

Newly discovered mussels may help refocus conservation efforts in Texas

August 15 2019



L. bergmanni, or the Guadalupe Fatmucket, shown here, is a new species of freshwater mussel discovered in the upper Guadalupe River area. Credit: Clinton Robertson, Texas Parks and Wildlife Department

A team of researchers recently discovered two new freshwater mussel

species in Texas, which will likely impact current conservation efforts by the U.S. Fish and Wildlife Service and Texas Parks and Wildlife Department.

"The discovery of the new [mussel species](#) *Lampsilis bergmanni*, Guadalupe Fatmucket, came out of a larger effort to better understand species' boundaries for rare and common mussels throughout the state," said Charles Randklev, Ph.D., Texas A&M AgriLife Research scientist with Texas A&M's Natural Resources Institute, NRI. Randklev, who is based in Dallas, works with the Freshwater Mussel Program of the NRI and Texas Water Resources Institute.

Randklev said the discovery of *L. bergmanni* is important because it shows that boundaries for many species in Texas are not well defined and resolving them is critical to making sure conservation status assessments are evidence-based and accurate.

Randklev noted the contributions of Kentaro Inoue with the Shedd Aquarium in Chicago, John Harris with Arkansas State University, Clinton Robertson with the Texas Parks and Wildlife Department, and Nathan Johnson with the U.S. Geological Survey toward the discovery of *L. bergmanni* as a separate mussel species.

In a separate effort, Chase Smith and Robert Doyle, Baylor University, along with Johnson, Inoue and Randklev, identified another new species, *Potamilus streckersoni*, or the Brazos Heelsplitter. They discovered this new species in the Brazos River basin using a similar molecular and morphological approach.



P. streckersoni, or the Brazos Heelsplitter, above, was another recent freshwater mussel discovery. This new species was discovered in the Brazos River Basin. Credit: Clinton Robertson, Texas Parks and Wildlife Department

"Most of the original taxonomical work for [freshwater mussels](#) in Texas is based only on external shell characteristics," Randklev said. "But the application of modern molecular tools combined with comprehensive sampling throughout the state has provided opportunities to reexamine species boundaries, which will help aid in the conservation and management of mussels."

Declining mussel populations serve as a barometer "for the overall health of freshwater ecosystems," where they contribute a number of important functions, including filtration, said NRI director Roel Lopez.

"Mussels are considered our 'canary in the coal mine,' letting us know when ecosystems aren't healthy," he said.

"Aspects of the Freshwater Mussel Program include knowing the location of various mussel populations and monitoring them, as well as

determining what [environmental factors](#) may be having an impact on those populations," Lopez said. "We also want to ensure mussels are properly identified and develop models to predict what may eventually happen to mussel populations."

Lopez said validating species identities and understanding how different species are related to each other are important pieces of information when it comes to evaluating species for protection and formulating conservation actions for their protection and recovery.

For example, *L. bergmanni* was originally thought to be part of a population of *Lampsilis bracteata*, Texas Fatmucket, which is endemic to Central Texas and is being reviewed for listing under the U.S. Endangered Species Act, or ESA.



**Which are the same?
Which are different?**



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Identifying mussels can be a tricky business. While the three mussels on top look very different, they are much closer taxonomically than the three mussels on the bottom, which at first glance appear to be more similar. Credit: Texas A&M Natural Resources Institute

L. bracteata and *L. bergmanni* share similar shell morphologies and soft anatomy characteristics, but are genetically distinct.

Based on these findings, the range of *L. bracteata* has been reduced to only the Colorado River drainage, while *L. bergmanni* appears restricted to the upper Guadalupe River drainage.

"These changes mean that *L. bracteata* is likely rarer than previously thought and *L. bergmanni* may be vulnerable to environmental changes because it occurs within a relatively small geographical area," Randklev said. "The latter is likely why U.S. Fish and Wildlife Service is now considering *L. bergmanni* for protection under the ESA."

He said a similar situation is playing out for *P. streckersoni*, which appears to be restricted in its distribution, although the U.S. Fish and Wildlife Service has yet to consider this species for protection.

As another example, Lopez noted in October of 2011 the Service determined the smooth pimpleback and golden orb warranted listing under the ESA and they were placed on the candidate species list.

"However, further [genetic studies](#) in which Dr. Randklev was instrumental have shown those mussels are identical to the wide-ranging pimpleback, *Cyclonaias pustulosa*," Lopez said. "As a result, they have determined those two mussel species should no longer be listed under the ESA and will now be removed from candidate status."

Lopez said this further reinforces the importance of the work of Randklev and his associates in evaluating species for protection under the ESA and determining any associated conservation actions.

More information: Kentaro Inoue et al. A comprehensive approach uncovers hidden diversity in freshwater mussels (Bivalvia: Unionidae) with the description of a novel species, *Cladistics* (2019). [DOI: 10.1111/cla.12386](https://doi.org/10.1111/cla.12386)

Provided by Texas A&M University

Citation: Newly discovered mussels may help refocus conservation efforts in Texas (2019, August 15) retrieved 21 June 2024 from <https://phys.org/news/2019-08-newly-mussels-refocus-efforts-texas.html>

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