



Tiny Shells Causing BIG Problems

Cities Seeking Help for Pesky Mollusks Migrating to the Midwest

Zebra mussels are tiny pin-striped mollusks about the size of the tip of your finger. But they are causing big problems across the country as they continue to invade waterways throughout America's Heartland where the mollusks nearly halted one city's water source in 2012 and continue to threaten public water supplies and waterways.

"Utilities in the U.S. are already spending about \$100 million annually to deal with zebra mussels," says Joe Werner, associate environmental scientist at Burns & McDonnell. "And they are projected to cause billions of dollars in damage during the next 10 years."

In Council Grove, Kan., zebra mussels formed a 2-inch-thick colony along the walls of the water intake structure and inside pipes that carry water from the lake to the city's treatment plant. Officials were forced to devise alternative water supply strategies. They used generators, portable pumps and intake piping to keep the water flowing, and urged residents to restrict water usage until city crews could address the emergency.

Council Grove is one of many cities and other agencies Burns & McDonnell is working with to mitigate the mollusks that are thriving in lakes, reservoirs and river systems. The firm's specialized team has decades of experience designing and implementing plans to deal with zebra mussels as they continue to proliferate and attack waterways and public water intake areas.

"If you have zebra mussels in your lake they will eventually be in your water intake system, and you need a plan to deal with them," says Matt Baker, environmental engineer in the Burns & McDonnell Water Group. "Every surface water source is at risk for invasion."

Zebra mussels first came to the United States from Europe and Asia in ship ballast water. They spread as the water containing larvae flows from one reservoir to another or are transported by boats and other objects. The algae-feeding mollusks thrive by filtering water through a siphon. Not only do they have a life span of about five years, female zebra mussels can produce more than 1 million eggs each spawning season that hatch into the microscopic larvae called veligers that eventually mature to breeding adults. Current research suggests that zebra mussels can have multiple breeding cycles in a single season, causing rapid population explosions over a very short time period.

Methods for combating zebra mussels vary and are unique to each environment. Natural predators such as ducks, fish, bacteria and parasites can't rid waterways of zebra mussels because the population of predators is out numbered. In Kansas, for example, an unusually warm summer led to more algae growth, creating the perfect conditions for zebra mussels to thrive.

Chlorine gas, chlorine dioxide and chloramines can be used for control of zebra mussel infestation of water intakes and pipelines; however, those solutions come with other environmental risks to waterways. Other solutions to mitigating zebra mussels include injecting copper ion, bromine, potassium permanganate, sodium permanganate or carbon dioxide into intake structures.

"It's often a combination of chemical and physical removal that works best to keep the mussels out of water intake facilities," Baker says.

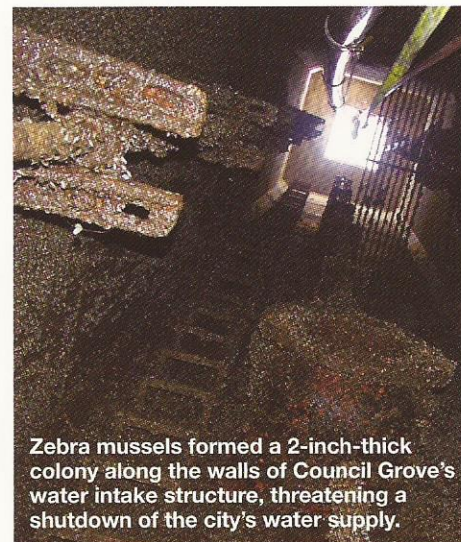
Burns & McDonnell is developing a system that will allow Council Grove to inject chemicals into water at its intake structure to protect it. But the team also specializes in intake screen design and has implemented hundreds of solutions for both water and power plant facilities.

In Osage City, Kan., another city struggling with zebra mussels, Burns & McDonnell replaced its water intake screen with one made with materials that prevent mussels from attaching.

In April, the city flushed thousands of zebra mussels from the intake area of the city's main water supply on Melvern Lake. The pipes were so clogged there was very little flow, forcing the city to use its secondary water supply in a severe drought.

"Our supply got low to scary levels," said Mike Gilliland, director of utilities in Osage City. "I've never seen it that low in 39 years. We're taking other precautions to avoid this happening again."

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Zebra mussels formed a 2-inch-thick colony along the walls of Council Grove's water intake structure, threatening a shutdown of the city's water supply.