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Report

Livers of the Rivers:

Proactive Stakeholder Collaboration Aims To Benefit Freshwater Mussels in Texas

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Freshwater mussels may lack charisma, as they look like nothing more than rocks. But that belies the natural wonders of their life-history and their incredibly important role in the ecology of streams and the people and economies that rely on the same water. Work getting underway in Texas holds promise for mussels in most need.

On February 7, 2017, more than 100 stakeholders gathered in Austin, Texas, to hear from top State and Federal officials about research focused on four Central Texas freshwater mussel species considered for listing under the Endangered Species Act (ESA): the false spike, Texas fatmucket, Texas fawnsfoot, and the Texas pimpleback. Glenn Hegar, the Texas Comptroller of Public Accounts, recently awarded \$2.3 million dollars to advance the scientific understanding of these mussel species given that conservation actions have the potential to affect the Texas economy. These four species are unique to the Brazos, Colorado and Guadalupe River basins and lie in the U.S. Fish and Wildlife Service's - Southwest Region's East Texas-East Oklahoma Emphasis Area.

Dr. Benjamin Tuggle, Regional Director for the Southwest Region, spoke at the gathering. He applauded the State's mussel research program and a stakeholder process to be led by the Comptroller's office that affords the opportunity to voluntarily conserve mussels and their habitats. Dr. Tuggle highlighted two examples of prior success: In West Texas, stakeholders implemented a conservation plan for the dunes sagebrush lizard that kept it off the endangered species list. Secondly, the City of Georgetown, Texas, passed an ordinance to protect water quality for the Georgetown salamander that ultimately led to its listing as a threatened species rather than endangered.

Dr. Tuggle stressed the importance of collaborative research in the Service's consideration of the status of the four mussel species. The science funded by the Comptroller's office will feed directly into the Service's Species Status Assessment (SSA) for the Central Texas mussels. The SSA process provides a framework to obtain the most contemporary science regarding a species' conservation status. The innovative approach using the SSA for the freshwater mussels enables the Service and its partners to collaborate and conduct important scientific research, leveraging strategic resources for



Images top to bottom: Texas pimpleback mussel, Texas fawnsfoot mussel, and the Texas pimpleback mussel, credit: Charish Stevens, USFWS. Bottom image is the Texas fawnsfoot mussel, credit: Gary Pandolfi, USFWS.

high-priority species conservation. The SSA will inform future conservation actions for the four species, including the Service's determination of whether or not the species will be proposed or not proposed for listing under the ESA.

Mussels Matter

Freshwater mussels spend almost their entire adult life buried in one spot in the sediment at the bottom of lakes and streams.

They eat by siphoning water, filtering algae, plankton and other minute materials. These "livers of the rivers" purify water but are susceptible to changes in water quality and quantity.

Although their lives may seem boring, mussels have a fascinating life cycle. Male mussels release sperm into the water that females siphon thereby fertilizing eggs. These hatch into larvae known as "glochidia" that then must parasitize fish to transform into adults. Gravid females lure unsuspecting fishes near them with their flesh outside of their shells that mimic small fish or insects. Would-be predators get close and get blasted with glochidia. Glochidia attach to a fish's gills and eat blood for a few weeks while they metamorphose into true juvenile mussels. Once this metamorphosis is completed they drop from their fish host into, hopefully, suitable habitat and begin filter feeding. Some mussels require very specific host-fish species that without their presence, the mussels may fail to produce offspring to the juvenile stage.

Central Texas Mussels

Traveling over the expanse of Texas, east to west, there's a natural decline in the abundance and number of species that is related to rainfall. Humid East Texas is rich in mussel species. The arid West Texas has far fewer, including the Texas hornshell which was recently proposed for listing as endangered, currently occupying only 15 percent of its historic U.S. range. Central Texas has its four unique species partially because of a distinctive underlying porous limestone geology and the waters that percolate from below and into the Brazos, Colorado and Guadalupe River basins. They provide habitat for freshwater mussels that are found nowhere else in the world.

Mussels everywhere face similar threats: habitat loss from land use changes, forest cover removal with subsequent sedimentation and impoundments. The false spike, Texas fatmucket, Texas fawnsfoot, and the Texas pimpleback are no different. They

require clean, reliable flowing water over a stable stream bottom. Consequently, impoundments negatively impact mussel populations by limiting their ranges and their ability to survive in these waterways.

Collaborative Efforts

Texas waters are the life blood for the Texas economy and provide water for municipal, agricultural, industrial, recreation and conservation purposes. They also provide habitat for more than 50 of the 300 known species of freshwater mussels that inhabit North America. The Service recognizes that there could potential economic impacts if regulating decisions do not involve stakeholder input. "We view this process as an opportunity to have discussions about the science needs and the voluntary conservation activities that can sustain and improve water quality and aquatic habitats upon which mussels depend," affirmed Tuggle. "This effort represents a great opportunity to identify conservation needs and balance those needs with water demands."

"There is real, palpable positive energy surrounding this effort," said Texas Comptroller Glenn Hegar following remarks at a recent stakeholder meeting in Austin. "Having grown up on land my family has farmed for six generations, I understand the importance of both protecting our natural resources and providing sustainable economic opportunity for our children and grandchildren. After meeting with stakeholders and visiting with Dr. Tuggle, I am confident that we can find collaborative solutions that strike that balance."

The Service is excited to be part of the collaborative stakeholder effort being led by the Comptroller's office and Texas Parks and Wildlife Department. The SSA process will allow collaborators to get ahead of potential species listings. Texas is setting the stage for creative approaches to mussel conservation. It is our hope this will serve as a model for others to conserve our "livers of the rivers."

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