

Opinion: Quiet demise of TRPA's Asian clam program

By Steve Urie

In a recent Voices post, (Collaborate over good policy, *Lake Tahoe News*, Nov. 28), I criticized the Tahoe Regional Planning Agency for carpeting acres of Lake Tahoe with rubber mats in a futile attempt to eradicate Asian clams. Since 2008, millions have been spent on the failed project that killed many more animals native to Lake Tahoe than the nonnative clams. Mercifully, when the 35 tons of mats that covered 5 acres of Emerald Bay were rolled up last month, the project was placed on hold, and there is no plan to reuse the mats.

In the November post, I wrote that Asian clam shells don't create high-calcium microzones where quagga mussels can survive, a reason that TRPA and UNR Professor Sudeep Chandra used to justify the eradication program. I also said that the clams slightly decrease dissolved calcium by absorbing it from the water to build their shells and for muscle function.



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A respondent to the article, who identified himself as Cosa Pescado, wrote: "Living [Asian clams] absorb calcium, yes. And the dead ones leave shells that release calcium. Baseline calcium is low for Tahoe. What is also telling about your understanding of science is that you mentioned limestone as a source of background calcium. It certainly is ... the remnants

of living organisms are responsible for the calcium in limestone.”

Although Cosa Pescado’s response appears logical and some aspects of his argument are correct, the science is wrong. He says that baseline calcium is low for Lake Tahoe – about that he’s correct, it’s exceptionally low. Tahoe’s average shore zone dissolved calcium is 9.16 parts per million. (The minimum calcium threshold for survival for Asian Clams is 6.5 ppm and for quagga and zebra mussels it’s 12 ppm – only 9 percent of all U.S water bodies have dissolved calcium less than 12 ppm.) Whittier, et al., 2008

Cosa Pescado also accurately points out that the remnants of living organisms are responsible for the calcium in limestone. But he then inaccurately implies that clam shells add to calcium concentrations in the water column, creating what Chandra calls “calcium hot zones.”

For all practical purposes, the total amount of calcium in Lake Tahoe is constant. There is a tiny increase from concrete leaching and natural sources, but the vast quantity of Tahoe’s water quickly dilutes it, and the average annual increase from external sources is minute. Asian clams and the half dozen native Tahoe mollusks filter calcium to build their shells, which reduces the lake’s dissolved calcium and proportionately increases the solid calcium – but the total calcium remains the same.

Measurable reduction of calcium in the water column by mollusks has occurred in the Great Lakes. In a research report, Long-term trends of Great Lakes major ion chemistry, scientists attribute slightly decreased dissolved calcium in the lower Great Lakes water to zebra mussels.

Like all mollusks, zebra and quagga mussels need calcium to build their shells, and they get it from the water. Hypothetically, how much calcium is needed to raise Lake

Tahoe's dissolved calcium from 9.16 ppm to 12 ppm? It would take approximately, 1.48 million tons of pure limestone (CaCO_3) to raise the lake's dissolved calcium by 2.84 ppm. That's enough limestone to fill a freight train stretching for 80 miles from Oakland to Sacramento – it is estimated that all of the Asian clam shells in Lake Tahoe would fit in a large dumpster.

Cosa Pescado also takes issue with my statement that because "Asian clams live on detritus and algae that they filter from the water, they actually improve water quality and clarity," and he writes that that the clams "fecal matter concentrates nitrates," which degrades water quality. That is true, but the logic error is similar to that which he makes with dissolved calcium – the clams remove more waste than they create.

All of Tahoe's native mollusks and Asian clams are prodigious filter feeders, and steadily remove pollutants, micro-particles, algae, bacteria, and waste from the water; convert it to shell material and use it for muscle energy and function. Unarguably, they measurably improve clarity and water quality. This has been demonstrated over the last 20 years in Lake Michigan where water clarity is greater than at any time since the 1950's. That Asian clams improve water quality was even acknowledged in a study in which Chandra was a principal investigator: Natural and Human Limitations to Asian Clam Distribution and Recolonization.

But looking at the larger picture of whether the Asian clam control program was not only a colossal waste of money, but also environmentally destructive, in 2013 Chris Rosamond, a freshwater biologist at UNR's Desert Research Institute and a colleague of Chandra's, wrote: "I would concur [with the] disdain for the 'Keep Tahoe Blue by putting big blue tarps all over the bottom and killing everything' approach that has been used these last few years.

"In addition to the initial shock of suffocating whatever

native benthic organisms there are in these locations, the anoxic conditions under these tarps will alter nutrient dynamics in the benthic substrates, particularly phosphorus and nitrogen cycling. Recall that nitrogen and phosphorus are our two greatest pollution concerns in the basin. In short, sterilizing the floor of Tahoe's shallow habitats through suffocation is probably not a viable long-term solution."

Last month at Emerald Bay, Rosamond was proven to be correct.

The Wittmann study also states: "Costs of Asian clam treatment in Lake Tahoe were approximately \$210,000 per acre. A hypothetical 100-acre area for treatment indicates that total costs of treatment can range [up to] \$26 million and will neither achieve eradication, nor the maintenance of low density populations of Asian clams in Lake Tahoe."

In other words, suffocating clams with rubber matting is prohibitively expensive, even if it were effective.

The quiet demise of the Asian clam control program won't be as hyped as its rollout was, but it is long past due, and Tahoe is the better for it.

Steve Urie is a 40-year Tahoe-Truckee resident and is the author of "Tessie, Quagga Mussels, and Other Lake Tahoe Myth's. To learn more about Tahoe's AIS programs go online.

A note to Cosa Pescado: "The Science" reference in my November post was not put in quotes to cheapen science or employ sarcasm, but to direct the reader to "The Science" tab on the website, where science studies and articles relevant to the Asian clam program and other TRPA AIS prevention and control programs can be found. Since you have an obvious interest in the subject, but aren't willing to spend \$10 to buy the book, please use "Contact" on the website to send me a postal address, and I will send you a complimentary copy.