish, is also affecting the Great Lakes food chain, particularly in the Lake Superior basin. The ruffe is considered a pest species in its native Europe. Each female ruffe can produce more than 100,000 eggs per year. From its first discovery in North America in 1986, the fish's population has grown to more than 300,000 in the Duluth-Superior Harbor alone. Since it feeds on zooplankton and insect larvae, other fish with the same food sources (including such commercially valuable species as perch and whitefish) are meeting significant competition. The fishing industry for perch and whitefish alone is estimated at four billion dollars annually.

To combat the ruffe's population growth, Minnesota and Wisconsin have limited anglers' catch of two predator species, the walleye and pike. Bans on removing minnows from Lake Superior streams are also in place to prevent the introduction of the ruffe into other fishing waters. Scientists believe there may be some hope in controlling the ruffe's expansion, since the fish has not ventured into the colder waters of Lake Superior.

Perhaps the most potentially costly exotic species discovered since the sea lamprey, financially and environmentally, is the zebra mussel. A native of the Black and Caspian Seas, the small freshwater mussel was first discovered in the Great Lakes in 1988. Each zebra mussel may spawn 30,000 to 50,000 eggs annually. Its larvae, called veligers, can remain suspended in water for up to 33 days and disperse over a wide area with the water currents. Because the veliger and adult mussel can adapt to all but the warmest or coolest temperatures, scientists expect them to spread to virtually all water systems on the North American continent.

Since its introduction into the Great Lakes, the mussel has reproduced at amazing rates. It has attached itself to virtually every hard surface in the Lakes Erie and St. Clair and has expanded into all other areas of the Great Lakes system. Pumping capacities have been severely restricted due to clogged water intakes for municipal drinking water plants and industries; navigational buoys have sunk from the weight of the mussels on buoy chains; boat bottoms have been severely damaged; and entire spawning reefs for walleye and trout have been covered in western Lake Erie.

Estimates to clean and retrofit industrial and municipal pipes alone over the next decade could total as much as $2 billion. Another $3 billion

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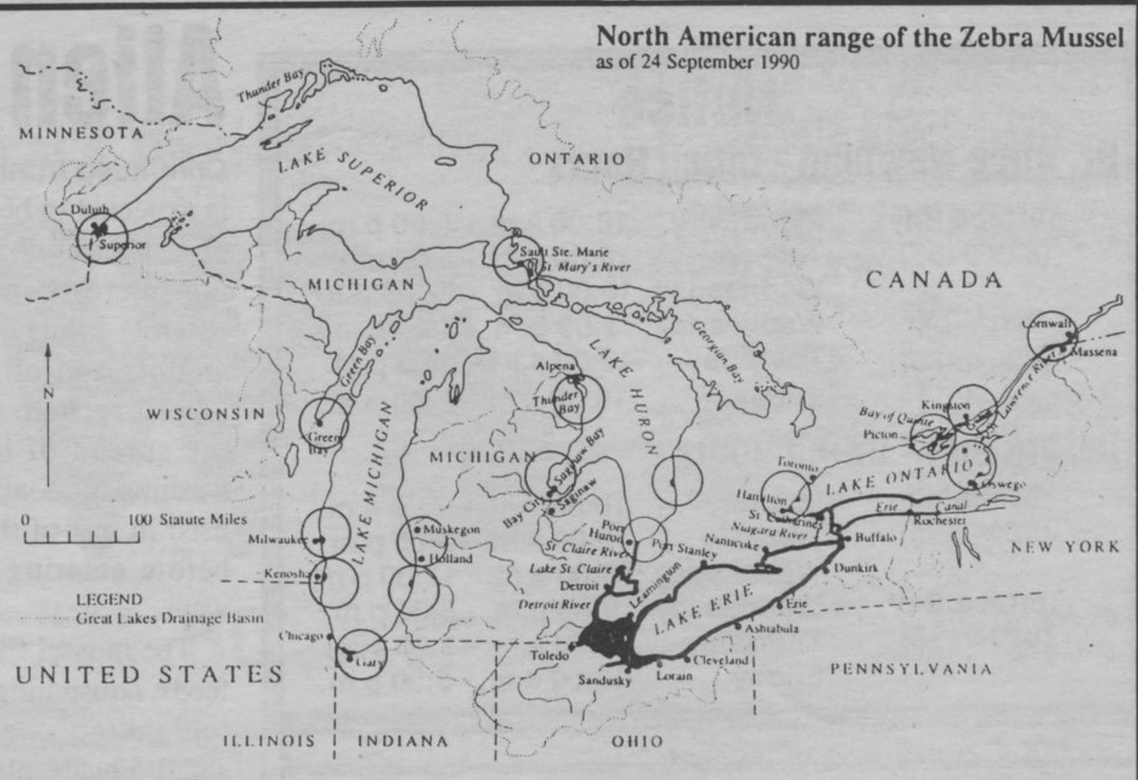


Please credit: New York Sea Grant

*Note: The Green Bay (WI), Milwaukee (WI), and Bay City (MI) sightings were all on "moveable substrate" (boats, barges, driftwood, etc.) and do not indicate colonization at this time.*

# PUBLIC NOTICE

## APPROVED MAJOR AMENDMENT TO THE 1987-92 TIMBER MANAGEMENT PLAN FOR THE BIG PIC MANAGEMENT UNIT TERRACE BAY DISTRICT

The Ministry of Natural Resources has approved an amendment to the James River-Marathon 1987-92 Timber Management Plan. This amendment will permit road construction to access proposed harvest areas for the 1992-97 Big Pic Timber Management Plan. This involves the construction of 60.2 kilometres of secondary all-weather forest access roads. The areas involved are as follows (refer to map):

| | |
|---|---|
| **1) Hades Lake Road-** | **3.7 km** |
| **2) Eino Lake Road-** | **6.8 km** |
| **3) Gene Lake Road-** | **7.1 km** |
| **4) Little Hagarty Lake Road-** | **16.3 km** |
| **5) South Gamsby Creek Road-** | **9.0 km** |
| **6) Thomas Lake Road-** | **17.3 km** |

The approved amendment will be available for public inspection at the Ministry of Natural Resources Manitouwadge Work Centre office on Manitou Road East **until August 16, 1991.**

For further information please contact:

**D. Johnson - Project Forester**
**Ministry of Natural Resources**
**P.O. Box 309**
**Manitouwadge, Ontario**
**P0T 2C0**
**Telephone (807) 826-3225**

Opinions and comments expressed by the public become part of the public record unless privacy is requested.

Please submit any comments or concerns regarding this amendment by **August 16, 1991** to:

**Mr. R.G. Running - District Manager**
**Ministry of Natural Resources**
**P.O. Box 280**
**Terrace Bay, Ontario**
**P0T 2W0**
**Telephone (807) 825-3205**

Renseigenments offerts en francais au numero suivant:
**(807) 826-3225.**