

Oklahoma water provider stops zebra mussels at the source



Massive infestation of critical pumping station and multiple downstream facilities prevented by targeted application of EarthTec QZ

When zebra mussels infested Waurika Lake in southeast Oklahoma, Dave Taylor immediately started looking for an effective way to control the unwelcome invaders. As Director of the Waurika Lake Master Conservancy (WLMCD), Taylor had already managed a complex project to remediate losses from years of severe drought. Zebra mussels threatened to undo that work.

The 10,100-acre Waurika Lake straddles three counties in southern Oklahoma. It supplies drinking water, recreational facilities and sporting opportunities for five nearby communities. The WLMCD pumping station sits atop a narrow channel on the southwestern shore of the lake. From there, the station conveys water through 100 miles of branching pipeline to a population of 275,000.



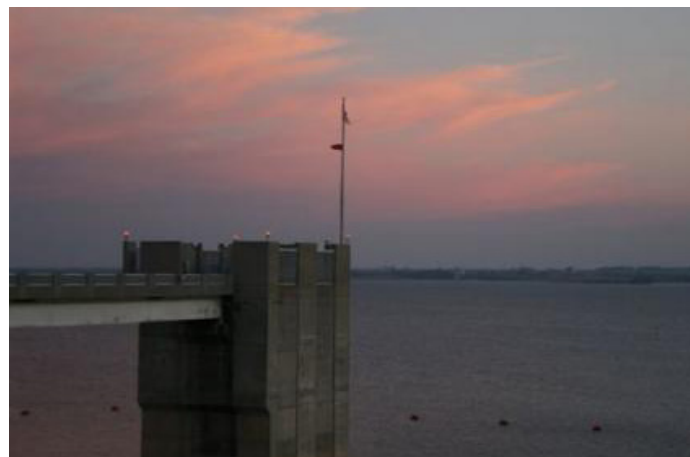
Waurika Lake Pumping Station

The Problem: Zebra mussels threaten renovated infrastructure and 100 miles of pipeline serving 8% of Oklahoma's population

Zebra mussels were discovered in Waurika Lake in 2016, not long after WLMCD completed a multi-million-dollar project to prepare the lake for a water-resilient future.¹ Prior to the appearance of mussels, severe drought had reduced the lake to 28% of its capacity. The water had receded below the pump station's upper intake gate, while massive silt buildup had disabled the lower gate. Only the middle gate remained open.

To secure the water supply, Taylor oversaw a plan to dredge the intake channel, repair the lower gate and install an alternate, floating intake.² The renovations were successfully completed in July of 2016. Five months later, on Christmas Eve, zebra mussels were discovered in the lake.

The pumping station's refurbished gates and newly extended pipeline provided solid surfaces on which the invading zebra mussels could settle, attach themselves, and multiply.³



Waurika Lake Gate 02

If zebra mussels successfully colonized the gatehouse, adult mussels and their free-floating larvae, called veligers, would hitch a ride in the flow of water, spreading through the 100 miles of pipeline from the pumping station to colonize water treatment plants in neighboring cities and counties.

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Zebra Mussels found in Waurika Lake

EarthTec QZ is a liquid molluscicide that contains biologically active copper in the form of cupric ions (Cu²⁺). The concentration required to kill zebra mussels is well below the EPA maximum permissible dose rate of 1 mg/L for drinking water.

The Solution: Targeted application of EarthTec QZ in the gatehouse

When Taylor learned about EarthTec QZ he reached out to the manufacturer, Earth Science Laboratories (ESL). The company immediately sent representatives from its Zebra Mussel Emergency Response Team. The team assessed the situation onsite and developed an adaptive prevention strategy that could be reevaluated and adjusted as conditions warranted.

The ESL team determined that EarthTec QZ applied at 1 part per million as product would be sufficient to prevent a zebra mussel infestation. 1 ppm of EarthTec QZ is equivalent to 60 micrograms per liter (60 ug/L) as copper, enough to achieve 100% mortality in about a week.

¹ Kaley, Jeff, "War Waged at Waurika," The Lawton Constitution, March 10, 2017. <http://swoknews.com/area/war-waged-waurika>

² Taylor, Dave, "Resilient Water Supply for an Uncertain Future." <https://www.owrb.ok.gov/supply/ocwp/Beaver-CacheSummit/Taylor.pdf>

³ Cofer, Larry, Ryan Ryswyk, and John Perry, Waurika Reservoir 5-Year Fisheries Management Plan, Southwest Region Oklahoma Department of Wildlife Conservation, 2014, p. 23. <https://www.wildlifedepartment.com/fishing-old/waurikafinaldraft.pdf>

EarthTec QZ can achieve mortality more quickly than most molluscicides because zebra mussels do not react to it as a toxin or modify their behavior. Oxidizing chemicals such as chlorine or permanganate cause zebra mussels to close up in an attempt to wait out the noxious conditions. Treatment with these chemicals can take weeks before mussels finally gasp open and start to be affected.

“All it takes is a drum,” said Taylor. “We pump QZ into the gatehouse whenever the water pumps are running. It’s that simple.”



Dave Taylor Checks Pump at Pump House

The treatment at Waurika is designed to protect pipelines and infrastructure, where contact with non-target organisms such as fish is not expected. The dose used would be safe for fish if they were present, however, or if it were applied in open waters. EarthTec QZ is approved for use both in pipelines and in open waters.

The WLMCD stores EarthTec QZ in 55-gallon drums near the pump station’s gatehouse. A simple metering pump feeds the molluscicide into the intake structure. The ease of implementing this setup was a key factor in the WLMCD’s decision to adopt EarthTec QZ.

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The Results: Intake structures, pipelines and downstream facilities remain free of zebra mussels

The WLMCD adopted EarthTec QZ shortly after discovering zebra mussels on Christmas Eve, 2016. The facility’s gatehouse and 100 miles of pipeline have remained zebra-mussel free ever since. The five downstream communities served by the WLMCD have reported no zebra mussel infestations in their water treatment plants.

A recent inspection by divers confirmed that the WLMCD’s intake structures remain free and clear of zebra mussels. The news has been so good, in fact, that people occasionally ask Taylor whether the lake ever had zebra mussels. His response? He points to a container of zebra mussels extracted from the lake – a reminder of what could happen without EarthTec QZ.

At 10,100 acres, Waurika Lake is too large for a full-scale zebra mussel eradication project. Instead, Taylor is content to keep zebra mussels out of critical infrastructure and protect downstream facilities from infestations. EarthTec QZ helps him do that.

“We are incredibly pleased that we found EarthTec QZ,” said Taylor. “We have been able to shut down a potentially massive infestation.”

Earth Science Laboratories Inc. manufactures advanced water treatment products for use in municipal, agricultural and recreational waters. EarthTec QZ is an EPA registered molluscicide for controlling quagga mussels and zebra mussels in pipelines and open waters. It is NSF Certified to Standard 60 as an additive to drinking water. More information is available at earthtecqz.com

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