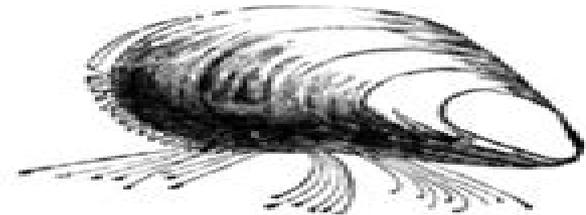


Are zebra mussels really invading?

In the mid-1980s a new species found its way to North America. The zebra mussel (*Dreissena polymorpha*), a small, clamlike mollusk that grows to about 25 cm as an adult, was introduced into the waters of the Great Lakes, probably carried in the bilge of a Russian freighter. The zebra mussel can reproduce in less than a year, and a single female can release 1 million eggs each year.



In the absence of their natural pathogens, parasites, and predators, the zebra mussel populations in the Great Lakes has grown enormously and are now invading eight major river systems, including the St. Lawrence, Hudson, Mississippi, Ohio, Illinois, Tennessee, Susquehanna, and Arkansas rivers. The mussels are spread from one body of water to another by natural flow, carried on the feathers or feet of migrating waterfowl, or by human transport in bait buckets or on trailered boats. Most of the freshwater systems in North America are now threatened by invasion of the zebra mussel.

The zebra mussels grow in massive colonies, where nearly a half million individuals may grow on each square meter of substrate. These colonies encrust the hulls and rudders of ships, the hinges of lock gates, and block the drains and intake ducts used by industries and power stations. In 1990, for example, Detroit Edison spent over \$500,000 to remove zebra mussels from the intake pipes of its power plants.

The zebra mussels also have severe negative effects on the local ecosystem. As filter-feeders, they take in water and filter out algae as food, excreting their waste as sediment. A single individual can filter 1 liter of water each day, and a colony covering 1 square meter of substrate can filter 180 million liters of water per year. Enormous colonies of zebra mussels can reduce the algal populations of lakes and rivers, thus removing a significant portion of the base of the food chain and resulting in a decline in the fish populations. Thus, these mussels are a threat to the local biodiversity.

The tremendous filtering capacity of these organisms may have some positive consequences. Zebra mussels have been a major factor in cleaning Lake Erie after a century of pollution from fertilizers and sewage. After the first 10 years of zebra mussel existence in Lake Erie, light penetration in the water has increased from only a few centimeters to nearly 10 meters. If these organisms could be controlled, they may become a useful tool in the treatment of sewage and pollution.

Are Zebra Mussels Really Invading Answer Key

Danielle Matuszak



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Department of the Interior and Related Agencies Appropriations for 1995: National Park Service United States.
Congress. House. Committee on Appropriations. Subcommittee on Department of the Interior and Related Agencies,1994

Department of the Interior and Related Agencies Appropriations for 1995: National Park Services ... pt. 12. Office of Surface Mining ... pt. 13. Testimony of members of Congress.foc 30657717 United States. Congress. House. Committee on Appropriations. Subcommittee on Department of the Interior and Related Agencies,1994 Book Review Digest ,2001-05

Zebra Mussels in North America Fred L. Snyder,David W. Garton,Maran Brainard Hilgendorf,1994 *Zebra Mussels Biology, Impacts, and Control* Thomas F. Nalepa,Don W. Schloesser,1992-11-24 The introduction and rapid spread of the zebra mussel in North American waters has caused great concern among industrial and recreational users of these waters This bivalve mollusk is a biofouler that attaches to any firm substrate e g rocks piers water intake pipes boat hulls and has already created significant problems for raw water users such as water treatment plants and power plants *Zebra Mussels Biology Impacts and Control* provides essential information regarding the biology of the zebra mussel in North America and Europe presents case studies of environmental and industrial impacts and outlines control strategies Summary articles detail its life history origins and morphology The book also examines techniques used to culture and maintain this organism in the laboratory Thirty two color plates illustrate some of the dramatic problems created by the explosive population growth of this species *Zebra Mussels Biology Impacts and Control* is an important resource for ecologists conservationists environmental consultants water quality engineers regulatory officials power utilities and libraries

Quagga and Zebra Mussels Thomas F. Nalepa,Don W. Schloesser,2013-10-25 The introduction and rapid spread of two Eurasian mussel species *Dreissena polymorpha* zebra mussel and *Dreissena rostriformis bugensis* quagga mussel in waters of North America has caused great concern among industrial and recreational water users These invasive species can create substantial problems for raw water users such as water treatment facilities and power plants and they can have other negative impacts by altering aquatic environments In the 20 years since the first edition of this book was published zebra mussels have continued to spread and quagga mussels have become the greater threat in the Great Lakes in deep regions of large lakes and in the southwestern Unites States Quagga mussels have also expanded greatly in eastern and western Europe since the first book edition was published *Quagga and Zebra Mussels Biology Impacts and Control Second Edition* provides a broad view of the zebra quagga mussel issue offering a historic perspective and up to date information on mussel research Comprising 48 chapters this second edition includes reviews of mussel morphology physiology and behavior It details mussel distribution and spread in Europe and across North America and examines policy and regulatory responses management strategies and mitigation efforts In addition this book provides extensive coverage of the impact of invasive mussel species on freshwater ecosystems including effects on water clarity phytoplankton water quality food web changes and consequences to other

aquatic fauna It also reviews and offers new insights on how zebra and quagga mussels respond and adapt to varying environmental conditions This new edition includes seven video clips that complement chapter text and through visual documentation provide a greater understanding of mussel behavior and distribution **Zebra Mussels** Martha London,2021-08-01 This title explores the role of zebra mussels in introduced environments how humans helped spread the species the threats they pose to ecosystems and efforts being taken to manage them **Biology and Management of Invasive Quagga and Zebra Mussels in the Western United States** Wai Hing Wong,Shawn L. Gerstenberger,2015-05-07 Biology and Management of Invasive Quagga and Zebra Mussels in the Western United States is a synthesis of the biology and management of invasive mussels from scientists and managers working on invasive quagga and zebra mussels in the western United States Invasive dreissenid mussels have spread throughout southwestern United States at unprecedented **Zebra Mussels** Suzanne Kehn Turner,New York (State). Legislature. Senate. Majority Task Force on Zebra Mussels,1990 The Zebra Mussel, (Dreissena Polymorpha) Michigan. Zebra Mussel Task Force,1991 Zebra Mussels Scott Pearson,2017 Through dynamic infographics charts up close photos and strong reading level control this title explores the invasion of zebra mussels including where they came from and their impact within biomes and food webs **Attack of the Zebra Mussels** Michael Rajczak,2017 Explains how zebra mussels came to freshwater lakes and what these invasive species are and how they can cause great harm to native ecosystems **The Zebra Mussel (Dreissena Polymorpha, Pallas) Invasion of Two Rivers in Southeast Michigan** Paul John Marangelo,1997 *Lake Type and Connectivity Predict Zebra Mussel (dreissena Polymorpha) Presence* Danielle Matuszak,2022 Studies that differentiate between lake type or origin i e natural lakes and reservoirs or that focus solely on reservoirs are rare especially at broad scales These facts lead to reservoirs being less well understood compared to natural lakes It is known that adding dams impoundments alters the flow regime of the original water body and changes surface water connectivity However the impact of these alterations on invasive species dispersal is widely unknown Reservoirs are also thought to have higher levels of human disturbance which can provide opportunities for non native species such as the zebra mussel Dreissena polymorpha to invade and establish Surface water connections allow zebra mussel larvae to flow from one waterbody to another Additionally trailering of recreational boats among lakes can promote overland dispersal of zebra mussels through live wells and boating equipment Although such connectivity promotes zebra mussel spread we do not yet know how zebra mussels vary according to lake type nor the relative roles of surface and human connectivity and lake type Taking a data intensive approach at the macroscale we ask Are zebra mussels more common in reservoirs than in natural lakes How does surface water and human connectivity influence the presence of zebra mussels in reservoirs and natural lakes To answer these questions we used 907 lakes within a 17 U S state extent and data from a variety of sources Water quality surface water connectivity and human disturbance data were from the LAke multi scaled GeOSpatial and temporal LAGOS database public lake access sites were from the United

States Geological Survey USGS and zebra mussel presence data were from the USGS Nonindigenous Aquatic Species database We characterized surface water connectivity using six unique lake connectivity classes We characterized human connectivity two ways watershed road densities measured in meters per hectare and for a 3 state subset of the study extent the presence of public access sites on lakes We characterized surface water connectivity using a lake connectivity classification based on lake and stream inflow s outflow s Using logistic multiple regressions and controlling for region and lake chlorophyll a concentrations we found that a higher proportion of reservoirs have zebra mussels compared to natural lakes for the 17 state extent At this same spatial extent we found that more highly connected lakes both by humans and surface waters were more likely to have zebra mussels present regardless of lake type Finally at the 3 state extent lakes with a public access site were more likely to have zebra mussels than those without regardless of lake type We conclude that not all lakes are equally likely to have zebra mussels present and that both surface water and human connectivity are important predictors of zebra mussel presence This study improves the understanding of how natural lakes and reservoirs differ and the extent to which reservoirs disproportionately harbor the invasive zebra mussel which can improve management and prevention For example these results suggest that legislation and management focused on uninvaded reservoirs that are highly connected may help slow the spread of this invasive species

The Zebra Mussel Charles R O'Neill,1996 **Zebra Mussel** Susan H. Gray,2008-01-01 Zebra Mussels are known for their striped shells and clingy habits These natives of Europe and Asia traveled to North America in by ship Learn more about why the zebra mussel poses a threat to native animals and the health of North American waterways *Biology and Potential Impacts of Zebra Mussels in Large Rivers* James E. Alexander,James H. Thorp,James Craig Smith,1997 *Zebra Mussels : Fact Sheet* Ontario. Ministry of Natural Resources. Zebra Mussel Coordination Office,1991 **Zebra Mussels and Aquatic Nuisance Species** Frank M. D'Itri,1999-06-09 This book is the outgrowth of the Sixth International Zebra Mussel and Other Aquatic Nuisance Species Conference It compiles data on the ecology of aquatic nuisance species and offers the latest ideas and methods on their control and elimination **Displacement of the invasive zebra mussel by the similarly invasive quagga mussel: patterns and biological factors** Nathan Haag,2020 R sum en anglais

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