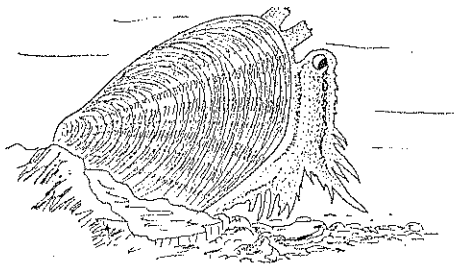
Howell 1994

INFO-MUSSEL NEWSLETTER



TEXAS PARKS AND WILDLIFE DEPARTMENT - INLAND FISHERIES BRANCH
HEART OF THE HILLS RESEARCH STATION
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MUSSEL SURVEY SITES: JAN 1994

- Lake Wichita, Archer and Wichita counties - Mark Howell (Inland Fisheries Management, Wichita Falls) called in January to advise that this lake was down 4.5 feet and mussels exposed. Technicians John Ingle and Jerry Hoover examined the exposed bottom areas and acquired specimens of as many different species as they could find, then sent them to HOH for identification. Specimens found included:
  - Pink papershell (Potamilus ohiensis) - 3 pairs of valves
  - Giant floater (Anodonta grandis) - 2 left valves
  - Paper pondshell (Anodonta imbecillis) - 1 pair of valves
  - Southern mapleleaf (Quadrula apiculata) - 2 left valves, 1 pair of valves, 1 very old fragment
  - Asian clam (Corbicula spp.) - 2 pairs of valves

  Previously, the only significant work above Lake Texoma on the Red River was a similar survey at Lake Arrowhead by R.W. Neck (1989) who found similar mussel fauna there.
- Lions Camp Pond, Kerr County, Kerrville - a single valve from an apparent Texas lilliput (Toxolasma texasensis) was found.
- Small impoundment on North Elm Creek, Falls County, NE of Temple - Mr. Bob Burleson acquired a specimen of pondhorn (Uniomerus sp.) here and sent it to HOH for identification. He indicated the species was common in the area. This individual has an epidermis like that of pondhorn (U. tetralasmus) but lateral teeth and posterior taper more like that of tapered pondhorn (U. declivis); both species could occur in the area.

OUACHITA ROCK-POCKETBOOK STATUS REPORT:

Since we first became aware of this federally-endangered species in Texas last summer, its status here has been of some concern. In January, the Texas Parks and Wildlife (TPW) Commission moved to make both Pine and Sanders Creeks in Lamar County no-harvest mussel sanctuaries to help protect this extremely rare species. This provides protection from accidental or deliberate harvest. It also provides protection for other mussel species which appear to be an important part of Ouachita rock-pocketbook's biotic environment. Although some commercial musseling activity has been reported in these water sheds, its extent is limited, most major commercial species are not present at either location, and the U.S. Army Corps of Engineers has already prohibited commercial activity on Pat Mayse Reservoir on Sanders Creek.

ADDITIONAL NEW MUSSEL SANCTUARY DESIGNATED:

In addition to Pine and Sanders Creeks in Lamar County, the TPW Commission also designated Elm Creek, Runnels County, a sanctuary as well. This small stream contains the only living population of Texas fatmuckets (Lampsilis bracteata) which we have been able to locate in two years of survey work. Texas fatmuckets are endemic to Central Texas and occur no where else in the world. Endemic Texas pimpleback (Quadrula petrina) also occurs here (one of only three locations we have found it alive). Additionally, the stream supports a population of Tampico pearlymussels (Cyrtonaias tampicoensis) including some of the largest, oldest individuals we have seen. Pearl-producing Tampico

pearlymussels within the sanctuary will continue to provide offspring to perpetually restock areas of the Colorado River downstream where an active pearl fishery occurs. Further, the stretch of Elm Creek from the dam at Elm Creek Lake in Ballinger City Park to its confluence with the Colorado River is still open to musseling (the sanctuary extends from the dam upstream). Paths from the park provide ready access to the stream. Although musseling can often be a dangerous activity, Elm Creek below the dam is shallow with bedrock slabs and sandy areas which can be safely and easily waded. It is a place where youngsters can be taken to mussel for pearls in relative safety.

U.S.A.C.E. POSITION ON MUSSELING CLARIFIED:

In 1991, before TPWD involvement with mussel work, the U.S. Army Corps of Engineers opted to prohibit commercial musseling on reservoirs it controls in Texas which are operated for recreational purposes. Queries from non-commercial musselers in Texas, who sport-harvest mussels for meat (trotline bait) or pearls, concerning how USACE regulations applied to them prompted a call from HOH to the Fort Worth office for clarification. Upon considering the situation, USACE-Fort Worth indicated it would allow sport harvest of mussels (e.g., under a standard fishing license, less then 25 lbs/day) within it reservoirs, but would continue to prohibit commercial harvest (under a commercial mussel license); a memo is scheduled to be sent to facilities around the state to make everyone aware of this point. Texas may be unique among musseling states in having a large number of sport musselers.

MUSSEL BOOK UPDATE:

Edits on the book are continuing. Dick Luebke jumped ahead to review photo titles within the text as a guide to similar full-color photos to be added as an insert. Publishers of other mussel books since 1962 (only a few produced) were consulted as a guide to the number they printed and number sold relative to what we will need and can expect.

MUSSEL FECUNDITY ESTIMATION TECHNIQUE:

Fecundity studies which determine the number of eggs (or larvae) a female produces are important aspects of species biology and management. However, very little such work has been performed on freshwater mussels. Most existing information springs from U.S. Fish Commission work earlier in the century where precise techniques were often not described. An attempt previously reported here to use Gilson's solution to dissolve gill tissue failed to work as it does with ovarian tissue and fish eggs. This month we found a better way.

Gravid females with eggs or glochidia in gill pouches (marsupia) are opened and gills carefully removed by snipping the membrane at their bases with a fine pair of scissors (without rupturing the marsupia). Gills are placed in a sample bottle and minced with a thin, sharp knife blade (a fillet knife works well). Water is then added (ca. 20-40 ml), the jar capped, and vigorously shaken to free eggs or glochidia from the gill tissue). Fresh, unpreserved gills are required for best success. Subsequently, 40-60 ml of alcohol is added as a preservative. The sample is processed by placing it in a large beaker or jar and diluting by adding water until the total volume is 1,000-4,000 ml. This mixture can then be subsampled (with replacement) with a Hensen-Stemple pipette and examined under a Sedgwick-Rafter cell exactly as any zooplankton sample would be handled. Counting about 100 per ml is about right. Where densities are substantially higher, a Folsom plankton splitter can be used to halve or quarter the sample before subsampling. For example: a 76.4-mm-long yellow sandshell (Lampsilis teres) female whose gill contents were suspended in 2,000 ml of water averaged 156.3 glochidia/ml hence 156.3 x 2,000 = 3,126,000 (total fecundity). Is that easy, or what?

MUSSEL ELECTROPHORETIC WORK:

David Van Meter at HOH has continued genetic analysis of mussel tissue samples to provide information on classification problems and unique populations. Samples of Tampico pearlymussel tissue from a number of locations throughout Texas appeared essentially similar. Although Strecker (1931) reported three subspecies within Texas, these preliminary data suggest shell morphology differences may not be taxonomically significant (more on this as work continues). We secured a good selection of mapleleaf (Quadrula quadrula) and southern mapleleaf (Q. apiculata) samples from B.A. Steinhagen animals and southern mapleleafs from Nasworthy Reservoir this month. These should help clarify the status of mapleleafs (sp.) in Pine and Sanders creeks in Lamar County where the identity of some is in doubt.

LOUISIANA FATMUCKET MANTLE FLAPS:

Several pocketbook mussels (Lampsilis ovata, etc.) and Texas fatmucket (L. bracteata) have exotically-developed mantle flaps on females that resemble a small minnow down to an eye spot and tail. This structure is wiggled, presumably to attract a fish close enough to be infected by its glochidia. Some of us had not seen this structure or behavior in Louisiana fatmucket (L. hydiana) and suspected this species lacked it. Not so. Females collected in B.A. Steinhagen Reservoir in late December began to display and wiggle mantle flaps in HOH raceways in January. Color slides and video tape footage were made of the display. Unfortunately, these females seem much more easily disturbed and much less forgiving once agitated than seen in Texas fatmuckets. Some refused to display for days or weeks after being moved to a photographic tank.

LARGEMOUTH BASS AND FRESHWATER MUSSELS:

It is probably safe to say that on more than one occasion a hard-core bass angler has been a bit put out to find TPWD research occasionally involving fishes other than largemouth bass...not to mention mussels. Imagine, time spent on beasties that spend their lives with their heads buried in the mud and their butts pointing skyward rather than on the royalty of the finned world. Blasphemy!!!

But wait a moment. No largemouth bass, or any other fish, exists alone in its aquatic environment. Other organisms not only occur with largemouth bass, but relate to its well being and to environmental quality of the ecosystem. At least eight species of mussels in Texas use largemouth bass as a host for the parasitic stage of their glochidia (another species uses smallmouth bass and many other mussel's hosts are unknown). Coker et al. (1922) and others reported fishes which have hosted mussel glochidia develop an immunity to subsequent infections by other glochidia and also to some parasitic copepods (a number of such copepod species infect largemouth bass with negative results). Mussels also filter bacteria from the water (a number of bacterial species produce infections in largemouth bass). Filter-feeding activity includes removal of phytoplankton and organic particles from the water and the concentration of environmental contaminants. Logically, a bass that does not need to use energy to fight infection or parasites can direct that energy to growth and reproduction. This, in conjunction with filtered, higher-quality water, results in better and bigger bass. Can a healthy mussel population result in a better quality bass fishery...perhaps so.

HOST FISH DETERMINATION:

In January, glochidia were obtained from Louisiana fatmuckets and flat floaters, Anodonta suborbiculata, (for which no hosts have been reported in the published literature) and for rock-pocketbook, Arcidens confragosus, (with only a few known hosts).

- Louisiana fatmucket glochidia attached to blue catfish, channel catfish, and green sunfish, including attachment on fins (this species would be expected to be a gill parasite).

- Flat floater (a species expanding its range in Texas) attached and encysted on the fins of largemouth bass, longear sunfish, green sunfish, and channel catfish.

- Two female rock-pocketbooks whose gills were filled with eggs early in development also contained a few mature glochidia. Attempts to infect largemouth bass with these glochidia were unsuccessful. Glochidia did attach to the gills of green sunfish and channel catfish (1-3 per fish).

CHANGE IN BLEUFER MINIMUM SIZE LIMIT:

When minimum harvest size limits were put in place in Texas in 1992, they included 2.75 inches (shell height) for Tampico pearlymussel and 2.50 inches for bleufer (Potamilus purpuratus), which was listed under "other". In January, the Texas Parks and Wildlife Commission changed minimum harvest size for bleufer to 2.75 inches as well. Although this change appears to create "one more regulation", it actually makes things easier for biologists, wardens, and musselers alike. Tampico pearlymussels and bleufers are similar in appearance; even early scientists sometimes confused them. Making the minimum size identical for both species now means it is no longer required to make a positive identification; it no longer matters which species one has collected, the minimums are the same.

FAWNSFOOT SPECIMEN BORROWED FROM SAN ANGELO NATURE CENTER:

A fawnsfoot (Truncilla sp.), which appears to be Texas fawnsfoot (T. macrodon), was received on loan from the San Angelo Nature Center where it had been placed by a local musseler. Texas fawnsfoot is an endemic to Central Texas and has become so rare that we have failed to find even fragments of a shell during two years in the field. Indeed, the only specimen seen by the HOH staff was a single, weathered shell in the Trinity University collection taken in the early 70's in Lake Buchanan. If the SANC specimen proves to be Texas fawnsfoot, photos of it will be placed in our mussel book.

PEARLS OF WISDOM:

- Hybrid sunfish used in host determination work reported here as bluegill x redear sunfish hybrids were found to have actually been green sunfish x redear sunfish hybrids.
- A specimen taken 29 December 1993 from B.A. Steinhagen Reservoir initially thought to be little spectaclecase (Villosa lienosa) was dissected in January and found to actually be a very atypical specimen of paper pondshell (Anodonta imbecillis). At least this individual won't be spreading aberrant genes throughout the population to confuse other investigators.
- We have been able to dismiss the old myth "if you pick up a mussel by its tail, its eyes will fall out."
- Mr. Bob Burleson wrote to report a small lake in Temple visited last month was "Sammons" rather than "Solomons" as reported here. Our spelling originated from a local park employee; we assumed he knew.

MUSSEL SPAWNING SEASONS:

Because of the almost complete lack of information on mussel spawning seasons in Texas, HOH began examining specimens (as they became available) from our first field work in spring 1992. To date, over 1,500 mussels of 28 species have been examined. A formal report is now being drafted, but below is a table roughly summarizing results. The presence of eggs (E) or glochidia (G) in gills as well as those containing neither (0) is indicated; blanks represent no specimens examined.

Species	N	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Threeridge *Amblema plicata*	135	0	0	0	0	0	0	0	E	0	0	0	0
Giant floater *Anodonta grandis*	96	G	0	0	0	0	0	0	0	0	E	G	G
Paper pondshell *Anodonta imbecillis*	21	0		0	G			G		G	EG	G	
Flat floater *Anodonta suborbiculata*	6	G				0							
Rock-pocketbook *Arcidens confragosus*	3	EG				0							
Tampico pearlymussel *Cyrtonaias tampicoensis*	341	E	E	E	G	G	0	E	G	G	G	EG	0
Texas fatmucket *Lampsilis bracteata*	6								G	0			
Louisiana fatmucket *Lampsilis hydiana*	51	G				G		G	E	0			
Sandbank pocketbook *Lampsilis satura*	1					0							
Yellow sandshell *Lampsilis teres*	73	G		0	0	G	G	G		0	E	G	G
White heelsplitter *Lasmigona complanata*	4								E	G	G		
Fragile papershell *Leptodea fragilis*	33	G				0	EG		0	0			G
Pond mussel *Ligumia subrostrata*	1						G						
Washboard *Megalonaias nervosa*	69	G	0	0	0	0	0			0	0	G	G
Threehorn wartyback *Obliquaria reflexa*	47	0				0			0				
Bankclimber *Plectomerus dombeyanus*	9	0				0							
Texas heelsplitter *Potamilus amphichaenus*	1	0											
Bleufer *Potamilus purpuratus*	71	G	0	0		G	0	0		0	0	G	EG
Southern mapleleaf *Quadrula apiculata*	391	0	0	0	0	G	E	0	0	0	0	0	0
Southern pimpleback *Quadrula houstonensis*	14						0			0	0		
Western pimpleback *Quadrula mortoni*	109	0				G	0						0
Wartyback *Quadrula nodulata*	7					0							
Texas pimpleback *Quadrula petrina*	14						EG		G				
Mapleleaf *Quadrula quadrula*	22	0				0			0				0
Pistolgrip *Tritogonia verrucosa*	1	0											
Texas lilliput *Toxolasma texasensis*	27					EG	G	0		0	0	0	0
Tapered pondhorn *Uniomerus declivis*	31					G	E		0		0		
Pondhorn *Uniomerus tetralasmus*	3					0		0					

LOSING THE OLD SHELL GAME:

Although there is little historical data relative to mussel abundance in Texas, some circumstantial evidence does indicate substantial declines in some areas. For example: Strecker (1931) published a summary to that date of unionids records for the state. Some of the collection sites listed by Strecker for Central Texas are presented below. Later in the 1960s and 70s, Dr. Harold Murray collected specimens from locations in Central Texas as well. Locations where his specimens, now in the Trinity University collection, were found are also indicated below. Additionally, locations examined by TPWD in 1992 and 1993 are also shown: black dots on the TPWD map indicated where living unionids were found and open circles places where no living mussels were collected. Although these figures do not show earlier sites where no mussels were found, clearly mussels appear to be losing ground. Mussel populations are still present in the Colorado River and associated reservoirs (Buchanan, Inks, etc.); however, between the Colorado River and San Antonio, few remain. Collections in Kerr County on the upper Guadalupe River are represented by a single Texas lilliput found at Hunt and several paper pondshells at Ingram Lake dam.

SELECTED MUSSEL COLLECTION SITES IN CENTRAL TEXAS