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War's on against invasive mussels

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QUAGGA MUSSEL FACTS

- Originally from Ukraine, they were discovered in the Great Lakes two decades ago.
- The tiny mussels were first found in the Southwest in 2007 at Lake Mead.
- One quagga can produce 1 million eggs in a season.
- They can deprive other aquatic life of food and clog water systems and hydroelectric works.

SACRAMENTO – Release the hounds. Pour the bacteria. Deploy ravenous fish.

Doable or doubtful, California and federal officials are sizing up diverse strategies in their frantic campaign to contain trillions of quagga mussels, dime-sized invaders threatening water and power supplies in California and across the Southwest.

“While we and everyone else continue to search for a method of controlling them, we haven't found the answer yet,” said Curt Brown, director of research and development for the U.S. Bureau of Reclamation.

Solutions may be on the horizon, however distant.

Most promising and closest to approval is a strain of common bacteria that is safe for humans, but produces a toxin so well disguised that it can sneak past a quagga mussel's self-defense mechanism of clamming up to protect itself from ingesting anything deadly.

Also being given tryouts are high-tech defenses, such as repellent coatings on pipes, ultraviolet light and quagga-trapping strainers with microscopic holes.

As a last resort, officials may consider introducing quagga-munching black carp, an aggressive invasive species. Already, dogs with a nose for quaggas hitchhiking on watercraft have joined the fight.

Originally from Ukraine, quagga mussels and their close cousin, the zebra mussel, became entrenched in the Great Lakes 20 years ago. For years, the Southwest appeared to have been spared – until Jan. 6, 2007. That's when a quagga was found in Lake Mead, which straddles Nevada and Arizona. From there, unsuspecting boaters provided free shuttles to other waterways.

“They are alive and well and multiplying rapidly,” Brown said.

Champion reproducers – a single quagga can produce 1 million eggs in a spawning season – the mussels quickly established colonies throughout the Metropolitan Water District's system tied to the Colorado River, as well as in San Diego County reservoirs, including San Vicente.

Left unchecked, quaggas can take over freshwater lakes and rivers, threatening to clog or damage plumbing, potentially squeezing water deliveries and limiting hydropower production.

“Right now, we're in a fight,” said Gary Eaton, director of operations and maintenance for the San Diego County Water Authority. “But I wouldn't say we're losing.”

For now, the state's defenses that ring Southern California have held, with the exception of one discovery in San Justo Reservoir near Hollister.

Water agencies and the Bureau of Reclamation have launched aggressive search-and-destroy missions.

“We can manage it now without sacrificing power,” said Leonard Willett, a federal mussel control coordinator based at Hoover Dam.

The march of the mollusks also menaces the environment. Quaggas are voracious filter feeders, drawing in plankton and other nutrients that other aquatic life depend on.

“They have quite an impact on the food supply,” said Fred Nibling, a biologist with the Bureau of Reclamation.

Today, none of the alternatives has dethroned the current quagga killer of choice, chlorine. But that's a costly chemical with its own environmental and public health risks. Chlorine-treated water must be treated with another chlorine-cleansing chemical before it can be discharged into a lake or stream.

Tactics are two-fold: control the spread, then eradicate. So far, preventing escapes from already infested waterways remains a challenge.

That's where the quagga-dogs come in. Boaters can be surprised by trained dogs sniffing out the mussels on vessels just pulled out of the water or on the way home.

The dogs' primary job is to detect evidence of poaching and smuggling game and fish, but since the first mussel was found they have been enlisted sporadically at checkpoints and at water's edge accompanied by their state Fish and Game handler.

“We don't have a lot of time to look for quagga mussels,” said Lt. Lynette Shimek, who oversees the program.

The cash-strapped state has about 20 of the highly trained dogs on patrol. Of those, three are based in Southern California, where mussels are entrenched. Wardens rely on donations to offset training and care costs.

The state Department of Food and Agriculture has added quaggas to checklists at inspection stations. Since the first find in Lake Mead, 249,000 boats, canoes and kayaks have been stopped in California. Of those, 21,728 were drained and dried after evidence of mussels were detected. Nearly 400 have been quarantined.

Meanwhile, in a private Davis laboratory and at Davis Dam downstream from Lake Powell, researchers are preparing a deadly meal for the mussel.

The main ingredient in Zequanox, a milky substance the color of lemonade, is a special strain of bacteria that appears to go undetected by the quaggas'self-defenses.

“They think it's food,” said Pam Marrone, founder of Marrone Bio Innovations, which develops natural defenses against pests.

If all goes well, a permit for limited use could be obtained from the Environmental Protection Agency this fall, Marrone said. That's still a tall order, given an arduous approval process.

One challenge is overcoming any public resistance. To many, adding bacteria to drinking water sounds appalling.

Marrone countered that humans routinely ingest bacteria.

“It's ubiquitous. It's found in soil, water, plants, whatever,” she said.

The bacteria used in Zequanox “has never been known to be toxic to humans,” Marrone said.

Still, to overcome any lingering doubt, researchers have found a way to kill the bacteria used in Zequanox without destroying the toxin that attacks the mussels.

Water officials are intrigued, but not sold.

“You can imagine the battle. . . . Think back to fluoride. Imagine what (opponents) are going to do when you tell them you're going to put a bacteria” in their drinking water, said Eaton of the San Diego water authority.

“We're a little leery of saying absolutely, this is it,” he said. “But we are very interested in seeing what they come up with.”

Nibling, of the Bureau of Reclamation, sounded the most enthusiastic.

“It's not some science-fiction strain. It's an everyday bacteria,” he said.

Tests at Davis Dam “came through with a sparkling record. It's amazing if we can find something that can kill mussels and nothing else,” he said.

Introducing carp to eat the sharp-shelled quaggas has not met with similar zeal. Still, Steve Robbins, general manager of the Coachella Valley Water District, sees value in allowing black carp to be used if the state's power and water delivery system is overrun.

“I haven't dropped the idea,” Robbins said. “We're being successful right now. But if we weren't successful” the district could seek a permit to use carp.

Nibling said some other species make meals of quaggas, such as the bottom-feeding redear sunfish.

“A number of fish eat quaggas,” he said. “The problem is they can't eat enough.”

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