



US Army Corps  
of Engineers  
Waterways Experiment  
Station

# Zebra Mussel Research Technical Notes

Section 2 — Control Methods

Technical Note ZMR-2-07

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## Accelerated Corrosion of Ferrous Metals Resulting from Zebra Mussel Infestations and Control Measures

**Purpose** The purpose of this note is to discuss the relationship between zebra mussel macrofouling and the degradation of ferrous metal surfaces.

**Additional information** For more information, contact the author of this note, Mr. Tim Race, (217) 373-6769, U.S. Army Construction Engineering Research Laboratories. Dr. Ed Theriot, U.S. Army Engineer Waterways Experiment Station (WES), (601) 634-2678, is Manager of the Zebra Mussel Research Program.

**Description** Accelerated corrosion of ferrous metals can occur directly as a result of zebra mussel infestation or as a result of treatments used to prevent fouling. For example, chlorine is being used to control and prevent zebra mussel infestations. High chloride content of water is a direct cause of corrosion of stainless and mild steels. High chloride environments also are more corrosive to steels protected with coatings. Thermal backflushing systems are also used to eradicate zebra mussel infestations. The rate of corrosion is directly proportional to water temperature. Degradation of protective coatings can also be affected by water temperature and thermal cycling.

Some facilities manage their zebra mussel problems by performing periodic cleaning. Mechanical cleaning methods such as high-pressure water blasting or scraping can damage the protective coating system, resulting in increased corrosion if the damage is not repaired before returning the item to service.

The buildup of a heavy layer of zebra mussels on a surface can produce anaerobic conditions at the substrate. Microbiologically induced corrosion (MIC) is caused by many types of anaerobic bacteria. Stainless steel weldments are particularly susceptible to MIC. Oxygen concentration cells may be caused by zebra mussel infestations. This effect will establish corrosion cells, which may accelerate corrosion of both coated and bare ferrous substrates.

**Recommendations** Methods for cleaning fouled substrates and for preventing infestations should be selected that minimize coating damage and corrosion. Ferrous metal systems and components likely to be fouled by zebra mussels should be designed with an understanding of the added potential for severe corrosion problems. Uncoated sheet piling and welded stainless steel construction are particularly

susceptible to MIC. Protective coating systems subjected to chlorine or other biocides often have to be repaired or replaced more frequently.