

**DISTRIBUTIONAL SURVEYS OF
FRESHWATER BIVALVES IN TEXAS:
PROGRESS REPORT FOR 2002**

by
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ABSTRACT

During 2002, just over 1,900 unionid specimens were documented among 103 locations examined statewide in Texas where specimens were either directly surveyed by the Heart of the Hills Fisheries Science Center (HOH) staff or were sent to HOH by volunteers. Living specimens and recently-dead shells were found in 33.0% of the collections and 44.7% produced no unionids or their remains.

In general, too few specimens were obtained from too few sites to draw extensive conclusions about the status of freshwater mussels in Texas in 2002. Drought conditions that began in mid-1995 in many areas of Texas continued, more or less continually, until mid-2000 when many locations experienced an increase in precipitation and elevation in water levels. Indeed, at some sites drought, followed by scouring flooding, occurred with subsequent negative impacts on local mussels, particularly in mid-2002 when numerous locations throughout the state experienced exceptionally damaging floods.

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INTRODUCTION

Beginning in January 1992, Texas Parks and Wildlife Department's (TPWD) Heart of the Hills Fisheries Science Center (HOH) began surveys of freshwater mussel populations within the state to better understand this resource and manage the fishery for them. A questionnaire survey of mussel license holders in 1992 was reported by Howells (1993). Field surveys of unionid populations also began in 1992 and have continued through the present. These have been reported on an annual basis (Howells 1994, 1995, 1996a, 1996b, 1997a, 1997b, 1998, 1999, 2000, 2001a, 2001b, 2002). Some of these data were ultimately used to compile *Freshwater Mussels of Texas* (Howells et al. 1996). Discussed here are findings from continuing surveys conducted in 2002, with comments relating to prior findings.

MATERIALS AND METHODS

Various habitats were sampled at each collection site. Collection methods and sampling effort varied between sites depending upon personnel, equipment, and time available as well as field conditions at the time of sampling. Minimal sampling efforts involved visual examination of shoreline and shallow-water habitats with hand collection. Where possible, sites were sampled by wading and snorkeling with hand collection. Previous annual reports discuss details of these methods (Howells 1994, 1995, 1996a, 1996b).

Results are presented in numbers collected (retained or released) and percent composition of the collection. Caution should be used in considering percentages calculated from small sample sizes, where mussel abundance and species composition may have been altered (e.g., after harvest by musselers), or where collection efforts focused on obtaining selected species (e.g., for laboratory work or reference specimens). Where a species at a given locality was represented only by fragments or definite numbers were not documented, they were excluded from percent-composition calculations.

Mussels taken were identified to species whenever possible. Some subfossil or badly weathered specimens could not be identified to species. Ill-defined taxonomic status of some "species" also sometimes precluded assigning specific identifications at this time. Other non-unionid bivalves were also documented when encountered. Where "no bivalves" including Asian clams (*Corbicula*) were found, this was indicated, but where unionids were absent and Asian clams were not documented as either present or absent at a particular site, it was reported as "no unionids present." Common and scientific names used generally follow Turgeon et al. (1988), Williams et al. (1993), and Howells et al. (1996), and are presented in Howells (1995, 1996a, 1996b) and Appendix I.

Varying environmental conditions can confound attempts to define how long a given specimen has been dead; however, a number of terms have been used herein to convey an approximation of this. While inherently imprecise, these attempts to characterize time since death are useful in distinguishing between shells that have been dead for many years or decades from others which clearly died only days or weeks before collection. Terminology relating to

condition of dead shells and shell counting methods are summarized in Howells (1996a, 1996b) and Appendix I.

RESULTS AND DISCUSSION

Neches River Drainage

Neches River, downstream of Town Bluff Dam, west side of river, Tyler County, Texas, 6 March 2002.

A volunteer examined this location and documented the following specimens:

Neches River, downstream of Town Bluff Dam				
Species	<i>N</i> alive	<i>N</i> shells	Condition	Percentage
Sandbank pocketbook	20+	0	-	76.9+
Yellow sandshell	0	2.0	recently dead	7.7
Fragile papershell	1	0	-	3.8
Threehorn wartyback	0	1.0	recently dead	3.8
Western pimpleback	0	1.0	recently dead	3.8
Unidentified unionid	1	0	-	3.8

Village Creek, Bridge at US 96 between Lumberton and Silsbee (Neches River drainage), Hardin County, 6 May 2002.

A graduate student examining this area reported the following specimens (dead shell material was not documented):

Village Creek, US 96, 6 May 2002				
Species	<i>N</i> alive	<i>N</i> shells	Condition	Percentage
Threeridge	31	-	-	5.8
Texas pigtoe	212	-	-	40.0
Triangle pigtoe	12	-	-	2.3
Louisiana fatmucket	25	-	-	4.7
Yellow sandshell	20	-	-	3.8
Threehorn wartyback	3	-	-	0.6
Southern hickorynut	1	-	-	0.2
Bankclimber	29	-	-	5.4
Louisiana pigtoe	1	-	-	0.2
Bleufer	2	-	-	0.4
Western pimpleback	175	-	-	33.0
Wartyback	15	-	-	2.8
Texas lilliput	2	-	-	0.4

Pistolgrip	1	-	-	0.2
Little spectaclecase	1	-	-	0.2
No Asian clams reported				

Village Creek, US 96, 8 May 2002

Species	<i>N</i> alive	<i>N</i> shells	Condition	Percentage
Texas pigtoe	4	-	-	3.7
Triangle pigtoe	2	-	-	1.8
Louisiana fatmucket	2	-	-	1.8
Yellow sandshell	4	-	-	3.7
Threehorn wartyback	1	-	-	31.8
Southern hickorynut	4	-	-	3.7
Western pimpleback	82	-	-	76.6
Wartyback	5	-	-	4.6
Texas lilliput	3	-	-	2.8
Asian clam (present)				

Village Creek, Baby Galvez boat ramp area (Neches River drainage), Hardin County, 10 May 2002.

A graduate student examining this area reported the following specimens (dead shell material was not documented):

Village Creek, Baby Galvez boat ramp area

Species	<i>N</i> alive	<i>N</i> shells	Condition	Percentage
Threeridge	4	-	-	3.1
Texas pigtoe	26	-	-	20.3
Triangle pigtoe	5	-	-	3.9
Louisiana fatmucket	25	-	-	19.5
Yellow sandshell	6	-	-	4.7
Southern hickorynut	3	-	-	2.3
Bankclimber	1	-	-	0.8
Western pimpleback	41	-	-	32.0
Wartyback	5	-	-	3.9
Texas lilliput	3	-	-	2.3
Little spectaclecase	9	-	-	7.0
No Asian clams reported				

Village Creek, SH 327 (Neches River drainage), Hardin County, 14 May 2002.

A graduate student examining this area reported the following specimens (dead shell material was not documented):

Village Creek, SH 327				
Species	<i>N</i> alive	<i>N</i> shells	Condition	Percentage
Threeridge	14	-	-	15.6
Texas pigtoe	1	-	-	1.3
Louisiana fatmucket	34	-	-	37.8
Yellow sandshell	4	-	-	4.4
Bankclimber	2	-	-	2.2
Bleufer	1	-	-	1.3
Western pimpleback	3	-	-	3.3
Wartyback	1	-	-	1.3
Texas lilliput	16	-	-	17.8
Little spectaclecase	14	-	-	15.6
No Asian clams reported				

Village Creek, Village Creek State Park north of parking lot (Neches River drainage), Hardin County, 19 May 2002.

A graduate student examining this area reported the following specimens (dead shell material was not documented):

Village Creek, Village Creek State Park				
Species	<i>N</i> alive	<i>N</i> shells	Condition	Percentage
Louisiana fatmucket	9	-	-	12.5
Yellow sandshell	4	-	-	5.6
Threehorn wartyback	1	-	-	1.4
Bankclimber	2	-	-	2.8
Western pimpleback	54	-	-	75.0
Wartyback	2	-	-	2.8
No Asian clams reported				

Village Creek, FM 418 (Neches River drainage), Hardin County, 20 May 2002.

A graduate student examining this area reported the following specimens (dead shell material was not documented):

Village Creek, FM 418				
Species	<i>N</i> alive	<i>N</i> shells	Condition	Percentage

Threeridge	1	-	-	2.2
Texas pigtoe	11	-	-	23.9
Triangle pigtoe	5	-	-	10.9
Louisiana fatmucket	7	-	-	15.2
Western pimpleback	12	-	-	26.1
Wartyback	4	-	-	8.7
Texas lilliput	3	-	-	6.5
Little spectaclecase	3	-	-	6.5
No Asian clams were reported				

Village Creek, FM 420 McNeely Bridge (Neches River drainage), Hardin County, 22 May 2002.
 A graduate student examining this area reported finding only Asian clam present (dead shell material was not documented):

Village Creek, FM 420, trail at Village Creek Unit between Turkey and Hickory creeks (Neches River drainage), Hardin County, 22 May 2002.
 A graduate student examining this area reported the following specimens (dead shell material was not documented):

Village Creek, FM 420 Village Creek Unit trail				
Species	<i>N</i> alive	<i>N</i> shells	Condition	Percentage
Western pimpleback	3	-	-	100.0
Asian clam (present)				

Turkey Creek, at Hester Bridge, Turkey Creek Unit (Village Creek – Neches River drainage), Hardin County, 28 May 2002.
 A graduate student examining this area reported the following specimens (dead shell material was not documented):

Turkey Creek, at Hester Bridge				
Species	<i>N</i> alive	<i>N</i> shells	Condition	Percentage
Texas pigtoe	11	-	-	26.8
Triangle pigtoe	6	-	-	14.6
Western pimpleback	18	-	-	43.9
Wartyback	3	-	-	7.3
Pistolgrip	3	-	-	7.3
Asian clam (reported as extremely abundant)				

Beech Creek, off Gore Store Road west of SH 92 (Village Creek – Neches River drainage),
Hardin County, 31 May 2002.

A graduate student examining this area reported the following specimens (dead shell
material was not documented):

Turkey Creek, Gore Store Road				
Species	<i>N</i> alive	<i>N</i> shells	Condition	Percentage
Texas pigtoe	37	-	-	78.7
Triangle pigtoe	6	-	-	12.8
Louisiana fatmucket	1	-	-	2.1
Bankclimber	1	-	-	2.1
Western pimpleback	1	-	-	2.1
Wartyback	1	-	-	2.1
Asian clams were not reported				

Turkey Creek, FM 1013 bridge east of US 69 (Village Creek – Neches River drainage), Tyler
County, 31 May 2003.

A graduate student examining this area reported the following specimens (dead shell
material was not documented):

Turkey Creek, FM 1913 bridge				
Species	<i>N</i> alive	<i>N</i> shells	Condition	Percentage
Pondhorn	1	-	-	100.0
Asian clams were not reported				

Trinity River Drainage

Lake Lewisville, Arrowhead Park east of US 35, Denton County, Texas, 22 August 2002.

A volunteer examined this site and reported finding:

Lake Lewisville, Arrowhead Park				
Species	<i>N</i> alive	<i>N</i> shells	Condition	Percentage
Louisiana fatmucket	0	0.5x1	long dead	8.3
Fragile papershell	0	0.5x2	long dead	16.7
Bleufer	0	1.0	very long dead	8.3
Giant floater	0	1.0+0.5x3	long dead	33.3
Southern mapleleaf	0	0.5x2	long dead	16.7

Paper pondshell	0	2.0	long dead	16.7
Asian clam (abundant)				

West Fork Trinity River, at Meyers Road, Dallas County, 8 December 2002.

A volunteer reported finding the following specimens at this site:

West Fort Trinity River, Meyers Road				
Species	<i>N</i> alive	<i>N</i> shells	Condition	Percentage
Threeridge	0	0.5x6	"weathered"	54.5
Pigtoe (<i>Fusconaia</i> spp.?)	0	0.5x3	"weathered"	27.3
Pistolgrip	0	0.5x2	"weathered"	18.2

White Rock Creek, White Rock Creek Park, Dallas, Dallas County, Texas, 18 May 2002.

A volunteer reported finding the following species at this location:

White Rock Creek, White Rock Creek Park, Dallas				
Species	<i>N</i> alive	<i>N</i> shells	Condition	Percentage
Paper pondshell	0	0.5x1	long dead	100.0
Asian clam (shell abundant)				

Henrietta Creek, just east of US 35, Denton County, Texas, 31 July 2002.

A volunteer reported the following specimens at this site:

Henrietta Creek				
Species	<i>N</i> alive	<i>N</i> shells	Condition	Percentage
Pondhorn (sp.?)	0	2.0	unstated	100.0

Cantrell Slough, at Naylor Road, Denton County, Texas, 24 July 2002.

A volunteer reported the following specimens at this site:

Cantrell Slough				
Species	<i>N</i> alive	<i>N</i> shells	Condition	Percentage
Pondhorn	0	3.0	unstated	100.0

Pecan Creek, northeast of Aubrey, Denton County, Texas, 6 September 2002.

A volunteer examined this area and reported finding "several" shells of tapered pondhorn (number and shell condition were not specified).

Hickory Creek, east of SH 135 and west of Bonnie Brae Road, Denton, Denton County, Texas, 18 August 2002.

A volunteer reported finding Louisiana fatmucket and unidentified unionid shell remains, presumably subfossil, but did not report numbers.

Denton Creek, at FM 2499 (Trinity River drainage); Tarrant County, 20 December 2002.

A volunteer reported finding the following specimens at this site:

Denton Creek, at FM 2499				
Species	<i>N</i> alive	<i>N</i> shells	Condition	Percentage
Yellow sandshell	0	0.5x1	unstated	100.0
Asian clam (abundant)				

Cottonwood Creek, north of Allen and east of SH 75, Collin County, Texas, 18 February 2002.

A volunteer found "old" shells and valves of tapered pondhorn at an 1874 dam archeological site at this location.

Buffalo Creek, at SH 80 Forney, Kaufman County, Texas, 12 August 2002.

A volunteer examined this site and reported the following species:

Buffalo Creek at SH 80.				
Species	<i>N</i> alive	<i>N</i> shells	Condition	Percentage
Threeridge	0	fragment	subfossil	-
Louisiana fatmucket	0	1.0	not given	-
Pistolgrip	0	0.5x1	subfossil	-
Pondhorn (sp.?)	0	fragments	not given	-
Asian clam (abundant)				

Ringling Lake, north of Eastland, Eastland County, Texas, 3 August 2002.

A volunteer found Asian clam valves here while fishing in the area. A larger, unidentified unionid shell fragment was also found.

Colorado River Drainage

Twin Buttes Reservoir, central dam reaches, Tom Green County, Texas, 1 May 2002.

Specimens were collected by wading and snorkeling at this site including:

Twin Buttes Reservoir				
Species	<i>N</i> alive	<i>N</i> shells	Condition	Percentage
Threeridge	0	0.5x3	recently dead to very-long dead	6.4
Tampico pearlymussel	3	6.0+0.5x6	recently dead to relatively-long dead	31.9
Bleufer	0	1.0+0.5x5	relatively-recently to relatively-long dead	12.8
Southern mapleleaf	8	7.0+0.5x7	relatively-recently to very-long dead	48.9
Asian clam (present)				

Twin Buttes Reservoir, upper reaches, Tom Green County, Texas, 28 July 2002.

Specimens obtained during by an area angler and brought to HOH included:

Twin Buttes Reservoir				
Species	<i>N</i> alive	<i>N</i> shells	Condition	Percentage
Threeridge	0	2.0	long dead	66.7
Tampico pearlymussel	0	1.0	long dead	33.3

The same day these specimens were collected, a San Angelo area resident called HOH to report water was being pumped from Twin Buttes Reservoir to maintain levels at Nasworthy Reservoir immediately downstream. Further, the water levels had fallen so dramatically that many mussels had been stranded or were in shallows where local pearl harvesters harvested large numbers of extremely large, old animals. Although this is not illegal, large-scale elimination of brood stock will seriously confound population recovery rates when this reservoir eventually refills.

Ballinger City Lake, off FM 2111, Ballinger, Runnels County, Texas, 11 June 2002.

A volunteer found the following specimens while fishing in the area:

Ballinger City Lake				
Species	<i>N</i> alive	<i>N</i> shells	Condition	Percentage
Southern mapleleaf	0	0.5x1	relatively-recently dead	100.0
Asian clam (present)				

O.H. Ivie Reservoir, Coleman County, Texas, 13 May 2002.

A volunteer found the following species while fishing in the area:

O.H. Ivie Reservoir				
Species	<i>N</i> alive	<i>N</i> shells	Condition	Percentage
Tampico pearlymussel	0	3.0	recently dead	50.0
Fragile papershell	0	2.0	recently dead	33.3
Southern mapleleaf	0	1.0	recently dead	16.7
Asian clam (present)				

Hords Creek Reservoir, Coleman County, Texas, 13 May 2002.

A volunteer found the following species while fishing in the area:

Hords Creek Reservoir				
Species	<i>N</i> alive	<i>N</i> shells	Condition	Percentage
Southern mapleleaf	0	1.0	recently dead	100.0
Asian clam (present)				

Pecan Bayou, no specific location given, Brown County, Texas, 28 January 2002.

A volunteer reported finding the following specimens at this location:

Pecan Bayou				
Species	<i>N</i> alive	<i>N</i> shells	Condition	Percentage
Fragile papershell	0	0.5x1	unstated	33.3
Bleufer	0	0.5x2	unstated	66.7

Live Oak Creek (Pedernales River drainage), Lady Bird Johnson Park, Fredericksburg, Gillespie County, Texas, 16 July 2002.

A volunteer studying turtles in this area found the following specimens:

Live Oak Creek, Lady Bird Johnson Park				
Species	<i>N</i> alive	<i>N</i> shells	Condition	Percentage
Texas fatmucket	0	6.0+0.5x5	very-recently to recently dead	45.8
Texas lilliput	0	0.5x1	subfossil	4.2

Paper pondshell	0	10.0+0.5x2	very- to relatively-recently dead	50.0
Asian clam (present)				

Texas fatmucket is endemic to Central Texas, but had been reduced to only four known populations in recent years. This record represents a fifth location; however, the collection was made after a major flood and no living specimens were documented. Among the previously recognized populations, those in Kerr, Runnels, and Tom Green counties may have been eliminated by flood, droughts, or both in the past two to four years.

Irrigation canal, 1.9 km west of Van Vleck on SH 35 (Colorado River drainage), Matagorda County, 2 December 2002.

A volunteer reported finding the following specimens at this location:

Irrigation canal, 1.9 km west of Van Vleck				
Species	<i>N</i> alive	<i>N</i> shells	Condition	Percentage
Yellow sandshell	0	4.0 + others	relatively-recently dead	44.4+
Southern mapleleaf	1	0.0	-	11.1
Lilliput spp.?	0	2.0 + others	relatively-recently dead	22.2+
Paper pondshell	0	2.0	relatively-recently dead	22.2
Asian clam (present)				
Sphaeriidae (present)				

Guadalupe River Drainage

Guadalupe River, downstream of Lake Wood near Gonzales, Gonzales County, Texas, 5 May 2002.

Gravel bar, shoreline, and shallow-water searches here produced:

Guadalupe River, below Lake Wood				
Species	<i>N</i> alive	<i>N</i> shells	Condition	Percentage
Threeridge	2	many	recent-long dead	-
Tampico pearl mussel	3	0	-	-
Yellow sandshell	20	many	recent-long dead	-
Washboard	1	abundant	recent-long dead	-
Golden orb	1	0	-	-
Texas lilliput	2	0	-	-
Asian clam (abundant)				

Cibolo Creek, at Cibolo Nature Center, Boerne, Kendall County, Texas, 5 May 2002.
This site was surveyed by a volunteer who found no unionids and only shells of Asian clam present.

Olmos Creek, at north Jones-Maltsberger Road access at Olmos Basin, San Antonio, Bexar County, Texas, 5 April 2002.
A volunteer examined this site and found only numerous Asian clam shells.

Olmos Creek, at central Jones-Maltsberger Road access at Olmos Basin, San Antonio, Bexar County, Texas, 5 April 2002.
A volunteer examined this site and found only numerous Asian clam shells.

Olmos Creek, at south Jones-Maltsberger Road access at Olmos Basin, San Antonio, Bexar County, Texas, 5 April 2002.
A volunteer examined this site and found only numerous Asian clam shells.

Live Oak Creek (San Antonio River drainage), Live Oak Municipal Park, Live Oak, Bexar County, Texas, 10 January 2002.
A volunteer examined this site, but no bivalves were found.

Nueces – Frio River Drainage

Unnamed Creek, first creek on US 37 west of Mathis, San Patricio County, Texas, 21 March 2002.
A volunteer examined this area, but no bivalves were found.

Arroyo Nombre de Dios, at US 37 southeast of Mathis, San Patricio County, Texas, 16 December 2002.
A volunteer examined this area, but no bivalves were found.

Unnamed creek, at Williams Hollow near San Patricio County line, Live Oak County, Texas, 16 December 2002.
A volunteer examined this area, but no bivalves were found.

Sulphur Creek, at US 37 at Oakville, Live Oak County, Texas, 25 January 2002.
A volunteer examined this area, but no bivalves were found.

Waller Gully, at US 37, Live Oak County, Texas, 25 January 2002.
A volunteer examined this area, but no bivalves were found.

Little Gamble Gully, at US 37, Live Oak County, Texas, 25 January 2002.
A volunteer examined this area, but no bivalves were found.

Gamble Gully, at US 37, Live Oak County, Texas, 25 January 2002.

A volunteer examined this area, but no bivalves were found.

La Para Creek, at US 37, south of US 59, Live Oak County, Texas, 25 January 2002.

A volunteer examined this area, but no bivalves were found.

Baffin Bay – Laguna Madre Drainage

Petronila Creek, at FM 665 east of Driscoll, Nueces County, Texas, 19 December 2002.

A volunteer examined this area, but no bivalves were found.

Ditch, at FM 665 east of Petronila Creek, Nueces County, Texas, 19 December 2002.

A volunteer examined this area, but no bivalves were found.

Petronila Creek, county road crossing southeast of Driscoll, Nueces County, Texas, 19 December 2002.

A volunteer examined this area, but no bivalves were found.

Carreta Creek, at US 77 south of Bishop, Nueces County, Texas, 5 December 2002.

A volunteer examined this site and reported the following species:

Carreta Creek, at US 77				
Species	<i>N</i> alive	<i>N</i> shells	Condition	Percentage
Pondhorn	0	2.0 + others	recently to relatively- recently dead	100.0
No Asian clams were found				

Quinta Creek, at SH 359 northeast of Orange Grove, Jim Wells County, Texas, 8 February 2002.

A volunteer examined this area, but no bivalves were found.

Quinta Creek, at FM 624, just east of FM 70, east of Orange Grove, Nueces County, Texas, 8 February 2002.

A volunteer examined this area, but no bivalves were found.

Quinta Creek, at FM 70, just north of FM 624, east of Orange Grove, Jim Wells/Nueces counties, Texas, 8 February 2002.

A volunteer examined this area, but no bivalves were found.

Unnamed Creek, at FM 70, about 1.6 km south of FM 624, Jim Wells/Nueces counties, Texas, 8 February 2002.

A volunteer examined this area, but no bivalves were found.

Leon Creek, at FM 70, southeast of Orange Grove, Nueces County, Texas, 8 February 2002.

A volunteer examined this area, but no bivalves were found.

Banquete Creek, at FM 666, north of Banquete, Nueces County, Texas, 11 January 2002.

A volunteer examined this area, but no bivalves were found.

Agua Dulce Creek, at FM 70, north of Agua Dulce, Nueces County, Texas, 8 February 2002.

A volunteer examined this area, but no bivalves were found.

Pintas Creek, at FM 70, south of Agua Dulce, Nueces County, Texas, 8 February 2002.

A volunteer examined this area, but no bivalves were found.

Agua Dulce Creek, at SH 44, west of Banquete, Nueces County, Texas, 11 January 2002.

A volunteer examined this area, but no bivalves were found.

Agua Dulce Creek, Sablatura County Park, west of Banquete, Nueces County, Texas, 11 January 2002.

A volunteer examined this area, but no bivalves were found.

Banquete Creek, at SH 44, east of Banquete, Nueces County, Texas, 11 January 2002.

A volunteer examined this area, but no bivalves were found.

Agua Dulce Creek, at FM 666, south of Banquete, Nueces County, Texas, 11 January 2002.

A volunteer examined this area, but no bivalves were found.

Santa Gertrudis Creek, at SH 141 west of Kingsville, Kleberg County, Texas, 5 December 2002.

A volunteer examined this site, but no bivalves were found.

Santa Gertrudis Creek, county road near FM 1717 southeast of Kingsville, Kleberg County, Texas, 5 December 2002.

A volunteer examined this site, but no bivalves were found.

Santa Gertrudis Creek, at FM 1717 southeast of Kingsville, Kleberg County, Texas, 5 December 2002.

A volunteer examined this site, but no bivalves were found.

Ebanito Creek, at US 77 south of Ricardo, Kleberg County, Texas, 5 December 2002.

A volunteer examined this site, but no bivalves were found.

Radicha Creek, at US 77 north of Riviera, Kleberg County, Texas, 5 December 2002.

A volunteer examined this site and reported the following species:

Radicha Creek, at US 77				
Species	<i>N</i> alive	<i>N</i> shells	Condition	Percentage
Pondhorn	0	2.0 + others	relatively-recently dead	100.0
No Asian clams were found				

Arania Creek, at US 77 north of Riviera, Kleberg County, Texas, 5 December 2002.

A volunteer examined this area, but no bivalves were found.

Los Olmos Creek, west of the railroad tracks near US 77 southwest of Riviera, Kleberg County, Texas, 19 December 2002.

A volunteer examined this area, but no bivalves were found.

Rio Grande Drainage

Rio Grande, upper Boquillas Canyon, Big Bend National Park, UTM 0702889E and 3233882 N, Brewster County, Texas, 27 March 2002.

A biologist with Big Bend National Park sent a broken valve from Tampico pearlymussel (relatively-long dead) to HOH for identification. Previously the upstream record for this species had been the downstream national park boundary; this specimen was found several km further upriver.

Devils River, downstream of Dolan Falls, Val Verde County, Texas, 1 August 2002.

The HOH staff obtained the following species during other work in this area:

Devils River, downstream of Dolan Falls				
Species	<i>N</i> alive	<i>N</i> shells	Condition	Percentage
Texas hornshell	0	1.0	relatively-recently dead	100.0

Rio Grande, about 8.8 km west of Del Rio, Val Verde County, Texas, 17 September 2002.

HOH staff examined this area, but found only Asian clams. Efforts to reach this site during a low-water period were thwarted by high-volume releases from Amistad Dam.

San Pedro Creek, San Pedro Ranch southwest of Carrizo Springs, Dimmit County, 3 December 2002.

Personnel from HOH and US Fish and Wildlife Service documented the following species at this location:

San Pedro Creek, southwest of Carrizo Springs

Species	<i>N</i> alive	<i>N</i> shells	Condition	Percentage
Paper pondshell	0	1.0+0.5x5	relatively-recently dead	100.0

Rio Grande, both sides of the island 2 km upstream of Columbia Bridge at mouth of Santo Thomas Creek, Webb County, Texas, 27°42'32"N, 99°45'07"W, 15 December 2002. Laredo Community College (LCC) personnel examined this site and found:

Rio Grande, 2 km upstream of Columbia Bridge

Species	<i>N</i> alive	<i>N</i> shells	Condition	Percentage
Tampico pearlymussel	0	55.0+0.5x4	long to very-long dead	79.7
Yellow sandshell	0	2.0+0.5x2	long to very-long dead	5.4
Washboard	0	3.0	relatively-long dead	4.1
Texas hornshell	0	3.0+0.5x1	very-recently to very-long dead	5.4
Mexican fawnsfoot	0	3.0+0.5x1	very-recently to very-long dead	5.4

Rio Grande, El Pico Road access upstream of Laredo, Webb County, Texas, 27°37'43"N, 99°35'22"W, 10 December 2002. LCC personnel examined this site and found:

Rio Grande, Pico Road access upstream of Laredo

Species	<i>N</i> alive	<i>N</i> shells	Condition	Percentage
Tampico pearlymussel	0	1.0+0.5x26	relatively-recently to long dead	81.8
Yellow sandshell	0	2.0+0.5x1	recently dead	9.1
Texas hornshell	0	1.0	very-recently dead	3.0
Mexican fawnsfoot	0	1.0	long dead	3.0
Paper pondshell	0	1.0	relatively-recently dead	3.0
Asian clam (present)				

Rio Grande, La Bota Ranch upstream of Laredo at Sombreretillo Creek, upstream and downstream sites, Webb County, Texas, 27°36'52"N 99°33'21"W, two dates. LCC personnel examined this site and found:

22 December 2002

Rio Grande, La Bota Ranch, upstream location				
Species	<i>N</i> alive	<i>N</i> shells	Condition	Percentage
Tampico pearlymussel	0	many	long dead to subfossil	P
Washboard	0	1.0+0.5x1	very-recently to recently dead	4.3
Texas hornshell	0	33.0+0.5x5	recently to long dead	80.9
Southern mapleleaf	0	1.0	very-recently dead	2.1
Mexican fawnsfoot	0	6.0	very- to relatively-recently dead	12.8
Asian clam (present)				

23 December 2002

Rio Grande, La Bota Ranch				
Species	<i>N</i> alive	<i>N</i> shells	Condition	Percentage
Tampico pearlymussel	0	several	long dead	P
Texas hornshell	0	19.0+0.5x2	very-recently to long dead	91.3
Mexican fawnsfoot	0	2.0	recently to long dead	8.7
Asian clam (present)				

Rio Grande, La Bota Ranch upstream of Laredo, downstream of Sombreretillo Creek, Webb County, Texas, 27°36'44"N 99°33'21"W, 22 December 2002.

LCC personnel examined this site and found:

Rio Grande, La Bota Ranch, downstream location				
Species	<i>N</i> alive	<i>N</i> shells	Condition	Percentage
Tampico pearlymussel	0	few	long dead	P
Yellow sandshell	0	1.0	recently dead	2.5
Washboard	0	1,0+0.5x1	relatively-long dead	5.0
Texas hornshell	0	31.0+0.5x4	very-recently to relatively-recently dead	87.5

Mexican fawnsfoot	0	1.0+0.5x1	recently dead	5.0
Asian clam (present)				

Rio Grande, La Bota Ranch upstream Bridge 4 at Laredo, Webb County, Texas, 27°35'57"N, 99°32'18"W, 23 December 2002.

LCC personnel examined this site and found:

Rio Grande, La Bota Ranch				
Species	<i>N</i> alive	<i>N</i> shells	Condition	Percentage
Washboard	0	-	-	7.1
Texas hornshell	4	30.0+0.5x5	very-recently to long dead	92.9

Rio Grande, south end of Bill Hayes Island upstream of Laredo, Webb County, Texas, 27°33'22"N, 99°30'51"W, 30 October 2002.

LCC personnel examined this site and found:

Rio Grande, north end of Bill Hayes Island				
Species	<i>N</i> alive	<i>N</i> shells	Condition	Percentage
Tampico pearlymussel	0	0.5x6	long dead	66.7
Yellow sandshell	1	0.0	-	11.1
Texas hornshell	0	2.0	very-recently to relatively-long dead	22.2

Rio Grande, Mexican side opposite Laredo Community College Loop, Webb County, Texas, 21°31'17"N, 99°31'33"W, 26 December 2002.

LCC personnel examined this site and found:

Rio Grande, Mexican side opposite Laredo Community College Loop				
Species	<i>N</i> alive	<i>N</i> shells	Condition	Percentage
Texas hornshell	0	9.0+0.5x3	unstated	66.7
Mexican fawnsfoot	0	6.0	unstated	33.3

Rio Grande, rapids and riffles upstream of Nuevo Laredo water intake plant upstream of railroad bridge, Laredo, Webb County, Texas, 20 April 2002.

Laredo Community College personnel assisted with survey efforts at this site.

Rio Grande, rapids and riffles above Nuevo Laredo water intake plant				
Species	<i>N</i> alive	<i>N</i> shells	Condition	Percentage
Unionid fragment	0	fragment	long dead	100.0
Asian clam (present)				

Rio Grande, opposite Nuevo Laredo water intake plant, upstream of railroad bridge, Laredo, Webb County, Texas, 20 April 2002.

Laredo Community College personnel assisted with a survey of this site. Soft mud banks appeared to be good unionid habitat, but not even Asian clam was found.

Rio Grande, at and immediately downstream of the railroad bridge and upstream of the international bridges, Laredo, Webb County, Texas, 20 April 2002.

Laredo Community College personnel assisted with a survey at this site. No bivalves were found on the exposed banks and flow rates were too swift to allow sampling of deeper waters.

Rio Grande, under Gateway Bridge 2 at Laredo, Webb County, Texas, 27°30'03"N, 99°30'10"W, 30 October 2002.

LCC personnel examined this site and found:

Rio Grande, under Gateway Bridge 2				
Species	<i>N</i> alive	<i>N</i> shells	Condition	Percentage
Texas hornshell	1	0.0	-	50.0
Southern mapleleaf	0	1.0	relatively-long dead	50.0

Rio Grande, Los Palmas Park, between the international bridges and island immediately downstream, Laredo, Webb County, Texas, 20 April 2002.

Laredo Community College personnel assisted with a survey at this site. The site was not sampled due to apparent high bacterial levels at the time.

Rio Grande, Los Palmas Park, island and secondary channel on the Texas side of the island area between Bridge 2 upstream and Zacota Creek downstream, Laredo, Webb County, Texas, 27°30'01"N, 99°30'02"W, several dates.

Laredo Community College personnel assisted with a survey at this site and the following specimens were documented:

12 February 2002

Los Palmas Park, island and secondary channel, Laredo				
Species	<i>N</i> alive	<i>N</i> shells	Condition	Percentage
Washboard	0	1.0	recently dead	100.0

23 March 2002

Los Palmas Park, island and secondary channel, Laredo				
Species	<i>N</i> alive	<i>N</i> shells	Condition	Percentage
Washboard	1	0.0	-	7.1
Texas hornshell	0	2.0	unstated	14.3
Southern mapleleaf	0	8.0	unstated	57.1
Mexican fawnsfoot	0	3.0	unstated	21.4

Early April 2002 (day unstated)

Los Palmas Park, island and secondary channel, Laredo				
Species	<i>N</i> alive	<i>N</i> shells	Condition	Percentage
Texas hornshell	1	present	recently to long dead	11.1
Southern mapleleaf	1	present	recently- to relatively- recently dead	11.1
Mexican fawnsfoot	0	2.0+0.5x5	recently to long dead	77.8
Asian clam (present)				

20 April 2002 (LCC and HOH personnel and volunteers)

Los Palmas Park, island and secondary channel, Laredo				
Species	<i>N</i> alive	<i>N</i> shells	Condition	Percentage
Tampico pearlymussel	1	-		5.0
Texas hornshell	0	2.0+0.5x5	recently dead to relatively-recently dead	35.0
Mexican fawnsfoot	0	3.0+0.5x1	recently dead to relatively-recently dead	20.0

Southern mapleleaf	3	4.0+0.5x1	relatively-recently dead	40.0
Asian clam (shells abundant, few living specimens)				

11 July 2002

Los Palmas Park, island and secondary channel, Laredo				
Species	<i>N</i> alive	<i>N</i> shells	Condition	Percentage
Texas hornshell	0	0.5x2	recently to relatively- recently dead	50.0
Mexican fawnsfoot	0	2.0	relatively-recently dead	50.0
Asian clam (present)				

25 July 2002

Los Palmas Park, island and secondary channel, Laredo				
Species	<i>N</i> alive	<i>N</i> shells	Condition	Percentage
Texas hornshell	0	1.0	relatively-long dead	50.0
Mexican fawns foot	0	1.0	relatively-recently dead	50.0
Asian clam (present)				

27 August 2002

Los Palmas Park, island and secondary channel, Laredo				
Species	<i>N</i> alive	<i>N</i> shells	Condition	Percentage
Texas hornshell	0	1.0+0.5x1	relatively-long dead	22.2
Southern mapleleaf	0	2.0	relatively-long dead	22.2
Mexican fawnsfoot	0	4.0+0.5x1	recently to relatively- long dead	55.6
Asian clam (present)				

8 October 2002

Los Palmas Park, island and secondary channel, Laredo				
Species	<i>N</i> alive	<i>N</i> shells	Condition	Percentage
Yellow sandshell	0	0.5x1	relatively-long dead	5.6

Texas hornshell	1	5.0+0.5x2	relatively-recently to relatively-long dead	44.4
Southern mapleleaf	1	1.0	relatively-recently dead	11.1
Mexican fawnsfoot	0	6.0+0.5x1	relatively-recently to relatively-long dead	38.9
Asian clam (present)				

29 October 2002

Los Palmas Park, island and secondary channel, Laredo				
Species	<i>N</i> alive	<i>N</i> shells	Condition	Percentage
Tampico pearlymussel	1	0.0	-	2.6
Washboard	1	0.0	-	2.6
Texas hornshell	3	13.0+0.5x2	very-recently to relatively-long dead	46.2
Southern mapleleaf	1	13.0	very-recently to relatively-long dead	35.9
Mexican fawnsfoot	0	3.0+0.5x2	very-recently dead	12.8

19 November 2002

Los Palmas Park, island and secondary channel, Laredo				
Species	<i>N</i> alive	<i>N</i> shells	Condition	Percentage
Tampico pearlymussel	1	0.0	-	1.8
Yellow sandshell	1	1.0+0.5x1	relatively-recently dead	5.5
Washboard	0	2.0	relatively-long dead	3.6
Texas hornshell	12	11.0+0.5x2	very-recently to relatively-long dead	45.5
Southern mapleleaf	3	13.0+0.5x1	very-recently to relatively-long dead	30.9
Mexican fawnsfoot	0	7.0	relatively-recently to long dead	12.7
Asian clam (present)				

24 November 2002

Los Palmas Park, island and secondary channel, Laredo				
Species	<i>N</i> alive	<i>N</i> shells	Condition	Percentage

Yellow sandshell	1	0.0	-	8.3
Texas hornshell	3	4.0	very- to relatively- recently dead	58.3
Southern mapleleaf	1	1.0	relatively-recently dead	16.7
Mexican fawnsfoot	0	1.0+-.5x1	relatively-long to long dead	16.7

19 December 2002

Los Palmas Park, island and secondary channel, Laredo

Species	<i>N</i> alive	<i>N</i> shells	Condition	Percentage
Texas hornshell	0	3.0+0.5x1	recently- to relatively- recently dead	44.4
Southern mapleleaf	1	3.0	recently- to relatively- recently dead	44.4
Truncilla cognata Asian clam (present)	0	1.0	recently dead	11.1

Rio Grande, gravel bars downstream of Zacate Creek near Laredo Sewage Treatment Plant,
Webb County, Texas, 27°29'59"N, 99°29'38"W, two dates.

LCC personnel examined this site and reported the following species:

19 December 2002

Rio Grande, downstream of Zacate Creek

Species	<i>N</i> alive	<i>N</i> shells	Condition	Percentage
Texas hornshell	0	6.0	recently dead	66.7
Southern mapleleaf	0	1.0	relatively-recently dead	11.1
Mexican fawnsfoot	0	1.0+0.5x1	recently dead	22.2

30 October

Rio Grande, downstream of Zacate Creek

Species	<i>N</i> alive	<i>N</i> shells	Condition	Percentage
Tampico pearlymussel	0	6.0+0.5x4	very-recently to relatively-long dead	21.3
Yellow sandshell	0	8.0+0.5x1	very-recently to relatively-long dead	19.1

Washboard	0	1.0	relatively-recently dead	2.1
Texas hornshell	0	11.0	very-recently to	23.4
			relatively-recently dead	
Southern mapleleaf	0	8.0+0.5x1	very-recently to	19.1
			relatively-recently dead	
Mexican fawnsfoot	0	5.0+0.5x2	very-recently to	14.9
			relatively-recently dead	
Asian clam (present)				

Rio Grande, Hernandez Ranch downstream of Arroyo Coyote, Webb County, Texas,
27°24'42"N, 99°29'14"W, 10 December 2002.

LCC personnel examined this site and documented the following species:

Rio Grande, Hernandez Ranch downstream of Arroyo Coyote				
Species	<i>N</i> alive	<i>N</i> shells	Condition	Percentage
Tampico pearlymussel	0	0.5x5	long dead	35.7
Washboard	0	2.0	long dead	14.3
Southern mapleleaf	0	4.0+0.5x2	relatively-long to	42.9
			long dead	
Mexican fawnsfoot	0	0.5x1	long dead	7.1

Rio Grande, G.G. Hein Ranch downstream of Laredo, Webb-Zapata counties, Texas,
27°16'03"N, 99°27'00"W, 10 December 2002.

LCC personnel examined this site and documented the following species:

Rio Grande, Hein Ranch				
Species	<i>N</i> alive	<i>N</i> shells	Condition	Percentage
Tampico pearlymussel	0	0.5x7	long dead	46.7
Yellow sandshell	0	0.5x1	long dead	6.7
Southern mapleleaf	1	2.0	relatively-long dead	20.0
Mexican fawnsfoot	0	2.0+0.5x1	very-recently to	20.0
			long dead	
Paper pondshell	0	1.0	relatively-recently dead	6.7

Rio Grande, La Perla Ranch, Dolores Creek, Zapata County, Texas, 27°13'31"N, 99°25'56"W,
20 December 2002.

LCC personnel examined this site and reported the following species:

Rio Grande, La Perla Ranch, Dolores Creek				
Species	<i>N</i> alive	<i>N</i> shells	Condition	Percentage
Tampico pearlymussel	0	4.0+0.5x many	relatively-recently to long dead	23.5+
Yellow sandshell	0	0.5x3	relatively-recently to very-long dead	17.6
Southern mapleleaf	0	3.0+0.5x1	relatively-recently dead	23.5
Mexican fawnsfoot	0	3.0+0.5x2	relatively-recently to long dead	29.4
Paper pondshell	0	1.0	recently dead	5.9
Asian clam (present)				

Rio Grande, La Perla Ranch, 1.6 km downstream of Dolores Creek, Zapata County, Texas, 27°13'30"N, 99°25'56"W, 21 December 2002.

LCC personnel examined this site and reported the following species:

Rio Grande, La Perla Ranch, 1.6 km downstream of Dolores Creek				
Species	<i>N</i> alive	<i>N</i> shells	Condition	Percentage
Tampico pearlymussel	1	many	unstated	3.3+
Washboard	1	0.0	-	3.3
Texas hornshell	0	0.5x1	very-long dead	3.3
Southern mapleleaf	1	11.0+0.5x2	recently to very-long dead	46.7
Mexican fawnsfoot	0	10.0+0.5x3	recently to very-long dead	43.3
Asian clam (present)				

Rio Grande, La Perla Ranch, 11.3 km downstream of Webb-Zapata County line, Zapata County, Texas, 27°09'55"N, 99°25'55"W, 18 December 2002.

LCC personnel examined this site and reported the following species:

Rio Grande, La Perla Ranch, 11.3 km downstream of Webb-Zapata County line				
Species	<i>N</i> alive	<i>N</i> shells	Condition	Percentage
Tampico pearlymussel	0	4.0	relatively-long to long dead	11.4
Washboard	0	5.0+0.5x2	relatively-long dead	20.0
Southern mapleleaf	1	20.0+0.5x2	very-recently to	65.7

Mexican fawnsfoot	0	1.0	long dead recently dead	2.9
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Lake Casa Blanca, Laredo, Webb County, Texas, four dates (21 June, 12 July, 19 July, and 02 August 2002) combined.

LCC personnel examined this reservoir and reported finding:

Lake Casa Blanca				
Species	N alive	N shells	Condition	Percentage
Tampico pearlymussel	12	thousands	alive to long dead	46.2+
Southern mapleleaf	12	hundreds	alive to long dead	46.2+
Texas lilliput	0	2.0	relatively-recently to relatively-long dead	2.9

Unnamed creek, at SH 186 about 9.7 km southwest of Port Mansfield (Laguna Madre drainage), Willacy County, Texas, 22 December 2002.

A volunteer examined this area, but no bivalves were found.

Resaca de los Cuates, west of the intersection of Ted Hunt Road and Perez Road, north of Bay View, Cameron County, Texas, 1 and 3 August 2002.

A volunteer surveyed this area. No unionids or their shells were found, but a single Asian clam shell was located as were several Florida marshclam *Cyrenoida floridana* (Cyrenoididae).

Resaca de los Cuates, northwest of the intersection of Ted Hunt Road and Perez Road, north of Bay View, Cameron County, Texas, 3 August 2002.

A volunteer surveyed this area and documented the following species:

Resaca de los Cuates, northwest of intersection				
Species	N alive	N shells	Condition	Percentage
Tampico pearlymussel	0	29.0+	relatively-recently dead	96.7+
Paper pondshell	0	0.5x1	relatively-recently dead	3.3
Asian clam (present)				
Florida marshclam (present)				

Resaca de los Cuates, northeast of the intersection of Ted Hunt Road and Perez Road, north of Bay View, Cameron County, Texas, 3 August 2002.

A volunteer surveyed this area and reported finding:

Resaca de los Cuates, northeast of intersection				
Species	<i>N</i> alive	<i>N</i> shells	Condition	Percentage
Lilliput	0	1.0+0.5x1	relatively recently dead	100.0
Asian clam (present)				
Florida marshclam (present)				

Resaca de los Cuates, immediately south-southeast of Ted Hunt Road and FM 510 just east of Bay View, Cameron County, Texas, 3 August 2002.

A volunteer surveyed this area, but no bivalves were found.

Resaca de los Cuates, south side of General Brant Road, Cameron County, Texas 17 August 2002.

A volunteer examined this area, no bivalves were found.

Resaca de los Cuates, at SH 100 (Russeltown), south side of highway, Cameron County, Texas, 17 August 2002.

A volunteer examined this site, but no bivalves were found.

Resaca de los Cuates, at SH 100 (Russeltown), west side of highway, Cameron County, Texas, 19 August 2002.

A volunteer examined this site and found:

Resaca de los Cuates, SH 100 (Russeltown), west side of highway				
Species	<i>N</i> alive	<i>N</i> shells	Condition	Percentage
Tampico pearlymussel	0	1.0+0.5x2	recently to long dead	75.0
Paper pondshell	0	0.5x1	recently dead	25.0
Asian clam (abundant)				

Cross Lake, about 9.7 km north of Los Fresnos, west of FM 1847, Cameron County, Texas, 17 August 2002.

A volunteer examined this site, but no bivalves were found.

Loma Alta Lake, 9.7 km northeast of Brownsville, Cameron County, Texas, 17 August 2002.

A volunteer examined this site found:

Loma Alta Lake				
Species	<i>N</i> alive	<i>N</i> shells	Condition	Percentage
Lilliput Florida marshclam (numerous)	0	1.0	not stated	100.0

Laguna Atascosa, Cameron County, Texas, 2 August 2002.

A volunteer surveyed this area, but neither unionids nor Asian clams were found. The presence of Florida marshclam indicated the site was apparently too saline to support freshwater taxa.

Water Body and Species Summary

The number of specimens examined annually was not documented in 1992, but from 1993 through 2002 was >2,500; >3,000; >1,700; >7,200; >1,500, >1,200; > 3,000; >3,100; <150; and > 1,900 respectively. The number of locations examined each year from 1992 through 2002 was 56, 162, 202, 179, 232, 87, 118, 136, 121, 90, and 103, respectively. Generally, too few specimens were documented and too few locations examined to allow conclusions about status of freshwater mussels at most locations in Texas in 2002, but with three exceptions. Work by a graduate student from Lamar University demonstrated that greater numbers and a wider diversity of unionids still survive in Village Creek, Hardin County, Texas, than previous TPWD surveys suggested (Howells 1996a). Finally, work by a volunteer in the Baffin Bay drainage along the lower Gulf Coast in 2001 (Howells 2002) and in 2002 (this report) provided an excellent overview of bivalve status in that region. Additionally, collection of very-recently dead Texas fatmuckets in Gillespie County following extensive flooding was one of only five records of living or recently-dead examples of this species found surviving in over 10 years.

Work in Village Creek was significant not only in finding a unionid assemblage still present, but in documentation of populations of Texas and triangle pigtoes, Louisiana pigtoe, and southern hickorynut. During the previous decade of unionid surveys, HOH has only been able to document a small number of Texas pigtoes, five living triangle pigtoes, two living Louisiana fatmuckets, and no living southern hickorynuts.

Surveys by LCC personnel in the Rio Grande in Webb and Zapata counties discovered living populations of washboard, Texas hornshell, and yellow sandshell. Washboards were suspected of having been extirpated from the system as early as 1988 (Neck and Metcalf 1988), but are not only present in limited numbers, but have experienced successful reproduction during the past decade. Texas hornshell was only known from a single population in the Black River, New Mexico, and several recently dead shells and valves found between Big Bend and the mouth of the Pecos River (Howells 2001b). Work in the Rio Grande in Webb County now confirms a second population is surviving there. Yellow sandshell, while being relatively common at many other locations throughout Texas and the Midwest, had not been found alive in the Rio Grande

drainage in many years; however, a small population is now known to persist in the vicinity of Laredo. Finally, prior to the 1992 collections, Mexican fawnsfoot had not been documented alive or recently dead since at least 1972 (Howells et al. 1997), the species is clearly surviving in the Rio Grande near Laredo. Indeed, in February 2003, a single living Mexican fawnsfoot was collected in that area.

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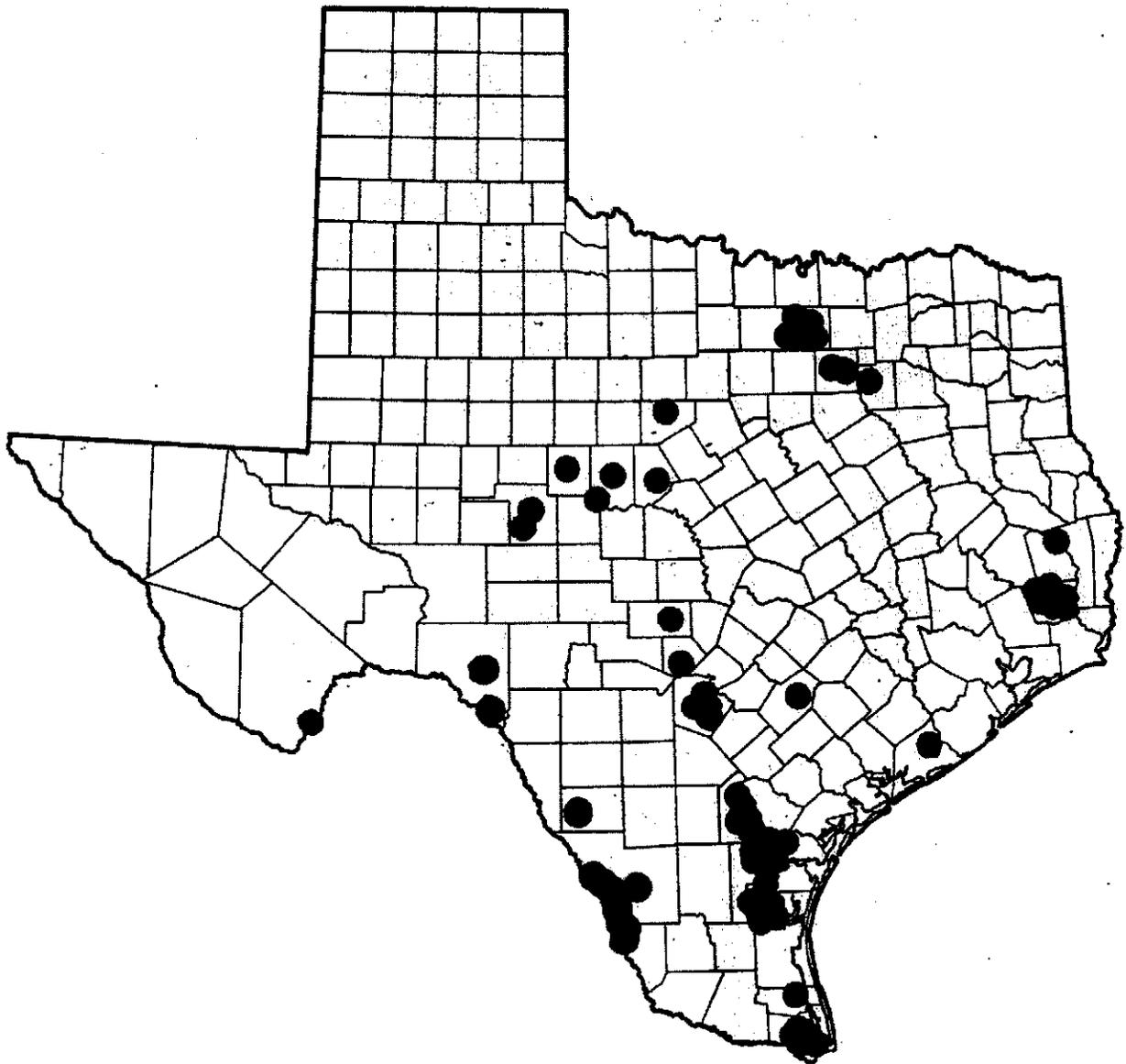


Figure 1. Locations surveyed for freshwater mussels (Family: Unionidae) and other bivalves in 2000 by Texas Parks and Wildlife Department personnel or by volunteers who subsequently provided data on these sites.

APPENDIX I.

COMMON AND SCIENTIFIC NAMES

Common names used in this and previous TPWD mussel-distribution reports and associated scientific names include:

Family: Unionidae

Threeridge *Amblema plicata*

Flat floater *Anodonta suborbiculata*

Floater sp. *Anodonta* sp. – Collections in B.A. Steinhagen Reservoir in 1993 produced specimens that appear intermediate between giant floater and flat floater. They have higher beaks and darker coloration than flat floater and are more inflated and less-deep bodied. Similar specimens have been found by P. Hartfield (US Fish and Wildlife Service, Jackson, Mississippi; pers. com.) in Mississippi. Whether these represent an undescribed species, unusual ecophenotype of flat floater, or a hybrid remains unresolved.

Rock-pocketbook *Arcidens confragosus*

Ouachita rock-pocketbook *Arkansia wheeleri*

Tampico pearlymussel *Cyrtonaias tampicoensis*

Spike *Elliptio dilatata*

Texas pigtoe *Fusconaia askewi*

Wabash pigtoe *Fusconaia flava*

Triangle pigtoe *Fusconaia lananensis*

Round pearlshell *Glebula rotundata*

Texas fatmucket *Lampsilis bracteata*

Plain pocketbook *Lampsilis cardium*

Louisiana fatmucket *Lampsilis hydiana*

Sandbank pocketbook *Lampsilis satura*

Yellow sandshell *Lampsilis teres*

Pocketbook *Lampsilis ovata* – not present in Texas

Pocketbooks – collectively refers to plain pocketbook, sandbank pocketbook, or both

Fatmuckets – collectively refers to Texas fatmucket, Louisiana fatmucket, or both

White heelsplitter *Lasmigona complanata*

Fragile papershell *Leptodea fragilis*

Pond mussel *Ligumia subrostrata*

Washboard *Megaloniaias nervosa*

Threehorn wartyback *Obliquaria reflexa*

Southern hickorynut *Obovaria jacksoniana*

Bankclimber *Plectomerus dombeyanus*

Louisiana pigtoe *Pleurobema riddellii*

Texas hornshell *Popenaias popeii*

Texas heelsplitter *Potamilus amphichaenus*

Pink papershell *Potamilus ohioensis*

Bleufer *Potamilus purpuratus*

Salina mucket *Potamilus metnecktayi* – this species has also been called *Disconaias salinasensis* and *Potamilus salinasensis*

Giant floater *Pygaonodon grandis*

Rio Grande monkeyface *Quadrula couchiana*

Southern mapleleaf *Quadrula apiculata*

Golden orb *Quadrula aurea*

Smooth pimpleback *Quadrula houstonensis*

Western pimpleback *Quadrula mortoni* – also known as *Quadrula pustulosa mortoni*

Gulf mapleleaf *Quadrula nobilis*

Wartyback *Quadrula nodulata*

Texas pimpleback *Quadrula petrina*

Pimpleback *Quadrula pustulosa*

Mapleleaf or common mapleleaf *Quadrula quadrula*

Pimpleback sp. or sp(p). – refers to golden orb, smooth pimpleback, western pimpleback, Texas pimpleback, pimpleback, or some combination of those species; identification of worn specimens and others from the Trinity River drainage can be difficult or impossible

False spike *Quincuncina mitchelli*

Creeper *Strophitus undulatus* – previously called squawfoot

Lilliput *Toxolasma parvus*

Texas lilliput *Toxolasma texasiensis* – western lilliput *Toxolasma mearnsi* is considered only a form of

Texas lilliput herein

Pistolgrip *Tritogonia verrucosa*

Mexican fawnsfoot *Truncilla cognata*

Fawnsfoot *Truncilla donaciformis*

Texas fawnsfoot *Truncilla macrodon*

Deertoe *Truncilla truncata*

Tapered pondhorn *Uniomerus declivis*

Pondhorn *Uniomerus tetralasmus*

Paper pondshell *Utterbackia imbecillis*

Little spectaclecase *Villosa lienosa*

Family: Corbiculidae

Asian clam *Corbicula* sp(p). – Most recognize all American corbiculas as *Corbicula fluminea*; however, some genetic studies suggest a second species may be present in Texas; no efforts were made to define species in this study

Family: Dreissenidae

Zebra mussel *Dreissena polymorpha*

Quagga mussel *Dreissena bugensis*

Zebra mussels – collectively zebra mussel, quagga mussel, or both

Family : Mactridae
Atlantic rangia *Rangia cuneata*

Family: Sphaeriidae
Fingernail clams and their relatives – no effort was made to identify species herein

SHELL CONDITION TERMINOLOGY

It is not usually possible to determine exactly how long a freshwater mussel shell has been dead. Different conditions such as water and substrate pH, erosive or corrosive environments, and exposure to sun can impact specimen condition and rate of disintegration. None the less, some qualitative estimate of time-since-death can be very useful. The following terms are used in TPWD freshwater mussel surveys:

Very-recently dead: Soft tissue remains attached to the shell; shell in good condition, essentially as it would be in a living specimen; internal and external colors are not faded.

Recently dead: No soft tissue remains, but shell otherwise in good condition (looking like a living specimen that had been killed and cleaned); internally nacre is glossy and without evidence of algal staining, calcium deposition, or external erosive effects; internal and external colors are not faded.

Relatively-recently dead: Shell in good condition, but internally nacre is losing its glossy nature; algal staining, calcium deposition, or external erosive effects (or some combination of these) is evident on the nacre; internal and external colors often faded somewhat.

Long dead: Shell shows early signs of internal and external erosion, staining, calcium deposition, or some combination of these; most or all of the internal coloration and glossy nature has faded (especially in species with colored nacre); shell epidermis with major sections absent, or, if present, clearly aged and flaking.

Very-long dead: Shell shows significant signs of erosion, staining, and calcium deposition more widely pronounced than above; coloration often faded white or nearly so; relatively little intact epidermis left; for specimens in erosive environments, internal features (*e.g.*, pseudocardinal teeth) and external features (*e.g.*, pustules) often weathered and smoothed, or otherwise exfoliated; shells often chalky, brittle, and crumbling.

Subfossil: Shells with little or no epidermis; nacre faded white and entire shell often white; sometimes with signs of erosion, staining, or calcium deposition; typically chalky and powdery to the touch; shells often brittle and crumbling.

SHELL COUNTING METHODS

0.5 x 1 = one valve (one half shell); counted as one specimen in some calculations.

1 = one living specimen with a complete shell (two matched valves);

1.0 = one complete shell consisting of two, matching valves.

0.5 x 2 = one valve from each of two individuals; counted as two specimens in some calculations.

3.0+ 0.5 x 2 = three complete shells (pairs of matched valves) and two additional unpaired valves from two additional individuals; counted as five specimens in some calculations.

