

# Updates to the Distributional Checklist and Status of Illinois Freshwater Mussels (Mollusca: Unionidae)

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## ABSTRACT

Literature reviews and voucher specimens housed in museum collections were examined to update the distributional checklist and status of Illinois freshwater mussels (Mollusca: Unionidae). Data collected includes information for 51 species, including new drainage records for 37 species and status updates for 40 species. Also reported are corrections of seven errors from the last checklist of the freshwater mussels of Illinois.

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## INTRODUCTION

A decade has passed since Cummings and Mayer (1997) published a checklist of the freshwater mussels (Mollusca: Unionidae) of Illinois that summarizes the distribution and status of unionids within the state. This article is an updated contribution to that paper, and is a continuation for the preparation of a new Freshwater Mussels of Illinois. Additional collecting and compilation of museum records are still needed to complete that task.

## METHODS

The format of this paper follows Cummings and Mayer (1997). The state was divided into 25 subunits that correspond to the major rivers and drainages within and bordering Illinois (Table 1, Figure 1). Information was updated on the distribution and status of freshwater mussels in each basin with data being taken from literature reviews and voucher specimens housed in museum collections. Any records of live individuals collected after 1969 were considered to indicate that a given species was extant within a given drainage. The species are arranged alphabetically by genus and species within subfamilies. The new distributional data are presented by species and includes 1) state and federal status, if applicable; 2) remarks on historic and current distributions within the state; and 3) comments on new drainage or status records. Numbers following species names indicate updated drainage records, where numbers in **bold** designate that at least one individual of that species was collected alive in the corresponding drainage since 1970 (Table 1, Figure 1). New records for "Galena, Apple, and Plum River Drainages" (#1 in Table 1) are not current due to two ongoing studies in the Wisconsin Driftless

Division in northwestern Illinois: 1) freshwater mussels of the Menominee, Little Menominee, Sinsinawa, and Galena river drainages in Jo Daviess County by J.S. Tiemann (Illinois Natural History Survey), and 2) freshwater mussels of the Apple River drainage in Jo Daviess and Carroll counties by B.E. Sietman (Minnesota Department of Natural Resources) and E.A. Anderson (Illinois Department of Natural Resources). Specimens with catalogue numbers reported herein are housed in the Illinois Natural History Survey Mollusk Collection (INHS) in Champaign or the University of Michigan Museum of Zoology (UMMZ) in Ann Arbor; specimens without catalogue numbers were observed but not vouchered and are cited as "INHS Mollusk Collection."

## RESULTS

### Family Unionidae

#### Subfamily Ambleminae

*Amblema plicata* (Say, 1817), threeridge. Updated drainage records: **3, 10, 16**. The threeridge is generally distributed throughout Illinois (Cummings and Mayer 1997). A live *A. plicata* specimen was discovered in South Branch Larry Creek (Middle Mississippi River tributaries), 5 mi W Ferris at the junction of Co. Rd 1100E and Co. Rd 1900N, Hancock County on 2 August 2000 (INHS 25376). One live *A. plicata* individual was collected in LaMoine River, 3 mi ENE Carthage, Hancock County on 2 October 1991 (Baumgardner 1995). Over a hundred live *A. plicata* individuals were collected in the Cache River, 1.5 mi NW Forman, Johnson County on 4-6 August 1997 (INHS Mollusk Collection). The threeridge has been found alive in 22 drainages in Illinois since 1970 and was historically present in all 25 drainages in the state.

*Elliptio dilatata* (Rafinesque, 1820), spike (state-threatened). Updated drainage records: **2, 11, 17, 23**. The spike was historically distributed throughout Illinois, and was thought to be alive only in the Fox, Kankakee, Vermilion of the Illinois, Sangamon, Kaskaskia, and Little Wabash river drainages in the state (Cummings and Mayer 1997). A live *E. dilatata* specimen was discovered in the Rock River, 2 mi SE Rockton at the Hononegah Forest Preserve, Winnebago County on 25 August 2005 (INHS Mollusk Collection). Two live *E. dilatata* individuals were collected in the Mackinaw River, 3.5 mi NE Congerville at the Chiquapin Bluff Nature Preserve, Woodford County on 31 August 2001 (INHS 25833). A recent-dead *E. dilatata* specimen was found in Big Grand Pierre Creek (Ohio River tributaries), 1 mi NE Blackman Cemetery, Pope County on 15 June 2002 (INHS 27666). A live *E. dilatata* individual was found in the Mississippi River, Cordova, Rock Island County on 24 July 2001 (INHS Mollusk Collection). The spike has been collected alive in nine drainages in Illinois since 1970 and was historically present in 21 drainages in the state.

*Fusconaia ebena* (Lea, 1831), ebonyshell (state-threatened). Updated drainage records: **19, 22**. The ebonyshell was historically distributed in the larger streams in Illinois, and was thought to be alive only in the Ohio, Mississippi, and Wabash rivers in the state (Cummings and Mayer 1997). A live *F. ebena* individual was collected in the Little Wabash River, 4 mi S Golden Gate at the Saxe Bridge, Wayne County on 22 August 2002 (INHS 27514). A live *F. ebena* specimen was found in the Illinois River, 2 mi SW Meredosia, Morgan County on 14 August 2002 (INHS 27946). The ebonyshell has been

collected alive in five drainages in Illinois since 1970 and was historically present in 11 drainages in the state.

*Fusconaia flava* (Rafinesque, 1820), Wabash pigtoe. Updated drainage records: **10**, 17. The Wabash pigtoe is generally distributed throughout Illinois (Cummings and Mayer 1997). A live *F. flava* individual was discovered in the East Fork LaMoine River, 3 mi W Macomb at the Co. Rd 900N Bridge, McDonough County on 16 July 1997 (INHS 21612). A recent-dead *F. flava* specimen was found in Big Grand Pierre Creek (Ohio River tributaries), 1.5 mi SSE Herod near the Blackman Road Bridge, Pope County on 31 August 2000 (INHS 25207). The Wabash pigtoe has been collected alive in 16 drainages in Illinois since 1970 and was historically present in 23 drainages in the state.

*Megalonaias nervosa* (Rafinesque, 1820), washboard. Updated drainage records: 2, 10, **16**. The washboard is sporadically distributed in the larger streams in Illinois (Cummings and Mayer 1997). A relict *M. nervosa* valve was encountered in the Rock River, Milan, Rock Island County on 16-17 May 1988 (INHS 23324). A relict *M. nervosa* specimen was found in the East Fork LaMoine River drainage, 3 mi WSW Bushnell at the Co. Rd 1700N Bridge, McDonough County on 31 July 1990 (Baumgardner 1995). A live *M. nervosa* individual was found in the Cache River, 1 mi NE Belknap, Johnson County on 26 September 1997 (INHS 21671). The washboard has been collected alive in 11 drainages in Illinois since 1970 and was historically present in 16 drainages in the state.

*Plethobasus cooperianus* (Lea, 1834), orangefoot pimpleback (state-endangered, federally-endangered). Updated drainage record: 25. The orangefoot pimpleback is extant in what was thought to be its only know historical drainage, the Ohio River, in Illinois (Cummings and Mayer 1997). A relict *P. cooperianus* specimen was collected in the Wabash River, White County in 1885 (no specific locality or date data were given; INHS 22581). This individual, initially catalogued as *Quadrula pustulosa*, was recently transferred to the INHS Mollusk Collection from the A.A. Hinkley Collection at the University of Illinois Museum of Natural History, Champaign. The orangefoot pimpleback has been collected alive in one drainage in Illinois since 1970 and was historically present in two drainages in the state.

*Pleurobema clava* (Lamarck, 1819), clubshell (state-endangered, federally-endangered). Updated drainage records: 20, **22**, 24. The clubshell was historically distributed throughout the Wabash River drainage in Illinois, and was thought to be extirpated from the state (Cummings and Mayer 1997). A relict *P. clava* valve was collected in the Embarras River, 1.5 mi SW Timothy, Cumberland County on 30 October 1998 (INHS 22609). A live *P. clava* was discovered in the North Fork Vermilion River of the Wabash River drainage (Szafoni et al. 2000). A relict *P. clava* valve was located in the Ohio River, Metropolis at Fort Massac State Park, Massac County on 24 September 1999 (INHS 24135). The clubshell has been collected alive in one drainage in Illinois since 1970 and was historically present in four drainages in the state.

*Pleurobema cordatum* (Rafinesque, 1820), Ohio pigtoe (state-endangered). Updated drainage record: 19. The Ohio pigtoe was historically widely distributed in the Wabash and Ohio rivers in Illinois, but is now alive only in the Ohio River in the state (Cummings and Mayer 1997). A relict *P. cordatum* specimen was collected in the Little Wabash

River, Carmi at the Ill. Rte 1 Bridge, White County on 13 August 1997 (INHS 20766). The Ohio pigtoe has been collected alive in one drainage in Illinois since 1970 and was historically present in three drainages in the state.

*Pleurobema rubrum* (Rafinesque, 1820), pyramid pigtoe (state-extirpated). Updated drainage record: 2, 12. The pyramid pigtoe was historically known to inhabit the Ohio River drainage and the Illinois River in Illinois, and is likely extirpated from the state (Cummings and Mayer 1997). A relict *P. rubrum* valve was found in the Rock River, 2 mi SW Byron, Ogle County on 27 August 1996 (INHS 18829). A relict *P. rubrum* valve was found in Salt Creek (Sangamon River drainage), Lincoln at the I-55 Business bridge, Logan County on 22 June 2006 (INHS 31227). The pyramid pigtoe has not been collected alive since pre-1970 in Illinois and was historically present in six drainages in the state.

*Pleurobema sintoxia* (Rafinesque, 1820), round pigtoe. Updated drainage records: **22, 23**. The round pigtoe is occasionally found in northern Illinois (Cummings and Mayer 1997), and is expanding its range in the Illinois River drainage (Sietman et al. 2001). One live *P. sintoxia* individual was collected in the Illinois River, 4 mi SSW Minooka downstream of Big Dresden Island, Grundy County on 4 May 1999 (INHS 23881). Two live *P. sintoxia* specimens were discovered in the Mississippi River, Pool 15 near Campbell Island, Rock Island County on 24 July 1998 (INHS 22894). The round pigtoe has been collected alive in 12 drainages in Illinois since 1970 and was historically present in 17 drainages in the state.

*Quadrula nodulata*, (Rafinesque, 1820), wartyback. Updated drainage records: 10, 13, 17, **18**. The wartyback is generally found in the larger streams in Illinois, but also can be sporadically found in the downstream reaches of the larger tributaries to those rivers (Cummings and Mayer 1997). A relict *Q. nodulata* specimen was found in the East Fork LaMoine River drainage, 3 mi WSW Bushnell at the Co. Rd 1700N Bridge, McDonough County on 31 July 1990 (Baumgardner 1995). Two relict valves were found in Clear Creek of the Indian Creek drainage (Lower Illinois River tributaries), 4 mi SSE Beardstown at the Burlington Northern Railroad Bridge, Cass County on 22 May 1996 (INHS 19438). A relict *Q. nodulata* valve was discovered in Big Creek (Ohio River tributaries), 1.5 mi SW Elizabethtown at the Ill. Rte 146 Bridge, Hardin County on 28 June 2001 (INHS 25697). Seven live *Q. nodulata* individuals were collected in the Saline River, 9 mi W Shawneetown at the Ill. Rte 1 Bridge, Gallatin County on 21 June 2005 (INHS 30545). The wartyback has been collected alive in ten drainages in Illinois since 1970 and was historically present in 15 drainages in the state.

*Quadrula pustulosa* (Lea, 1831), pimpleback. Updated drainage records: **10, 17, 18**. The pimpleback is generally distributed throughout Illinois (Cummings and Mayer 1997), and is expanding its range in the Illinois River drainage (Sietman et al. 2001). Four live *Q. pustulosa* specimens were discovered in the East Fork LaMoine River, 3 mi W Macomb at the Co. Rd 900N Bridge, McDonough County on 16 July 1997 (INHS 21616). A recent-dead *Q. pustulosa* specimen was found in Bay Creek (Ohio River tributaries), 1.5 mi W Homberg at the Homberg Bridge, Pope County on 7 July 2000 (INHS 28691). One live *Q. pustulosa* individual was collected in the Saline River, 9 mi W Shawneetown at the Ill. Rte 1 Bridge, Gallatin County on 21 June 2005 (INHS 30545). The pimpleback

has been collected alive in 18 drainages in Illinois since 1970 and was historically present in 21 drainages in the state.

*Quadrula quadrula* (Rafinesque, 1820), mapleleaf. Updated drainage records: **10, 16**. The mapleleaf is generally distributed throughout Illinois (Cummings and Mayer 1997). Four live *Q. quadrula* individuals were collected in the East Fork LaMoine River, 3 mi W Macomb at the Co. Rd 900N Bridge, McDonough County on 16 July 1997 (INHS 21616). Eight live *Q. quadrula* individuals were found in the Cache River, 1 mi NE Belknap, Johnson County on 26 September 1997 (INHS 21673). The mapleleaf has been collected alive in 23 drainages in Illinois since 1970 and was historically present in 24 drainages in the state.

*Tritogonia verrucosa* (Rafinesque, 1820), pistolgrip. Updated drainage record: **10**. The pistolgrip is sporadically distributed throughout Illinois (Cummings and Mayer 1997), and is expanding its range in the Illinois River drainage (Sietman et al. 2001). A live *T. verrucosa* specimen was collected in Camp Creek (LaMoine River drainage), 5 mi S Fandon at the Co. Rd 800E Bridge, McDonough County on 18 September 2002 (INHS 27806). The pistolgrip has been collected alive in 16 drainages in Illinois since 1970 and was historically present in 21 drainages in the state.

*Uniomerus tetralasmus* (Say, 1831), pondhorn. Updated drainage records: **3, 4, 14, 20**. The pondhorn is typically found in small streams in Illinois (Cummings and Mayer 1997). A live *U. tetralasmus* specimen was found in Bay Creek (Middle Mississippi River tributaries), 1.5 mi E Pittsfield at the Ill. Rte 106 Bridge, Pike County on 7 July 1998 (INHS 21931). A relict *U. tetralasmus* valve was located in Spring Brook of the DuPage River basin (Des Plaines River drainage) in the Blackwell County Forest Preserve in Warrenville, DuPage County on 1 October 2004 (INHS 30361). Four live *U. tetralasmus* individuals were found in Jonathon Creek (Kaskaskia River drainage), 3 mi E Sullivan at the Ill. Rte 121 Bridge, Moultrie County on 2 August 2002 (INHS 27205). Live *U. tetralasmus* were found in 2004 throughout Brouilletts Creek, a Wabash River tributary (Tiemann 2005). The pondhorn has been collected alive in 14 drainages in Illinois since 1970 and was historically present in 20 drainages in the state.

#### Subfamily Anodontinae

*Alasmidonta viridis* (Rafinesque, 1820), slippershell mussel (state-threatened). Updated drainage records: **2, 4, 6, 20**. The slippershell mussel is sporadically distributed in northern Illinois (Cummings and Mayer 1997). Two live *A. viridis* specimens were found in Piscasaw Creek (Rock River drainage), 3 mi SW Chemung at the Streit Road Bridge, McHenry County on 19 August 1996 (INHS Mollusk Collection). One live *A. viridis* specimen was collected in Hickory Creek (Des Plaines River drainage), near New Lenox, in Will County in the 1970-80s (INHS 9599). A relict *A. viridis* valve was discovered in Big Bureau Creek (Middle Illinois River tributaries), 2.5 mi WNW Bureau, Bureau County on 30 September 2004 (INHS 29910). One live *A. viridis* individual was found in the Embarras River, 2 mi SE Hugo near the Co. Rd 1900E Bridge, Douglas County on 6 September 2001 (INHS Mollusk Collection). The slippershell mussel has been collected alive in eight drainages in Illinois since 1970 and was historically present in 16 drainages in the state.

*Anodonta suborbiculata* Say, 1831, flat floater. Updated drainage record: 10. The flat floater is occasionally encountered in lentic waters including floodplain ponds and quiet backwaters of large streams in Illinois (Cummings and Mayer 1997), and is expanding its range in the Illinois River drainage (Sietman et al. 2001). A recent-dead *A. suborbiculata* specimen was found in a wetland in the LaMoine River drainage, 1.5 mi SW Briggs Landing, Brown County on 5 August 2005 (INHS 30569). The flat floater has been collected alive in nine drainages in Illinois since 1970 and was historically present in 17 drainages in the state.

*Anodontoides ferussacianus* (Lea, 1834), cylindrical papershell. Updated drainage records: 6, 10, 14. The cylindrical papershell is commonly distributed in small streams in northeastern Illinois (Cummings and Mayer 1997). A live *A. ferussacianus* individual was collected in Big Bureau Creek (Middle Illinois River tributaries), 2.5 mi SW Compton at the Carnahan Road Bridge, Lee County on 1 May 2002 (INHS 28548). A relict *A. ferussacianus* valve was discovered in the LaMoine River, 4.5 mi SW Bushnell at the Co. Rd 1650N Bridge, McDonough County on 1 August 2005 (INHS Mollusk Collection). A live *A. ferussacianus* specimen was collected in East Fork Shoal Creek (Kaskaskia River drainage), 2 mi SE Coffeen at the Ill. Rte 185 Bridge, Montgomery County on 5 September 2002 (INHS 27436). The cylindrical has been collected alive in 14 drainages in Illinois since 1970 and was historically present in 19 drainages in the state.

*Arcidens confragosus* (Say, 1829), rock pocketbook. Updated drainage record: 16. The rock pocketbook is generally distributed in the larger streams in southern Illinois (Cummings and Mayer 1997). Fifteen live *A. confragosus* individuals were collected alive in the Cache River, 1.5 mi NW Forman, Johnson County on 4-6 August 1997 (INHS Mollusk Collection). The rock pocketbook has been collected alive in nine drainages in Illinois since 1970 and was historically present in 13 drainages in the state.

*Lasmigona complanata* (Barnes, 1823), white heelsplitter. Updated drainage records: 6, 17. The white heelsplitter is one of the most widespread and common unionids in Illinois (Cummings and Mayer 1997). One live *L. complanata* specimen was found in Big Bureau Creek (Middle Illinois River tributaries), 1.25 mi NW Dover at the confluence Master's Fork, Bureau County on 30 September 2004 (INHS 29916). A relict *L. complanata* specimen was discovered in Bay Creek (Ohio River tributaries), Grantsburg at the Ill. Rte 146 Bridge, Johnson County on 3 July 2002 (INHS 27481). The white heelsplitter has been collected alive in 23 drainages in Illinois since 1970 and was historically present in 24 drainages in the state.

*Lasmigona compressa* (Lea, 1829), creek heelsplitter. Updated drainage records: 13, 20. The creek heelsplitter is occasionally found in small streams in northern Illinois (Cummings and Mayer 1997). One live *L. compressa* specimen was discovered in Holiday Lake (Lower Illinois River tributaries drainage) near Holiday Shores, Madison County on 28 June 2004 (INHS 28775). Live *L. compressa* were found in 2004 throughout Brouillets Creek, a Wabash River tributary (Tiemann 2005). The creek heelsplitter has been collected alive in 11 drainages in Illinois since 1970 and was historically present in 17 drainages in the state.

*Lasmigona costata* (Rafinesque, 1820), flutedshell. Updated drainage record: **22**. The flutedshell is sporadically distributed in northern Illinois and is presently found in about half of its historical drainages in the state (Cummings and Mayer 1997); however, it is expanding its range in the Illinois River drainage (Sietman et al. 2001). One live *L. costata* specimen was found in the Illinois River, 4 mi SSW Minooka downstream of Big Dresden Island, Grundy County on 4 May 1999 (INHS 23876). The flutedshell has been collected alive in ten drainages in Illinois since 1970 and was historically present in 17 drainages in the state.

*Pyganodon grandis* (Say, 1829), giant floater. Updated drainage record: **6**. The giant floater is the most widespread and common unionid in Illinois (Cummings and Mayer 1997). A live *P. grandis* specimen was found in Big Bureau Creek (Middle Illinois River tributaries), 3 mi SW LaMoille, Bureau County on 1 October 2004 (INHS Mollusk Collection). The giant floater has been collected alive in all 25 drainages in Illinois since 1970.

*Strophitus undulatus* (Say, 1817), creeper. Updated drainage records: **4, 6, 10**. The creeper is generally distributed throughout Illinois (Cummings and Mayer 1997), and is expanding its range in the Illinois River drainage (Sietman et al. 2001). One live *S. undulatus* individual was found in the DuPage River (Des Plaines River drainage), Plainfield at the Ill. Rte 59 Bridge, Will County on 7 August 1990 (INHS Mollusk Collection). A live *S. undulatus* specimen was found in Big Bureau Creek (Middle Illinois River tributaries), 3 mi SW LaMoille, Bureau County on 1 October 2004 (INHS 29923). Two live *S. undulatus* individuals were collected in the LaMoine River, 4.5 mi SW Bushnell at the Co. Rd 1650N Bridge, McDonough County on 1 August 2005 (INHS 30621). The creeper has been collected alive in 19 drainages in Illinois since 1970 and was historically present in 22 drainages in the state.

*Utterbackia imbecillis* (Say, 1829), paper pondshell. Updated drainage records: **4, 11, 13, 21**. The paper pondshell is generally distributed throughout Illinois (Cummings and Mayer 1997). One live *U. imbecillis* individual was found in Powder Horn Lake (Calumet River drainage), 0.5 mi N Calumet City, Cook County on 24 August 2002 (INHS 27089). One live *U. imbecillis* individual was collected in Panther Creek (Mackinaw River drainage), 1.5 mi S Secor at the Co. Rd 800N Bridge, Woodford County on 30 August 2005 (INHS Mollusk Collection). Five live *U. imbecillis* specimens were discovered in Holiday Lake (Lower Illinois River tributaries drainage) near Holiday Shores, Madison County on 28 June 2004 (INHS 28778). Two live *U. imbecillis* individuals were found in the Little Vermilion River of the Wabash River drainage, 1 mi S Georgetown at the Ill. Rte 1 Bridge, Vermilion County on 4 September 1997 (INHS 20018). The paper pondshell has been collected alive in 21 drainages in Illinois since 1970 and was historically present in 23 drainages in the state.

#### Subfamily Lampsilinae

*Cyprogenia stegaria* (Rafinesque, 1820), fanshell (state-endangered, federally-endangered). Updated drainage record: 21. The fanshell was historically known to inhabit the Ohio River and the Wabash River drainage in Illinois, but is now alive only in the Wabash River in the state (Cummings and Mayer 1997). A relict *C. stegaria* valve was discovered in the Vermilion River of the Wabash River drainage, 4.25 mi E Westville,

Vermilion County on 6 October 1997 (INHS 21625). The fanshell has been collected alive in one drainage in Illinois since 1970 and was historically present in five drainages in the state.

*Ellipsaria lineolata* (Rafinesque, 1820), butterfly (state-threatened). Updated drainage records: **2, 20**. The butterfly was historically distributed in the larger streams in Illinois, and was thought to be alive only in the Illinois, Mississippi, and Ohio rivers in the state (Cummings and Mayer 1997). Three live *E. lineolata* specimens were found in the Rock River, Milan near the Milan Dam, Rock Island County on 25 August 2003 (INHS Mollusk Collection). Three relict *E. lineolata* valves were discovered in the Embarras River, 1 mi E Lawrenceville at the Business Rte 50 Bridge, Lawrence County on 13 September 2001 (INHS 26099). The butterfly has been collected alive in four drainages in Illinois since 1970 and was historically present in nine drainages in the state.

*Epioblasma triquetra* (Rafinesque, 1820), snuffbox (state-endangered). Updated drainage record: **5**. The snuffbox was historically distributed in the larger streams in Illinois, but is now alive only in the Embarras River in the state (Cummings and Mayer 1997). Schanzle et al. (2004) reported collecting a relict *E. triquetra* valve in Nippersink Creek (Fox River drainage) near Spring Grove at the Richardson Road Bridge, McHenry County on 12 June 1997 (INHS 20037). The snuffbox has been collected alive in one drainage in Illinois since 1970 and was historically present in 14 drainages in the state.

*Lampsilis abrupta* (Say, 1831), pink mucket (state-endangered, federally-endangered). Updated drainage records: **25**. The pink mucket is likely extirpated from Illinois since it has not been collected alive in the state in over 40 y; it was thought to be known from only the Ohio River in the state (Cummings and Mayer 1997). Relict *L. abrupta* valves were discovered in the Wabash River, Rochester, Wabash County on 14 September 1998 (INHS 24365). The pink mucket has not been collected alive in Illinois since pre-1970 and was historically present in two drainages in the state.

*Lampsilis cardium* Rafinesque, 1820, plain pocketbook. Updated drainage records: **10, 24**. The plain pocketbook is generally distributed throughout Illinois (Cummings and Mayer 1997), and is expanding its range in the Illinois River drainage (Sietman et al. 2001). Three live *L. cardium* individuals were collected in the East Fork LaMoine River, 3 mi W Macomb at the Co. Rd 900N Bridge, McDonough County on 16 July 1997 (INHS 21613). One live *L. cardium* specimen was collected in the Ohio River, 4 mi SE Olmsted, Pulaski County on 15 August 2002 (INHS Mollusk Collection). The plain pocketbook has been collected alive in 20 drainages in Illinois since 1970 and was historically present in 22 drainages in the state.

*Lampsilis siliquoidea* (Barnes, 1823), fatmucket. Updated drainage records: **6, 10, 18, 23**. The fatmucket is commonly found throughout Illinois (Cummings and Mayer 1997), and is expanding its range in the Illinois River drainage (Sietman et al. 2001). Ten live *L. siliquoidea* specimens were found in Big Bureau Creek (Middle Illinois River tributaries), 1.25 mi NW Dover at the confluence Master's Fork, Bureau County on 30 September 2004 (INHS 29915). One live *L. siliquoidea* individual was collected in the East Fork LaMoine River, 3 mi W Macomb at the Co. Rd 900N Bridge, McDonough County on 16 July 1997 (INHS 21614). A relict *L. siliquoidea* valve was discovered in the North Fork



Saline River, 1.5 mi E Broughton at the Co. Rd 200N Bridge, Hamilton County on 3 July 2003 (INHS 28821). One live *L. siliquoidea* specimen was discovered in the Mississippi River, 1.5 mi N Cordova, Rock Island County on 17 September 1999 (INHS Mollusk Collection). The fatmucket has been collected alive in 18 drainages in Illinois since 1970 and was historically present in 24 drainages in the state.

*Lampsilis teres*, (Rafinesque, 1820), yellow sandshell. Updated drainage records: **3, 16, 17**. The yellow sandshell is occasionally found throughout Illinois (Cummings and Mayer 1997). A live *L. teres* specimen was found in Bay Creek (Middle Mississippi River tributaries), 1.5 mi E Pittsfield at the Ill. Rte 106 Bridge, Pike County on 7 July 1998 (INHS 21930). One live *L. teres* individual was discovered in the Cache River, 1.5 mi NW Forman, Johnson County on 4-6 August 1997 (INHS Mollusk Collection). A recent-dead *L. teres* valve was found in Lusk Creek (Ohio River tributaries), Golconda at the Ill. Rte 146 Bridge, Pope County on 28 August 1999 (INHS 23482). The yellow sandshell has been collected alive in 14 drainages in Illinois since 1970 and was historically present in 22 drainages in the state.

*Leptodea fragilis* (Rafinesque, 1820), fragile papershell. Updated drainage records: **6, 16, 17**. The fragile papershell is generally distributed throughout Illinois and might be expanding its range in the state (Cummings and Mayer 1997). One live *L. fragilis* specimen was collected in Kickapoo Creek (Middle Illinois River tributaries), 1 mi SE Oakhill at the Ill. Rte 8 Bridge, Peoria County on 15 August 1999 (INHS 23645). One live *L. fragilis* individual was discovered in the Cache River, 1.5 mi NW Forman, Johnson County on 4-6 August 1997 (INHS Mollusk Collection). One live *L. fragilis* specimen was found in Big Grand Pierre Creek (Ohio River tributaries), 7 mi SE Vaughn Cemetery at the Ill. Rte 146 Bridge, Pope County on 10 July 2001 (INHS 25654). The fragile papershell has been found alive in 21 drainages in Illinois since 1970 and was historically present in all 25 drainages in the state.

*Ligumia recta* (Lamarck, 1819), black sandshell (state-threatened). Updated drainage records: **3, 5, 14, 21**. The black sandshell was historically distributed in large streams throughout Illinois, and was thought to be alive only in the Galena/Apple, Rock, and Kankakee river drainages as well as the Mississippi and Ohio rivers in the state (Cummings & Mayer 1997). Two relict *L. recta* specimens were discovered in Edwards Creek (Middle Mississippi River tributaries) near Aledo in Mercer County, but no date was given (UMMZ 98299). Schanzle et al. (2004) reported collecting two live *L. recta* specimens in the Fox River, West Dundee, Kane County on 7 September 2000 (INHS 25184). One live *L. recta* specimen was discovered in West Okaw River (Kaskaskia River drainage), 4 mi SW Lovington, Moultrie County on 26 September 2003 (INHS Mollusk Collection). Four live *L. recta* individuals were collected in the Vermilion River of the Wabash River drainage, Danville, Vermilion County on 7 September 2005 (INHS Mollusk Collection). The black sandshell has been collected alive in eight drainages in Illinois since 1970 and was historically present in 16 drainages in the state.

*Ligumia subrostrata* (Say, 1831), pondmussel. Updated drainage records: **10, 13, 14, 17**. The pondmussel is occasionally found in small streams in southern Illinois (Cummings and Mayer 1997). Seven live *L. subrostrata* specimens were found in Drowning Fork of the East Fork LaMoine River drainage, 4 mi SW Bushnell at the Co. Rd 1700N Bridge,

McDonough County on 1 August 2005 (INHS 30616). Six live *L. subrostrata* specimens were discovered in Holiday Lake (Lower Illinois River tributaries drainage) near Holiday Shores, Madison County on 28 June 2004 (INHS 28776). Five live *L. subrostrata* individuals were collected in East Fork Shoal Creek (Kaskaskia River drainage), 2 mi SE Coffeen at the Ill. Rte 185 Bridge, Montgomery County on 5 September 2002 (INHS 27438). One live *L. subrostrata* individual was discovered in Hayes Creek (Ohio River tributaries), 3 mi SW Eddyville at the Ill. Rte 145 Bridge, Pope County on 13 August 1998 (INHS 22711). The pondmussel has been collected alive in eight drainages in Illinois since 1970 and was historically present in 16 drainages in the state.

*Obliquaria reflexa* Rafinesque, 1820, threehorn wartyback. Updated drainage records: 17, **18**. The threehorn wartyback is generally distributed in larger streams in Illinois (Cummings and Mayer 1997). A recent-dead *O. reflexa* specimen was discovered in Lusk Creek (Ohio River tributaries), Golconda at the Ill. Rte 146 Bridge, Pope County on 28 August 1999 (INHS 23484). A live *O. reflexa* was found in the Saline River, 9 mi W Shawneetown at the Ill. Rte 1 Bridge, Gallatin County on 21 June 2005 (INHS 30543). The threehorn wartyback has been found alive in ten drainages in Illinois since 1970 and was historically present in 15 drainages in the state.

*Obovaria olivaria* (Rafinesque, 1820), hickorynut. Updated drainage record: **21**. The hickorynut is generally found in the larger streams of Illinois (Cummings and Mayer 1997). Three live *O. olivaria* individuals were discovered in the Vermilion River of the Wabash River drainage, 4.25 mi E Westville at old railroad trestles, Vermilion County on 6 October 1997 (INHS 21635). The hickorynut has been found alive in six drainages in Illinois since 1970 and was historically present in 11 drainages in the state.

*Obovaria subrotunda* (Rafinesque, 1820), round hickorynut (state-extirpated). Updated drainage record: 19. The round hickorynut was historically known to inhabit the Ohio and Wabash river drainages in Illinois, but is now alive only in the Vermilion of the Wabash River drainage in the state (Cummings and Mayer 1997). A relict *O. subrotunda* valve was found in Horse Creek (Little Wabash River drainage), 2.5 mi NNW Keenes at the Co. Rd 200E Bridge, Wayne County on 8 August 2003 (INHS 28840). The round hickorynut has been collected alive in one drainage in Illinois since 1970 and was historically present in five drainages in the state.

*Potamilus alatus* (Say, 1817), pink heelsplitter. Updated drainage records: **5, 8, 9, 10, 13, 16, 18, 21**. The pink heelsplitter is commonly distributed in streams in central and southern Illinois (Cummings and Mayer), and is expanding its range in the Illinois River drainage (Sietman et al. 2001). A live *P. alatus* specimen was discovered in Aux Sable Creek, 2.25 mi W Minooka at the Minooka Road Bridge, Grundy County on 13 July 2005 (INHS Mollusk Collection). A live *P. alatus* specimen was collected in the Mazon River, 1 mi SE Morris, Grundy County on 25 August 2000 (INHS Mollusk Collection). A live *P. alatus* was found in the Spoon River, 4 mi S Seville at an abandoned bridge, Fulton County on 3 August 2004 (INHS 28874). A live *P. alatus* individual was found in Town Creek (LaMoine River drainage), 2 mi SE Good Hope at the Co. Rd 1400E Bridge, McDonough County on 17 May 1990 (Baumgardner 1995). A recent-dead *P. alatus* specimen was discovered in Mauvaise Terre Creek (Lower Illinois River tributaries), 5.5 mi WNW Jacksonville, Morgan County on 23 August 1996 (INHS 19434). A live *P.*

*alatus* individual was found in the Cache River, 1 mi NE Belknap, Johnson County on 26 September 1997 (INHS 21672). A live *P. alatus* was found in the Saline River, 9 mi W Shawneetown at the Ill. Rte 1 Bridge, Gallatin County on 21 June 2005 (INHS 30544). A live *P. alatus* specimen was discovered in the Vermilion River of the Wabash River drainage, 2 mi SE Danville at old railroad trestles, Vermilion County on 21 July 2000 (INHS 24755). The pink heelsplitter has been found alive in 18 drainages in Illinois since 1970 and was historically present in 22 drainages in the state.

*Potamilus capax*, (Green, 1832), fat pocketbook (state-endangered, federally-endangered). Updated drainage record: **19**. The fat pocketbook was historically known from the Mississippi, Wabash and Ohio rivers and their larger tributaries in Illinois, and was thought to be alive only in the Wabash and Ohio rivers in the state (Cummings and Mayer 1997). A live *P. capax* specimen was discovered in the Little Wabash River, Carmi at the Ill. Rte 1 Bridge, White County on 8 September 1998 (INHS 22242). The fat pocketbook has been collected alive in three drainages in Illinois since 1970 and was historically present in six drainages in the state.

*Potamilus ohiensis* (Rafinesque, 1820), pink papershell. Updated drainage records: **6**, **16**, **17**, **21**. The pink papershell is widely distributed throughout Illinois and might be expanding its range in the state (Cummings and Mayer 1997). Two live *P. ohiensis* specimens were discovered in Big Bureau Creek (Middle Illinois River tributaries), 1.75 mi ENE Tiskilwa, Bureau County on 1 October 2004 (INHS 29913). A recent-dead *P. ohiensis* specimen was found in Bear Creek Ditch (Cache River drainage), 2 mi ESE New Columbia at the New Columbia Road Bridge, Massac County on 1 July 2002 (INHS 27674). A recent-dead *P. ohiensis* specimen was found in Big Creek (Ohio River tributaries), 1.5 mi SW Elizabethtown at the Ill. Rte 146 Bridge, Hardin County on 28 June 2001 (INHS 25695). A live *P. ohiensis* specimen was discovered in the Vermilion River of the Wabash River drainage, 4.25 mi E Westville at old railroad trestles, Vermilion County on 2 October 1997 (INHS 20740). The pink papershell has been collected alive in 21 drainages in Illinois since 1970 and was historically present in 24 drainages in the state.

*Potamilus purpuratus* (Lamarck, 1819), bleufer (species of special concern). Updated drainage record: **24**. The bleufer was historically known from only the Wabash and lower Mississippi rivers in Illinois; it is at the northeastern edge of its geographic range in the state (Cummings and Mayer 1997). Relict valves were located in the Ohio River, 3 mi NE Mound City, Pulaski County on 22 September 1999 (INHS 24128), and a live *P. purpuratus* individual was found here on 27 July 2005 (INHS 31099). This specimen is the first recorded live individual of *P. purpuratus* for the state. The bleufer has been collected alive in one drainage in Illinois since 1970 and was historically present in three drainages in the state.

*Toxolasma lividus* (Rafinesque, 1831), purple lilliput (state-endangered). Updated drainage record: **17**. The purple lilliput was historically found in the Wabash River and its tributaries in Illinois, and was thought to be alive only in two Wabash River tributaries in the state: the Vermilion and Little Wabash rivers (Cummings and Mayer 1997). Two live *T. lividus* specimens were discovered in Big Grand Pierre Creek (Ohio River tributaries), 1.75 mi SE Herod near the Blackman Road Bridge, Pope County on 14 May 1997 (INHS

19620). The purple lilliput has been collected alive in three drainages in Illinois since 1970 and was historically present in five drainages in the state.

*Toxolasma parvus* (Barnes, 1823), lilliput. Updated drainage records: **3, 9**. The lilliput is commonly distributed throughout Illinois (Cummings and Mayer 1997). One live *T. parvus* specimen was found in Burton Creek (Middle Mississippi River tributaries), 2 mi NW Payson at the Ill. Rte 96 Bridge, Adams County on 21 October 1997 (INHS 20078). One live *T. parvus* was discovered in Haw Creek (Spoon River drainage), 3.5 mi W Maquon at the Co. Rd 550N Bridge, Knox County on 15 August 1999 (INHS 25776). The lilliput has been collected alive in 21 drainages in Illinois since 1970 and was historically present in 24 drainages in the state.

*Toxolasma texasiensis* (Lea, 1857), Texas lilliput. Updated drainage record: **19**. The Texas lilliput is restricted to southern Illinois. Two live *T. texasiensis* were collected in the Little Wabash River, Carmi at the Ill. Rte 1 Bridge, White County on 3-4 August 1999 (INHS 23430). The Texas lilliput has been found alive in five drainages in Illinois since 1970 and was historically present in six drainages in the state.

*Truncilla donaciformis* (Lea, 1828), fawnsfoot. Updated drainage records: 3, 7, **14**, 15. The fawnsfoot is commonly found in the larger streams in Illinois (Cummings and Mayer 1997). A relict *T. donaciformis* valve was discovered in Edwards Creek (Middle Mississippi River tributaries) in Mercer County (Bryant Walker Collection; UMMZ 70893). This specimen recently was acquired from the University of Illinois Museum of Natural History. A relict *T. donaciformis* valve was collected in the Kankakee River near Kankakee, Kankakee County (no date was given; UMMZ 154008). Six live *T. donaciformis* specimens were found in Shoal Creek (Kaskaskia River drainage), 2 mi SE Pocahontas at the Doll's Orchard Avenue Bridge, Bond County on 6 September 2002 (INHS 27469). A relict *T. donaciformis* valve was discovered in the Big Muddy River, 0.7 mi N Grassy Knob, Jackson County on 25 August 2001 (INHS 26388). The fawnsfoot has been discovered alive in 14 drainages in Illinois since 1970 and was historically present in 20 drainages in the state.

*Truncilla truncata* Rafinesque, 1820, deertoe. Updated drainage records: **5, 7, 8, 17**. The deertoe is generally distributed in large streams in Illinois (Cummings and Mayer 1997), and is expanding its range in the Illinois River drainage (Sietman et al. 2001). A live *T. truncata* specimen was collected in Aux Sable Creek, 5 mi ENE Morris, Grundy County on 26 July 2005 (INHS 30683). A recent-dead *T. truncata* valve was found in the Kankakee River, Langham Island at Altorf, Kankakee County on 5 Aug 2004 (INHS 29180). One live *T. truncata* specimen was collected in the Vermilion River of the Illinois River drainage, 3 mi ENE Leonore at the Co. Rd 57 bridge, LaSalle County on 27 July 2004 (INHS 30120), and three live were collected in the Mazon River, 1 mi SE Morris, Grundy County on 25 August 2000 (INHS 25341). A live *T. truncata* specimen was discovered in Bay Creek (Ohio River tributaries), 2.5 mi SE Brownfield at the Co. Rd 700E Bridge, Pope County on 30 August 1998 (INHS 23112). The deertoe has been found alive in 16 drainages in Illinois since 1970 and was historically present in 20 drainages in the state.

*Venustaconcha ellipsiformis* (Conrad, 1836), ellipse. Updated drainage record: 25. The ellipse is restricted to northern Illinois (Cummings and Mayer 1997). Two relict *V. ellipsiformis* specimens were recorded for the Wabash River, Mount Carmel, Wabash County (A.A. Hinkley Collection, pre-1921; INHS 30207). This specimen recently was acquired from the University of Illinois Museum of Natural History. The ellipse has been found alive in seven drainages in Illinois since 1970 and was historically present in 13 drainages in the state.

*Villosa fabalis* (Lea, 1831), rayed bean (state-extirpated). Updated drainage record: 21. The rayed bean was historically distributed in the Wabash River and its tributaries in Illinois, and was thought to be extirpated from the state (Cummings and Mayer 1997). Live *V. fabalis* specimens were collected in the Middle Fork Vermilion River, 0.75 mi WSW Armstrong at the Ill. Rte 49 Bridge, Vermilion County on 9 July 1991 (INHS 12158). The rayed bean has been found alive in one drainage in Illinois since 1970 and was historically present in four drainages in the state.

*Villosa iris* (Lea, 1829), rainbow (state-endangered). Updated drainage record: 2. The rainbow was historically distributed in northern and eastern Illinois, but is now alive only in the Vermilion River basin of the Wabash River drainage in the state (Cummings and Mayer 1997). Relict *V. iris* valves were discovered in the Kishwaukee River (Rock River drainage), 2 mi WNW Marengo, McHenry County on 17 September 1996 (INHS 19486). The rainbow has been found alive in one drainage in Illinois since 1970 and was historically present in nine drainages in the state.

*Villosa lienosa* (Conrad, 1834), little spectaclecase (state-threatened). Updated drainage records: 16, 17, 18. The little spectaclecase was historically found throughout the Wabash River drainage in addition to the upper Sangamon River in Illinois, but is now only alive in two drainages in the state: 1) the Embarras River and Wabash River tributaries (e.g., Brouillets Creek), and 2) the Vermilion River (Cummings and Mayer 1997; Tiemann 2005). A relict *V. lienosa* valve was found in Lake Creek (Cache River drainage), 2 mi E Miller City just downstream of Horseshoe Lake spillway, Alexander County on 12 October 2005 (INHS 31115). A recent-dead *V. lienosa* specimen was found in Big Grand Pierre Creek (Ohio River tributaries), 1.5 mi SE Herod near the Blackman Road Bridge, Pope County on 31 August 2000 (INHS 25205). A relict *V. lienosa* valve was found in the North Fork Saline River, 5.5 mi W Norris City at the Co. Rd 500N Bridge, Hamilton County on 3 November 2005 (INHS 31082). The little spectaclecase has been found alive in two drainages in Illinois since 1970 and was historically present in nine drainages in the state.

## DISCUSSION

An examination of museum records and literature reviews of freshwater mussels from Illinois uncovered information for 51 species, including new drainage records for 37 species and status updates for 40 species, since Cummings and Mayer (1997). These data suggest that reduction of unionids in Illinois might not be as high as originally reported in Cummings and Mayer (1997). Although there are still considerable differences between current and historical species richness in many drainages, additional collecting would likely reveal more taxa due to the fact that many of these areas have not been adequately

sampled. Disturbances to freshwater mussel faunas are similar to those affecting other riverine faunas, and continued work on managing stream habitats is vital to protecting the remaining diversity of those faunas.

Morphological and genetic work still needs to be done to determine range and status of a few species in Illinois, including winged mapleleaf *Quadrula fragosa* (Conrad, 1835), gulf mapleleaf *Quadrula nobilis* (Conrad, 1854), *Lampsilis ovata* (Say, 1817), and Louisiana fatmucket *Lampsilis hydiaana* (Lea, 1838). Updated records for these four species were not included in this paper.

We also would like to correct seven records reported in Cummings and Mayer (1997). Evidence could not be found for *Cyclonaias tuberculata* (Rafinesque, 1820), purple wartyback, in the Little Wabash River; *A. ferussacianus* in the Wabash River in Illinois, although there are records for it in Indiana (INHS 6235); *P. alatus* in the Big Muddy River; and *V. iris* in the Mississippi River mainstem. Also, although *F. ebena* was known to occur in the Rock River, evidence of recent live individuals as reported in Cummings and Mayer (1997) could not be found. Records of *M. nervosa* occurring in both Middle Mississippi River tributaries and Ohio River tributaries (or “Massac, Bay, Lusk, Big Grand Pierre, and Big Creek Drainages”) were re-identified as *A. plicata*. The live and historical numbers listed both in the species accounts (in results section) and in Table 1 have the above errors taken into consideration; *C. tuberculata*, which is not listed in the species account section, has been discovered alive in three drainages in Illinois since 1970 and was historically present in 11 drainages in the state.

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Table 1. Extant and historic freshwater mussel species counts known from Illinois by drainage. 'No.' is the drainage number in Figure 1. Species count data were taken from literature reviews and voucher specimens housed in museum collections. Asterisks (\*) indicate projects that currently are ongoing within the drainage and species counts are not current. <sup>1</sup>Data from Aux Sable Creek were not included with data from the Fox River in Cummings and Mayer (1997). <sup>2</sup>Middle Illinois River tributaries are referred to as "Little Vermilion River, Big Bureau, and Kickapoo Creek Drainages" in Cummings and Mayer (1997). <sup>3</sup>Lower Illinois River tributaries are referred to as "Lower Illinois River tributaries and American Bottoms" in Cummings and Mayer (1997). <sup>4</sup>Ohio River tributaries are referred to as "Massac, Bay, Lusk, Big Grand Pierre, and Big Creek Drainages" in Cummings and Mayer (1997).

No.	Drainage	Extant Species Count	Historic Species Count
1.	Galena River, Apple River, and Plum River*	11	19
2.	Rock River	32	47
3.	Middle Mississippi River tributaries	11	27
4.	Des Plaines River and Lake Michigan tributaries	11	38
5.	Fox River and Aux Sable Creek <sup>1</sup>	26	34
6.	Middle Illinois River tributaries <sup>2</sup>	7	16
7.	Kankakee River-Iroquois River	27	40
8.	Vermilion River and Mazon River	25	31
9.	Spoon River	20	41
10.	LaMoine River	15	23
11.	Mackinaw River and Quiver Creek	26	35
12.	Sangamon River	34	48
13.	Lower Illinois River tributaries <sup>3</sup>	12	19
14.	Kaskaskia River	31	43
15.	Big Muddy River	17	24
16.	Cache River	16	20
17.	Ohio River tributaries <sup>4</sup>	15	26
18.	Saline River	18	24
19.	Little Wabash River and Bonpas Creek	35	47
20.	Embarras River and Wabash River tributaries	35	47
21.	Vermilion River and Little Vermilion River	37	45
22.	Illinois River	29	49
23.	Mississippi River	35	50
24.	Ohio River	35	57
25.	Wabash River	29	74



Figure 1. The 25 major river drainages in Illinois (figure taken from Cummings and Mayer 1997). See Table 1 for drainage key.



