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# RESTRICTED AND DECLINING NONMARINE MOLLUSCS OF TEXAS

by  
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## INTRODUCTION

Recent rapid human population increase and concomitant land-use practices and natural resource utilization have affected most plant and animal species of the world. Some species benefit from anthropogenic modifications of the environment but many are negatively impacted. Nonmarine molluscs have not escaped such population impacts (Sterki 1911; Clarke 1970; Jorgensen & Sharpe 1971; Roth 1972; Van der Schalie 1975; Neck 1982a). Comments on Texas nonmarine molluscan species of special concern have been made previously by Landye (1973, 1980). This list synthesizes currently available knowledge concerning restricted and declining nonmarine molluscan species of Texas.

The terms "restricted" and "declining" were deliberately chosen to avoid terms ("rare," "endangered," and "threatened") which are widely used or have specific legal meanings. "Restricted" species have localized geographic ranges within Texas; such taxa may or may not occur outside Texas. "Declining" species suffer from significant deficits in population recruitment as a result of human impact. Some species may fit both categories. Some species which have restricted ranges in Texas may occur over large geographic areas outside the state. This apparent irony is one result of surveying a geographic area delineated by political boundaries. However, study of peripheral populations can be significant as a living laboratory for workers to determine factors which limit geographic range. Such isolated populations could provide important stocks for range expansions during the next pluvial period exhibiting climatic conditions favorable to many boreal forms. Additionally, even widespread forms may be declining over their entire geographic range.

An attempt to survey the Texas nonmarine molluscs which are of special concern is difficult because the fauna of Texas is still imperfectly known. Several early compilations of records (Singley 1893; Strecker 1931, 1935) provided initial surveys which have only recently been expanded. Recent publications by the Dallas Museum of Natural History (Cheatum & Fullington 1971, 1973; Fullington & Pratt 1974) have updated our knowledge of the majority of the terrestrial gastropod fauna. The land snail fauna is certainly better known than the rest of the nonmarine mollusc fauna, but the ability of species to exist in isolated microhabitats makes a complete survey an impossible job. A recent review of the aquatic gastropods (Fullington 1978) has greatly increased our knowledge of this group. The aquatic gastropods are fewer in species number than their terrestrial counterparts and reasonably well-known, although the extent of the central Texas aquifer fauna is yet to be discovered. The freshwater mussels (unionids) are very poorly known with little published since Strecker's (1931) compilation. While limited collecting is the primary cause of the dearth of knowledge concerning Texas naiads, nomenclatorial inconsistencies typical of freshwater mussels are also negative factors in assessing the status of various unionids.

Most land snails on the following list are naturally restricted or peripheral in Texas, although some have also been negatively impacted by land-use patterns. Some aquatic snails are naturally restricted to specialized habitats, generally spring-fed streams of moderate size. Freshwater mussels have suffered from construction of reservoirs (see listing by Dowell & Breeding 1967). Also significant are groundwater demands for agricultural and municipal usage resulting in depressed aquifer levels with reduction or cessation of

spring flow (Brune 1975; Guyton & Assoc. 1979; Muller & Price 1979). Water pollution has undoubtedly been a factor in population declines of various species (see Horne and McIntosh 1979). Commercial mussel fisheries (Shira 1913; Garrett 1929) and localized private exploitation (see Bigony 1979; Pinkard 1979) have had local impacts, but the significance of this factor is unknown.

Legal protection of nonmarine molluscan species is minimal. Molluscs are eligible for protective listing under provisions of state statutes concerning Nongame and Endangered species. At present no species have been listed, primarily because of lack of detailed information. State legislation protecting nongame species does not include habitat protection. Statutes require a license before anyone may collect mussel shells but amounts of shell removed are not regulated (see Neck 1982a). Currently, no Texas molluscan species are listed by the U.S. Fish & Wildlife Service as being threatened or endangered (Chambers 1982).

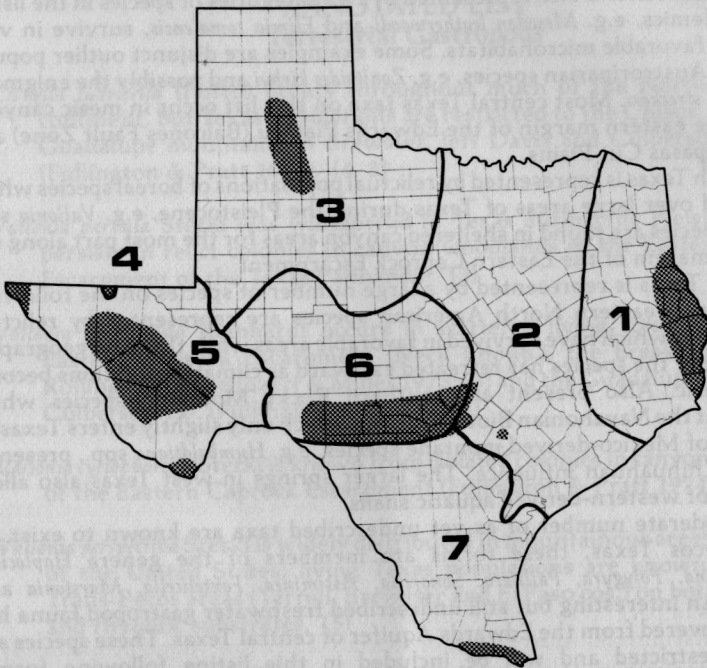
Introduction of exotic nonmarine mollusca is also an important factor. Decline in native aquatic snails and mussels has been paralleled by establishment of nonnatives (e.g. *Corbicula fluminea*, *Melanoides tuberculata*, and *Tarebia granifera*), although cause-and-effect relations remain to be studied (see Gardner et al. 1976; Murray 1971; Sickle 1973). *Rumina decollata*, a land snail native to the Mediterranean area, has become "weedy" in residential areas of much of Texas. While it is doubtful that it has a decisive negative impact in such already altered areas, this species is able to invade wild areas (Neck 1977b) where its impact on the native fauna is unknown.

Nonmarine molluscan species of special concern are found in practically all geographical areas of Texas (Fig. 1).

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**Figure 1.** Base map of Texas with shaded areas indicating concentrations of species considered in this report. Numbers refer to biotic provinces of Texas (Blair 1950): 1) Austroriparian, 2) Texan, 3) Kansan, 4) Navahonian, 5) Chihuahuan, 6) Balconian, and 7) Tamaulipan.

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East Texas is represented by two categories of species in the following list. Several species are found only in counties which lie on the Louisiana border or are adjacent to border counties. These are core species of the Austroriparian Biotic Province. While additional collecting will undoubtedly reveal new localities, little substantial increase in geographical range in Texas is to be expected. Aquatic forms in this group generally appear to be limited to the San Jacinto, Trinity and Sabine-Neches river systems (e.g. *Potamilus amphichaenus* and *Lampsilis satura*). A second group of species is known from only a few locations in the east-central portion or the fringes of east Texas, e.g. *Pupisoma macneilli*. At least some of these species are likely to be found in favorable microhabitats over large areas of the eastern part of Texas.

In deep southern Texas, four species of land snails, (*Guppya gundlachi*, *Euglandina texasiana*, *Thysanophora plagioptycha*, *Praticolella griseola*) occur no farther north than the extreme lower Rio Grande Valley in remnant native-brush tracts. These species are found farther south into Mexico, but recent extensive land clearing practices in Tamaulipas produces concern for these species.

Central Texas is also represented by two categories of species in the list. A few endemics, e.g. *Mesodon leatherwoodi* and *Elimia comalensis*, survive in very isolated favorable microhabitats. Some examples are disjunct outlier populations of Austroriparian species, e.g. *Zonitoides kirbyi* and possibly the enigmatic *Lampsilis streckeri*. Most central Texas taxa on this list occur in mesic canyons along the eastern margin of the Edwards Plateau (Balcones Fault Zone) and the Lampasas Cut Plains.

North Texas is represented by relictual populations of boreal species which occurred over large areas of Texas during the Pleistocene, e.g. *Vallonia* spp. These species are found in sheltered canyon areas for the most part along the eastern margin of the Eastern Caprock Escarpment.

West Texas is represented by a large number of species on the following list. Several eastern North American species are represented by relictual populations which have survived in favorable areas while the main geographical range of the species has retreated eastward as climatic conditions become more xeric. Also present are southern Rocky Mountain species which represent the Navahonian Biotic Province which only slightly enters Texas. A number of Mexico-derived montane species, e.g. *Humboldtiana* spp., present a strong Chihuahuan influence. The larger springs in west Texas also allow survival of western-derived aquatic snails.

A moderate number of as yet undescribed taxa are known to exist. In Trans-Pecos Texas, these forms are members of the genera *Haplocion*, *Humboltiana*, *Polygyra*, *Pallifera*, *Sonorella*, *Assimineia*, *Fontelicella*, *Marstonia* and *Tryonia*. An interesting but still undescribed freshwater gastropod fauna has been recovered from the Edwards Aquifer of central Texas. These species are highly restricted and will be included in this listing following formal description.

Several species considered during earlier drafts have been dropped from this listing. New taxonomic synonymy, awareness of locality errors and questionable identification or nomenclature resulted in the deletion of *Microphysula ingersolli* (Bland), *Polygyra latispira* Pilsbry, *Ashmunella edithae* Pilsbry & Cheatum and *Humboldtiana edithae* Parodiz. Even though *Polygyra hippocrepis* (Pfeiffer) has long been considered rare (Wheeler 1949; Dundee 1970), it is now known to be more widespread based on recent collections (Cheatum & Fullington 1971). Published records of *Haplotrema concavum* (Say) are few (Fullington & Pratt 1974), but additional records are known (Fullington, in litt.). Both *Quadrula aurea* and *Lampsilis bracteata* were listed by Athearn (1970) as species of special concern; however, reports by various workers (Bergman, Boone, Horne, and Murray; in litt.) have indicated that large populations of these species occur at numerous localities. *Fusconaia friersoni* was also listed by Athearn (1970), but this name is probably synonymous with *Pleurobema riddelli* which is listed below.

At the end of each species account are numbers keyed to the biotic provinces in figure 1. A species occupying only part of a province is so indicated by preceding the number with letters (N for north, etc.). Species are generally restricted to the shaded areas of the particular provinces unless additional locality information is provided in the species accounts.

I thank Joe Bergman, Constance Boone, Richard W. Fullington, Francis Horne, Leslie Hubricht, Artie L. Metcalf, Harold W. Murray, William L. Pratt, David Stansbery and Dwight Taylor for comments and suggested additions to previous drafts of this list. Information provided by letters is designated by "in litt." to distinguish it from conversations (pers. comm.).

## ANNOTATED LIST Terrestrial Gastropods

- Cionella lubricella* (Porro) occurs throughout much of the North American continent, but Texas populations are restricted to the Chisos, Davis, and Guadalupe mountains in Brewster, Jeff Davis and Culberson counties (Fullington & Pratt 1974). (4, 5)
- Vallonia parvula* Sterki was widespread in Texas during the Pleistocene, but persists in relict colonies in canyon woodlands of the Eastern Caprock Escarpment of the Texas Panhandle. (3)
- Vallonia gracilicosta* Reinhardt occurs in scattered living colonies along the Eastern Caprock Escarpment (Neck unpub.), the breaks area of the Rolling Plains (Bequaert & Miller 1973:63) and the Guadalupe Mountains, Culberson Co. (Fullington 1979a). (3, 4)
- Vallonia cyclophorella* Sterki is known from isolated colonies in canyon woodlands of the Eastern Caprock Escarpment (Fullington & Pratt 1974). (3)
- Vallonia perspectiva* Sterki is widely distributed in mountainous areas over much of the United States; living Texas populations are known only from Trans-Pecos areas (Terrell, Brewster and El Paso cos.) on both limestone and rhyolitic substrates. (5)
- Gastrocopta riograndensis* (Pilsbry & Vanatta) is known from mesic woodlands in arid and semiarid environments in the Davis Mountains (Jeff Davis Co., Cheatum 1935; Brewster Co., Neck 1980) and the lower Rio Grande Valley (Hidalgo Co., Pratt 1976). (5, 7)
- Gastrocopta rupicola* (Say) is known from coastal localities from South Carolina to Texas. Binney (1885:329) merely reported "Texas." Strecker (1935) reported that it was "probably not a Texan species," but Pilsbry (1948:905) reported it from Galveston. Hubricht (in litt.) has reported the species from Calhoun Co. (S2)
- Vertigo gouldi arizonensis* Pilsbry & Vanatta is known from northern Mexico into Arizona and New Mexico (Bequaert & Miller 1973:186). One Texas population is known from a small aspen grove in the Guadalupe Mountains, Culberson Co. (Fullington 1979a). (4)
- Vertigo oralis* (Sterki) is known throughout the southern United States east of Texas. The sole Texas record is from Brazos Co. (Cheatum & Fullington 1973:31). (2)
- Vertigo oscariana* (Sterki) ranges from Florida northwest to Tennessee and west to Texas. All published Texas records (Branson 1960; Pilsbry & Ferriss 1906) involve river-drift specimens of Pleistocene fossils. Records in Cheatum & Fullington (1973:31) involve a misinterpretation of Branson (1960). Hubricht (in litt.) reports only Austin Co., but Neck (1981) reported it from a protected, leaf-litter microhabitat in Bell Co. (E2, E6)
- Columella columella alticola* (Ingersoll) is distributed from Illinois westward to the eastern margin of the Rocky Mountains. A relict population is known

from the Chisos Mountains, Big Bend National Park, Brewster Co. (Cheatum et al. 1972). (5)

*Pupisoma macneilli* (Clapp) is known from South Carolina westward to Louisiana and Texas. The single Texas record is from Lavaca Co (Cheatum & Fullington 1973). (S2)

*Strobilops labyrinthica* (Say) ranges from southern Canada to Georgia westward into the Great Plains. Texas populations are known in Culberson (Fullington 1979a), Harris and Jackson cos. (Hubricht, in litt.). Reports of *S. labyrinthica* from San Patricio Co. (Branson 1960) may represent fossil drift specimens. (S2, CE7)

*Strobilops hubbardi* Brown ranges along the Coastal Plain from northeastern Mexico to Georgia. Cheatum and Burt (1931) reported living specimens from Ellis Co. The report from San Patricio Co. (Fullington and Pratt 1974:25) is based on a misinterpretation of Branson (1960). Hubricht (in litt.) reports it from Cameron Co. (C2, 7)

*Succinea unicolor* Tryon ranges over much of the southeastern United States. Pilsbry (1948:817) reported it from Galveston but Hubricht (in litt.) records Texas specimens only from Panola Co. (1)

*Discus cronkhitei* (Newcomb) occurs as a relict in the Guadalupe Mountains, Culberson Co. (Fullington 1979a). (4)

*Punctum minutissimum* (Lea) occurs over most of the United States except for the more xeric southwestern portion. The only known Texas record is from a remnant wooded tract of the Western Cross Timbers Vegetation Region near Fort Worth (Pratt 1971a). (NC2)

*Radiodiscus millecostatus* Pilsbry & Ferriss has been reported from montane areas of central northern Mexico and Arizona and New Mexico. The only known Texas locality is in the Chisos Mountains, Brewster Co. (Pratt 1972) in deciduous woodlands. (5)

*Nesovitrea suzannae* Pratt is recorded from live oak leaf litter at Goose Island State Park (Pratt 1978) and Aransas National Wildlife Refuge, Aransas Co. (Pratt, pers. comm.). Populations of this species are to be expected from localities in the Ingleside Complex, a series of sandy remnants of a Pleistocene strand deposit along the central and upper coast of Texas. (CE7).

*Nesovitrea electrina* (Gould) is found from Alaska and Canada south to Virginia and Arizona. Widely distributed throughout northern Texas during the Pleistocene, living colonies in Texas are known only in the Guadalupe Mountains (Fullington 1979a). (4)

*Mesomphix globosus* (MacMillan) is found in the southeastern United States with published records as far west as Louisiana (Hubricht 1963). Hubricht (in litt.) has found *M. globosus* from four counties in deep eastern Texas. (1)

*Paravitrea conecuhensis* (Clapp) is distributed from western Florida to eastern Louisiana. A single living individual (possibly introduced) has been discovered at Palmetto State Park, Gonzales Co. (Pratt & Fullington, in prep.). (2)



*Euconulus fulvus* (Muller) has a broad distribution throughout the cold temperate portions of the Holarctic Region. In Texas, this species exists in relictual habitats in the Guadalupe and Chisos mountains (Culberson and Brewster cos.). (4,5)

*Guppya gundlachi* (Pfeiffer) is found from Panama north to southern Texas with populations also present in Florida and the West Indies. Texas populations are restricted to subtropical brush and palm woodlands in Cameron and Hidalgo cos. (Pilsbry 1946, 2(1):244). (7)

*Ventridens intertextus* (Binney) occurs over large areas of southern Canada and eastern United States. Records from Texas are limited to four counties in the southeastern portion (Hubricht in litt.) These recent records appear to confirm an early record from this area (Weatherby 1878). (1)

*Zonitoides kirbyi* Fullington appears to be an obligate troglophile at the type locality (Schulz Cave, Edwards Co.) being totally confined to a relatively small sinkhole (Fullington 1974). Hubricht (in litt.) found it in epigeal habitats in Oklahoma, Arkansas and Missouri. (6)

*Vitrina pellucida alaskana* Dall has a wide distribution from Alaska south to northwestern United States. One living population occurs in the Guadalupe Mountains (Culberson Co.) (Fullington 1979a). (4)

*Euglandina texasiana* Pfeiffer is known from the three southernmost counties (Cameron, Willacy and Hidalgo) where it occurs in brushlands near the Rio Grande. Low density populations survive in residential areas. Introduced colonies are known from Corpus Christi, Nueces Co. (7)

*Pseudosubulina cheatumi* Pilsbry is found in deciduous woodlands at bases of mountain caprocks in the Chisos Mountains, Big Bend National Park, Brewster Co. (Pratt 1972). Fullington (in litt.) remarks that "habitat-wise, this is probably the most restricted land gastropod in Texas." (5)

*Holospira hamiltoni* Dall is known from Mexico but Texas records are limited to Brewster Co. in the Rio Grande Mountains at an elevation of 3500 ft. MSL (Pilsbry 1946, 2(1):118) along a low limestone ridge west of Rio Grande Village, (Pratt in litt.). (5)

*Holospira mesolia* Pilsbry is reported by Cheatum & Fullington (1973) only in Terrell and Pecos cos. under small limestone slabs; only a single shell was found in the latter county. Recently, *mesolia* has been found in Brewster Co. (Gallucci & Scudday 1979). (5)

*Holospira montivaga* Pilsbry is known only from the Guadalupe Mountains, Culberson Co. but this species is quite variable shellwise. Fullington (in litt.) has indicated that the nominate form, *brevaria*, *pitysis* and *oritis* are all conspecific. (4)

*Holospira riograndensis* Pilsbry is known only from the Mesa de Anguilla near the mouth of Santa Elena Canyon in Brewster Co. (Pratt in litt.). Inspection of further specimens may indicate the *H. riograndensis* and *H. hamiltoni* are conspecific (Cheatum and Fullington 1973:43). (5)

*Holospira yucatanensis* Bartsch is known from northern Coahuila and Brewster Co., Texas. Pratt (in litt.) reports this species from the southern end of Sierra del Caballo Muerto on low-elevation limestones near Rio Grande Village. (5)

*Rabdodus pilsbryi* (Ferriss) has a spotty distribution in parts of the northern Chihuahuan Desert of Mexico and Texas. Texas records are restricted to a small area of limestone hills near Sanderson, Terrell Co., and several mountain ranges in Brewster Co. (5)

*Thysanophora plagiptycha* (Schuttleworth) occurs from northern South America to southern Texas with populations in Florida and the West Indies. All Texas records are from subtropical thorn woodlands of Cameron and Hidalgo cos. (Fullington & Pratt 1974). (7)

*Polygyra chisosensis* Pilsbry is represented by the nominate form and the subspecies *discobolus*, both restricted to the Chisos Mountains, Big Bend National Park, Brewster Co., to shaded rockslides. Localized variation may negate the utility of subspecific nomenclature for this species (Pratt in litt.). (5)

*Polygyra polita* Pilsbry and Hinckley is known from Willacy Co. southward into Mexico. Texas populations were described as *Polygyra scintilla* (Pilsbry & Hubricht 1956) which Pratt (1981) has synonymized with *P. polita*. (7)

*Stenotrema stenotrema* (Pfeiffer) occurs over a large area of the southeastern United States. Hubricht (in litt.) has reported this species for the first time in Texas from two localities in Newton Co. (1)

*Stenotrema leai cheatumi* Fullington is known only from Palmetto State Park, Gonzales County (Fullington 1974), where it is often very abundant during moist periods. Ecological and behavioral observations have indicated that this is probably a separate species (Neck unpub.); unpublished anatomical studies by Pratt have indicated the same. (2)

*Praticolella griseola* (Pfeiffer) is centered in Central America with isolated population centers in Mexico and southern Texas (Rehder 1966). Dense populations occur in Cameron, Willacy and Hidalgo cos. along the Rio Grande in coastal saline areas and disturbed habitats (Neck 1977a; Hubricht 1983). (7)

— *Mesodon inflectus* (Say) is present in open, hardwood forests over much of the Midwest and southeastern United States. The only Texas records are from the far east Texas counties of Angelina (Cheatum & Fullington 1971:31), Newton (Hubricht in litt.), Red River, Morris and Orange (Fullington, pers. comm.). (1)

*Mesodon leatherwoodi* Pratt is known alive in two small canyons in southwestern Travis Co. (Pratt 1974). One locality is located within a nature preserve managed by the Westcave Preserve (Star Route 1A, Box 30C, Dripping Springs, TX 78620). (6)

*Triodopsis divesta* (Gould) occurs in Arkansas, Louisiana, Oklahoma, Kansas, Missouri and extreme eastern Texas. The only wild Texas population currently known occurs in Caddo Lake State Park, Harrison Co. (Pratt

1971b). Anthropogenic populations are known from several urban residential areas. (1)

*Ashmunella kochii amblya* Pilsbry is known only from the Guadalupe Mountains, Culberson Co. Fullington (1979a) suggests that *amblya* should be synonymized with nominate *kochii* which is found only in the southern San Andreas Mountains, New Mexico. Metcalf and Smartt (1977:861) elevated *amblya* to specific status. (4)

*Ashmunella bequaerti* Clench & Miller is the easternmost *Ashmunella* in Texas, being known only from Goat Cave Canyon of Black Mountain in the Davis Mountains, Jeff Davis Co. (5)

*Ashmunella mudgei* Cheatum is known only from the southern slope of Sawtooth Mountain of the Davis Mountains, Jeff Davis Co. (5)

*Ashmunella pasonis* (Drake) is restricted to the Franklin Mountains, El Paso Co., Texas, and the San Andrea Mountains, Dona Ana Co., New Mexico (Metcalf & Smartt 1977), where it is found in limestone and rhyolite talus. (5)

*Ashmunella sprouli* Fullington & Fullington was recently described (Fullington & Fullington 1978) from the R. E. Sproul Ranch in the Davis Mountains, Jeff Davis Co. This highly localized colony exists in an igneous talus slope above No. 10 Spring in Hell's Canyon. (5)

*Sonorella metcalfi* Miller is known only from the Franklin Mountains, El Paso Co., Texas, and the southernmost part of the Organ Mountains of New Mexico. (5)

*Humboldtiana agavophila* Pratt has been found only in an oak-juniper woodland around the edge of Laguna Meadow on Boquillas Limestone in Big Bend National Park, Brewster Co. Living snails were originally found only under dead clumps of *Agave havardi* (Pratt 1971c). (5)

*Humboldtiana chisosensis* Pilsbry is known from the Chisos Mountains, Big Bend National Park, Brewster Co., in xeric rockslides along the lower margin of the evergreen woodland (Pratt in litt.). (5)

*Humboldtiana ferrisiana* Pilsbry is known from Miter Peak, Davis Mountains, Jeff Davis Co. (5)

*Humboldtiana fullingtoni* Cheatum is known only from the type locality at the southern end of the Sierra Vieja Mountains, Presidio Co. (5)

*Humboldtiana hogeana praesidii* Pilsbry is known only from the type locality at the Chinaman's Tunnel, Presidio Co. (5)

### Freshwater Gastropods

*Pomacea (Ampullaria) paludosa* (Say) has been known from Florida and Georgia (Emerson & Jacobson 1976:292). Fullington (1978) has recently reported records from Matagorda, Harris and Cameron cos.; however, no recent

records are known. (S2, SE7)

*Tryonia cheatumi* (Pilsbry) was formerly abundant (Cheatum 1935) in Phantom Lake, Jeff Davis Co. Channelization and withdrawal of ground water for irrigation (Brune, 1975) have reduced suitable habitat to a cave spring and a short distance of the spring run (Dundee & Dundee 1969). This species was proposed as Endangered by USFWS (*Federal Register* 41(83):17742, 28 April 1976, "Cheatum's Snail") but was never listed. (5)

*Cochliopina riograndensis* (Pilsbry & Ferriss) was originally described from fossil material (Pilsbry & Ferris 1906) but was later found living by Leonard & Ho (1960). Fullington (1978) reported colonies in Val Verde, Kinney, Uvalde and Zavala cos. (5, N7)

*Cochliopina texana* (Pilsbry) is known from the same habitat as but even more abundant than *T. cheatumi*. This species was proposed as Endangered by USFWS (*Federal Register* 41(83):17742, 28 April 1976, "Reeves County Snail") but was never listed. (5)

*Horatia micra* (Pilsbry & Ferriss) inhabits extensive portions of the aquifer systems of the Texas Hill Country. Living specimens are known from Real, Hays and Bexar cos.; shells have also been found in Travis and Kendall cos. Pratt (in litt.) reports a single fresh shell in drift of Independence Creek, Terrell Co. (6)

*Orygoceras* sp. An uncoiled gastropod known in North America previously from Pliocene deposits of Idaho and central Europe, *Orygoceras* has recently been discovered living in gravel at the base of Roaring Springs, Real Co. (Taylor 1974). J. R. Davis (pers. comm.) has recently found a fresh shell in Williamson Co. (6)

*Elimia comalensis* (Pilsbry) occurs in spring-fed streams of the Texas Hill Country and Lampasas Cut Plains. Invasion of its habitat by two introduced thiarid species, *Melanoides tuberculata* and *Tarebia granifera*, may have placed locally severe population recruitment constraints on *E. comalensis* due to competition (Murray 1970, 1971). Neck (1983) reported an enigmatic occurrence of this species in a shallow urban reservoir. (6)

*Physella virgata bottimeri* (Clench) was described from four shells from Comanche Spring, Fort Stockton, Pecos Co. (Clench, 1924), but is of uncertain taxonomic status. As Comanche Springs have not flowed since 1961 (Brune, 1975), *P. v. bottimeri* is now restricted to Diamond-Y (Willbank) Spring complex and adjacent portions of Leon Creek in Pecos Co. Surviving populations are susceptible to spills of oil and brine from oil well operations but retaining dikes have reduced this threat. This species was proposed as Threatened by USFWS (*Federal Register* 41(83):17743, 28 April 1976 "Diamond-Y Pond Snail") but was never listed. Taylor (1966) reported *Physella* shells from Cuatro Ciénegas, Coahuila, Mexico, which were immature but showed morphological similarities to *bottimeri*. (5)

*Promenetus exacuosus* (Say) occurs over much of the United States east of the Rocky Mountains. Pratt (1983) recently reported a living population in Tarrant Co. (NC2)

*Paludiscala* (?) sp. Living specimens of this aquifer-inhabiting species have been discovered from Verstracken Well, San Antonio, Bexar Co. (Fullington 1979b). Further taxonomic studies are needed to determine the relationship of Texas populations to *P. caramba* Taylor from Cuatro Cienegas, Coahuila, Mexico. (6)

## Freshwater Bivalves

*Fusconaia askewi* Marsh is known from the Sabine, Neches, Trinity and San Jacinto river systems. This species is locally common, but its status over its geographical range is not yet clear. (1, E2)

*Fusconaia lananensis* (Frierson) was suggested by Athearn (1970) as rare and/or endangered. Texas populations occur as far west as the San Jacinto River. (1, E2)

*Pleurobema riddelli* Lea was included by Athearn (1970) as one of the endangered naiads of Texas. Its Texas range occurs as far west as the San Jacinto River. Strecker (1931:29) expressed concern for populations in the Trinity River due to water pollution. (1, E2)

*Quadrula couchiana* (Lea) is endemic to the Rio Grande drainage. To this point in time, only fossil specimens are known from Texas (Metcalf 1982). Taylor has reportedly found living specimens in the Rio Conchos, Chihuahua, in the Rio Grande basin (Metcalf, pers. comm.). (5, 6)

*Quadrula quadrula* (Rafinesque) is a well-known, widespread species occurring throughout the Mississippi drainage in addition to the Great Lakes, Red River (of the north) and various Gulf drainages. If the typical representatives of the *quadrula* group in Texas are referred to *Quadrula apiculata* (Say), true *Q. quadrula* is rare in Texas. Roback *et. al.* (1980) reported *Q. quadrula* from the Neches River and its tributary, Village Creek, from the Big Thicket area. Investigation of clam valves from an archeological site upstream on the Neches revealed several valves of *Q. quadrula* (Neck, unpub.) from a 500-year old Caddoan site. (1)

*Sphenonaias mitchelli* (Simpson) was listed by Stansbery (1971) as "rare and endangered." Records include several river systems in central Texas, but the relationship of this form to several other taxa is unclear. (6)

*Popenaias popei* (Lea) occurs in the Rio Grande drainage from the Pecos River to the Falcon Breaks. Populations in the New Mexico portion of the Rio Grande may be extinct, although Metcalf (1982) has found fresh looking shells in the Black River, Eddy Co., New Mexico. Murray (1975) reported that a population at Fort Clark Springs, Las Moras Creek, near Brackettville, Kinney Co. has disappeared due to removal of aquatic vegetation. Bereza (pers. comm.) found localized concentrations of living specimens in the Devil's River (Val Verde Co.). Strecker (1931:17) reported that *P. popei* "seems to be rather scarce," and was listed by Stansbery (1971) as "rare and endangered." (6, 7)

*Lasmsgona complanata* Barnes is known from the St. Lawrence and Mississippi drainages south to Arkansas and Oklahoma. Texas records are restricted

to Lake Texoma (White & White 1977) and Lake Lewisville (Neck 1982b). (N2)

*Disconaias salinasensis* (Simpson) is known from the Rio Grande system and southward into Mexico. Metcalf (in litt.) collected live specimens in 1972 in the Rio Grande near Del Rio. (SW6, W & SW7)

*Lampsilis satura* Lea is found in the Sabine/Neches River drainage of Texas and Louisiana in addition to the Trinity and San Jacinto river systems. (1, E2)

*Lampsilis streckeri* Frierson in Texas is reported only from Onion Creek (Travis Co.) and Salado Creek (Bell Co.). Athearn (1970) expressed concern about the future survival of this species. Texas records of this species must be considered unverified. Bergman (in litt.) found a large *L. bracteata* (Gould) in Onion Creek which "could fit the description of *streckeri*." (6)

*Potamilus amphichaenus* Frierson appears to occur (in Texas) only in the Sabine River drainage, although unverified reports of this taxon include the Brazos River. (1, 2)

*Truncilla cognata* (Lea) is endemic to the Rio Grande drainage. Taylor (in litt.) believes this species is "one of the few mussels listed that is actually endangered." (SW6, W & SW7)

*Truncilla donaciformis* (Lea) is found in a large portion of the Mississippi River drainage of the eastern United States. Concern has been expressed for populations in eastern Texas. Valentine and Stansbery (1971) reported this species as abundant in a feeder creek on the Oklahoma side of Lake Texoma. (1, 2)

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