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George L. Harp
Arkansas State University, glharp@astate.edu

Henry W. Robison
Southern Arkansas University

Aquatic Macroinvertebrates of the Strawberry River System in North-central Arkansas

GEORGE L. HARP[1,3] AND HENRY W. ROBISON[2]

[1]*Department of Biological Sciences, Arkansas State University, State University, AR 72467*
[2]*Department of Biology, Southern Arkansas University, Magnolia, AR 71754-9354*

[3]Correspondence: glharp@astate.edu

Abstract.—The Strawberry River has been designated an Extraordinay Resource Water, an Ecologically Sensitive Water Body, and a Natural and Scenic Waterway. As such, it is particularly important that the biodiversity of this river system be documented thoroughly. The purpose of this research was to develop a comprehensive list of the aquatic macroinvertebrates of the Strawberry River and its major tributaries. The information was developed from a thorough literature review and by examining specimens housed in various collections of the Arkansas State University Museum of Zoology and collections of the authors. The latter included 9 collections at 4 sites along the mainstream and 17 collections from 8 tributaries. To date, 313 species of aquatic macroinvertebrates are known to occur in the Strawberry River system. Among the freshwater mussels, 1 is listed and 7 are ranked: *Leptodea leptodon* (Federal list-endangered, S1), *Cyprogenia aberti*, *Lasmigona costata*, and *Quadrula cylindrica* (S2), *Cyclonaias tuberculata, Strophitus undulatus*, and *Villosa lienosa* (S3). Of 25 stonefly species known to be endemic to the Interior Highlands, 7 occur in this system.

Key words:—Strawberry River, aquatic macroinvertebrates, freshwater mussels, stonefly, Federal list-endangered, *Leptodea leptodon, Cyprogenia aberti*, *Lasmigona costata*, *Quadrula cylindrica*, *Cyclonaias tuberculata, Strophitus undulatus*, *Villosa lienosa.*

Introduction

The Strawberry River has been designated an Extraordinary Resource Water and an Ecologically Sensitive Water Body, as outlined by the Arkansas Water Quality Standards. It is also designated as a Natural and Scenic Waterway (ADPCE 1996). As such, it is particularly important that the biodiversity of this river system be documented thoroughly.The Strawberry River is a spring-fed, relatively clear stream in north-central Arkansas, typically consisting of wide, shallow pools separated by riffles. The river originates near Viola, Arkansas, and flows 177 km before entering the Black River at BR km 56.2, approximately 10.5 km above Lockheart Ferry. The drainage area is 2,100 km^2 (Beadles 1972). Principal tributaries are the Little Strawberry River, Piney Fork, North Big Creek, South Big Creek, Cooper Creek, Dry Creek, and Caney Creek. The Strawberry River arises in Ordovician Calico sandstone of lower Fulton County and winds through Cotter dolomite in Izard and Sharp counties. Midway into Lawrence County, the river passes through Powell limestone, then in rapid succession through Smithville and Black Rock limestone. As it nears its confluence with the Black River, the Strawberry River drops into the Quaternary Alluvium (Croneis 1930). Major soils adjacent to the river are chiefly of the Huntington and Elk series (SCS 1964). Mean annual rainfall is 112, 119, and 138 cm in Izard, Sharp and Lawrence counties, respectively. Air temperatures range from –25 to 40° C (Hickmon 1941).

No previous studies dealing with aquatic macroinvertebrates of the Strawberry River system have been comprehensive. Rather, they have been restricted to a few collections at a limited number of locations (e.g. Robison 1968; Robison and Harp 1971; Beadles 1972; Harp 1972; Moss and Harp 1993; ADPCE 1996) or have focused on a target group of organisms (e.g. Harp 1989; Poulton and Stewart 1991; Rust 1993; Moulton and Stewart 1996).

The purpose of this research was to develop a comprehensive list of the aquatic macroinvertebrates of the Strawberry River and its major tributaries. Species of particular interest are discussed.

Materials and Methods

The information to develop a list of the aquatic macroinvertebrates known to occur in the Strawberry River system was derived primarily from 4 sources (Table 1). A comprehensive review of the literature provided the nucleus. Aquatic macroinvertebrates previously collected and housed in the Adult Odonata Collection, Freshwater Mussel Collection and George L. Harp Aquatic Macroinvertebrate Collection of the Arkansas State University Museum of Zoology were inventoried. Mollusca collected from the Strawberry River mainstream in the 1970s by one of us (HWR) provided additional information. Both authors collected a series of samples during 1988-89 from tributaries that had received little or no previous attention.

Collections were made with a Turtox Indestructible™ dip net. Taxonomic usage follows Merritt and Cummins (1996) for aquatic insects, Gordon (1980) for Mollusca, and Smith (2001) for other aquatic macroinvertebrates. Common names of crayfishes follow Pflieger (1996), those of Mollusca follow Harris and Gordon (1990), and those of Odonata follow Paulson and Dunkle (1999).

We have endeavored to use the most current taxonomy. However, taxonomy, particularly that of aquatic macroinvertebrates, is dynamic. To minimize confusion, older names under which species have occurred in older literature have been noted (Table 2). For example, a small clubtail dragonfly that occurs in Arkansas, Kentucky, Missouri, and Tennessee, previously has been identified as *Stylogomphus albistylus*, an eastern species, but it was in fact an undescribed species. Cook and Laudermilk (2003) have recently described it as *Stylogomphus sigmastylus.*

Results and Discussion

This survey encompassed 9 collections at 4 sites along the Strawberry River mainstream and 14 collections on tributaries (Table 1). The authors or their former students were associated with nearly all collections made. The notable exception was the Plecoptera survey by Poulton and Stewart (1991), but even this comprehensive study began with verification of the identities of the stoneflies in the possession of the authors.

Because the purposes and methodologies varied greatly among studies, as well as number of times a given site was visited, analyses of data are restricted.

To date, 313 species of aquatic macroinvertebrates are known to occur in the Strawberry River system (Table 2). Significant records are as follows.

Among the Unionoida, *Leptodea leptodon*, the scaleshell, was reported from the Strawberry River by Harris et al. (1997). This species is on the federal list of endangered species and is ranked in Arkansas as S1, defined as typically 5 or fewer estimated occurrences in the state or only a few remaining individuals, may be vulnerable to extirpation. Additionally, in Arkansas 3 Strawberry River species are ranked as S2, *Cyprogenia aberti, Lasmigona costata, and Quadrula cylindrica.* Individuals of these species are very rare with typically 5-20 estimated occurrences or with many individuals in few occurrences; they are often susceptible to becoming extirpated. Finally, *Cyclonaias tuberculata, Strophitus undulatus, and Villosa lienosa* are ranked as S3. Individuals of these species are rare to uncommon with typically 20-100 estimated occurrences or fewer occurrences but with large numbers of individuals in some populations. These populations may be susceptible to large-scale disturbances.

Baetisca obesa was collected from the lower Strawberry River, at St. Hwy. 25. This is only the second record for this species in Arkansas. Cochran and Harp (1990) first reported this mayfly from the St. Francis Sunken Lands. At both locations, the rivers are of medium size and have moderate current over a sand substrate. The Strawberry River site is the only location reported for Arkansas where *B. lacustris* and *B. obesa* occur together. *B. lacustris* characteristically inhabits smaller, less turbid streams with rubble substrate.

Of the 25 stonefly species listed as regional endemics by Poulton and Stewart (1991), 7 are known to occur in the Strawberry River system. These are *Allocapnia mohri, Zealuctra warreni, Strophopteryx cucullata, Neoperla falayah, N. osage, N. robisoni* and *Isoperla ouachita.* Additionally, *Attaneuria ruralis*, which occurs only in Arkansas, Illinois, Kansas, and Missouri, is a species rarely collected.

Seven specimens of the predaceous diving beetle *Heterosternuta ouachitus* were collected, 2 from the Strawberry River at St. Hwy. 354 (Harp 1989), 2 at Hars Creek and 3 at McJunkins Branch. Prior to that date, the collection of only 21 specimens had ever been reported. Unlike most predaceous diving beetles, *Heterosternuta* species prefer the interstices of rocks at the edges of riffles in headwater streams, a microhabitat that is rarely sampled. The center of distribution for *H. ouachitus* is the Interior Highlands. While this species is widely distributed, it is quite uncommon. Of 30 samples taken in its preferred habitat, 9 contained a total of 34 specimens among 981 total *Hydroporus* (general sense) individuals (Harp 1989). The 5 specimens collected at Hars Creek and McJunkins Branch constituted only 2.7% of the *Hydroporus* from those streams.

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Table 1. Collecting sites (noted by date and collectors) and literature sources for aquatic macroinvertebrate taxa, Strawberry River System.

1. Strawberry R. at St. Hwy. 354, 5mi W Horseshoe Bend, SW¼Sec7, T18N, R8W, Izard Co. 4 Sep 88, GL Harp (1a); 1995, Richard Mitchell (1b).
2. South Big Cr. at St. Hwy. 115, 1.5mi NE Calamine, NE¼Sec23, T16N, R4W, Sharp Co. 19 Aug 86, GL Harp (2a); 5 Sep 88, Billy Justice & GL Harp (2b); 1 Apr 95, Bill Posey and Aquatic Entomology Class (2c).
3. Cooper Cr., 1.5mi W Smithville, NW¼Sec32, T17N, R3W, Lawrence Co. 1 Jul 64, L Tucker (3a); 25 Jun 71, GL Harp (3b), 11 Sep 71, GL Harp (3c); 1974, Herb Athearn (3d); 6 Oct 78, T Pickett (3e); 10 Jul 79, HE Barton (3f); 5 Sep 88, B Justus & GL Harp (3g); 19 Feb 95, B Posey & GL Harp (3h).
4. Greasy Cr., 3mi NNW Union, SE¼Sec21, T19N, R9W, Fulton Co. 23 Sep 89. HW Robison & GL Harp.
5. Unnamed tributary of the Strawberry R. at a section road ford, 5mi WNW Franklin, SE¼Sec30, T18N, R8W, Izard Co. 23 Sep 89. HW Robison & GL Harp.
6. McJunkins Branch, 2.2mi SE Franklin, SE¼Sec4, T17N, R7W, Izard Co. 23 Sep 89. HW Robison & GL Harp
7. Strawberry R. at St. Hwy. 395, 7mi W Salem, SW¼Sec10, T19N, R9W, Fulton Co. 23 Sep 89. HW Robison & GL Harp
8. Hars Cr. 0.7mi S St. Hwy. 56, 0.2mi E Izard Co line, SW¼Sec30, T18N, R6W, Sharp Co. 23 Sep 89. HW Robison & GL Harp
9. Strawberry R. at U.S. Hwy. 167, 2mi N Evening Shade, NE¼Sec 27, T17N, R6W, Sharp Co. 21 Aug 76, GL Harp (9a); 7 Aug 78, GL Harp (9b); 24 Sep 89, HW Robison & GL Harp (9c); 3 Jun 90, GL Harp (9d).
10. Mill Cr. at St Hwy 56, Evening Shade, NE¼Sec3, T16N, R6W, Sharp Co. 24 Sep 89, HW Robison & GL Harp.
11. Strawberry R. at St. Hwy. 25 bridge, ~2mi SW Lynn, NE¼Sec34, T16N, R3W, Lawrence Co. 22 Jul 90, GLH (11a); 1 Apr 95, B Posey and Aquatic Entomology Class (11b).
12. Strawberry R. ~1.3mi N Poughkeepsie, NE¼Sec26, T17N, R5W, Lawrence Co. 1 Apr 95, B Posey and Aquatic Entomology Class.
13. North Big Cr. ~1mi SE Center, NW¼Sec10, T17N, R5W, Sharp Co. 31 May 05. GL Harp.
14. Aquatic macroinvertebrates documented from the Strawberry R. by Robison and Harp (1971).
15. Aquatic macroinvertebrates documented from three stations along the Strawberry R. by Harp (1972).
16. Freshwater mussels documented from the Strawberry R. mainstream during the 1970s by HW Robison.
17. Stoneflies documented from the Strawberry R. System by Poulton and Stewart (1991).
18. Aquatic macroinvertebrates documented from North Big Cr. by Moss and Harp (1993).
19. Freshwater mussels documented from the Strawberry R. mainstem by Rust (1993).
20. Caddisflies documented from the Strawberry River System by Moulton and Stewart (1996).
21. Aquatic macroinvertebrates documented from the Strawberry River System by ADPCE (1996).
22. Arkansas crayfishes database.
23. Report listing rare and endangered Unionacea by Harris et al. 1997.

Table 2. Aquatic macroinvertebrate taxa and distributions within the Strawberry River System.

Scientific Name	Common Name	Location (Table 1)
PORIFERA	Sponges	
Spongillidae	Freshwater sponges	
Sp. 1	Freshwater sponges	18
PLATYHELMINTHES	Unsegmented flatworms	
Class Turbellaria	Turbellarians	
Order Tricladida	Triclads	
Planariidae	Planarians	14
Dugesia sp.	Planarian	15, 18
NEMATOMORPHA	Horsehair worms	4, 10
Gordiidae	Gordian worms	
ANNELIDA	Segmented roundworms	
Class Oligochaeta	Oligochaetes	14, 15, 21
Order Lumbriculida	Lumbriculids	
Lumbriculidae	Lumbriculids	
Sp. 1	Lumbriculid	18
Order Branchiobdellida	Branchiobdellid worm	
Branchiobdellidae	Branchiobdellid worm	
Sp. 1	Branchiobdellid worm	18
Class Hirudinea	Leeches	
Order Rhynchobdellida	Rhynchobdellid leeches	14
Glossiphoniidae	Glossiphoniid leeches	
Batrachobdella sp.	Glossiphoniid leech	18
Helobdella sp.	Glossiphoniid leech	4, 18
Placobdella sp.	Glossiphoniid leech	17
MOLLUSCA	Molluscs	
Class Gastropoda	Snails, limpets (Univalves)	21
Order Limnophila	Pulmonate snails	
Ancylidae	Limpets	
Ferrisia rivularis	Limpet	9c, 15, 18
Planorbidae	Planorbids	
Gyraulus sp.	Planorbid	18
Helisoma sp.	Planorbid	9c
Pleuroceridae	Pleurocerids	14
Elmia (=*Goniobasis*) *ovoidea*	Pleurocerid	9c, 10, 15
Pleurocera acuta	Pleurocerid	3d
Viviparidae	Viviparids	
Campeloma sp.	Viviparid	9c, 18
Physidae	Physids	
Physella (=*Physa*) sp.	Physid	4, 5, 6, 7, 8, 9c, 10, 18

Table 2. Aquatic macroinvertebrate taxa and distributions within the Strawberry River System. (cont.)

Scientific Name	Common Name	Location (Table 1)
Class Pelecypoda	Clams, mussels (Bivalves)	
Unionoida	Unionoid mussels	
Sphaeriidae	Fingernail clams	18
Musculium sp.	Fingernail clam	4
Sphaerium sp.	Fingernail clam	7
S. striatinum	Fingernail clam	15
Unionidae	Unionids	
Actinonaias ligamentina	Mucket	16, 19
Amblema plicata	Threeridge	16, 19
Cyclonaias tuberculata	Purple wartyback	16, 19
Cyprogenia aberti	Western fanshell	19
Elliptio dilata	Spike	19
Fusconaia ebena	Ebonyshell	19
F. flava	Wabash pigtoe	19
Lampsilis teres	Yellow sandshell	16
Lasmigona complanata	White heelsplitter	19
L. costata	Fluted-shell	19
Leptodea fragilis	Fragile papershell	16, 19
L. leptodon	Scaleshell	23
Legumia recta	Black sandshell	19
Obliquaria reflexa	Threehorn wartyback	19
Potamilus purpurata	Bleufer	16, 19
Pyganodon grandis	Giant floater	16, 18
Quadrula cylindrica	Rabbitsfoot	16
Q. metanevra	Monkeyface	16, 19
Q. pustulosa	Pimpleback	16, 19
Strophitus undulatus	Squawfoot	16
Tritogonia verrucosa	Pistolgrip	16, 19
Truncilla truncata	Deertoe	16. 19
Villosa lienosa	Little spectaclecase	16
Veneroida	Veneroid mussels	
Corbiculidae	Asiatic clam	
Corbicula fluminea	Asiatic clam	9c, 16, 18, 21
ARTHROPODA		
Class Arachnida	Arachnids	
Hydracarina	Water mites	14, 18
Lebertia sp.	Water mite	15
Class Crustacea	Crustaceans	
Order Isopoda	Isopods	
Asellidae	Sow bugs or pill bugs	
Caecidotea sp.	Sow bug	11b
C. militaris	Sow bug	15

Table 2. Aquatic macroinvertebrate taxa and distributions within the Strawberry River System. (cont.)

Scientific Name	Common Name	Location (Table 1)
Lirceus sp.	Sow bug	2c, 3h, 6, 11b, 15, 18, 21
Order Amphipoda	Amphipods	
Crangonyctidae	Sideswimmers, scuds	
Crangonyx gracilis	Sideswimmer	15
Synurella sp.	Sideswimmer	11b, 12
Gammaridae	Sideswimmers, scuds	
Gammarus sp.	Sideswimmer	3g, 3h
G. minus	Sideswimmer	10
Talitridae	Sideswimmers, scuds	
Hyalella azteca	Sideswimmer	6, 9c, 12, 15, 18
Order Decapoda	Decapod crustaceans	
Palaemonidae	Freshwater shrimp	
Palaemonetes kadiakensis	Freshwater shrimp	11b, 15
Cambaridae	Crayfishes	11b
Fallicambarus fodiens	Digger crayfish	22
Orconectes sp.	Crayfish	3g, 4, 5, 6, 10, 15, 18
O. eupunctus	Coldwater crayfish	22
O. ozarkae	Ozark crayfish	22
O. punctimanus	Spothanded crayfish	22
O. virilis	Northern crayfish	22
Class Insecta		
Order Ephemeroptera	Mayflies	
Baetidae	Baetid mayflies	
Acentrella sp.	Baetid mayfly	1b
Baetis sp.	Baetid mayfly	1b, 2c, 10, 11b, 12, 18, 21
Callibaetis fluctuans	Baetid mayfly	8
Diphetor hageni	Baetid mayfly	12
Procloeon rubropictum	Baetid mayfly	2c
P. rufostrigatum	Baetid mayfly	11b
Pseudocloeon sp.	Baetid mayfly	14, 15, 21
Baetiscidae		
Baetisca sp.	Baetiscid mayfly	11b
B. lacustris (=*bajkovi*)	Baetiscid mayfly	2c, 11b, 15
B. obesa	Baetiscid mayfly	11b
Caenidae	Caenid mayfly	
Bracycercus sp.	Caenid mayfly	14
Caenis sp.	Caenid mayfly	2c, 8, 12, 14, 18, 21
Ephemeridae	Burrowing mayfly	
Hexagenia sp.	Burrowing mayfly	18
H. atrocaudata	Burrowing mayfly	8c
H. limbata	Burrowing mayfly	15
Ephemerellidae	Ephemerellid mayfly	12
Ephemerella sp.	Ephemerellid mayfly	18

Table 2. Aquatic macroinvertebrate taxa and distributions within the Strawberry River System. (cont.)

Scientific Name	Common Name	Location (Table 1)
E. argo	Ephemerellid mayfly	15
E. deficiens	Ephemerellid mayfly	15
E. dorothea	Ephemerellid mayfly	1b, 2c, 3h, 11b, 12, 15
E. invaria	Ephemerellid mayfly	11b
E. needhami	Ephemerellid mayfly	2c, 11b, 15
E. rotunda	Ephemerellid mayfly	11b
E. simplex	Ephemerellid mayfly	15
E. sordida	Ephemerellid mayfly	15
Seratella sp.	Ephemerellid mayfly	10b
S. sordida	Ephemerellid mayfly	12
Heptageniidae	Heptageniid mayfly	
Heptagenia sp.	Heptageniid mayfly	18
Nixe sp.	Heptageniid mayfly	18
Stenacron interpunctatum	Heptageniid mayfly	1b, 3g, 18
Stenonema sp.	Heptageniid mayfly	10, 14, 18, 21
S. ares	Heptageniid mayfly	15
S. femoratum	Heptageniid mayfly	1a, 3h, 6, 7, 9c, 11b, 15, 18
S. luteum	Heptageniid mayfly	2c, 3h, 11b
S. mediopunctatum	Heptageniid mayfly	1b, 2c, 3h, 11b, 12, 18
S. nepotellum	Heptageniid mayfly	15
S. pulchellum	Heptageniid mayfly	18
S. terminatum	Heptageniid mayfly	7, 11b, 12, 18
Isonychiidae	Isonychiid mayfly	
Isonychia sp.	Isonychiid mayfly	1b, 2b, 2c, 3g, 3h, 5, 6, 10, 11b, 12, 14, 15, 18, 21
Leptophlebiidae	Leptophlebiid mayfly	2c
Choroterpes sp.	Leptophlebiid mayfly	18
C. basalis	Leptophlebiid mayfly	5, 6
Paraleptophlebia sp.	Leptophlebiid mayfly	15
P. guttata	Leptophlebiid mayfly	1b, 2c, 3h, 11b
Polymitarcyidae	Burrowing mayfly	
Ephoron sp.	Burrowing mayfly	14, 21
Potamanthidae	Burrowing mayfly	
Anthopotamus (=Potamanthus) sp.	Burrowing mayfly	12, 14, 15
Siphloneuridae	Siphloneurid mayfly	
Ameletus sp.	Siphloneurid mayfly	3h
Siphloneurus sp.	Siphloneurid mayfly	11b
S. marshalli	Siphloneurid mayfly	2c
Tricorythidae	Tricorythid mayfly	
Tricorythodes sp.	Tricorythid mayfly	6, 18, 21
T. atratus	Tricorythid mayfly	3h, 11b, 15
Order Odonata	Dragonflies, damselflies	
Calopterygidae	Broad-winged damsels	
Calopteryx maculata	Ebony jewelwing	1b, 2a, 2b, 2c, 3g, 5, 10, 11b, 18

Table 2. Aquatic macroinvertebrate taxa and distributions within the Strawberry River System. (cont.)

Scientific Name	Common Name	Location (Table 1)
Hetaerina sp.	Rubyspot damselfly	2b, 11b
H. americana	American rubyspot	2c, 3e, 9b, 9c, 18
H. titia	Smoky rubyspot	2a
Coenagrionidae	Pond damsels	
Amphiagrion sp.?	Red damsel	15 (probably *Ischnura)*
Argia sp.	Dancer	1a, 2b, 2c, 4, 5, 6, 9c, 10, 11b, 12, 15, 18
A. apicalis	Blue-fronted dancer	9b
A. fumipennis violacea	Variable dancer	9b
A. moesta	Powdered dancer	9b
A. plana	Springwater dancer	9b, 10
A. sedula	Blue-ringed dancer	2a, 3e, 9b
A. tibialis	Blue-tipped dancer	9b, 9d
A. translata	Dusky dancer	9b
Enallagma sp.	Bluet	1a, 2b, 2c, 4, 6, 7, 8, 9c, 11b, 12, 18
Ischnura sp.	Forktail	4, 6, 7, 15, 18
I. posita	Fragile forktail	9b
Aeshnidae	Darners	14, 18
Basiaeschna janata	Springtime darner	2b, 3g, 3h, 4, 5, 6, 9c, 10, 18
Boyeria vinosa	Fawn darner	2b, 10, 12
Gomphidae	Clubtails	
Arigomphus lentulus	Stillwater clubtail	9c
Dromogomphus sp.	Spinyleg clubtail	1a, 2b, 3g, 12
D. spinosus	Black-shouldered spinyleg	3e, 3h, 4, 9a, 9c, 15
D. spoliatus	Flag-tailed spinyleg	3h
Erpetogomphus designatus	Eastern ringtail dragonfly	9c
Gomphus sp.	Clubtail	2b, 2c, 4, 9c, 10, 11b
G. externus	Plains clubtail	12
G. graslinellus?	Pronghorn clubtail	5
G. lividus	Ashy clubtail	11a
G. ozarkensis	Ozark clubtail	13
Hagenius brevistylus	Dragonhunter	2c, 3c, 3g, 9a, 11b, 12
Ophiogomphus westfalli	Westfall's snaketail	1a, 2b
Progomphus obscurus	Common sanddragon	2b, 2c, 3b, 3g, 3h, 11b
Stylogomphus sigmastylus	Western least clubtail	2c, 3g, 6, 7, 9c, 10, 18
Stylurus plagiatus	Russet-tipped clubtail	11a
Corduligastridae	Spiketails	
Cordulegaster maculata?	Twin-spotted spiketail	10
Macromiidae	Cruisers	
Didymops transversa	Stream cruiser	11b
Macromia sp.	River cruiser	1a, 2b, 2c, 3g, 9c, 11b, 12, 14, 18
M. illinoiensis	Illinois river cruiser	11a, 15
Corduliidae	Emeralds	
Epitheca cynosura	Common baskettail	1a, 4

Table 2. Aquatic macroinvertebrate taxa and distributions within the Strawberry River System. (cont.)

Scientific Name	Common Name	Location (Table 1)
E. princeps	Prince baskettail	2b, 4, 9c
Neurocordulia xanthosoma	Orange shadowdragon	3a, 9d
Somatochlora linearis	Mocha emerald	5, 8
Libellulidae	Skimmers	15, 18
Dythemis velox	Swift setwing	9a
Erythemis simplicicollis	Eastern pondhawk	3c, 4
Libellula sp.	Skimmer	1a, 11b
L. cyanea	Eastern spangled skimmer	3b, 4
L. luctuosa	Pied skimmer	4, 8
L. vibrans	Great blue skimmer	3c, 4, 9a
Plathemis lydia	Common whitetail	4, 5, 9a
Sympetrum sp.	Meadowhawk	1a
S. ambiguum	Blue-faced meadowhawk	9b
Order Plecoptera	Stoneflies	
Capniidae		
Allocapnia granulata	Capniid stonefly	17
A. mohri	Capniid stonefly	17
A. mystica	Capniid stonefly	17
A. rickeri	Capniid stonefly	17
Leuctridae	Winter stoneflies	
Leuctra tenuis	Winter stonefly	17
Zealeuctra classeni	Winter stonefly	17
Z. narfi	Winter stonefly	17
Z. warreni	Winter stonefly	17
Taeniopterygidae	Taeniopterygid stoneflies	
Strophopteryx sp.	Taeniopterygid stonefly	2c
S. cucullata	Taeniopterygid stonefly	17
S. fasciata	Taeniopterygid stonefly	17
Taeniopteryx sp.	Taeniopterygid stonefly	3h
T. burksi	Taeniopterygid stonefly	17
Nemouridae	Nemourid stoneflies	
Amphinemura sp.	Nemourid stonefly	1b
A. delosa	Nemourid stonefly	17
Prostoia sp.	Nemourid stonefly	1b
P. completa	Nemourid stonefly	17
Chloroperlidae	Chloroperlid stoneflies	
Haploperla sp.	Chloroperlid stonefly	1b
H. brevis	Chloroperlid stonefly	17
Perlidae	Perlid stoneflies	
Acroneuria sp.	Perlid stonefly	2c, 3h, 18
A. evoluta	Perlid stonefly	17
A. perplexa	Perlid stonefly	17
Agnetina capitata	Perlid stonefly	11b

Table 2. Aquatic macroinvertebrate taxa and distributions within the Strawberry River System. (cont.)

Scientific Name	Common Name	Location (Table 1)
Anacroneuria sp.	Perlid stonefly	18
Attaneuria ruralis	Perlid stonefly	2c, 12
Neoperla sp.	Perlid stonefly	17, 18, 21
N. choctaw	Perlid stonefly	17
N. clymene	Perlid stonefly	14, 15, 17
N. falayah	Perlid stonefly	17
N. osage	Perlid stonefly	2c, 17
N. robisoni	Perlid stonefly	17
Paragnetina kansensis	Perlid stonefly	17
Perlesta sp.	Perlid stonefly	1b, 15
P. cinctipes	Perlid stonefly	17
P. decipiens	Perlid stonefly	17
P. shubuta	Perlid stonefly	17
Perlinella drymo	Perlid stonefly	17
P. ephyre	Perlid stonefly	17
Phasganophora sp.	Perlid stonefly	18
Perlodidae	Perlodid stoneflies	
Hydroperla crosbyi	Perlodid stonefly	17
Isoperla sp.	Perlodid stonefly	1b, 2c, 3h, 15
I. coushatta	Perlodid stonefly	2c, 11b, 17
I. dicala	Perlodid stonefly	2c, 12
I. mohri	Perlodid stonefly	2c, 17
I. namata	Perlodid stonefly	17
I. ouachita	Perlodid stonefly	17
Order Hemiptera	True bugs	
Belostomatidae	Giant water bugs	
Sp. 1	Giant water bug	18
Corixidae	Water boatmen	15
Hesperocorixa sp.	Water boatman	5, 8, 18
Sigara sp.	Water boatman	5, 7, 8, 10, 18
S. modesta	Water boatman	1a, 18
Trichocorixa sp.	Water boatman	4, 9c, 18
Gelastocoridae	Toad bugs	
Gelastocoris oculatus oculatus	Toad bug	4, 5, 18
Gerridae	Water striders	
Gerris marginatus	Water strider	1a, 15
G. nebularis	Water strider	15
G. remigis	Water strider	7, 10
Limnoporus canaliculatus	Water strider	5, 6, 8, 9c, 10
Metrobates hesperius	Water strider	2b
Neogerris sp.	Water strider	18
Rheumatobates sp.	Water strider	6, 18
Trepobates sp.	Water strider	1a, 8

Table 2. Aquatic macroinvertebrate taxa and distributions within the Strawberry River System. (cont.)

Scientific Name	Common Name	Location (Table 1)
T. pictus	Water strider	4
T. subnitidus?	Water strider	6
Hebridae	Velvet water bugs	
Hebrus sp.	Velvet water bug	18
H. concinnus	Velvet water bug	6
Hydrometridae	Water measurers	
Hydrometra hungerfordi	Water measurer	5
H. martini	Water measurer	2b, 3f
Mesoveliidae	Water treaders	
Mesovelia sp.	Water treader	1a, 2b, 3g, 18
M. mulsanti	Water treader	6
Naucoridae	Creeping water bugs	
Pelocoris sp.	Creeping water bug	2c
Nepidae	Water scorpions	
Ranatra kirkaldyi	Water scorpion	1a, 4
Notonectidae	Backswimmers	
Notonecta indica	Backswimmer	5
Pleidae	Pygmy backswimmers	
Neoplea sp.	Pygmy backswimmer	4, 18
Veliidae	Broad-shouldered water strider	
Microvelia sp.	Small water strider	1a, 2c, 3g, 18
M. americana	Small water strider	5, 7, 10
M. hinei	Small water strider	8
Rhagovelia sp.	Broad-shouldered water strider	2b, 3g, 18
R. knighti	Broad-shouldered water strider	6, 10
Steinovelia stagnalis	Small water strider	4
Order Megaloptera	Alderflies, dobsonflies, fishflies	
Corydalidae	Dobsonflies, fishflies	
Chauliodes pectinicornis	Fishfly	7, 9c
Corydalus cornutus	Hellgrammite	2b, 2c, 3h, 7, 12, 14, 15, 18
Nigronia serricornis	Fishfly	3g
Sialidae	Alderflies	
Sialis sp.	Alderfly	1a, 4, 5, 7, 9c, 10, 14, 18
Order Trichoptera	Caddisflies, caddisworms	
Glossosomatidae	Glossosomatid caddisflies	
Agapetus illini	Glossosomatid caddisfly	20
Helicopsychidae	Helicopsychid caddisflies	
Helicopsyche sp.	Helicopsychid caddisfly	2c, 10, 18, 21
H. borealis	Helicopsychid caddisfly	20
Hydropsychidae	Hydropsychid caddisflies	
Ceratopsyche bronta	Hydropsychid caddisfly	20
C. morosa	Hydropsychid caddisfly	20
Cheumatopsyche sp.	Hydropsychid caddisfly	1b, 2b, 10, 14, 15, 18, 21

Table 2. Aquatic macroinvertebrate taxa and distributions within the Strawberry River System. (cont.)

Scientific Name	Common Name	Location (Table 1)
C. campyla	Hydropsychid caddisfly	20
C. miniscula	Hydropsychid caddisfly	20
C. oxa	Hydropsychid caddisfly	20
C. pettiti	Hydropsychid caddisfly	20
Hydropsyche sp.	Hydropsychid caddisfly	2c, 11b, 12
Macrostemum (=*Macromia*) *sp.*	Hydropsychid caddisfly	15
Hydroptilidae	Hydroptilid caddisflies	
Sp. 1	Hydroptilid caddisfly	18
Leptoceridae	Leptocerid caddisflies	
Ceraclea cancellata	Leptocerid caddisfly	20
C. tarsipunctata	Leptocerid caddisfly	20
C. transversa	Leptocerid caddisfly	20
Oecetis sp.	Leptocerid caddisfly	15
O. inconspicua	Leptocerid caddisfly	20
O. persimilis	Leptocerid caddisfly	20
Triaenodes flavescens	Leptocerid caddisfly	20
T. ignitus	Leptocerid caddisfly	20
Limnephilidae	Limnephilid caddisflies	
Pycnopsyche sp.	Limnephilid caddisfly	2b, 3g, 3h, 18
Philopotamidae	Philopotamid caddisflies	
Chimarra sp.	Philopotamid caddisfly	1b, 3h, 5, 7, 10, 14, 15, 18, 21
C. feria	Philopotamid caddisfly	20
Polycentropodidae	Polycentropodid caddisflies	
Cyrnellus sp.	Polycentropodid caddisfly	3h
Neureclipsis sp.	Polycentropodid caddisfly	3h
Polycentropus sp.	Polycentropodid caddisfly	15, 20, 21
Psychomyiidae	Psychomyiid caddisflies	
Psychomyia sp.	Psychomyiid caddisflies	21
P. flavida	Psychomyiid caddisfly	20
Rhyacophilidae	Rhyacophilid caddisflies	
Rhyacophila sp.	Rhyacophilid caddisfly	1b
R. fenestra	Rhyacophilid caddisfly	20
Order Lepidoptera	Butterflies, moths	
Pyralidae	Pyralid moths	
Petrophila (=*Elophila*) sp.	Pyralid moth	14, 15, 18
Order Coleoptera	Beetles	
Anthicidae	Anthicid beetles	
Sp. 1	Anthicid beetle	7
Curculionidae	Weevils	
Lixus sp.	Weevil	18
Dryopidae	Long-toed water beetles	
Helichus sp.	Long-toed water beetle	1a, 1b, 2b, 2c, 3g, 10, 11b, 18
H. lithophilus	Long-toed water beetle	5, 6, 7, 8, 9c

Table 2. Aquatic macroinvertebrate taxa and distributions within the Strawberry River System. (cont.)

Scientific Name	Common Name	Location (Table 1)
Dytiscidae	Predaceous diving beetles	
Agabus ambiguous?	Predaceous diving beetle	7
Copelatus chevrolati renovatusi	Predaceous diving beetle	6
Coptotomus venustus	Predaceous diving beetle	7, 9c
Heterosternuta ouachitus	Predaceous diving beetle	1a, 6, 8
H. pulcher	Predaceous diving beetle	1a, 6, 8
H. wickhami	Predaceous diving beetle	1a, 2b, 6, 8
Hydroporus sp. 1	Predaceous diving beetle	2b, 3g, 3h, 4, 5, 7, 9c, 10, 18
H. sp. 2	Predaceous diving beetle	4, 5, 7, 9c, 10
H. sp. 3	Predaceous diving beetle	4, 5
H. sp. 4	Predaceous diving beetle	4
H. sp. 5	Predaceous diving beetle	4
H. sp. 6	Predaceous diving beetle	4
H. rufilabris	Predaceous diving beetle	1a, 6
Hydrovatus sp.	Predaceous diving beetle	4
Ilybius biguttulus	Predaceous diving beetle	5
Laccophilus sp.	Predaceous diving beetle	3h
L. fasciatus rufus	Predaceous diving beetle	5, 7, 10
L. maculatus maculatus	Predaceous diving beetle	4, 5
L. proximus proximus	Predaceous diving beetle	4, 6
Neobidessus sp.	Predaceous diving beetle	5
Neoporus blanchardi	Predaceous diving beetle	2b
N. clypealis	Predaceous diving beetle	1a, 8
N. dimidiatus	Predaceous diving beetle	6, 8
N. shermani	Predaceous diving beetle	1a, 2b, 6, 8
N. striatopunctipennis	Predaceous diving beetle	2b
N. undulatus	Predaceous diving beetle	8
Thermonectus basillaris	Predaceous diving beetle	8
Uvarus sp.	Predaceous diving beetle	4, 11b, 18
Elmidae	Riffle beetles	3h, 14, 15
Ancyronyx variegata	Riffle beetle	2c
Dubiraphia sp. 1	Riffle beetle	2b, 9c, 18
D. sp. 2	Riffle beetle	18
Macronychus glabratus	Riffle beetle	1b, 2b, 2c, 3g, 7
Optioservus sp.	Riffle beetle	18
Stenelmis sp.	Riffle beetle	1a, 1b, 2b, 3g, 11b, 18, 21
S. crenata	Riffle beetle	6
Gyrinidae	Whirligig beetles	
Dineutus sp.	Whirligig beetle	18, 21
Dineutus carolinus	Whirligig beetle	9c
D. ciliatus	Whirligig beetle	1a, 3h, 5, 6, 7
D. discolor	Whirligig beetle	15
D. emarginatus	Whirligig beetle	9c

Table 2. Aquatic macroinvertebrate taxa and distributions within the Strawberry River System. (cont.)

Scientific Name	Common Name	Location (Table 1)
D. serrulatus	Whirligig beetle	2c, 3h
Gyretes sinuatus	Whirligig beetle	15
Gyrinus sp.	Whirligig beetle	1a, 15
G. woodruffi	Whirligig beetle	9c
Haliplidae	Crawling water beetles	
Haliplus fasciatus	Crawling water beetle	8
Peltodytes dispersus	Crawling water beetle	8
P. dunavani	Crawling water beetle	1a, 4, 6, 8, 18
P. duodecimpunctatus	Crawling water beetle	1a, 2c, 3h, 4, 5, 6, 7, 8, 12, 18
P. festivus	Crawling water beetle	4
P. litoralis	Crawling water beetle	1a, 4, 18
P. muticus	Crawling water beetle	4
P. sexmaculatus	Crawling water beetle	1a, 4, 11b, 18
Helophoridae	Water scavenger beetle	
Helophorus sp.	Water scavenger beetle	18
Hydrophilidae	Water scavenger beetles	
Sphaeridiinae	Water scavenger beetle	1a, 3g
Berosus sp. 1	Water scavenger beetle	1a, 4, 18
B. sp. 2	Water scavenger beetle	4
Crenitus? sp.	Water scavenger beetle	5
Enochrus sp.	Water scavenger beetle	4, 9c, 18
E. ochraceus	Water scavenger beetle	1a, 8
E. perplexus	Water scavenger beetle	6
E. pygmaeus nebulosus	Water scavenger beetle	1a, 2b, 8, 18
Helochares sp.	Water scavenger beetle	1a, 4, 5, 18
Hydrochus sp.	Water scavenger beetle	1a, 4
Laccobius sp.	Water scavenger beetle	1a, 4, 7
Paracymus sp.	Water scavenger beetle	1a, 18
Tropisternus sp.	Water scavenger beetle	18
T. collaris mexicanus	Water scavenger beetle	4, 5
T. ellipticus	Water scavenger beetle	7, 18
T. glaber	Water scavenger beetle	7, 9
T. lateralis nimbatus	Water scavenger beetle	4, 8
T. natator	Water scavenger beetle	1a, 4, 5, 6, 7, 8, 9c, 10
Lutrochidae	Marsh-loving beetles	
Lutrochus laticeps	Marsh-loving beetle	18
Noteridae	Burrowing water beetles	
Hydrocanthus atripennis	Burrowing water beetle	2b
Psephenidae	Water pennies	
Ectopria nervosa	Water penny	3g, 3h
Psephenus herricki	Water penny	3g, 14, 15, 18
Scirtidae (=Helodidae)	Marsh beetles	15
Scirtes sp.	Marsh beetle	6

Table 2. Aquatic macroinvertebrate taxa and distributions within the Strawberry River System. (cont.)

Scientific Name	Common Name	Location (Table 1)
Order Diptera	True flies	
Athericidae	Athericid flies	
Atherix sp.	Athericid fly	10
Ceratopogonidae	Biting midges	15
Sp. 1	Biting midge	18
Bezzia or *Probezzia*	No see'um, punkie	4
Chaoboridae	Phantom midges	
Chaoborus sp.	Phantom midge	18
Chironomidae	Non-biting midges, bloodworms	
Procladius sp.	Bloodworm	3h
Sp. 1	Bloodworm	1a, 2b, 3g, 4, 5, 6, 7, 8, 9c, 10, 11b, 12, 14, 15, 18, 21
Dixidae	Dixid midges	
Dixella sp.	Dixid midge	18
Dolichopodidae	Dolichopodid fly	
Rhaphium sp.	Dolichopodid fly	1a
Empididae	Dance flies	
Hemerodromia	Dance fly	21
Ptychopteridae	Phantom craneflies	
Bittacomorpha clavipes	Phantom cranefly	7
Sciomyzidae	Sciomyzid flies	
Sepedon sp.	Sciomyzid fly	9c
Simuliidae	Blackflies	2c
Prosimulium sp.	Blackfly	3h
Simulium sp.	Blackfly	1b, 14, 15, 18, 21
Stratiomyidae	Soldier flies	
Stratiomys sp.	Soldier fly	1a, 2b, 4, 10, 18
Tabanidae	Horseflies, deerflies	2c, 14
Apatolestes sp.	Horsefly	11b, 12
Chrysops sp.	Horsefly	3g, 6
Hybomitra sp.	Horsefly	1b
Tabanus sp.	Horsefly	9c, 21
Tipulidae	Craneflies	
Hexatoma sp.	Cranefly	1a, 21
Tipula sp.	Cranefly	1a, 1b, 3g, 3h, 10, 11b, 12, 18

Total taxa = 313

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