

## Mantle Flap Variation in Texas Fatmucket (*Lampsilis bracteata*)

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Texas Fatmucket (*Lampsilis bracteata*) is endemic to the Colorado and Guadalupe-San Antonio drainages of the Edwards Plateau and Texas Hill Country in Central Texas (Howells et al. 1996; Howells 2010a, b). Other reports from the lower Guadalupe River coastal plain, central Brazos River, and eastern Texas waters are based on misidentified Louisiana Fatmucket (*L. hydiana*). Historically, Texas Fatmucket has been limited in both distribution and abundance and has been reduced to a small number of particularly small populations in recent decades. Reproductive biology of the species was largely unstudied until Texas Parks and Wildlife Department (TPWD) began work with the species in 1992 (Howells 1997, 2000) and, more recently, by Texas A&M University Institute of Renewable Natural Resources in 2011.

Prior to TPWD's decision to terminate research on mussel reproductive biology in 1997 and 1998, mantle displays of specimens from three locations were photographed at Heart of the Hills Fisheries Science Center (HOH), Ingram, Texas. Video footage was obtained of Texas Fatmucket females from Elm Creek, a Colorado River tributary at the northwestern limit of its range, Runnels County, and from Spring Creek, a tributary of the Concho River that feeds into the central Colorado River, Tom Green County. Additionally, 35-mm slides and prints were made of a female from the Guadalupe River, Kerr County, by RGH. These media were damaged by smoke and heat during a fire at HOH (thereby reducing the quality of those images shown here). In 2011, CRR and MSJ photographed females from a fourth population in the upper San Saba River, Menard County, and the Llano River, Llano County. All four had distinctive mantle flaps, including:

Elm Creek, Runnels County (Figure 1) – Mantle flaps are very minnow-like being elongate with well defined eyespots, lateral lines, and moderate-sized “fins”, and colors of black, white, and gray. This population was dramatically reduced in 1999 and 2000 by flooding, drought, and over-collecting. Despite these pressures, stragglers are believed to persist.

Guadalupe River, Kerr County (Figure 2) – Female's lures from the upper Guadalupe River are similar to those from Elm Creek, but their lures are more brown and tan in color. This population was nearly eliminated during a construction project in 1998 and other subsequent construction activities. None have been found alive since 2005; however, nearly 100 shells and valves were found during drought-related dewatering in 2011.

Spring Creek, Tom Green County (Figure 3) – A female from this population had a dramatically enlarged mantle flap resembling a ragged mitten or surgical glove. The lure included a particularly enlarged “dorsal fin”, and was generally white in color with only a suggestion of an eyespot. This creek dried completely in 1999 and 2000, and subsequent surveys failed to find any live mussels at this location. This population is likely extinct.

San Saba River, Menard County (Figure 4) – These females have mantle flaps colored light charcoal gray and expanded posteriorly on the lure (posterior-ventrally on the mussel) with only a small, poorly defined eyespot. This population has continued to persist since its discovery in 1997. However, when examined in 2011, silt accumulation and upstream development were noted.

Llano River, Llano County, Texas (Figure 5) – A single female from this site produced a partially extended mantle flap that appeared uniformly dark and may be similar to those from the San Saba River, but a full display has yet to be observed.

Among the other extant populations currently known, mantle flap displays have not been reported or observed to date of females in the Onion Creek (Colorado drainage), Travis County, and Threadgill (Llano drainage) and Live Oak (Pedernales drainage) creeks, Gillespie County, Texas. A female from the Live Oak Creek population with a mantle flap that appeared to have been bitten off extended the remaining nub and vigorously wiggled it during aquarium observation. Another Live Oak Creek female had well-defined black and white eye spots, but never displayed a mantle flap.

Another species, Wavyrayed Lampmussel (*Lampsilis fasciola*), also produces females with several distinctive mantle flap forms. At least three such morphs occur in Ohio and two forms are known from the Paint Rock River, Alabama, and Williams et al. (2008) and Watters et al. (2009) questioned whether this represented a single variable species or a complex of sibling species. However, Zanatta et al. (2007)

reported mantle displays of seven populations could not be distinguished genetically with molecular variation. To date, Texas Fatmucket populations have not been subjected to biochemical genetic analysis relative to mantle flap forms. Although TPWD now lists Texas Fatmucket as legally threatened and U.S. Fish and Wildlife Service is currently considering listing as well, this species is declining so rapidly that the taxonomic status of some populations may never to be known.

**References:**

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Figure 1. Texas Fatmucket (*Lampsilis bracteata*) from Elm Creek (Colorado River tributary), Runnels County, Texas.

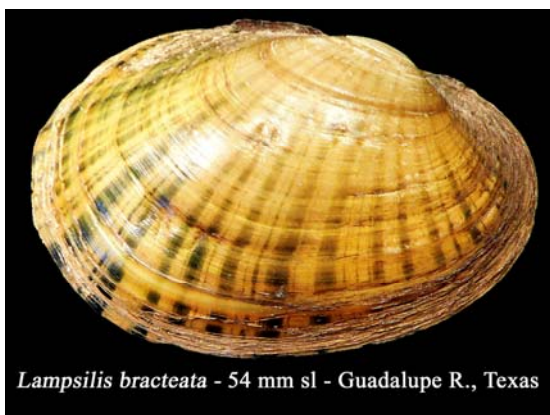


Figure 2. Texas Fatmucket (*Lampsilis bracteata*) from the upper Guadalupe River, Kerr County, Texas.



Figure 3. Texas Fatmucket (*Lampsilis bracteata*) from Spring Creek (> Concho River > Colorado River), Tom Green County, Texas. Note male positioned in front of the displaying female.

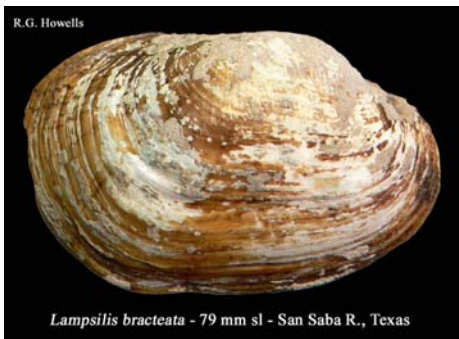


Figure 4. Texas Fatmucket (*Lampsilis bracteata*) from the upper San Saba River (> Colorado River), Menard County, Texas.

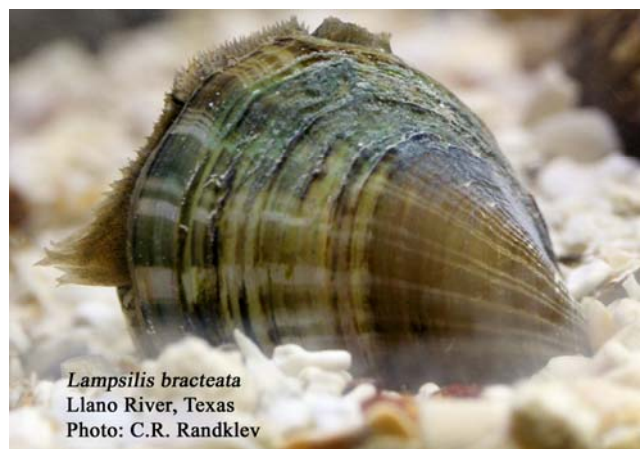


Figure 5. Texas Fatmucket (*Lampsilis bracteata*) from the Llano River (> Colorado River), Llano County, Texas.