

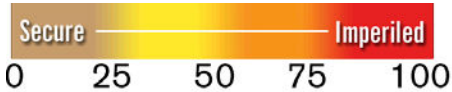
Alasmidonta marginata

Elktoe

Class: Bivalvia

Order: Unionoida

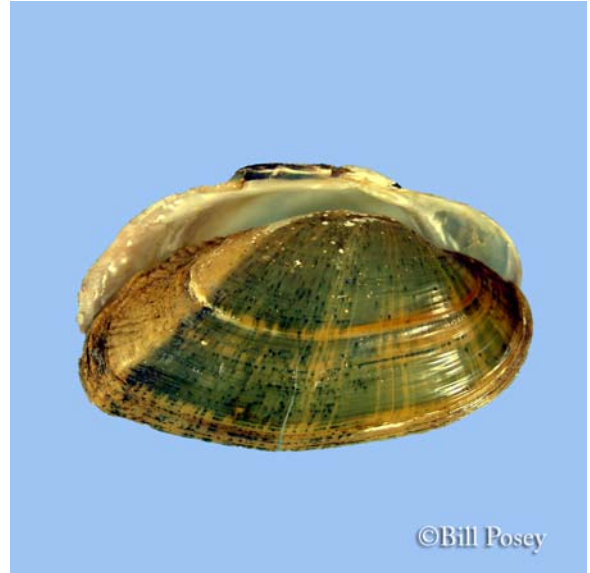
Family: Unionidae

Priority Score: **19** out of 100

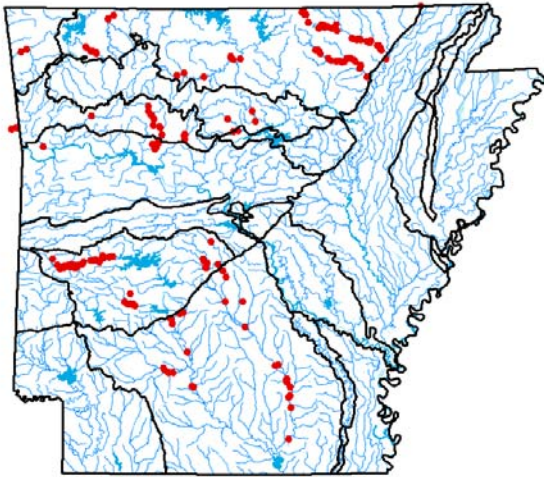
Population Trend: Unknown

Global Rank: G4 — Apparently secure species

State Rank: S3 — Vulnerable in Arkansas



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Distribution**Occurrence Records**

Ecoregions where the species occurs:

- ☒ Ozark Highlands
- ☒ Boston Mountains
- ☒ Arkansas Valley
- ☒ Ouachita Mountains
- ☒ South Central Plains
- ☒ Mississippi Alluvial Plain
- ☐ Mississippi Valley Loess Plains

Suitable Substrate gravel/cobble**Description**

Shell elongate, triangular, inflated, and relatively thin. Anterior end rounded, posterior end sharply angled, ending in a blunt, squared point. Posterior ridge sharply angled and prominent, posterior

slope broad, flat, and covered with fine ridges. Ventral margin straight to slightly curved. Umbos large, located near the center of the shell, and elevated above the hinge line. Beak sculpture of three or four heavy, double-looped ridges. Shell smooth and dull. Periostracum yellowish green or bright green with numerous rays and dark green spots present. Posterior slope often lighter than rest of shell. Length to four inches (10.2cm). Pseudocardinal teeth thin and elongate; one in right, occasionally two in the left. Lateral teeth reduced to a thickened swelling along the hinge line. Beak cavity moderately deep. Nacre bluish white, occasionally with salmon near the beaks.

Host Fish

Rockbass, White Sucker, Northern Hogsucker, Warmouth, Shorthead Redhorse,

Ecobasins

Arkansas Valley - Arkansas River

Boston Mountains - Arkansas River

Boston Mountains - White River

Mississippi River Alluvial Plain - White River

Ouachita Mountains - Ouachita River

Ozark Highlands - Arkansas River

Ozark Highlands - White River

South Central Plains - Ouachita River

Habitats

Weight

Natural Glide: Headwater

Suitable

Natural Pool: Headwater

Marginal

Natural Run: Headwater - Medium - Large

Optimal

Problems Faced

Threat: Habitat destruction

Source: Forestry activities

Threat: Habitat destruction

Source: Resource extraction

Threat: Habitat destruction

Source: Urban development

Threat: Nutrient loading

Source: Confined animal operations

Threat: Nutrient loading

Source: Grazing/Browsing

Threat: Nutrient loading

Source: Urban development

Threat: Sedimentation

Source: Channel alteration

Threat: Sedimentation

Source: Grazing/Browsing

Threat: Sedimentation

Source: Road construction

Data Gaps/Research Needs

Conduct status survey.

Conservation Actions

Importance Category

Manage watershed, addressing physical, chemical, biological and land use components, to restore or sustain aquatic life.

Medium

Threat Abatement

Restore or enhance riparian buffers.

High

Habitat Protection

Monitoring Strategies

Monitor occurrence in ongoing river surveys.

Comments

Widespread but rare. Rangewide population status of the elktoe mussel is not known. (AFMC 2004a, AFMC 2004b, AFMC 2004c, AFMC 2005, AGFC 2003, AGFC 1991-1999, AHTD 1984, AHTD 1994, ANHI 2003, Bates and Dennis 1983, Branson 1983, Burns and McDonnell 1992a, Clark 1987, Crump 2003, Cummings and Mayer 1992, Davidson and others 2000, Gordon 1980, 1980a, 1985, Gordon and Brown 1980, Gordon and others 1979, 1980, Harris 1992a, 1996, 1997b, 1999, 1999a, Harris and Doster 1992, Harris and Gordon 1985, 1990, Harris and Milam 2002, Johnson 1980, Meek and Clark 1912, Oesch 1995, ONHI 2003, Rust 1993, Stoeckel and others 1996, 2000, Turgeon and others 1988, 1998, USDA FS 1999, Wheeler 1918, Williams & others 1993).

Taxa Association Team and Peer Reviewers

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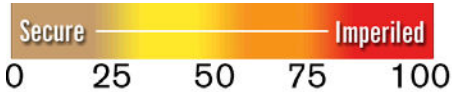
Alasmidonta viridis

Slippershell Mussel

Class: Bivalvia

Order: Unionoida

Family: Unionidae

Priority Score: **31** out of 100

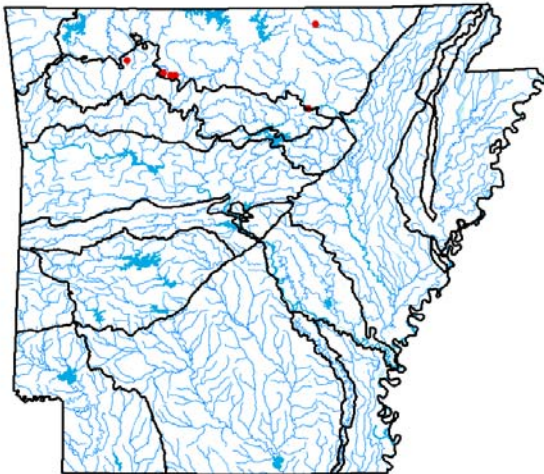
Population Trend: Decreasing

Global Rank: G4G5 — Apparently secure (uncertain rank)

State Rank: S1 — Critically imperiled in Arkansas



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Distribution**Occurrence Records**

Ecoregions where the species occurs:

- ☒ Ozark Highlands
- ☐ Boston Mountains
- ☐ Arkansas Valley
- ☐ Ouachita Mountains
- ☐ South Central Plains
- ☐ Mississippi Alluvial Plain
- ☐ Mississippi Valley Loess Plains

Suitable Substrate gravel**Description**

Shell small (usually about an inch), somewhat inflated, thin in young individuals to moderately thick in adults. Anterior end rounded, posterior end squared or truncated. Posterior ridge high and rounded,

posterior slope flattened. Ventral margin straight or slightly arched. Umbos full and elevated above the hinge line. Beak sculpture of three or four elevated ridges or loops. Shell smooth to rough and yellowish green with numerous wavy green rays, particularly on the posterior half of the shell. Length to 1.5 inches (3.8 cm). Pseudocardinal teeth triangular; two in the left valve, one in the right. Lateral teeth poorly developed, generally appearing as a slight swelling along the hinge line. Beak cavity moderately deep. Nacre white, iridescent on the posterior third of the shell.

Host Fish

Mottled Sculpin, Banded Sculpin, Johnny Darter

Ecobasins

Ozark Highlands - White River

Habitats

Natural Riffle: Headwater

Natural Run: Headwater

Weight

Suitable

Optimal

Problems Faced

Threat: Habitat destruction

Source: Grazing/Browsing

Threat: Habitat destruction

Source: Recreation

Threat: Habitat destruction

Source: Road construction

Threat: Nutrient loading

Source: Confined animal operations

Threat: Nutrient loading

Source: Grazing/Browsing

Threat: Sedimentation

Source: Forestry activities

Threat: Sedimentation

Source: Grazing/Browsing

Threat: Sedimentation

Source: Recreation

Threat: Sedimentation

Source: Road construction

Data Gaps/Research Needs

Conduct additional population surveys.

Conduct life history study.

Determine habitat preferences and availability.

Determine host fish suitability and availability.

Conservation Actions

	Importance	Category
Augment populations in suitable habitat.	Low	Population Management
Establish populations in suitable habitat.	High	Population Management
Manage watershed, addressing physical, chemical, biological and land use components, to restore or sustain aquatic life.	Medium	Threat Abatement
Restore or enhance riparian buffers.	Medium	Habitat Protection

Monitoring Strategies

Additional information is needed before a monitoring strategy can be determined.

Comments

Ristricted range and extremely rare. Since 1996, few specimens have been recorded (AFMC 2004a, 2004b, 2004c, 2005, Harris 1996).

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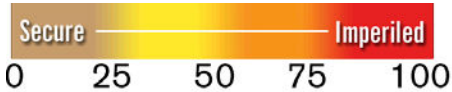
Arcidens wheeleri

Ouachita Rock Pocketbook

Class: Bivalvia

Order: Unionoida

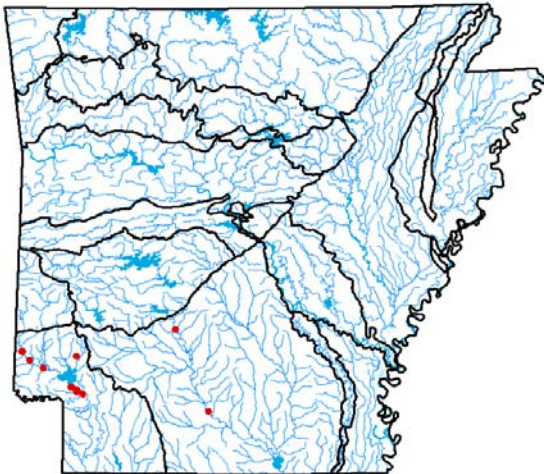
Family: Unionidae

Priority Score: **80** out of 100

Population Trend: Unknown

Global Rank: G1 — Critically imperiled species

State Rank: S1 — Critically imperiled in Arkansas

**Distribution****Occurrence Records**

Ecoregions where the species occurs:

- ☐ Ozark Highlands
- ☐ Boston Mountains
- ☐ Arkansas Valley
- ☐ Ouachita Mountains
- ☒ South Central Plains
- ☐ Mississippi Alluvial Plain
- ☐ Mississippi Valley Loess Plains

Suitable Substrate gravel/cobble/sand**Description**

Shell subcircular to subovate to subquadrate in profile, truncated posteriorly, moderately inflated, up to 4.4 inches long, 3.4 inches high, and 2.4 inches wide, moderately heavy, somewhat thickened

anteriorly, up 0.24 inches thick, and half as thick posteriorly. Outer shell layer is chestnut-brown to black with a silky luster, and appears to slightly iridescent when wet. Umbo is prominent. Posterior half of shell is sculptured by irregular, oblique ridges that are sometimes crossed by smaller ridges or sometimes indistinct. Beak sculpturing is very restricted, rarely intact. Nacre is usually salmon-colored above the pallial line, white to light blue below. Hinge teeth well developed.

Host Fish

Green Sunfish, Bluegill, Smallmouth Bass, Bleeding Shiner, River Carpsucker, Longear Sunfish, Largemouth Bass, White Crappie, Black Crappie, Emerald Shiner, Warmouth

Ecobasins

South Central Plains - Ouachita River

South Central Plains - Red River

Habitats	Weight
Natural Oxbow - connected: - Medium - Large	Optimal
Natural Pool: - Medium - Large	Suitable
Natural Run: - Medium - Large	Optimal
Natural Shoal: - Medium - Large	Marginal

Problems Faced

Threat: Habitat destruction
Source: Channel alteration

Threat: Habitat destruction
Source: Dam

Threat: Hydrological alteration
Source: Dam

Threat: Hydrological alteration
Source: Water diversion

Threat: Sedimentation
Source: Channel alteration

Threat: Sedimentation
Source: Dam

Data Gaps/Research Needs

Determine environmental stressors such as nutrient loading, toxicity to chemicals and metals, sedimentation effects, etc.

Determine habitat preferences and habitat availability.

Determine sustainable flow below dams to improve habitat.

Survey streams and rivers for unknown populations, particularly in Ouachita River sided channels and backwater habitats.

Conservation Actions

	Importance	Category
Develop an outreach program.	Medium	Public Relations/Education
Implement habitat conservation plan.	High	Habitat Protection
Manage the Ouachita River watershed, addressing physical, chemical, biological and land use components, to restore or sustain aquatic life.	Medium	Threat Abatement
Propagate, augment and reintroduce species where appropriate.	High	Population Management
Protect host fish and associated habitat.	High	Population Management

Monitoring Strategies

Monitor in accordance with U.S. Fish and Wildlife Service recovery plan.

Comments

Federally-listed endangered species. Populations occur in the Kiamichi and Glover rivers in Oklahoma, and the Little River system in Oklahoma and Arkansas. The only known reproducing population, based on juveniles and gravid females, occurs in the Little River in Arkansas. This species should be considered for reintroduction to the Ouachita River as part of recovery efforts. The generic name for this species has been changed to *Arcidens*, based on genetic studies when compared to its closest relative, also an *Arcidens* species. (AFMC 2004a, 2004b, 2004c, 2005, AGFC 2003, Bouldin and others, 2013, Branson 1983, Clark 1987, Crump 2003, Crump and others 2003a, 2003c, 2003d, 2003e, 2003g, 2003q, 2003r, 2003t, Gordon 1980a, Gordon and Harris 1983, Gordon and Kraemer 1984, Harris 1999, 1999a, Harris and Gordon 1987, 1990, Harris and others 1997, Inuoe and others 2014, Johnson 1980, Mehlhop-Cifelli and Miller 1989, Posey 1997, Posey and others 1996, Seagraves 2006, Stansbery 1970, Turgeon and others 1988, 1998, USDA FS 1999, USDI FWS 1994, Vaughn and others 1993, 1996, 1997, Wheeler 1918, Williams & others 1993).

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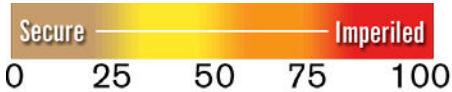
Cumberlandia monodonta

Spectaclecase

Class: Bivalvia

Order: Unionoida

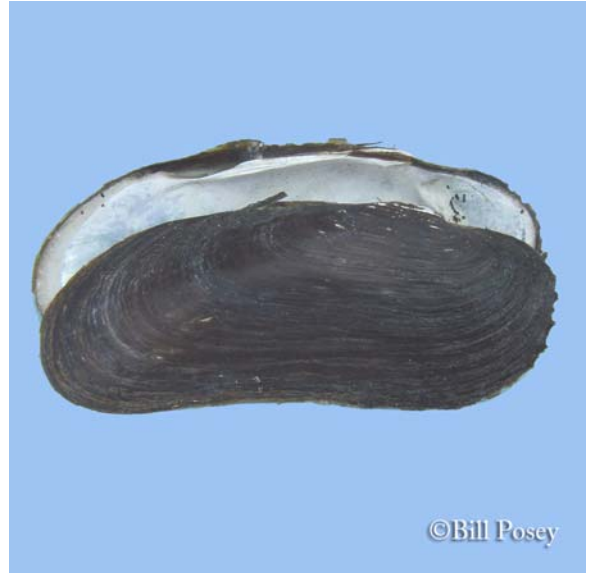
Family: Margaritiferidae

Priority Score: **38** out of 100

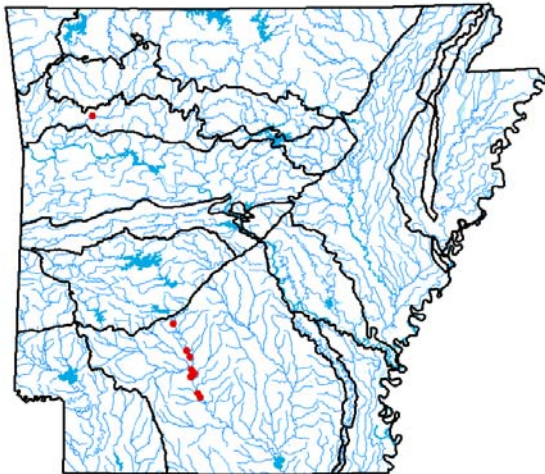
Population Trend: Decreasing

Global Rank: G3 — Vulnerable species

State Rank: S2 — Imperiled in Arkansas

**Distribution**

Occurrence Records



Ecoregions where the species occurs:

- ☐ Ozark Highlands
- ☒ Boston Mountains
- ☐ Arkansas Valley
- ☒ Ouachita Mountains
- ☒ South Central Plains
- ☐ Mississippi Alluvial Plain
- ☐ Mississippi Valley Loess Plains

Suitable Substrate gravel

Description

Shell oblong, elongate, and compressed. Anterior and posterior ends rounded. Ventral margin usually arched or pinched, occasionally straight. Shell thin in young, becoming thicker in older

individuals. Umbos only slightly elevated above the hinge line. Beak sculpture, when visible, of three or four heavy ridges. Surface of shell smooth to somewhat rough, brown in young shells, becoming dark brown to black and rayless with age. Length to eight inches. Pseudocardinal teeth small, tubercular; one in each valve in young individuals. Lateral teeth poorly developed or absent. Beak cavity moderately shallow. Nacre white, iridescent in young individuals and on the posterior fourth of shell in adults

Host Fish

Unknown

Ecobasins

Boston Mountains - Arkansas River

Ouachita Mountains - Ouachita River

South Central Plains - Ouachita River

Habitats

Weight

Natural Pool: Headwater - Medium - Large

Optimal

Natural Run: - Medium - Large

Optimal

Natural Shoal: - Medium - Large

Suitable

Problems Faced

Threat: Habitat destruction

Source: Channel alteration

Threat: Habitat destruction

Source: Channel maintenance

Threat: Habitat destruction

Source: Municipal/Industrial point source

Threat: Hydrological alteration

Source: Dam

Threat: Hydrological alteration

Source: Water diversion

Data Gaps/Research Needs

Conduct life history study.

Determine environmental stressors such as nutrient loading, toxicity to chemicals and metals, sedimentation effects, etc.

Determine habitat preferences and availability.

Determine host fish suitability and host fish availability.

Determine viability of species in the Ouachita River in Arkansas.

Survey streams for additional populations.

Conservation Actions

	Importance	Category
Develop an outreach/education program.	Low	Public Relations/Education
Manage watershed, addressing physical, chemical, biological and land use components, to restore or sustain aquatic life.	High	Threat Abatement
Partner with other agencies to prevent loss of suitable habitat.	High	Habitat Protection
Propagate, augment and reintroduce species where appropriate.	Medium	Population Management

Monitoring Strategies

Additional information is needed before a monitoring strategy can be developed.

Comments

Federally-listed candidate species. Extremely rare, on periphery of range. Known from one relic above Lake Ouachita but known to occur downstream of Remmel Dam (Malvern, Ark.) in the Ouachita River mainstem. Surveys from 2012-2014 have detected reproducing populations in the Ouachita River below Remmel Dam. One record reported from the Mulberry River. Additional surveys in the Mulberry River have not detected additional animals. A difficult species to detect since it utilizes habitat that is not generally used by other bivalve species. Habitat preference includes sand/gravel/silt beneath overhanging boulders. Three host fish trials have not determined the host fish. (AFMC 2004a, 2004b, 2004c, 2005, AGFC 2003, Coker 1919, Crump 2003, Crump and others 2003a, 2003c, 2003d, 2003e, 2003g, 2003q, 2003r, 2003t, Cummings and Mayer 1992, Gordon 1980a, Gordon and Harris 1983, Gordon and others 1980, Harris 1999, 1999a, Harris and Gordon 1987, 1990, Harris and others 1997, K. Inuoe, pers. Comm., Johnson 1980, ORVET 2003, Posey and others 1996, Stoeckel and others 1996, Turgeon and others 1988, 1998, USDA FS 1999, USFWS 2004, Wheeler 1918, Williams & others 1993).

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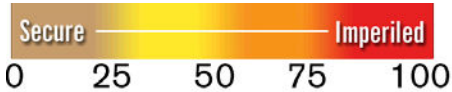
Cyprogenia aberti

Western Fanshell

Class: Bivalvia

Order: Unionoida

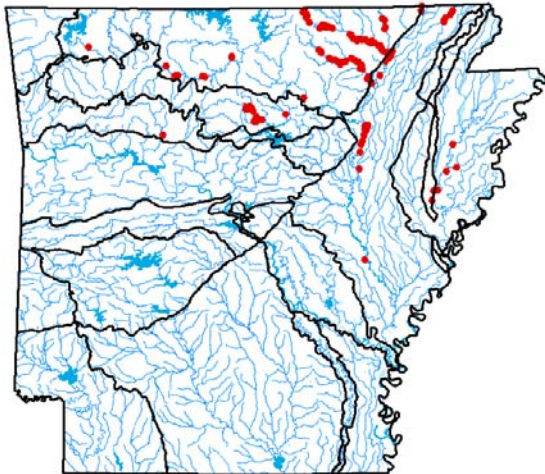
Family: Unionidae

Priority Score: **43** out of 100

Population Trend: Decreasing

Global Rank: G2G3Q — Imperiled (uncertain rank) questionable taxonomy

State Rank: S3 — Vulnerable in Arkansas

**Distribution****Occurrence Records**

Ecoregions where the species occurs:

- ☒ Ozark Highlands
- ☒ Boston Mountains
- ☐ Arkansas Valley
- ☐ Ouachita Mountains
- ☐ South Central Plains
- ☒ Mississippi Alluvial Plain
- ☐ Mississippi Valley Loess Plains

Suitable Substrate gravel/sand**Description**

Shell rounded, solid, and moderately inflated. Anterior margin rounded, posterior margin bluntly rounded or truncated. Ventral margin broadly rounded. Umbos not elevated above the hinge line.

Beak sculpture, if visible, of a few weak ridges. Growth lines appear as distinct elevated ridges. Numerous pustules usually concentrated in the center but occasionally covering the entire surface of the shell. Periostracum usually greenish yellow, with a pattern of dark green rays made up of numerous smaller broken lines or dots. Length to three inches (7.6 cm). Pseudocardinal teeth relatively large and serrated; two in the left valve, one in the right. Lateral teeth roughened, straight to slightly curved, heavy and very short. Interdentum wide. Beak cavity shallow to moderately deep. Nacre white, iridescent posteriorly.

Host Fish

Fantail Darter, Logperch, Slenderhead Darter

Ecobasins

Boston Mountains - Arkansas River

Boston Mountains - White River

Mississippi River Alluvial Plain - St. Francis River

Mississippi River Alluvial Plain - White River

Ozark Highlands - White River

Habitats

Weight

Natural Glide: Headwater

Optimal

Natural Pool: Headwater - Medium - Large

Suitable

Natural Riffle: Headwater

Optimal

Natural Run: Headwater - Medium - Large

Optimal

Natural Shoal: - Medium - Large

Suitable

Problems Faced

Threat: Habitat destruction

Source: Dam

Threat: Habitat destruction

Source: Grazing/Browsing

Threat: Habitat destruction

Source: Resource extraction

Threat: Nutrient loading

Source: Confined animal operations

Threat: Nutrient loading

Source: Grazing/Browsing

Threat: Sedimentation

Source: Forestry activities

Threat: Sedimentation

Source: Road construction

Data Gaps/Research Needs

Conduct life history study.

Continue genetic studies to determine taxonomy of the different groups.

Conservation Actions	Importance	Category
More data are needed to determine conservation actions.	High	Data Gap

Monitoring Strategies

Additional information is needed before a monitoring strategy can be developed.

Comments

Ongoing taxonomic work indicates that this complex may be comprised of more than one species, possibly up to three. Widespread, rare to locally common. The western fanshell may be declining across its range (AFMC 2004a, 2004b, 2004c, 2005, AGFC 2003, Ahlstedt and Jenkinson 1987, 1991, AHTD 1984, 1987, 1989, 1994, ANHI 2003, Bates and Dennis 1983, Branson 1984, Burns and McDonnell 1992a, Call 1895, Christian 1995, Clark 1987, Crump 2003, Crump and others 2003a, 2003c, 2003d, 2003e, 2003g, 2003q, 2003r, 2003t, Davidson 1997, Davidson and Gosse 2001, Davidson and others 2000, Eckert 2003, Ecological Consultants 1984, Gordon 1980, 1980a, 1982, Gordon and Brown 1980, Gordon and Harris 1983, Gordon and others 1980, Harris 1987, 1996, 1999, 1999a, Harris and Gordon 1985, 1988, 1990, Harris and Milam 2002, 2002a, Harris and others 1997, Jenkinson and Ahlstedt 1987, 1994, Johnson 1980, Mather 1990, Meek and Clark 1912, Miller and Harris 1987, Oesch 1995, ONHI 2003, Posey 1997, Roe and Chong 2014, Rust 1993, Stansbery 1970, Stansbery and Stein 1982, Stein and Stansbery 1980, Stoeckel and others 2000, Turgeon and others 1988, 1998, USDA FS 1999, Wheeler 1918, Williams & others 1993).

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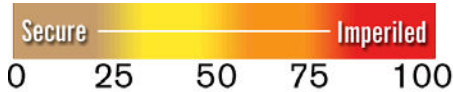
Cyprogenia sp. cf aberti

"Ouachita" Fanshell

Class: Bivalva

Order: Unionoida

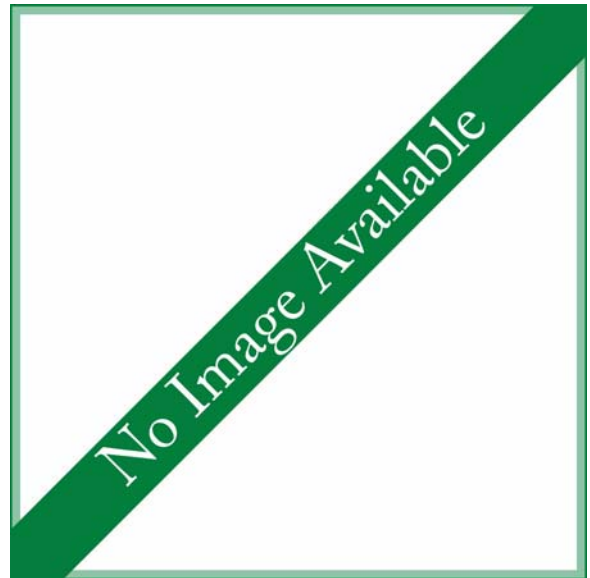
Family: Unionidae

Priority Score: **19** out of 100

Population Trend: Decreasing

Global Rank: GNR — Not yet ranked

State Rank: S3 — Vulnerable in Arkansas

**Distribution****Occurrence Records**

Ecoregions where the species occurs:

- ☐ Ozark Highlands
- ☐ Boston Mountains
- ☐ Arkansas Valley
- ☒ Ouachita Mountains
- ☒ South Central Plains
- ☐ Mississippi Alluvial Plain
- ☐ Mississippi Valley Loess Plains

Suitable Substrate gravel/sand**Description**

Shell rounded, solid, and moderately inflated. Anterior margin rounded, posterior margin bluntly rounded or truncated. Ventral margin broadly rounded. Umbos not elevated above the hinge line.

Cyprogenia sp. cf aberti
"Ouachita" Fanshell

Beak sculpture, if visible, of a few weak ridges. Growth lines appear as distinct elevated ridges. Numerous pustules usually concentrated in the center but occasionally covering the entire surface of the shell. Periostracum usually greenish yellow, with a pattern of dark green rays made up of numerous smaller broken lines or dots. Length to three inches (7.6 cm). Pseudocardinal teeth relatively large and serrated; two in the left valve, one in the right. Lateral teeth roughened, straight to slightly curved, heavy and very short. Interdentum wide. Beak cavity shallow to moderately deep. Nacre white, iridescent posteriorly.

Host Fish

Logperch, Orangebelly Darter

Ecobasins

Ouachita Mountains - Ouachita River

South Central Plains - Ouachita River

Habitats	Weight
Natural Glide: Headwater	Optimal
Natural Pool: Headwater - Medium	Suitable
Natural Riffle: Headwater	Optimal
Natural Run: Headwater - Medium - Large	Optimal
Natural Shoal: - Medium - Large	Suitable

Problems Faced

Threat: Habitat destruction
Source: Dam

Threat: Habitat destruction
Source: Grazing/Browsing

Threat: Habitat destruction
Source: Resource extraction

Threat: Nutrient loading
Source: Confined animal operations

Threat: Nutrient loading
Source: Grazing/Browsing

Threat: Sedimentation
Source: Forestry activities

Threat: Sedimentation
Source: Road construction

Conservation Actions	Importance	Category
More data are needed to determine conservation actions.	High	Data Gap

Monitoring Strategies

Additional information is needed before a monitoring strategy can be developed.

Comments

Ongoing taxonomic work indicates that this complex may be comprised of more than one species, possibly up to three. Widespread, rare to locally common. The western fanshell may be declining across its range (AFMC 2004a, 2004b, 2004c, 2005, AGFC 2003, Ahlstedt and Jenkinson 1987, 1991, AHTD 1984, 1987, 1989, 1994, ANHI 2003, Bates and Dennis 1983, Branson 1984, Burns and McDonnell 1992a, Call 1895, Christian 1995, Clark 1987, Crump 2003, Crump and others 2003a, 2003c, 2003d, 2003e, 2003g, 2003q, 2003r, 2003t, Davidson 1997, Davidson and Gosse 2001, Davidson and others 2000, Ecological Consultants 1984, Gordon 1980, 1980a, 1982, Gordon and Brown 1980, Gordon and Harris 1983, Gordon and others 1980, Harris 1987, 1996, 1999, 1999a, Harris and Gordon 1985, 1988, 1990, Harris and Milam 2002, 2002a, Harris and others 1997, Jenkinson and Ahlstedt 1987, 1994, Johnson 1980, Mather 1990, Meek and Clark 1912, Miller and Harris 1987, Oesch 1995, ONHI 2003, Posey 1997, Rust 1993, Stansbery 1970, Stansbery and Stein 1982, Stein and Stansbery 1980, Stoeckel and others 2000, Turgeon and others 1988, 1998, USDA FS 1999, Wheeler 1918, Williams & others 1993).

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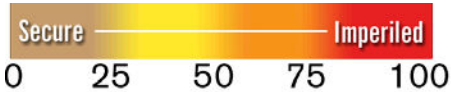
Epioblasma florentina curtisii

Curtis Pearlymussel

Class: Bivalvia

Order: Unionoida

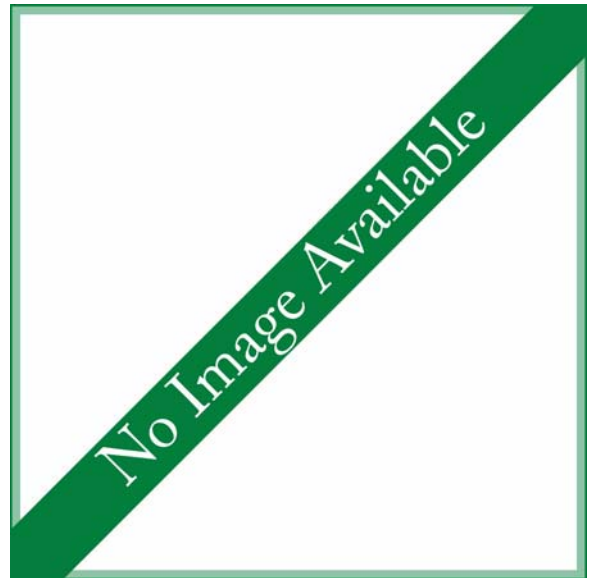
Family: Unionidae

Priority Score: **100** out of 100

Population Trend: Decreasing

Global Rank: G1T1 — Critically imperiled subspecies

State Rank: S1 — Critically imperiled in Arkansas

**Distribution****Occurrence Records**

Ecoregions where the species occurs:

- ☒ Ozark Highlands
- ☐ Boston Mountains
- ☐ Arkansas Valley
- ☐ Ouachita Mountains
- ☐ South Central Plains
- ☐ Mississippi Alluvial Plain
- ☐ Mississippi Valley Loess Plains

Suitable Substrate gravel**Description**

Shell small (less than 1.5 inches), yellowish brown to brown, sometimes with fine evenly spaced rays over most of its length. Beak broad and low and beak sculpture usually eroded away. Males oval in

shape, with the anterior end smoothly rounded, and the posterior end bluntly pointed and biangular. Female smoothly rounded anteriorly and broadly rounded and inflated posteriorly, posterior edge serrated. Nacre white to whitish-blue, hinge line broadly curved. Cardinal teeth high, triangular and divergent.

Host Fish

Rainbow Darter

Ecobasins

Ozark Highlands - White River

Habitats

Natural Riffle: Headwater

Natural Run: Headwater

Weight

Suitable

Optimal

Problems Faced

Threat: Habitat destruction

Source: Grazing/Browsing

Threat: Habitat destruction

Source: Recreation

Threat: Nutrient loading

Source: Confined animal operations

Threat: Nutrient loading

Source: Grazing/Browsing

Threat: Nutrient loading

Source: Urban development

Data Gaps/Research Needs

Continue searching for species using eDNA technology.

Conservation Actions

Develop an outreach program.

Find females and propagate juveniles for release.

Protect habitat from recreational uses.

Protect host fish and associated habitat.

Protect or enhance riparian buffer.

Importance Category

Medium

High

Medium

High

High

Public Relations/Education

Population Management

Habitat Protection

Habitat Protection

Habitat Restoration/Improvement

Monitoring Strategies

Survey in accordance with U.S. Fish and Wildlife Service recovery plan.

Comments

Historically known from the Spring Rivers in Arkansas. Reported from South Fork Spring River in early 1980s. A 2007 Status Assessment conducted throughout its range yielded no live or dead individuals. The last live specimen was found in the Little Black River in Missouri in 1993. (AFMC 2004a, 2004b, 2004c, 2005, Bruendeman and others 2001, Harris and others 2007)

Taxa Association Team and Peer Reviewers

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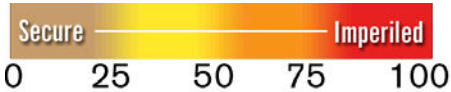
Epioblasma triquetra

Snuffbox

Class: Bivalvia

Order: Unionoida

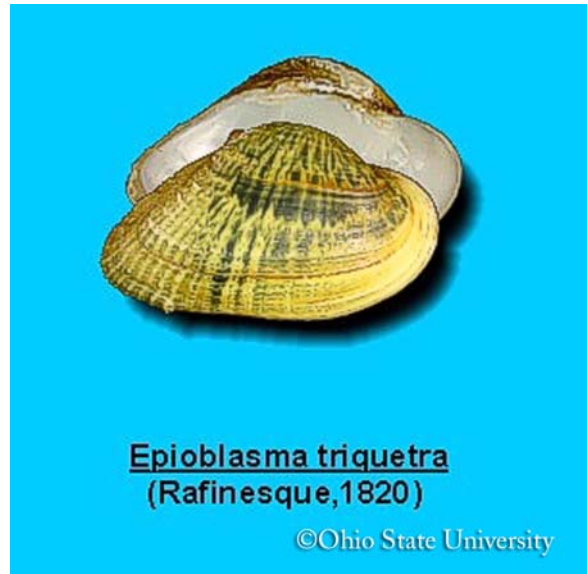
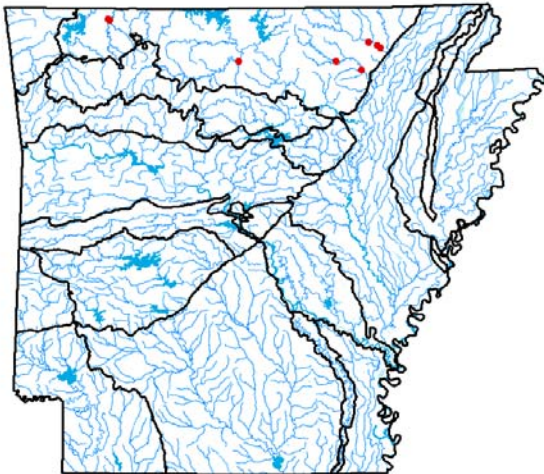
Family: Unionidae

Priority Score: **43** out of 100

Population Trend: Decreasing

Global Rank: G3 — Vulnerable species

State Rank: S1 — Critically imperiled in Arkansas

**Distribution****Occurrence Records**

Ecoregions where the species occurs:

- ☒ Ozark Highlands
- ☐ Boston Mountains
- ☐ Arkansas Valley
- ☐ Ouachita Mountains
- ☐ South Central Plains
- ☐ Mississippi Alluvial Plain
- ☐ Mississippi Valley Loess Plains

Suitable Substrate gravel**Description**

Shell small, fairly solid, triangular (males) to somewhat elongate (females) and inflated (particularly in females). Anterior end rounded, posterior end truncated in males, expanded in females. Dorsal and

ventral margins straight to slightly curved. Posterior ridge sharply angled, posterior slope wide, expanded, and ribbed (especially in females). Umbos swollen and slightly elevated above the hinge line. Beak sculpture of three or four faint, double-looped bars. Periostracum yellow or yellowish green, with numerous dark green rays, blotches or chevron-shaped markings. Length to 2.5 inches (6.4 cm). Pseudocardinal teeth elevated, roughened, relatively thin and compressed; two in the left valve, two in the right, with the front one being thinner and much smaller. Lateral teeth very short, slightly curved, serrated, and elevated. Beak cavity fairly deep. Nacre pearly white, iridescent posteriorly.

Host Fish

Banded Sculpin, Logperch

Ecobasins

Ozark Highlands - White River

Habitats

Natural Riffle: Headwater - Small - Medium

Natural Run: Headwater - Small - Medium

Weight

Suitable

Optimal

Problems Faced

Threat: Habitat destruction

Source: Grazing/Browsing

Threat: Habitat destruction

Source: Recreation

Threat: Nutrient loading

Source: Confined animal operations

Threat: Nutrient loading

Source: Grazing/Browsing

Threat: Nutrient loading

Source: Urban development

Data Gaps/Research Needs

Conduct genetic research to address taxonomic questions.

Conduct status survey.

Conduct survey for additional populations.

Determine environmental stressors such as nutrient loading, toxicity to chemicals and metals, sedimentation effects, etc.

Conservation Actions

	Importance	Category
Develop an outreach program.	Medium	Public Relations/Education
Propagate, augment and reintroduce species where appropriate.	High	Population Management
Protect habitat from recreational uses.	Medium	Habitat Protection
Protect host fish and associated habitat.	High	Habitat Restoration/Improvement
Protect or enhance riparian buffer.	High	Habitat Restoration/Improvement

Monitoring Strategies

Additional information is needed before a monitoring strategy can be developed.

Comments

Appears to be a viable population in the Spring River, and one live individual has been found in the Buffalo River. Relict shells have been found in the Kings and Strawberry rivers. Widespread distribution in North America but declining rangewide and is thought to exist in 40 percent of its former range (AFMC 2004a, 2004b, 2004c, 2005, Matthews 2007, Roe 2002).

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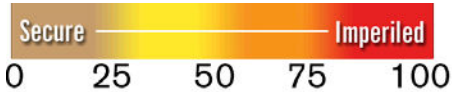
Epioblasma turgidula

Turgid Blossom

Class: Bivalvia

Order: Unionoida

Family: Unionidae

Priority Score: **100** out of 100

Population Trend: Decreasing

Global Rank: GX — Presumed extinct

State Rank: SX — Presumed extinct

**Distribution****Occurrence Records**

Ecoregions where the species occurs:

- ☒ Ozark Highlands
- ☐ Boston Mountains
- ☐ Arkansas Valley
- ☐ Ouachita Mountains
- ☐ South Central Plains
- ☐ Mississippi Alluvial Plain
- ☐ Mississippi Valley Loess Plains

Suitable Substrate gravel**Description**

Shell small, elliptical, ovate, or obovate in shape (maximum length 40 mm). Anterior end of shell rounded; posterior end of male shells pointed, while females are broadly rounded. Shell yellowish

green covered with numerous fine green rays evenly distributed over the shell surface. Nacre bluish-white.

Host Fish

Unknown

Ecobasins

Ozark Highlands - White River

Habitats

Natural Riffle: Headwater

Natural Run: Headwater

Weight

Data Gap

Data Gap

Problems Faced

Threat: Habitat destruction

Source: Grazing/Browsing

Threat: Habitat destruction

Source: Recreation

Threat: Nutrient loading

Source: Confined animal operations

Threat: Nutrient loading

Source: Grazing/Browsing

Threat: Nutrient loading

Source: Recreation

Data Gaps/Research Needs

Continue searching for species using eDNA technology.

Conservation Actions

Develop an outreach program.

Develop and implement habitat conservation plan.

Propagate, augment and reintroduce species where appropriate.

Protect habitat from recreational uses.

Protect or enhance riparian buffer.

Importance Category

Medium

Medium

Medium

Medium

Medium

Public Relations/Education

Habitat Restoration/Improvement

Population Management

Habitat Protection

Habitat Protection

Monitoring Strategies

Survey in accordance with U.S. Fish and Wildlife Service recovery plan.

Comments

Possibly extinct, but exhaustive surveys have not been conducted in Arkansas (AFMC 2004a, 2004b, 2004c, 2005, USFW 1985).

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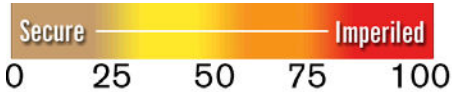
Fusconaia ozarkensis

Ozark Pigtoe

Class: Bivalvia

Order: Unionoida

Family: Unionidae

Priority Score: **23** out of 100

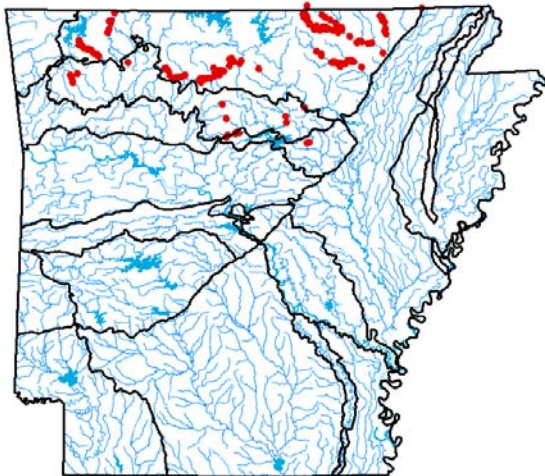
Population Trend: Unknown

Global Rank: G3G4 — Vulnerable (uncertain rank)

State Rank: S3 — Vulnerable in Arkansas

**Distribution**

Occurrence Records



Ecoregions where the species occurs:

- ☒ Ozark Highlands
- ☐ Boston Mountains
- ☐ Arkansas Valley
- ☐ Ouachita Mountains
- ☐ South Central Plains
- ☐ Mississippi Alluvial Plain
- ☐ Mississippi Valley Loess Plains

Suitable Substrate gravel/cobble

Description

Shell quadrate; dorsal margin straight or slightly curved; ventral margin gently convex to straight but may be concave; anterior end uniformly rounded; posterior margin with two angles. Shells thick, not

inflated, posterior ridge not prominent. Shell color tan with faint green rays in young individuals, becoming red-brown to black in older individuals. Left valve with two erect, triangular, striated pseudocardinals; lateral teeth nearly straight, relatively short and striated; right valve has one erect, stout, striated pseudocardinal; single lateral tooth is heavy, broad, striated; nacre white to blue-white, often tinged with pink.

Host Fish

Unknown

Ecobasins

Ozark Highlands - White River

Habitats	Weight
Natural Glide: Headwater	Suitable
Natural Pool: Headwater - Medium - Large	Suitable
Natural Riffle: Headwater	Optimal
Natural Run: Headwater - Medium - Large	Optimal
Natural Shoal: - Medium - Large	Suitable

Problems Faced

Threat: Habitat destruction

Source: Channel alteration

Threat: Habitat destruction

Source: Channel maintenance

Threat: Habitat destruction

Source: Dam

Threat: Hydrological alteration

Source: Dam

Threat: Nutrient loading

Source: Confined animal operations

Threat: Nutrient loading

Source: Grazing/Browsing

Data Gaps/Research Needs

Conduct genetic and life history studies to determine the taxonomic relationships of *Fusconaia* and *Pleurobema*.

Conduct status survey.

Conduct survey for additional populations.

Conservation Actions	Importance	Category
More data are needed to determine conservation actions.	Medium	Data Gap

Monitoring Strategies

Additional information is needed before a monitoring strategy can be developed.

Comments

Recognized form is widespread across Ozark Mountains in Arkansas and Missouri. Genetic uncertainty has resulted in uncertain distributional information. Genetic analysis will help determine phylogeography of species in Arkansas (AFMC 2004a, 2004b, 2004c, 2005).

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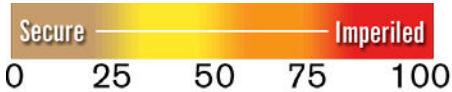
Fusconaia sp. cf. flava

"Elongate" Pigtoe

Class: Bivalva

Order: Unionoida

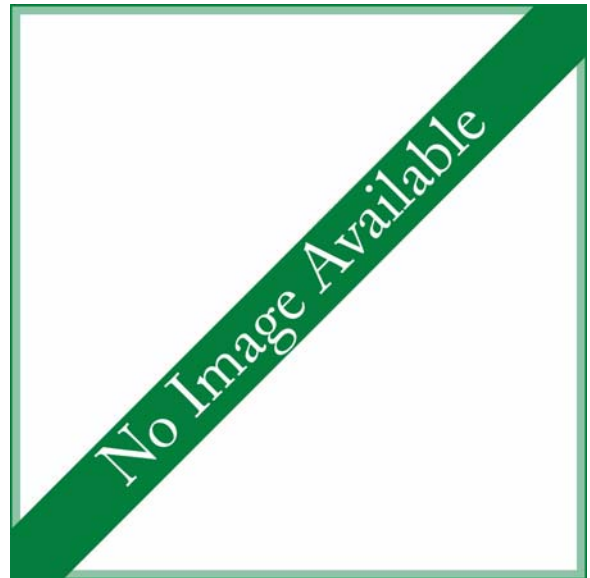
Family: Unionidae

Priority Score: **29** out of 100

Population Trend: Decreasing

Global Rank: GNR — Not yet ranked

State Rank: S1 — Critically imperiled in Arkansas

**Distribution****Occurrence Records**

Ecoregions where the species occurs:

- ☒ Ozark Highlands
- ☒ Boston Mountains
- ☐ Arkansas Valley
- ☐ Ouachita Mountains
- ☐ South Central Plains
- ☐ Mississippi Alluvial Plain
- ☐ Mississippi Valley Loess Plains

Suitable Substrate gravel**Description**

Valves thin to moderately thick, strong; shell thin to moderately inflated, outline quadrate to elongate; beaks low, turned forward. Posterior ridge indistinct; sulcus absent on disc. Periostracum has a

satiny or cloth-like sheen; fine green rays may be present, especially in young specimens. Pseudocardinal and lateral teeth well developed and solid; narrow interdentum; beak cavity moderately deep to deep. Nacre usually white. The species is most closely related to *Fusconaia flava*; however, it most closely resembles the Ozark pigtoe (*Fusconaia ozarkensis*) and is thought to occur only in Arkansas River tributaries in Arkansas, Kansas, Missouri and Oklahoma.

Host Fish

Unknown

Ecobasins

Boston Mountains - Arkansas River

Ozark Highlands - Arkansas River

Habitats	Weight
Natural Glide: Headwater	Suitable
Natural Pool: Headwater - Medium - Large	Optimal
Natural Riffle: Headwater	Optimal
Natural Run: Headwater - Medium - Large	Optimal
Natural Shoal: - Medium - Large	Suitable

Problems Faced

Threat: Nutrient loading
Source: Confined animal operations

Threat: Nutrient loading
Source: Grazing/Browsing

Threat: Nutrient loading
Source: Municipal/Industrial point source

Threat: Nutrient loading
Source: Urban development

Threat: Sedimentation
Source: Grazing/Browsing

Threat: Sedimentation
Source: Road construction

Threat: Sedimentation
Source: Urban development

Data Gaps/Research Needs

Conduct genetic research to determine phylogenetic relationships.

Conduct life history study.

Determine environmental stressors such as nutrient loading, toxicity to chemicals and metals, sedimentation effects, etc.

Determine habitat preferences and availability.

Determine host fish availability.

Conservation Actions

Importance Category

Develop an outreach program.	Medium	Public Relations/Education
Manage watershed, addressing physical, chemical, biological and land use components, to restore or sustain aquatic life.	High	Threat Abatement
Propagate, augment and reintroduce species where appropriate.	Low	Population Management
Protect host fish and associated habitat.	Medium	Habitat Protection
Reduce cattle access to the Illinois River.	Medium	Habitat Protection

Monitoring Strategies

Continue to monitor occurrence in ongoing river surveys.

Comments

This species was recognized by Hayes (2010) from the Illinois River based on genetic sampling. However, more samples are needed before a formal taxonomic change can be recommended.

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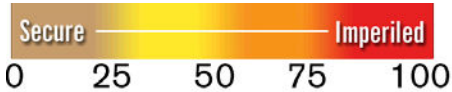
Lampsilis abrupta

Pink Mucket

Class: Bivalvia

Order: Unionoida

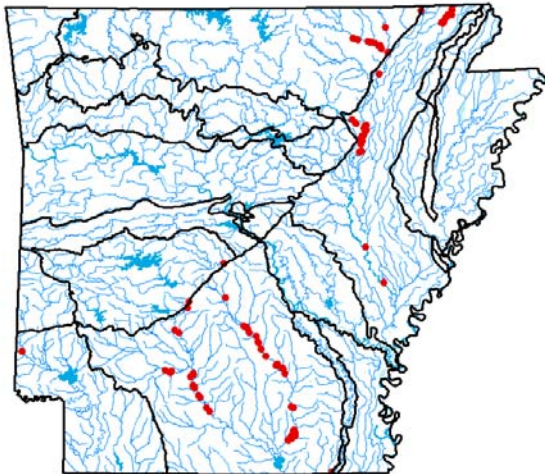
Family: Unionidae

Priority Score: **46** out of 100

Population Trend: Unknown

Global Rank: G2 — Imperiled species

State Rank: S2 — Imperiled in Arkansas

**Distribution****Occurrence Records**

Ecoregions where the species occurs:

- ☒ Ozark Highlands
- ☐ Boston Mountains
- ☐ Arkansas Valley
- ☐ Ouachita Mountains
- ☒ South Central Plains
- ☒ Mississippi Alluvial Plain
- ☐ Mississippi Valley Loess Plains

Suitable Substrate sand/gravel**Description**

Shell round to elliptical, solid, and inflated. Anterior end rounded, posterior end bluntly pointed in males, truncated in females. Dorsal margin straight, ventral margin straight to slightly curved. Umbos

turned forward and elevated above the hinge line. Beak sculpture, if visible, of three or four double-looped ridges. Shell smooth, yellow or yellowish green and rayless or with faint green rays. Length to four inches (10.2 cm). Pseudocardinal teeth triangular, thick, divergent; two in the left valve, one in the right, occasionally with a smaller tubercular tooth in front. Lateral teeth short, heavy, and relatively thick. Beak cavity deep. Nacre pink or white, iridescent posteriorly.

Host Fish

Smallmouth Bass, Largemouth Bass, Spotted Bass

Ecobasins

Mississippi River Alluvial Plain - White River

Ozark Highlands - White River

South Central Plains - Ouachita River

South Central Plains - Red River

Habitats

Weight

Natural Pool: - Medium - Large

Suitable

Natural Run: - Medium - Large

Optimal

Natural Shoal: - Medium - Large

Suitable

Problems Faced

Threat: Habitat destruction

Source: Channel alteration

Threat: Habitat destruction

Source: Channel maintenance

Threat: Habitat destruction

Source: Dam

Threat: Hydrological alteration

Source: Dam

Threat: Hydrological alteration

Source: Water diversion

Threat: Sedimentation

Source: Agricultural practices

Threat: Sedimentation

Source: Channel alteration

Threat: Sedimentation

Source: Channel maintenance

Threat: Sedimentation

Source: Dam

Threat: Sedimentation

Source: Forestry activities

Threat: Sedimentation

Source: Road construction

Data Gaps/Research Needs

Conduct genetic testing to determine species in Arkansas.

Conduct status survey.

Determine environmental stressors such as nutrient loading, toxicity to chemicals and metals, sedimentation effects, etc.

Determine host fish.

Conservation Actions

	Importance	Category
Avoid dredging White and Ouachita river beds and channel.	High	Habitat Protection
Develop an outreach program.	Medium	Public Relations/Education
Manage watershed, addressing physical, chemical, biological and land use components, to restore or sustain aquatic life.	Medium	Threat Abatement
Propagate, augment and reintroduce species where appropriate.	Medium	Population Management
Protect host fish and associated habitat.	Medium	Habitat Protection

Monitoring Strategies

Survey in accordance with U.S. Fish and Wildlife Service recovery plan.

Comments

Federally-listed endangered species. Taxonomic concerns are due to similarity of appearance with another species. May also be two separate species in Arkansas. Historically widespread but rarely common. The lack of recruitment and the difficulty with which it is found makes the species difficult to determine its status in Arkansas. In 2014, the USFWS and AGFC released 1,000 two-year old Pink mucket mussels into the Saline River in Ashley County. (AFMC 2004a, 2004b, 2004c, 2005, AGFC 2003, AHTD 1984, ANHI 2003, Bates and Dennis 1983, Christian 1995, Clark 1987, Coker 1919, Crump 2003, Crump and others 2003a, 2003c, 2003d, 2003e, 2003g, 2003q, 2003r, 2003t, Cummings and Mayer 1992, Davidson 1997, Gordon 1980a, 1982, Gordon and Harris 1983, Gordon and others 1980, Harris 1989d, 1990c, 1995, 1997c, 1999, 1999a, 2002, Harris and Gordon 1987, 1990, Harris and Milam 2002, 2002a, Harris and others 1997, Johnson 1980, Miller and Harris 1987, Oesch 1995, ONHI 2003, Posey 1997, Rust 1993, Stansbery 1970, Turgeon and others 1988, 1998, USDA FS 1999, Wheeler 1918, Williams & others 1993).

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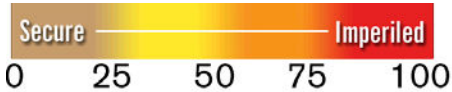
Lampsilis ornata

Southern Pocketbook

Class: Bivalvia

Order: Unionoida

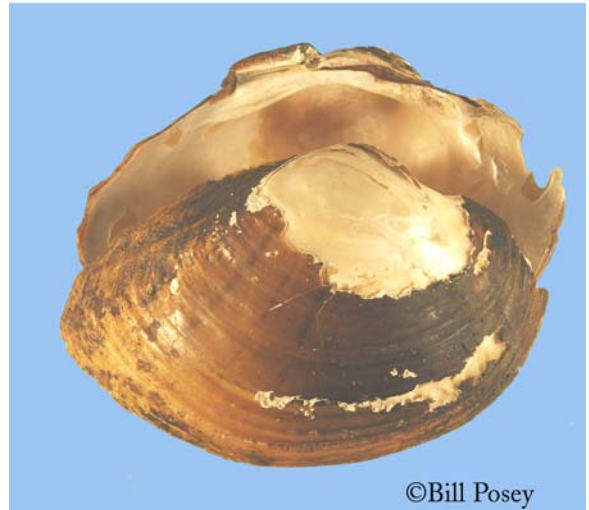
Family: Unionidae

Priority Score: **19** out of 100

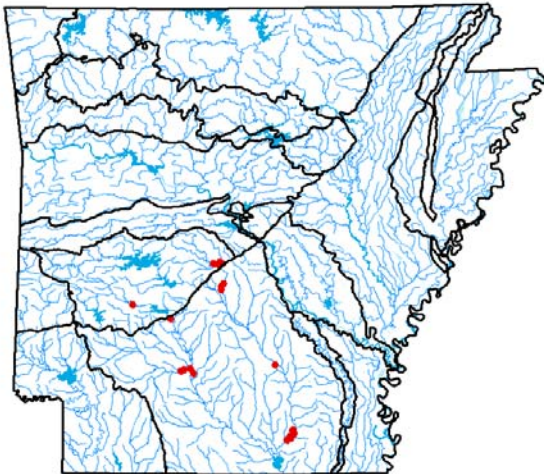
Population Trend: Unknown

Global Rank: G5 — Secure

State Rank: S2 — Imperiled in Arkansas



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Distribution**Occurrence Records**

Ecoregions where the species occurs:

- ☐ Ozark Highlands
- ☐ Boston Mountains
- ☐ Arkansas Valley
- ☒ Ouachita Mountains
- ☒ South Central Plains
- ☐ Mississippi Alluvial Plain
- ☐ Mississippi Valley Loess Plains

Suitable Substrate gravel**Description**

Shell inflated, subsolid, the male irregularly ovate or rhomboid, the female obovate, with a high, decided posterior ridge; beaks high and full. Shell tawny or greenish-yellow, showing a few greenish

rays. Two pseudocardinals in left valve, and two small remote laterals; right valve with two subcompressed, triangular pseudocardinals, and one high lateral truncated behind; nacre white.

Host Fish

Largemouth Bass

Ecobasins

Ouachita Mountains - Ouachita River

Habitats	Weight
Natural Oxbow - connected: - Medium - Large	Marginal
Natural Pool: Headwater - Medium - Large	Suitable
Natural Riffle: Headwater	Suitable
Natural Run: Headwater - Medium - Large	Optimal
Natural Shoal: - Medium - Large	Marginal

Problems Faced

Threat: Nutrient loading

Source:

Threat: Nutrient loading

Source:

Threat: Nutrient loading

Source:

Data Gaps/Research Needs

Conduct distribution surveys.

Conduct genetic study to determine extent of population in Arkansas.

Determine habitat preferences and availability.

Determine host fish suitability and availability.

Conservation Actions	Importance	Category
Manage watershed, addressing physical, chemical, biological and land use components, to restore or sustain aquatic life.	Medium	Threat Abatement

Monitoring Strategies

Additional information is needed before a monitoring strategy can be developed.

Comments

Peripheral. Scattered distribution. Low density in the Ouachita Mountain portion of its range. The Southern Pocketbook has only been confirmed from the Saline River in Arkansas. Although this species is not considered to be very threatened rangewide, the small number of occurrences known from Arkansas seems to indicate that this species is rare (AFMC 2004a, 2004b, 2004c, 2005, AGFC 2003, ANHI 2003, Crump 2003, Crump and others 2003a, 2003c, 2003d, 2003e, 2003g, 2003q, 2003r, 2003t, Gordon and Harris 1983, Harris 1999, Harris and Gordon 1987, Harris and others 1997, Johnson 1980, Turgeon and others 1988, 1998, USDA FS 1999, Williams & others 1993).

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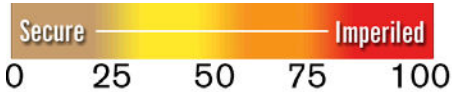
Lampsilis powellii

Arkansas Fatmucket

Class: Bivalvia

Order: Unionoida

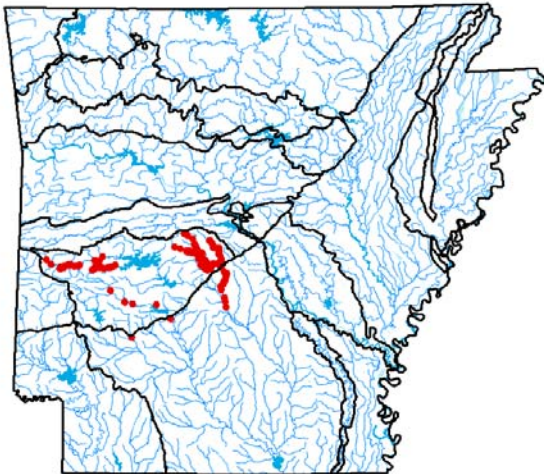
Family: Unionidae

Priority Score: **57** out of 100

Population Trend: Decreasing

Global Rank: G2 — Imperiled species

State Rank: S2 — Imperiled in Arkansas

**Distribution****Occurrence Records**

Ecoregions where the species occurs:

- ☐ Ozark Highlands
- ☐ Boston Mountains
- ☐ Arkansas Valley
- ☒ Ouachita Mountains
- ☒ South Central Plains
- ☐ Mississippi Alluvial Plain
- ☐ Mississippi Valley Loess Plains

Suitable Substrate gravel/sand**Description**

Shell oblong to quadrate and slightly to moderately inflated, with thin to moderately thick valves. Shell color is yellow to tan and color rays are always absent. Nacre and both pseudocardinal and lateral

teeth are thin but well developed. Maximum length is about six inches.

Host Fish

Spotted Bass, Largemouth Bass

Ecobasins

Ouachita Mountains - Ouachita River

South Central Plains - Ouachita River

Habitats

Weight

Natural Pool: Headwater - Medium - Large

Suitable

Natural Riffle: Headwater

Marginal

Natural Run: Headwater - Medium - Large

Suitable

Natural Shoal: - Medium - Large

Marginal

Natural Side channel: - Medium - Large

Optimal

Problems Faced

Threat: Nutrient loading

Source: Confined animal operations

Threat: Nutrient loading

Source: Grazing/Browsing

Threat: Nutrient loading

Source: Recreation

Threat: Nutrient loading

Source: Urban development

Threat: Sedimentation

Source: Grazing/Browsing

Threat: Sedimentation

Source: Road construction

Threat: Sedimentation

Source: Urban development

Data Gaps/Research Needs

Determine environmental stressors such as nutrient loading, toxicity to chemicals and metals, sedimentation effects, etc.

Determine habitat preferences and availability.

Determine host fish availability.

Conservation Actions

	Importance	Category
Develop an outreach program.	Medium	Public Relations/Education
Implement a Safe Harbor agreement.	High	Habitat Protection
Manage watershed, addressing physical, chemical, biological and land use components, to restore or sustain aquatic life with emphasis in the Saline and Ouachita Rivers.	High	Threat Abatement
Propagate, augment and reintroduce species where appropriate.	High	Population Management
Protect host fish and associated habitat.	Medium	Habitat Protection

Monitoring Strategies

Survey in accordance with U.S. Fish and Wildlife Service recovery plan.

Comments

Federally-listed threatened species. Ouachita River drainage endemic. Main populations are in the Forks of the Saline, South Fork Ouachita and upper Ouachita rivers. Restricted distribution and relatively common in preferred habitat, its population sizes appear small; however, its frequency of capture may be decreasing. Host fish availability was conducted in 2004. Propagating and releasing juveniles is a high priority in the Ouachita and Caddo rivers where the species has become difficult to locate. (AFMC 2004a, 2004b, 2004c, 2005, AGFC 2003, AHTD 1989, 1994, ANHI 2003, Branson 1984, Brown and Brown 1989, Burns and McDonnell 1992, 1992a, Crump 2003, Crump and others 2003a, 2003c, 2003d, 2003e, 2003g, 2003q, 2003r, 2003t, Davidson and Gosse 2001, Gordon and Harris 1983, 1985, Harris 1989c, 1991a, 1994a, 1999, 1999a, Harris and Gordon 1987, 1988, 1990, Harris and others 1992, 1997, Johnson 1980, Scott 2004, Turgeon and others 1988, 1998, Turner and others 2000, USDA FS 1999, USDI FWS 1990, 1992, Williams & others 1993).

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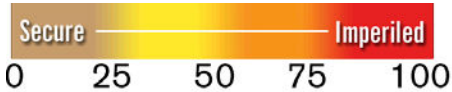
Lampsilis rafinesqueana

Neosho Mucket

Class: Bivalvia

Order: Unionoida

Family: Unionidae

Priority Score: **62** out of 100

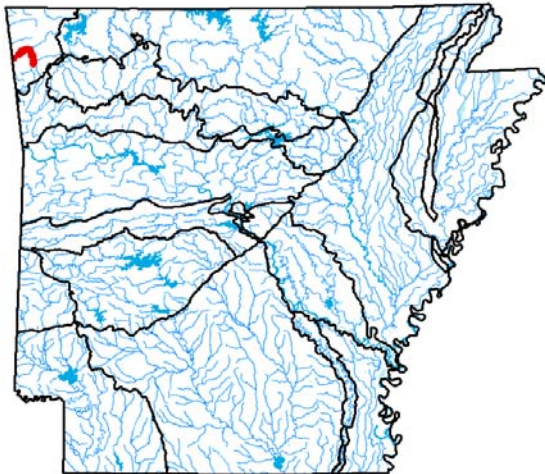
Population Trend: Decreasing

Global Rank: G2 — Imperiled species

State Rank: S1 — Critically imperiled in Arkansas



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Distribution**Occurrence Records**

Ecoregions where the species occurs:

- ☒ Ozark Highlands
- ☒ Boston Mountains
- ☐ Arkansas Valley
- ☐ Ouachita Mountains
- ☐ South Central Plains
- ☐ Mississippi Alluvial Plain
- ☐ Mississippi Valley Loess Plains

Suitable Substrate gravel**Description**

Shell oblong, dorsal line gently rounded, ventral line straight to gently curved; anterior end uniformly rounded, posterior end truncated above and at the posterior ridge which usually gives it a biangulate

appearance; compressed; relatively strong although thin; beaks low; shell light brown and has a dull, waxy luster; green rays cover surface; left valve has two stout, divergent, striated, triangular pseudocardinal teeth; the two lateral teeth are short, stout and slightly curved; right valve has a tall, triangular to columnar, striated pseudocardinal, a low, lamellar tooth can be seen anteriorly; right lateral tooth is short, stout and slightly curved. Nacre is bluish-white to white, slightly iridescent posteriorly.

Host Fish

Largemouth Bass, Smallmouth Bass

Ecobasins

Boston Mountains - Arkansas River

Ozark Highlands - Arkansas River

Habitats	Weight
Natural Glide: Headwater	Suitable
Natural Pool: Headwater - Medium - Large	Optimal
Natural Riffle: Headwater	Optimal
Natural Run: Headwater - Medium - Large	Optimal
Natural Shoal: - Medium - Large	Suitable

Problems Faced

Threat: Nutrient loading

Source: Confined animal operations

Threat: Nutrient loading

Source: Grazing/Browsing

Threat: Nutrient loading

Source: Municipal/Industrial point source

Threat: Nutrient loading

Source: Urban development

Threat: Sedimentation

Source: Grazing/Browsing

Threat: Sedimentation

Source: Road construction

Threat: Sedimentation

Source: Urban development

Data Gaps/Research Needs

Conduct life history study.

Determine environmental stressors such as nutrient loading, toxicity to chemicals and metals, sedimentation effects, etc.

Determine genetic structure among extant populations across the range.

Determine habitat preferences and availability,

Determine host fish availability.

Conservation Actions

	Importance	Category
Develop an outreach program.	Medium	Public Relations/Education
Manage watershed, addressing physical, chemical, biological and land use components, to restore or sustain aquatic life.	High	Threat Abatement
Propagate, augment and reintroduce species where appropriate.	Low	Population Management
Protect host fish and associated habitat.	Medium	Habitat Protection
Reduce cattle access to the Illinois River.	High	Habitat Protection

Monitoring Strategies

Continue to monitor occurrence in ongoing river surveys.

Comments

Federally-listed endangered species. Endemic to Arkansas River drainage streams in Arkansas, Oklahoma, Kansas and Missouri. Most imperiled in Kansas streams where it has been lost in several stream segments. Propagation and augmentation efforts are showing signs of success in Kansas streams. Genetic research to determine phylogenetic relationships was completed in 2004 and confirmed the Neosho Mucket as a valid species. (AFMC 2004a, 2004b, 2004c, 2005, Chris Barnhart, personal communication 2005, USFWS 2013).

Taxa Association Team and Peer Reviewers

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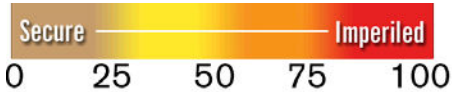
Lampsilis sp. A cf hydiana

"Arkoma" Fatmucket

Class: Bivalva

Order: Unionoida

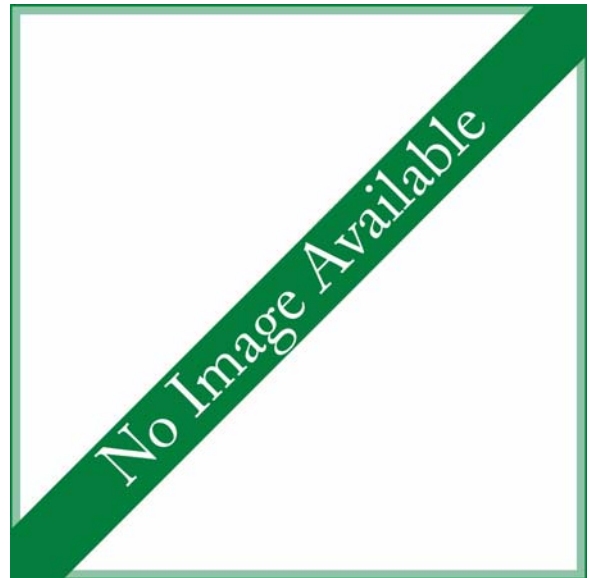
Family: Unionidae

Priority Score: **15** out of 100

Population Trend: Unknown

Global Rank: GNR — Not yet ranked

State Rank: S3 — Vulnerable in Arkansas

**Distribution****Occurrence Records**

Ecoregions where the species occurs:

- ☐ Ozark Highlands
- ☐ Boston Mountains
- ☒ Arkansas Valley
- ☒ Ouachita Mountains
- ☐ South Central Plains
- ☐ Mississippi Alluvial Plain
- ☐ Mississippi Valley Loess Plains

Suitable Substrate unknown**Description**

Currently undescribed.

Host Fish

Lampsilis sp. A cf hydiana
 "Arkoma" Fatmucket

Unknown

Ecobasins

Arkansas Valley - Arkansas River

Ouachita Mountains - Arkansas River

Habitats

Natural Pool: - Small - Medium

Natural Riffle: - Small - Medium

Natural Run: - Small - Medium

Weight

Data Gap

Data Gap

Data Gap

Problems Faced

Threat: Sedimentation

Source: Resource extraction

Data Gaps/Research Needs

Conduct life history study.

Describe species and determine distribution.

Determine habitat preferences.

Determine host fish suitability and availability.

Identify threats and sources of threats.

Conservation Actions

More data are needed to determine conservation actions.

Importance Category

Medium Data Gap

Monitoring Strategies

Additional information is needed before a monitoring strategy can be developed.

Comments

This is an undescribed species that was historically treated as *Lampsilis hydiana*. Future work will develop global and state rankings and needs for this species (AFMC 2004a, 2004b, 2004c, 2005, Harris and others 2004).

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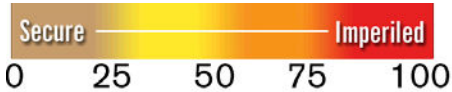
Lampsilis sp. B cf hydiana

"Red River" Mucket

Class: Bivalva

Order: Unionoida

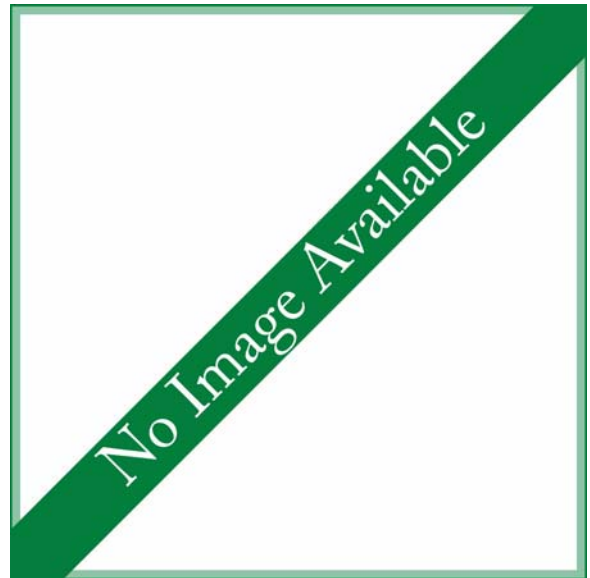
Family: Unionidae

Priority Score: **19** out of 100

Population Trend: Unknown

Global Rank: GNR — Not yet ranked

State Rank: S2 — Imperiled in Arkansas

**Distribution****Occurrence Records**

Ecoregions where the species occurs:

- ☐ Ozark Highlands
- ☐ Boston Mountains
- ☐ Arkansas Valley
- ☐ Ouachita Mountains
- ☒ South Central Plains
- ☐ Mississippi Alluvial Plain
- ☐ Mississippi Valley Loess Plains

Suitable Substrate unknown**Description**

Currently undescribed.

Host Fish

Lampsilis sp. B cf hydiana
 "Red River" Mucket

Unknown

Ecobasins

South Central Plains - Red River

Habitats

Natural Pool: - Medium

Natural Riffle:

Natural Run:

Weight

Suitable

Data Gap

Data Gap

Problems Faced

Threat:

Source:

Data Gaps/Research Needs

Conduct life history study.

Determine distribution.

Determine habitat preferences.

Determine host fish suitability and availability.

Identify threats and sources of threats.

Conservation Actions

More data are needed to determine conservation actions.

Importance Category

Medium

Data Gap

Monitoring Strategies

Additional information is needed before a monitoring strategy can be developed.

Comments

This is an undescribed species that was historically treated as *Lampsilis hydiana*. Future work will develop global rankings. State ranks have been developed. (AFMC 2004a, 2004b, 2004c, 2005, Harris and others 2004; Harris and Posey 2015).

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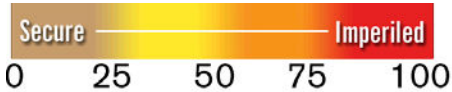
Lampsilis streckeri

Speckled Pocketbook

Class: Bivalvia

Order: Unionoida

Family: Unionidae

Priority Score: **80** out of 100

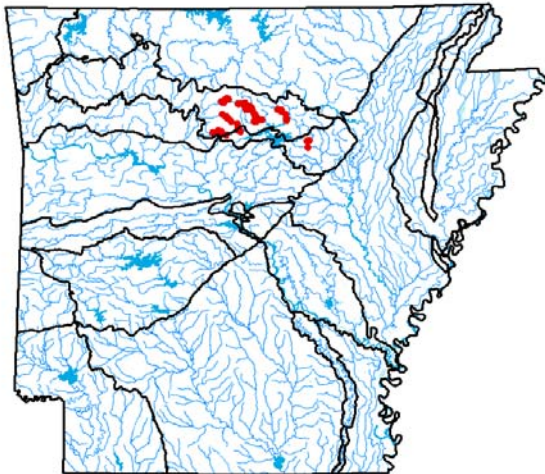
Population Trend: Stable



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Global Rank: G1Q — Critically imperiled (questionable taxonomy)

State Rank: S1 — Critically imperiled in Arkansas

Distribution**Occurrence Records**

Ecoregions where the species occurs:

- ☐ Ozark Highlands
- ☒ Boston Mountains
- ☐ Arkansas Valley
- ☐ Ouachita Mountains
- ☐ South Central Plains
- ☐ Mississippi Alluvial Plain
- ☐ Mississippi Valley Loess Plains

Suitable Substrate gravel

Description

Shell oblong to quadrate, moderately inflated with thin to moderately thick valves. Pseudocardinal and lateral teeth are thin but well developed. Shell color ranges from yellow to green to tan, with

numerous thin, broken rays and flecks extending from the umbo to the posterior margin. Nacre grayish to iridescent, and maximum length is about four inches.

Host Fish

Green Sunfish, Bluegill, Longear Sunfish, Redear Sunfish, Spotted Sunfish, Smallmouth Bass, Spotted Bass, Largemouth Bass

Ecobasins

Boston Mountains - White River

Habitats	Weight
Natural Glide: Headwater	Suitable
Natural Pool: Headwater - Medium - Large	Optimal
Natural Riffle: Headwater	Suitable
Natural Run: Headwater - Medium - Large	Optimal
Natural Shoal: - Medium - Large	Suitable

Problems Faced

Threat: Habitat destruction
Source: Dam

Threat: Habitat destruction
Source: Grazing/Browsing

Threat: Habitat destruction
Source: Resource extraction

Threat: Nutrient loading
Source: Confined animal operations

Threat: Nutrient loading
Source: Grazing/Browsing

Threat: Sedimentation
Source: Forestry activities

Threat: Sedimentation
Source: Grazing/Browsing

Threat: Sedimentation
Source: Resource extraction

Threat: Sedimentation
Source: Road construction

Data Gaps/Research Needs

Conduct status survey.

Survey for additional populations.

Conservation Actions

	Importance	Category
Develop an outreach program.	Medium	Public Relations/Education
Implement Safe Harbor Agreement.	High	Habitat Restoration/Improvement
Manage watershed, addressing physical, chemical, biological and land use components, to restore or sustain aquatic life in the Little Red River basin.	High	Threat Abatement
Propagate, augment or reintroduce species where appropriate.	Low	Population Management
Protect and enhance riparian buffers.	High	Habitat Protection
Protect host fish and associated habitat.	Medium	Habitat Protection

Monitoring Strategies

Survey in accordance with U.S. Fish and Wildlife Service recovery plan.

Comments

Federally-listed endangered species. Endemic to Little Red River. Previously thought to only remain in Middle Fork Little Red River, but recent surveys found small populations in all forks (AFMC 2004a, 2004b, 2004c, 2005). Genetic research has confirmed the validity of this species (Harris and others 2004). The species has also been discovered in Big Creek, a tributary occurring downstream of Greers Ferry Dam.

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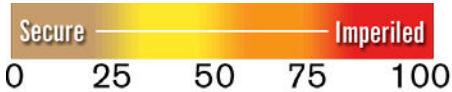
Leptodea leptodon

Scaleshell

Class: Bivalvia

Order: Unionoida

Family: Unionidae

Priority Score: **76** out of 100

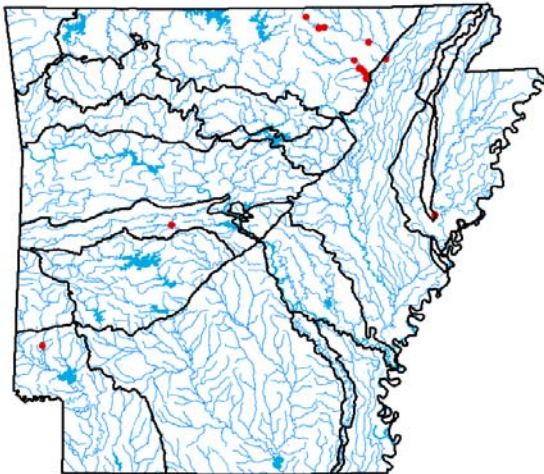
Population Trend: Decreasing

Global Rank: G1G2 — Critically imperiled (uncertain rank)

State Rank: S2 — Imperiled in Arkansas



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Distribution**Occurrence Records**

Ecoregions where the species occurs:

- ☒ Ozark Highlands
- ☐ Boston Mountains
- ☐ Arkansas Valley
- ☒ Ouachita Mountains
- ☒ South Central Plains
- ☒ Mississippi Alluvial Plain
- ☐ Mississippi Valley Loess Plains

Suitable Substrate gravel/sand**Description**

Shell relatively small, elongate, thin, and compressed. Anterior end rounded, posterior end pointed. Dorsal margin straight, ventral margin straight to broadly curved. Umbos small and low, about even

with the hinge line. Beak sculpture, if visible, of four or five double-looped ridges. Shell smooth, yellowish green or brown, with numerous faint green rays. Length to 4 inches (10.2 cm). Pseudocardinal teeth reduced to a small thickened ridge. Lateral teeth moderately long; two low, indistinct lateral teeth in left valve, one fine tooth in the right. Beak cavity very shallow or absent. Nacre pinkish white or light purple and highly iridescent.

Host Fish

Freshwater Drum

Ecobasins

Mississippi River Alluvial Plain - St. Francis River

Ouachita Mountains - Arkansas River

Ozark Highlands - White River

South Central Plains - Ouachita River

South Central Plains - Red River

Habitats

Weight

Natural Glide: Headwater

Optimal

Natural Riffle: Headwater

Optimal

Natural Run: Headwater - Medium - Large

Optimal

Natural Shoal: - Medium - Large

Suitable

Problems Faced

Threat: Habitat destruction

Source: Dam

Threat: Habitat destruction

Source: Grazing/Browsing

Threat: Habitat destruction

Source: Resource extraction

Threat: Nutrient loading

Source: Confined animal operations

Threat: Nutrient loading

Source: Grazing/Browsing

Threat: Sedimentation

Source: Forestry activities

Threat: Sedimentation

Source: Road construction

Data Gaps/Research Needs

Conduct status surveys.

Determine environmental stressors such as nutrient loading, toxicity to chemicals and metals, sedimentation effects, etc.

Conservation Actions

	Importance	Category
Develop an outreach program.	Medium	Public Relations/Education
Develop and implement a habitat conservation plan.	High	Habitat Restoration/Improvement
Propagate, augment and reintroduce species where appropriate.	High	Population Management
Protect host fish and associated habitat.	High	Habitat Restoration/Improvement

Monitoring Strategies

Survey in accordance with U.S. Fish and Wildlife
Service recovery plan.

Comments

Federally-listed endangered species. Poorly known, difficult to detect and extremely rare. Occurs in Arkansas, but distribution and densities not well understood. Scaleshell is found with increasing difficulty. Those found have been so rare that they do not appear to be members of viable populations. There has been no evidence of recent reproduction (AFMC 2004a, 2004b, 2004c, 2005, AGFC 2003, AHTD 1984, ANHI 2003, Bates and Dennis 1983, Branson 1984, Clark 1985, 1987, Crump 2003, Crump and others 2003a, 2003c, 2003d, 2003e, 2003g, 2003q, 2003r, 2003t, Cummings and Mayer 1992, Davidson and others 1997, Gordon 1980, 1980a, 1985, Gordon and others 1980, Harris 1992b, 1999, 1999a, 2002, Harris and Gordon 1987, 1990, Harris and Milam 2002, 2002a, Harris and others 1997, Jenkinson and Ahlstedt 1987, Johnson 1980, Mehlhop-Cifelli and Miller 1989, Oesch 1995, ONHI 2003, Stansbery 1970, Stoeckel and Mole 2002, Szymanski 1998, Turgeon and others 1988, 1998, USDA FS 1999, USDI FWS 1998, Vaughn 1996, Vaughn and Spooner 2000, Vaughn and others 1996, Wheeler 1918, Williams & others 1993).

A life history study was conducted by Barnhart and others in 1998, and a status assessment was completed in 2013 (Bouldin and others).

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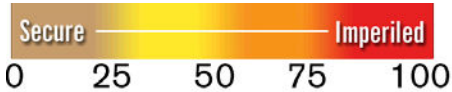
Margaritifera hembeli

Louisiana Pearlshell

Class: Bivalvia

Order: Unionoida

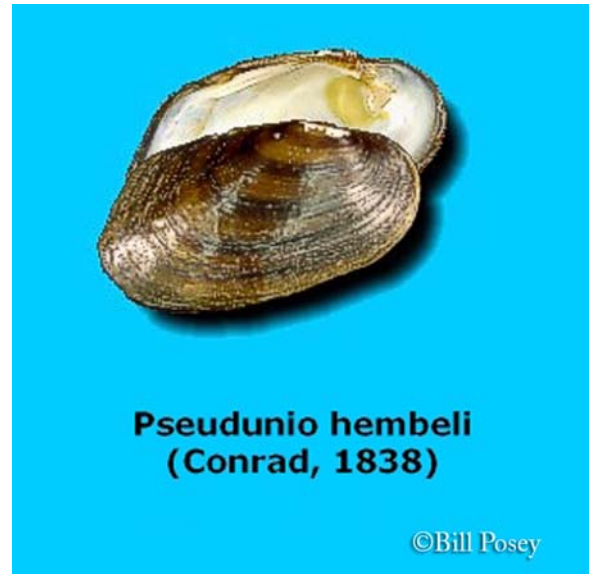
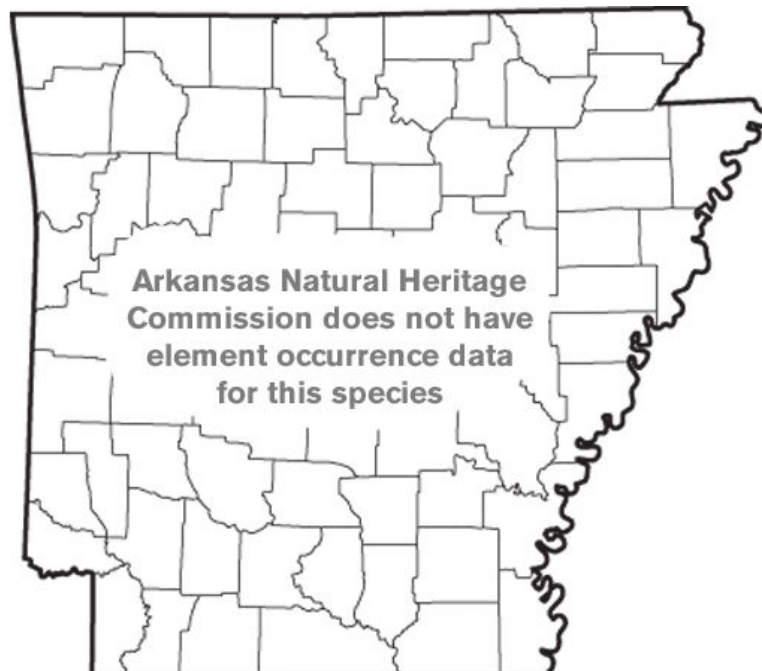
Family: Margaritiferidae

Priority Score: **65** out of 100

Population Trend: Unknown

Global Rank: G1 — Critically imperiled species

State Rank: SU — Presumed extirpated in Arkansas

**Distribution****Occurrence Records**Ecoregions where
the species occurs:

- ☐ Ozark Highlands
- ☐ Boston Mountains
- ☐ Arkansas Valley
- ☐ Ouachita Mountains
- ☒ South Central Plains
- ☐ Mississippi Alluvial Plain
- ☐ Mississippi Valley Loess Plains

Suitable Substrate ?

Description

Shell oblong, obovate to subrhomboid, sometimes a little arcuate, subsolid to solid, inequilateral;
beaks moderately full, their sculpture not seen; posterior ridge low, rounded or somewhat doubled;

Margaritifera hembeli
Louisiana Pearlshell

Shell brownish or blackish; left valve with two low, stumpy, rough pseudocardinals and two remote, feeble laterals; right valve with one pseudocardinal and behind it a vestige of a second with one lateral; nacre whitish or lurid purplish with numerous pits.

Host Fish

Striped Shiner, Redfin Shiner, Golden Shiner

Ecobasins

South Central Plains - Red River

Habitats

Natural Run: Headwater

Weight

Optimal

Problems Faced

Threat: Nutrient loading

Source: Grazing/Browsing

Threat: Nutrient loading

Source: Urban development

Data Gaps/Research Needs

Conduct distribution surveys.

Determine habitat preferences.

Determine problems faced and sources of problems faced.

Conservation Actions

More data is needed to determine conservation actions.

Importance

High

Category

Data Gap

Monitoring Strategies

Additional information is needed before a monitoring strategy can be developed.

Comments

Prefers water quality low in nutrients and is often found in runs along cobble banks in small streams. Only one record in Arkansas from Dorcheat Bayou (Columbia County). (AFMC 2004a, 2004b, 2004c, 2005, Paul Johnson personal communication 2005, Smith 2001).

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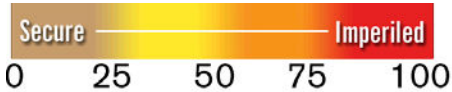
Obovaria olivaria

Hickorynut

Class: Bivalvia

Order: Unionoida

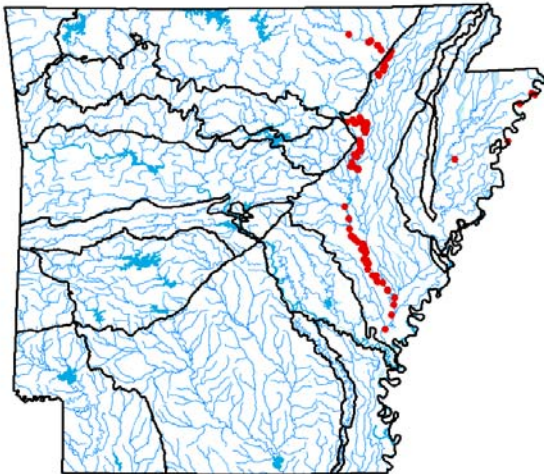
Family: Unionidae

Priority Score: **19** out of 100

Population Trend: Unknown

Global Rank: G4 — Apparently secure species

State Rank: S3 — Vulnerable in Arkansas

**Distribution****Occurrence Records**

Ecoregions where the species occurs:

- ☒ Ozark Highlands
- ☐ Boston Mountains
- ☐ Arkansas Valley
- ☐ Ouachita Mountains
- ☒ South Central Plains
- ☒ Mississippi Alluvial Plain
- ☐ Mississippi Valley Loess Plains

Suitable Substrate sand/gravel**Description**

Shell oval or oblong, thick, solid, and inflated. Anterior and posterior ends broadly rounded. Umbos slightly elevated above the hinge line, rounded, curved inward, and directed forward. Beak sculpture

Obovaria olivaria
Hickorynut

of four or five delicate, double-looped bars, usually evident only in very small shells. Shell smooth, olive green or yellowish brown, faintly rayed in young shells, becoming dark brown in old individuals. Length to four inches (10.2 cm). Pseudocardinal teeth triangular, relatively small, widely divergent, and horizontal. Lateral teeth straight to slightly curved, wide, heavy, and fairly long. Interdentum narrow. Beak cavity shallow. Nacre white, iridescent posteriorly.

Host Fish

Shovelnose Sturgeon

Ecobasins

Mississippi River Alluvial Plain - St. Francis River

Mississippi River Alluvial Plain - White River

Ozark Highlands - White River

Habitats

Natural Pool: - Medium - Large

Natural Run: - Medium - Large

Natural Shoal: - Medium - Large

Weight

Suitable

Optimal

Optimal

Problems Faced

Threat: Biological alteration

Source: Commercial harvest

Threat: Habitat destruction

Source: Channel alteration

Threat: Habitat destruction

Source: Channel maintenance

Threat: Habitat destruction

Source: Dam

Threat: Habitat destruction

Source: Water diversion

Threat: Sedimentation

Source: Agricultural practices

Threat: Sedimentation

Source: Channel maintenance

Threat: Sedimentation

Source: Road construction

Data Gaps/Research Needs

Conduct life history study.

Conduct status survey.

Conservation Actions

Maintain stable populations of host fish (sturgeon) in the White and Black rivers.

Importance

High

Category

Habitat Protection

Manage watershed, addressing physical, chemical, biological and land use components, to restore or sustain aquatic life.

High

Threat Abatement

Monitoring Strategies

Continue to monitor occurrence in ongoing river surveys.

Comments

Widely distributed in the White River drainage but never comprises a large percentage of a community (AFMC 2004a, 2004b, 2004c, 2005).

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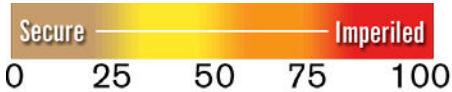
Obovaria sp. cf arkansasensi

"White" Hickorynut

Class: Bivalvia

Order: Unionoida

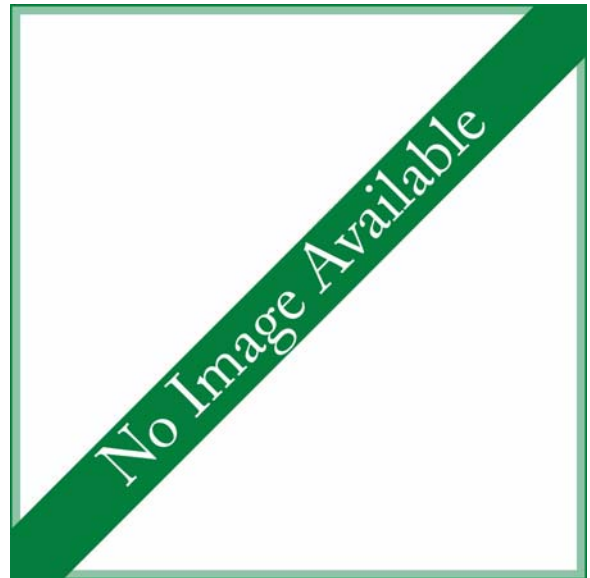
Family: Unionidae

Priority Score: **19** out of 100

Population Trend: Unknown

Global Rank: GNR — Not yet ranked

State Rank: S2 — Imperiled in Arkansas

**Distribution****Occurrence Records**

Ecoregions where the species occurs:

- ☒ Ozark Highlands
- ☒ Boston Mountains
- ☐ Arkansas Valley
- ☐ Ouachita Mountains
- ☐ South Central Plains
- ☐ Mississippi Alluvial Plain
- ☐ Mississippi Valley Loess Plains

Suitable Substrate gravel/sand**Description**

Shell ovate, smooth, rounded before and below, nearly straight from the beak to post-point, umbonal ridge low, beaks not high, sculpture not seen; nacre bluish-white; teeth double in left, single in right

Obovaria sp. cf arkansasensi
"White" Hickorynut

valve; cardinals stout, erect; laterals not very large.

Host Fish

Unknown

Ecobasins

Boston Mountains - White River

Ozark Highlands - White River

Habitats

Natural Pool: Headwater

Natural Run: Headwater

Natural Shoal: Headwater

Weight

Suitable

Suitable

Suitable

Problems Faced

Threat: Habitat destruction

Source: Dam

Threat: Habitat destruction

Source: Grazing/Browsing

Threat: Habitat destruction

Source: Resource extraction

Threat: Nutrient loading

Source: Confined animal operations

Threat: Nutrient loading

Source: Grazing

Threat: Sedimentation

Source: Forestry activities

Threat: Sedimentation

Source: Grazing/Browsing

Threat: Sedimentation

Source: Resource extraction

Threat: Sedimentation

Source: Road construction

Data Gaps/Research Needs

Compare taxonomic relationship of southern hickorynut in Ouachita River watershed to those in other watersheds.

Conduct life history study.

Conduct status survey.

Conservation Actions

Manage watershed, addressing physical, chemical, biological and land use components, to restore or sustain aquatic life.

Importance

High

Category

Threat Abatement

Monitoring Strategies

Additional information is needed before a monitoring strategy can be developed.

Comments

Known from two sites in the Little Red River Basin. Other records from the White River drainage may represent this taxon, but genetic confirmation is needed if extant populations can be found (AFMC 2015).

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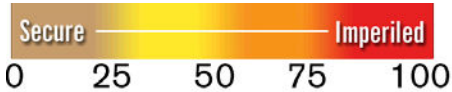
Pleurobema cordatum

Ohio Pigtoe

Class: Bivalvia

Order: Unionoida

Family: Unionidae

Priority Score: **19** out of 100

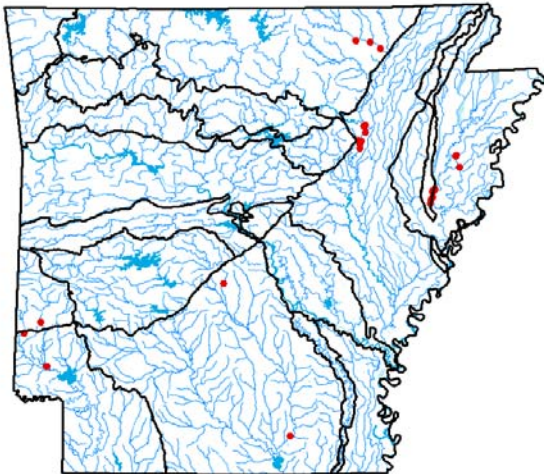
Population Trend: Unknown

Global Rank: G4 — Apparently secure species

State Rank: S3 — Vulnerable in Arkansas



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Distribution**Occurrence Records**

Ecoregions where the species occurs:

- ☒ Ozark Highlands
- ☐ Boston Mountains
- ☐ Arkansas Valley
- ☐ Ouachita Mountains
- ☒ South Central Plains
- ☒ Mississippi Alluvial Plain
- ☐ Mississippi Valley Loess Plains

Suitable Substrate ?**Description**

Shell moderately thick, triangular, and moderately inflated. Anterior end rounded, posterior end bluntly pointed. Dorsal margin straight, ventral margin curved anteriorly, straight posteriorly. Umbos

Pleurobema cordatum
Ohio Pigtoe

moderately high and projecting forward. Beak sculpture of two or three elevated ridges. Shell smooth, a broad shallow sulcus present in front of the posterior ridge. Periostracum dark brown or chestnut, juveniles often lighter and marked with green rays, particularly near the beaks. Length to four inches (10.2 cm). Pseudocardinal teeth well developed; two in the left valve, one in the right. Lateral teeth straight to slightly curved. Beak cavity very deep. Nacre variable, usually white, occasionally pink or rose-colored in some individuals.

Host Fish

Bluegill, Rosefin Shiner

Ecobasins

Mississippi River Alluvial Plain - St. Francis River

Mississippi River Alluvial Plain - White River

Ozark Highlands - White River

South Central Plains - Ouachita River

Habitats

Weight

Natural Run: - Medium - Large

Optimal

Natural Shoal: - Medium - Large

Suitable

Problems Faced

Threat: Habitat destruction

Source: Channel alteration

Threat: Habitat destruction

Source: Channel maintenance

Threat: Habitat destruction

Source: Dam

Threat: Hydrological alteration

Source: Dam

Threat: Nutrient loading

Source: Confined animal operations

Threat: Nutrient loading

Source: Grazing/Browsing

Data Gaps/Research Needs

Conduct genetic analysis of *Pleurobema* to determine if *P. cordatum* is present in Arkansas.
Review distribution and abundance based on taxonomic status.

Determine habitat preferences.

Determine host fish and host fish availability.

Determine if species is extirpated from the state.

Determine problems faced and sources of problems faced.

Conservation Actions**Importance Category**

Manage watershed, addressing physical, chemical, biological and land use components, to restore or sustain aquatic life.

Medium

Threat Abatement

Monitoring Strategies

Additional information is needed before a monitoring strategy can be developed.

Comments

May be multiple species. True Ohio pigtoe is a large river obligate. Some Arkansas *P. cordatum* records may be based on misidentifications of Round Pigtoe (*P. sintoxia*) or Pyramid Pigtoe (*P. rubrum*), investigation ongoing (AFMC 2004a, 2004b, 2004c, 2005, AGFC 2003, Ahlstedt and Jenkinson 1987, 1991, AHTD 1989, 1994, ANHI 2003, Bates and Dennis 1983, Branson 1973, 1983, Christian 1995, Clark 1985, 1987, Coker 1919, Crump 2003, Crump and others 2003a, 2003c, 2003d, 2003e, 2003g, 2003q, 2003r, 2003t, Cummings and Mayer 1992, Davidson and others 1997, Ecological Consultants 1984, Gordon 1980, 1980a, 1982, Gordon and Brown 1980, Gordon and others 1979, 1980, Harris 1991d, 1992a, 1994b, 1996, 1997c, 1999, 1999a, 2001, 2002, Harris and Gordon 1988, 1990, Harris and Milam 2002, Jenkinson and Ahlstedt 1987, Johnson 1980, Meek and Clark 1912, Mehlhop-Cifelli and Miller 1989, Miller and Harris 1987, Oesch 1995, ONHI 2003, Posey 1997, Rust 1993, Stansbery and Stein 1982, Stein and Stansbery 1980, Turgeon and others 1988, 1998, USDA FS 1999, Vaughn and others 1997, Wheeler 1918, White 1977, Williams & others 1993).

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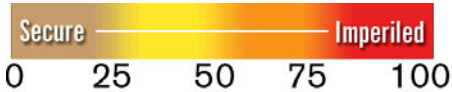
Pleurobema riddellii

Texas Pigtoe

Class: Bivalva

Order: Unionoida

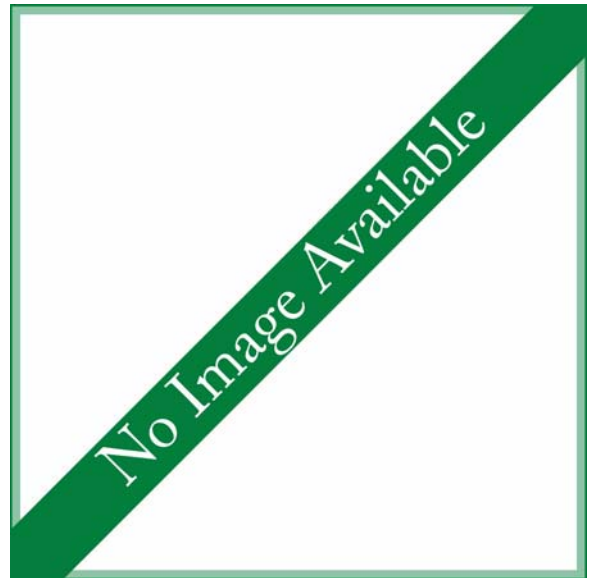
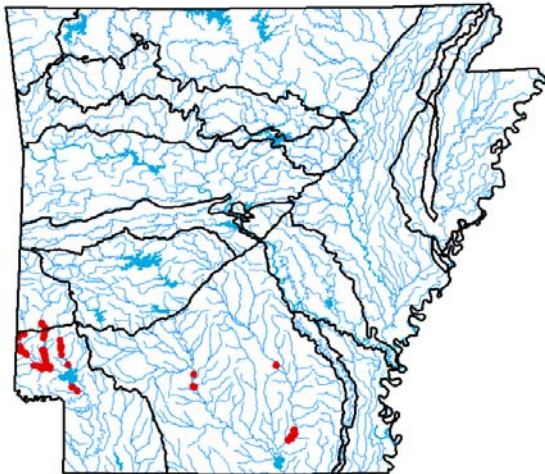
Family: Unionidae

Priority Score: **65** out of 100

Population Trend: Stable

Global Rank: G1G2 — Critically imperiled (uncertain rank)

State Rank: S1 — Critically imperiled in Arkansas

**Distribution****Occurrence Records**

Ecoregions where the species occurs:

- ☐ Ozark Highlands
- ☐ Boston Mountains
- ☐ Arkansas Valley
- ☐ Ouachita Mountains
- ☒ South Central Plains
- ☐ Mississippi Alluvial Plain
- ☐ Mississippi Valley Loess Plains

Suitable Substrate gravel/sand**Description**

Shell triangular to rounded, short, inflated, solid. Umbos high and full above the hinge line; anterior end almost evenly rounded. Sulcus absent, disc flat to slightly convex; posterior ridge usually

rounded. Periostracum brown, greenish-brown, tan. Beak cavities moderately deep. Nacre bluish-white but becoming iridescent posteriorly.

Host Fish

Unknown

Ecobasins

Mississippi River Alluvial Plain (Bayou Bartholomew) - Ouachita River

South Central Plains - Ouachita River

South Central Plains - Red River

Habitats

Weight

Natural Pool: - Medium - Large

Optimal

Natural Riffle: - Medium

Marginal

Natural Run: - Medium - Large

Optimal

Natural Shoal: - Medium - Large

Marginal

Problems Faced

Threat: Habitat destruction

Source: Channel alteration

Threat: Habitat destruction

Source: Channel maintenance

Threat: Habitat destruction

Source: Dam

Threat: Hydrological alteration

Source: Dam

Threat: Nutrient loading

Source: Confined animal operations

Threat: Nutrient loading

Source: Grazing/Browsing

Data Gaps/Research Needs

Conduct genetic analysis of *Pleurobema* to determine geographic extent of *P. riddellii* in Arkansas. Review distribution and abundance based on taxonomic status.

Conduct life history study.

Conservation Actions

Importance Category

Medium

Threat Abatement

Manage watershed, addressing physical, chemical, biological and land use components, to restore or sustain aquatic life.

Monitoring Strategies

Continue to monitor occurrence in ongoing river surveys.

Comments

The species has been confirmed in the Little, Cossatot, Saline and Rolling Fork rivers. However, a morphologically similar species occurs in the Ouachita drainage that may be a different distinct species. (Turgeon and others 1988, Hayes 2010, Bouldin and others 2013).

Taxa Association Team and Peer Reviewers

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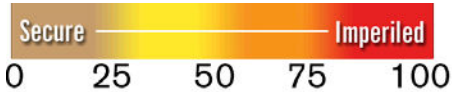
Pleurobema rubrum

Pyramid Pigtoe

Class: Bivalvia

Order: Unionoida

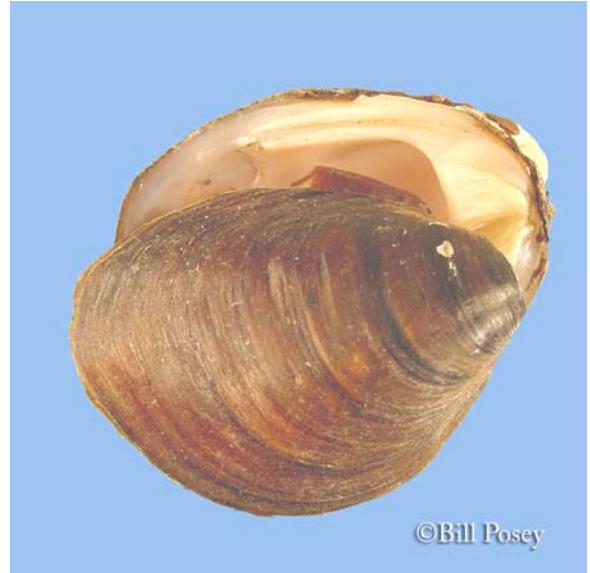
Family: Unionidae

Priority Score: **38** out of 100

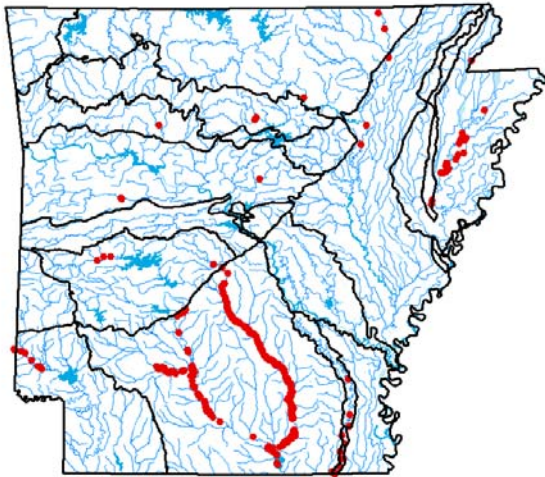
Population Trend: Stable

Global Rank: G2G3 — Imperiled (uncertain rank)

State Rank: S2 — Imperiled in Arkansas



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Distribution**Occurrence Records**

Ecoregions where the species occurs:

- ☒ Ozark Highlands
- ☒ Boston Mountains
- ☒ Arkansas Valley
- ☒ Ouachita Mountains
- ☒ South Central Plains
- ☒ Mississippi Alluvial Plain
- ☐ Mississippi Valley Loess Plains

Suitable Substrate gravel/sand**Description**

Shell thick, triangular and elongate, and moderately inflated. Anterior end rounded, posterior end rounded to bluntly pointed. Dorsal and ventral margins curved. Umbos high, projected forward, and

anterior to rest of shell. Shell smooth or satin-like. Shallow sulcus present. Periostracum brown or chestnut, with faint green rays on the umbos. Length to four inches (10.2 cm). Pseudocardinal teeth well developed; two in the left valve, one in the right. Lateral teeth straight or slightly curved. Beak cavity moderately deep. Nacre pink or rose-colored in most individuals, occasionally white.

Host Fish

Unknown

Ecobasins

Arkansas Valley - Arkansas River

Boston Mountains - Arkansas River

Mississippi River Alluvial Plain - White River

Mississippi River Alluvial Plain (Bayou Bartholomew) - Ouachita River

Mississippi Valley Loess Plains - St. Francis River

Ouachita Mountains - Ouachita River

Ozark Highlands - White River

South Central Plains - Ouachita River

South Central Plains - Red River

Habitats

Natural Pool: Headwater - Medium - Large

Natural Riffle: Headwater

Natural Run: Headwater - Medium - Large

Natural Shoal: - Medium - Large

Weight

Optimal

Marginal

Optimal

Marginal

Problems Faced

Threat: Habitat destruction

Source: Channel alteration

Threat: Habitat destruction

Source: Channel maintenance

Threat: Habitat destruction

Source: Dam

Threat: Hydrological alteration

Source: Dam

Threat: Nutrient loading

Source: Confined animal operations

Threat: Nutrient loading

Source: Grazing/Browsing

Data Gaps/Research Needs

Conduct genetic analysis of *Pleurobema* to determine if *P. rubrum* is present in Arkansas.
Review distribution and abundance based on taxonomic status.

Conduct life history study.

Conservation Actions

Importance Category

Manage watershed, addressing physical, chemical, biological and land use components, to restore or sustain aquatic life.	Medium	Threat Abatement
--	--------	------------------

Monitoring Strategies

Continue to monitor occurrence in ongoing river surveys.

Comments

Extremely abundant in the lower Ouachita and lower Saline. Upper Ouachita and upper Saline rivers populations are peripheral. Known to occur in the lower St. Francis River (AFMC 2004a, 2004b, 2004c, 2005, AGFC 2003, AHTD 1989, Ahlstedt and Jenkinson 1987, 1991, ANHI 2003, Branson 1983, Christian 1995, Clark 1987, Coker 1919, Crump 2003, Crump and others 2003a, 2003c, 2003d, 2003e, 2003g, 2003q, 2003r, 2003t, Cummings and Mayer 1992, Davidson 1997, Davidson and Gosse 2001, Gordon 1980a, Gordon and others 1980, Harris 1986, 1989b, 1999, 1999a, 2001, 2002a, Harris and Gordon 1985, 1987, Harris and Milam 2002, 2002a, Harris and others 1997, Jenkinson 1989, Jenkinson and Ahlstedt 1987, 1994, Johnson 1980, Miller and Harris 1987, ONHI 2003, Posey 1997, Stansbery 1970, Stansbery and Stein 1982, Stein and Stansbery 1980, Turgeon and others 1988, 1998, USDA FS 1999, Vaughn 1996, Wheeler 1918, Williams & others 1993).

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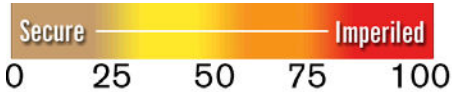
Pleurobema sintoxia

Round Pigtoe

Class: Bivalva

Order: Unionoida

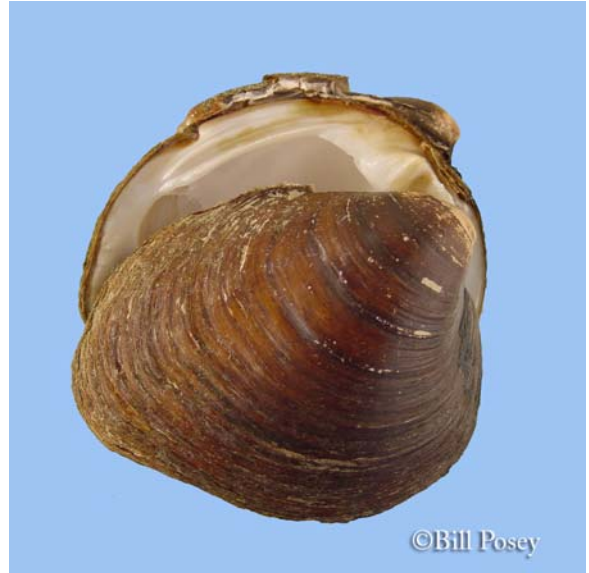
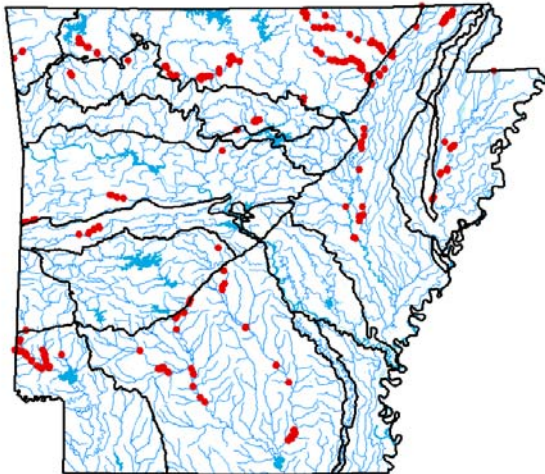
Family: Unionidae

Priority Score: **17** out of 100

Population Trend: Stable

Global Rank: G4G5 — Apparently secure (uncertain rank)

State Rank: S3 — Vulnerable in Arkansas

**Distribution****Occurrence Records**

Ecoregions where the species occurs:

- ☒ Ozark Highlands
- ☒ Boston Mountains
- ☒ Arkansas Valley
- ☒ Ouachita Mountains
- ☒ South Central Plains
- ☒ Mississippi Alluvial Plain
- ☐ Mississippi Valley Loess Plains

Suitable Substrate gravel/sand**Description**

Shell moderately thick, round, and compressed (medium-sized rivers) to inflated (large rivers). Anterior end rounded, posterior end rounded to bluntly pointed. Dorsal margin straight to slightly

curved, ventral margin usually curved. Umbos low and only slightly elevated above the hinge line. Beak sculpture of two or three elevated ridges on the umbo. Shell smooth. Periostracum greenish brown, light brown, or reddish brown in juveniles, becoming chestnut or dark brown in adults, with faint green rays visible near the beaks in some shells. Length to 4 inches (10.2 cm). Pseudocardinal teeth well developed; two in the left valve, one in the right. Lateral teeth straight. Beak cavity shallow (medium-sized rivers) to moderately deep (large rivers). Nacre variable from white to pink or rose-colored.

Host Fish

Spotfin Shiner, Northern Redbelly Dace, Bluntnose Minnow, Bluegill, Southern Redbelly Dace

Ecobasins

Arkansas Valley - Arkansas River

Mississippi River Alluvial Plain - White River

Mississippi Valley Loess Plains - St. Francis River

Ouachita Mountains - Ouachita River

South Central Plains - Ouachita River

South Central Plains - Red River

Habitats

Weight

Natural Pool: Headwater - Medium - Large

Optimal

Natural Run: - Medium - Large

Optimal

Natural Shoal: - Medium - Large

Marginal

Problems Faced

Threat: Habitat destruction

Source: Channel alteration

Threat: Habitat destruction

Source: Channel maintenance

Threat: Habitat destruction

Source: Dam

Threat: Hydrological alteration

Source: Dam

Threat: Nutrient loading

Source: Confined animal operations

Threat: Nutrient loading

Source: Grazing/Browsing

Data Gaps/Research Needs

Conduct genetic analysis of *Pleurobema sintoxia* to determine geographic extent of *P. sintoxia* in Arkansas. Review distribution and abundance based on taxonomic status.

Conservation Actions

Manage watershed, addressing physical, chemical, biological and land use components, to restore or sustain aquatic life.

Importance

Medium

Category

Threat Abatement

Monitoring Strategies

Continue to monitor occurrence in ongoing river surveys.

Comments

Common but rarely abundant in streams where it is known to exist (AFMC 2015).

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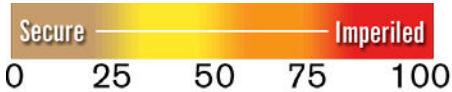
Potamilus alatus

Pink Heelsplitter

Class: Bivalvia

Order: Unionoida

Family: Unionidae

Priority Score: **23** out of 100

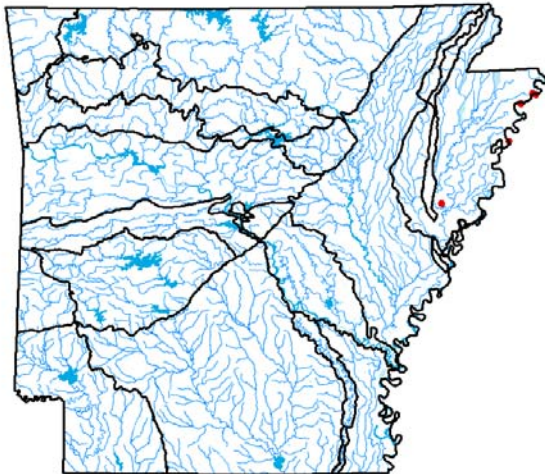
Population Trend: Unknown

Global Rank: G5 — Secure

State Rank: S1 — Critically imperiled in Arkansas



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Distribution**Occurrence Records**

Ecoregions where the species occurs:

- ☐ Ozark Highlands
- ☐ Boston Mountains
- ☐ Arkansas Valley
- ☐ Ouachita Mountains
- ☐ South Central Plains
- ☒ Mississippi Alluvial Plain
- ☐ Mississippi Valley Loess Plains

Suitable Substrate sand/silt**Description**

Shell large, elongate, laterally compressed and somewhat rectangular, thin in young shells to moderately thick in older individuals. Anterior end rounded, posterior end bluntly squared or

truncated. Umbos flattened and only slightly elevated above the hinge line. Beak sculpture of three or four concentric ridges, visible only in small shells. Large wing present posterior to the umbos. Shell smooth, dark green or brown, becoming black in old individuals. Young shells typically marked with dark green rays that become fainter with age. Length to eight inches (20.3 cm). Pseudocardinal teeth small, roughened, thin and divergent; two in the left valve, two in the right. Lateral teeth long, thin, and straight to slightly curved. Beak cavity shallow. Nacre usually purple or pinkish purple, rarely white; highly iridescent.

Host Fish

Freshwater Drum

Ecobasins

Mississippi River Alluvial Plain - St. Francis River

Habitats

Natural Run: - Medium - Large

Natural Shoal: - Medium - Large

Weight

Optimal

Suitable

Problems Faced

Threat: Habitat destruction

Source: Agricultural practices

Threat: Habitat destruction

Source: Channel alteration

Threat: Habitat destruction

Source: Channel maintenance

Threat: Habitat destruction

Source: Water diversion

Threat: Hydrological alteration

Source: Channel alteration

Threat: Hydrological alteration

Source: Water diversion

Threat: Sedimentation

Source: Agricultural practices

Threat: Sedimentation

Source: Channel maintenance

Threat: Sedimentation

Source: Road construction

Data Gaps/Research Needs

Determine extent of species' range.

Conservation Actions

More data are needed to determine conservation actions.

Importance Category

Medium

Data Gap

Monitoring Strategies

Additional information is needed before a monitoring strategy can be developed.

Comments

Large river species rarely collected twice in Arkansas. Most individuals have been collected from the Mississippi River or adjacent backwaters. (AFMC 2004a, 2004b, 2004c, 2005, 2015).

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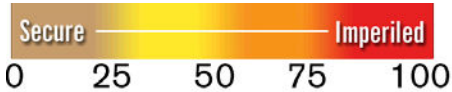
Potamilus capax

Fat Pocketbook

Class: Bivalvia

Order: Unionoida

Family: Unionidae

Priority Score: **46** out of 100

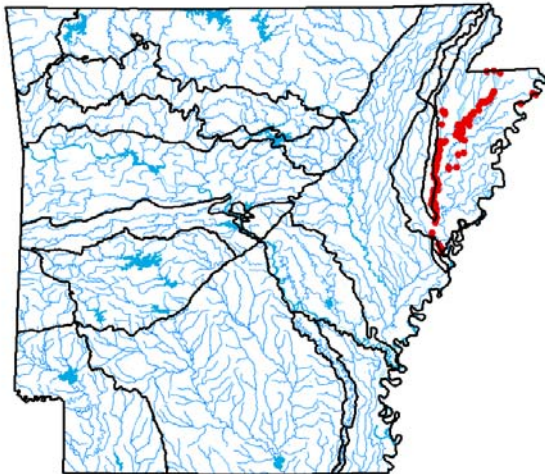
Population Trend: Stable

Global Rank: G2 — Imperiled species

State Rank: S2 — Imperiled in Arkansas

**Distribution**

Occurrence Records



Ecoregions where the species occurs:

- ☐ Ozark Highlands
- ☐ Boston Mountains
- ☐ Arkansas Valley
- ☐ Ouachita Mountains
- ☐ South Central Plains
- ☒ Mississippi Alluvial Plain
- ☐ Mississippi Valley Loess Plains

Suitable Substrate sand/clay/gravel**Description**

Shell round to somewhat oblong, greatly inflated, and thin (young) to moderately thick (adults). Anterior and posterior ends rounded. Umbos greatly inflated, elevated, and turned inward. Beak

sculpture of a few faint ridges, visible only in young shells. Small posterior wing present in young mussels. Surface usually smooth and very shiny. Periostracum rayless, yellow, yellowish tan, or olive, becoming dark brown in older individuals. Length to five inches (12.7 cm). Pseudocardinal teeth thin, compressed, and elevated; two in each valve. Lateral teeth thin and greatly curved; two in the left valve, one in the right. Hinge line S-shaped. Beak cavity very deep. Nacre white, sometimes tinged with pink or salmon.

Host Fish

Freshwater Drum

Ecobasins

Mississippi River Alluvial Plain - St. Francis River

Mississippi River Alluvial Plain - White River

Habitats	Weight
Natural Glide: Headwater	Marginal
Natural Pool: Headwater - Medium - Large	Suitable
Natural Riffle: Headwater	Marginal
Natural Run: Headwater - Medium - Large	Optimal
Natural Shoal: - Medium - Large	Marginal

Problems Faced

Threat: Habitat destruction
Source: Agricultural practices

Threat: Habitat destruction
Source: Channel alteration

Threat: Habitat destruction
Source: Channel maintenance

Threat: Habitat destruction
Source: Water diversion

Threat: Hydrological alteration
Source: Channel alteration

Threat: Hydrological alteration
Source: Water diversion

Threat: Sedimentation
Source: Agricultural practices

Threat: Sedimentation
Source: Channel maintenance

Threat: Sedimentation
Source: Road construction

Data Gaps/Research Needs

Determine environmental stressors such as nutrient loading, toxicity to chemicals and metals, sedimentation effects, etc.

Implement research components discussed at outlined in meeting with AGFC, CoE, AHTD and FWS. Plan includes additional surveys, long term monitoring and Programmatic BA for both AHTD and CoE.

Conservation Actions	Importance	Category
Develop an outreach program.	Low	Public Relations/Education
Develop refugium for species in a river or ditch that will not be maintained for flood control.	High	Habitat Protection
Propagate, augment and reintroduce species where appropriate.	Low	Population Management
Protect host fish and associated habitat.	Medium	Habitat Restoration/Improvement

Monitoring Strategies

Proceed with monitoring plan outlined in meeting with AGFC, CoE, AHTD and FWS. Implement research components discussed at that meeting. Plan includes additional surveys, long term monitoring and Programmatic BA for both AHTD and CoE.

Comments

Federally-listed endangered species. Often found in drainage ditches flowing into the St. Francis River. Populations have been found in the Mississippi and Ohio rivers. (AFMC 2004a, 2004b, 2004c, 2005).

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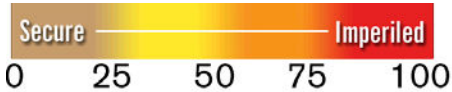
Ptychobranchus occidentalis

Ouachita Kidneyshell

Class: Bivalvia

Order: Unionoida

Family: Unionidae

Priority Score: **23** out of 100

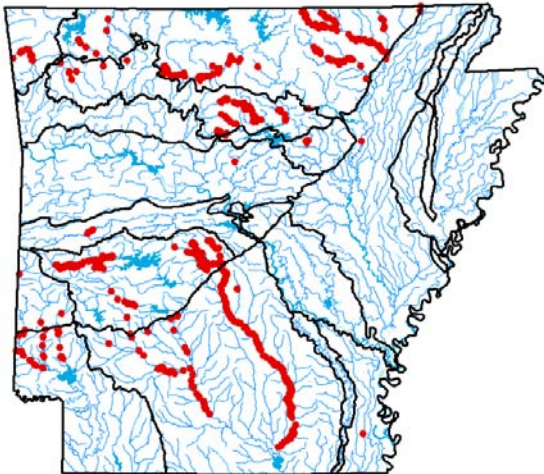
Population Trend: Unknown

Global Rank: G3G4 — Vulnerable (uncertain rank)

State Rank: S3 — Vulnerable in Arkansas



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Distribution**Occurrence Records**

Ecoregions where the species occurs:

- ☒ Ozark Highlands
- ☒ Boston Mountains
- ☐ Arkansas Valley
- ☒ Ouachita Mountains
- ☒ South Central Plains
- ☒ Mississippi Alluvial Plain
- ☐ Mississippi Valley Loess Plains

Suitable Substrate gravel/sand**Description**

Shell elongate, compressed with thick to moderately thick valves. Nacre white, pseudocardinal teeth are small and postlike, and the lateral teeth are well developed but short. Shell color yellow to tan to

brown with very fine, wavy green rays over most of the shell. Maximum length six inches.

Host Fish

Greenside Darter, Rainbow Darter, Yoke Darter, Orangethroat Darter

Ecobasins

Boston Mountains - White River

Mississippi River Alluvial Plain - White River

Mississippi River Alluvial Plain (Lake Chicot) -
Mississippi River

Ouachita Mountains - Arkansas River

Ouachita Mountains - Ouachita River

Ouachita Mountains - Red River

Ozark Highlands - Arkansas River

Ozark Highlands - White River

South Central Plains - Ouachita River

South Central Plains - Red River

Habitats

Weight

Natural Glide: Headwater

Optimal

Natural Pool: - Medium - Large

Suitable

Natural Riffle: Headwater - Medium

Optimal

Natural Run: Headwater - Medium - Large

Optimal

Natural Shoal: - Medium - Large

Suitable

Problems Faced

Threat: Habitat destruction

Source: Channel alteration

Threat: Habitat destruction

Source: Channel maintenance

Threat: Habitat destruction

Source: Dam

Threat: Hydrological alteration

Source: Dam

Threat: Nutrient loading

Source: Confined animal operations

Threat: Nutrient loading

Source: Grazing

Data Gaps/Research Needs

Conduct additional genetic analysis of Ouachita River and Red River populations.

Conduct life history study.

Review taxonomic status based on results of Roe 2013.

Conservation Actions

Maintain stability of riffle/run habitats in medium-sized rivers.

Importance Category

Medium Habitat Protection

Monitoring Strategies

Additional information is needed before a monitoring strategy can be developed.

Comments

Common in the upper Ouachita River. May be two different species, one in the Ouachita, Red, and Arkansas river drainages with another in the White River drainage. In recent years, this species has been found in reduced numbers (AFMC 2004a, 2004b, 2004c, 2005, AGFC 2003, AHTD 1984, 1989, 1994, ANHI 2003, Bates and Dennis 1983, Branson 1973, 1984, Burns and McDonnell 1992, 1992a, Call 1895, Clark 1987, Coker 1919, Crump 2003, Crump and others 2003a, 2003c, 2003d, 2003e, 2003g, 2003q, 2003r, 2003t, Cummings and Mayer 1992, Davidson 1997, Davidson and Gosse 2001, Davidson and others 1997, 2000, Gordon 1980, 1980a, 1982, Gordon and Brown 1980, Gordon and others 1979, 1980, Harris 1991a, 1991b, 1992a, 1993, 1994a, 1996, 1997b, 1999, 1999a, 2001, 2002, Harris and Doster 1992, Harris and Gordon 1988, 1990, Harris and Milam 2002, Harris and others 1997, Johnson 1980, Meek and Clark 1912, Mehlhop-Cifelli and Miller 1989, Miller and Harris 1987, Oesch 1995, ONHI 2003, Posey 1997, Rust 1993, Stansbery and Stein 1982, Stoeckel and others 2000, Turgeon and others 1988, 1998, Vaughn 1996, Vaughn and others 1993, 1996, 1997, Vaughn and Spooner 2000, USDA FS 1999, Warren 1991, Wheeler 1918, Williams & others 1993.).

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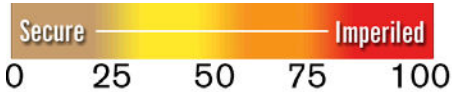
Quadrula apiculata

Southern Mapleleaf

Class: Bivalvia

Order: Unionoida

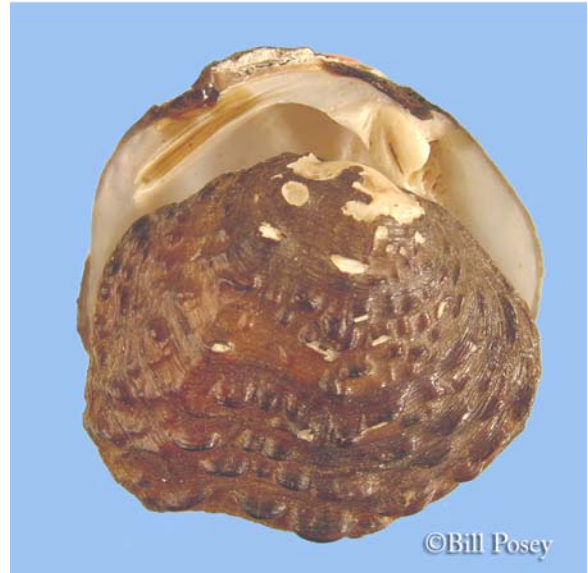
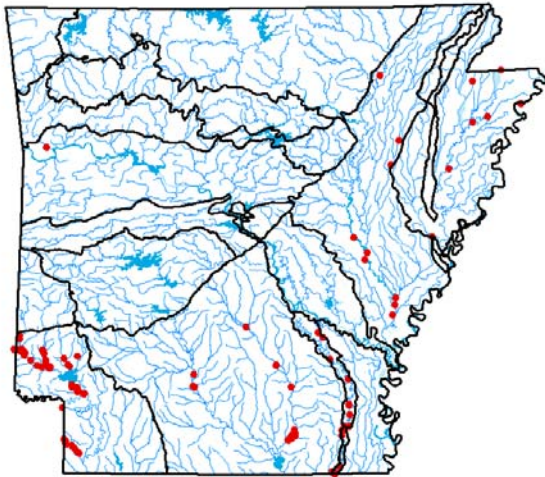
Family: Unionidae

Priority Score: **15** out of 100

Population Trend: Unknown

Global Rank: G5 — Secure

State Rank: S3 — Vulnerable in Arkansas

**Distribution****Occurrence Records**

Ecoregions where the species occurs:

- ☐ Ozark Highlands
- ☐ Boston Mountains
- ☐ Arkansas Valley
- ☐ Ouachita Mountains
- ☒ South Central Plains
- ☒ Mississippi Alluvial Plain
- ☐ Mississippi Valley Loess Plains

Suitable Substrate gravel/cobble/sand**Description**

Shell subrhomboid, rather short, slightly inequilateral, subsolid to solid; beaks high, moderately full; posterior ridge well developed, narrowly rounded, angled or showing a tendency to be double, ending

in a point or feeble biangulation at the base; anterior end rounded, sometimes obliquely truncated above, surface covered with fine, close pustules, which are often laid down in zigzag patterns; epidermis greenish in young shells, ashy-brown in old ones. Pseudocardinals, radial, somewhat split; lateral of right valve double; beak cavities moderately deep, nacre white.

Host Fish

Unknown

Ecobasins

Mississippi River Alluvial Plain - St. Francis River

Mississippi River Alluvial Plain - White River

Mississippi River Alluvial Plain (Bayou Bartholomew) - Ouachita River

South Central Plains - Ouachita River

South Central Plains - Red River

Habitats

Weight

Natural Pool: Headwater - Medium - Large

Suitable

Natural Run: Headwater - Medium - Large

Optimal

Natural Shoal: - Medium - Large

Suitable

Problems Faced

Threat: Habitat destruction

Source: Channel alteration

Threat: Habitat destruction

Source: Channel maintenance

Threat: Habitat destruction

Source: Dam

Threat: Hydrological alteration

Source: Dam

Threat: Sedimentation

Source: Agricultural practices

Threat: Sedimentation

Source: Channel maintenance

Threat: Sedimentation

Source: Forestry activities

Threat: Sedimentation

Source: Road construction

Data Gaps/Research Needs

Conduct genetic analysis of *Quadrula* to determine if species is present in state. Reanalyze distribution and abundance of species based on results of genetic work.

Conduct life history study.

Conservation Actions

Importance Category

Manage watershed, addressing physical, chemical, biological and land use components, to restore or sustain aquatic life.

Medium

Threat Abatement

Monitoring Strategies

Additional information is needed before a monitoring strategy can be developed.

Comments

Often confused with *Quadrula quadrula* (mapleleaf) because of similarity of appearance. First recognized in Arkansas in 1996 (AFMC 2004a, 2004b, 2004c, 2005, Posey and others 1996).

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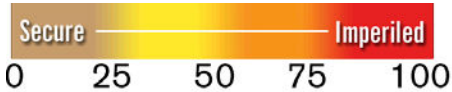
Quadrula cylindrica cylindrica

Rabbitsfoot

Class: Bivalvia

Order: Unionoida

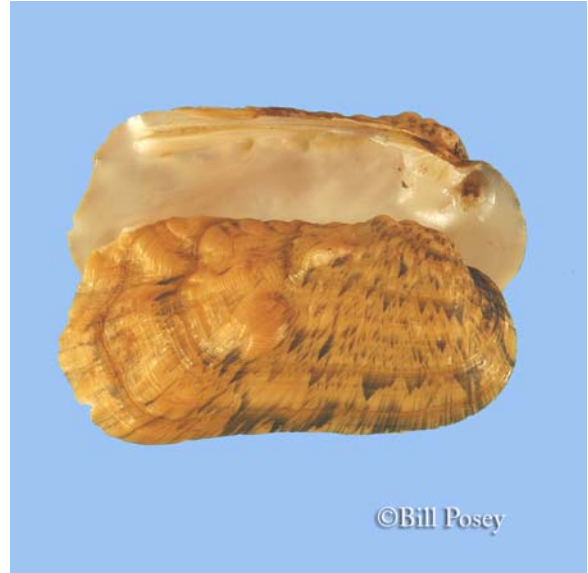
Family: Unionidae

Priority Score: **52** out of 100

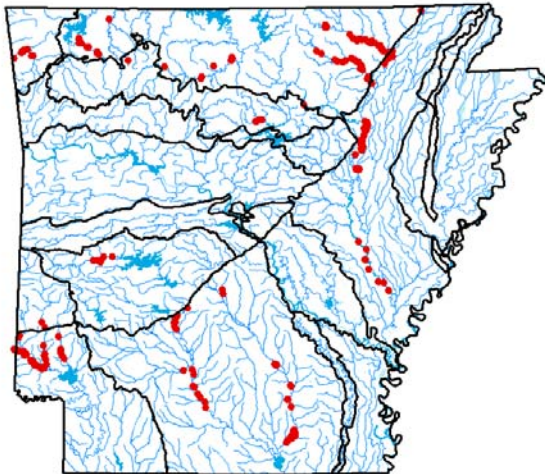
Population Trend: Decreasing

Global Rank: G3G4T3 — Vulnerable (vulnerable subspecies)

State Rank: S3 — Vulnerable in Arkansas

**Distribution**

Occurrence Records



Ecoregions where the species occurs:

- ☒ Ozark Highlands
- ☒ Boston Mountains
- ☐ Arkansas Valley
- ☒ Ouachita Mountains
- ☒ South Central Plains
- ☒ Mississippi Alluvial Plain
- ☐ Mississippi Valley Loess Plains

Suitable Substrate gravel/sand

Description

Shell rectangular, elongate (about three times as long as high), thick, and compressed to moderately inflated. Anterior end rounded, posterior end squared or truncated. Dorsal and ventral margins

Quadrula cylindrica cylindrica
Rabbitsfoot

parallel. Umbos low, only slightly elevated above the hinge line. Beak sculpture consists of two rows of knobs or ridges that continue down the lateral surface of the shell. Surface of the shell usually rough, with numerous tubercles on the anterior end and a series of large pustules or knobs along the posterior ridge. Periostracum green or light brown (darker in older shells) with yellow zigzag or chevron-shaped markings on the shell. Length to five inches (12.7 cm). Pseudocardinal teeth serrated and well developed; two in the left valve, one in the right. Lateral teeth very long and straight; two in the left valve, one in the right. Beak cavity deep. Nacre pearly white, iridescent posteriorly.

Host Fish

Whitefin Shiner, Spottail Shiner, Bigeye Chub

Ecobasins

Boston Mountains - White River

Mississippi River Alluvial Plain - White River

Ouachita Mountains - Ouachita River

Ouachita Mountains - Red River

Ozark Highlands - Arkansas River

Ozark Highlands - White River

South Central Plains - Ouachita River

South Central Plains - Red River

Habitats

Weight

Natural Glide: Headwater	Marginal
Natural Pool: - Medium - Large	Suitable
Natural Riffle: Headwater	Suitable
Natural Run: Headwater - Medium - Large	Optimal
Natural Slough: - Medium - Large	Marginal

Problems Faced

Threat: Habitat destruction

Source: Channel alteration

Threat: Habitat destruction

Source: Channel maintenance

Threat: Habitat destruction

Source: Dam

Threat: Habitat destruction

Source: Resource extraction

Threat: Habitat destruction

Source: Water diversion

Threat: Nutrient loading

Source: Confined animal operations

Threat: Nutrient loading

Source: Grazing/Browsing

Threat: Sedimentation

Source: Agricultural practices

Threat: Sedimentation

Source: Channel alteration

Threat: Sedimentation

Source: Channel maintenance

Threat: Sedimentation

Source: Dam

Threat: Sedimentation

Source: Forestry activities

Threat: Sedimentation

Source: Grazing/Browsing

Threat: Sedimentation

Source: Resource extraction

Threat: Sedimentation

Source: Road construction

Data Gaps/Research Needs

Conduct status survey.

Conservation Actions

Ensure stability and availability of fish hosts in populations in the Black and Ouachita rivers.

Importance Category

Medium

Habitat Protection

Monitoring Strategies

Continue to monitor occurrence in ongoing river surveys.

Comments

This species was federally listed as threatened in 2013. Widespread but uncommon and is declining in small/medium streams. The life history is now better understood, and host fish have been identified for three different populations, two of which occur in the Black/Spring River and Little River (Fobian 2007).

(AFMC 2004a, 2004b, 2004c, 2005, AGFC 2003, ANHI 2003, Bates and Dennis 1983, Branson 1973, 1982, Call 1895, Christian 1995, Clark 1985, 1987, Crump 2003, Crump and others 2003a, 2003c, 2003d, 2003e, 2003g, 2003q, 2003r, 2003t, Cummings and Mayer 1992, Davidson 1997, Ecological Consultants 1984, Gordon 1980a, 1982, Gordon and Brown 1980, Gordon and others 1979, 1980, Harris 1987, 1992a, 1996, 1997b, 1997c, 1999, 1999a, Harris and Gordon 1987, 1988, Harris and Milam 2002, 2002a, Harris and others 1997, Johnson 1980, Kraemer and Gordon, Meek and Clark 1912, Miller and Harris 1987, Oesch 1995, ONHI 2003, Posey 1997, Rust 1993, Stansbery 1970, Stansbery and Stein 1982, Stein and Stansbery 1980, Turgeon and others 1988, 1998, Vaughn 1996, Vaughn and others 1997, Vaughn and Spooner 2000, USDA FS 1999, Wheeler 1918, Williams & others 1993).

Taxa Association Team and Peer Reviewers

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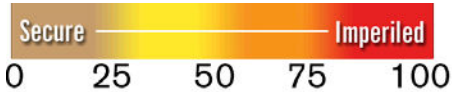
Quadrula fragosa

Winged Mapleleaf

Class: Bivalvia

Order: Unionoida

Family: Unionidae

Priority Score: **80** out of 100

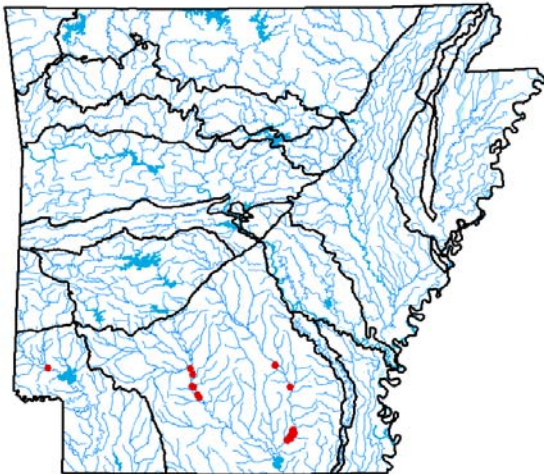
Population Trend: Unknown

Global Rank: G1 — Critically imperiled species

State Rank: S1 — Critically imperiled in Arkansas



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Distribution**Occurrence Records**

Ecoregions where the species occurs:

- ☐ Ozark Highlands
- ☐ Boston Mountains
- ☐ Arkansas Valley
- ☐ Ouachita Mountains
- ☒ South Central Plains
- ☐ Mississippi Alluvial Plain
- ☐ Mississippi Valley Loess Plains

Suitable Substrate gravel**Description**

Shell quadrate or square, thick, and moderately inflated. Anterior end rounded, posterior end squared or truncated. Dorsal margin straight, ventral margin curved in the anterior half, arched posteriorly. A

pronounced wing present posterior to the umbo, with radiating rows of pustules or ridges. Umbos small and elevated above the hinge line. Beak sculpture of two rows of raised bumps or nodules that continue downward on the surface of the shell, separated by a furrow or sulcus. Periostracum variable, from yellowish green to light brown with faint rays in small shells, becoming greenish brown, chestnut, or dark brown in larger individuals. Length to four inches (10.2 cm). Pseudocardinal teeth well developed, serrated; two in the left valve, one in the right. Lateral teeth striated, fairly long, and straight; two in the left valve, one in the right. Beak cavity very deep. Nacre pearly white, iridescent posteriorly.

Host Fish

Channel Catfish, Blue Catfish

Ecobasins

South Central Plains - Ouachita River

Habitats	Weight
Natural Pool: - Medium - Large	Suitable
Natural Run: - Medium - Large	Optimal
Natural Shoal: - Medium - Large	Suitable

Problems Faced

Threat: Habitat destruction
Source: Channel alteration

Threat: Habitat destruction
Source: Channel maintenance

Threat: Habitat destruction
Source: Dam

Threat: Hydrological alteration
Source: Dam

Threat: Sedimentation
Source: Agricultural practices

Threat: Sedimentation
Source: Channel maintenance

Threat: Sedimentation
Source: Forestry activities

Threat: Sedimentation
Source: Road construction

Data Gaps/Research Needs

Conduct life history study.

Conduct status survey.

Determine environmental stressors such as nutrient loading, toxicity to chemicals and metals, sedimentation effects, etc.

Population estimates needed in additional Saline and Ouachita River beds.

Conservation Actions	Importance	Category
Develop an outreach program.	Medium	Public Relations/Education
Maintain stability of Ouachita River and Saline River beds known to be occupied by species.	High	Habitat Protection
Propagate, augment and reintroduce species where appropriate.	Low	Population Management

Monitoring Strategies

Survey in accordance with U.S. Fish and Wildlife Service recovery plan.

Comments

Federally-listed endangered. Originally found in the Ouachita River in 1994. Populations were discovered so recently that it is difficult to determine trends, but the low numbers of individuals and limited distribution indicate that the populations are in a precarious viability position. There is some evidence of recruitment in the Ouachita River near Camden, Ark. Recent surveys indicates populations in the lower Saline River. Other confirmed populations include the St. Croix River, Wisconsin, Bourbeuse River, Missouri, Cossatot River in Arkansas and Little River in Arkansas and Oklahoma. (AFMC 2004a, 2004b, 2004c, 2005, AGFC 2003, ANHI 2003, Clark 1987, Coker 1919, Crump 2003, Crump and others 2003a, 2003c, 2003d, 2003e, 2003g, 2003q, 2003r, 2003t, Cummings and Mayer 1992, Davidson 1997, Davidson and Clem 2004, Harris 1999, 1999a, Harris and others 1997, Mehlhop-Cifelli and Miller 1989, ONHI 2003, Posey and others 1996, Turgeon and others 1988, 1998, USDA FS 1999, Williams & others 1993).

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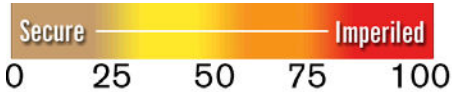
Quadrula nobilis

Gulf Mapleleaf

Class: Bivalvia

Order: Unionoida

Family: Unionidae

Priority Score: **19** out of 100

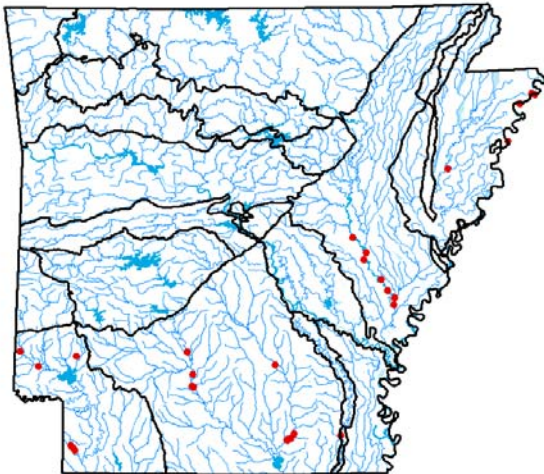
Population Trend: Unknown

Global Rank: G4 — Apparently secure species

State Rank: S3 — Vulnerable in Arkansas

**Distribution**

Occurrence Records



Ecoregions where the species occurs:

- ☐ Ozark Highlands
- ☒ Boston Mountains
- ☐ Arkansas Valley
- ☐ Ouachita Mountains
- ☒ South Central Plains
- ☒ Mississippi Alluvial Plain
- ☐ Mississippi Valley Loess Plains

Suitable Substrate**Description****Host Fish**

Quadrula nobilis
Gulf Mapleleaf

Channel Catfish, Flathead Catfish

Ecobasins

Boston Mountains - Arkansas River

Mississippi River Alluvial Plain - St. Francis River

South Central Plains - Ouachita River

South Central Plains - Red River

Habitats

Weight

Natural Glide: - Small - Medium - Large

Suitable

Natural Pool: - Small - Medium - Large

Suitable

Natural Riffle: - Small - Medium - Large

Suitable

Natural Run: - Small - Medium - Large

Optimal

Problems Faced

Threat:

Source:

Data Gaps/Research Needs

Conduct genetic analysis of *Quadrula* to determine if species is present in state. Reanalyze distribution and population numbers.

Conduct life history study.

Determine habitat preferences.

Determine problems faced and sources of problems faced.

Conservation Actions

Importance Category

Manage watershed, addressing physical, chemical, biological and land use components, to restore or sustain aquatic life.

Medium

Threat Abatement

Monitoring Strategies

More information is needed before a monitoring strategy can be developed.

Comments

Taxonomic confusion exists with this species. Only recently recognized in Arkansas (AFMC 2004a, 2004b, 2004c, 2005).

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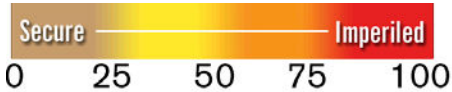
Quadrula refulgens

Purple Pimpleback

Class: Bivalvia

Order: Unionoida

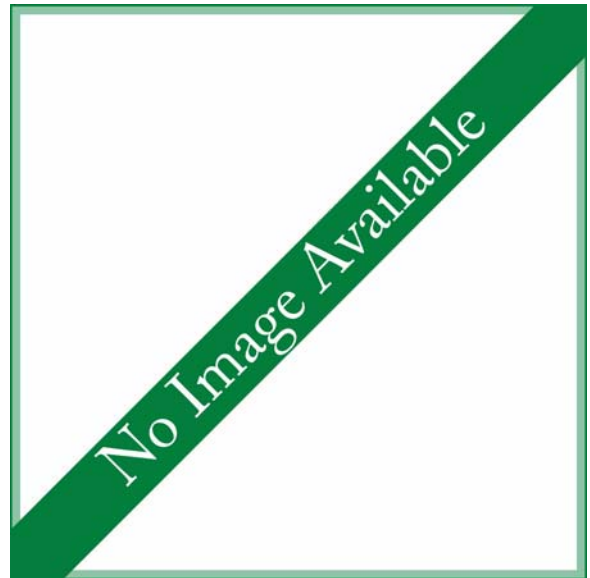
Family: Unionidae

Priority Score: **31** out of 100

Population Trend: Stable

Global Rank: G3G4 — Vulnerable (uncertain rank)

State Rank: S1 — Critically imperiled in Arkansas

**Distribution****Occurrence Records**

Ecoregions where the species occurs:

- ☐ Ozark Highlands
- ☐ Boston Mountains
- ☐ Arkansas Valley
- ☐ Ouachita Mountains
- ☒ South Central Plains
- ☐ Mississippi Alluvial Plain
- ☐ Mississippi Valley Loess Plains

Suitable Substrate gravel/sand**Description**

Shell subelliptical, subcompressed to slightly inflated, somewhat inequilateral; Umbos elevated but not inflated; anterior end rounded Periostracum reddish-chestnut; pseudocardinals triangular, ragged,

two in the left valve and three in the right; lateral in the right valve single or double; beak cavities deep. Nacre purple or violet, iridescent posteriorly in some specimens, white in others with some purple in the beak cavity.

Host Fish

Unknown

Ecobasins

Mississippi River Alluvial Plain (Lake Chicot) -
Mississippi River

Habitats

Natural Pool: - Medium

Natural Run: - Medium

Weight

Marginal

Optimal

Problems Faced

Threat: Habitat destruction

Source: Channel alteration

Threat: Habitat destruction

Source: Channel maintenance

Threat: Habitat destruction

Source: Dam

Threat: Hydrological alteration

Source: Dam

Threat: Nutrient loading

Source: Agricultural practices

Data Gaps/Research Needs

Conduct genetic analysis of *Quadrula* to determine species extent.

Conduct life history study.

Survey additional localities in Southeast Arkansas to determine species' geographic extent.

Conservation Actions

Manage watershed, addressing physical, chemical, biological and land use components, to restore or sustain aquatic life.

Importance Category

Medium

Threat Abatement

Monitoring Strategies

Continue to monitor occurrence in ongoing river surveys.

Comments

Only one specimen confirmed in Arkansas but likely others have been undetected due to similarity of appearance with Pimpleback (*Quadrula pustulosa*). (Turgeon and others 1998, Harris and others 2010)

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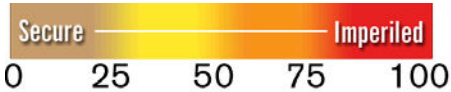
Simpsonaias ambigua

Salamander Mussel

Class: Bivalvia

Order: Unionoida

Family: Unionidae

Priority Score: **34** out of 100

Population Trend: Unknown

Global Rank: G3 — Vulnerable species

State Rank: S1 — Critically imperiled in Arkansas

**Distribution****Occurrence Records**

Ecoregions where the species occurs:

- ☒ Ozark Highlands
- ☒ Boston Mountains
- ☐ Arkansas Valley
- ☐ Ouachita Mountains
- ☐ South Central Plains
- ☒ Mississippi Alluvial Plain
- ☐ Mississippi Valley Loess Plains

Suitable Substrate ?

Description

Shell small, thin, elongate elliptical or oval, and compressed (male) to slightly inflated posteriorly (female). Anterior and posterior ends rounded. Posterior ridge rounded. Dorsal and ventral margins

Simpsonaias ambigua
Salamander Mussel

straight, parallel. Umbos slightly elevated above the hinge line. Beak sculpture of three or four double-looped bars. Shell smooth, dull, yellowish tan to dark brown, and rayless. Length to two inches (5.1 cm). Pseudocardinal teeth very small, low, rounded; one in each valve. Lateral teeth absent. Beak cavity shallow. Nacre bluish white, occasionally tinged with salmon near the beaks, iridescent on the posterior half.

Host Fish

Mudpuppy Salamander

Ecobasins

Boston Mountains - White River

Mississippi River Alluvial Plain - White River

Ozark Highlands - White River

Habitats

Natural :

Weight

Data Gap

Problems Faced

Threat:

Source:

Data Gaps/Research Needs

Conduct genetic studies to determine if populations differ between streams.

Conduct life history study.

Determine habitat preferences.

Determine problems faced and sources of problems faced.

Survey Spring River for occurrences.

Conservation Actions

Protect Spring River populations and ensure adequate host populations (mudpuppy).

Importance Category

High

Habitat Protection

Monitoring Strategies

Additional information is needed before a monitoring strategy can be developed.

Comments

Restricted and rare in Arkansas (AFMC 2004a, 2004b, 2004c, 2005). Habitat preference is silt/sand beneath large rocks.

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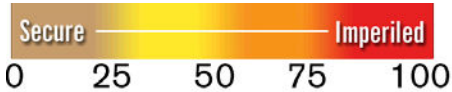
Toxolasma lividum

Purple Lilliput

Class: Bivalvia

Order: Unionoida

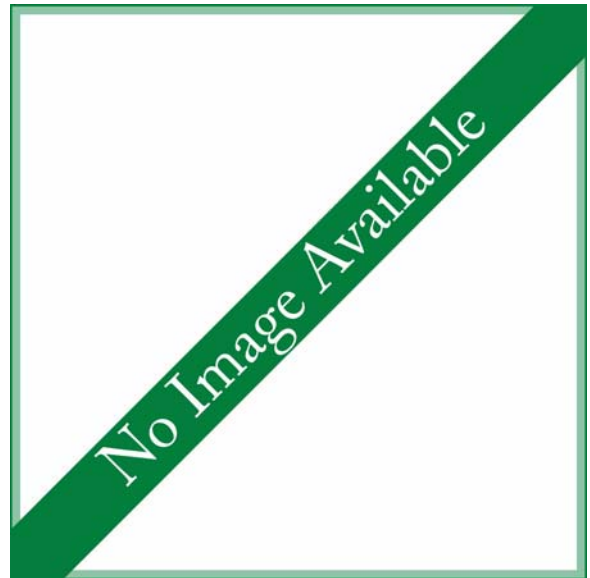
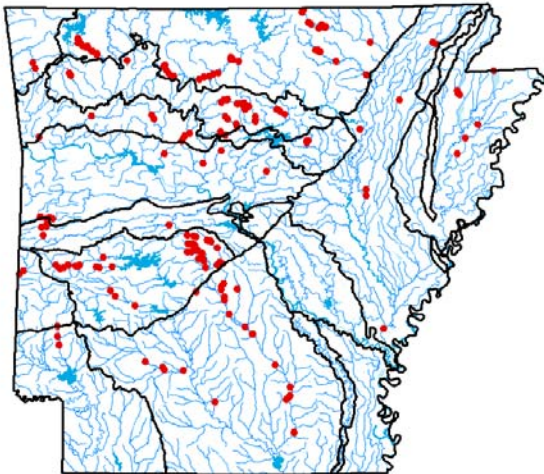
Family: Unionidae

Priority Score: **33** out of 100

Population Trend: Decreasing

Global Rank: G3Q — Vulnerable (questionable taxonomy)

State Rank: S3 — Vulnerable in Arkansas

**Distribution****Occurrence Records**

Ecoregions where the species occurs:

- ☒ Ozark Highlands
- ☒ Boston Mountains
- ☒ Arkansas Valley
- ☒ Ouachita Mountains
- ☒ South Central Plains
- ☒ Mississippi Alluvial Plain
- ☐ Mississippi Valley Loess Plains

Suitable Substrate gravel/cobble**Description**

Shell small, rounded to somewhat oblong, relatively solid, and inflated. Anterior end rounded, posterior end bluntly pointed (males) or truncated (females). Umbos inflated and slightly elevated

Toxolasma lividum
Purple Lilliput

above the hinge line. Beak sculpture of three or four heavy bars. Periostracum tan or dark green to dark brown, becoming black in older shells. Length to one inch (2.5,cm). Pseudocardinal teeth well developed, elevated and serrated; two in the left valve, one in the right. Lateral teeth straight to slightly curved; two in the left valve, one in the right. Beak cavity variable from very shallow to moderately deep. Nacre purple, usually lighter near the ventral margin, and iridescent.

Host Fish

Green Sunfish, Longear Sunfish

Ecobasins

Arkansas Valley - Arkansas River

Boston Mountains - Arkansas River

Boston Mountains - White River

Mississippi River Alluvial Plain - St. Francis River

Mississippi River Alluvial Plain - White River

Ouachita Mountains - Arkansas River

Ouachita Mountains - Ouachita River

Ouachita Mountains - Red River

Ozark Highlands - Arkansas River

Ozark Highlands - White River

South Central Plains - Ouachita River

Habitats

Weight

Natural Pool: Headwater - Small - Medium

Suitable

Natural Run: Headwater - Small - Medium

Optimal

Problems Faced

Threat: Habitat destruction
Source: Dam

Threat: Habitat destruction
Source: Grazing/Browsing

Threat: Habitat destruction
Source: Resource extraction

Threat: Nutrient loading
Source: Confined animal operations

Threat: Nutrient loading
Source: Grazing/Browsing

Threat: Sedimentation
Source: Forestry activities

Threat: Sedimentation
Source: Grazing/Browsing

Threat: Sedimentation
Source: Resource extraction

Threat: Sedimentation
Source: Road construction

Data Gaps/Research Needs

Conduct genetic analysis and comparison of White River and Ouachita River watershed populations.

Conduct life history study.

Conduct status survey.

Conservation Actions

Manage watershed, addressing physical, chemical, biological and land use components, to restore or sustain aquatic life.

Importance Category

Medium Threat Abatement

Monitoring Strategies

Continue to monitor occurrence in ongoing river surveys.

Comments

Widespread but uncommon, usually found in the headwaters to medium rivers. Population numbers appear to be very low (AFMC 2004a, 2004b, 2004c, 2005, AGFC 2003, ANHI 2003, Bates and Dennis 1983, Branson 1984, Brown and Brown 1989, Burns and McDonnell 1992a, Crump 2003, Crump and others 2003a, 2003c, 2003d, 2003e, 2003g, 2003q, 2003r, 2003t, Cummings and Mayer 1992, Davidson 1997, Davidson and others 2000, Ecological Consultants 1984, Gordon 1980, 1980a, 1982, Gordon and Brown 1980, Gordon and others 1979, 1980, Harris 1991d, 1992b, 1994b, 1996, 1997b, 1999, 1999a, Harris and Gordon 1988, 1990, Harris and Milam 2002, Harris and others 1997, Jenkinson and Ahlstedt 1987, Johnson 1980, Meek and Clark 1912, Oesch 1995, ONHI 2003, Posey 1997, Rust 1993, Stansbery 1970, Turgeon and others 1988, 1998, Wheeler 1918, Williams & others 1993).

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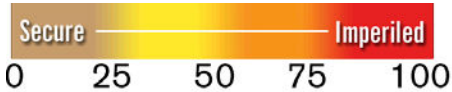
Toxolasma parvum

Lilliput

Class: Bivalvia

Order: Unionoida

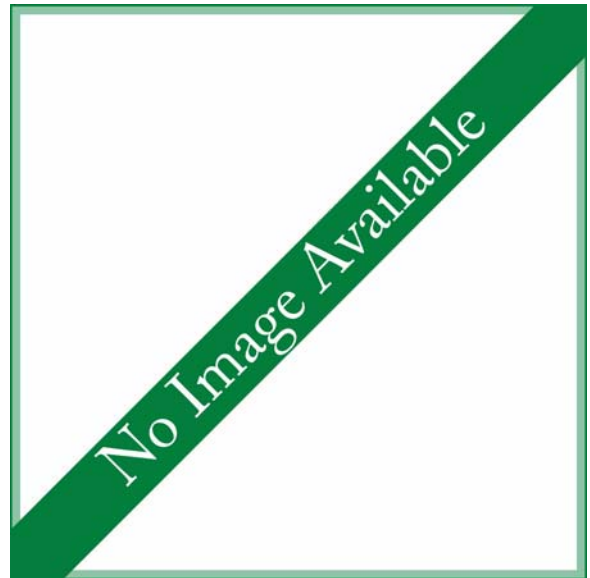
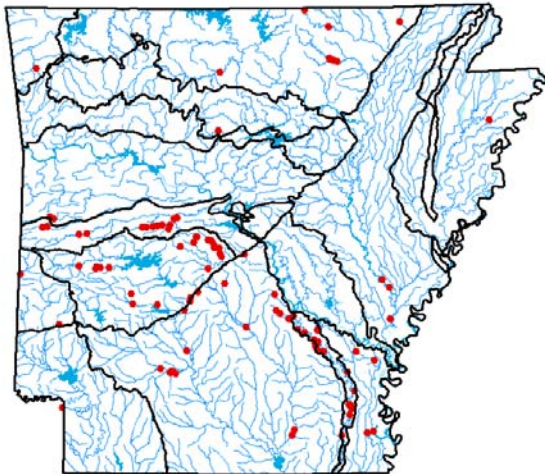
Family: Unionidae

Priority Score: **19** out of 100

Population Trend: Decreasing

Global Rank: G5 — Secure

State Rank: S3 — Vulnerable in Arkansas

**Distribution****Occurrence Records**

Ecoregions where the species occurs:

- ☒ Ozark Highlands
- ☒ Boston Mountains
- ☒ Arkansas Valley
- ☒ Ouachita Mountains
- ☒ South Central Plains
- ☒ Mississippi Alluvial Plain
- ☐ Mississippi Valley Loess Plains

Suitable Substrate gravel/cobble**Description**

Shell small, elliptical or cylindrical, relatively solid, and inflated. Anterior and posterior ends rounded. Umbos inflated and slightly elevated above the hinge line. Beak sculpture consists of five or six

distinct angled ridges. Surface of the shell with a clothlike texture, dark green, brown, or dark brown and rayless. Length to 1.5 inches (3.8 cm). Pseudocardinal teeth thin, elevated, compressed, and serrated; two in the left valve, one or two in the right. Lateral teeth long, thin and straight; two in the left valve, one in the right. Beak cavity moderately deep. Nacre silvery or bluish white and highly iridescent.

Host Fish

Green Sunfish, Warmouth, Orange Spotted Sunfish, Bluegill, White Crappie

Ecobasins

Arkansas Valley - Arkansas River

Boston Mountains - White River

Mississippi River Alluvial Plain - St. Francis River

Mississippi River Alluvial Plain - White River

Ouachita Mountains - Arkansas River

Ouachita Mountains - Ouachita River

Ouachita Mountains - Red River

Ozark Highlands - Arkansas River

Ozark Highlands - White River

South Central Plains - Ouachita River

South Central Plains - Red River

Habitats

Weight

Natural Pool: Headwater - Small - Medium

Suitable

Natural Run: Headwater - Small - Medium

Optimal

Problems Faced

Threat: Habitat destruction
Source: Dam

Threat: Habitat destruction
Source: Grazing/Browsing

Threat: Habitat destruction
Source: Resource extraction

Threat: Nutrient loading
Source: Confined animal operations

Threat: Nutrient loading
Source: Grazing/Browsing

Threat: Sedimentation
Source: Forestry activities

Threat: Sedimentation
Source: Grazing/Browsing

Threat: Sedimentation
Source: Resource extraction

Threat: Sedimentation
Source: Road construction

Data Gaps/Research Needs

Conduct genetic analysis and comparison of White River, Arkansas River and Ouachita River watershed populations.

Conduct life history study.

Conduct status survey.

Conservation Actions

Manage watershed, addressing physical, chemical, biological and land use components, to restore or sustain aquatic life.

Importance Category

Medium Threat Abatement

Monitoring Strategies

Continue to monitor occurrence in ongoing river surveys.

Comments

Widespread but uncommon, usually found in backwaters and headwaters. Population numbers are unknown. (AFMC 2015)

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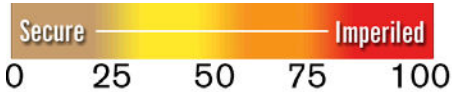
Toxolasma texasiense

Texas Lilliput

Class: Bivalvia

Order: Unionoida

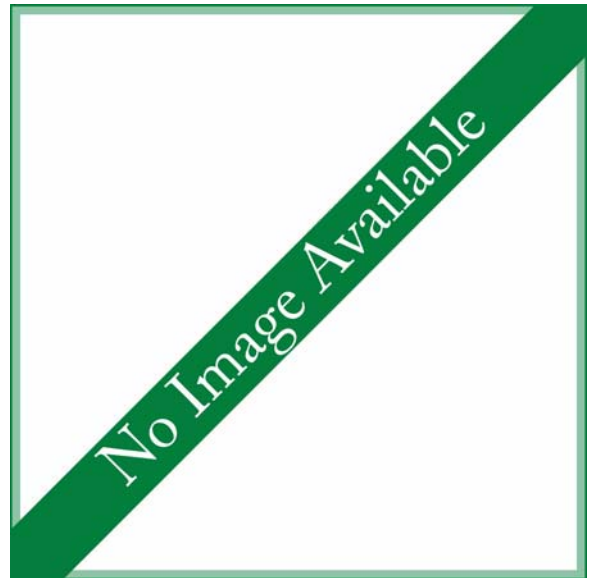
Family: Unionidae

Priority Score: **19** out of 100

Population Trend: Unknown

Global Rank: G4 — Apparently secure species

State Rank: S3 — Vulnerable in Arkansas

**Distribution****Occurrence Records**

Ecoregions where the species occurs:

- ☐ Ozark Highlands
- ☐ Boston Mountains
- ☐ Arkansas Valley
- ☒ Ouachita Mountains
- ☒ South Central Plains
- ☒ Mississippi Alluvial Plain
- ☐ Mississippi Valley Loess Plains

Suitable Substrate sand/silt**Description**

Shell elongate, thin to relatively solid, and moderately inflated. Anterior end rounded, posterior end pointed (males) or truncated (females). Umbos even with or only slightly elevated above the hinge

line. Beak sculpture of five or six strong angular ridges. Periostracum greenish brown to black with clothlike texture. Length to 2.5 inches (6.4 cm). Pseudocardinal teeth relatively thin and compressed, elevated and serrated; two in the left valve, one in the right. Lateral teeth long, straight or curved; two in the left valve, one in the right. Beak cavity shallow. Nacre white, occasionally tinged with salmon in the beak cavity and center of the shell.

Host Fish

Bluegill, Warmouth

Ecobasins

Mississippi River Alluvial Plain - White River

Ouachita Mountains - Ouachita River

South Central Plains - Ouachita River

South Central Plains - Red River

Habitats

Weight

Man-made Littoral: - Small - Large

Suitable

Man-made Pelagic: - Small - Large

Marginal

Natural Other: - Medium - Large

Data Gap

Natural Oxbow - connected: - Medium - Large

Suitable

Natural Oxbow - disconnected:

Suitable

Natural Side channel: - Medium - Large

Suitable

Natural Slough: - Medium - Large

Suitable

Problems Faced

Threat: Biological alteration

Source: Exotic species

Threat: Biological alteration

Source: Predation

Threat: Habitat destruction

Source: Channel alteration

Threat: Habitat destruction

Source: Channel maintenance

Data Gaps/Research Needs

Conduct life history study.

Conduct status surveys.

Determine genetic relationships of populations from different streams.

Conservation Actions

Manage watershed, addressing physical, chemical, biological and land use components, to restore or sustain aquatic life.

Importance

Medium

Category

Threat Abatement

Monitoring Strategies

Continue to monitor occurrence in ongoing river surveys.

Comments

Species is probably more common than is shown by its State Rank. Often found in small, turbid streams with extremely soft substrates and along banks in larger stream which may lead to the species being overlooked during general mussel surveys (AFMC 2004a, 2004b, 2004c, 2005).

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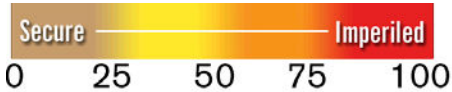
Truncilla donaciformis

Fawnsfoot

Class: Bivalvia

Order: Unionoida

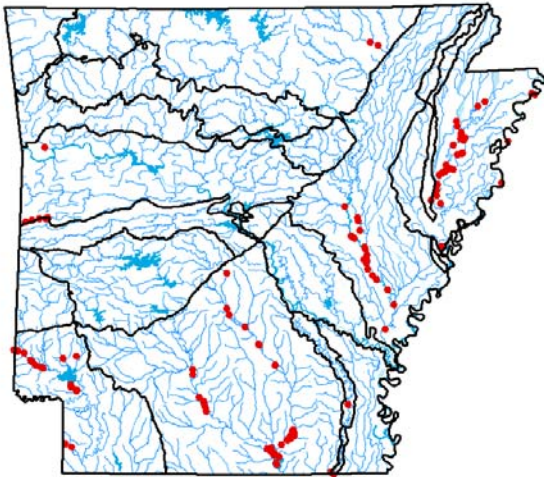
Family: Unionidae

Priority Score: **15** out of 100

Population Trend: Unknown

Global Rank: G5 — Secure

State Rank: S3 — Vulnerable in Arkansas

**Distribution****Occurrence Records**

Ecoregions where the species occurs:

- ☐ Ozark Highlands
- ☐ Boston Mountains
- ☒ Arkansas Valley
- ☒ Ouachita Mountains
- ☒ South Central Plains
- ☒ Mississippi Alluvial Plain
- ☐ Mississippi Valley Loess Plains

Suitable Substrate sand/gravel**Description**

Shell small, elongate, somewhat oblong, relatively thin, and compressed to moderately inflated. Anterior end rounded, posterior end pointed, ventral margin smoothly rounded. Umbos full, centrally

located, and slightly elevated above the hinge line. Beak sculpture of five or six double-looped bars. Periostracum variable from yellow to greenish brown, with numerous dark green rays made up of many smaller broken, V-shaped or zigzag lines. Length to two inches (5.1 cm). Pseudocardinal teeth small, roughened, and elevated; two in the left valve, one in the right. Lateral teeth thin, relatively long, and straight to slightly curved. Beak cavity moderately shallow. Nacre white, iridescent posteriorly.

Host Fish

Freshwater Drum, Sauger

Ecobasins

Arkansas Valley - Arkansas River

Mississippi River Alluvial Plain - St. Francis River

Mississippi River Alluvial Plain - White River

Ouachita Mountains - Arkansas River

South Central Plains - Ouachita River

South Central Plains - Red River

Habitats

Weight

Natural Pool: - Medium - Large

Optimal

Natural Run: - Medium - Large

Optimal

Problems Faced

Threat: Habitat destruction

Source: Dam

Threat: Habitat destruction

Source: Grazing/Browsing

Threat: Habitat destruction

Source: Resource extraction

Threat: Sedimentation

Source: Agricultural practices

Threat: Sedimentation

Source: Dam

Threat: Sedimentation

Source: Forestry activities

Threat: Sedimentation

Source: Resource extraction

Threat: Sedimentation

Source: Road construction

Data Gaps/Research Needs

Conduct life history study.

Conduct status survey.

Conservation Actions**Importance Category**

More data needed to determine conservation actions. Medium Data Gap

Monitoring Strategies

Continue to monitor occurrence in ongoing river surveys.

Comments

Widespread but uncommon. Small size may result in it being overlooked during general mussel surveys (AFMC 2004a, 2004b, 2004c, 2005).

Taxa Association Team and Peer Reviewers

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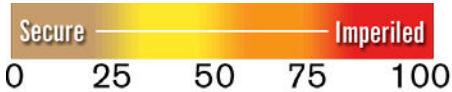
Uniomerus declivis

Tapered Pondhorn

Class: Bivalvia

Order: Unionoida

Family: Unionidae

Priority Score: **19** out of 100

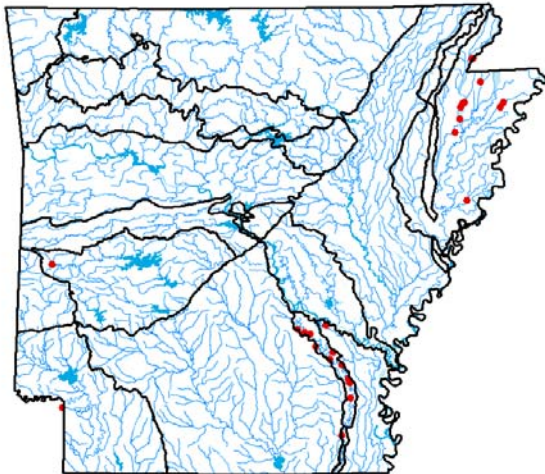
Population Trend: Unknown

Global Rank: G5Q — Secure (questionable taxonomy)

State Rank: S2 — Imperiled in Arkansas



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Distribution**Occurrence Records**

Ecoregions where the species occurs:

- ☐ Ozark Highlands
- ☐ Boston Mountains
- ☐ Arkansas Valley
- ☐ Ouachita Mountains
- ☒ South Central Plains
- ☒ Mississippi Alluvial Plain
- ☐ Mississippi Valley Loess Plains

Suitable Substrate silt/sand/gravel**Description**

Shell elliptical, elongate, and compressed to moderately inflated. Anterior end rounded and posterior end acutely pointed. Dorsal and ventral margins both straight. Umbos low, approximately even with

hingeline. Two shallow grooves present on posterior slope, giving rise to a short ridge. Posterior ridge prominent. Coloration yellowish brown, green, brown to black; rays generally absent. Pseudocardinal teeth small and thin; lateral teeth relatively thin, short and straight to slightly curved. Beak cavity shallow. Nacre white to occasionally salmon tinged. Maximum length to approximately six inches (15 cm).

Host Fish

Unknown

Ecobasins

Mississippi River Alluvial Plain - St. Francis River

Mississippi River Alluvial Plain (Bayou Bartholomew) - Ouachita River

South Central Plains - Red River

Habitats

Natural Riffle: Headwater - Small

Natural Run: Headwater - Small

Weight

Suitable

Suitable

Problems Faced

Threat:

Source:

Data Gaps/Research Needs

Conduct life history study.

Determine habitat preferences.

Determine problems faced and sources of problems faced.

Conservation Actions

Manage watershed, addressing physical, chemical, biological and land use components, to restore or sustain aquatic life.

Importance Category

Medium

Threat Abatement

Monitoring Strategies

Additional information is needed before a monitoring strategy can be developed.

Comments

Species is probably more common than is shown by its State Rank. Often found in small, turbid streams with extremely soft substrates and along banks in larger stream which may lead to the species being overlooked during general mussel surveys (AFMC 2004a, 2004b, 2004c, 2005).

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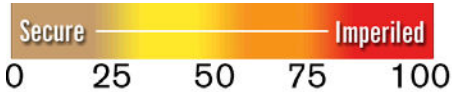
Unio merus tetralasmus

Pondhorn

Class: Bivalvia

Order: Unionoida

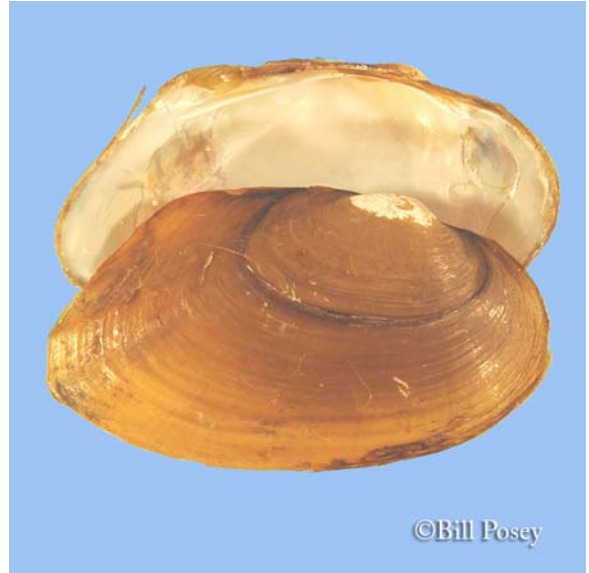
Family: Unionidae

Priority Score: **19** out of 100

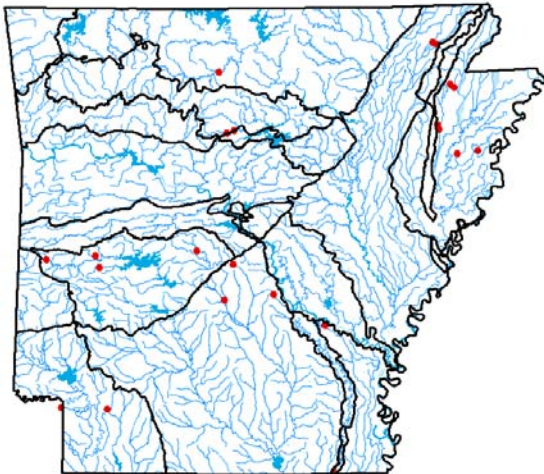
Population Trend: Unknown

Global Rank: G5 — Secure

State Rank: S2 — Imperiled in Arkansas



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Distribution**Occurrence Records**

Ecoregions where the species occurs:

- ☐ Ozark Highlands
- ☒ Boston Mountains
- ☐ Arkansas Valley
- ☒ Ouachita Mountains
- ☒ South Central Plains
- ☒ Mississippi Alluvial Plain
- ☐ Mississippi Valley Loess Plains

Suitable Substrate gravel/sand**Description**

Shell relatively thin, elongate, and compressed to moderately inflated. Anterior end rounded, posterior end bluntly or sharply pointed. Dorsal margin straight, ventral margin straight, rarely curved.

Unio merus tetralasmus
Pondhorn

Umbos low, approximately even with the hinge line. Beak sculpture of four or five concentric ridges. Two shallow grooves present on the posterior slope, giving rise to a short ridge. Surface smooth and shiny in small shells, becoming rougher and dull in older individuals. Periostracum greenish or yellowish brown in young individuals, adults dark brown to black and rayless. Length to five inches (12.7 cm). Pseudocardinal teeth small and thin; two in the left valve, one in the right. Lateral teeth relatively thin, short, and straight to slightly curved. Beak cavity shallow. Nacre white, occasionally with a tinge of salmon.

Host Fish

Golden Shiner

Ecobasins

Boston Mountains - White River

Mississippi River Alluvial Plain - St. Francis River

Mississippi River Alluvial Plain - White River

Mississippi River Alluvial Plain (Lake Chicot) -
Mississippi River

Ouachita Mountains - Ouachita River

South Central Plains - Ouachita River

South Central Plains - Red River

Habitats

Weight

Man-made Littoral: - Small	Optimal
Man-made Pelagic: - Small	Marginal
Natural Other: - Medium - Large	Data Gap
Natural Oxbow - connected: - Medium - Large	Optimal
Natural Pool: Headwater - Medium - Large	Optimal
Natural Side channel: - Medium - Large	Optimal
Natural Slough: - Medium - Large	Optimal

Problems Faced

Threat: Habitat destruction

Source: Grazing/Browsing

Threat: Habitat destruction

Source: Resource extraction

Threat: Habitat destruction

Source: Water diversion

Threat: Sedimentation

Source: Agricultural practices

Threat: Sedimentation

Source: Forestry activities

Threat: Sedimentation

Source: Resource extraction

Data Gaps/Research Needs

Conduct life history study.

Conservation Actions

Manage watershed, addressing physical, chemical, biological and land use components, to restore or sustain aquatic life.

Importance Category

Medium Threat Abatement

Monitoring Strategies

Continue to monitor occurrence in ongoing river surveys.

Comments

Species is probably more common than is shown by its State Rank. Often found in small, turbid streams with extremely soft substrates, in ponds and lakes, and along banks in larger stream which may lead to the species being overlooked during general mussel surveys (AFMC 2004a, 2004b, 2004c, 2005).

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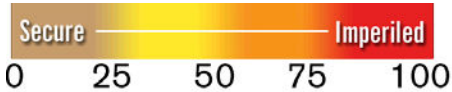
Venustaconcha ellipsiformis

Ellipse

Class: Bivalvia

Order: Unionoida

Family: Unionidae

Priority Score: **23** out of 100

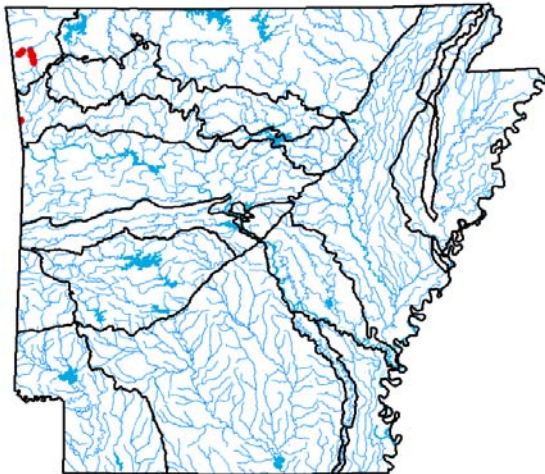
Population Trend: Unknown

Global Rank: G4 — Apparently secure species

State Rank: S2 — Imperiled in Arkansas



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Distribution**Occurrence Records**

Ecoregions where the species occurs:

- ☒ Ozark Highlands
- ☒ Boston Mountains
- ☐ Arkansas Valley
- ☐ Ouachita Mountains
- ☐ South Central Plains
- ☐ Mississippi Alluvial Plain
- ☐ Mississippi Valley Loess Plains

Suitable Substrate gravel/cobble**Description**

Shell small, solid, elliptical, and compressed. Anterior end rounded, posterior end bluntly pointed. Ventral margin straight to slightly curved. Umbos only slightly elevated above the hinge line. Beak

Venustaconcha ellipsiformis
Ellipse

sculpture of three or four very fine, double-looped ridges. Shell usually smooth, with a few wrinkles or folds on the posterior half in older shells. Periostracum green or greenish yellow with numerous dark green rays, becoming wavy on the posterior half of the shell. Length to three inches (7.6 cm). Pseudocardinal teeth triangular, heavy, roughened, and divergent; two in the left valve, one in the right (occasionally with a thin, ridgelike tooth in front). Lateral teeth relatively short, thick, and straight to slightly curved. Beak cavity shallow. Nacre white, iridescent posteriorly.

Host Fish

Mottled Sculpin, Slimy Sculpin, Brook Stickleback, Rainbow Darter, Iowa Darter, Johnny Darter, Logperch, Blackside Darter, Greenside Darter, Orangethroat Darter, Redfin Darter, Cardinal Shiner, Yoke Darter

Ecobasins

Boston Mountains - Arkansas River

Ozark Highlands - Arkansas River

Habitats	Weight
Natural Glide: Headwater	Suitable
Natural Pool: Headwater - Medium - Large	Suitable
Natural Riffle: Headwater - Medium - Large	Suitable
Natural Run: Headwater - Medium - Large	Optimal
Natural Shoal: - Medium - Large	Suitable

Problems Faced

Threat: Habitat destruction
Source: Dam

Threat: Habitat destruction
Source: Grazing/Browsing

Threat: Habitat destruction
Source: Resource extraction

Threat: Nutrient loading
Source: Confined animal operations

Threat: Nutrient loading
Source: Grazing/Browsing

Threat: Sedimentation
Source: Forestry activities

Threat: Sedimentation
Source: Grazing/Browsing

Threat: Sedimentation
Source: Resource extraction

Threat: Sedimentation
Source: Road construction

Data Gaps/Research Needs

Conduct life history study.

Conduct status survey.

Determine genetic relationship to *Venustaconcha pleasii*.

Conservation Actions

Importance Category

Manage watershed, addressing physical, chemical, biological and land use components, to restore or sustain aquatic life.

Medium

Threat Abatement

Monitoring Strategies

Continue to monitor occurrence in ongoing river surveys.

Comments

Only known from Illinois River and Lee Creek in Arkansas (Arkansas River drainages). (AFMC 2004a, 2004b, 2004c, 2005).

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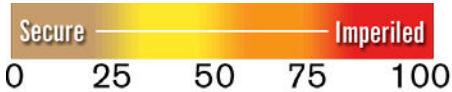
Venustaconcha pleasii

Bleedingtooth Mussel

Class: Bivalvia

Order: Unionoida

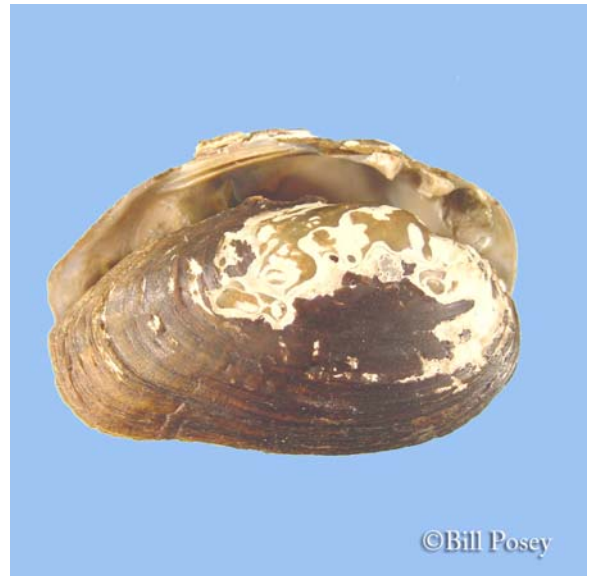
Family: Unionidae

Priority Score: **23** out of 100

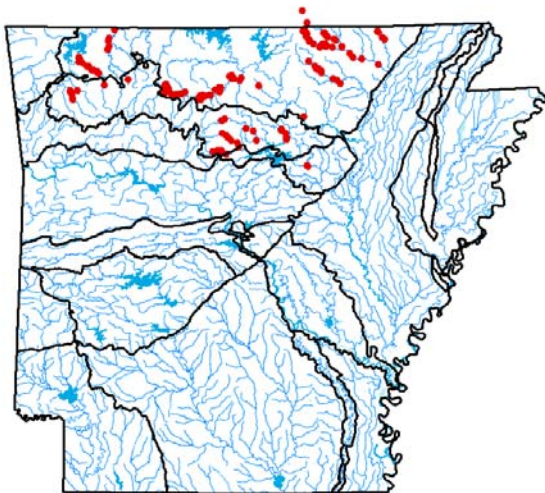
Population Trend: Unknown

Global Rank: G3G4 — Vulnerable (uncertain rank)

State Rank: S3 — Vulnerable in Arkansas

**Distribution**

Occurrence Records



Ecoregions where the species occurs:

- ☒ Ozark Highlands
- ☒ Boston Mountains
- ☒ Arkansas Valley
- ☐ Ouachita Mountains
- ☐ South Central Plains
- ☐ Mississippi Alluvial Plain
- ☐ Mississippi Valley Loess Plains

Suitable Substrate cobble/gravel

DescriptionSimilar to *Venustaconcha ellipsiformis***Host Fish**

Venustaconcha pleasii
Bleedingtooth Mussel

Greenside Darter, Rainbow Darter, Yoke Darter

Ecobasins

Boston Mountains - White River

Mississippi River Alluvial Plain - St. Francis River

Ozark Highlands - White River

Habitats	Weight
Natural Glide: Headwater	Suitable
Natural Pool: Headwater - Medium - Large	Suitable
Natural Riffle: Headwater - Medium - Large	Suitable
Natural Run: Headwater - Medium - Large	Optimal
Natural Shoal: - Medium - Large	Suitable

Problems Faced

Threat: Habitat destruction
Source: Dam

Threat: Habitat destruction
Source: Grazing/Browsing

Threat: Habitat destruction
Source: Resource extraction

Threat: Nutrient loading
Source: Confined animal operations

Threat: Nutrient loading
Source: Grazing/Browsing

Threat: Sedimentation
Source: Forestry activities

Threat: Sedimentation
Source: Grazing/Browsing

Threat: Sedimentation
Source: Resource extraction

Threat: Sedimentation
Source: Road construction

Data Gaps/Research Needs

Conduct life history study.

Conduct status survey.

Conservation Actions	Importance	Category
Manage watershed, addressing physical, chemical, biological and land use components, to restore or sustain aquatic life.	Medium	Threat Abatement

Monitoring Strategies

Additional information is needed before a monitoring strategy can be developed.

Comments

Widespread in the White River drainage but seldom common (AFMC 2004a, 2004b, 2004c, 2005).

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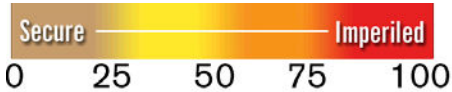
Villosa iris

Rainbow

Class: Bivalvia

Order: Unionoida

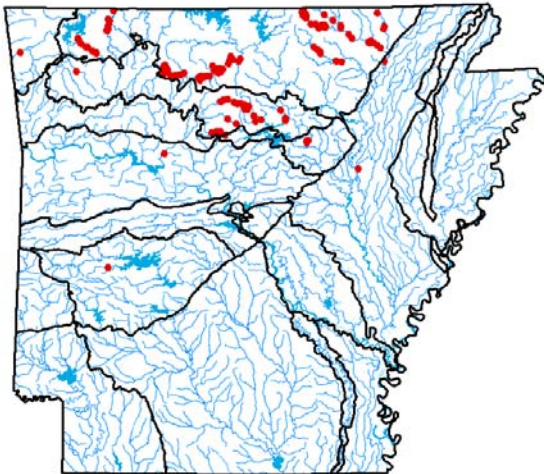
Family: Unionidae

Priority Score: **15** out of 100

Population Trend: Unknown

Global Rank: G5Q — Secure (questionable taxonomy)

State Rank: S3 — Vulnerable in Arkansas

**Distribution****Occurrence Records**

Ecoregions where the species occurs:

- ☒ Ozark Highlands
- ☒ Boston Mountains
- ☐ Arkansas Valley
- ☐ Ouachita Mountains
- ☐ South Central Plains
- ☒ Mississippi Alluvial Plain
- ☐ Mississippi Valley Loess Plains

Suitable Substrate cobble/gravel**Description**

Shell small, elongate, relatively thin, and compressed (males) to moderately inflated (females). Anterior end rounded, posterior end rounded (females) to bluntly pointed (males). Umbos even with

or slightly elevated above hinge line. Beak sculpture of four to six distinct, double-looped bars. Periostracum yellow or greenish yellow, with dark green rays, often interrupted. Length to three inches (7.6 cm). Pseudocardinal teeth small, triangular, and somewhat divergent; two in the left valve, one in the right. Lateral teeth long, thin, and straight to slightly curved. Beak cavity shallow. Nacre silvery white and highly iridescent on the posterior half, giving this species its common name.

Host Fish

Streamline Chub, Greenside Darter, Rainbow Darter, Bluebreast Darter, Green Sunfish, Striped Shiner, Smallmouth Bass, Largemouth Bass, Yellow Perch, Rock Bass, Mosquito Fish, Suwannee Bass, Spotted Bass

Ecobasins

Boston Mountains - White River

Mississippi River Alluvial Plain - White River

Ozark Highlands - White River

Habitats

Habitats	Weight
Natural Glide: Headwater	Suitable
Natural Pool: Headwater - Medium - Large	Optimal
Natural Riffle: Headwater	Suitable
Natural Run: Headwater - Medium - Large	Optimal
Natural Shoal: - Medium - Large	Marginal

Problems Faced

Threat: Habitat destruction
Source: Dam

Threat: Habitat destruction
Source: Grazing/Browsing

Threat: Habitat destruction
Source: Resource extraction

Threat: Nutrient loading
Source: Confined animal operations

Threat: Nutrient loading
Source: Grazing/Browsing

Threat: Sedimentation
Source: Forestry activities

Threat: Sedimentation
Source: Grazing

Threat: Sedimentation
Source: Resource extraction

Threat: Sedimentation
Source: Road construction

Data Gaps/Research Needs

Research taxonomic relationship of two forms.
Describe species, if necessary.

Review distribution and abundance based on
taxonomic status or revision.

Conservation Actions

Importance Category

Manage watershed, addressing physical, chemical, biological and land use components, to restore or sustain aquatic life.

Medium

Threat Abatement

Monitoring Strategies

Additional information is needed before a monitoring strategy can be developed.

Comments

The status of this species is unclear due to taxonomic uncertainty. There appear to be two phylogenetic units in Arkansas (AFMC 2004a, 2004b, 2004c, 2005, AGFC 2003, AHTD 1984, ANHI 2003, Bates and Dennis 1983, Branson 1984, Clark 1987, Coker 1919, Crump 2003, Crump and others 2003a, 2003c, 2003d, 2003e, 2003g, 2003q, 2003r, 2003t, Cummings and Mayer 1992, Davidson and others 1997, Ecological Consultants 1984, Gordon 1980a, Gordon and others 1980, Harris 1991b, 1992a, 1993, 1996, 1999, Harris and Christian 2004, Harris and Gordon 1990, Harris and Milam 2002, Johnson 1980, Meek and Clark 1912, Oesch 1995, ONHI 2003, Rust 1993, Turgeon and others 1988, 1998, Vaughn 1996, Vaughn and Spooner 2000, USDA FS 1999, Warren 1991, Williams & others 1993).

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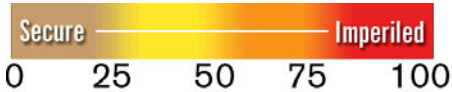
Villosa sp. cf lienosa

Little Spectaclecase group

Class: Bivalvia

Order: Unionoida

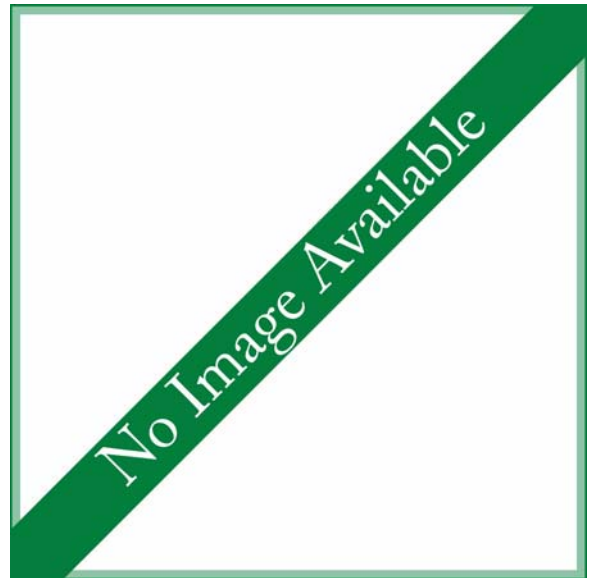
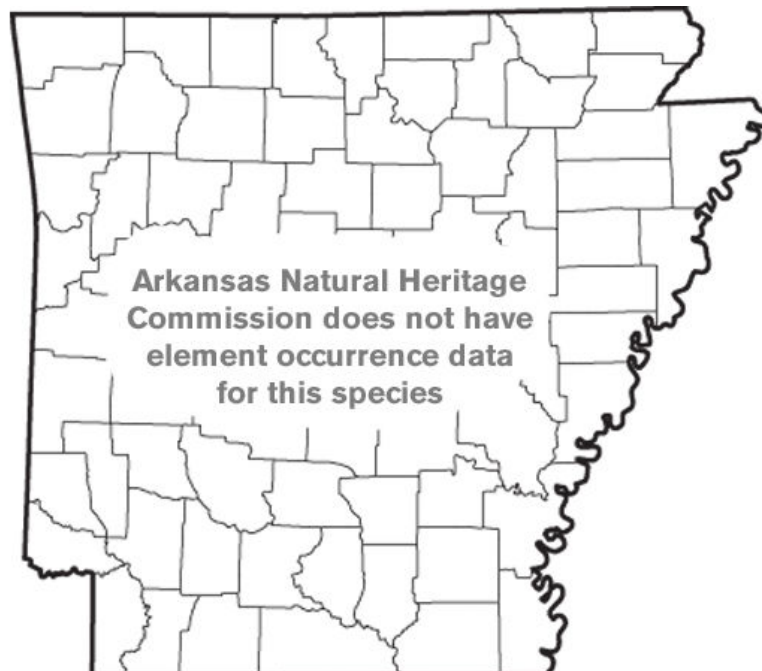
Family: Unionidae

Priority Score: **17** out of 100

Population Trend: Unknown

Global Rank: G5 — Secure

State Rank: S2S3 — Imperiled species in Arkansas (uncertain rank)

**Distribution****Occurrence Records**

Ecoregions where the species occurs:

- ☒ Ozark Highlands
- ☒ Boston Mountains
- ☒ Arkansas Valley
- ☒ Ouachita Mountains
- ☒ South Central Plains
- ☒ Mississippi Alluvial Plain
- ☐ Mississippi Valley Loess Plains

Suitable Substrate gravel/sand**Description**

Generally for all three taxonomic entities, shell small, slightly elongate, thin to moderately thick, compressed in males and inflated in females. Anterior end rounded, posterior end bluntly pointed

Villosa sp. cf lienosa
Little Spectaclecase group

(males) or truncated (females). Dorsal margin straight, ventral margin straight to slightly curved. Umbos elevated above the hinge line. Beak sculpture of four to seven distinct, double-looped bars. Periostracum green to dark brown, with green rays (often obscure). Length to 2.5 inches (6.4 cm). Pseudocardinal teeth relatively small and compressed; two in the left valve, one in the right, with a smaller tooth present anteriorly in some shells. Lateral teeth elongate, thin, and straight. Nacre white or bluish white, occasionally tinged with salmon, iridescent posteriorly.

Host Fish

Brown Bullhead, Channel Catfish, Bluegill, Largemouth Bass

Ecobasins

Arkansas Valley - Arkansas River

Boston Mountains - Arkansas River

Boston Mountains - White River

Mississippi River Alluvial Plain - St. Francis River

Mississippi River Alluvial Plain - White River

Ouachita Mountains - Arkansas River

Ouachita Mountains - Ouachita River

Ouachita Mountains - Red River

Ozark Highlands - Arkansas River

Ozark Highlands - White River

South Central Plains - Ouachita River

Habitats

Weight

Natural Pool: Headwater - Medium - Large

Optimal

Natural Riffle: Headwater

Suitable

Natural Run: Headwater - Medium - Large

Suitable

Natural Shoal: - Medium - Large

Suitable

Natural Side channel: - Medium - Large

Suitable

Problems Faced

Threat: Habitat destruction
Source: Grazing/Browsing

Threat: Habitat destruction
Source: Resource extraction

Threat: Nutrient loading
Source: Confined animal operations

Threat: Nutrient loading
Source: Grazing/Browsing

Threat: Nutrient loading
Source: Urban development

Threat: Sedimentation
Source: Forestry activities

Threat: Sedimentation
Source: Grazing/Browsing

Threat: Sedimentation
Source: Road construction

Data Gaps/Research Needs

Conduct life history study.

Conservation Actions

Manage watershed, addressing physical, chemical, biological and land use components, to restore or sustain aquatic life.

Importance Category

Medium Threat Abatement

Monitoring Strategies

More information is needed before a monitoring strategy can be developed.

Comments

Widespread but uncommon. Found in habitats not usually surveyed during general mussel surveys. Three taxonomic units may occur in Arkansas with "forms" inhabiting the Red River Basin, Ouachita River Basin and the combined Arkansas, White and St. Francis drainages. (AFMC 2004a, 2004b, 2004c, 2005, G.T. Waters pers. Comm.)

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