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## A Guide to Missouri's Freshwater Mussels

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A GUIDE TO MISSOURI'S

# FRESHWATER MUSSELS



MISSOURI DEPARTMENT OF CONSERVATION



A GUIDE TO MISSOURI'S  
**FRESHWATER  
MUSSELS**

by

**Stephen E. McMurray & J. Scott Faiman**  
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Design by Marci Porter, Missouri Department of Conservation



*Serving nature and you®*



Front cover: The plain pocketbook (*Lampsilis cardium*), page 36, is part of Missouri's ecologically important but seldom seen freshwater mussel fauna.



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Elephantear (*Elliptio crassidens*), page 64, is one of Missouri's state endangered species.

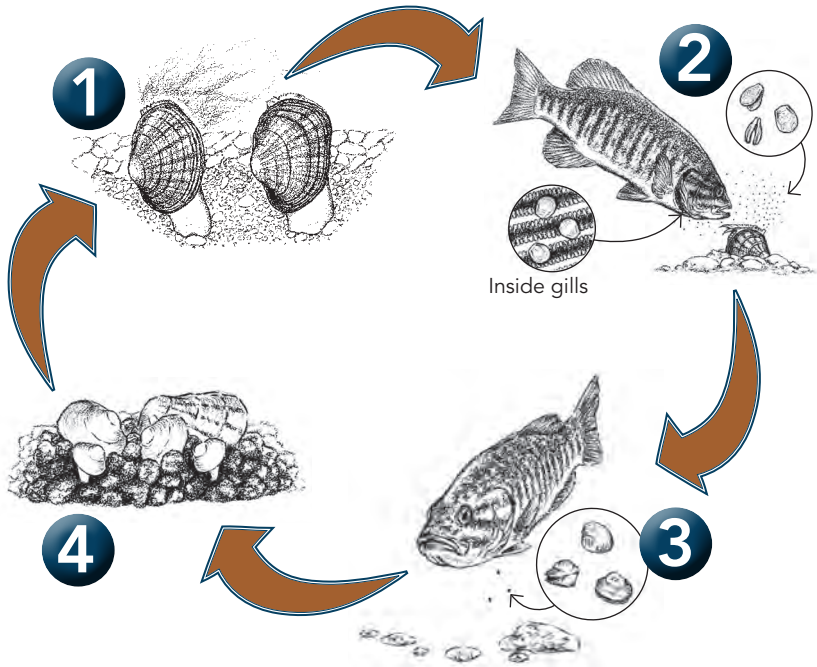
# INTRODUCTION

## Importance of Mussels

The diversity of freshwater mussels found in Missouri is an extraordinary component of our natural heritage. Living mussels are secretive and seldom seen, but the array of lustrous, ornate, and textured shells that they leave behind provides us with a familiar and appealing presence in our rivers. We are only beginning to discover the biology of mussels and the remarkable behaviors surrounding their interesting life cycle. Mussels provide vital functions in aquatic ecosystems. They are an important food source for a variety of animals including fish, small mammals, and some birds. They filter algae, bacteria, and other particles from the water, improving water quality and cycling nutrients and energy in streams and lakes. Because mussels are sensitive to habitat disturbance and pollution, they are good indicators of the overall health of aquatic ecosystems and water quality. The shells of mussels were an important resource historically for button manufacture, and some species are still commercially important in the cultured pearl and jewelry industries.

## Mussel Reproduction

The freshwater mussel life-cycle is unique. Males release sperm, which are filtered from the water by females. The fertilized eggs are brooded in the female's gills, and develop there into tiny larvae called glochidia. The glochidia are parasitic and must attach to the gills, fins, or skin of their host, usually a fish, to complete their development. Some mussel species can use a variety of species as host while others can only develop on just a single host species. The ways in which mussels attract the fish host and deliver their larvae are varied and fascinating. Some species including members of the genus *Lampsilis* and its relatives display lures that resemble small fish or crayfish to attract bass or walleye, which strike at the lure and inhale the larval mussels. Other mussels release packages of unfertilized eggs and glochidia called conglutinates, which resemble prey items like insects that rupture when the fish attempts to eat them, releasing the glochidia. Glochidia are not harmful to the hosts, and remain on the host for only a few days or weeks before dropping off and continuing their development into adult mussels.



- 1** Males release sperm into water. Females filter the sperm into their gill chambers where the eggs are fertilized, subsequently developing into tiny larvae called glochidia.
- 2** Glochidia lack internal organs and must attach to the gills or fins of a specific host to develop. Some mussels must trick the host into biting or inhaling the glochidia, using lures resembling small fish, insects or other prey items of the host.
- 3** When developed, juvenile mussels separate from the host and drop to the stream bottom. Although parasitic, glochidia usually do not harm their host.
- 4** If the juvenile mussels drop into good habitat their chances for survival are much greater, enabling them to reach adulthood and reproduce.

## Habitat in General

Mussels can potentially be found in any permanent body of water in Missouri. A few species can be found in ponds, lakes, and reservoirs. However, most species require flowing water, and live only in streams and rivers. Mussel diversity and abundance increases downstream, as the river is joined by tributaries and increases in size. Adult mussels live partly buried in the substrate. Although some species actively burrow and crawl, others may remain in one spot for decades. Most river-dwelling mussels have fairly similar habitat requirements, and as many as 20 or more species can be found living together in favorable areas, called mussel beds. Mussel beds form in the most stable areas in streams, where the substrate is usually a firm mixture of cobble, gravel, sand, and silt. Stable areas are solid underfoot, and deep enough to be submerged even during drought. Unstable areas of stream bed generally have few mussels because the loose gravel and sand move during floods, displacing or burying the mussels.

## Diversity and Conservation Status

Approximately 69 species of native mussels have been found in Missouri. The exact number is in doubt, because discoveries are still being made and the classification of freshwater mussels is in a state of flux. Different species are found in different river systems, and Missouri's mussel fauna is diverse because several major river systems with distinctive faunas are present. Some species have narrow ranges, and are restricted to a few rivers (and some to just a few locations). Other species are widespread and may be encountered throughout the state. Mussels reach their highest diversity in Missouri in streams that drain the Ozark Uplifts, including the Meramec, Gasconade, Osage, Spring, White, Black, and St. Francis rivers. Nearly 42 percent (29 species) of the mussel species in Missouri are considered to be Species of Conservation Concern. Of these, 14 are considered to be in danger of extirpation in Missouri or of extinction throughout their range. For several endangered species, Missouri rivers are home to some of the last remaining populations of these rare animals.

## Reasons for Decline

Freshwater mussels are sensitive to water quality degradation and alteration of physical habitat. The construction of dams to form reservoirs has been a major factor in the nation-wide decline of native mussels. Reservoirs eliminate long stretches of flowing water that are vital for the survival of most mussel species. Downstream of dams, flow,

temperature, water chemistry, and fish host populations are altered. Dredging, channelization, gravel mining, and removal of streamside trees can destabilize streams for decades, seriously impacting mussel recruitment. Sediments entering streams from cleared land can bury mussels. Mussels are also sensitive to many types of pollution including heavy metals, ammonia, and pesticides. Invasive fish such as Asian carp can displace native fish hosts, and the invasive zebra mussel and Asian clams compete with native mussels for food and space. The conservation of native mussels in the future will depend upon good stewardship of watersheds that will benefit all aquatic life.

## Invasive Bivalves

Three invasive bivalves, the Asian clam (*Corbicula fluminea*) and the zebra and quagga mussels (*Dreissena polymorpha* and *D. bugensis*), have contributed to the decline of native mussel populations. These invasive species do not have the complex life cycle of native mussels and are more closely related to the native pea clams. The Asian clam was first discovered in the United States in the late 1930s. It quickly spread across the continent and is now nearly ubiquitous, where it occupies both rivers and lakes, and can reach densities up to 10,000 per square meter. It is believed to compete with native mussels for food and space, and large die-offs of Asian clam can poison native mussels by increasing ammonia levels.

The introduction of the *Dreissena* species to North America in the 1980s resulted from ocean-crossing vessels from Europe that discharged freshwater ballast containing the free-swimming microscopic larvae. The larvae are continually spread into new areas by humans as well as by drifting downstream. Adult *Dreissena* attach themselves to virtually any hard surface, including boat hulls, outboards, gear, and even aquatic vegetation, and can be easily transported when boats, gear and water are moved from place to place. At the time of this writing, zebra mussels are present in several Missouri reservoirs including Lake of the Ozarks, Bull Shoals Lake, Lake Taneycomo, Lake Lotawana, and Smithville Lake, and several rivers including the Osage River below Bagnell Dam, Missouri River, Mississippi River, and the lower Meramec River. Zebra and quagga mussels starve and suffocate native mussels by attaching to their shells and the surrounding habitat in large numbers. The spread of these prolific species has caused severe declines of native freshwater mussel species in many areas. The spread of zebra mussels can be thwarted by remembering to *Clean, Drain, and Dry* boats and other gear that is used in the water, and by disposing of unused bait in the trash.



## Collecting and the Wildlife Code

In Missouri it is legal to collect most mussel species with a Resident or Nonresident Fishing Permit. There is a daily limit of five live or dead mussels, with two shell halves counting as one animal. Asian clams may be taken and possessed in any number. Zebra mussels and quagga mussels are Prohibited Species in Missouri and may not be collected or possessed. Mussels may be collected year round, by hand, hand net, or pole and line, and can be used as bait. Written permission from the Director of the Conservation Department is required to collect Missouri Endangered Species and Species of Conservation Concern, so don't collect animals unless you are sure of their identification. A Wildlife Collector's Permit is required to collect or possess mussels for scientific or educational purposes. Other restrictions may apply in certain areas of the state. For Missouri Department of Conservation areas, *always check* the Area Regulations before doing any collecting. Other agencies and organizations including The Nature Conservancy, U.S. Forest Service and National Park Service also regulate collecting on their lands. Finally, remember that much of the land in Missouri is privately owned. Always ask for permission before entering private property.

## Observing Mussels

Dead shells can be found by walking banks during low water periods. Live animals can be located by snorkeling, using water scopes, wading or hand-groping in shallow water, and SCUBA or surface-supplied air in deeper waters (appropriate safety certifications are required). For your activity to have the most value, carry a camera and a field journal to take notes on the exact location, the habitats and species present, the condition of the animals (live or dead shells), and sketch maps to show locations and indicate stream conditions. Good digital photographs can be nearly as useful as shells for documenting your finds and they are much easier to store and share. Records of rare species, mussel die-offs, or new localities for native or invasive species are of interest to the professional community and should be reported. Finally, return all live animals to the stream as close to where they were found as possible. To return a mussel to the stream, make sure that the hinge where the two halves of the shell are joined is pointing up.

## Reporting Discoveries

If you think that you have discovered something significant about mussels, such as a very diverse mussel bed, a native or invasive species outside its known range, a rare species, or a recent die-off of mussels (many dead animals with tissue still in the shells), please report it. To document species identification, please do the following:

1. If the mussel is live, take numerous high quality photos (in the shade if possible) of both sides of the animal. Close-ups of the umbos ("beaks") can be very useful if they are not worn away.
2. Return live animals to the river near their original location. You can partly embed the mussel, hinge side up, or lay it flat on the substrate.
3. Up to five dead shells can be collected (see Collecting and the *Wildlife Code*). Place them in a labeled bag with river name, nearest bridge crossing, or other available location information (i.e. Township, Range, Section or GPS coordinates), collector(s) name, date, and suspected species name.
4. Take wide angle photos of the immediate vicinity to help indicate where the mussel was collected.
5. Sketch a map of the river location, indicating where the specimen was located and, or returned, where photos were taken, and any other unique features to help identify the site in the near future. Include your put-in and take-out locations and landowner contact information if permission was granted.
6. Report your findings to your nearest MDC Regional Office.

# INTRODUCTION TO SPECIES ACCOUNTS

Species accounts are arranged by family, by tribe, and then alphabetically by species. Each account includes the species status in Missouri, the most distinguishing shell characteristics (including those used to separate similar looking species), Missouri distribution, habitat, and finally similar species for comparison. The scientific and common names in this guide generally follow Turgeon *et al.* (1998), except where accepted taxonomic changes have occurred.

## Status Definitions

**Federal Endangered** indicates species that are recognized by the U.S. Fish and Wildlife Service to be in danger of extinction throughout all or a significant portion of their range.

**Federal Candidate** species are animals that are being evaluated for possible addition to the list of endangered or threatened species.

**Species of Conservation Concern** are species that are considered to be Critically Imperiled (S1), Imperiled (S2), or Vulnerable (S3) in Missouri.

**State Endangered** species are those animals listed in Rule 3 CSR 10-4.111 of the *Wildlife Code of Missouri* as endangered in Missouri.

**Common** species are those that can be encountered with relative ease in the proper habitat and may be widespread in the state.

**Common, but restricted** indicates those species that are common, but are restricted to a particular part of the state or river drainage.

**Undetermined** species are those that are known to occur in Missouri, but there isn't enough information available to determine their status.

**Unknown** indicates species that have been reported in Missouri, but we are uncertain of their occurrence.

**Invasive** species are those that are not native to Missouri.

*Keep in mind that the status of species may change. You should stay current with the status of Missouri's mussel species before collecting any animals.*

## Shell Characteristics

The shell characteristics listed for each species are those that can be used to identify and separate them from other, similar species. Refer to the shell shape image, shell characteristics image and glossary for unfamiliar terms. Keep in mind that freshwater mussels are highly variable in size and shape, and even experts can have difficulty identifying some individuals to species. The images included in this field guide are representative of the species in Missouri, but don't expect any individual to match the pictures exactly. Learning to identify mussels requires looking at a large number of individuals to learn the range of variation within each species. One of the most important variables is age. Like people, mussels change shape as they get old. A very useful trick is to look at the early growth lines of old shells. In that way you can see what the shape of the shell was when it was younger.



Rhomboidal



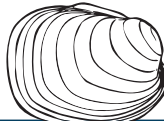
Round



Oval



Oval



Quadrat



Elliptical



Triangular

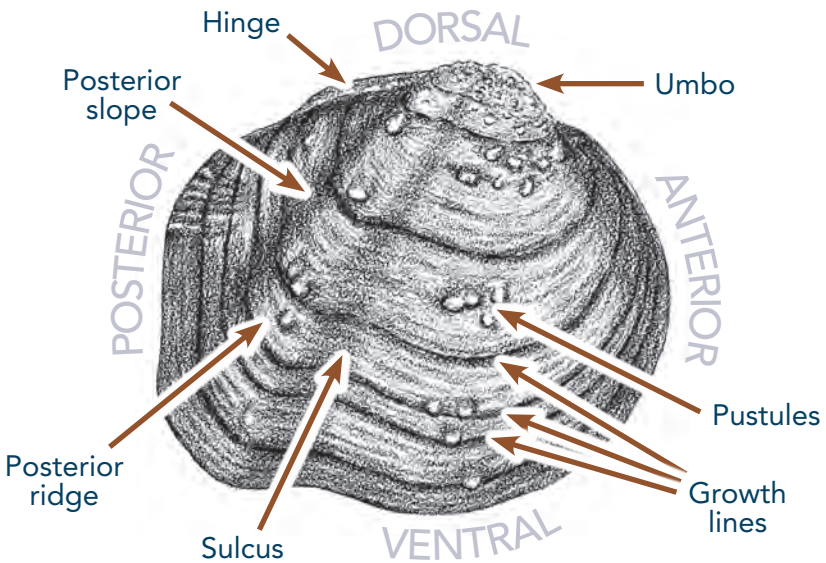
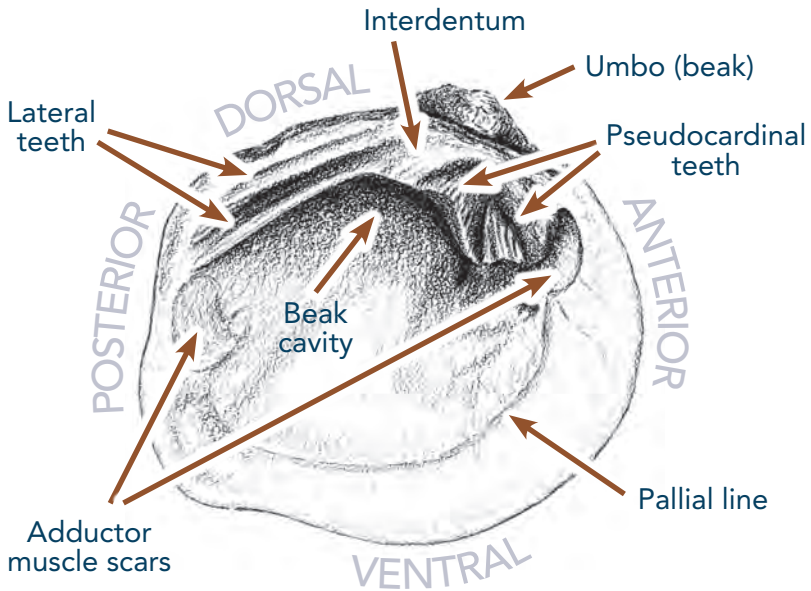


Concave Posterior Ridge



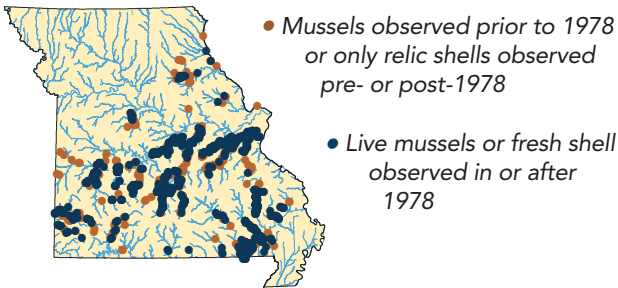
Convex Posterior Ridge

## Mussel Shell Anatomy



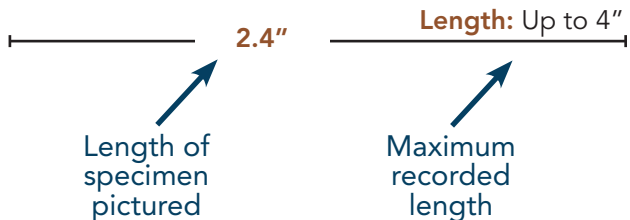
## Distribution Maps

The distribution map included with each species account is based on known occurrences at the time of publication, but our knowledge is incomplete. You might very well find a new location for some of our mussel species! The maps are only intended to show the distribution of each species in Missouri and should not be used to infer conservation status. Some species are rarely encountered, and even though there might be several dots on the map it might literally take experienced collectors an entire day to even find an old shell. Two symbols are used in the maps: orange circles are used to indicate where specimens were collected before 1978 or where only relic shell material was collected; blue circles are used to indicate records from 1978 to present.



## Length Measurements

The scale bar included with each account shows the length of the actual specimen pictured. Also included is the maximum recorded size for each species.





# SPECIES ACCOUNTS

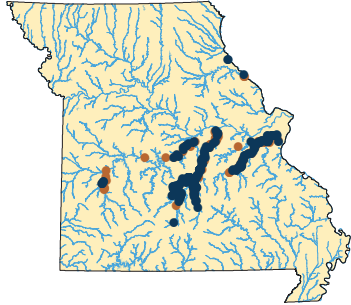


# Spectaclecase

*Cumberlandia monodonta* (Say, 1829)

**Status:** Federal Endangered  
Species of Conservation Concern

**Shell characteristics:** Shell thin to moderately thick; elongate and compressed, often arched in shape; smooth. Posterior ridge rounded, long; shell turned down posteriorly. Pseudocardinal teeth poorly developed, conical, lateral teeth nearly absent; no beak cavity. Periostracum black or brown, often peeling; rays absent. Nacre bluish-white to white.



**Habitat:** Large rivers, in association with boulders or under large, flat rocks, and bluff pool habitats. The Meramec and Gasconade rivers may have the largest populations of spectaclecase in the United States.

**Similar species:** spike, black sandshell



5.7" Length: Up to 10"

# Elktoe

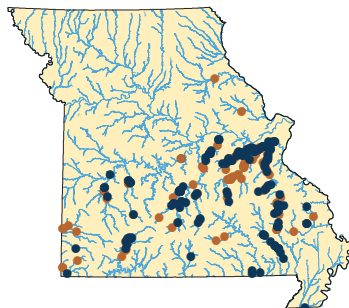
*Alasmidonta marginata* Say, 1818

**Status:** Species of Conservation Concern

**Shell characteristics:** Shell thin; nearly rhomboidal to elongated, truncated posteriorly, inflated; umbos located more posterior than most mussels and elevated above the hinge line, beak sculpture of 3–4 strong, rhomboidal, wavelike, concentric ridges. Posterior slope broad and flat, sculptured with low, oblique ribs, with a sharp posterior ridge. Lateral teeth absent, small pseudocardinals. Periostracum yellowish to light brownish, with greenish tinge; numerous fine to wide zigzag blue-green rays, usually speckled with small dark flecks. Nacre white or iridescent.

**Habitat:** Usually found in gravel or gravel-sand substrates

**Similar species:** snuffbox, slippershell mussel, deertoe



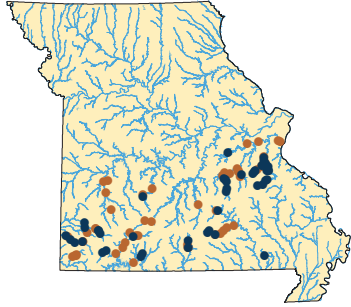
2.4" Length: Up to 4"

# Slippershell mussel

*Alasmodonta viridis* (Rafinesque, 1820)

**Status:** Species of Conservation Concern

**Shell characteristics:** Shell moderately thick; rectangular to nearly trapezoidal; often inflated, with a high posterior ridge; smooth; beak sculpture composed of several heavy, concentric loops. Posterior slope abrupt, smooth. Lateral teeth absent, the pseudocardinal teeth triangular and distinct. Periostracum often a semi-metallic silvery-gray or yellowish with numerous green or brownish wavy rays. Nacre silvery white to iridescent.



**Habitat:** Found in small streams in sand, mud, or fine gravel

**Similar species:** elktoe



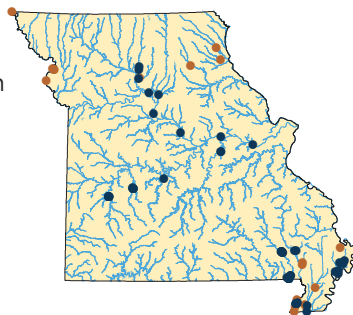
1.5" Length: Up to 2"

# Flat floater

*Anodonta suborbiculata* Say, 1831

**Status:** Species of Conservation Concern

**Shell characteristics:** Shell thin, fragile; round, nearly circular; smooth; compressed with a low dorsal keel; hinge line straight. Posterior ridge indistinct. Teeth absent. Periostacum yellow, tan, and green with very faint color rays, especially in young. Nacre white to pinkish, iridescent.



**Habitat:** Can be locally abundant, especially in oxbow lakes and backwaters of large rivers

**Similar species:** giant floater, paper pondshell



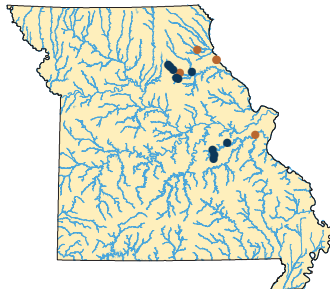
3.8" Length: Up to 12"

# Cylindrical papershell

*Anodontoides ferussacianus* (Lea, 1834)

**Status:** Species of Conservation Concern

**Shell characteristics:** Shell thin, fragile; elliptical, usually with a straight dorsal margin; smooth; beaks slightly inflated with 2–3 curved, inconspicuous concentric ridges. Posterior ridge indistinct. Both pseudocardinal and lateral teeth absent; beak cavity absent. Periostracum light green to yellowish-brown, green rays present in younger shells. Nacre silvery to bluish-white.



**Habitat:** Can be found in small streams in mud or sand

**Similar species:** creeper, paper pondshell, giant floater



2.4"

**Length:** Up to 4"



# Rock pocketbook

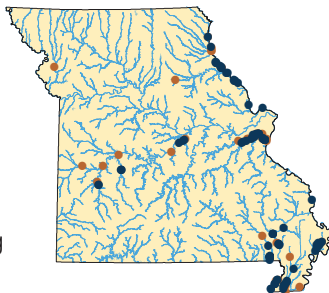
*Arcidens confragosus* (Say, 1829)

**Status:** Species of Conservation Concern

**Shell characteristics:** Shell thin to moderately solid; nearly quadrate to rhomboidal; inflated; beak sculpturing of two prominent rows of tubercles extending across umbo. Irregular folds or ridges on posterior third of shell. Posterior ridge indistinct. Pseudocardinals sharp, distinct, lateral teeth absent except for a single flange extending halfway along hinge line. Periostracum greenish to black, no rays. Nacre blue-white.

**Habitat:** Medium to large rivers in mud in slow current

**Similar species:** threeridge, washboard



3.9" Length: Up to 6"

# White heelsplitter

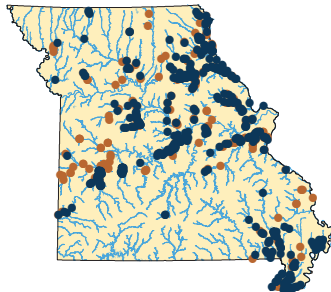
*Lasmigona complanata complanata*  
(Barnes, 1823)

**Status:** Common

**Shell characteristics:** Shell thin to thick, sturdy; nearly quadrate to rounded; laterally compressed, with a pronounced wing; umbos flat, beak sculpture of heavy W-shaped ridges. Often has flutings on the wing, otherwise shell smooth. Posterior ridge indistinct. Pseudocardinals moderate to weak, laterals poorly developed. Dark periostracum, rayless. Nacre white.

**Habitat:** Found in medium to large rivers with mud or mud-gravel substrates

**Similar species:** pink heelsplitter, fragile papershell, pink papershell



4.5"

Length: Up to 10"

# Flutedshell

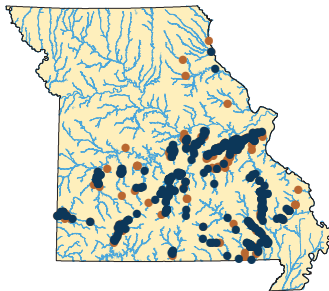
*Lasmigona costata* (Rafinesque, 1820)

**Status:** Common, but restricted

**Shell characteristics:** Shell thin to moderately thick; nearly rhomboidal, compressed; beak sculpture of 3–4 coarse ridges, slightly notched in the middle. Posterior ridge indistinct; distinct flutings on posterior ridge in most populations. Pseudocardinals weak to moderate, laterals poorly developed. Periostracum yellowish-brown to black, sometimes with green rays. Nacre white.

**Habitat:** Found in medium-sized rivers in moderate current, prefers gravel substrates

**Similar species:** creeper



3.2" Length: Up to 6"

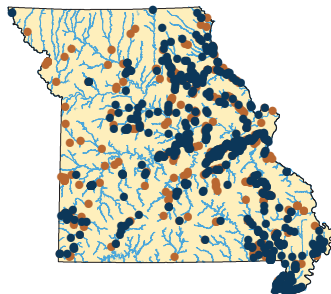


# Giant floater

*Pyganodon grandis* (Say, 1829)

**Status:** Common

**Shell characteristics:** Shell thin, fragile; nearly oval; smooth; umbos broad, moderately inflated. Posterior ridge indistinct. Teeth absent. Periostracum rayless and usually brown, but can be yellow or green. Nacre iridescent or salmon to white.



**Habitat:** Prefers slack water habitats, with mud or gravel bottoms; can be found in lakes or ponds

**Similar species:** creeper, cylindrical papershell, flat floater, pondhorn



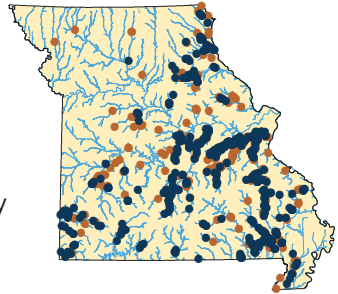
4.5" Length: Up to 12"

# Creeper

***Strophitus undulatus*** (Say, 1817)

**Status:** Common

**Shell characteristics:** Shell thin, strong; quadrate to elliptical, compressed to moderately inflated; smooth; beaks slightly elevated above the hinge line and located near the middle of the shell, sculpture of 2–3 coarse ridges. Anterior end rounded, posterior end bluntly pointed. Posterior ridge indistinct. Lateral teeth absent, pseudocardinals poorly developed. Lateral-pseudocardinal teeth form a distinctive waved outline. Periostracum green with rays in juveniles, becoming chestnut, dark brown, or black in older individuals, shiny. Nacre iridescent, salmon to milky white in umbo.



**Habitat:** Found in small to large streams, preferring gravel or gravel-mud substrates

**Similar species:** cylindrical papershell, giant floater, paper pondshell



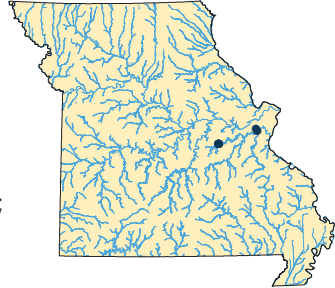
2.7" Length: Up to 4"

# Salamander mussel

*Simpsonaias ambigua* (Say, 1825)

**Status:** Species of Conservation Concern

**Shell characteristics:** Shell thin; elliptical to oblong, with parallel dorsal and ventral margins, moderately compressed; smooth; beak sculpture of several thin ridges forming an upside down "V." Posterior ridge indistinct. Lateral teeth absent, pseudocardinals very reduced. Periostracum brownish and rayless. Nacre dull whitish-purplish, salmon in beak cavity.



**Habitat:** Found under large, flat rocks, often in fine mud; has also been reported living inside of dead shells of larger species

**Similar species:** cylindrical papershell, spectaclecase, pondhorn



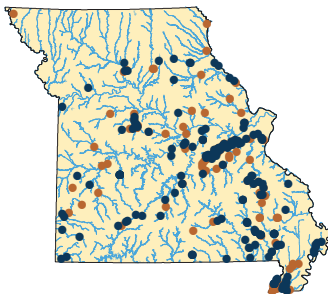
1.3" Length: Up to 2"

# Paper pondshell

*Utterbackia imbecillis* (Say, 1829)

**Status:** Common

**Shell characteristics:** Shell thin, fragile; nearly elliptical, inflated; hinge line nearly straight; smooth; umbos flattened and do not rise above the hinge line, sculptured with flat double loops. Posterior ridge indistinct. Lateral and pseudocardinal teeth absent. Periostracum green or yellowish green, often with fine green rays. Nacre white to bluish.



**Habitat:** Prefers backwaters, sloughs, ponds, and oxbows

**Similar species:** cylindrical papershell, giant floater, scaleshell



2.2"

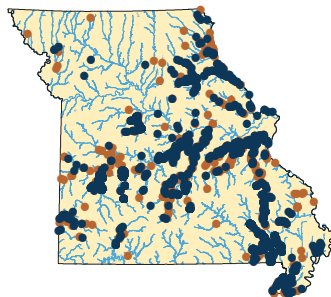
**Length:** Up to 4"

# Threeridge

*Amblema plicata* (Say, 1817)

**Status:** Common

**Shell characteristics:** Shell moderately thick, solid; quadrate to rounded, moderately inflated to inflated; beak sculpture of 2–3 curved concentric ridges. Posterior ridge present, shell with folds or undulations parallel to the posterior ridge, mainly posterior to umbo. Stout and heavy pseudocardinal and lateral teeth. Periostracum brownish to black. Nacre white, sometimes iridescent blue at posterior end ("bluepoint").



**Habitat:** Small to large rivers, lakes, in gravel, sand, or mud

**Similar species:** washboard, bankclimber, rock pocketbook



3.4"

**Length:** Up to 6"

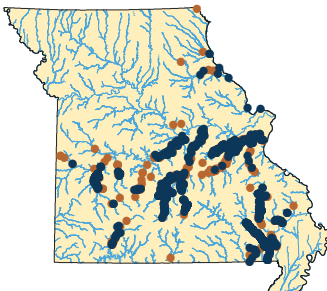


# Mucket

*Actinonaias ligamentina* (Lamarck, 1819)

**Status:** Common

**Shell characteristics:** Shell thick, moderately heavy to very heavy; oblong oval to quadrate, moderately inflated; umbos broad, only slightly elevated above the hinge line, sculpture of many fine concentric lines, often obscure. Posterior ridge broadly rounded, shell lacks any sculpturing except growth lines. Pseudocardinal teeth large, erect and somewhat triangular; lateral teeth short, downcurved, stout; relatively shallow beak cavity. Periostacum yellowish-brown, dark green rays are variable, may be broad and straight or thin, some are rayless. Nacre white, sometimes pinkish.



**Habitat:** Medium to large rivers in stable gravel

**Similar species:** pink mucket, plain pocketbook, sheepnose, fatmucket



3.7"

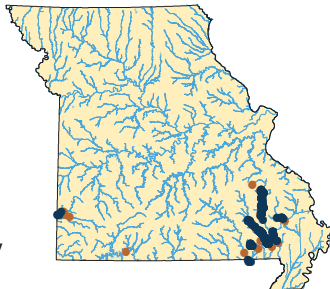
**Length:** Up to 7"

# Western fanshell

*Cyprogenia aberti* (Conrad, 1850)

**Status:** Species of Conservation Concern

**Shell characteristics:** Shell thick, strong; round to triangular, compressed to moderately inflated; umbos low, sculpture faint. Posterior ridge prominent and raised, shallow sulcus from umbo to middle of the ventral margin; shell with a wrinkled or rough appearance. Pseudocardinal teeth large, lateral teeth short and slightly curved; beak cavity moderately deep. Periostacum dull, tan, with distinctive ray pattern from bands of tiny pigment flecks. Nacre white.



**Habitat:** Small to medium streams in gravel

**Similar species:** pimpleback



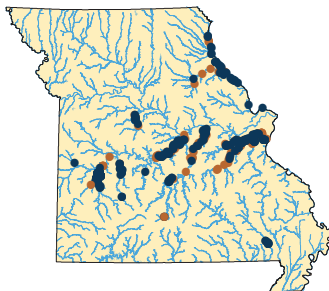
2.0" Length: Up to 3"

# Butterfly

*Ellipsaria lineolata* (Rafinesque, 1820)

**Status:** Common, but restricted

**Shell characteristics:** Shell stout, thick; triangular and compressed; umbos broad, flattened, pointed at the apex, directed forward, sculpture of multiple fine double-looped lines. Posterior ridge prominent and sharply angled; sexually dimorphic—females are smaller and more robust (thickened posteriorly) than males. Lateral and pseudocardinal teeth large and well defined; beak cavity shallow to moderately deep. Periostracum yellowish to brownish, becoming darker with age, with characteristic dark brown raying. Nacre white.



**Habitat:** Large rivers in stable gravel

**Similar species:** deertoe, mucket



3.0" Length: Up to 4"

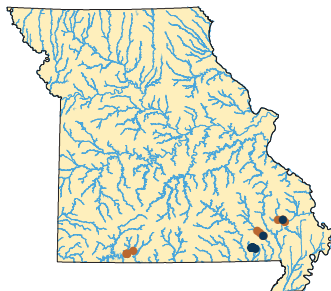


# Curtis pearlymussel

*Epioblasma florentina curtisii*

(Frierson and Utterback, 1916)

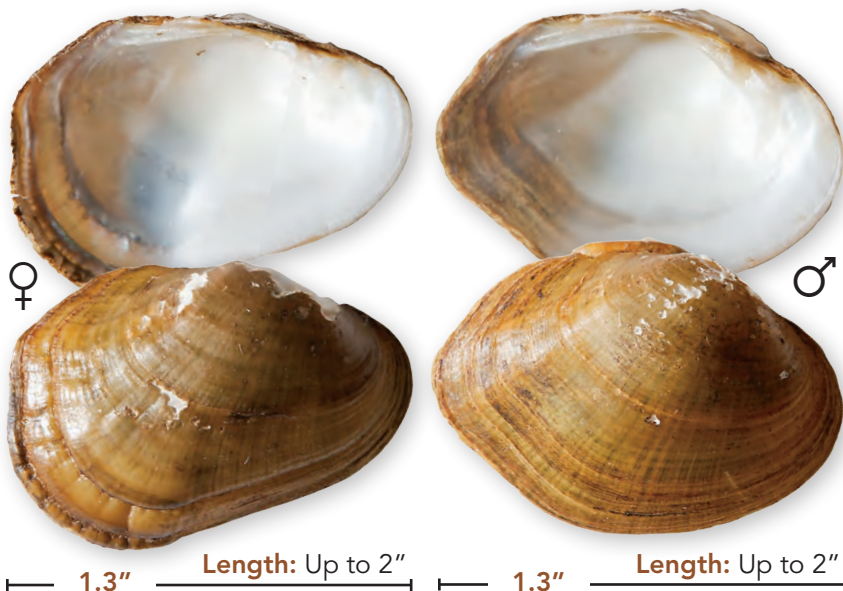
**Status:** Federal Endangered  
State Endangered  
Species of Conservation Concern



**Shell Characteristics:** Shell relatively thick, stout; oval to rhomboidal, inflated; umbos broad, raised slightly above the hinge line, sculpture unknown. Posterior ridge of male biangulate, of female broadly rounded; shell with prominent growth lines; sexually dimorphic—females with distinct marsupial swelling and more rhomboidal in outline. Pseudocardinal and lateral teeth well defined, beak cavity broad. Periostracum yellow-tan with green rays. Nacre white.

**Habitat:** Small Ozark streams in stable gravel

**Similar species:** snuffbox, ellipse

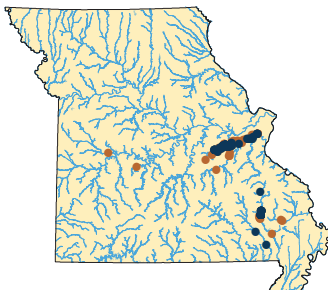


# Snuffbox

*Epioblasma triquetra* (Rafinesque, 1820)

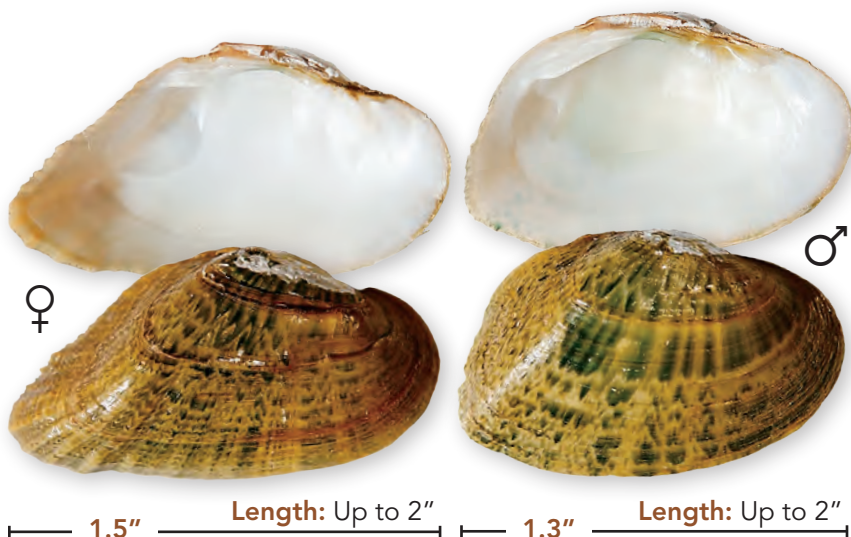
**Status:** Federal Endangered  
State Endangered  
Species of Conservation Concern

**Shell characteristics:** Shell thick and stout; oblong to oval, inflated; umbos broad, slightly raised, sculpture of faint, double-looped ridges. Posterior ridge strong, concave, with fine parallel “ribbing”; sexually dimorphic—females with the posterior part of the shell laterally expanded (looks almost “nose-like”); this expansion is finely ribbed, the ends of the ribs forming sharp teeth on the ventral margin. Pseudocardinal teeth elevated, thin, and rough; lateral teeth short and curved; beak cavity deep. Periostracum yellowish or greenish, with bold interrupted rays, occasionally forming chevron markings. Nacre pearly white.



**Habitat:** Medium to large rivers in gravel

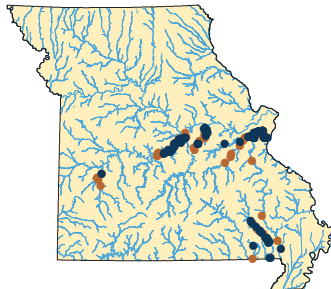
**Similar species:** elktoe, deertoe, fawnsfoot



# Pink mucket

*Lampsilis abrupta* (Say, 1831)

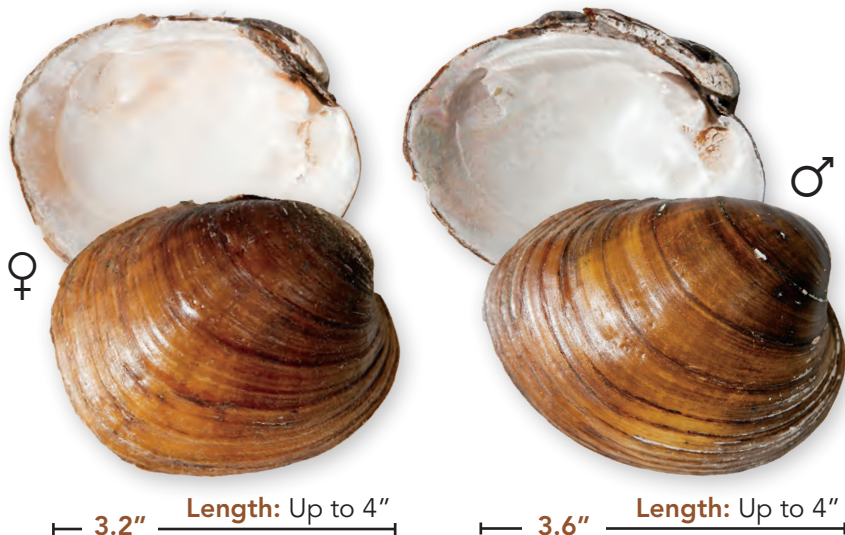
**Status:** Federal Endangered  
State Endangered  
Species of Conservation Concern



**Shell characteristics:** Shell thick, heavy, solid; slightly rounded to broadly elongate, rounded or blunt posterior end; beaks low, not raised above the hinge line, sculpture of 6–10 fine, wavy double-looped ridges. Posterior ridge indistinct, shell smooth; sexually dimorphic—females are square in shape, males are round. Pseudocardinal teeth stout, triangular, erect; lateral teeth long, curved, sharp; beak cavities deep. Periostracum yellowish brown to chestnut, sometimes with faint rays (juveniles or younger individuals). Nacre white, with pinkish or salmon beak cavity; sometimes all white.

**Habitat:** Medium to large rivers in gravel, sand, cobble

**Similar species:** mucket, plain pocketbook, Higgins eye

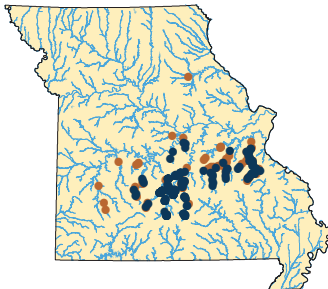


# Northern brokenray

*Lampsilis birttsi* (Simpson, 1900)

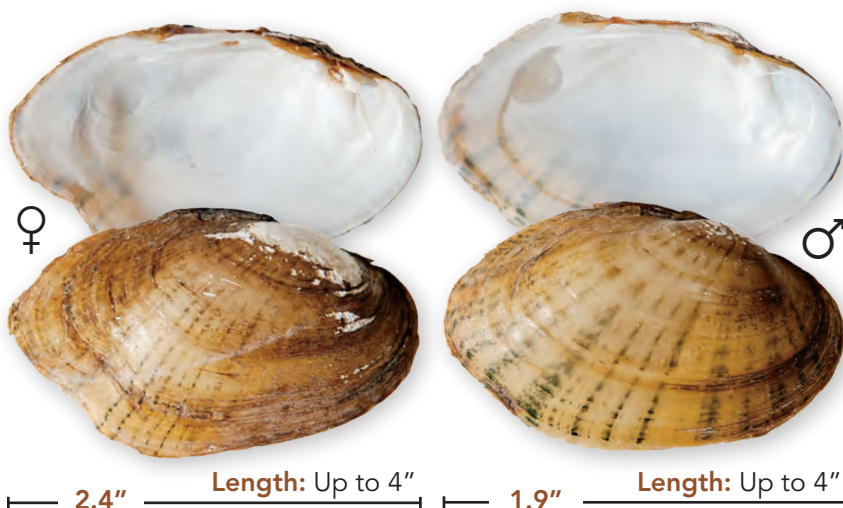
**Status:** Species of Conservation Concern

**Shell characteristics:** Shell thin but strong; elliptical to ovate or elongate, compressed to slightly inflated; umbos large, but only slightly raised above the hinge line, beak sculpture of inverted, V-shaped ridges. Posterior ridge indistinct; shell smooth; sexually dimorphic—females resemble a “catcher’s mitt” in outline with an indentation on the post-ventral margin. Pseudocardinal teeth distinct, lateral teeth short, slightly curved, taller posteriorly; beak cavity shallow. Periostracum light yellowish, becoming darker with age; green rays fine to broad, more dense posteriorly, appearing splotchy. Nacre white to bluish-white, iridescent posteriorly.



**Habitat:** Occurs in small streams and headwaters of medium rivers in gravel substrate; only occurs in streams that flow north off the Salem and Springfield plateaus.

**Similar species:** Arkansas brokenray, fatmucket

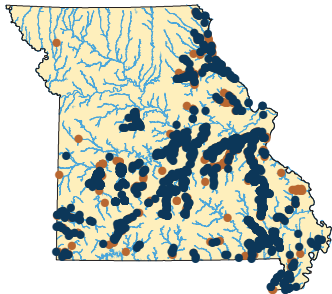


# Plain pocketbook

*Lampsilis cardium* Rafinesque, 1820

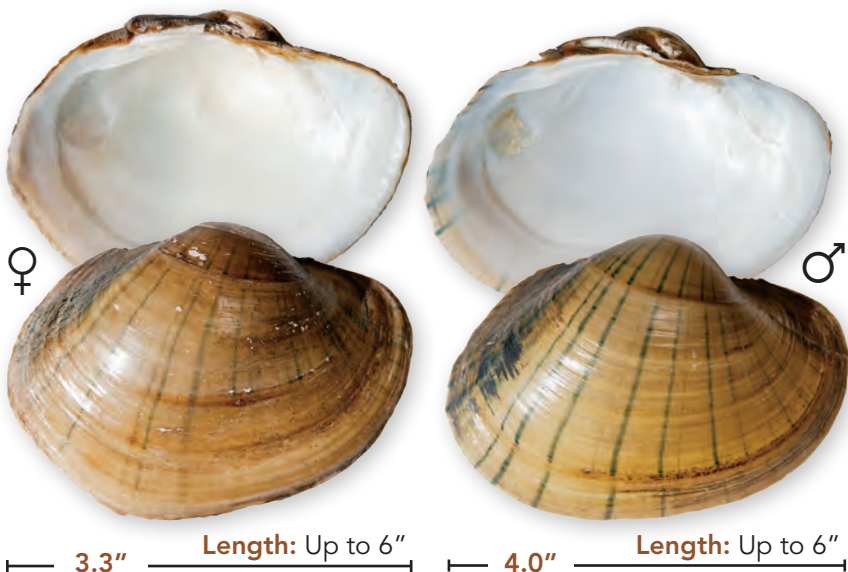
**Status:** Common

**Shell characteristics:** Shell moderately thick, stout; quadrate to oval or elliptical, moderately to very inflated; beaks broad, raised above the hinge line, sculpture of 2–3 coarse ridges. Posterior ridge indistinct and rounded; shell smooth; sexually dimorphic—posterior end sharp in males, broadly rounded in females. Pseudocardinal and lateral teeth distinct, solid; beak cavities broad and deep. Periostacum usually yellow, sometimes tan or brown, thin rays usually present. Nacre white, often pinkish in beak cavity.



**Habitat:** Small creeks to large rivers, in a variety of substrates

**Similar species:** mucket, pink mucket, bleufer, fat pocketbook, fatmucket

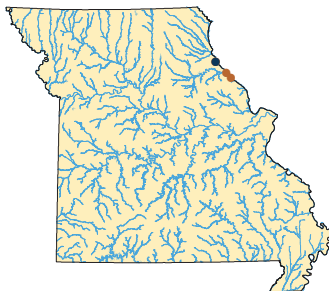




# Higgins eye

*Lampsilis higginsii* (Lea, 1857)

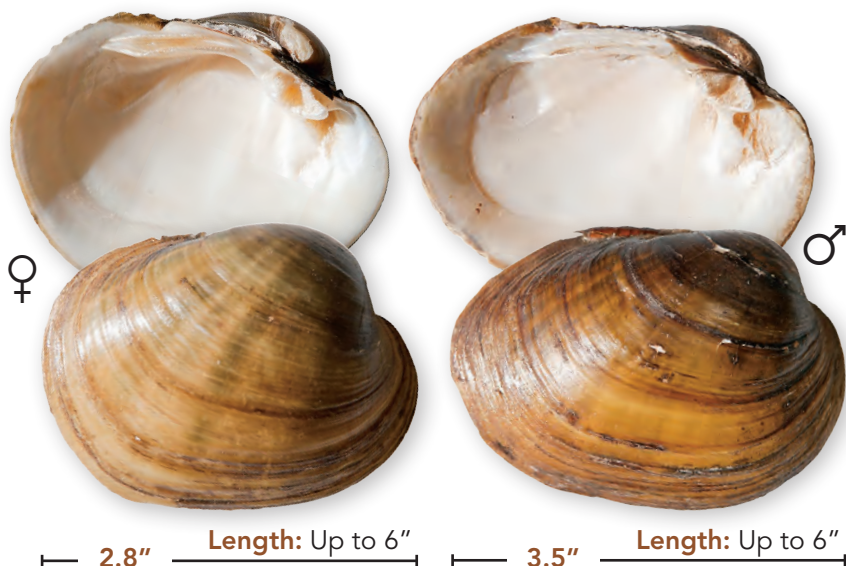
**Status:** Federal Endangered  
State Endangered  
Species of Conservation Concern



**Shell characteristics:** Shell thick, heavy; rounded to slightly elongate, moderately inflated; beaks broad, above the hinge line, directed forward, sculpture of fine double-looped lines. Posterior ridge indistinct, rounded; shell smooth; sexually dimorphic—females rounded and truncate, males oval. Large, triangular pseudocardinal teeth; lateral teeth long, heavy, straight; beak cavity deep. Periostracum yellowish-brown, with bold green rays. Nacre white, sometimes tinged with salmon or cream.

**Habitat:** Large rivers in gravel or sand; currently only known from the upper Mississippi River

**Similar species:** pink mucket, mucket, plain pocketbook

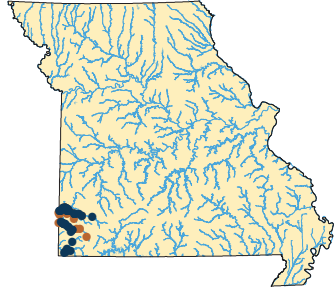


# Neosho mucket

*Lampsilis rafinesqueana* Frierson, 1927

**Status:** Federal Candidate  
Species of Conservation Concern

**Shell characteristics:** Shell relatively thin, strong; oblong to quadrate, compressed; beaks low, only slightly raised above the hinge line, sculpture of fine lines rounded up posteriorly. Posterior ridge broadly rounded to flattened, shell appearing biangulate; shell smooth. Pseudocardinal teeth stout, lateral teeth short and stout, downcurved; beak cavity relatively shallow. Periostracum yellow to tan; shell with interrupted broad green rays or chevrons. Nacre bluish white to white, slightly iridescent posteriorly.



**Habitat:** Small to medium streams in gravel or mixture of gravel and sand substrate; occurs exclusively in streams in the Neosho River system in southwest Missouri

**Similar species:** mucket, plain pocketbook, fatmucket



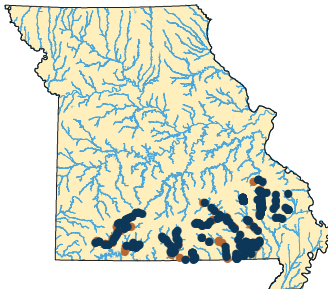
2.8" Length: Up to 5"

# Arkansas brokenray

*Lampsilis reeveiana* (Lea, 1852)

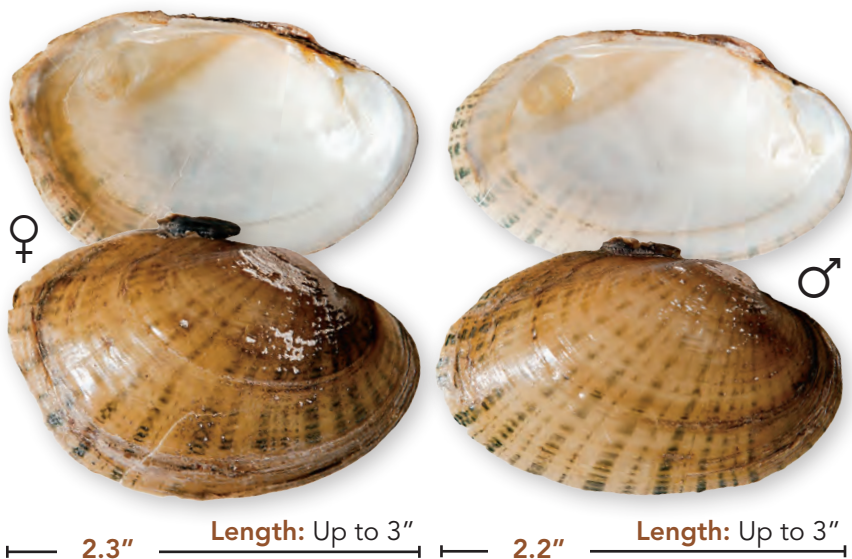
**Status:** Common, but restricted

**Shell characteristics:** Shell thin; elliptical to ovate, moderately inflated; umbos small, only slightly raised above the hinge line, beak sculpture of inverted, V-shaped ridges. Posterior ridge indistinct, broadly rounded; shell smooth, slightly alate posteriorly. Pseudocardinal teeth small but distinct, lateral teeth relatively short and curved; beak cavity shallow. Periostracum yellowish to yellowish brown, shiny; numerous thin to broad green rays present. Nacre salmon to bluish-white, iridescent posteriorly.



**Habitat:** Small streams and headwaters of medium streams in gravel substrate; only occurs in streams that flow south off the Salem and Springfield plateaus

**Similar:** Northern brokenray, fatmucket



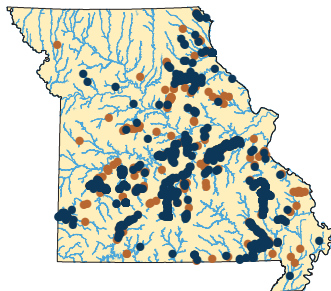


# Fatmucket

*Lampsilis siliquioidea* (Barnes, 1823)

**Status:** Common

**Shell characteristics:** Shell thin to thick, solid; elongate to elliptical, moderately inflated; umbos large, only slightly raised above the hinge line, sculpture of multiple fine double-looped lines. Posterior ridge not prominent; shell smooth; sexually dimorphic—females prominently swollen posteriorly. Pseudocardinal and lateral teeth thin, erect; beak cavity shallow. Periostracum typically yellowish, usually with distinct rays. Nacre bluish-white to white.



**Habitat:** Small streams to large rivers, lakes, reservoirs, in a variety of substrates

**Similar species:** yellow sandshell, mucket, plain pocketbook



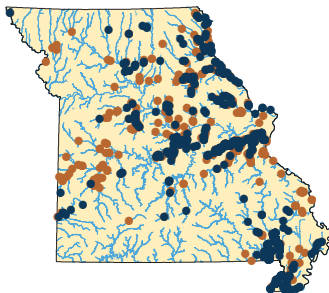
2.7"      Length: Up to 6"      3.6"      Length: Up to 6"

# Yellow sandshell

*Lampsilis teres* (Rafinesque, 1820)

**Status:** Common

**Shell characteristics:** Shell moderately thick, solid; elongate, moderately inflated; umbos large, only slightly raised above the hinge line, sculpture of multiple fine double-looped lines. Posterior ridge indistinct; shell smooth; sexually dimorphic—females swollen posteriorly. Pseudocardinal teeth distinct and elevated, lateral teeth distinct and long; beak cavity shallow. Periostracum distinct yellow to yellowish-tan, often shiny. Nacre white.



**Habitat:** Small to large rivers, oxbows, or reservoirs in sand to fine gravel.

**Similar species:** black sandshell, fat mucket



3.2" Length: Up to 8"

# Fragile papershell

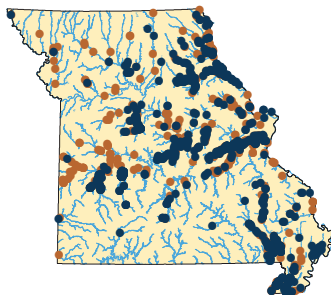
*Leptodea fragilis* (Rafinesque, 1820)

**Status:** Common

**Shell characteristics:** Shell thin, fragile; oblong to ovate, compressed; umbos low and forward, sculpture of 3–4 delicate lines, the first concentric and remaining ones double-looped, often imperceptible. Posterior ridge broadly rounded; shell with a moderate dorsal wing (may be broken off). Pseudocardinal and lateral teeth thin, sharp; beak cavity shallow. Yellow periostracum often with thin greenish rays, or rayless. Nacre pinkish to white and highly iridescent.

**Habitat:** Small streams to large rivers in stable mud, sand, or gravel

**Similar species:** pink papershell, scaleshell

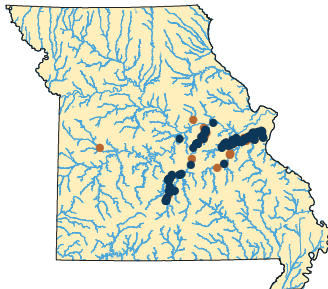


3.5" Length: Up to 8"

# Scaleshell

*Leptodea leptodon* (Rafinesque, 1820)

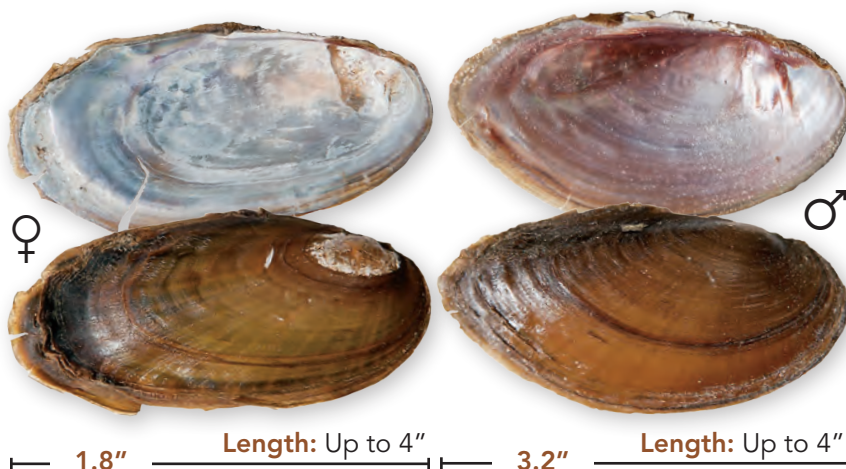
**Status:** Federal Endangered  
State Endangered  
Species of Conservation Concern



**Shell characteristics:** Shell thin, extremely fragile; oblong, rhomboidal to oval and compressed; umbos low and narrow, sculpture of a few very faint, double-looped ridges. Posterior ridge not prominent, shell with a weak dorsal wing; shell appears “bent” when examined from the top; sexually dimorphic—females are much smaller than males and are more elongate, and shell is flaky at posterior tip due to the periostracum layer extending past the margin of the shell. Pseudocardinal teeth poorly developed, lateral teeth weakly defined; beak cavity shallow. Periostracum olive to brown, covered with fine, wavy rays. Nacre rose colored in the cavity, bluish or purple elsewhere, iridescent throughout.

**Habitat:** Medium to large rivers in mixture of sand and gravel, also in mud

**Similar species:** fragile papershell, paper pondshell

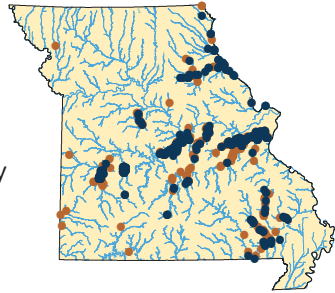


# Black sandshell

*Ligumia recta* (Lamarck, 1819)

**Status:** Species of Conservation Concern

**Shell characteristics:** Shell thick, heavy, solid; elongate, compressed to moderately inflated; umbos low, barely above the hinge line, sculpture of 2–3 double-looped lines, usually obscure. Posterior ridge indistinct; shell smooth; sexually dimorphic—posterior end of females is blunt and turned upwards. Pseudocardinal teeth well developed but not large, lateral teeth elongate and straight; beak cavity shallow. Periostracum polished black to dark brown with obscure green rays that are more prevalent in young. Nacre is white to iridescent, often pink to purplish.



**Habitat:** Medium to large rivers in gravel to firm sand

**Similar species:** spike, yellow sandshell, spectaclecase



5.8"

**Length:** Up to 8"

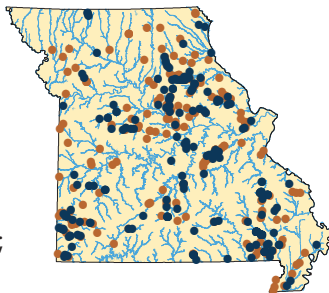


# Pondmussel

*Ligumia subrostrata* (Say, 1831)

**Status:** Common

**Shell characteristics:** Shell thin to moderately solid; elongate to elliptical, drawn to a point posteriorly above the dorsal-ventral midline, moderately inflated; small; umbos full, slightly elevated, sculptured with fine double loops. Posterior ridge indistinct; shell smooth; sexually dimorphic—females noticeably truncate. Pseudocardinal and lateral teeth distinct, thin; beak cavity shallow. Periostracum colored green or black with broad rays. Nacre white.



**Habitat:** Small creeks, ponds, lakes, in mud

**Similar species:** black sandshell, little spectaclecase

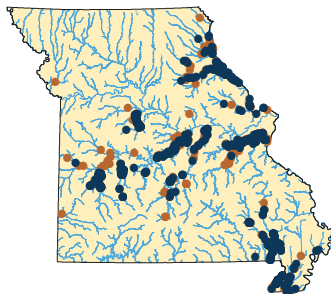


# Threehorn wartyback

*Obliquaria reflexa* Rafinesque, 1820

**Status:** Common

**Shell characteristics:** Shell thick, stout; roundly triangular, somewhat inflated; umbos narrow, incurved, above the hinge line, sculpture of 2–3 ridges, more prominent posteriorly. Posterior ridge broadly rounded and prominent, with slight flutings on posterior slope. Single rows of knobs that alternate on both valves. Pseudocardinal teeth prominent, lateral teeth short and straight; beak cavity shallow. Periostracum light tan to green, with numerous interrupted fine rays. Nacre pearly white.



**Habitat:** Medium to large rivers in gravel

**Similar species:** pimpleback, sheepsnose, wartyback



2.3"

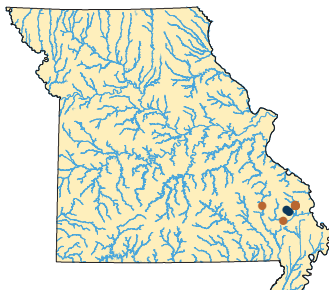
Length: Up to 3"

# Southern hickorynut

*Obovaria jacksoniana* (Frierson, 1912)

**Status:** Species of Conservation Concern

**Shell characteristics:** Shell thick, stout; oval to elliptical, gently rounded dorsally and ventrally, moderately inflated; umbos broad and low but raised above the hinge line, sculpture unknown. Posterior ridge not prominent; sexually dimorphic—females have a bluntly truncated posterior end. Pseudocardinal teeth well defined and triangular, lateral teeth high, roughened, and slightly curved; beak cavity shallow. Periostracum light to dark brown, with faint green capillary rays on posterior two-thirds. Nacre bluish-white, iridescent posteriorly.



**Habitat:** Small to medium rivers in sand or gravel

**Similar species:** hickorynut, round pigtoe, Wabash pigtoe



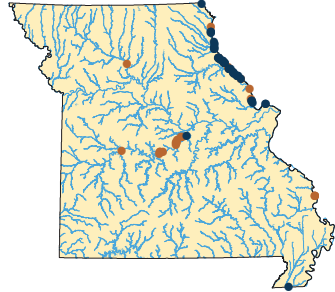


# Hickorynut

*Obovaria olivaria* (Rafinesque, 1820)

**Status:** Species of Conservation Concern

**Shell characteristics:** Shell thick, stout; oblong to ovate, inflated; umbos narrow, high, and directed forward, sculpture of a series of fine lines, often offset in the middle and drawn up. Posterior ridge broadly rounded, dorsal margin nearly straight, anterior end broadly rounded, posterior end sharply rounded. Large, thick, well-defined teeth; beak cavity shallow. Periostracum olive-brown to yellowish-brown, with green capillary rays present, some may be rayless, often a slight sheen. Nacre blue-white, iridescent throughout.



**Habitat:** Large rivers in mixed sand or gravel

**Similar species:** southern hickorynut, round pigtoe, ebonyshell, Higgins eye, pink mucket



1.9"      Length: Up to 3"

# Bankclimber

*Plectomerus dombeyanus*

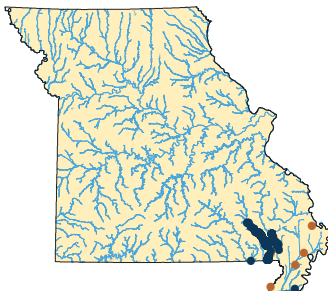
(Valenciennes, 1827)

**Status:** Species of Conservation Concern

**Shell characteristics:** Shell not particularly thick, but heavy; rhomboidal to quadrate, moderately inflated to compressed; umbos low, only slightly above the hinge line, sculpture of irregular double-looped ridges. Posterior ridge defined and sharp, with plications anterior to the ridge and flutings dorsal to the posterior ridge. Pseudocardinal teeth prominent, lateral teeth long and curved; beak cavity shallow. Periostracum greenish to brown, darker with age. Nacre color variable, usually purple but often tinged with bronze.

**Habitat:** Medium streams or ditches in mud or mud-gravel; restricted to rivers, streams or ditches in southeast Missouri

**Similar species:** threeridge, washboard, pistolgrip, flutedshell



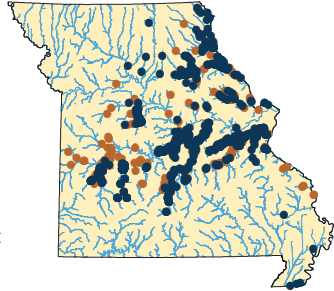
5.7" Length: Up to 6"

# Pink heelsplitter

*Potamilus alatus* (Say, 1817)

**Status:** Common

**Shell characteristics:** Shell thin but strong; quadrate, compressed; umbos low, narrow, not raised above the hinge line, sculpture of a few very fine concentric lines drawn up at either end. Posterior ridge broadly rounded; shell sculpture-less except for growth lines, with a high, prominent posterior wing; sexually dimorphic—posterior of females usually angled and bluntly squared or truncated. Pseudocardinal teeth erect, knobby, lateral teeth short, curved; beak cavity shallow. Periostracum greenish in juveniles; older individual's dark or brown colored, green rays may be present. Nacre uniformly purple or pink, sometimes tinged with copper.



**Habitat:** Medium to large rivers in a variety of substrates

**Similar species:** white heelsplitter, pink papershell



6.0" Length: Up to 8"

# Fat pocketbook

*Potamilus capax* (Green, 1832)

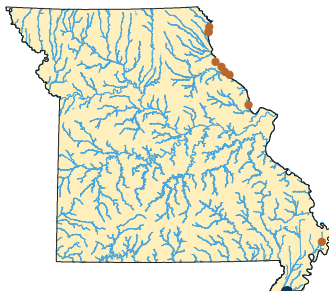
**Status:** Federal Endangered  
State Endangered  
Species of Conservation Concern

**Shell characteristics:** Shell thin but stout; round to oblong, very inflated; umbos large, prominent, and turned inward, sculpture of a few faint oblique ridges.

Posterior ridge sharply angled; hinge line distinctly S-shaped (most easily seen on the inside of the shell); shell has minute anterior and posterior wings. Pseudocardinal teeth erect, lateral teeth short, erect, and curved; beak cavity deep and wide. Periostracum smooth, shiny, yellow to brownish and lacking rays, highly polished. Nacre white or flushed with pink or salmon.

**Habitat:** Ditches, large rivers in slow flowing water, in mud or sand

**Similar species:** plain pocketbook, bleufer



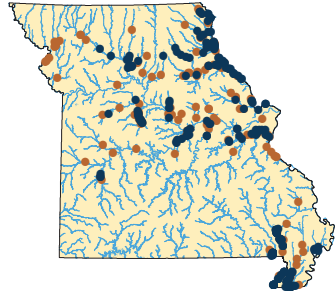
3.7" Length: Up to 6"

# Pink papershell

*Potamilus ohiensis* (Rafinesque, 1820)

**Status:** Common

**Shell characteristics:** Shell very thin and fragile; oblong to oval, compressed; umbos low, sculpture of several small broken ridges with nodules, often indiscernible. Posterior ridge indistinct; shell alate, with a high, pronounced posterior wing in addition to the anterior wing, but these may be broken off in older individuals. Pseudocardinal and lateral teeth present, thin, weak. Periostracum brown to tan, shiny, some rays may be present. Nacre iridescent, pink to light purple.



**Habitat:** Medium to large rivers in a variety of substrates

**Similar species:** fragile papershell, pink heelsplitter, white heelsplitter



4.4" Length: Up to 6"

# Bleufer

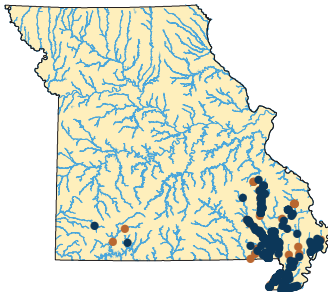
*Potamilus purpuratus* (Lamarck, 1819)

**Status:** Common, but restricted

**Shell characteristics:** Shell moderately thick, stout; oval to quadrate, inflated; umbos narrow and incurved, barely above hinge line, sculpture of faint corrugations. Posterior ridge not prominent; shell slightly alate; sexually dimorphic—female posterior end usually angled and bluntly squared or truncated. Pseudocardinal teeth erect and emarginated, lateral teeth short, curved, raised; beak cavity broad and moderately deep. Periostacum dark brown to black, without rays. Nacre deep purple and highly iridescent.

**Habitat:** Large rivers in mud or gravel

**Similar species:** pink heelsplitter, plain pocketbook



3.2" Length: Up to 8"



# Ouachita kidneyshell

*Ptychobranchus occidentalis*

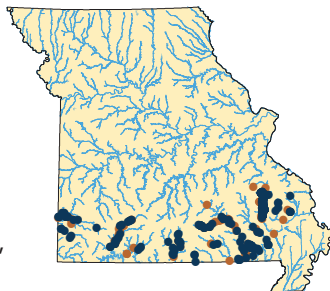
(Conrad, 1836)

**Status:** Species of Conservation Concern

**Shell characteristics:** Shell relatively thin but stout; oblong to elongate, noticeably "kidney shaped," compressed; umbos low, sculpture unknown. Posterior ridge not prominent; have a finger-shaped sulcus inside the shell pointing to the umbo. Pseudocardinal and lateral teeth well developed; lateral teeth short, broad, and striated; beak cavity shallow. Periostracum yellow to brown with a cloth-like texture, may have very fine green or dark rays. Nacre white.

**Habitat:** Small streams in gravel

**Similar species:** spike



— 2.7" — **Length:** Up to 5"

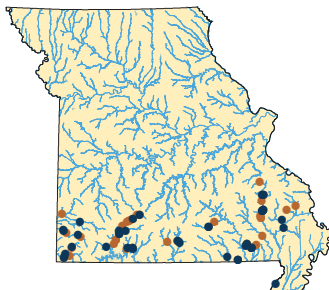


# Purple lilliput

*Toxolasma lividum* (Rafinesque, 1831)

**Status:** Species of Conservation Concern

**Shell characteristics:** Shell thick, stout; quadrate, with straight dorsal and ventral lines, moderately inflated; small; umbos broad, low, sculpture of 3–4 concentric bars, often incomplete. Posterior ridge indistinct; sexually dimorphic—females truncated posteriorly. Pseudocardinal teeth well developed, serrated and elevated, lateral teeth straight to slightly curved; beak cavity moderately deep. Periostracum dark brown, often faint green on new parts. Nacre rusty purple fading to lighter purple or white at shell margin.



**Habitat:** Small to medium streams, lakes, ponds, in gravel, mud

**Similar species:** lilliput, Texas lilliput, little spectaclecase



1.0"

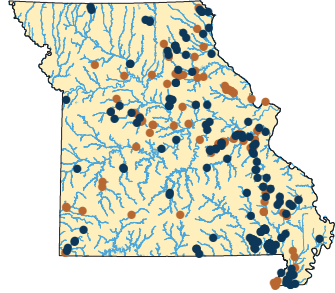
**Length:** Up to 2"

# Lilliput

*Toxolasma parvum* (Barnes, 1823)

**Status:** Common

**Shell characteristics:** Shell moderately thin but stout; elliptical, with dorsal and ventral margins parallel, inflated; small; umbos low, broad and flattened, sculpture of 5–6 coarse, concentric ridges. Posterior ridge indistinct. Pseudocardinal and lateral teeth well defined but delicate, lateral teeth slightly curved; beak cavity shallow. Periostacum tan to dark brown with a cloth-like texture, posterior half tinged with green. Nacre bluish-white, iridescent throughout.



**Habitat:** Small to medium streams, lakes, ponds, in gravel, mud

**Similar species:** salamander mussel, Texas lilliput



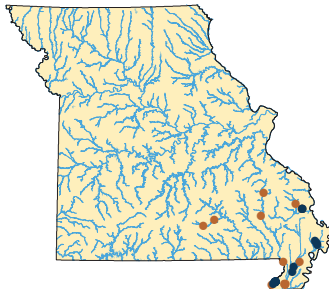
1.1" Length: Up to 2"

# Texas lilliput

*Toxolasma texasense* (Lea, 1857)

**Status:** Species of Conservation Concern

**Shell characteristics:** Shell thin to solid; elongate, moderately inflated; umbos low, only slightly raised above the hinge line, sculpture of 5–6 sharp, angular ridges. Posterior ridge indistinct; sexually dimorphic—females are noticeably truncated on the posterior end and shorter in length. Pseudocardinal teeth thin and compressed, lateral teeth long, straight or curved; beak cavity shallow. Periostracum dark or greenish-brown with a cloth-like texture (faint, silvery sheen). Nacre white, sometimes tinged with salmon in the beak cavity.



**Habitat:** Small streams to medium rivers in sand or mud; restricted to southern Missouri

**Similar species:** lilliput, purple lilliput



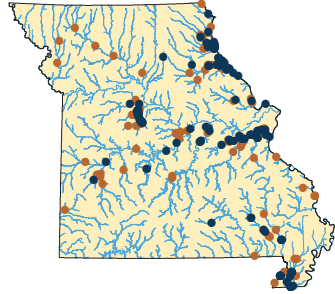
1.1" Length: Up to 3"

# Fawnsfoot

*Truncilla donaciformis* (Lea, 1828)

**Status:** Common

**Shell characteristics:** Shell relatively thick and stout; broadly triangular with a pointed posterior end, moderately inflated; umbos narrow and flattened, only slightly above hinge line, sculpture of 5–6 double-looped bars. Posterior ridge sharply angled. Pseudocardinal and lateral teeth moderately developed and sharp. Periostracum yellow or greenish, covered with chevron-shaped or zigzag lines. Nacre pearly white.



**Habitat:** Medium streams to large rivers in sand or gravel

**Similar species:** deertoe



0.9"

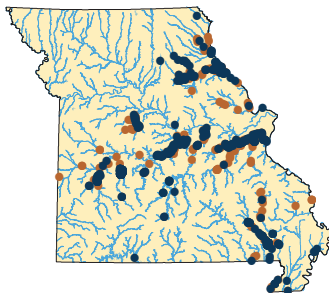
**Length:** Up to 2"

# Deertoe

***Truncilla truncata*** Rafinesque, 1820

**Status:** Common

**Shell characteristics:** Shell moderately thick and stout; triangular with posterior end bluntly pointed or truncated, inflated; umbos narrow, raised above the hinge line, sculpture of 3–5 thin, double-looped ridges. Posterior ridge sharply angled and prominent. Pseudocardinal and lateral teeth moderately developed. Periostracum yellow-brown to brown, often with green capillary rays grouped together to form broad bands of color, some valves may be almost rayless. Nacre white, occasionally pink.



**Habitat:** Medium streams to large rivers in mud, gravel, or sand

**Similar species:** fawnsfoot, Wabash pigtoe, snuffbox



1.8" Length: Up to 2"



# Ellipse

## *Venustaconcha ellipsiformis*

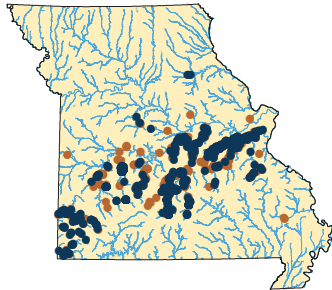
(Conrad, 1836)

**Status:** Common

**Shell characteristics:** Shell moderately thick, solid; elliptical to slightly ovate, slightly inflated; umbos low, sculpture of 3–4 fine, double-looped ridges. Posterior ridge indistinct; posterior ventral margin indented; sexually dimorphic—females have a slight crease or sulcus that runs parallel to the rays on the posterior end of the shell. Pseudocardinal and lateral teeth well developed and stout, often reddish in fresh shells. Periostracum greenish to brownish with numerous fine green rays or lines. Nacre variable, usually white, iridescent.

**Habitat:** Small to medium streams and rivers in stable gravel; common in some north-flowing Ozark streams

**Similar species:** rainbow, bleedingtooth mussel, mucket



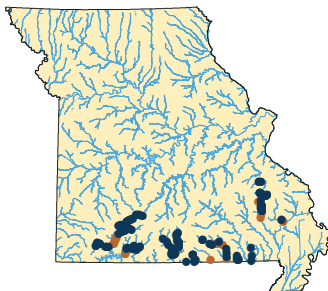
2.2" Length: Up to 3"

# Bleedingtooth mussel

*Venustaconcha pleasii* (Marsh, 1891)

**Status:** Common, but restricted

**Shell characteristics:** Shell moderately thick, stout (more thick anteriorly); sub-elliptical and elongated, compressed to moderately inflated; umbos low, sculpture of 3–4 fine undulations. Posterior ridge broadly rounded; shell distinctly “pinched” near posterior end; sexually dimorphic—females have a pronounced sulcus running parallel to the rays on the posterior end of the shell. Pseudocardinal teeth stout and erect, lateral teeth long and nearly straight, with reddish coloring. Periostracum yellowish-brown to chestnut, with numerous fine, wavy green rays. Nacre white, center often salmon-coppery colored, iridescent. Specimens of bleedingtooth mussel from the St. Francis and Black rivers are of uncertain identification.



**Habitat:** Small to medium streams and rivers in stable gravel; restricted to streams that flow south and west off the Springfield and Salem plateaus

**Similar species:** ellipse, rainbow



1.6"      Length: Up to 3"

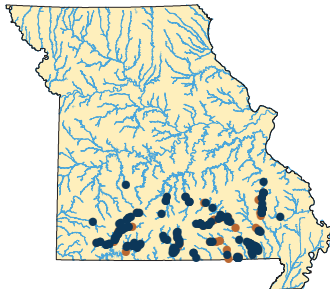


# Rainbow

*Villosa iris* (Lea, 1829)

**Status:** Common, but restricted

**Shell characteristics:** Shell thin, especially on posterior tip, but strong; elongate to elliptical, compressed; small; umbos small, only slightly elevated, sculpture of several ridges, 2–3 concentric, others appearing double-looped. Posterior ridge indistinct; shell smooth. Pseudocardinal teeth triangular, lateral teeth thin and bladelike; beak cavity shallow. Periostracum yellow to yellow-green, with distinctive broad green rays on posterior third of shell. Nacre iridescent to white or bluish-white.



**Habitat:** Small to medium streams in gravel

**Similar species:** ellipse, pondmussel, Texas lilliput, little spectaclecase, bleedingtooth mussel



1.5"

**Length:** Up to 3"

# Little spectaclecase

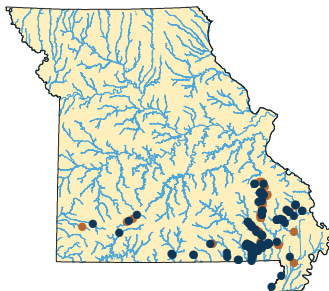
***Villosa lienosa*** (Conrad, 1834)

**Status:** Species of Conservation Concern

**Shell characteristics:** Shell thin but strong; elongate to elliptical, moderately inflated; small; umbos moderately inflated and slightly elevated, sculpture of 4–6 fine double-looped lines. Posterior ridge indistinct; shell smooth; sexually dimorphic—females with posterior end inflated and truncated. Pseudocardinal teeth triangular, lateral teeth short and curved; beak cavity moderately deep. Periostracum brown to tan, becoming darker with age, sometimes with greenish rays or rayless. Nacre iridescent, pink, sometimes creamish or bluish-white.

**Habitat:** Small to medium streams in gravel

**Similar species:** pondmussel, Texas lilliput



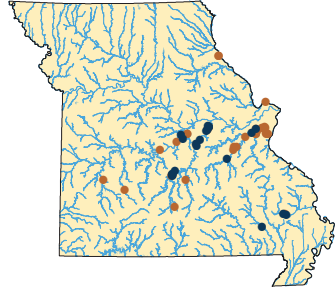
1.7" Length: Up to 3"

# Elephantear

*Elliptio crassidens* (Lamarck, 1819)

**Status:** State Endangered  
Species of Conservation Concern

**Shell characteristics:** Shell thick, heavy; triangular to rhomboidal, slightly to moderately inflated, often slightly elongated or “humped” in profile; beaks large, flattened, sculpture of 3–4 loops. Posterior ridge indistinct; shell smooth. Pseudocardinal and lateral teeth distinct, large, compressed beak cavity shallow. Periostracum nearly black, rays lacking. Nacre usually purple, rarely salmon or white.



**Habitat:** Large rivers in mud, sand, or gravel

**Similar species:** mucket, spike



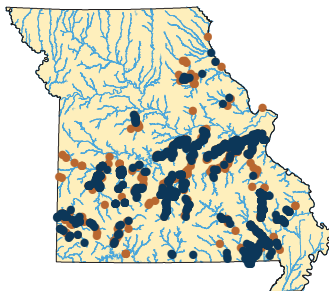
6.1" Length: Up to 6"

# Spike

*Elliptio dilatata* (Rafinesque, 1820)

**Status:** Common

**Shell characteristics:** Shell moderately thick and solid; elongate-ellipsoid, and slightly laterally compressed; beaks depressed, flattened, sculpture of 2–3 coarse ridges sometimes drawn up in the middle. Posterior ridge indistinct, rounded; shell smooth. Pseudocardinal teeth well developed and heavy; lateral teeth well developed, short, and straight; beak cavities shallow. Periostacum dark and smooth, rays usually absent. Nacre white, salmon, or purple.



**Habitat:** Small to large rivers in mud, gravel, and in lakes

**Similar species:** Ouachita kidneyshell, black sandshell, elephantear



3.2"

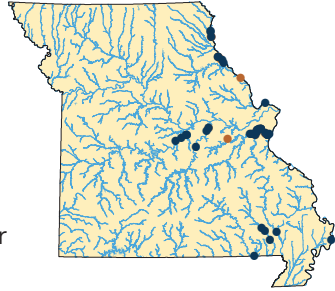
**Length:** Up to 6"

# Ebonyshell

*Fusconaia ebena* (Lea, 1831)

**Status:** State Endangered  
Species of Conservation Concern

**Shell characteristics:** Shell thick, solid; subrotund, inflated; beaks inflated, incurved, and projecting forward. Posterior ridge indistinct; sulcus absent. Lateral and pseudocardinal teeth well developed and parallel; beak cavity very deep. Periostracum rayless, light brown in young shells, becoming dark brown to black in older individuals.



**Habitat:** Large rivers in fine to coarse gravel

**Similar species:** hickorynut, Wabash pigtoe, round pigtoe, Ohio pigtoe, pyramid pigtoe



3.1"      Length: Up to 6"

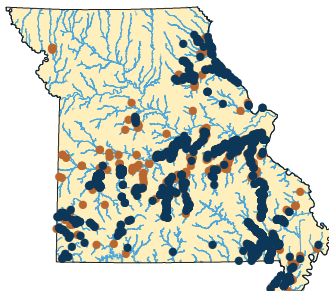


# Wabash pigtoe

*Fusconaia flava* (Rafinesque, 1820)

**Status:** Common

**Shell characteristics:** Shell thin to moderately solid; broadly to sharply triangular, compressed in headwaters with reduced sulcus, thick and inflated with deep sulcus in large river form; beaks depressed, turned forward, sculpture of 2–3 small ridges. Posterior ridge indistinct; sulcus present. Hinge teeth well developed, with short laterals; deep beak cavity. Periostracum tan to black, rays seldom obvious. Nacre white, sometimes pink to orange, foot usually orange, sometimes white.



**Habitat:** Creeks to large rivers in gravel and sand

**Similar species:** hickorynut, round pigtoe, Ohio pigtoe, pyramid pigtoe, deertoe



2.0"

**Length:** Up to 5"

# Ozark pigtoe

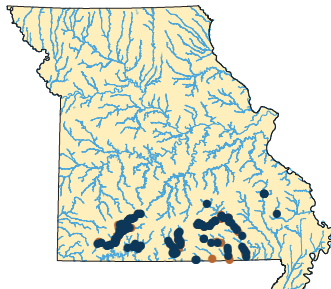
*Fusconaia ozarkensis* (Call, 1887)

**Status:** Common, but restricted

**Shell characteristics:** Shell uniformly thin to moderately thick, strong; quadrate to slightly elongate or triangular; beaks low, turned forward, sculpture obscure. Posterior ridge indistinct, with no sulcus; often a pair of diverging grooves on the dorsal slope. Pseudocardinal and lateral teeth well developed and solid; beak cavity moderately deep. Periostacum has a satiny or cloth-like sheen; fine green rays may be present. Nacre white to pale pink.

**Habitat:** Small streams in gravel substrate or mixture of sand and gravel. Only occurs in south flowing Ozark streams of the White and Black river systems

**Similar species:** Wabash pigtoe, round pigtoe



2.1"

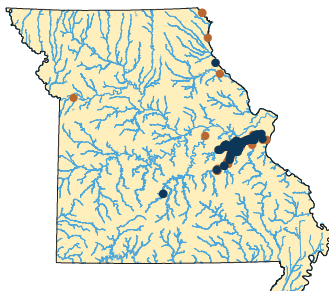
**Length:** Up to 4"



# Sheepnose

*Plethobasus cyphus* (Rafinesque, 1820)

**Status:** Federal Endangered  
State Endangered  
Species of Conservation Concern



**Shell characteristics:** Shell moderately thick, heavy, solid; elongate to oval; beak sculpture of two heavy ridges. Posterior ridge weak to moderately-developed; shell smooth except for a single row of low, undulating knobs radiating from the umbo to the posterior ventral margin. Pseudocardinal and lateral teeth well-developed and heavy, beak cavity shallow. Periostacum yellowish to brownish, rayless, and polished; foot typically bright orange. Nacre white.

**Habitat:** Medium to large rivers in gravel or gravel mixed with sand

**Similar species:** mucket, threehorn wartyback, wartyback



3.4" Length: Up to 5"

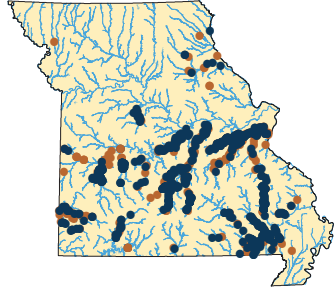
# Round pigtoe

*Pleurobema sintoxia* (Rafinesque, 1820)

**Status:** Common

**Shell characteristics:** Shell thick, solid; nearly triangular to nearly round, moderately inflated or compressed; beaks slightly elevated and directed forward, sculpture of 2–3 small ridges. Posterior ridge indistinct; sulcus absent.

Pseudocardinal teeth heavy, lateral teeth well-developed; beak cavity moderately deep. Periostacum dark, generally without defined rays. Nacre white, pink, or orange.



**Habitat:** Medium to large rivers in gravel or gravel-mud substrate

**Similar species:** Wabash pigtoe, hickorynut, Ozark pigtoe, Ohio pigtoe, pyramid pigtoe, ebonyshell



1.9"

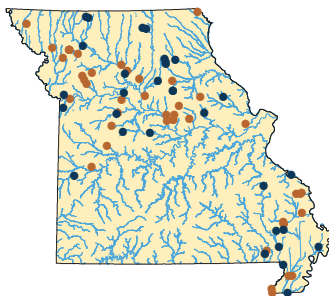
Length: Up to 5"

# Pondhorn

*Uniomerus tetralasmus* (Say, 1831)

**Status:** Common, but restricted

**Shell characteristics:** Shell thin to moderately solid; elongate, rounded anteriorly and pointed posteriorly; moderately inflated; smooth; beaks elevated, sculpture of 5–6 coarse, concentric semicircles that open anteriorly; usually has two slightly divergent but parallel lines or creases along the posterior ridge. Posterior ridge long and widely rounded. Pseudocardinal teeth distinct and thin, lateral teeth delicate; beak cavities shallow. Periostacum greenish brown and rayless. Nacre white, occasionally salmon.



**Habitat:** Lakes, ponds, small streams in mud; prefers still water areas

**Similar species:** yellow sandshell, spike, giant floater, creeper, cylindrical papershell, tapered pondhorn



3.2"

**Length:** Up to 5"

# Purple wartyback

*Cyclonaias tuberculata*

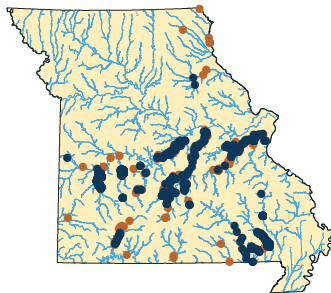
(Rafinesque, 1820)

**Status:** Common

**Shell characteristics:** Shell thick, heavy, solid; round to quadrate, relatively compressed laterally, with small wing on posterior ridge; beak sculpture of several fine wavy lines. Posterior ridge indistinct; posterior half of shell sculptured with numerous pustules and short ribs. Massive pseudocardinal and lateral teeth and a deep, compressed beak cavity. Periostracum brown to black, lacking rays. Nacre purple to deep purple, occasionally coppery, sometimes white.

**Habitat:** Medium to large rivers, primarily in gravel substrates; often found in swift water

**Similar species:** pimpleback



3.3"

Length: Up to 4"

# Washboard

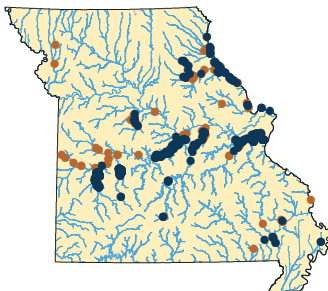
***Megaloniaias nervosa*** (Rafinesque, 1820)

**Status:** Common

**Shell characteristics:** Shell thick, heavy, solid; elongate-quadrate, compressed to slightly inflated; large; beak sculpture of well-developed double loops. Posterior ridge indistinct; posterior slope fluted; umbonal region covered with zigzag ridges; ridges, vertical creases, wrinkles and sculpturing present anterior to umbo, and may be present at the ventral margin. Moderately heavy lateral teeth and rather small pseudocardinal teeth for its size. Periostracum brown to black and rayless. Nacre pearly white.

**Habitat:** Primarily large rivers with gravel or gravel-mud substrates, often in swift water

**Similar species:** threeridge, rock pocketbook, bankclimber



— 4.6" — Length: Up to 8"



# Rabbitsfoot

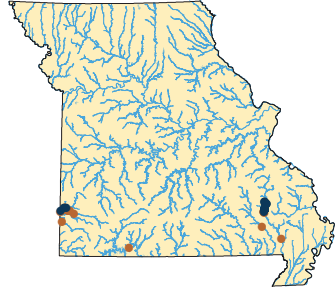
*Quadrula cylindrica cylindrica*  
(Say, 1817)

**Status:** Federal Candidate  
Species of Conservation Concern

**Shell characteristics:** Shell thick, heavy; elongate to nearly cylindrical, compressed to moderately inflated; beaks only slightly raised above the hinge line, sculpture of coarse folds extending as small tubercles. Prominent posterior ridge with large nodules or knobs, often sculpturing is below and anterior to the umbos; there is a distinct indentation in the posterior shell margin between the siphons. Well-developed teeth, moderately deep beak cavity. Periostracum typically marked with dense, distinctive greenish chevrons. Nacre white.

**Habitat:** Medium to large rivers in gravel

**Similar species:** monkeyface, pistolgrip



2.6"

**Length:** Up to 5"



# Winged mapleleaf

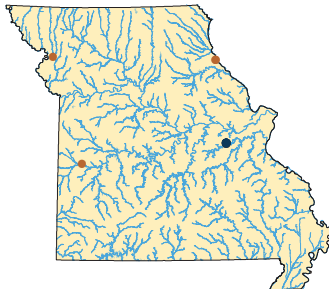
*Quadrula fragosa* (Conrad, 1835)

**Status:** Federal Endangered  
State Endangered  
Species of Conservation Concern

**Shell characteristics:** Shell moderately thick; quadrate, with a pronounced wing posterior to the umbo; beak sculpture similar to adult shell. Two rows of pustules from umbo to ventral margin, separated by sulcus. Wing has radiating rows of tubercles, knobs, or flutings. Pseudocardinal and lateral teeth well developed; lateral teeth straight, nearly parallel to ventral margin. Periostracum light tan to dark brown, occasionally with faint green rays. Nacre pearly white to iridescent.

**Habitat:** Medium to large rivers, in gravel or gravel-sand mixtures

**Similar species:** mapleleaf, Gulf mapleleaf, wartyback



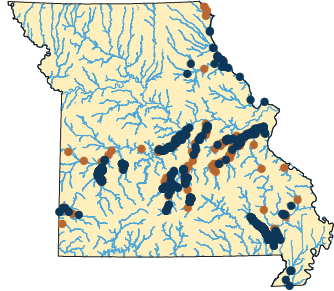
— 2.9" — **Length:** Up to 4"

# Monkeyface

*Quadrula metanevra* (Rafinesque, 1820)

**Status:** Common

**Shell characteristics:** Shell thick, heavy; quadrate, moderately inflated, with distinct indentation in the posterior shell margin; beak sculpture similar to adult. Very prominent, often slightly concave, posterior ridge with one row of large tubercles extending from umbo to the posterior ventral margin, the remaining shell sculptured with ribs or pustules. Pseudocardinal teeth heavy, lateral teeth short, deep beak cavity. Distinctive inverted greenish chevrons usually present. Nacre pearly white.



**Habitat:** Prefers gravel substrates in medium to large rivers

**Similar species:** mapleleaf, pimpleback, Gulf mapleleaf



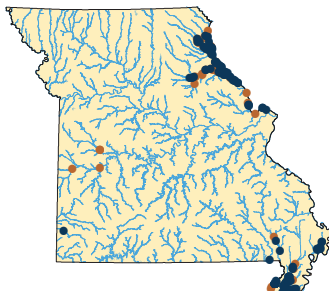
2.6" Length: Up to 5"

# Wartyback

*Quadrula nodulata* (Rafinesque, 1820)

**Status:** Species of Conservation Concern

**Shell characteristics:** Shell thick, heavy; rounded to quadrate, moderately inflated; beaks prominent, sculpture obscure. Posterior ridge indistinct; two weakly-defined rows of knobs diverging from the umbo to the ventral margin of the shell; knobs often are distinctly darker than the rest of the shell; no sulcus. Pseudocardinal and lateral teeth distinct, massive. Periostracum straw colored in young, turning tan to brown with age, rays are lacking. Nacre pearly white.



**Habitat:** Medium to large rivers in sand to fine gravel

**Similar species:** wartyback, pimpleback, mapleleaf, purple wartyback



1.8"

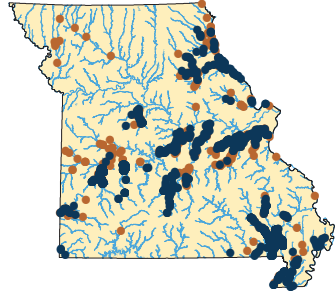
**Length:** Up to 3"

# Pimpleback

*Quadrula pustulosa* (Lea, 1831)

**Status:** Common

**Shell characteristics:** Shell thick, heavy; round to triangular, compressed; beak sculpture obscure. Posterior ridge indistinct; numerous randomly distributed pustules variously developed (may be absent in some individuals or populations), anterior part of shell smooth. Pseudocardinal and lateral teeth distinct, massive; beak cavity deep. Periostracum brown, young specimens and some old with prominent green ray from umbo halfway down shell. Nacre pearly white.



**Habitat:** Small streams to large rivers, found in a variety of substrates

**Similar species:** wartyback, purple wartyback



1.9"

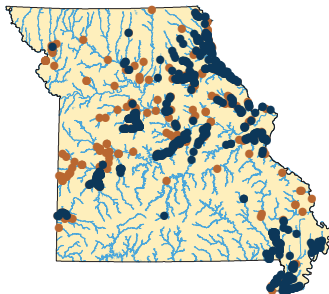
**Length:** Up to 4"

# Mapleleaf

*Quadrula quadrula* (Rafinesque, 1820)

**Status:** Common

**Shell characteristics:** Shell moderately thick to heavy; quadrate; compressed to inflated (depends on habitat—more inflated in softer substrates); beak sculpture similar to adult shell. Two divergent rows of pustules from umbo to ventral margin, fairly strong sulcus present between rows. Pseudocardinal and lateral teeth distinct, massive. Periostracum greenish to brown, often with green rays (may be lacking). Nacre pearly white.



**Habitat:** Medium to large rivers, with gravel or sand substrates intermixed with mud; can also be found in reservoirs

**Similar species:** winged mapleleaf, Gulf mapleleaf, pimpleback, wartyback



2.9" Length: Up to 5"

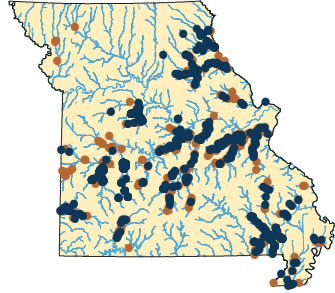


# Pistolgrip

*Tritogonia verrucosa* (Rafinesque, 1820)

**Status:** Common

**Shell characteristics:** Shell heavy, solid; elongate to quadrate or trapezoidal, posterior half tapered; beak sculpture similar to adult shell. Posterior ridge distinct, with large knobs usually on posterior ridge, flutings and pustules prominent especially anterior to ridge; sexually dimorphic—female posterior expanded and compressed. Pseudocardinal teeth large, lateral teeth elongate; shallow beak cavity. Periostracum green to dark brown. Nacre white.



**Habitat:** Small streams to large rivers, found in a variety of substrates

**Similar species:** Gulf mapleleaf, rabbitsfoot



3.5"

Length: Up to 8"



# ADDITIONAL SPECIES

POSSIBLY OCCURRING  
IN MISSOURI

# Ohio pigtoe

*Pleurobema cordatum* (Rafinesque, 1820)

**Status:** Unknown; reported from the St. Francis River

**Shell characteristics:** Shell thick, solid; triangular, moderately inflated; beaks elevated above the hinge line and projected forward, sculpture of elevated concentric ridges. Posterior ridge indistinct; shell smooth, with a broad, shallow but distinct sulcus. Pseudocardinal and lateral teeth heavy, lateral teeth straight or nearly so; beak cavity deep. Periostracum dark, without rays. Nacre white, rarely pink or rose-colored.

**Habitat:** Large rivers in gravel-sand substrates

**Similar species:** round pigtoe, pyramid pigtoe, ebonyshell, Wabash pigtoe



3.0"

Length: Up to 5"

# Pyramid pigtoe

*Pleurobema rubrum* (Rafinesque, 1820)

**Status:** Unknown; reported from the Meramec and Osage rivers

**Shell Characteristics:** Shell thick, solid; elongate triangular, moderately inflated; beaks elevated above the hinge line and projected forward, sculpture of elevated, nodulated concentric ridges. Posterior ridge indistinct; shell smooth with a shallow sulcus. Pseudocardinal and lateral teeth heavy and well-developed, lateral teeth nearly straight; beak cavity deep. Periostracum brown to chestnut, with faint green rays. Nacre pink, occasionally white.

**Habitat:** Large rivers in gravel-sand substrates

**Similar species:** Ohio pigtoe, round pigtoe, ebonyshell, Wabash pigtoe



2.7" Length: Up to 5"

# Gulf mapleleaf

*Quadrula nobilis* (Conrad, 1853)

**Status:** Undetermined; reported from the Osage River, possibly occurs in other areas

**Shell characteristics:** Shell thick, heavy; quadrate to ovate to elongate; beaks only slightly above the hinge, sculpture similar to adult. Broad, shallow sulcus present; with two rows of horizontally flattened, elongate pustules on either side of the sulcus, which is often free of pimples or pustules; pustules also occur in areas anterior and posterior to the sulcus. Pseudocardinal teeth erect, heavy, triangular, lateral teeth distinct, straight to slightly curved. Periostracum brown to black. Nacre white.

**Habitat:** Large rivers in gravel substrates

**Similar species:** mapleleaf, winged mapleleaf, pimpleback, pistolgrip



— 2.7" — Length: Up to 5"

# Tapered pondhorn

*Uniomerus declivis* (Say, 1831)

**Status:** Unknown; reported from the lower St. Francis River system

**Shell characteristics:** Shell thin, moderately solid; elongate to subrhomboidal, rounded anteriorly and strongly pointed posteriorly; moderately inflated; smooth; beaks slightly elevated, sculpture of 5–6 coarse, concentric semicircles that open anteriorly. Posterior ridge high and rounded. Pseudocardinal teeth distinct and thin, lateral teeth delicate; beak cavity shallow. Periostracum dark tan to brown. Nacre bluish white.

**Habitat:** Ponds, lakes, small creeks in fine sand and mud; prefers still water areas

**Similar species:** yellow sandshell, spike, giant floater, creeper, cylindrical papershell, pondhorn



3.8" Length: Up to 5"





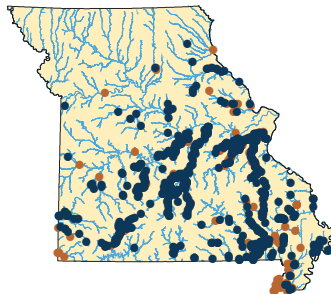
# INVASIVE SPECIES

# Asian clam

*Corbicula fluminea* (Müller, 1774)

**Status:** Invasive

**Shell characteristics:** Shell relatively strong; rounded to triangular, moderately inflated; beaks moderately inflated and slightly elevated, sculpture of concentric lines, which continue as raised rings. Posterior ridge indistinct; shell with well defined, raised rings. Pseudocardinal teeth triangular and centrally located, two sets of lateral teeth long and straight; beak cavity deep. Periostracum yellowish or brown, often green, becoming darker with age. Nacre purple, white, bluish-white, or purple changing to white.



**Habitat:** Small to large rivers and streams, lakes, ponds, in a variety of substrate types

**Similar species:** fingernail clams, pea clams



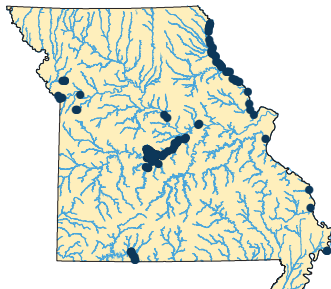
1.8" Length: Up to 2"

# Zebra mussel

*Dreissena polymorpha* (Pallas, 1771)

**Status:** Invasive

**Shell characteristics:** Shell thin; elongate triangular, inflated. Dorsal margin straight to broadly rounded and sharp; posterior ridge sharply angulate; anterior end sharply pointed; growth lines not prominent. Pseudocardinal and lateral teeth absent; beak cavity deep, with a small shelf or septum anteriorly. Periostracum highly variable, but most cream or white colored with characteristic dark brown or black bands. Nacre white, polished.



**Habitat:** Small creeks to large rivers, lakes, reservoirs; attaches to virtually any hard surface with glue-like byssal threads

**Similar species:** quagga mussel



0.7" Length: Up to 2"

# Glossary

**Alate** winged; having dorsal wing-like structures

**Angulate** having either the anterior or posterior margins forming a relatively acute angle

**Anterior** toward the head or front end of an animal

**Beak** the raised, or inflated portion of a bivalve shell, centrally or anteriorly placed along the dorsal margin of the shell

**Beak cavity** a cavity located inside the shell that extends into the beak

**Beak sculpture** the raised loops, ridges, or bumps on the beak

**Biangulate** having two angles

**Chevron** a V-shaped marking

**Compressed** flattened or pressed together laterally

**Conglutinates** small structures made up of gelatinous material and unfertilized eggs that enclose large numbers of glochidia

**Dorsal** toward the back or top of an animal

**Elliptical** having the shape of an ellipse or a flattened oval

**Emarginate** having the margin notched, as in a leaf

**Fluted** having grooves, furrows, or corrugations on the shell

**Glochidia** the larval form of unionacean freshwater mussels before metamorphosis

**Growth lines** darkened lines on the surface of the shell indicating periods of rest during growth

**Hinge** layers of periostracum that function to keep the two valves of the shell together

**Inflated** swollen in appearance

**Knob** a prominent rounded protuberance

**Lateral teeth** the elongated, raised, and interlocking structures located dorsally along the hinge of the inside of the valves of freshwater mussels

**Mussel beds** areas containing a high concentration and diversity of mussels

**Nacre** the inner, lustrous “mother of pearl” layer of the shell, which is often iridescent or colored

**Nodule** small knot, protuberance, or knob

**Ovate (Oval)** having a shape with the broader end being the posterior

**Periostracum** the thin, outside layer or covering of the shell, aka “epidermis”

**Posterior** rear or toward the back-end of an animal

**Posterior ridge, posterior slope** a ridge or slope emanating from the beak and extending posteriorly to the margin of the shell

**Pseudocardinal teeth** the triangular, often serrated, molariform structures located on the upper part of the shell in freshwater mussels

**Pustule** a pimple-like bump or small raised knob on the outside surface of the shell

**Pyramidal** of or pertaining to a pyramid; triangular

**Quadrate** square or rectangular

**Rhomboid** a parallelogram with opposite sides equal

**Sub** somewhat or nearly; prefix usually attached to shell outline, as in “subquadrate” or “subcircular”

**Sulcus** a shallow depression or furrow

**Trapezoidal** like a four-sided figure with two parallel sides

**Truncate** square or broad at end, as if cut off transversely

**Tubercle** a small, rounded projection or knob

**Umbo (Beak)** the raised or domed part of the dorsal margin of the shell

**Unionid (Unionidae)** a family of bivalved mollusks inhabiting freshwater formally referred to as unionids or naiades (also referred to as naiades, mussels, clams, freshwater mussels, and freshwater bivalves)

**Valve** the left or right half of a bivalve shell such as a freshwater mussel

**Ventral** toward the underside or bottom of an animal

**Wing (Ala)** a dorsal, wing-like structure; is often eroded or broken off

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