

POPULATION STATUS OF OHIO ENDANGERED  
UNIONIDAE, 1993.

By

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## Purpose

The purpose of this status report on the Unionidae of Ohio is to summarize the current population status of the federally endangered pearly freshwater mussels so that trends can be determined. As we identify these trends and as we more fully understand the current status of the populations we can begin to rank tasks intended to preserve and enhance these species in the state. Currently 11 species or subspecies are listed as endangered in Ohio at the federal level. These species, listed as they appear in the Federal Register ( 1992, 1993), are:

*Cyprogenia stegaria* (=irrorata) (fanshell)  
*Obovaria retusa* (ring pink mussel)  
*Quadrula fragosa* (winged mapleleaf mussel)  
*Hemistina* (=Lastena) *lata* (cracking pearly mussel)  
*Plethobasus cooperianus* (orange-footed pearly mussel)  
*Lampsilis orbiculata* (pink mucket pearly mussel)  
*Epioblasma* (=Dysnomia) *obliquata obliquata* (purple cat's paw pearly mussel)  
*Epioblasma* (=Dysnomia) *sulcata dilicata* (white cat's paw pearly mussel)  
*Potamilus* (=Proptera) *capax* (fat pocketbook)  
*Pleurobema clava* (clubshell)  
*Epioblasma torulosa rangiana* (northern riffleshell)

Additional federally endangered species of Unionidae, not listed as endangered for Ohio but historically found in the state are included in this report. These species are:

*Epioblasma torulosa torulosa* (tubercled-blossom pearly mussel)  
*Plethobasus cicatricosus* (white wartyback pearly mussel)  
*Pleurobema plenum* (rough pigtoe)

Given that the unionid fauna of Ohio consists of 79 species (Watters 1988a), the above lists of 14 taxa represent 18% of this total that have been designated as endangered at the federal level. This percentage endangered is higher than the average for the United States as a whole (15%) (Neves 1993). Furthermore, of the 79 Ohio species, four additional species are believed to be extinct (5%), and six other species are candidates for federal protection (8%). These numbers depict a fauna that has been altered to a great extent over the years and that is currently in jeopardy of severe and dramatic change. It is appropriate that we understand the current status of their populations so that we can continue to work toward the restoration of their habitats and the recovery of the populations they support.

The following status reports include sections on synonymy, classification, characteristics, comparison with similar species, historic range (including Ohio), current Ohio range, preferred habitat, and status of Ohio populations. A combined literature cited section is included. The species are treated alphabetically and each species is listed as it appears in the Federal Register, although the currently accepted name is provided as well. Common names are included as they appear in the Federal Register and as in Turgeon et al. (1988) where that name is considerably different from that found in the Federal Register.

*Cyprogenia stegaria* (=irrorata)  
fanshell

*Obovaria stegaria* Rafinesque 1820

*Unio verrucosus albus* Hildreth 1828

*Unio irroratus* Lea 1830

*Cyprogenia irrorata pusilla* Simpson 1900

**Classification**

Family Unionidae Fleming 1828

Subfamily Lampsilinae Von Ihering 1901

Genus *Cyprogenia* Agassiz 1852

Species *Cyprogenia stegaria* (Rafinesque 1820)

**Characteristics**

The fanshell, as its common name implies, has numerous, broken green rays fanning out across the disc of the shell from the umbo to the shell margin. The shell is fairly thick and solid and up to three inches in length. It is circular in outline and moderately inflated, pustulate, and narrowly sulcate. The hinge is short with heavy cardinal teeth and thick lateral teeth. The periostracum is green to yellowish brown while the nacre is white.

**Comparison with Similar Species**

*Quadrula pustulosa pustulosa* (pimpleback) is similar in that they are both circular in outline and pustulate but that species has a thinner shell, is asulcate, and although it has a broad green ray at the umbo, this ray does not spread out over the disc like a fan.

**Historic Range (Including Ohio)**

*Cyprogenia stegaria* occurred in the Ohio River and many of its larger tributaries in Alabama, Tennessee, Kentucky, Virginia, West Virginia, Indiana, Ohio, and Pennsylvania (U.S.F.W.S. 1991a). Historic records locate this species in the Tennessee River in Alabama and Tennessee, the Green, Barren, and Licking rivers in Kentucky, Tygarts Creek in Kentucky, the Clinch River in Tennessee and Virginia, the Cumberland River in Tennessee, the Kanawha River in West Virginia, the Wabash River in Illinois and Indiana, the East Fork White and Tippecanoe rivers in Indiana, the Great Miami, Scioto, Tuscarawas, Walhonding, and Muskingum rivers in Ohio, and the Mahonig River in Ohio and Pennsylvania. Presently, the fanshell is thought to be reproducing only in the Green and Licking rivers in Kentucky, and the Clinch River in Tennessee and Virginia (U.S.F.W.S. 1991a). The species may also be reproducing in the lower Muskingum River based on recent young specimens found in that river (Tom Watters, personal communication 1993). Other small remnant populations (thought to be nonreproductive) include those in the Walhonding, Wabash, East Fork White, Barren, Tippecanoe, Kanawha, Cumberland, and Tennessee rivers, and in Tygarts Creek.

### **Current Ohio Range**

Although widely distributed in Ohio's larger rivers in the past, this species is currently found only in the Muskingum River. Hoggarth (in prep) collected only weathered shells of this species from the Walhonding River during a three year study of that tributary of the Muskingum River. It is unlikely that a population of this species still exists in that river today. However, fresh specimens collected from the Muskingum River from 1988 through 1993 would indicate that a population of this species still occurs in that river. Some of the specimens collected were fairly young indicating that reproduction has been taking place in this system. The species appears to be restricted to the Muskingum River in Morgan and Washington counties in Ohio.

### **Preferred Habitat**

The fanshell is found on a coarse sand and gravel bottom with steady current in a few inches to over two feet of water (Ortmann 1919, Parmalee 1967, Gordon and Layer 1989).

### **Status of Ohio Populations**

Of the rivers in the state that once supported populations of the fanshell, only the Muskingum River and Walhonding River populations have yielded recent collection records. Furthermore, even though no recent exhaustive surveys of the Mahoning, Great Miami, and Scioto rivers have been done, it is clear that these rivers could not support this species today. They are either highly modified by channelization and impoundments, or have been degraded by industrial and wastewater treatment plant effluent to the point that they only support a very few species. Most of these are of our most common unionids.

The population of the fanshell in the Walhonding River is in question as well. A recent three year study of the Walhonding River failed to document a viable population of the species in the stream (Hoggarth in prep). A viable population would have been indicated by just one fairly recently dead specimen or the collection of a living specimen. Fourteen specimens of the fanshell were collected during the study, but none were found alive or even freshly dead. All of these specimens were collected from Mohawk Dam downstream to Lake Park, approximately 2.0 miles upstream of the river's mouth.

The Muskingum River population of this species appears to be the only viable population left in Ohio. Even here the species is not evenly distributed throughout the lower Muskingum River but in disjunct populations downstream of dams on the river. Stansbery and King (1983) collected three specimens downstream of the dams at Lowell, and Devola and Watters (personal communication 1993) took one specimen downstream of the dam at Beverly from shallow water and another below the dam at Devola in deeper water. Furthermore, in July of 1988, Cathy Borrer (personal communication 1988) took a single valve of a freshly dead specimen from below the dam at Devola. It is probable that this species is reproducing downstream of these dams in the swift reaches over sand and gravel substrates.

*Epioblasma* (=Dysnomia) *obliquata obliquata* (=E. *sulcata sulcata*)  
purple cat's paw pearly mussel (=catspaw Turgeon et al. 1988)

*Obliquaria obliquata* Rafinesque 1820

*Unio sulcatus* lea 1829

*Unio ellipsis* Lea 1829

*Unio ridibundus* Say 1829

*Unio flagellatus* Say 1829

### Classification

Family Unionidae Fleming 1828

Subfamily Lampsilinae Von Ihering 1901

Genus *Epioblasma* Rafinesque 1831

Species *Epioblasma obliquata obliquata* (Rafinesque 1820)

### Characteristics

The purple catspaw shows sexual dimorphism in shell characteristics. The female is subquadrate in outline with an expanded posterior margin that bears a row of small, sharp, comb-like teeth. The male is quadrate anteriorly and bluntly pointed posteriorly. Both male and female shells are sulcate with a greenish to yellowish brown periostracum. The shell has fine green rays in the periostracum and the nacre is purple. The shell is solid with heavy cardinal teeth and thick lateral teeth. The subspecies reaches a length of approximately three inches.

### Comparison with Similar Species

*Epioblasma obliquata perobliqua* is less ovate and less solid than *E. o. obliquata*, and has white rather than purple nacre. *Epioblasma torulosa rangiana* is generally much larger, more widely sulcate, and has diffuse rather than thin green rays. *Epioblasma torulosa rangiana* has white rather than purple nacre.

### Historic Range (Including Ohio)

The purple catspaw was historically a big river species distributed in a few of the larger rivers of the Ohio, Cumberland, and Tennessee river systems. The subspecies once occurred in the Tennessee River at Muscle Shoals, Alabama, in the Cumberland River in Tennessee, in the Cumberland, Carey Fork, Harpeth, Liking, Kentucky, and Green rivers in Kentucky, and in the Muskingum River in Ohio. Until recently, the subspecies was unknown from the Walhonding River in Ohio (Hoggarth in prep.). Currently the purple catspaw is restricted to two isolated reaches of the Cumberland and Green rivers in Tennessee and Kentucky.

## **Current Ohio Range**

Prior to collecting this subspecies from the Walhonding River in 1991, the purple catspaw was considered to be extirpated from the state (Stansbery et al. 1982). All of the Muskingum River specimens were collected in the early 1800's (Sullivant 1838, Sterki 1907). The only recently collected specimens came from the Walhonding River below the U.S. Route 36 bridge, 3.5 miles ESE of Warsaw, 5.7 miles NW of Coshocton, Coshocton County, Ohio. The single specimens taken from the Walhonding had been dead approximately three years and it was approximately six years old. This would indicate that the subspecies had reproduced in Ohio in the last ten years and should not be considered extirpated from the state. However, this one specimen would not suggest that there is a viable, reproducing population in the river.

## **Preferred Habitat**

Bogan and Parmalee (1983) state that they had collected specimens from relic populations in 20-30 feet of water but that this mussel would have lived in riffle habitats of big rivers. Stansbery et al. (1982) state that this mussel had been collected from riffle and run habitats in the Green River in Kentucky and the Cumberland River in Tennessee. The shell collected in the Walhonding River was collected from a gravel bar adjacent to a swift run upstream of an extensive riffle that stretched the width of the river.

## **Status of Ohio Populations**

Stansbery et al. (1982) have concluded that the Muskingum River population is extirpated. It has not been collected in the Muskingum River in well over 150 years and very little suitable habitat is present within the Muskingum River at this time. The riffles and fast runs that provide habitat for this subspecies are limited to widely distributed sites immediately downstream of dams.

The occurrence of this subspecies in the Walhonding River was unexpected given its preference for large rivers. Still the river provides a large area of potential habitat with extensive riffle and run habitats throughout much of the lower reach of the river. If the purple catspaw has a population in the river, it will probably be located in the reach from the U.S. Route 36 bridge, downstream of the mouth of Killbuck Creek, to Lake Park, approximately 2.0 miles upstream of the mouth of the river. This reach has numerous riffle-run complexes with abundant sand-gravel-cobble substrate that would be ideal for this mussel. Continued effort in the watershed should be exerted to try and locate additional specimens. In the current study only one specimen of over 8700 collected was found. Still the amount of available habitat is very large, and there is a possibility that the mussel would be found here.

***Epioblasma* (=Dysnomia) *sulcata delicata***

white cat's paw pearly mussel (=white catspaw Turgeon et al. 1988)

*Unio gibosus perobliquus* Conrad 1836

*Truncilla sulcata delicata* of Authors, non Simpson 1900  
(=*Epioblasma torulosa rangiana*)

**Classification**

Family Unionidae Fleming 1828

Subfamily Lampsilinae Von Ihering 1901

Genus *Epioblasma* Rafinesque 1831

Species *Epioblasma obliquata perobliqua* (Conrad 1836)

**Characteristics**

The white catspaw and purple catspaw look very similar as noted above. The white catspaw shows sexual dimorphism in shell characteristics, with the female subquadrate in outline, expanded posteriorly, and with small, sharp denticles along the posterior margin that resembles the claws of a cat (hence the common name). The male is quadrate anteriorly and bluntly pointed posteriorly. Both male and female shells have a greenish to yellowish brown periostracum (generally lighter in color than the purple catspaw), fine green rays, and a white nacre. Both male and female shells are narrowly sulcate, rather solid and heavy for their size (approximately three inches in length), with heavy cardinal and lateral teeth.

**Comparison with Similar Species**

*Epioblasma obliquata perobliqua* differs from *E. o. obliquata* by being less ovate and less solid, and by having white rather than purple nacre. It differs from *Epioblasma torulosa rangiana* by being less widely sulcate and having fine rather than diffuse green rays.

**Historic Range (Including Ohio)**

*Epioblasma obliquata perobliqua* has been confused with *E. t. rangiana* found in Lake Erie and its tributaries, and has been attributed with a much wider range than it actually inhabited (U.S.F.W.S. 1990a). Based on specimens located in museum collections, the white catspaw occurred in the Ohio, Wabash, White, Tippecanoe, Maumee, and St. Joseph rivers in Indiana, the Maumee and St. Joseph rivers in Ohio, and in Fish Creek in Ohio. The Ohio River specimen is questionable since this characteristically is the small river subspecies of the complex. This record may be the result of the mussel being washed out of a tributary, or an aberrant specimen located in a more stream-like setting that once occurred along the margin of the Ohio River. Currently the white catspaw appears to exist only in Fish Creek in Ohio (Hoggarth 1986, Watters 1988b, U.S.F.W.S. 1990a). Recent collections of the unionid fauna of other river systems within the former range of this subspecies failed to locate living or freshly dead specimens (Cummings and Berlocher 1990, Cummings et al. 1992).

### **Current Ohio Range**

Since 1970, the white catspaw has been collected nowhere but Fish Creek in Williams County, Ohio. Clark (1977) collected one living specimen in 1975. Forrer found a living specimen in 1985, Hoggarth and Rice took a freshdead shell in 1985 (Hoggarth 1986, U.S.F.W.S. 1990a), and Watters (1988b) collected one living specimen and one freshdead specimen in 1988. Furthermore, one living specimen was observed in the stream following a pipeline break that sent diesel fuel spilling into the creek in 1993 (personal communication with C. Yoder, 1993). It is unknown whether these few specimens represent a viable population of this subspecies, but it appears to be the only site where a viable population may occur.

### **Preferred Habitat**

Clark (1977) reported that the specimen he collected was found, "laying on the surface of the gravel bottom, completely exposed." Stansbery et al. (1982) concluded that the habitat of this subspecies is similar to that of *E. o. obliquata* except that *E. o. perobliqua* prefers small rivers and creeks. Both subspecies prefer riffle and swift run habitats in stable gravel and sand substrates.

### **Status of Ohio Populations**

The white catspaw has been collected from the Maumee River near Defiance by Eggleston in 1936 and from the St. Joseph River near the Indiana border by Eggleston in the same year (Stansbery et al. 1982). However, no recent collections of this mussel have been made from either river. The white catspaw has been extirpated from these two rivers, as it has from the remainder of its range other than Fish Creek.

The Fish Creek population appears to be the only remnant of this subspecies. In the last 20 years, six specimens have been collected from the three mile reach of this stream that occurs in Ohio. Continued effort should be made to locate the mussel in the stream in order to monitor its population status. This monitoring should be done as unobtrusively as possible. General surveys for mussels, and fish, disrupt the habitats that are required for the continued survival of this subspecies and should be avoided. Instead, periodic searches for females during the glochidial release period (August through September) could accomplish the same goals with much less disruption of the population. Since the females emerge from the substrate when they are ready to release glochidia, they could be found by simply searching the riffles and runs rather than disrupting the substrate. It is also during this time of the year when streams in Ohio are characteristically low and clear, increasing the efficiency of the search. All subsequent survey work in Fish Creek should be done when this mussel is most easily located, and in such a way as to do as little damage to the unionid community that exists in the stream.



***Epioblasma torulosa rangiana***  
**northern riffleshell**

*Truncilla perplexa rangiana* Lea 1839

*Truncilla sulcata delicata* Simpson 1900

**Classification**

Family Unionidae Fleming 1828

Subfamily Lampsilinae Von Ihering 1901

Genus *Epioblasma* Rafinesque 1831

Species *Epioblasma torulosa rangiana* (Lea 1839)

**Characteristics**

The northern riffleshell expresses sexual dimorphism in shell characteristics. The female is subquadrate to obovate in outline and expanded posteriorly. The postventral expansion is broadly rounded, very thin, and fragile. The male is irregularly ovate to broadly rounded anteriorly, and narrowly pointed posteriorly, with a wide sulcus anterior to the posterior ridge. The periostracum is greenish to yellowish brown, sometimes reddish brown, with diffuse green rays. The nacre is usually white sometimes pink, and rarely rose. The northern riffleshell has a well developed hinge with small cardinal and short lateral teeth. The shell reaches a length of approximately three inches.

**Comparison with Similar Species**

*Epioblasma torulosa torulosa* is very similar to this subspecies, except that it has a row of large nodules that accentuate the anterior margin of a fairly wide sulcus. Posterior to the sulcus there is a high posterior ridge. The postventral expansion of the female is less inflated, thin, and fragile than in *E. t. rangiana*. Male *E. o. perobliqua* may be confused with this mussel, but the white catspaw is narrowly sulcate with numerous fine green rays.

**Historic Range (Including Ohio)**

The northern riffleshell was widely distributed in the Ohio River and Lake Erie drainage basins. Records indicate that the mussel occurred in the Ohio, Allegheny, Scioto, Kanawha, Little Kanawha, Licking, Kentucky, Wabash, White, Vermillion, Mississinewa, Tippecanoe, Tennessee, Elk, Green, and Salt rivers as well as many of their tributaries (Federal Register 1993). It occurred in the Maumee, St. Joseph, Sandusky, Detroit, St. Clair, Black, Ausable, Sydenman, and Huron rivers, and River Raisin of the St. Lawrence system. Presently this mussel is restricted to the upper two miles of the Detroit River from Lake St. Clair to Belle Isle, Wayne County, Michigan, French Creek, Crawford, Vernango, and Mercer counties, Pennsylvania, LeBouef Creek, Irie County, Pennsylvania, the Allegheny River, Warren and Forest counties, Pennsylvania, Big Darby Creek, Franklin and Pickaway counties, Ohio, and Fish Creek, Williams County, Ohio (Hoggarth 1986, U.S.F.W.S. 1993).

### **Current Ohio Range**

The northern riffleshell has been recorded from a number of streams in Ohio. Sullivant (1838) listed it for the Scioto River and Sterki (1907) stated that it was found in the Ohio, Scioto, Tuscarawas, and Mahoning rivers, while Stansbery et al. (1982) added the Walhonding River, Olentangy River, Big Walnut Creek, and Big Darby Creek. Watters (U.S.F.W.S. 1993) adds historic records from the Little Mahoning River and Pymatuning Creek. This mussel was once widely distributed in the western basin of Lake Erie and in some Lake Erie tributaries (Stansbery et al. 1982). Currently, the northern riffleshell is limited to Big Darby Creek from Battelle-Darby Metropark in Franklin County to near Fox in Pickaway County and in the three mile reach of Fish Creek in Williams County. Given the recent documentation of the clubshell (*Pleurobema clava*) in Pymatuning Creek (Huehner and Corr in prep), it is possible that the northern riffleshell is there as well.

### **Preferred Habitat**

This mussel is found on a sand and gravel substrate in riffle to fast run habitats. I have collected gravid females in four to six inches of water. These females were displaying their milky white mantles to entice a host fish to strike to initiate the release of the glochidia.

### **Status of Ohio Populations**

Although once widely distributed in Ohio, the range of the northern riffleshell has been severely reduced. Only two known populations occur in Ohio and neither population may be viable due to their low numbers of individuals (U.S.F.W.S. 1993). The status of the northern riffleshell is unknown in Pymatuning Creek, and in western Lake Erie. Recent surveys of Pymatuning Creek failed to find the mussel (Huehner and Corr in prep), and the subspecies has not been found in the western basin since the 1960's, although no concentrated search for the mussel has been performed in either area.

In regard to the two known populations, those in Big Darby Creek and in Fish Creek, the Big Darby Creek population is by far the largest. It is still not difficult to find living specimens in Big Darby Creek. Furthermore, since these animals are dioecious, it is obvious that they are reproducing in the stream, since everyone who has looked for these mussels in Big Darby Creek recently (personal observation, U.S.F.W.S. 1993), has found gravid females perched on the substrate attempting to attract a host for their glochidia. The glochidia would not have been produced other than by sexual reproduction. It is obvious that the animals are reproducing, however it is not obvious whether they are successfully attracting hosts.

The Fish Creek population is much smaller than that found in Big Darby Creek. Hoggarth (1986) and Watters (1988b) only found a few living or freshdead specimens each and Anderson in a recent survey failed to find any specimens that would indicate a population of the mussel still occurs there (U.S.F.W.S. 1993). Since the females of this mussel emerge from the substrate like those of *E. o. perobliqua*, it is suggested that any survey work performed be done during the glochidial release period as was suggested above.

***Epioblasma (=Dysnomia) torulosa torulosa*  
tubercled-blossom pearly mussel**

*Amblema torulosa* Rafinesque 1820

*Truncilla perplexa* Lea 1831

**Classification**

Family Unionidae Fleming 1828

Subfamily Lampsilinae Von Ihering 1901

Genus *Epioblasma* Rafinesque 1831

Species *Epioblasma torulosa torulosa* (Rafinesque 1820)

**Characteristics**

The tubercled blossom expresses sexual dimorphism in shell characteristics. The female is obovate to subquadrate in outline with an expanded posterior margin. The expansion is compressed and rounded, not thin or fragile. The male is irregularly ovate in outline with a prominent sulcus between the high posterior ridge and a row of pronounced knobs that begin in the middle of the disc and extend to the margin of the shell. The female shell is much more shallowly sulcate. In both male and female, the periostracum is yellowish green to brown with diffuse green rays. The nacre is white. The mussel has a well developed hinge with large cardinal teeth and thick lateral teeth. The tubercled blossom reaches a length of approximately three inches.

**Comparison with Similar Species**

*Epioblasma torulosa rangiana* lack the row of knobs on the shell and the female shell is much more inflated, thin and fragile postventrally.

**Historic Range (Including Ohio)**

*Epioblasma torulosa torulosa* was restricted to the Ohio River and the mainstems of its larger tributaries (Stansbery et al. 1982, Bogan and Parmalee 1983). The tubercled blossom inhabited the Tennessee River in Tennessee and Alabama, the Elk and Paint Rock rivers in Alabama, the Duck River in Tennessee, and the Ohio River and some of its larger tributaries such as the Green, Scioto, and Muskingum rivers. It is unknown whether any populations of this mussel remain today.

**Current Ohio Range**

This subspecies has been recorded from the lower Scioto River by Sullivant (1838) and Sterki (1907) and from the Muskingum River by Hildreth (1830). It has not been collected in the state recently, and is presumed extirpated from Ohio (Stansbery et al. 1982). The mussel was not listed for Ohio when it was listed as a federal endangered species.

**Preferred Habitat**

This mussel lived in the firm substrates in riffles of the larger rivers in the Ohio River drainage basin. As most of this type of habitat was lost to impoundments, the mussel became extirpated from more and more of its former range, and is probably extinct today.

**Status of Ohio Populations**

This subspecies no longer occurs in Ohio. It has been extirpated from the Muskingum River and from the Scioto River and some of its major tributaries such as Big Darby Creek and Big Walnut Creek (subfossil shells only) for many years.

***Hemistena* (=Lastena) lata**  
**cracking pearly mussel**

*Anodonta* (*Lastena*) *lata* Rafinesque 1820

*Unio dehiscens* Say 1829

**Classification**

Family Unionidae Fleming 1828

Subfamily Ambleminae Rafinesque 1820

Genus *Hemistena* Rafinesque 1820

Species *Hemistena lata* (Rafinesque 1820)

**Characteristics**

The cracking pearly mussel is elongate, elliptical, thin, and compresses. The anterior end is rounded and the posterior end is bluntly pointed to truncate. The shell reaches a length of approximately four inches and does not show sexual dimorphism in shell characters. The umbos are low, with coarse ridges. The disc is smooth, without pustules or knobs, and with a yellowish green to yellowish brown periostracum. The nacre is white and the hinge is poorly developed, sometimes edentulous.

**Comparison with Similar Species**

*Elliptio dilatata* (*spike*) resembles this species in outline but that species has well developed hinge dentition and purple rather than white nacre. *Uniomerous tetralasmus* (pondhorn) has a poorly developed hinge, white nacre, and a similar outline but that species is more inflated with higher umbos and a cloth-like texture to the exterior of the shell. *Hemistena lata* is a distinctive species not easily confused with any other.

**Historic Range (Including Ohio)**

*Hemistena lata* occurred in the Ohio, Cumberland, and Tennessee river drainage systems (Simpson 1914). It once was found in the Ohio River in Ohio, Indiana, and Illinois, the Wabash River in Indiana, the Illinois River in Illinois, the Green River in Kentucky, the Cumberland River and the Big South Fork of the Cumberland River in Tennessee, the Buffalo, Duck, Clinch, Powell, and Holston rivers in Tennessee, and the Elk River in Tennessee and Alabama (Bogan and Parmalee 1983). It has been recorded from the Scioto, Muskingum, and Tuscarawas rivers in Ohio (Stansbery et al. 1982). The current range of the species is limited to isolated populations in the Green, Powell, and Clinch rivers.

**Current Ohio Range**

Sullivant (1838) recorded the cracking pearly mussel from the Scioto River while others recorded the species from the Tuscarawas River in the 1800's and from the Muskingum River in 1930 (Stansbery et al. 1982). It has not been collected in Ohio since these collections and it is believed that the species has been extirpated from the state.

**Preferred Habitat**

This species buries deeply in the firm silt, sand, and gravel substrates associated with the riffles of medium sized streams.

**Status of Ohio Populations**

The species is probably extirpated from Ohio and is only of historic significance for the state.

***Lampsilis orbiculata***

pink mucket pearly mussel

*Unio crassus* Say 1817, *in partim*(=*nomen dubium*)*Unio orbiculatus* of Authors, *non* Hildreth 1828(=*Obovaria subrotunda*)*Unio abruptus* Say 1831**Classification**

Family Unionidae Fleming 1828

Subfamily Lampsilinae Von Ihering 1901

Genus *Lampsilis* Rafinesque 1820Species *Lampsilis abrupta* (Say 1831)**Characteristics**

The pink mucket expresses sexual dimorphism in shell characteristics. The female has a subquadrate outline and a postventrally inflated shell. The male has an elliptical outline with a well developed posterior ridge. Both male and female shells are thick with low umbos and fine double-looped umbo sculpture. The periostracum is dark yellowish brown to reddish brown without rays or with faint greenish rays. The nacre is white, pink or salmon. The hinge is well developed with large cardinal teeth and thick lateral teeth. The species grows to a maximum length of approximately five inches.

**Comparison with Similar Species**

*Actinonaias ligamentina ligamentina* and *Actinonaias ligamentina carinata* (mucket) are elliptical and usually distinctly rayed. The males of both taxa may so closely resemble the male of the pink mucket that they may be indistinguishable without soft parts. *Lampsilis abrupta* is virtually identical with the upper Mississippian *Lampsilis higginsi*, except for characters of the gravid females, but *L. higginsi* is restricted to the upper Mississippi while *L. abrupta* is found in the Ohio drainage system.

**Historic Range (Including Ohio)**

This species was once fairly common in the Tennessee, Cumberland, and Ohio river drainage systems (U.S.F.W.S. 1985). Historically *L. abrupta* was distributed in the Tennessee, Flint, Limestone, Duck, Holston, French Broad, Clinch, Cumberland, Muskingum, White, Wabash, Osage, Mississippi, Illinois, Quachita, Old, Big, Black, Little Black, Sac, Meramec, Current, Paint Rock, Gasconade, and St. Francis rivers. It is currently found in the Tennessee, Cumberland, Osage, Meramec, Paint Rock, Kanawha, Clinch, Green, Big, Black, Little Black, Current, Gasconade, and Ohio rivers (U.S.F.W.S. 1985, Tolin et al. 1987). It is probably extirpated from all of Ohio.

### **Current Ohio Range**

This species is probably extirpated from Ohio. Very old dead shells of the species have been collected from the Scioto River and although fairly fresh shells were once collected from the Muskingum River, the species has not been collected alive or as a freshdead shell from the Muskingum River in over 20 years (Stansbery et al. 1982). The closest recent record of this species is two specimens collected alive from the Ohio River between Ohio and West Virginia (Tolin et al. 1987).

### **Preferred Habitat**

*Lampsilis abrupta* is a medium to large river species that inhabits silt, sand, gravel, and cobble substrate where there is moderate to fast flowing water. It may also be found in pooled habitats and has apparently adapted to existence in the impoundments on the Tennessee, Cumberland, and Ohio rivers (U.S.F.W.S. 1985, Tolin et al. 1987).

### **Status of Ohio Populations**

This species is probably extirpated from Ohio. It has never been taken as a fresh specimen from the Scioto River and was probably eliminated from that river in the 1800's to early 1900's. It may still be present in the lower Muskingum River but recent surveys of the river (Stansbery and King 1983) did not find any living or freshdead specimens and attempts at finding the species during recent droughts in the watershed failed to located the species (personal observation). It is unlikely that an undiscovered population of this species will be found in the river.



***Obovaria retusa***

ring pink mussel

*Unio retusa* Lamarck 1819*Obovaria torsa* Rafinesque 1820**Classification**

Family Unionidae Fleming 1828

Subfamily Lampsilinae Von Ihering 1901

Genus *Obovaria* Rafinesque 1820Species *Obovaria retusa* (Lamarck 1819)**Characteristics**

The ring pink mussel expresses sexual dimorphism in shell characteristics. The female is subquadrate, inflated with high umbos. The male is ovate, also with a high umbos. Both male and female shells are solid with purple nacre changing to white beyond the pallial line. The shell is brown to yellowish brown, without sculpture except at the umbo where there are a few weak double-looped ridges. The hinge is well developed with massive cardinal teeth and thick, fairly short lateral teeth. The shell reaches a maximum length of approximately four inches.

**Comparison with Similar Species**

*Obovaria subrotunda* (round hickorynut) has a similar shape, but that species has lower umbos that are opposite one another rather than facing anteriorly, a less massive hinge, and white rather than purple nacre.

**Historic Range (Including Ohio)**

The ring pink mussel was widely distributed throughout the Ohio River system. It was found in the Ohio, Cumberland, and Tennessee rivers and their larger tributaries (Bogan and Parmalee 1983). *Obovaria retusa* has been recorded from the Ohio River in Pennsylvania to Illinois, the Wabash, White, Eel, Whitewater, and Maumee rivers in Indiana, the Green River in Kentucky, the Clinch, Duck, and Holston rivers in Tennessee, the Tennessee River from Tennessee to Alabama, and the Cumberland River in Tennessee and Kentucky (Bogan and Parmalee 1983, U.S.F.W.S. 1990b). The species was recorded from the Scioto River by Sullivant (1838), the Muskingum River in 1933, and the Maumee River in the 1800's (Stansbery et al. 1982). The Maumee River record is questionable according to Stansbery et al. (1982) since there is no other record of this species for the St. Lawrence River system.

**Current Ohio Range**

This species may still occur within the Ohio River but it is undoubtedly extirpated from the Scioto and Muskingum rivers. Currently, the ring pink mussel is reproducing only in the Green River in Kentucky although there may be other populations in the Tennessee River and the Cumberland River (U.S.F.W.S. 1990b).

**Preferred Habitat**

This is a large river species that is found in the coarse gravel and sand substrate associated with swift flowing water.

**Status of Ohio populations**

The ring pink mussel is extirpated from Ohio.

***Plethobasus cicatricosus***

white wartyback pearly mussel

*Unio cicatricosus* Say 1829*Unio varicosus* Lea 1831*Unio detectus* Frierson 1911(=*Nomen novem* per *Unio varicosus*)**Classification**

Family Unionidae Fleming 1828

Subfamily Lampsilinae Von Ihering 1901

Genus *Plethobasus* Simpson 1900Species *Plethobasus cicatricosus* (Say 1829)**Characteristics**

The white wartyback grows to a length of approximately five inches. It has white nacre and the shell is sculptured with a row of low, irregular, laterally expanded knobs beginning behind the umbo and extending across the disc to the ventral margin. The shell does not express sexual dimorphism, is subtriangular to elliptical, solid and moderately compressed. The periostracum is yellowish brown to brown, cloth-like, with faint green rays. The hinge is well developed with massive cardinal teeth and thick lateral teeth.

**Comparison with Similar Species**

*Plethobasus cyphus* (sheepnose) is similar in outline and in having a sculptured disc, but that species is more yellow than brown, with a shining periostracum rather than the cloth-like periostracum of *P. cicatricosus*. The nodules of *P. cyphus* are generally not as well developed as in *P. cicatricosus*.

**Historic Range (Including Ohio)**

The white wartyback has been recorded from the Ohio River and some of its larger tributaries. It was taken in the Wabash, Holston, Tennessee, and Cumberland rivers (Bogan and Parmalee 1983). In Ohio, this species has been recorded from the Muskingum River (Stansbery et al. 1982). Currently, the white wartyback is limited to the Tennessee River below Wilson Dam in Alabama. This population is probably not reproducing and the species is soon to be extinct.

**Current Ohio Range**

*Plethobasus cicatricosus* once occurred in the Ohio and Muskingum rivers in Ohio (Sterki 1907). The last specimen collected in Ohio was taken from the Muskingum River in 1930 (Stansbery et al. 1982). This species is extirpated from the state.

**Preferred Habitat**

This is a big river species found in the stable sand, gravel, and cobble substrates associated with strong currents. As most of these habitats were altered due to impoundments, the species was extirpated from more and more of its historic range so that today it is on the verge of extinction.

**Status of Ohio Populations**

Ohio was not included within the historic range of this species when it was listed as a federal endangered species. The species has been extirpated from Ohio for at least 60 years.

***Plethobasus cooperianus***

orange-footed pearly mussel (=orange-foot pimpleback Turgeon et al. 1988)

*Quadrula striata* Rafinesque 1820

*Quadrula cooperiana* Lea 1834

**Classification**

Family Unionidae Fleming 1828

Subfamily Lampsilinae Von Ihering 1901

Genus *Plethobasus* Simpson 1900

Species *Plethobasus striatus* (Rafinesque 1820)

**Characteristics**

The orange-foot pimpleback reaches a maximum length of approximately five inches. The shell is compressed, solid, and oval in outline. The species does not express sexual dimorphism and the posterior dorsal surface of the disc is covered with low pustules that often coalesce into short bars, or longer lateral ridges. The umbos are high, without sculpture. The nacre is white, sometimes washed with pink inside the pallial line and the hinge is well developed with heavy cardinal and thick but short lateral teeth.

**Comparison with Similar Species**

*Quadrula pustulosa pustulosa* has the same outline as this species, and both are pustulate, however that species is more inflated and has a broad green band at the umbo. *Cyclonaias tuberculata* (purple wartyback) is subcircular in outline with numerous pustules on the disc, but that species usually has a purple nacre and is very compressed.

**Historic Range (Including Ohio)**

The orange-foot pimpleback occurred in the Ohio River and some of its larger tributaries. Records indicate that it once inhabited the Ohio, Wabash, Rough, Clinch, French Broad, Tennessee, Holston, Duck, and Cumberland rivers (Bogan and Parmalee 1983). In Ohio, the species was recorded from the Scioto and Muskingum rivers (Stansbery et al. 1982). Currently, the orange-foot pimpleback is restricted to isolated populations in the Tennessee and Cumberland rivers.

**Current Ohio Range**

This species has been extirpated from Ohio for many years. It once occurred in the Muskingum River (Hildreth 1830) and in the Scioto River (Sullivant 1838). It has not been collected within the last century in Ohio.

**Preferred Habitat**

This is a big river species found in the stable sand, gravel, and cobble substrates associated with strong currents. As most of these habitats were altered due to impoundments, the species was extirpated from more and more of its historic range, including that portion of its range in Ohio.

**Status of Ohio Populations**

This species is extirpated from Ohio. It has not been collected in the state within the last century.

*Pleurobema clava*  
clubshell

*Unio clava* Lamarck 1819

*Unio patulum* Lea 1829

**Classification**

Family Unionidae Fleming 1828

Subfamily Lampsilinae Von Ihering 1901

Genus *Pleurobema* Rafinesque 1820

Species *Pleurobema clava* (Lamarck 1819)

**Characteristics**

The clubshell is triangular, usually much longer than high. The shell does not express sexual dimorphism and reaches a maximum length of approximately three inches. The umbo is high, fairly narrow and positioned far anterior. The Disc lacks sculpture and the periostracum is yellowish to yellowish brown, with numerous narrow to wide broken green rays. The nacre is white, often iridescent posteriorly. The hinge is well developed with small cardinal teeth and thin lateral teeth.

**Comparison with Similar Species**

*Fusconaia flava* (Wabash pigtoe) is similar but it is much more triangular and it lacks the density of rays found in *P. clava*. *Pleurobema sintoxia* (round pigtoe) may have an outline similar to *P. clava*, but that species has darker periostracum and indistinct rays.

**Historic Range (Including Ohio)**

The clubshell had a wide distribution within the Ohio and St. Lawrence river systems. It has been recorded from Lake Erie, the Maumee, Blanchard, Tiffin, St. Marys, St. Joseph, West Branch St. Joseph, Wabash, White, West Fork White, East Fork White, Big Blue, Flat Rock, Vermillion (->Wabash), North Fork Vermillion, Salt Fork Vermillion, Middle Fork Vermillion, Tippecanoe, Eel, Mississinewa, Ohio, Blue, Tennessee, Elk (-> Tennessee), Sequatchie, Cumberland, Red, Stones, Big South Fork, Rockcastle, Green, Barren, Nolin, Salt, Great Miami, Stillwater, Licking, South Fork Licking, Little Miami, East Fork Little Miami, Scioto, Olentangy, Elk (-> Kanawha), Hocking, Little Kanawha, Muskingum, Tuscarawas, Walhonding, Mohican, Hughes, Allegheny, Cheat, Beaver, Shenango, Conemaugh, and Mahoning rivers (Hoggarth 1992, U.S.F.W.S. 1993) and their tributaries. Its current range includes the West Branch of the St. Joseph River, Fish Creek (-> St. Joseph River), the Tippecanoe, Green, Allegheny, and Elk (->Kanawha) rivers, Little Darby Creek, and Hackers Creek, French Creek, Conneaut Outlet, Canneauttee Creek, and LeBouef Creek of the Allegheny River system (U.S.F.W.S. 1993). Other extant populations occur in the Walhonding River (Hoggarth in prep) and in Pymatuning Creek (Huehner and Corr in prep).

### Current Ohio Range

Many of the extant populations of this species occur in Ohio. Currently Ohio supports populations of the clubshell in the West Branch of the St Joseph River in Williams County, Fish Creek in Williams County, Little Darby Creek in Madison County, the Walhonding River in Coshocton County, and in Pymatuning Creek in Ashtabula County.

### Preferred Habitat

The clubshell is found buried in sand and small gravel in areas of moderate current. It is most frequently encountered in run habitats over a stable substrate. It lives its life completely buried in the bottom, with only the smallest portion of the posterior of its shell exposed above the surface of the substrate.

### Status of Ohio Populations

The largest populations of the clubshell are found outside of the state of Ohio in the Allegheny River and some of its tributaries and in the Tippecanoe River. In Ohio, the clubshell is uncommon where ever it is found. Of the numerous Lake Erie tributaries that once supported populations of the clubshell, including, the Sandusky River, the Maumee River, the Blanchard River, the Tiffin River, the St. Joseph River, the West Branch of the St. Joseph River, Nettle Creek, and Fish Creek, populations occur today only in Fish Creek and in the West Branch of the St. Joseph River. These populations are small, the one in the West Branch smaller than the one in Fish Creek. The West Branch population is probably not reproducing as only older specimens have been collected from that stream (Hoggarth 1986, Watters 1988b).

Of the Ohio River tributaries that once supported populations of the clubshell in Ohio, including the Great Miami River, the Stillwater River, the Little Miami River, the East Fork Little Miami River, Ohio Brush Creek, the Scioto River, Paint Creek, Deer Creek, Big Darby Creek, Little Darby Creek, Treacle Creek, Little Walnut Creek, Big Walnut Creek, the Olentangy River, the Hocking River, the Muskingum River, the Tuscarawas River, the Walhonding River, Killbuck Creek, the Mohican River, the Mahoning River, and Pymatuning Creek, only the Walhonding River and Pymatuning Creek currently support populations. The Pymatuning Creek population may be the largest population in the state. Huehner and Corr (in prep) collected 10 living and 11 freshdead specimens from a single short reach of this stream. The Walhonding River once had a thriving population but it has been severely reduced. Hoggarth (in prep) only collected on freshdead shell of the species. As indicated in the status section for *Epioblasma torulosa rangiana*, the status of the unionid fauna of Pymatuning Creek should be examined further.



*Pleurobema plenum*  
rough pigtoe

*Quadrula plena* Lea 1840

**Classification**

Family Unionidae Fleming 1828

Subfamily Lampsilinae Von Ihering 1901

Genus *Pleurobema* Rafinesque 1820

Species *Pleurobema plenum* (Lea 1840)

**Characteristics**

This medium sized species reaches a length of approximately three inches. It does not express sexual dimorphism in shell characters and is distinctly triangular in outline. The umbos are high and directed toward each other, apposed. The shell is shallowly sulcate in older specimens and faintly rayed in younger specimens. The rough pigtoe has a smooth, cloth-like periostracum that is brown to reddish brown in color. It has white, pink or salmon nacre. The rough pigtoe has a well developed hinge with heavy cardinal teeth and thick but short lateral teeth.

**Comparison with Similar Species**

*Pleurobema plenum* is a member of a complex of very similar species. The other members of this complex are *cordatum*, *rubrum*, and *sintoxia*. Both *rubrum* and *cordatum* have anteriorly turned umbos and are widely sulcate. Both species are elongate triangular. *Pleurobema sintoxia* has a similar outline and umbo but that species is typically more elongate and has a shining rather than a dull periostracum.

**Historic Range (Including Ohio)**

The rough pigtoe was once widely distributed in the mainstems of many of the larger rivers of the Ohio River system. It inhabited the lower Allegheny and Monongahela rivers in Pennsylvania, the Ohio River from West Virginia to Illinois, the Wabash, Tippecanoe, and White rivers in Indiana, the Green and Cumberland rivers in Kentucky, the Clinch, Holston, French Broad, and Tennessee rivers in Tennessee, and the Illinois River in Illinois (Bogan and Parmalee 1983). All other records are probably not this species but are misidentified *Pleurobema sintoxia*. In Ohio, this species once occurred in the Muskingum River (Stansbery et al. 1982). Currently the rough pigtoe occurs as relic populations in tributaries of the lower Ohio River.

**Current Ohio Range**

Hildreth collected this species from the Muskingum River in 1830. No other records for this species in the state exist. It has been extirpated from the state for well over a century and it was not listed for Ohio when it was listed as a federal endangered species.

**Status of Ohio Populations**

The rough pigtoe has been extirpated from the state and is currently very close to extinction.

*Potamilus (=Proptera) capax*  
fat pocketbook

*Unio capax* Green 1832  
*Symphynota globosa* Lea 1832

**Classification**

Family Unionidae Fleming 1828  
Subfamily Lampsilinae Von Ihering 1901  
Genus *Potamilus* Rafinesque 1818  
Species *Potamilus capax* (Green 1832)

**Characteristics**

The fat pocketbook expresses sexual dimorphism in shell characters. The female is broadly subquadrate, obovate with large prominent umbos and an inflated shell. The male is less inflated and less truncate posteriorly, but it has prominent umbos and a globose shell. The shell is without sculpture but with minute anterior and posterior wings at the hinge margin. The periostracum is yellowish to yellowish brown, rayless, and shining especially in the young portion of the shell. The hinge is well developed with lamellate cardinal teeth and thin, short lateral teeth. The species reaches a length of approximately six inches.

**Comparison with Similar Species**

This distinct species is not easily confused with any other. *Lampsilis ventricosa* (plain pocketbook) approaches the size and shape of *P. capax*, but that species does not possess a shining periostracum, and usually has green rays.

**Historic Range (Including Ohio)**

This species occurred in the lower Ohio River drainage basin and in the Mississippi River drainage basin. It was once found in the Wabash River in Indiana and Illinois, in the White River in Indiana, and in the St. Francis and White river basins in Arkansas and Missouri (U.S.F.W.S. 1984). It has never been taken from Ohio.

**Current Ohio Range**

The species has never been collected in Ohio. Some early reports, such as Sterki's (1907) indication that the species occurred in the Ohio River or that of other author who gave a general locality of "Ohio" for the species, are not based on actual specimens collected from the streams of the state. The closest the species has come, is to be found in the Wabash River in Indiana.

**Preferred Habitat**

Like all of the members of the genus *Potamilus*, this species prefers the mud and fine sand of slowly flowing water. It is often found in large numbers where there is a slackwater reach of stream.

**Status of Ohio Populations**

This species should not have been listed as endangered for Ohio. It has never occurred here and does not occur here at this time.

***Quadrula fragosa***  
**winged mapleleaf mussel**

*Unio fragosus* Conrad 1835

*Quadrula quadrula* of Authors, *non* Rafinesque 1820, *in partim*

**Classification**

Family Unionidae Fleming 1828

Subfamily Lampsilinae Von Ihering 1901

Genus *Quadrula* Rafinesque 1820

Species *Quadrula fragosa* (Conrad 1835)

**Characteristics**

The winged mapleleaf mussel is quadrate in outline with prominent umbos and two loose rows of pustules on the disc. The shell does not express sexual dimorphism, has a low wing accentuated by a prominent posterior slope, and is sulcate. The periostracum is tan to greenish brown and the nacre is white. The hinge is well developed with heavy cardinal teeth and thick lateral teeth. The species reaches a length of approximately four inches.

**Comparison with Similar Species**

*Quadrula quadrula* (mapleleaf) is similar to this species in outline and disc sculpture, but that species lacks the dorsal wing and generally has more numerous, smaller pustules.

**Historic Range (Including Ohio)**

There are at least two species in the *Quadrula fragosa* complex. The range given when the species was listed included the undescribed upper Mississippi River species and *Quadrula fragosa* of the Ohio River system. Both species are extremely rare and in need of federal protection. The Ohio River species once occurred in the Ohio River and some of its larger tributaries in Ohio, Kentucky, Tennessee, and Illinois. It was recorded from Raccoon Creek and the Scioto River in Ohio (Stansbery et al. 1982). The Scioto River is the type locality of *Quadrula fragosa*. Currently the Ohio River species of *Quadrula fragosa* is extirpated from Ohio but it has recently been collected in the Ohio River by Cicerello et al. (1991).

**Current Ohio Range**

This species once occurred in Raccoon Creek and in the Scioto River in Ohio. Both sites no longer support populations of this species and it is believed that the species is extirpated from the state (Watters 1992).

### Preferred Habitat

This species prefers the mud to sand bottoms in the slowly moving reaches of big rivers.

### Status of Ohio Populations

The species is extirpated from the state. It once lived in the Scioto River and in Raccoon Creek, a tributary of the Ohio River in southern Ohio. The Scioto River has been degraded to the point that very few unionids remain in the stream and Raccoon Creek suffers from acid mine drainage.

### Summary

Of the fourteen species of federally endangered Unionidae in Ohio, four are probably still extant in Ohio streams, two may be present but their population numbers are so low that they will soon become extirpated if they have not done so already, one probably never occurred in Ohio, and the remainder have been extirpated from the state. The four species that currently exist in the state are *Cyprogenia stegaria* (fanshell), *Epioblasma obliquata perobliqua* (white catspaw), *Pleurobema clava* (clubshell), and *Epioblasma torulosa rangiana* (northern riffleshell). The two species that are probably extirpated but have been collected recently from Ohio or from near Ohio are *Lampsilis abrupta* (pink mucket) and *Epioblasma obliquata obliquata* (purple catspaw). The remainder are not found in Ohio at this time.

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