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SURVEY OF THE FRESHWATER MUSSELS  
(BIVALVIA UNIONIDAE)  
IN THE LITTLE WABASH RIVER DRAINAGE, ILLINOIS

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Technical Report 1989-7 (1)

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Prepared for

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Study funded by a Grant from the  
Illinois Department of Conservation  
Nongame Wildlife Program



## TABLE OF CONTENTS

	PAGE
LIST OF FIGURES .....	ii
LIST OF TABLES .....	iii
LIST OF APPENDICES.....	iv
ABSTRACT.....	1
INTRODUCTION.....	1
OBJECTIVES OF STUDY.....	3
METHODS.....	3
DESCRIPTION OF STUDY AREA.....	7
RESULTS.....	7
SPECIES ACCOUNTS.....	13
Federally Endangered Species.....	13
Federal Candidate Species.....	15
Proposed State Endangered Species.....	15
Proposed State Threatened Species.....	16
Watch List Species.....	16
Other Species.....	17
Introduced Species.....	33
DISCUSSION.....	33
ACKNOWLEDGEMENTS.....	35
LITERATURE CITED.....	36

## LIST OF FIGURES

	PAGE
Figure 1. Collection sites in the Little Wabash River drainage, 1988 .....	6
Figure 2. The Little Wabash River and its tributaries.....	8
Figure 3. Number of individuals collected liver per site in the Little Wabash River (main channel) in 1988.....	12
Figure 4. Number of species collected per site in the Little Wabash River (main channel) in 1988.....	12

## LIST OF TABLES

	PAGE
Table 1. Comparison of the mussel species of the Little Wabash River reported by Baker (1906) and others [pre-1950], Fechtner (1963) [1951-53], Parmalee [1954], Matteson [1956], INHS [1957-88], and this study .....	4
Table 2. Collection sites in the Little Wabash River drainage, 1988.....	5
Table 3. Total, rank order of abundance and percent composition of the mussel species collected live in the Little Wabash River drainage, 1988.....	9
Table 4. Site by site listing of all mussel species collected in the Little Wabash River drainage, 1988 .....	10-11
Table 5. Site by site listing of all mussel species collected by M.R. Matteson in the Little Wabash River, 1956.....	14

**LIST OF APPENDICES**

	PAGE
Appendix I. Distribution maps of the freshwater mussels (Unionidae) of the Little Wabash River drainage, Illinois.....	39
Appendix II. Photographs of the freshwater mussels (Unionidae) of the Little Wabash River drainage, Illinois.....	60

**SURVEY OF THE FRESHWATER MUSSELS  
(BIVALVIA: UNIONIDAE)  
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**ABSTRACT**

A survey of the Little Wabash River was conducted in order to determine the distribution and status of freshwater mussels (Mollusca: Unionidae) in the drainage. Thirty sites were sampled from 3 May to 17 August 1988. Living mussels and valves of dead individuals were collected by hand at each site. A total of 32 species was found and 26 were collected alive. The three most abundant species found were *Quadrula quadrula* (Rafinesque, 1820), *Amblema plicata* (Say, 1817), and *Megaloniais nervosa* (Rafinesque, 1820), which together comprised 52% of the live mussels collected. An examination of literature and museum records brings the total number of species recorded from the drainage to 40. Comparisons made with a survey conducted by Matteson in 1956 revealed a 10% reduction in the number of individuals found and the extirpation of rare or endangered species.

**INTRODUCTION**

The freshwater mussel fauna of Illinois has been studied periodically over the past 100 years (Calkins, 1874; Baker, 1898, 1906; Zetek, 1918; van der Schalie & van der Schalie, 1950; Parmalee, 1967). Many drainages in Illinois have been surveyed, and the species composition of mussels in these streams has been fairly well documented (Wilson & Clark, 1912; Danglade, 1914; Baker, 1922, 1927; Parmalee, 1956; Matteson & Dexter, 1966; Starrett, 1971; Miller,

1972; J. Suloway, 1975; L. Suloway, 1981; L. Suloway et al., 1981; Cummings et al., 1987, 1988a; 1988b; 1988c). Populations of mussels have decreased in all of the Illinois rivers resurveyed in the last 30 years, but recent changes in composition and abundances are unknown for most Illinois streams.

Mussels are basically sedentary and as a result are particularly susceptible to changes in their environment (Parmalee, 1967). Pollutants from domestic, industrial, and agricultural sources, overharvest by commercial musselors, and habitat destruction caused by dam construction, channelization and increased sediment loads have been cited as factors responsible for the decline of freshwater mussels in the eastern United States (Baker, 1922; Stansbery, 1970; Starrett, 1971). The Illinois River changed from an excellent to a poor mussel stream in only 75 years: 21 of the 44 species present in the river between 1870 and 1900 were extirpated by 1969 (Starrett, 1971). A serious decline in the Kaskaskia River mussel fauna occurred between 1956 and 1978-79. The number of species decreased from 31 to 24, and there was a 76% reduction in the number of individuals collected (L. Suloway et al., 1981). Surveys on the Kankakee, Vermilion, Embarras, and Mackinaw rivers yielded similar results (J. Suloway, 1975; L. Suloway, 1981; Cummings et al., 1988a; 1988b)

The decline in the fauna in Illinois and elsewhere has prompted the federal government to provide protection for several species of mussels under the Endangered Species Act of 1973 (P.L. 93-205). Although federal listing as endangered is intended to protect species from further decline and to provide for recovery if possible, specific information concerning distribution is often lacking. Such information is vital for the protection of existing populations, particularly in areas where there is economic pressure for further alteration of habitats. Also, certain (e.g. federal candidate) species may actually be endangered but, due to lack of information on their present distribution and abundance, do not yet receive federal protection. It is imperative that data on the status of these species be gathered so that, if warranted, they receive immediate protection.

Published information on the mussel fauna of the Little Wabash River drainage is limited to papers by Baker (1906), Fechtner (1963), and Parmalee (1967). In his "Catalogue of the Mollusca of Illinois" (1906), Baker reported 14 species of mussels from the Little Wabash; most were collected by A.A. Hinkley at Carmi in White County. Fechtner (1963) published a checklist of mussels collected from 1951 to 1953 in east-central Illinois, most of which were vouchered at the Field Museum. Many additional specimens resulting from unpublished surveys are present in various malacological collections in the U.S. Additional pre-1950 records were gathered from examination of specimens in the following museums: Academy of Natural Sciences of Philadelphia (ANSP),

Field Museum of Natural History (FMNH), Ohio State University Museum of Zoology (OSUMZ), and the University of Michigan Museum of Zoology (UMMZ). In 1954, Parmalee collected seven species mussels in the Little Wabash River as part of his work on the mussels of Illinois (1967) (Table 1). Matteson collected mussels at 17 sites in the Little Wabash River as part of a statewide survey of the streams of Illinois. The specimens and associated field notes were deposited at the Illinois Natural History Survey (INHS) and were the basis for the resurvey of the river in 1988. Additional collections were made between 1979 and 1988 by L. Suloway (INHS) and others, who recorded 27 species from the drainage (Table 1).

The total number of species resulting from these past collections is 37 (Table 1). Included are records of the federally endangered fat pocketbook, *Potamilus capax* (Green, 1832), and rough pigtoe, *Pleurobema plenum* (L. Lea, 1840); the federal candidate species pyramid pigtoe, *Pleurobema rubrum* (Rafinesque, 1820); and the proposed state endangered purple lilliput, *Toxolasma lividus* (Rafinesque, 1831), and little spectaclecase, *Villosa lienosa* (Conrad, 1834). The historic occurrence of rare and endangered mussels in the Little Wabash River and its tributaries and the present decline of the unionid fauna in North America underscored the need to determine the status of mussels in the drainage.

## OBJECTIVES OF STUDY

Collect data on the distribution and status of:

1. Federally endangered species.
2. Species which are candidates for federal listing as endangered.
3. Species proposed for Illinois threatened and endangered status.
4. Other mussel species inhabiting the Little Wabash River drainage.

## METHODS

Freshwater mussels were systematically collected from 30 sites in the Little Wabash River drainage from 3 May to 17 August 1988 (Table 2, Figure 1). Living mussels and valves of dead specimens were collected by hand at each station. Collections were quantified by sampling for four man-hours at each site. An effort was made to sample all available habitats, but particular emphasis was placed on areas likely to support mussels (i.e., gravel bars, riffles, backwaters, etc.). Vouchers were retained of all species collected and catalogued into the Mollusk Collection of the Illinois Natural History Survey (INHS), Champaign, Illinois.



Table 1. Comparison of the mussel species of the Little Wabash River reported by Baker (1906) and others [pre-1950], Fechtner (1963) [1951-53], Parmalee [1954], Matteson [1956], INHS [1957-88], and this study. (X = Present, L = Live, and D = Dead)

Species	pre-1950	Fechtner 1951-53	Parmalee 1954	Matteson 1956	1957-88	This Study
<i>Actinonaias ligamentina</i>	X	X		L	X	D
<i>Amblyma plicata</i>	X	X		L	X	L
<i>Anodonta grandis</i>	X	X	X	L	X	L
<i>Anodonta imbecillis</i>	X		X	L		L
<i>Anodonta suborbiculata</i>						L
<i>Anodontoides ferussacianus</i>		X		L	X	L
<i>Arcidens contragosus</i>	X	X		L	X	L
<i>Cyclonaias tuberculata</i>	X	X				
<i>Elipsaria lineolata</i>						D
<i>Eliptio dilatata</i>		X		L	X	L
<i>Fusconaia ebena</i>	X			L		D
<i>Fusconaia flava</i>		X	X	L	X	L
<i>Lampsilis cardium</i>	X	X	X	L	X	L
<i>Lampsilis siliquoidea</i>	X	X	X	L	X	L
<i>Lampsilis teres</i>	X	X	X	L	X	L
<i>Lasrnigona complanata</i>	X	X		L	X	L
<i>Lasrnigona costata</i>					X	
<i>Leptodea fragilis</i>	X	X		L	X	L
<i>Ligumia subrostrata</i>			X		X	L
<i>Megalonaias nervosa</i>	X	X		L	X	L
<i>Obliquaria reflexa</i>				L	X	L
<i>Pleurobema plenum</i>	X					
<i>Pleurobema rubrum</i>	X			L	X	
<i>Pleurobema sintoxia</i>		X			X	
<i>Potamilus alatus</i>	X	X		L		L
<i>Potamilus capax</i>				L		
<i>Potamilus ohioensis</i>		X		L		L
<i>Ptychobranchnus fasciolaris</i>	X					D
<i>Quadrula nodulata</i>				L	X	L
<i>Quadrula pustulosa</i>	X	X		L	X	L
<i>Quadrula quadrula</i>	X	X	X	L	X	L
<i>Strophitus undulatus</i>				L		L
<i>Toxolasma lividus</i>	X				X	
<i>Toxolasma parvum</i>	X			L		D
<i>Toxolasma texasensis</i>						D
<i>Tritogonia verrucosa</i>	X	X		L	X	L
<i>Truncilla donaciformis</i>	X			L	X	L
<i>Truncilla truncata</i>	X			L	X	L
<i>Unio merus tetralasmus</i>		X			X	L
<i>Villosa lienosa</i>		X		L	X	
<b>TOTAL # OF SPECIES = 40</b>	<b>24</b>	<b>22</b>	<b>8</b>	<b>29</b>	<b>27</b>	<b>32</b>

Table 2. Collection sites in the Little Wabash River drainage, 1988.

SITE #	LOCATION
1.	Little Wabash River, S end Lake Paradise at spillway, Coles Co., IL. T11N, R7E, sec. 8.
2.	Little Wabash River, 0.5 mi E Trowbridge, Shelby Co., IL. T10N, R6E, sec. 14.
3.	Little Wabash River, 3.5 mi E Stewardson, Shelby Co., IL. T10N, R6E, sec. 29.
4.	Little Wabash River, 4 mi W Sigel, Shelby Co., IL. T9N, R6E, sec. 7.
5.	Little Wabash River, 2 mi NW Effingham above Rt. 33 bridge, Effingham Co., IL. T8N, R5E, sec. 13.
6.	Little Wabash River, 2.5 mi NW Watson, Effingham Co., IL. T7N, R5E, sec. 22.
7.	Little Wabash River, 4 mi E Mason, Effingham Co., IL. T6N, R6E, sec. 17.
8.	Little Wabash River, 4.5 mi NW Louisville, Clay Co., IL. T5N, R6E, sec. 33.
9.	Little Wabash River, E edge of Louisville at bridge, Clay Co., IL. T4N, R6E, sec. 23.
10.	Little Wabash River, 2 mi E Clay City above old Rt. 50 bridge, Clay Co., IL. T3N, R8E, sec. 16.
11.	Little Wabash River, 8 mi S Noble, Wayne Co., IL. T2N, R9E, sec. 20.
12.	Little Wabash River, 7.5 mi W Bone Gap at Base Line bridge, Edwards Co., IL. T1S, R10E, sec. 6.
13.	Little Wabash River, 5 mi NE Burnt Prairie above Saxe bridge, Wayne Co., IL. T2S, R9E, sec. 35.
14.	Little Wabash River, 4 mi W Calvin at Riverside School bridge, White Co., IL. T3S, R10E, sec. 33.
15.	Little Wabash River, Carmi at Rt. 1 bridge, White Co., IL. T5S, R9E, sec. 13.
16.	Little Wabash River, 1.5 mi below Carmi at Possom bridge, White Co., IL. T5S, R9E, sec. 25.
17.	Little Wabash River, E edge of New Haven, White Co., IL. T7S, R10E, sec. 17.
18.	Big Muddy Creek, at Latona, Jasper Co., IL. T6N, R8E, sec. 9.
19.	Little Salt Creek, 3.5 NW Dieterich, Effingham Co., IL. T7N, R7E, sec. 5.
20.	Weather Creek, 1.5 mi E Ingraham, Clay Co., IL. T5N, R8E, sec. 34.
21.	Hurricane Creek, 5 mi S Wendelin, Clay Co., IL. T4N, R8E, sec. 25.
22.	Fox River, 3 mi NNW West Liberty, Jasper Co., IL. T5N, R10E, sec. 9 & 4.
23.	Fox River, 3 mi SW Olney, Richland Co., IL. T3N, R10E, sec. 19.
24.	Buck Creek, 3 mi NW Flora, Clay Co., IL. T3N, R6E, sec. 9.
25.	Elm River, at Enterprise, Wayne Co., IL. T1N, R8E, sec. 17.
26.	Elm River, 5 mi NE Fairfield, Wayne Co., IL. T1S, R9E, sec. 18.
27.	Skillet Fork, 2 mi SE Forbes Lake, Marion Co., IL. T3N, R4E, sec. 22.
28.	Skillet Fork, 0.5 mi N Wayne City, Wayne Co., IL. T2S, R6E, sec. 7.
29.	Skillet Fork, 1 mi S Mill Shoals, White Co., IL. T3S, R8E, sec. 29.
30.	Skillet Fork, 7.5 mi S Burnt Prairie, White Co., IL. T4S, R9E, sec. 28.

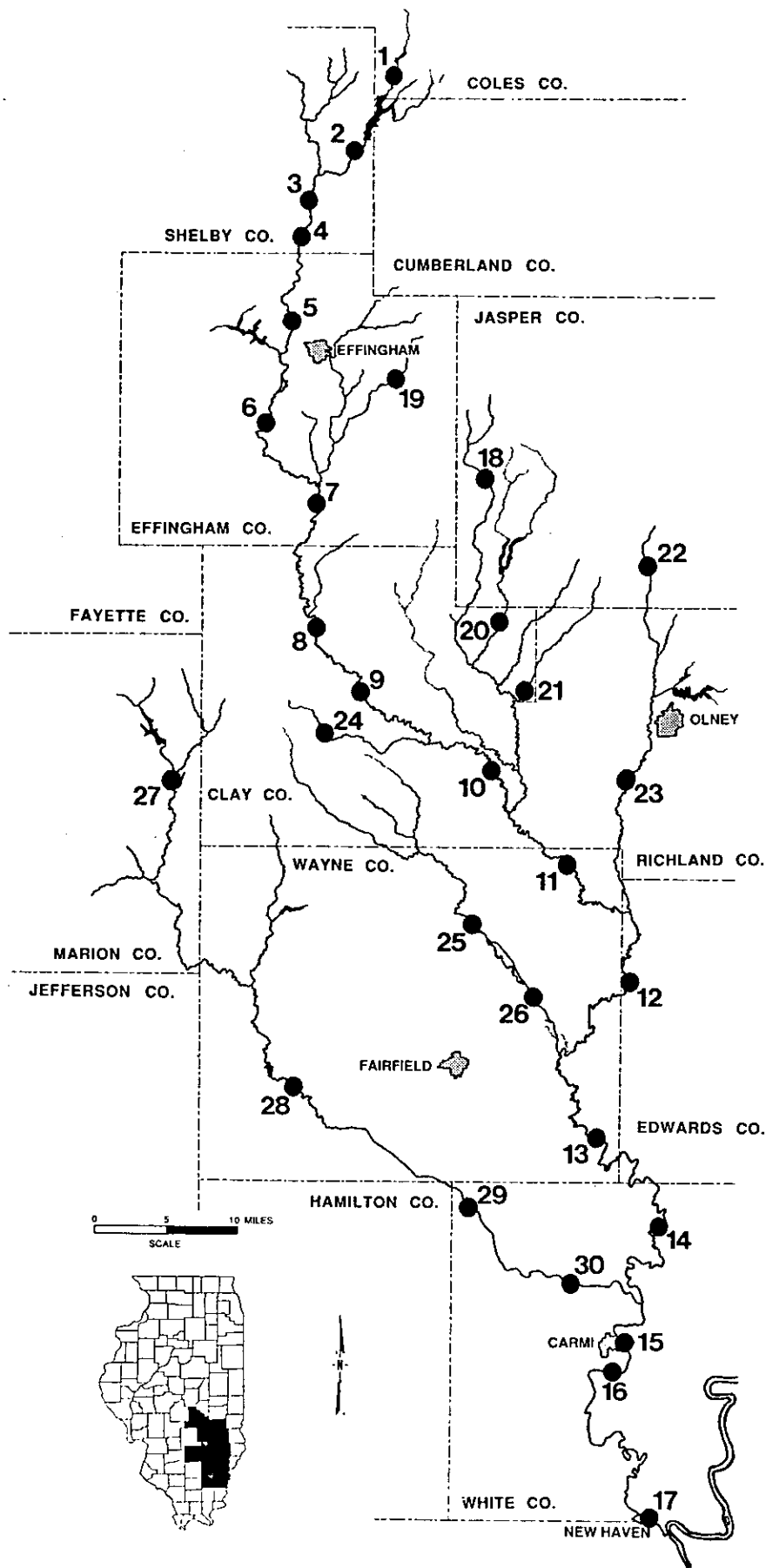


Figure 1. Collection sites in the Little Wabash River drainage, 1988.

The nomenclature in this report follows a list prepared by the Committee on Scientific and Vernacular Names of Mollusks of the Council of Systematic Malacologists, American Malacological Union (Turgeon et al., 1988) except as follows: 1) subspecies are not recognized, 2) members of the *Pleurobema cordatum* complex are recognized following Stansbery (1983). A short synonymy containing references to previously published works on Illinois mussels is given for each species. Distribution maps have been prepared for all species reported from the drainage (Appendix I) and photographs of all species are provided in Appendix II.

## DESCRIPTION OF STUDY AREA

The Little Wabash River in southeastern Illinois flows 239 miles from Coles County south through Cumberland, Shelby, Effingham, Clay, Richland, Wayne, Edwards, and White counties to its confluence with the Wabash River near New Haven, Illinois. It is the second largest tributary of the Wabash River and has a drainage area of approximately 3200 square miles (U.S. Army Corps of Engineers, 1979). The river originates in the area of the Shelbyville Moraine, continues on a relatively flat plain until it reaches Clay County where the topography of the basin becomes hilly and rolling, then flattens out again when it reaches the Wabash River floodplain near Carmi, Illinois. The average slope of the river is about two feet per mile with nearly half the available fall occurring in its upper 40 miles (Barker et al., 1967). Major tributaries include the Skillet Fork, Elm River, Fox River, and Big Muddy Creek (Figure 2).

## RESULTS

A total of 32 species was collected from 30 sites in the Little Wabash River drainage in 1988 (Tables 3 & 4). Of those thirty-two species, 26 were collected alive and totaled 1788 individuals. One hundred twenty man-hours were spent sampling, with an average of 15 mussels per man-hour collected. The three most common species in order of abundance were *Quadrula quadrula* (18%), *Amblema plicata* (18%), and *Megaloniais nervosa* (16%) which together comprised 52% of the individuals collected (Table 3). The number of live mussels per site ranged from 0 to 436 and the number of live species from 0 to 18 (Table 4 & Figures 3, 4). The sites with the greatest numbers of live mussels were 11 through 17 where 85% of the individuals were collected. The remaining 23 sites had 55 or fewer individuals and together totaled only 267 mussels.

The greatest number of live species were found at sites 14 (15 species), 15 (18 species), 16 (15 species), and 17 (16 species), all of which were located in the lower Little Wabash River proper (Figure 4). Of the 26 species collected alive, eight were represented by fewer than 10 individuals,

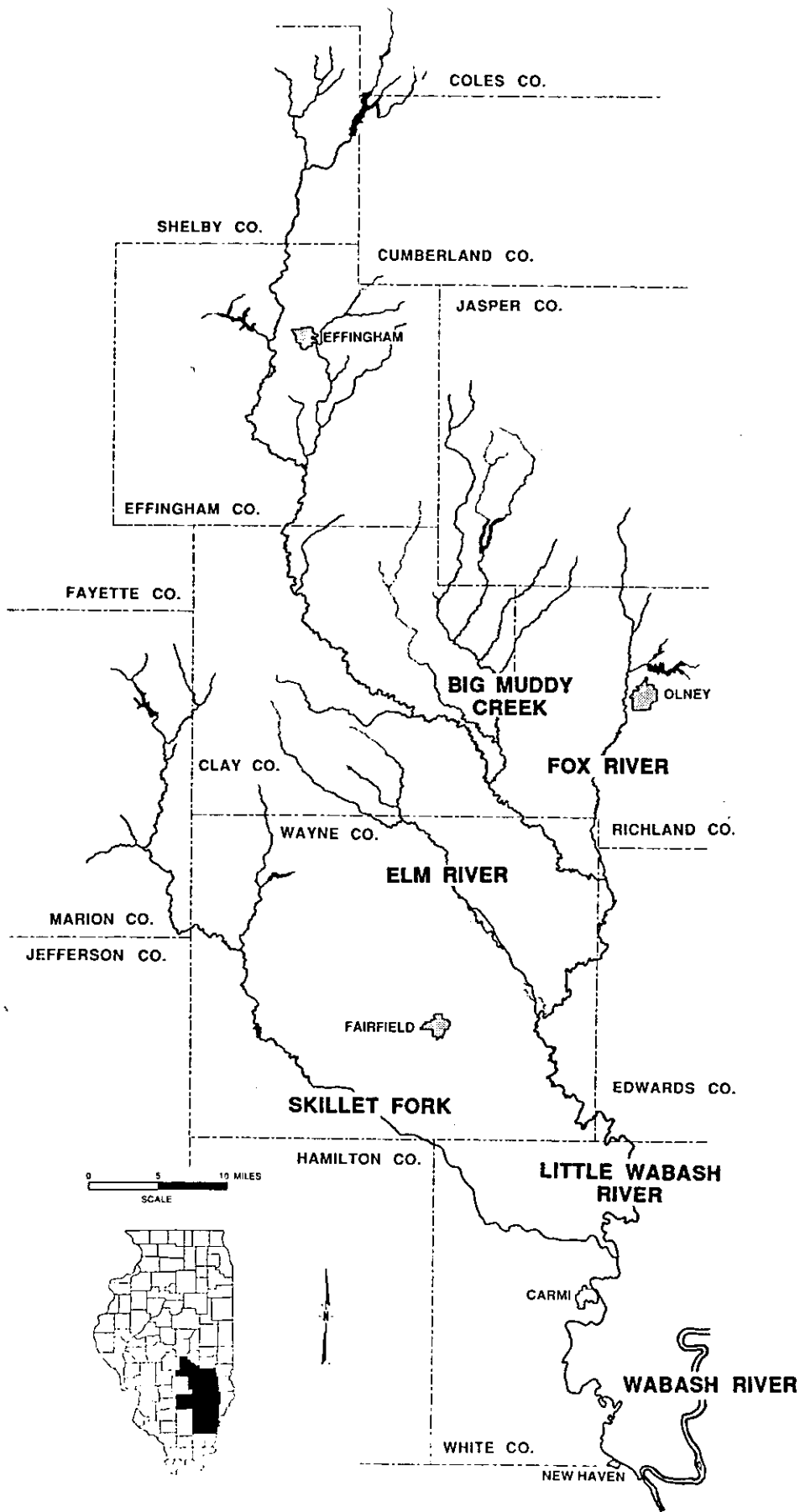


Figure 2. The Little Wabash River and its tributaries.

Table 3. Total, rank order of abundance and percent composition of the mussel species collected live in the Little Wabash River drainage, 1988.

Species	TOTAL	RANK	% COMPOSITION	CUMMULATIVE %
<i>Quadrula quadrula</i>	325	1	18.18	18.18
<i>Amblema plicata</i>	323	2	18.06	36.24
<i>Megaloniais nervosa</i>	288	3	16.11	52.35
<i>Anodonta grandis</i>	145	4	8.11	60.46
<i>Tritogonia verrucosa</i>	110	5	6.15	66.61
<i>Truncilla truncata</i>	104	6	5.82	72.43
<i>Anodonta imbecillis</i>	102	7	5.70	78.13
<i>Lasmigona complanata</i>	71	8	3.97	82.10
<i>Quadrula pustulosa</i>	68	9	3.80	85.91
<i>Leptodea fragilis</i>	64	10	3.58	89.49
<i>Lampsilis cardium</i>	31	11	1.73	91.22
<i>Obliquaria reflexa</i>	22	12	1.23	92.45
<i>Anodontoides ferussacianus</i>	20	13	1.12	93.57
<i>Arcidens confragosus</i>	20	13	1.12	94.69
<i>Lampsilis teres</i>	18	15	1.01	95.69
<i>Lampsilis siliquoidea</i>	17	16	0.95	96.64
<i>Potamilus ohioensis</i>	16	17	0.89	97.54
<i>Quadrula nodulata</i>	15	18	0.84	98.38
<i>Fusconaia flava</i>	6	19	0.34	98.71
<i>Ligumia subrostrata</i>	6	19	0.34	99.05
<i>Truncilla donaciformis</i>	6	19	0.34	99.38
<i>Unio merus tetralasmus</i>	4	22	0.22	99.61
<i>Anodonta suborbiculata</i>	2	23	0.11	99.72
<i>Potamilus alatus</i>	2	23	0.11	99.83
<i>Strophitus undulatus</i>	2	23	0.11	99.94
<i>Elliptio dilatata</i>	1	26	0.06	100.00
<i>Actinonaias ligamentina</i>	0			
<i>Ellipsaria lineolata</i>	0			
<i>Fusconaia ebena</i>	0			
<i>Ptychobranthus fasciolaris</i>	0			
<i>Toxolasma parvus</i>	0			
<i>Toxolasma texasensis</i>	0			
<b># OF INDIVIDUALS</b>	<b>1788</b>			
<b># OF SPECIES (LIVE)</b>	<b>26</b>			
<b># OF SPECIES (DEAD)</b>	<b>6</b>			
<b>TOTAL # OF SPECIES</b>	<b>32</b>			

Table 4. Site by site listing of all mussel species collected in the Little Wabash River drainage, 1988.  
(D = Dead, WD = Weathered Dead, SF = Sub-fossil)

Species	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
<i>Actinonaias ligamentina</i>											WD					
<i>Amblema plicata</i>										7	5	18	30	46	125	36
<i>Anodonta grandis</i>	D	1	2	1	D			4		9	3	1	2	29	3	
<i>Anodonta imbecillis</i>	2									D		D		2	1	
<i>Anodonta suborbiculata</i>																1
<i>Anodontoides ferussacianus</i>			18	1	D	WD										
<i>Arcidens confragosus</i>										1	1	D	1	2	3	3
<i>Ellipsaria lineolata</i>																
<i>Elliptio dilatata</i>										WD	WD	WD	WD			1
<i>Fusconaia ebena</i>																WD
<i>Fusconaia flava</i>		SF		WD						2		2	1	1		
<i>Lampsilis cardium</i>		1	13	3	5	3					WD	1			3	2
<i>Lampsilis siliquioidea</i>				WD							1					
<i>Lampsilis teres</i>				SF		SF		1		WD		D	SF	3	6	6
<i>Lasmigona complanata</i>						1	2	4		7	1	2	3	9	6	8
<i>Leptodea fragilis</i>		1				D	4	1		4	8	6	1	5	8	13
<i>Ligumia subrostrata</i>																
<i>Megalonaias nervosa</i>										13	82	25	75	26	17	33
<i>Obliquaria reflexa</i>										1			1	1	15	2
<i>Potamilus alatus</i>											WD				1	
<i>Potamilus ohioensis</i>								1		1	4			D		1
<i>Ptychobranthus fasciolaris</i>																
<i>Quadrula nodulata</i>														1	13	
<i>Quadrula pustulosa</i>								WD		1		12	6	10	35	1
<i>Quadrula quadrula</i>							2	WD		6	1	28	19	107	136	15
<i>Strophitus undulatus</i>					1											
<i>Toxolasma parvum</i>																
<i>Toxolasma texasensis</i>																
<i>Tritogonia verrucosa</i>										2	2	49	2	25	17	10
<i>Truncilla donaciformis</i>														D	2	4
<i>Truncilla truncata</i>										1		14	9	15	44	21
<i>Unio merus tetralasmus</i>		WD														
<b>INDIVIDUALS (LIVE)</b>	2	3	33	5	6	4	8	11	0	55	108	158	150	282	436	156
<b>SPECIES (LIVE)</b>	1	3	3	3	2	2	3	5	0	13	10	11	12	15	18	15
<b>SPECIES (DEAD)</b>	1	2	0	3	2	3	0	2	0	3	4	4	2	2	0	1
<b>SPECIES (TOTAL)</b>	2	5	3	6	4	5	3	7	0	16	14	15	14	17	18	16

Table 4. (cont.)

Species	17	18	19	20	21	22	23	24	25	26	27	28	29	30	TOTAL
<i>Actinonaias ligamentina</i>															0
<i>Amblema plicata</i>	53										1			2	323
<i>Anodonta grandis</i>	36			10	4	1	7	D	2	3	9	17		1	145
<i>Anodonta imbecillis</i>	95								D	D	2				102
<i>Anodonta suborbiculata</i>	1								D						2
<i>Anodontoides ferussacianus</i>		1													20
<i>Arcidens confragosus</i>	2								2	2		2		1	20
<i>Ellipsaria lineolata</i>	WD														0
<i>Elliptio dilatata</i>															1
<i>Fusconaia ebena</i>															0
<i>Fusconaia flava</i>															6
<i>Lampsilis cardium</i>															31
<i>Lampsilis siliquoidea</i>				4							12				17
<i>Lampsilis teres</i>	1			D			WD		WD	1		D		WD	18
<i>Lasmigona complanata</i>	4			4					11	3	D	5	D	1	71
<i>Leptodea fragilis</i>	9									2	1	1	D		64
<i>Ligumia subrostrata</i>					D			WD	1		4	1			6
<i>Megalonaias nervosa</i>	11													6	288
<i>Obliquaria reflexa</i>	2														22
<i>Potamilus alatus</i>	1														2
<i>Potamilus ohioensis</i>	2												4	3	16
<i>Ptychobranthus fasciolaris</i>	WD														0
<i>Quadrula nodulata</i>	1														15
<i>Quadrula pustulosa</i>	3														68
<i>Quadrula quadrula</i>	7									2			2	WD	325
<i>Strophitus undulatus</i>				1											2
<i>Toxolasma parvus</i>					D										0
<i>Toxolasma texasensis</i>								D							0
<i>Tritogonia verrucosa</i>	3														110
<i>Truncilla donaciformis</i>	D														6
<i>Truncilla truncata</i>	D														104
<i>Unio merus tetralasmus</i>			WD	1				3							4
<b>INDIVIDUALS (LIVE)</b>	231	1	0	20	4	1	7	3	16	13	29	26	6	14	1788
<b>SPECIES (LIVE)</b>	16	1	0	5	1	1	1	1	4	6	6	5	2	6	26
<b>SPECIES (DEAD)</b>	4	0	1	1	2	0	1	3	3	1	1	1	2	2	6
<b>SPECIES (TOTAL)</b>	20	1	1	6	3	1	2	4	7	7	7	6	4	8	32



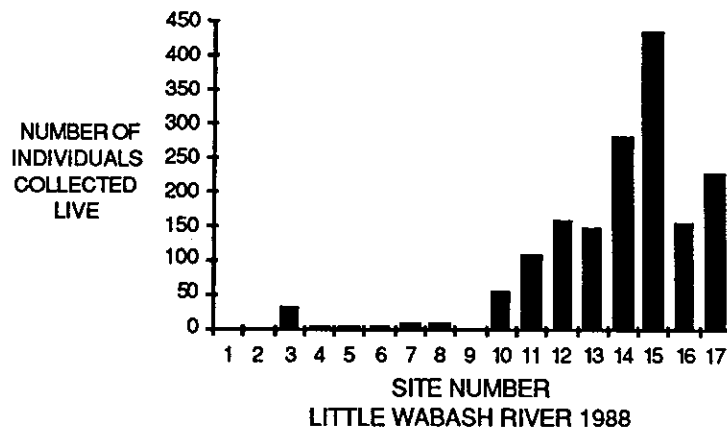


Figure 3. Number of individuals collected live per site in the Little Wabash River (main channel) in 1988. Sites sampled for four man-hours each. Site numbers correspond to those in Figure 1 and Table 2.

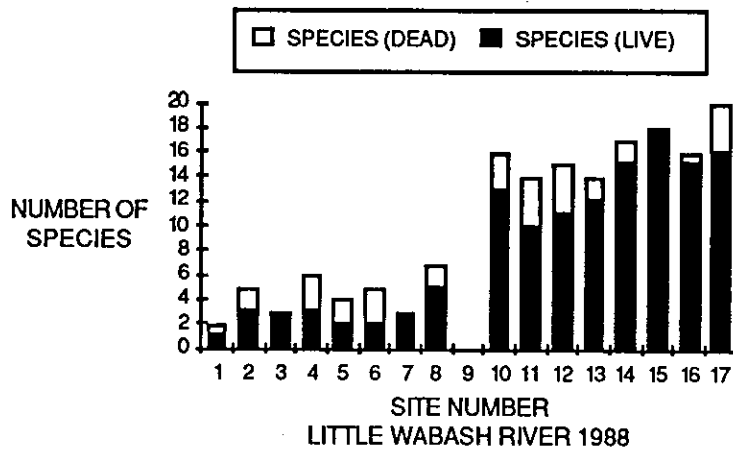


Figure 4. Number of species collected per site in the Little Wabash River (main channel) in 1988. Sites sampled for four man-hours each. Site numbers correspond to those in Figure 1 and Table 2.

but only one (*Elliptio dilatata*) was represented by a single specimen. None of the eight were reported as abundant by any of the previous workers, and three of the species (*Anodonta suborbiculata*, *Ellipsaria lineolata*, and *Toxolasma texasensis*) are reported from the drainage for the first time (Table 1). Of these three, only *A. suborbiculata* was collected alive. However, *T. texasensis* was found as a fresh dead shell and is most likely still extant in the drainage.

## SPECIES ACCOUNTS

The following is an annotated list of the freshwater mussels reported from the Little Wabash River drainage. Each species is discussed individually with respect to its historical and present distribution and status in the drainage. The accounts are organized by rarity of the species with federally endangered species treated first, followed by federal candidates, proposed state endangered species, proposed state threatened species, species of special concern or "Watch List Species", and others. Comparisons are made with data presented in earlier surveys of the unionid fauna of the Little Wabash River. All graphs presented are for the number of live individuals only and do not include dead shells.

### FEDERALLY ENDANGERED SPECIES

*Pleurobema plenum* (l. Lea, 1840) - rough pigtoe

*Quadrula plena* (Lea): Baker 1906:81; Danglade 1914:9.

*P. plenum* is represented by two specimens (UMMZ # 80919) collected by A.A. Hinkley [pre-1921] from the Little Wabash River. No other specimens were located in any of the museum collections examined, and no shells of this species were found in 1988. It was not collected alive in the Wabash River in 1988 (Cummings et al., 1988c) and may be extirpated from the drainage.

*Potamilus capax* (Green, 1832) - fat pocketbook

*Lampsilis capax* (Green): Baker 1906:64.

*Proptera capax* (Green): Parmalee 1967:83; Starrett 1971:330.

A survey conducted in the lower Wabash River in 1987 by INHS and IDOC biologists turned up live individuals of *P. capax* just below the mouth of the Little Wabash River in White County, Illinois (Cummings et al., 1987). A 1956 collection of *P. capax* by Matteson at site 17 (New Haven) documented the occurrence of this species in the lower Little Wabash River (Table 5). Although not found in 1988, available habitat exists in the area and an intensive search of the area may eventually document its presence.

Table 5. Site by site listing of all mussel species collected by M.R. Matteson in the Little Wabash River, 1956. (D = dead)

Species	1	2	4	5	6	7	8	9	10*	11**	12	13	14	16	17	TOTAL	RANK	% Comp.	Cummulative %
<i>Amblema plicata</i>						1	20				3	111	46	62	107	350	1	29.00	29.00
<i>Quadrula quadrula</i>						2	10				6	28	105	11	49	211	2	17.48	46.48
<i>Quadrula pustulosa</i>						3	19				21	11	75	24	23	176	3	14.58	61.06
<i>Megaloniais nervosa</i>							7				23	21	31	35	1	118	4	9.78	70.84
<i>Tritogonia verrucosa</i>							9				18	8	25	12	7	79	5	6.55	77.38
<i>Leptodea fragilis</i>						2	13	2			6	1	2	8	9	43	6	3.56	80.94
<i>Fusconaia flava</i>						1	9				6	20	4			40	7	3.31	84.26
<i>Lampsilis teres</i>						7	23						1	1	5	37	8	3.07	87.32
<i>Anodonta grandis</i>						1	25							1	3	30	9	2.49	89.81
<i>Lampsilis siliquoidea</i>				D		12	9									21	10	1.74	91.55
<i>Truncilla truncata</i>							4				3	2	1	4	4	18	11	1.49	93.04
<i>Lampsilis cardium</i>			D	1	D	2	9									12	12	0.99	94.03
<i>Lasmigona complanata</i>							9							2	1	12	12	0.99	95.03
<i>Pleurobema rubrum</i>												11	1			12	12	0.99	96.02
<i>Arcidens confragosus</i>							2				1		2	5	1	11	15	0.91	96.93
<i>Elliptio dilatata</i>												8		1		9	16	0.75	97.68
<i>Potamilus alatus</i>						1	5					1				7	17	0.58	98.26
<i>Toxolasma parvus</i>						5										5	18	0.41	98.67
<i>Anodonta imbecillis</i>							2								1	3	19	0.25	98.92
<i>Anodontoides ferussacianus</i>						2										2	20	0.17	99.09
<i>Obliquaria reflexa</i>														1	1	2	20	0.17	99.25
<i>Quadrula nodulata</i>															2	2	20	0.17	99.42
<i>Actinonaias ligamentina</i>															1	1	23	0.08	99.50
<i>Fusconaia ebena</i>												1				1	23	0.08	99.59
<i>Potamilus capax</i>															1	1	23	0.08	99.67
<i>Potamilus ohioensis</i>															1	1	23	0.08	99.75
<i>Strophitus undulatus</i>							1									1	23	0.08	99.83
<i>Truncilla donaciformis</i>							1									1	23	0.08	99.92
<i>Villosa lienosa</i>							1									1	23	0.08	100.00
# OF INDIVIDUALS	0	0	0	1	0	33	122	2	0	0	34	52	36	35	37	1207			
# OF SPECIES LIVE	0	0	0	1	0	12	19	1	0	0	9	12	11	13	17	29			
# OF SPECIES DEAD	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0			
TOTAL # OF SPECIES	0	0	1	2	1	12	19	1	0	0	9	12	11	13	17	29			

\* Matteson searched this site for 2 man-hours in 1956

\*\* Matteson searched this site for 1 man-hour in 1956

## FEDERAL CANDIDATE SPECIES

### *Pleurobema rubrum* (Rafinesque, 1820) - pyramid pigtoe

*Quadrula pyramidata* (Lea): Baker 1906:81; Dangle 1914:9.  
*Pleurobema cordatum pyramidatum* (Lea): Parmalee 1967:35.  
*Pleurobema pyramidatum* (Lea, 1831): Starrett 1971:309.

The pyramid pigtoe is a candidate for listing as endangered or threatened at the federal level, and should be listed as endangered in Illinois in the next update of the Endangered Species List. Twelve live *P. rubrum* were found in 1956: 11 from site 13 and one from site 14 (Table 5). A return visit to site 13 by L. Suloway (INHS) in 1979 resulted in only one live *P. rubrum* found. This mussel was not collected in the Little Wabash River in 1988, and its status in the river is uncertain.

## PROPOSED STATE ENDANGERED SPECIES

### *Ptychobranchnus fasciolaris* (Rafinesque, 1820) - kidneyshell

*Ptychobranchnus phaseolus* (Hildreth): Baker 1906:71.  
*Ptychobranchnus fasciolaris* (Rafinesque): Parmalee 1967:83.

Reported by Baker (1906) from the Little Wabash River, this species was not listed by any of the other previous workers until the 1988 survey when weathered shells were found at site 17. The kidneyshell has been proposed as endangered in Illinois, and the only known extant population exists in the Embarras River (Cummings et al., 1988a).

### *Toxolasma lividus* (Rafinesque, 1831) - purple lilliput

*Lampsilis glans* (Lea): Baker 1906:68.  
*Carunculina glans* (Lea): Parmalee 1967:59.

The purple lilliput is rare in Illinois with the only known records from the Embarras, Vermilion (Wabash River drainage), Little Wabash, and Wabash rivers. Reported from the Little Wabash River by Baker (1906), this species was not collected in the drainage again until 1987 when a single live individual (INHS #4737) was found at site 15 (Carmi). An effort to locate additional specimens in 1988 was unsuccessful; however, this is an extremely small species and could have been overlooked. The mussel population at Carmi is diverse, and this species probably still exists in the river.

***Villosa lienosa* (Conrad, 1834) - little spectaclecase**

*Lampsilis lienosa* (Conrad) (= *calliginosa* Lea): Baker 1906:67.  
*Villosa* (= *Micromya*) *lienosa* (Conrad): Parmalee 1967:76.

With the exception of a single record from the upper Sangamon River, the little spectaclecase is found only in the Wabash River drainage in Illinois. The only extant population in the state exists in the Little Vermilion River. This species is known from three localities in the Little Wabash River drainage (Appendix I). *V. lienosa* was collected northwest of Effingham by F.R. Fechtner on 12 October 1952, but catalogued as *Toxolasma parvus* (FMNH # 54857). One individual was found by Matteson at site 8 in 1956. In 1988, a shell of *V. lienosa* was found in the Skillet Fork by a INHS field crew while conducting a site survey for the Illinois Department of Transportation (IDOT). The paired valves appeared to be relatively fresh, but no live individuals were found. This species was not found during this survey and its status in the drainage is uncertain.

**PROPOSED STATE THREATENED SPECIES**

***Unio merus tetralasmus* (Say, 1831) - pondhorn**

*Unio tetralasmus* Say (= *jamesianus* Lea): Baker 1906:77.  
*Unio tetralasmus camptodon* Say: Baker 1906:77.  
*Elliptio tetralasmus* (Say): Fechtner 1963:100.  
*Unio merus tetralasmus* (Say): Parmalee 1956:186; 1967:44;  
Starrett 1971:311.

The pondhorn was found alive at two sites in the Little Wabash River in 1988. When proposed for state threatened status in 1987, few recent records of this species were known. With the increased survey work in recent years, it now appears that *U. tetralasmus* is more common than previously thought, and it may no longer meet the criteria for threatened status in Illinois.

**WATCH LIST SPECIES**

***Ellipsaria lineolata* (Rafinesque, 1820) - butterfly**

*Plagiola securis* (Lea): Baker 1906:69.  
*Plagiola lineolata* (Rafinesque): Parmalee 1956:186; 1967:80;  
Starrett 1971:325.

A large-river species, with records from the Mississippi, Illinois, Ohio and Wabash rivers, this is the first reported occurrence of this species in the Little Wabash River system. However, only one weathered dead shell of this species was found at site 17, and it probably no longer occurs in the drainage. Extirpated from the Illinois (Starrett, 1971) and Wabash rivers (Cummings et al., 1987; 1988c), remaining populations of this species should be monitored to ensure its survival in Illinois.

## OTHER SPECIES

### *Actinonaias ligamentina* (Lamarck, 1819) - mucket

- Unio ligamentinus* Lamarck: Calkins 1874:43.
- Lampsilis ligamentinus* (Lamarck): Kelly 1899:401.
- Lampsilis ligamentina* (Lamarck) (= *crassa* Say): Baker 1906:65.
- Lampsilis ligamentina* (Lamarck): Forbes & Richardson 1913:529; Danglade 1914:10.
- Actinonais* [sic] *carinata* (Barnes) Richardson 1928:457.
- Lampsilis carinata* (Barnes): Fechtner 1963:100.
- Actinonaias carinata* (Barnes): Parmalee 1956:186; 1967:56.
- Actinonaias ligamentina* (Lamarck): Baker 1922:48; Starrett 1971:324.

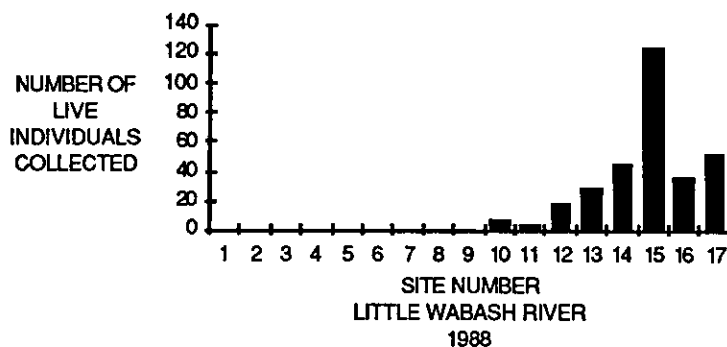
Only one live *A. ligamentina* was found by Matteson, at site 17 (New Haven), in 1956. Twenty-four muckets were collected by L. Suloway five miles southeast of Clay City in 1979. The mucket was not collected alive in the Little Wabash River drainage in 1988, and only one shell was found (at site 11). The mucket is the most abundant species in the Kankakee River (L. Suloway, 1981) and common in the Embarras and Wabash rivers (Cummings et al., 1988a; 1988c).

### *Amblema plicata* (Say, 1817) - threeridge

- Unio undulataus* Barnes: Calkins 1874:45.
- Quadrula plicata* (Say): Kelly 1899:401; Baker 1906:78; Forbes & Richardson 1913:529; Danglade 1914:10.
- Quadrula undulata* (Barnes): Baker 1906:78; Danglade 1914:10.
- Amblema undulata* (Barnes): Baker 1922:34.
- Amblema rariplacata* (Deshayes): Richardson 1928:456.
- Amblema plicata costata* (Rafinesque): Fechtner, 1963:100.
- Amblema plicata plicata* (Say): Fechtner 1963:100.
- Amblema costata* (Rafinesque): Parmalee 1956:186; 1967:26.
- Amblema peruviana* (Lamarck): Parmalee, 1956:186; 1967:27.

The threeridge was the second most common species found in the Little Wabash River in 1988. It comprised approximately 18% of the individuals collected from the drainage (Table 3) and was most common in the lower Little Wabash River proper from site 10 to the mouth (Appendix I & below).

Amblema plicata (Say, 1817)  
threeridge

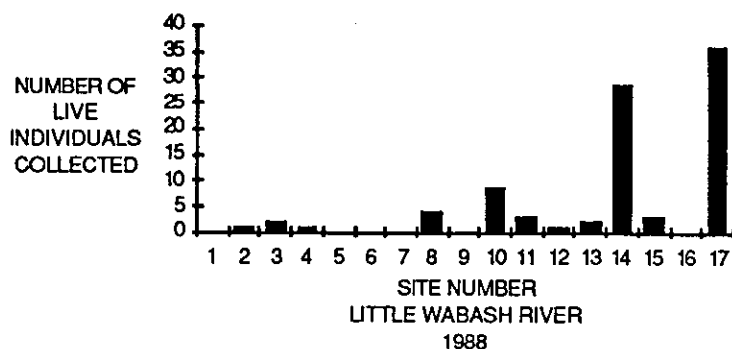


*Anodonta grandis* Say 1829 - giant floater

- Anodonta ovata* Lea: Calkins 1874:47.
- Anodonta grandis* Say (=salmonia Lea, ovata Lea): Baker 1906:72.
- Anodonta grandis* Say: Forbes & Richardson 1913:533; Danglade 1914:10; Baker 1922:42; Fechtner 1963:100; Parmalee 1956:186; 1967:47.
- Anodonta corpulenta* Cooper: Calkins 1874:47; Strode 1891:133; Kelly 1899:401; Baker 1906:73; Forbes & Richardson 1913:525; Danglade 1914:10; Baker 1922:43; Richardson 1928:457; Parmalee 1967:47.
- Anodonta grandis gigantea* Lea: Baker 1922:43.
- Anodonta grandis* var. *gigantea* Lea: Richardson 1928:457.
- Anodonta grandis grandis* Say: Starrett 1971:318.
- Anodonta grandis corpulenta* Cooper: Starrett 1971:319.

The giant floater is one of the most common mussels in Illinois. *A. grandis* ranked 4th in abundance for all species collected in the Little Wabash River drainage in 1988 and comprised 8% of the individuals found. It was found throughout the drainage, but was most common at sites 14, 17, and 28 (Appendix I & below).

*Anodonta grandis* Say, 1829  
giant floater



***Anodonta imbecillis* Say, 1829 - paper pondshell**

*Anodonta imbecillis* Say: Calkins 1874:47; Baker 1906:72;  
Forbes & Richardson 1913:533; Danglade 1914:43;  
Baker 1922:44; Richardson 1928:457; Parmalee  
1956:186; 1967:48; Starrett 1971:319.  
*Anodonta imbecilis* [sic] Say: Kelly 1899:401.

A widespread and common species in Illinois, the paper pondshell ranked 7th in order of abundance in the Little Wabash River drainage in 1988. *A. imbecillis* was most common at site 17 where 95 individuals were collected.

***Anodonta suborbiculata* Say, 1831 - flat floater**

*Anodonta suborbiculata* Say: Baker 1906:72; Parmalee  
1967:48.

The flat floater is reported for the first time from the Little Wabash River drainage. Two live individuals were found at sites 15 and 17. Although thought to be restricted to the Mississippi River, its backwater areas, and major tributary streams (Parmalee, 1967), recent collecting has shown *A. suborbiculata* to be more widespread than previously thought. This species will undoubtedly turn up in additional localities as more oxbows, reservoirs, and lentic habitats are surveyed in the future.

***Anodontoides ferrussacianus* (L. Lea, 1834) - cylindrical papershell**

*Anodontoides ferrussacianus* [sic] (Lea): Richardson 1928:457.  
*Anodontoides ferrussacianus* [sic] (Lea): Forbes & Richardson  
1913:533.  
*Anodonta ferrussaciana* (Lea): Fechtner 1963:100.  
*Anodontoides ferrussacianus* (Lea): Baker 1922:44; Parmalee  
1956:186; 1967:77; Starrett 1971:32.

*A. ferrussacianus* was found at sites 3 through 6 and site 18. Typically a headwater species, the cylindrical papershell was most common at site 3 where 18 of the 20 individuals were collected (Table 4).

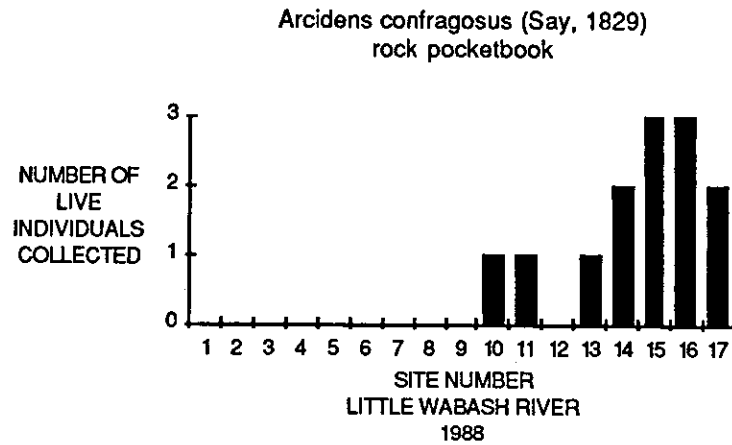
***Arcidens confragosus* (Say, 1829) - rock pocketbook**

*Alasmodonta confragosa* Say: Kelly 1899:401.  
*Arcidens confragosa* (Say): Fechtner 1963:100.  
*Arcidens confragosus* (Say): Baker 1906:74; Danglade  
1914:10; Baker 1922:45; Parmalee 1956:186; 1967:51;  
Starrett 1971:312.

The rock pocketbook is widely distributed in medium- to large-sized streams in the southern half of Illinois. It is usually found in quiet water areas with little or no flow. This species ranked 13th in



order of abundance in 1988 and was collected primarily in the lower Little Wabash River proper (Appendix I & below).



***Cyclonaias tuberculata* (Rafinesque, 1820) - purple wartyback**

- Unio verrucosus* Barnes: Calkins 1874:46.
- Quadrula tuberculata* (Barnes): Kelly 1899:401.
- Quadrula granifera* (Lea): Kelly 1899:401; Baker 1906:82; Danglade 1914:9.
- Quadrula tuberculata* (Rafinesque) (=verrucosa Barnes): Baker 1906:81;
- Quadrula tuberculata* (Rafinesque): Danglade 1914:9; Fechtner 1963:100.
- Rotundaria tuberculata* (Rafinesque): Baker 1922:38.
- Cyclonaias tuberculata granifera* (Lea): Baker 1928:107.
- Cyclonaias tuberculata* (Rafinesque): Parmalee 1956:186; 1967:27; Starrett 1971:306.

This species is represented by a specimen (UIMNH # Z-5550) collected by A.A. Hinkley [pre-1921] from the Little Wabash River in White County. It was also found between 1951 and 1953 by F.R. Fechtner (1963), but has not been collected in the drainage since. *C. tuberculata* has undergone a reduction in range in the Wabash River (Cummings, et al., 1988c) and is probably extirpated in the Little Wabash River.

***Elliptio dilatata* (Rafinesque, 1820) - spike**

- Unio gibbosus* Barnes: Calkins 1874:42; Kelly 1899:401;  
Forbes & Richardson 1913:536; Danglade 1914:10.  
*Unio gibbosus* Barnes (= *arctior* Lea): Baker 1906:76.  
*Elliptio gibbosus* (Barnes): Baker 1922:39.  
*Elliptio dilatatus* (Rafinesque): Richardson 1928:457; Parmalee  
1956:186; 1967:29; Fechtner 1963:100; Starrett  
1971:310.

Only one live individual of *E. dilatata* was found in 1988. This species was formerly common in medium to large-sized streams in Illinois (Parmalee, 1967) but has shown a marked reduction in range in recent years. This species is extirpated in the Illinois River (Starrett, 1971) and was collected only as weathered or subfossil shells in a recent survey of the Wabash River (Cummings et al., 1988c). Still widespread and common in the Ohio River tributaries of Indiana and Kentucky, its disappearance in the upper Midwest is puzzling.

***Fusconaia ebena* (I. Lea, 1831) - ebonyshell**

- Unio ebenus* Lea: Calkins 1874:42.  
*Quadrula ebena* (Lea): Kelly 1899:401; Baker 1906:81; Forbes  
& Richardson 1913:536; Danglade 1914:9.  
*Fusconaia ebena* (Lea): Richardson 1928:457; Starrett  
1971:288.  
*Fusconaia ebenus* (Lea): Parmalee 1956:186; 1967:31.

The ebonyshell is a large-river species rarely entering medium-sized streams in Illinois. Collected alive by Matteson at site 13 in 1956, this mussel was found only as a weathered shell in 1988. Probably never common in the drainage, *F. ebena* is most likely extirpated from the Little Wabash drainage.

***Fusconaia flava* (Rafinesque, 1820) - Wabash pigtoe**

- Unio rubiginosa* Lea: Calkins 1874:44.  
*Unio trigonus* Lea: Calkins 1874:45.  
*Quadrula trigona* (Lea) Kelly 1899:401; Forbes & Richardson  
1913:533; Danglade 1914:9.  
*Quadrula rubiginosa* (Lea): Kelly 1899:401; Danglade 1914:9.  
*Quadrula rubiginosa* (Lea) (= *flava* Conrad): Baker 1906:80.  
*Quadrula undata* (Barnes): Danglade 1914:39.  
*Fusconaia* [sic] *rubiginosa* (Lea): Baker 1922:35.  
*Fusconaia undata* (Barnes): Richardson 1928:457; Fechtner  
1963:100; Parmalee 1967:32.  
*Fusconaia flava* (Rafinesque): Parmalee 1956:186; 1967:31.  
*Fusconaia flava* forma *flava* (Rafinesque): Starrett 1971:291.  
*Fusconaia flava* forma *undata* (Barnes): Starrett 1971:292.

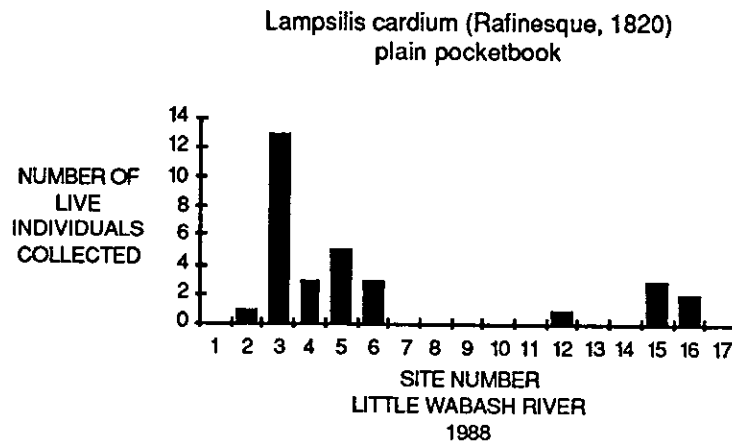
The Wabash pigtoe was one of the most common and widespread species in the state. However, loss of habitat due to siltation has seriously reduced the range of this species in many streams (Parmalee, 1967). An examination of historical records for *F. flava* shows the disappearance of this species in the upper third of the Little Wabash River. This species which ranked 7th in 1956

collections dropped to 19th in 1988. A similar reduction was observed for the Embarras River in 1986-87 (Cummings et al., 1988a).

***Lampsilis cardium* (Rafinesque, 1820) - plain pocketbook**

- Lampsilis ventricosus* (Barnes): Kelly 1899:401.
- Lampsilis ventricosa* (Barnes) (= *occidens* Lea, *subovata* Lea):  
Baker 1906:64.
- Lampsilis occidens* (Lea): Richardson 1928:457.
- Lampsilis ventricosa* (Barnes): Danglade 1914:10; Forbes &  
Richardson 1913:525; Baker 1922:53; Richardson  
1928:457; Parmalee 1956:186; 1967:70; Starrett  
1971:337.
- Lampsilis cardium* (Rafinesque): Fechtner 1963:100.

The plain pocketbook is one of the most widespread mussels in Illinois, occurring in almost every major drainage in the state. *L. cardium* was found alive at eight of the 17 main channel sites in the Little Wabash River in this survey. It was most common in the headwaters where it was found at five of the first six sites. Unlike the Embarras River where this species dominates (Cummings et al., 1988a), the plain pocketbook ranked 11th in order of abundance in the Little Wabash River in 1988.



***Lampsilis siliquoidea* (Barnes, 1823) - fatmucket**

- Unio luteolus* Lamarck: Calkins 1874:42.  
*Lampsilis luteolus* (Lamarck): Kelly 1899:401.  
*Lampsilis luteola* (Lamarck) (= *siliquoides* Barnes, *distans* Anthony): Baker 1906:65.  
*Lampsilis luteola* (Lamarck): Danglade 1914:10; Forbes & Richardson 1913:533; Baker 1922:52.  
*Lampsilis siliquoidea* (Barnes); Richardson 1928:457; Fechtner 1963:100; Parmalee 1956:186; 1967:68.  
*Lampsilis radiata luteola* (Lamarck): Starrett 1971:336.

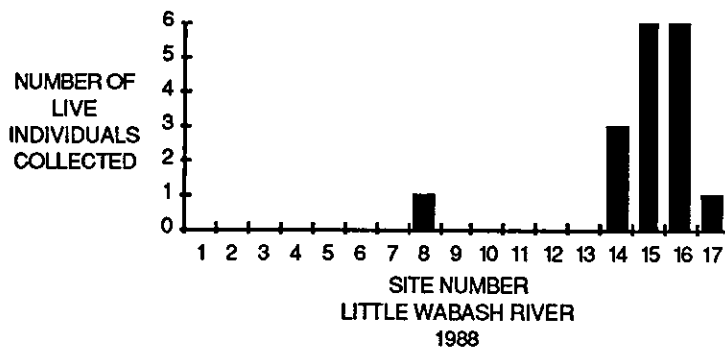
The fatmucket is widely distributed and common in Illinois. Although collected in almost the same numbers in 1956 (21) as in 1988 (17), the fatmucket was not collected at any of the sites common to both surveys. This species is usually found in the headwaters of rivers and was not collected in the lower half of the drainage in 1988.

***Lampsilis teres* (Rafinesque, 1820) - yellow sandshell**

- Unio anodontoides* Lea: Calkins 1874:41; Strode 1891:133.  
*Lampsilis anodontoides* (Lea) (= *teres* Say): Baker 1906:66.  
*Lampsilis fallaciosa* (Smith) Simpson: Baker 1906:66.  
*Lampsilis fallaciosa* (Smith): Forbes & Richardson 1913:533; Danglade 1914:10; Richardson 1928:457.  
*Lampsilis anodontoides* (Lea): Kelly 1899:401; Forbes & Richardson 1913:536; Danglade 1914:10; Baker 1922:56; Richardson 1928:457; Parmalee 1967:64.  
*Lampsilis fallaciosa* (Rafinesque) Parmalee 1956:186; 1967:65.  
*Lampsilis teres* (Rafinesque): Fechtner 1963:100.  
*Lampsilis anodontoides* forma *anodontoides* (Lea): Starrett 1971:333.  
*Lampsilis anodontoides* forma *fallaciosa* (Smith): Starrett 1971:334.

Formerly widespread in Illinois, *L. teres* is declining throughout the state. Conversations with commercial mussel fishermen attest to its former abundance in the Wabash River drainage. Although shells of this species were found throughout the Little Wabash drainage, live mussels were concentrated in the lower part of the river proper in 1988 (Appendix I & below).

Lampsilis teres (Rafinesque, 1820)  
yellow sandshell

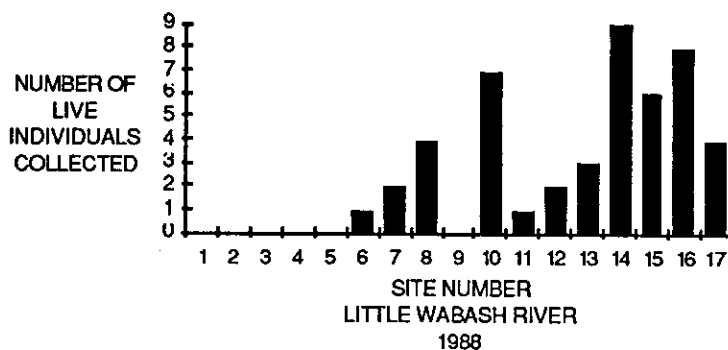


*Lasmigona complanata* (Barnes, 1823) - white heelsplitter

- Margaritana complanata* Barnes: Calkins 1874:46.
- Alasmodonta complanata* (Barnes): Kelly 1899:401.
- Symphynota complanata* (Barnes): Baker 1906:75; Danglede 1914:10; Forbes & Richardson 1913:529.
- Lasmigona (Pterosygna) complanata* (Barnes): Baker 1922:46.
- Lasmigona complanata* (Barnes): Richardson 1928:457; Fechtner 1963:100; Parmalee 1956:186; 1967:52; Starrett 1971:314.

Probably the most widespread species in Illinois, the white heelsplitter was common in Little Wabash collections in 1988 (Appendix 1 & below). This species ranked 8th in order of abundance for the drainage as a whole with 71 individuals collected (Table 3).

*Lasmigona complanata* (Barnes, 1823)  
white heelsplitter



***Lasmigona costata* (Rafinesque, 1820) - fluted-shell**

*Margaritana rugosa* Barnes: Calkins 1874:46.  
*Symphynota costata* (Rafinesque) (= *rugosa* Barnes): Baker 1906:74.  
*Symphynota costata* (Rafinesque): Danglade 1914:10.  
*Lasmigona (Lasmigona) costata* Rafinesque: Baker 1922:46.  
*Lasmigona costata* (Rafinesque): Fechtner 1963:100;  
Parmalee 1967:53; Starrett 1971:312.

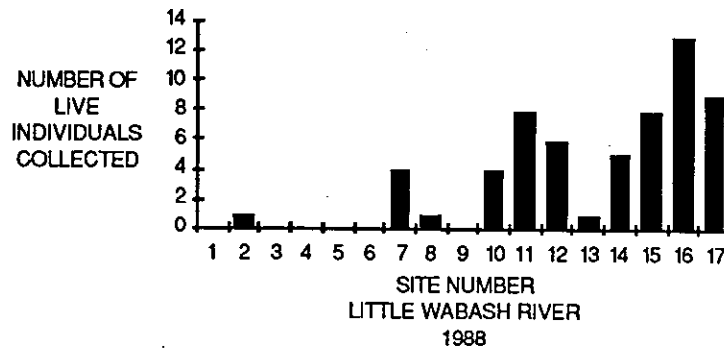
Although fairly common in the Embarras River, the fluted-shell is represented in the Little Wabash River by a single individual collected by L. Suloway five miles southeast of Clay City in 1979 (INHS #84). It was not listed as part of the fauna by previous workers and was not found in 1988.

***Leptodea fragilis* (Rafinesque, 1820) - fragile papershell**

*Unio gracilis* Barnes: Calkins 1874:42.  
*Lampsilis gracilis* (Barnes): Kelly 1899:401; Danglade 1914:10;  
Forbes & Richardson 1913:529; Baker 1906:68.  
*Lampsilis fragilis* (Rafinesque): Fechtner 1963:100.  
*Leptodea fragilis* (Rafinesque): Parmalee 1967:72; Starrett 1971:327

The fragile papershell was found at 16 of the 30 sites sampled in 1988 and is one of the most abundant mussels found in the Wabash River drainage (Cummings et al., 1988a; 1988c). Found in a wide variety of substrates, it was collected throughout the drainage in tributaries as well as in the main channel.

Leptodea fragilis (Rafinesque, 1820)  
fragile papershell



***Ligumia subrostrata* (Say, 1831) - pondmussel**

*Lampsilis subrostrata* (Say) (= *mississippiensis* Conrad):  
Baker 1906:67.  
*Lampsilis subrostrata* (Say): Fechtner 1963:100.  
*Ligumia subrostrata* (Say): Parmalee 1956:186; 1967:75;  
Starrett 1971:332.

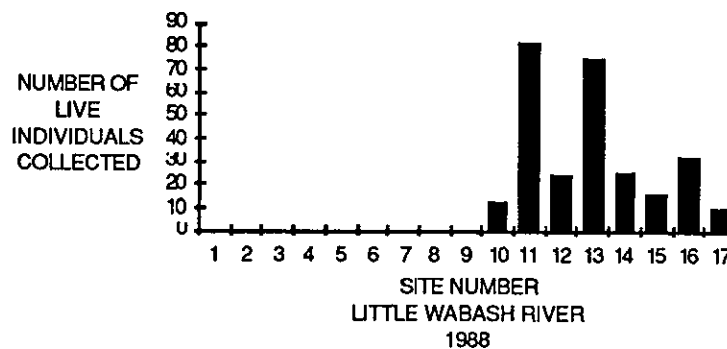
The common pondmussel is widespread in the southern half of Illinois. It typically inhabits ponds, sloughs, lakes, and reservoirs and may be found in quiet waters in streams. An examination of the map in Appendix 1 shows the preference of this species for the tributaries of the drainage which may account for its absence in Matteson's survey of 1956.

***Megaloniais nervosa* (Rafinesque, 1820) - washboard**

*Quadrula multiplicata* (Lea): Kelly 1899:401.  
*Quadrula heros* (Say) (= *multiplicata* Lea): Baker 1906:78.  
*Quadrula heros* (Say): Forbes & Richardson 1913:533;  
Danglade 1914:10.  
*Amblema gigantea* (Barnes): Fechtner 1963:100.  
*Megaloniais gigantea* (Barnes): Richardson 1928:457;  
Parmalee 1956:186; 1967:33; Starrett 1971:295.

The washboard is one of the top three commercial species harvested in Illinois. *M. nervosa* ranked 3rd in order of abundance for the Little Wabash River in 1988 and was the dominant species found at sites 10, 11, and 13. A total of 288 individuals was collected and represented over 16% of all live mussels found. Washboards were restricted to the lower half of the main channel, except for six individuals which came from one site in the lower Skillet Fork (Appendix 1 & below).

Megaloniais nervosa (Rafinesque, 1820)  
washboard



***Obliquaria reflexa* Rafinesque 1820 - threehorn wartyback**

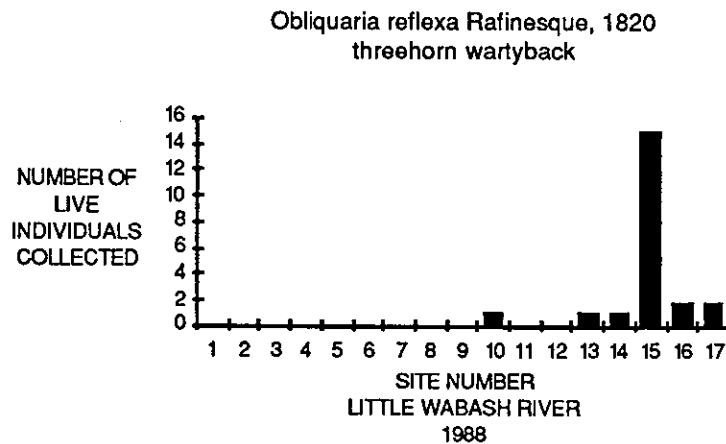
*Unio cornutus* Barnes: Calkins 1874:41.

*Obliquaria reflexa* Rafinesque (= *cornuta* Barnes): Baker 1906:71.

*Obliquaria* [sic] *reflexa* Rafinesque: Fechtner 1963:100.

*Obliquaria reflexa* Rafinesque: Kelly 1899:401; Forbes & Richardson 1913:536; Danglade 1914:10; Richardson 1928:457; Parmalee 1956:186; 1967:77; Starrett 1071:322.

The threehorn wartyback is a large-stream species occasionally entering the lower reaches of medium-sized rivers. *O. reflexa* was found only in the main channel of the Little Wabash River in 1988. It was not abundant at any of the sites surveyed except site 15 where 15 individuals were found (Appendix I & below).



***Pleurobema sintoxia* (Rafinesque, 1820) - round pigtoe**

*Unio coccineus* Lea: Calkins 1874:42.

*Unio obliquus* Lamarck: Calkins 1874:44.

*Unis* [sic] *solidus* Lea: Calkins 1874:45.

*Quadrula obliqua* Lamarck: [in part] Baker 1906:80.

*Quadrula coccinea* Conrad (= *catillus* Conrad): Baker 1906:81.

*Quadrula solida* (Lea): Danglade 1914:9.

*Quadrula obliqua* (Lamarck): Danglade 1914:9; Coker 1921:25.

*Quadrula coccinea* (Conrad): Danglade 1914:9; Fechtner 1963:100.

*Pleurobema cordatum coccineum* (Lea): Parmalee 1967:35.

*Pleurobema coccineum* forma *solida* (Lea): Starrett 1971:309.

The round pigtoe was reported by Fechtner (1963) from the Little Wabash River in 1951 to 1953. It was not collected by Matteson in 1956, and only one individual was found by Suloway in 1979. No *P. sintoxia* were found in 1988. This species was fairly common in the Embarras River in 1986 (Cummings et al., 1988a), and the reason for its rarity in the Little Wabash River is unknown.



***Potamillus alatus* (Say, 1817) - pink heelsplitter**

*Lampsilis alatus* (Say): Kelly 1899:401.  
*Lampsilis alata* (Say): Baker 1906:68; Forbes & Richardson  
1913:529; Danglade 1914:10.  
*Proptera alata* (Say): Richardson 1928:457; Parmalee  
1956:186; 1967:81; Fechtner 1963:100; Starrett,  
1971:329.

*P. alatus* was uncommon in the Little Wabash collections of 1988. It was found alive at two sites (15 & 17), and only two individuals were found. It was not particularly abundant in the 1956 survey when only seven individuals were collected.

***Potamillus ohioensis* (Rafinesque, 1820) - pink papershell**

*Lampsilis laevissimus* (Lea): Kelly 1899:401.  
*Lampsilis laevissima* (Lea) (=ohioensis Say): Baker 1906:68.  
*Lampsilis laevissima* (Lea): Forbes & Richardson 1913:525;  
Danglade 1914:10.  
*Leptodea laevissima* (Lea): Richardson 1928:457; Parmalee  
1967:74.  
*Proptera laevissima* (Lea): Fechtner 1963:100; Starrett  
1971:330.

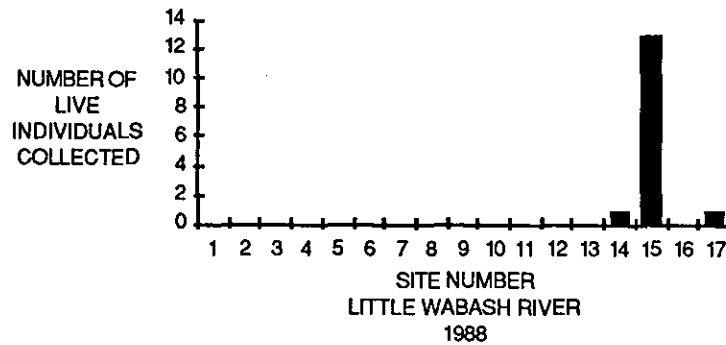
Sixteen individuals were collected at seven sites in the Little Wabash River in 1988; in 1956 only one pink papershell was found. Most were located in the main channel, but seven individuals were found at two sites in Skillet Fork (Appendix I).

***Quadrula nodulata* (Rafinesque, 1820) - wartyback**

*Unio pustulatus* Lea: Calkins 1874:44.  
*Quadrula pustulata* (Lea): Kelly 1899:401; Baker 1906:80;  
Danglade 1914:9.  
*Quadrula nodulata* (Rafinesque): Parmalee 1956:186; 1967:39;  
Fechtner 1963:100; Starrett 1971:303.

The wartyback is a large-river species occasionally ascending the lower reaches of medium-sized streams such as the Embarras and Little Wabash rivers. Only two individuals were found in 1956, compared to 15 in 1988. This species ranked 18th in order of abundance and comprised 0.84% of the mussels collected (Table 3).

*Quadrula nodulata* (Rafinesque, 1820)  
wartyback



*Quadrula pustulosa* (l. Lea, 1831) - pimpleback

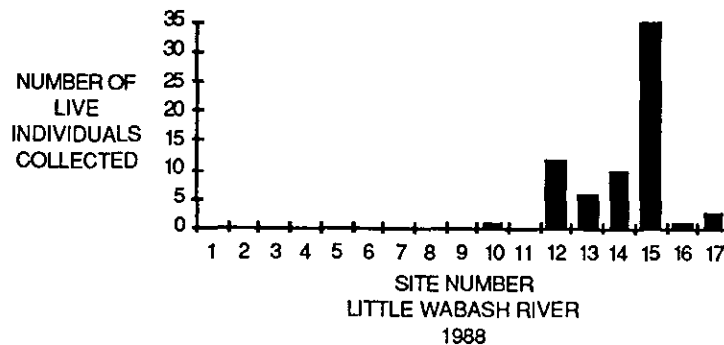
*Unio pustulosus* Lea: Calkins 1874:44.

*Quadrula pustulosa* (Lea) (= *dorfeuilliana* Lea, *schoolcraftensis* Lea): Baker 1906:79.

*Quadrula pustulosa* (Lea): Kelly 1899:401; Forbes & Richardson 1913:531; Danglade 1914:9; Coker 1921:23; Richardson 1928:457; Parmalee 1956:186; 1967:40; Fechtner 1963:100; Starrett 1971:302.

The pimpleback is one of the most common and widespread species in Illinois. It can be found in a wide variety of habitats and is one of the dominant species in the Wabash River drainage (Cummings et al., 1988a; 1988c). *Q. pustulosa* was the 3rd most abundant species in the 1956 survey but dropped to 9th in 1988. The pimpleback is still common in the lower half of the Little Wabash River, particularly near Carmi in White County (Appendix 1 & below).

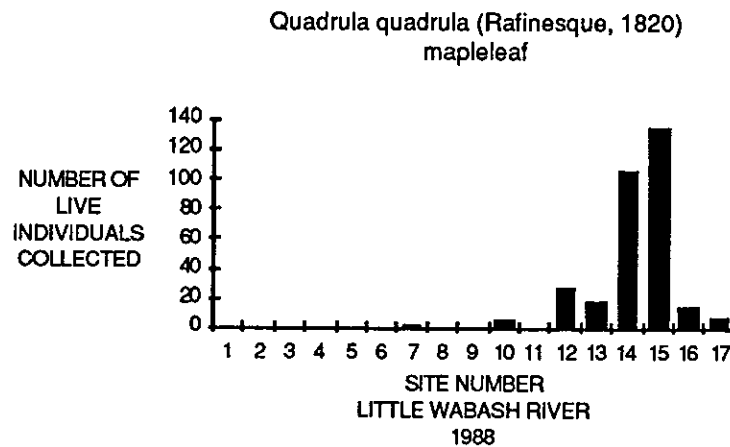
*Quadrula pustulosa* (l. Lea, 1831)  
pimpleback



***Quadrula quadrula* (Rafinesque, 1820) - mapleleaf**

*Quadrula asperrima* (Lea): Kelly 1899:401; Forbes & Richardson 1913:533.  
*Quadrula lachrymosa* (Lea) (= *quadrula* Say, *asperrimus* Lea): Baker 1906:79.  
*Quadrula lachrymosa* (Lea): Danglade 1914:10.  
*Quadrula quadrula* (Rafinesque): Fechtner 1963:100; Parmalee 1956:186; 1967:43; Starrett 1971:300.

Like the preceding species, the mapleleaf is widespread and common in Illinois. *Q. quadrula* ranked 1st in order of abundance in 1988 and was 2nd in 1956. It was present in tributaries as well as the Little Wabash River proper, but was most common in the lower half of the main channel (Appendix 1 & below).



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

*Strophitus edentulus* (Say): Baker 1906:71.  
*Strophitus rugosus* (Swainson): Parmalee 1967:56.  
*Strophitus undulatus* (Say): Fechtner 1963:100; Starrett 1971:321.

The squawfoot is found in suitable habitat from small streams to large rivers (Parmalee, 1967). This species was uncommon in the Little Wabash and was found only in the upper portion of the drainage (Appendix 1).

***Toxolasma parvus* (Barnes, 1823) - lilliput**

*Lampsilis parva* (Barnes): Baker 1906:67.  
*Carunculina parva* (Barnes): Fechtner 1963:100; Parmalee  
1967:59; Starrett 1971:331.

The lilliput was collected as a dead shell only from site 21 in the Little Wabash River in 1988. Five live individuals were found at site 7 by Matteson in 1956. Although not collected alive in 1988, this species was probably overlooked and it most likely still exists in the drainage.

***Toxolasma texasensis* (I. Lea, 1857) - Texas lilliput**

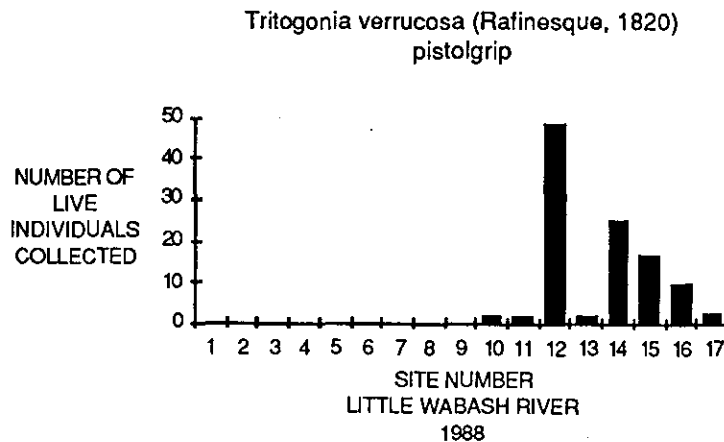
*Lampsilis texasensis* (Lea): Baker 1906:67.  
*Carunculina texasensis* (Lea): Parmalee 1967:60.

Reported as occurring at only three localities in the Saline and Big Muddy drainages in Illinois (Parmalee, 1967), the Texas lilliput is present in most of the drainages in the southern third of the state. In 1988, *T. texasensis* was collected in the Little Wabash as shells only, but it is most likely still extant in the river.

***Tritogonia verrucosa* (Rafinesque, 1820) - pistolgrip**

*Tritogonia tuberculata* (Barnes): Baker 1906:70.  
*Tritogonia verrucosa* (Rafinesque): Fechtner 1963:100;  
Parmalee 1956:186; 1967:43; Starrett 1971:305.

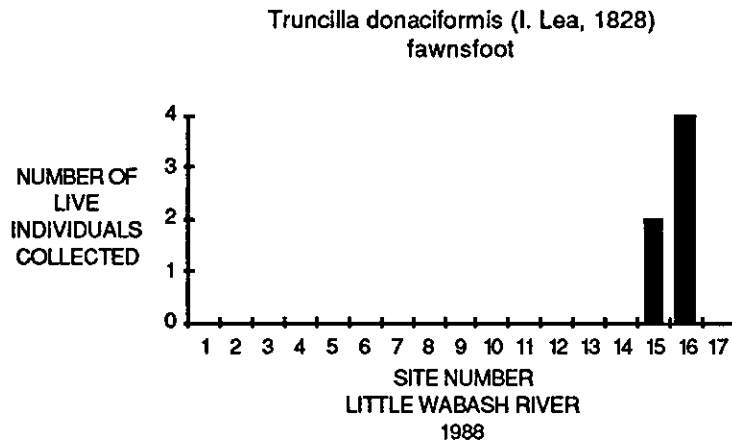
The pistolgrip is a common species in the medium-sized streams in the southern half of Illinois. *T. verrucosa* ranked 5th in order of abundance in the Little Wabash River in 1988, but was collected in the main channel of the river only. This species was most abundant in the lower half of the river, and was the dominant species found at site 12 (Appendix 1 & below).



***Truncilla donaciformis* (I. Lea, 1828) - fawnsfoot**

*Plagiola donaciformis* (Lea) (= *zigzag* Lea) Baker 1906:70.  
*Truncilla donaciformis* (Lea): Fechtner 1963:100; Parmalee  
1967:85; Starrett 1971:327.

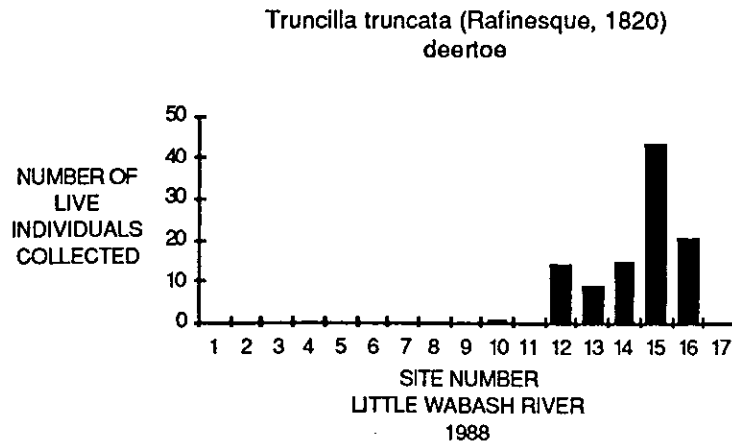
The fawnsfoot is widely distributed in the large rivers of the state. Only one individual was found by Matteson in 1956. This species ranked 19th in the Little Wabash River in 1988 with six individuals found.



***Truncilla truncata* Rafinesque, 1820 - deerto**

*Plagiola elegans* (Lea): Baker 1906:70.  
*Truncilla truncata* Rafinesque: Fechtner 1963:100; Parmalee  
1956:186; 1967:86; Starrett 1971:327.

*Truncilla truncata* was common in the Little Wabash River in 1988. The deerto ranked 6th for all live mussels collected and was the third most common species found at site 15 (Table 5).



## INTRODUCED SPECIES

### *Corbicula fluminea* (Müller, 1774) - Asian clam

Although not part of the unionid fauna, voucher specimens of the introduced Asian clam, *Corbicula fluminea*, were collected to document the occurrence and distribution of this species in the Little Wabash River. *Corbicula fluminea* is of interest to those studying freshwater mussels because of the controversy surrounding its effect on unionid populations (Clarke, 1988). The Asian clam was found throughout the Little Wabash drainage from the headwaters to the mouth.

## DISCUSSION

### COMPARISON WITH PREVIOUS SURVEYS

Eight of the species reported from the drainage prior to 1956 by Baker (1906), Fechtner (1963), Parmalee (ISM collections) and others were not collected alive in 1988 (Table 1). The results of the systematic survey of the Little Wabash River conducted in 1956 by M.R. Matteson was compared to data obtained in 1988 to determine changes in the mussel fauna of the drainage. The two surveys had 15 sites in common: 1, 2, 4 through 14, 16, and 17. An equal amount of time was spent in the two surveys collecting mussels at each site and totaled 55 man-hours.

The 1956 and 1988 surveys had 25 species in common (Table 1). Of those 25 species, 12 decreased in number, 11 increased, and 2 remained unchanged. Four species new in 1988 were: *Anodonta suborbiculata* (live), *Ellipsaria lineolata* (dead), *Ptychobranhus fasciolaris* (dead), and *Unio merus tetralasmus* (dead). Four species not found in 1988 were: *Pleurobema rubrum*, *Potamilus capax*, *Toxolasma parvus*, and *Villosa lienosa*. Of these four species, *Potamilus capax* is federally endangered, *Pleurobema rubrum* is a candidate for federal listing, and *Villosa lienosa* has been proposed for listing as endangered in Illinois. *Toxolasma parvus* was found in the Little Wabash River proper in 1956 but not in 1988. However, it was collected at one of the tributary sites and probably is still extant in the drainage.

At the 15 sites, 1207 individuals were collected in 1956 vs. 1081 in 1988; a reduction of 10%. Nine sites had more individuals collected in 1988 than 1956. The most striking of these were sites 1, 2, 4, 10, 11 (108 vs. 0), and 12 (158 vs. 87). One of the reasons which could have contributed to the larger number of individuals found was the record drought of 1988. Although Matteson's field notes indicated that water levels were low in 1956, the extremely low levels of 1988 allowed sampling in areas which were probably inaccessible in 1956. The reduction in the

numbers of individuals collected for the Little Wabash River was not as drastic as have been reported for other Illinois streams (Starrett, 1971; Suloway, 1981; Suloway et al., 1981; Cummings et al., 1988a; 1988b).

The three most abundant species in 1956 were *Amblema plicata*, *Quadrula quadrula*, and *Quadrula pustulosa* which together comprised 61% of all mussels collected (Table 5). In 1988, the species composition changed with the top three species, *Megalonaias nervosa*, *Amblema plicata*, and *Quadrula quadrula* comprising 52% of the total. *Quadrula pustulosa* dropped from 3rd in 1956 to 9th in 1988, and *M. nervosa* rose from 4th to 3rd. The average number of mussels collected per man-hour in 1956 was 21.95, compared to 19.65 in 1988.

Six sites had more individuals collected in 1956 than 1988. Most notable of these were sites 7 (39 vs. 8) and 8 (178 vs. 11). The most drastic reduction occurred at site 8, where a severe decrease in the number of species found coincided with a marked reduction in the number of individuals collected. Site 8 was the most diverse station sampled in 1956 with 19 species recorded and was the only locality where three species were found, including the state proposed *Villosa lienosa* (Table 5). Matteson's field notes referred to this site as "excellent" with a "nice sand and gravel bottom" and indicated that a bridge replacement was underway. In 1988, site 8 was radically changed from its previous condition. The substrate consisted of a deep layer of silt and mud overlying gravel and the flow was negligible. The number of species found was reduced from 19 to five, all of which were common in other parts of the drainage.

Seven species, *Actinonaias ligamentina*, *Fusconaia ebena*, *Potamilus capax*, *Potamilus ohioensis*, *Strophitus undulatus*, *Truncilla donaciformis*, and *Villosa lienosa*, were represented by only one individual in 1956. Of these seven, *Potamilus capax* and *Villosa lienosa* were not found in 1988, and *Actinonaias ligamentina* and *Fusconaia ebena* were collected as shells only. *Potamilus ohioensis* and *Truncilla donaciformis* increased in number in 1988, and *Strophitus undulatus* remained unchanged.

At the common sites, six species, *Anodonta suborbiculata*, *Anodontoides ferussacianus*, *Elliptio dilatata*, *Lampsilis siliquoidea*, *Potamilus alatus*, and *Strophitus undulatus* were represented by one individual in 1988. Of these only *Anodonta suborbiculata* had not been previously reported from the drainage. *Anodontoides ferussacianus*, *Elliptio dilatata*, *Lampsilis siliquoidea*, and *Potamilus alatus* decreased in number, and *Strophitus undulatus* remained the same.

In his classification of Illinois streams based on the fish fauna, Smith (1971) characterized the Little Wabash River as poor in the lower reaches and very good in the upper part of the system. The 1988 data on mussels do not coincide with his findings; the best sites were 12 through 17, all in the lower half of the river. The condition of the mussels collected from the Little Wabash River was noticeably different from those found in the Embarras River and drainages to the north. Considerable dissolution and weathering of the shells near the umbo was observed in many of the specimens. The Little Wabash material resembled individuals collected in the streams of the southeastern U.S., where the beaks are typically highly eroded.

### ACKNOWLEDGEMENTS

We would like to thank the following for their help in this study: Mina Tynan for assistance in the field and laboratory, Dr. A. Bogan (ANSP), Dr. A. Solem and M. Baker (FMNH), Dr. T. Cashatt (ISM), Dr. D. H. Stansbery and K. G. Borrer (OSUMZ), Dr. T. Uzzell (UIMNH), and Dr. D. J. Eernisse (UMMZ), for allowing us access to collections under their care. This study was supported by a grant from the Illinois Nongame Wildlife Checkoff Program, Illinois Department of Conservation, Division of Natural Heritage.



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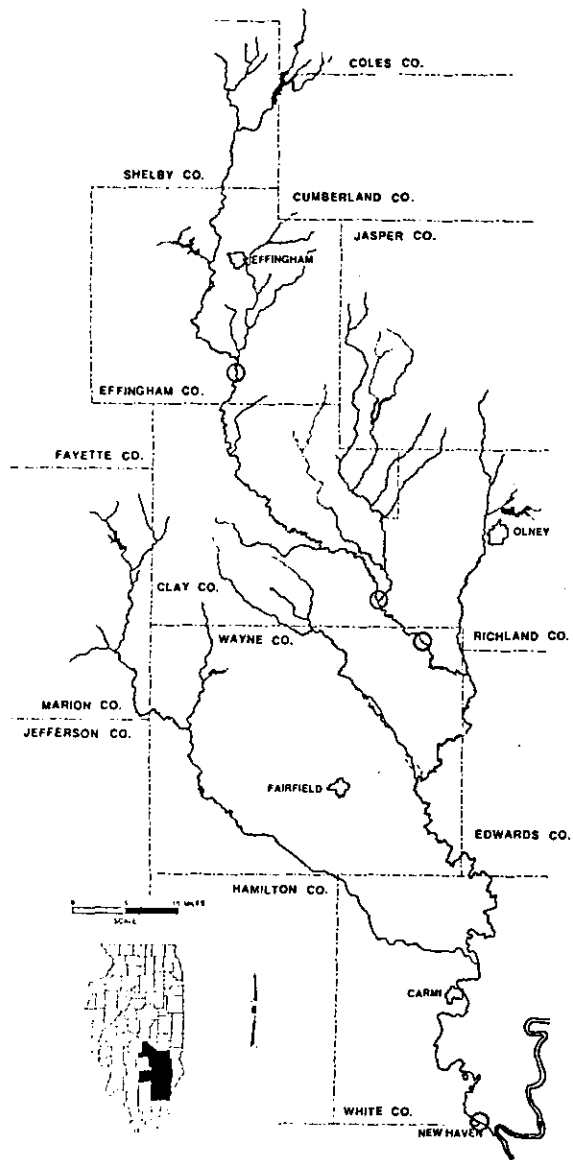
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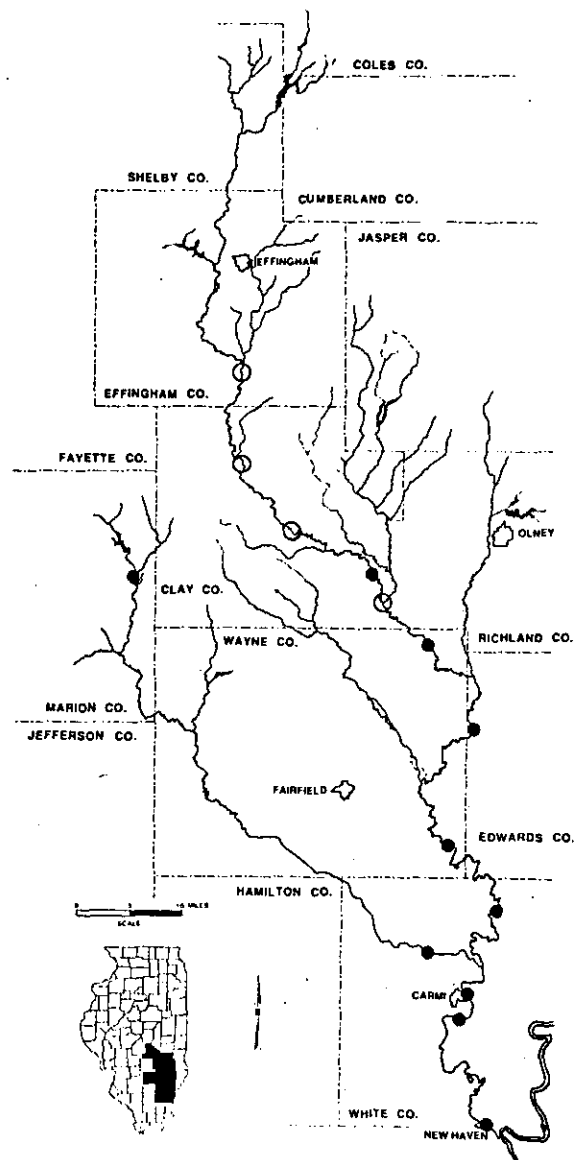
Appendix I.

Distribution maps of the freshwater mussels  
(Unionidae)  
of the Little Wabash River drainage, Illinois.

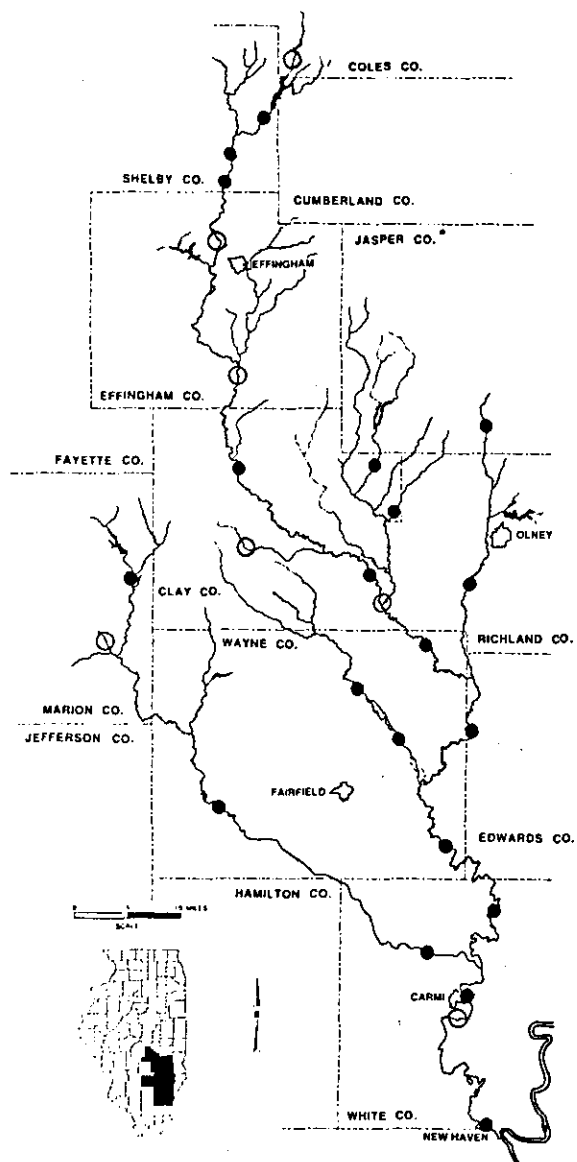
- = LIVE MUSSELS COLLECTED (1988)
- = SHELLS (1988) & MUSEUM RECORDS



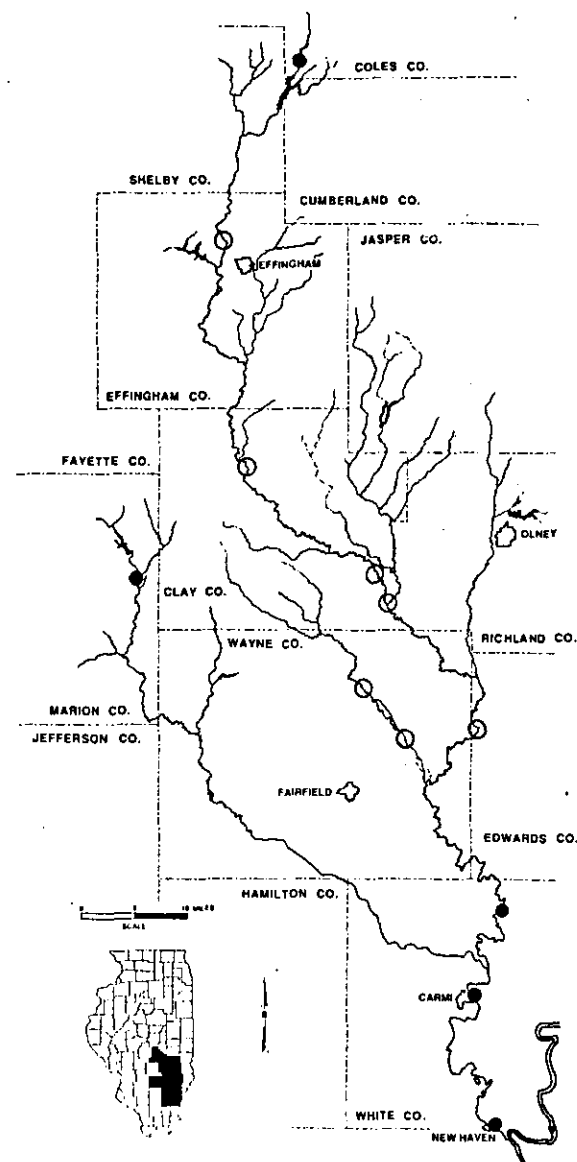
*Actinonias ligamentina* (Lamarck, 1819)  
mucket



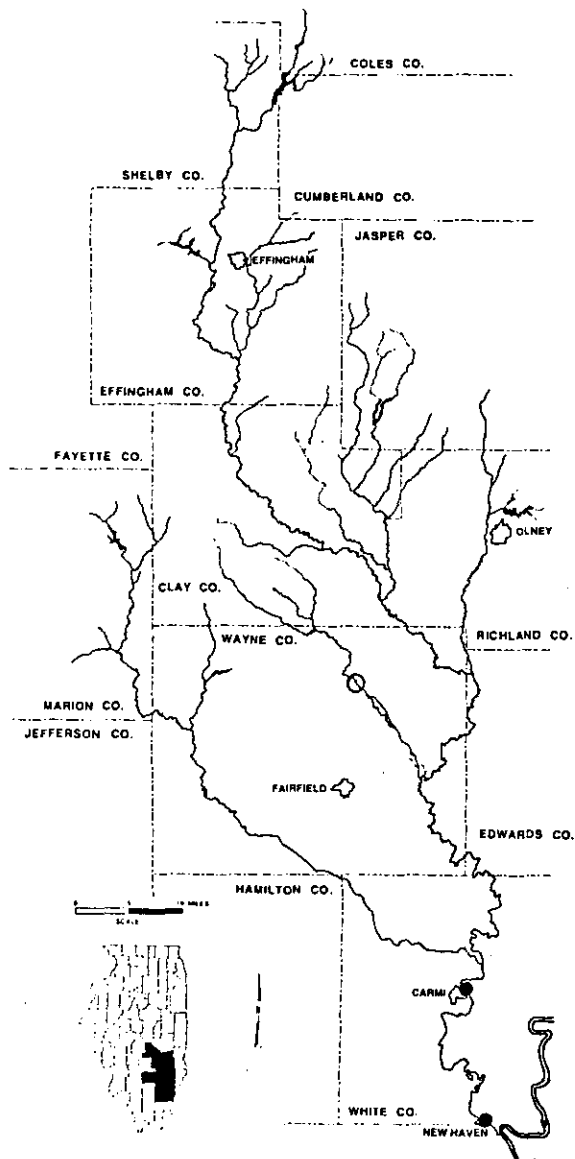
*Amblema plicata* (Say, 1817)  
three-ridge



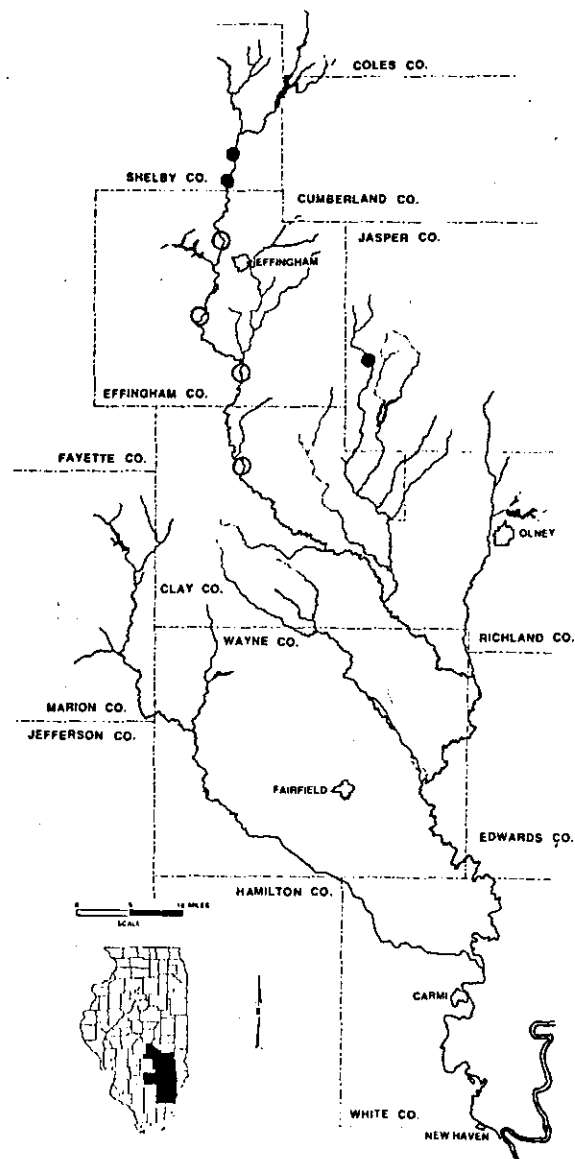
*Anodonta grandis* Say, 1829  
giant floater



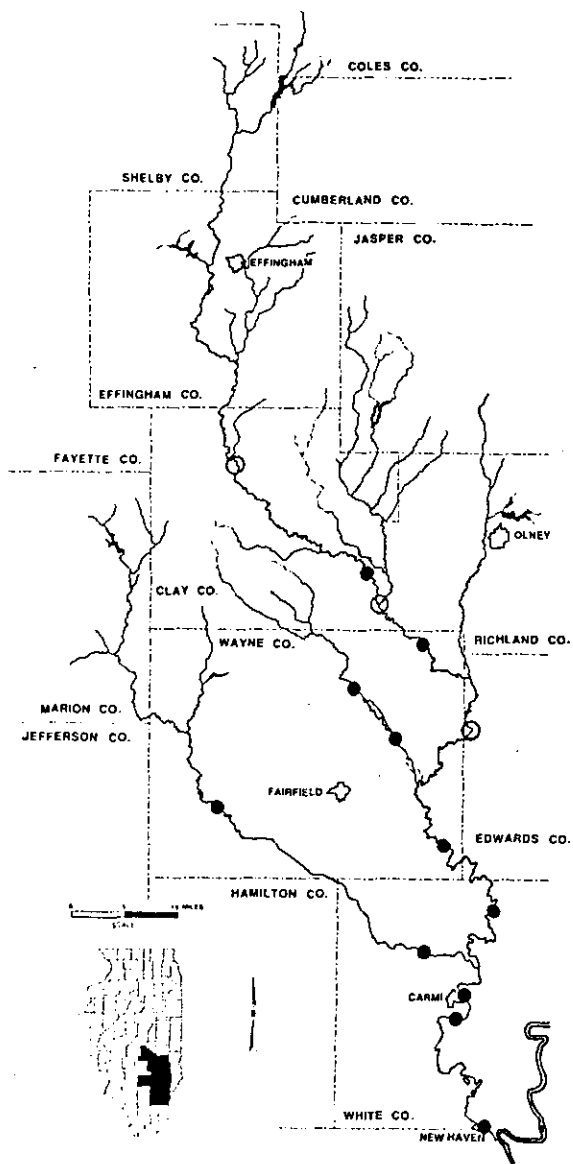
*Anodonta imbecillis* Say, 1829  
paper pondshell



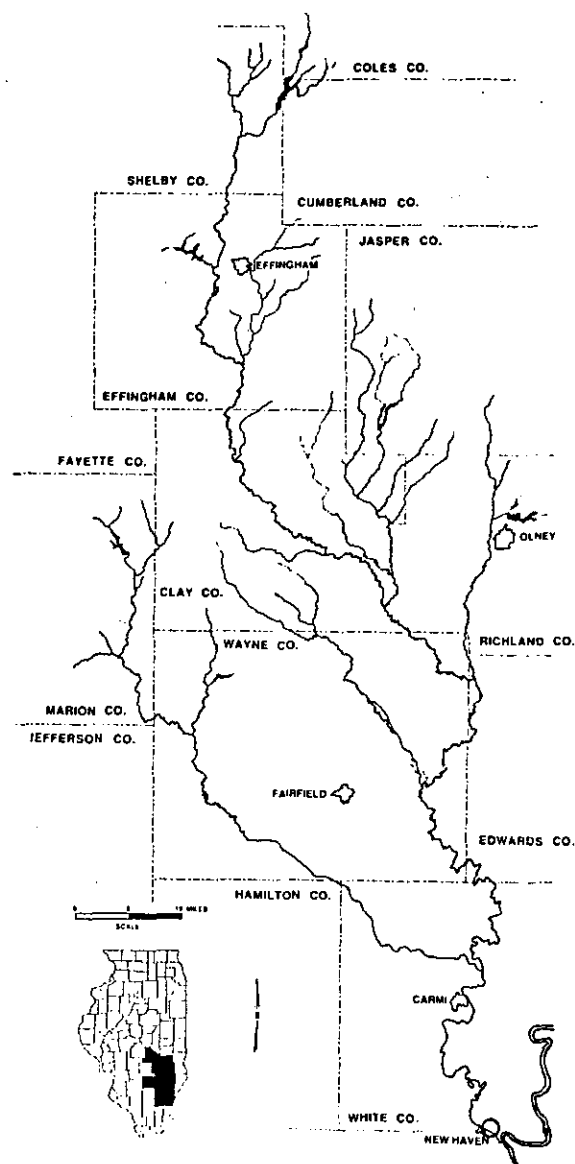
*Anodonta suborbiculata* Say, 1831  
flat floater



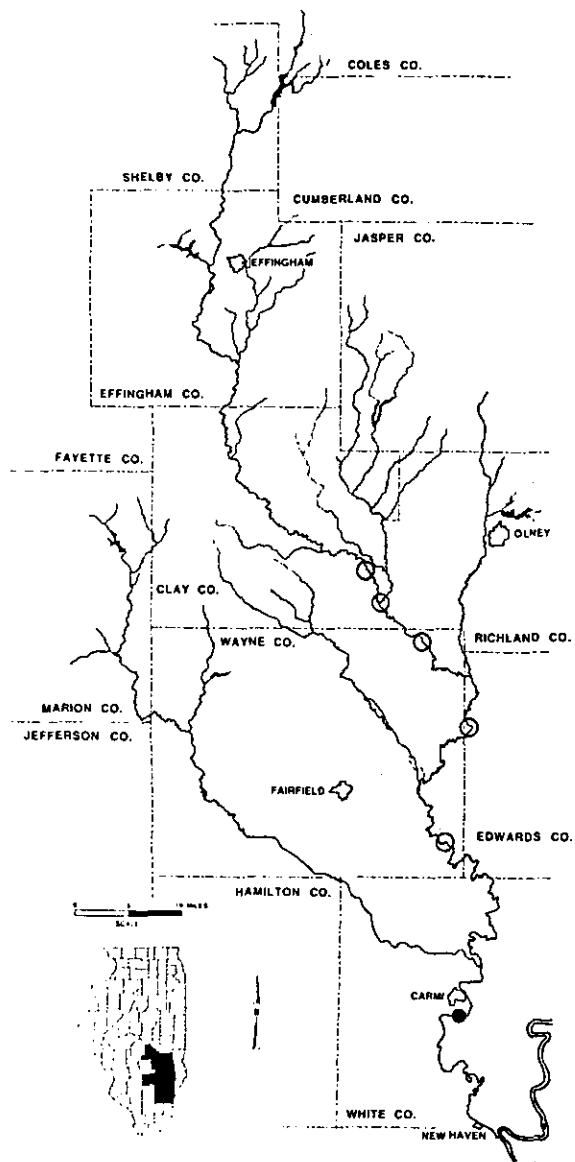
*Anodontoides ferussacianus* (I. Lea, 1834)  
cylindrical papershell



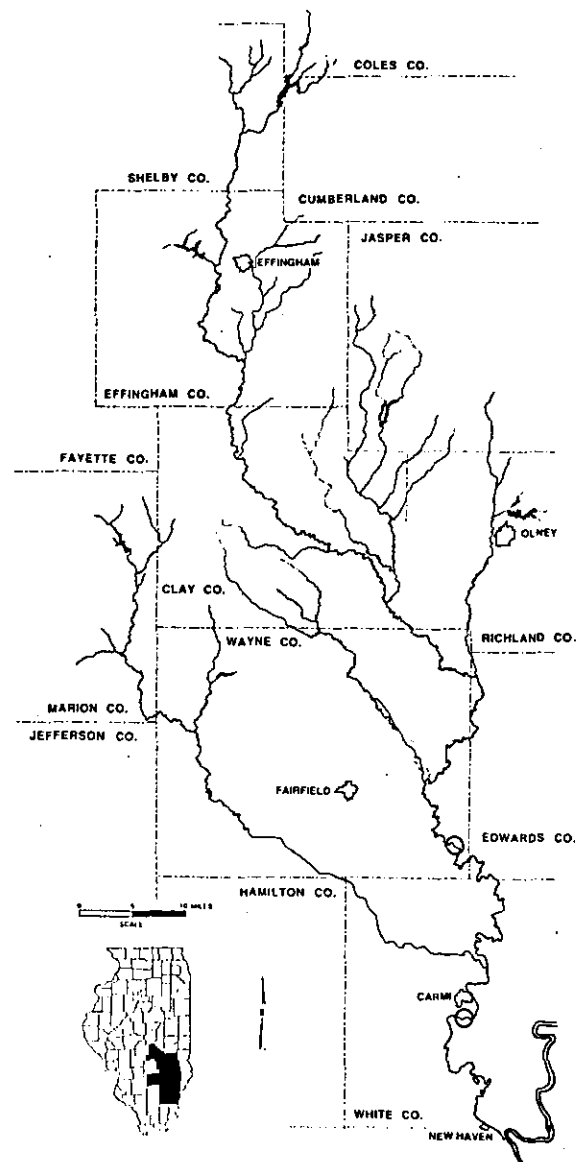
*Arcidens contragosus* (Say, 1829)  
rock pocketbook



*Ellipsaria lineolata* (Rafinesque, 1820)  
butterfly

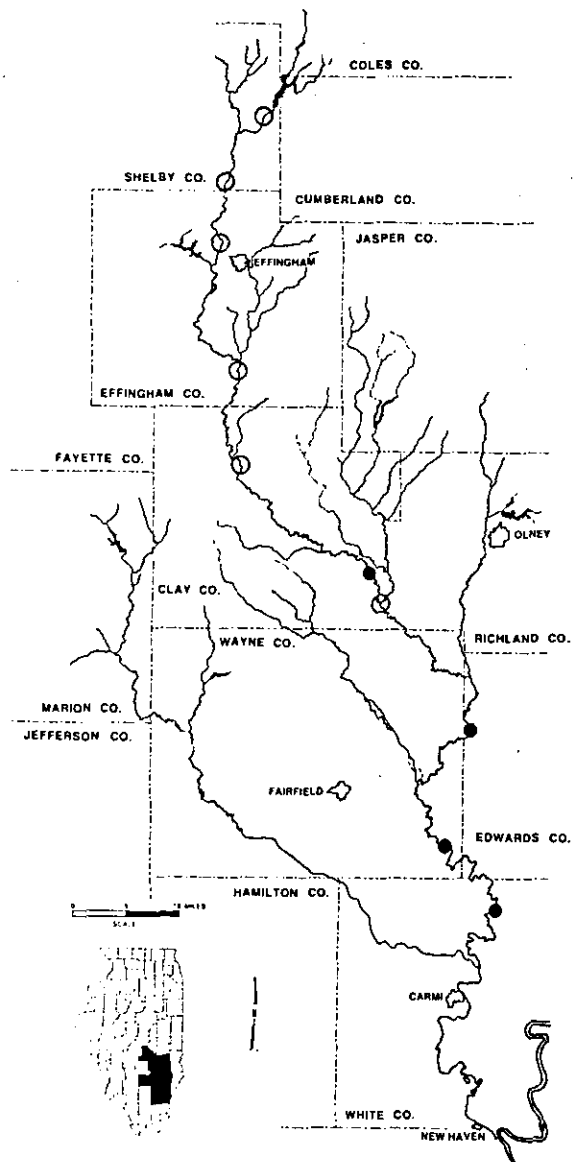


*Elliptio dilatata* (Rafinesque, 1820)  
spike

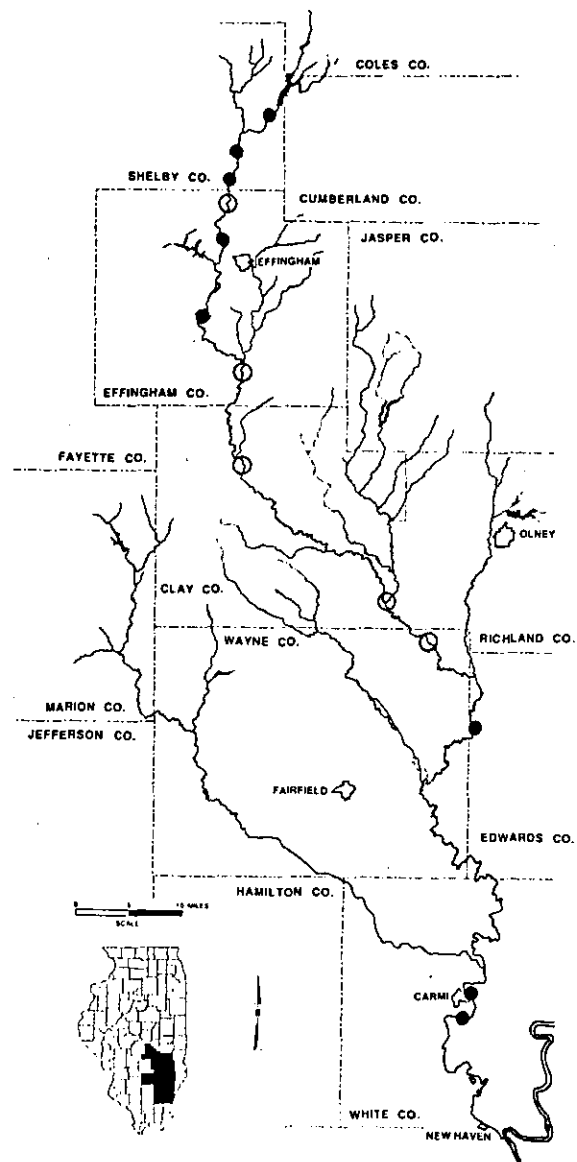


*Fusconaia ebena* (I. Lea, 1831)  
ebonyshell

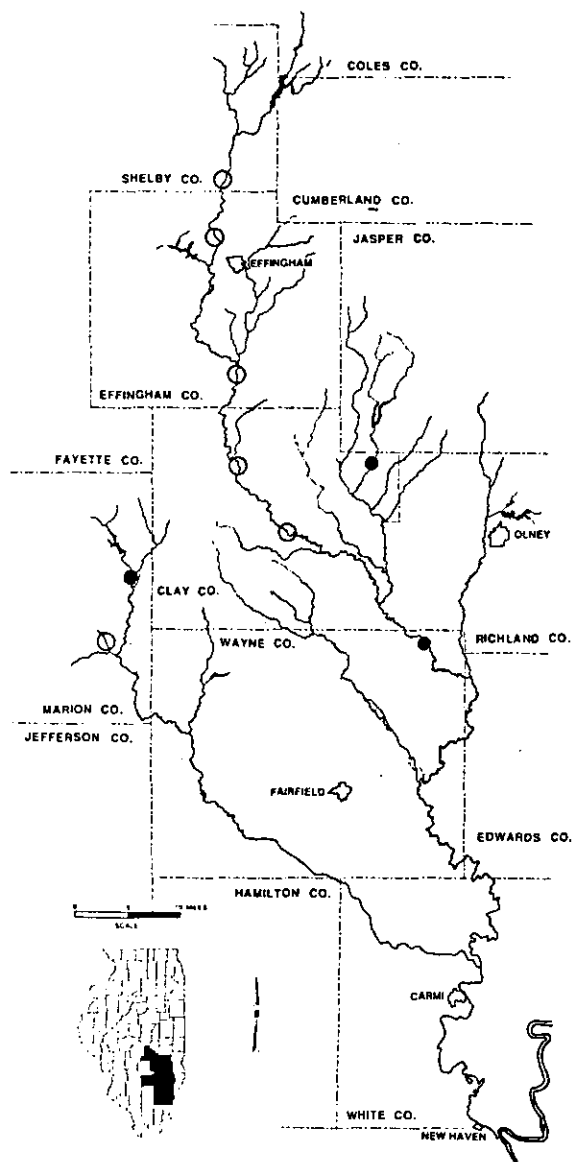




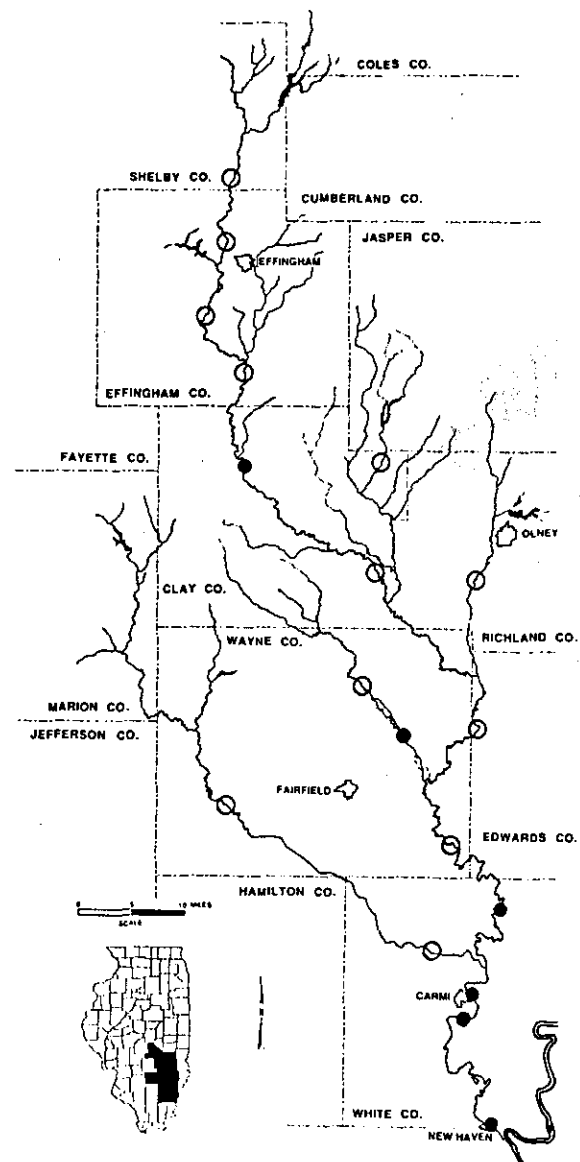
*Fusconaia flava* (Rafinesque, 1820)  
Wabash pigtoe



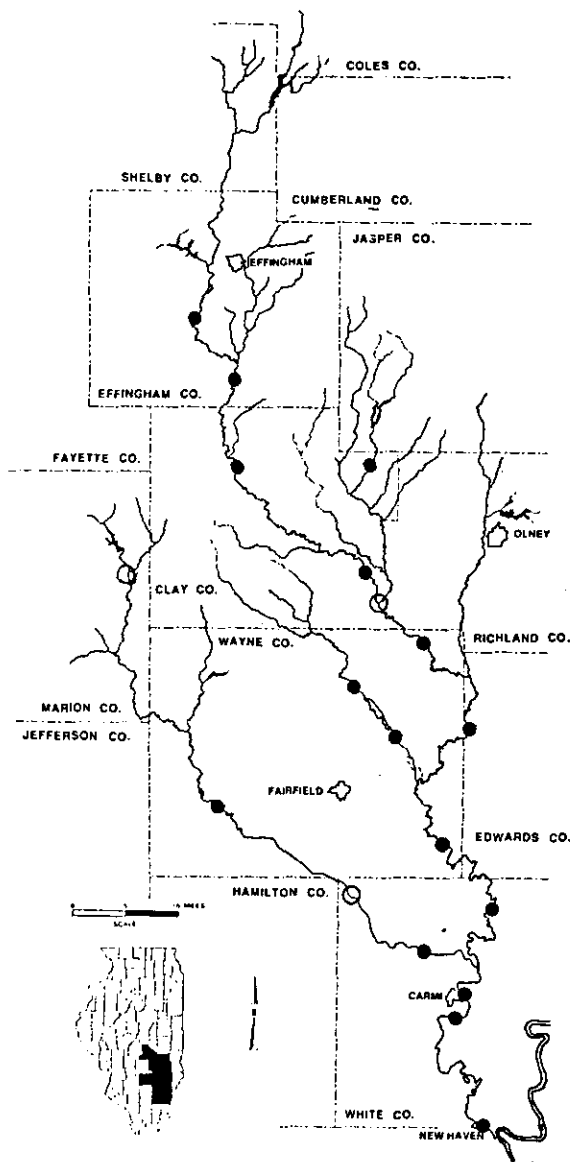
*Lampsilis cardium* (Rafinesque, 1820)  
plain pocketbook



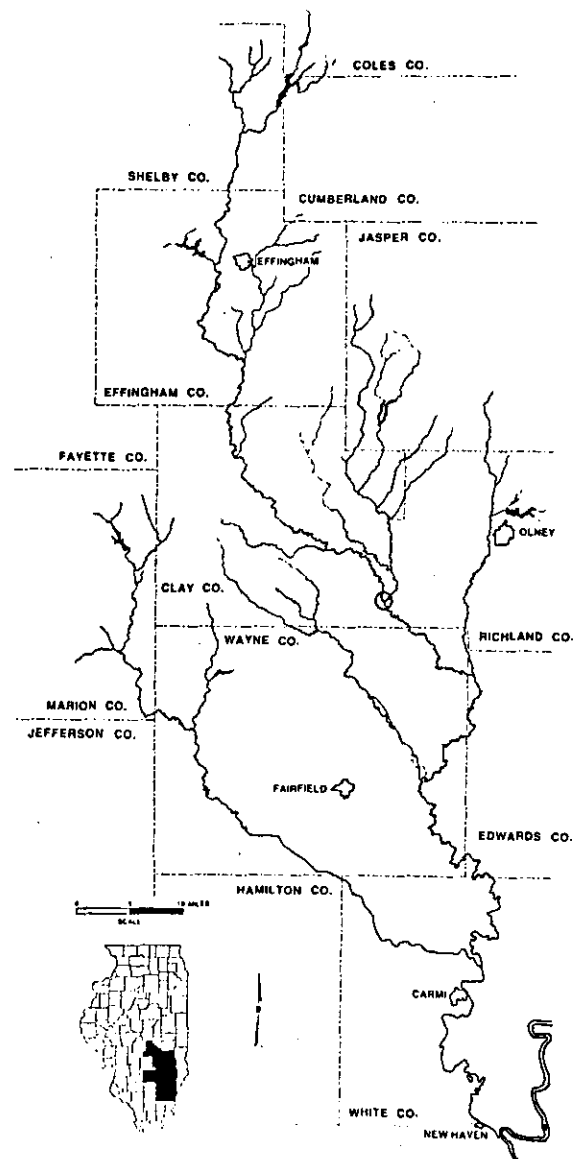
*Lampsilla silquoides* (Barnes, 1823)  
fatmucket



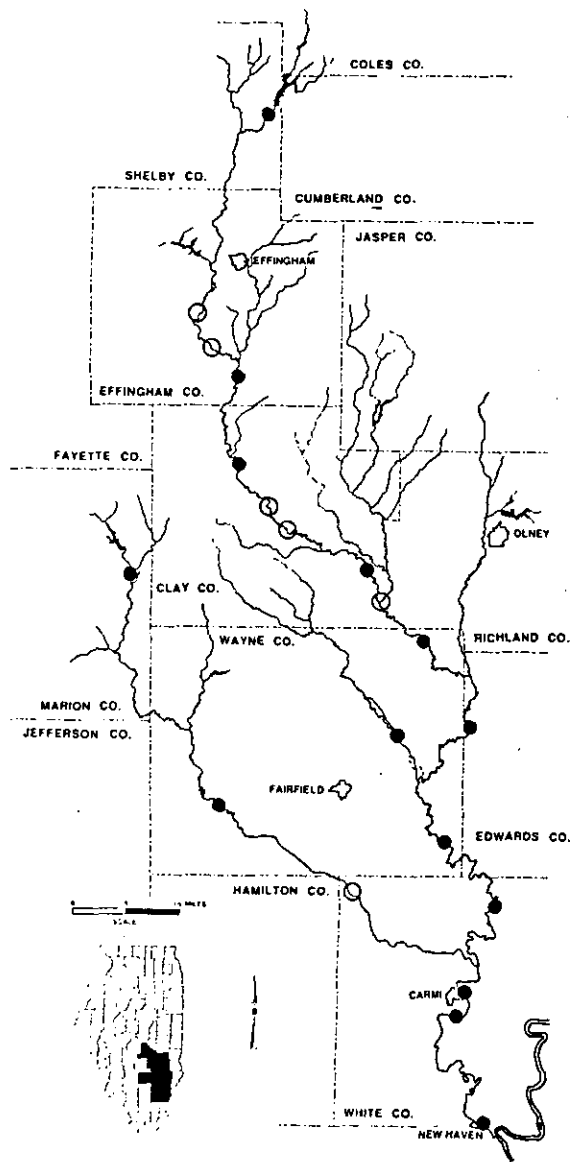
*Lampsilla teres* (Rafinesque, 1820)  
yellow sandshell



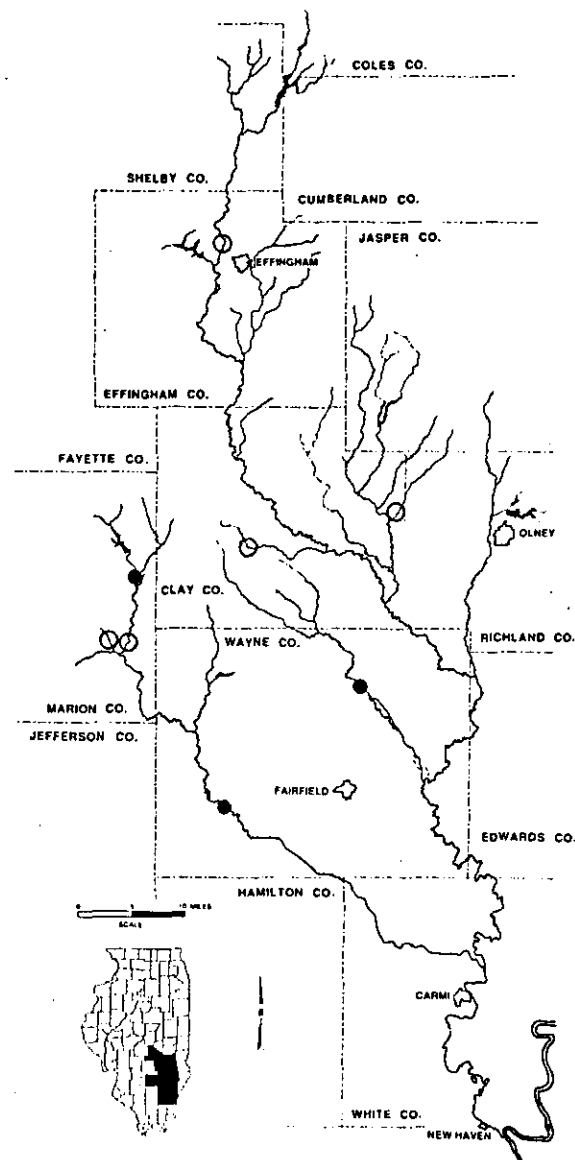
*Lasmigona complanata* (Barnes, 1823)  
white heelsplitter



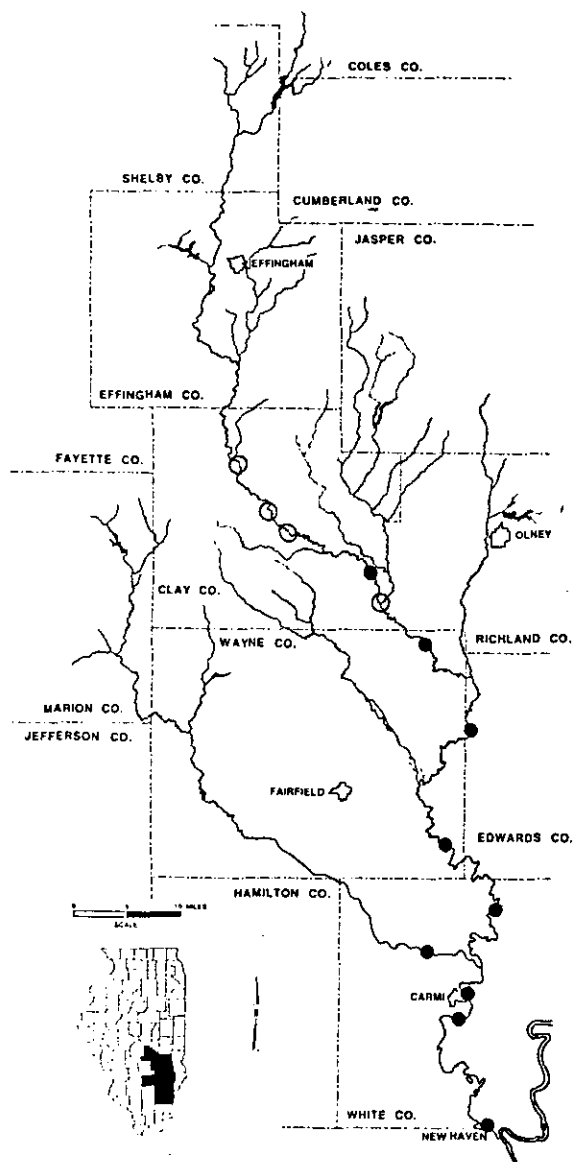
*Lasmigona costata* (Rafinesque, 1820)  
fluted-shell



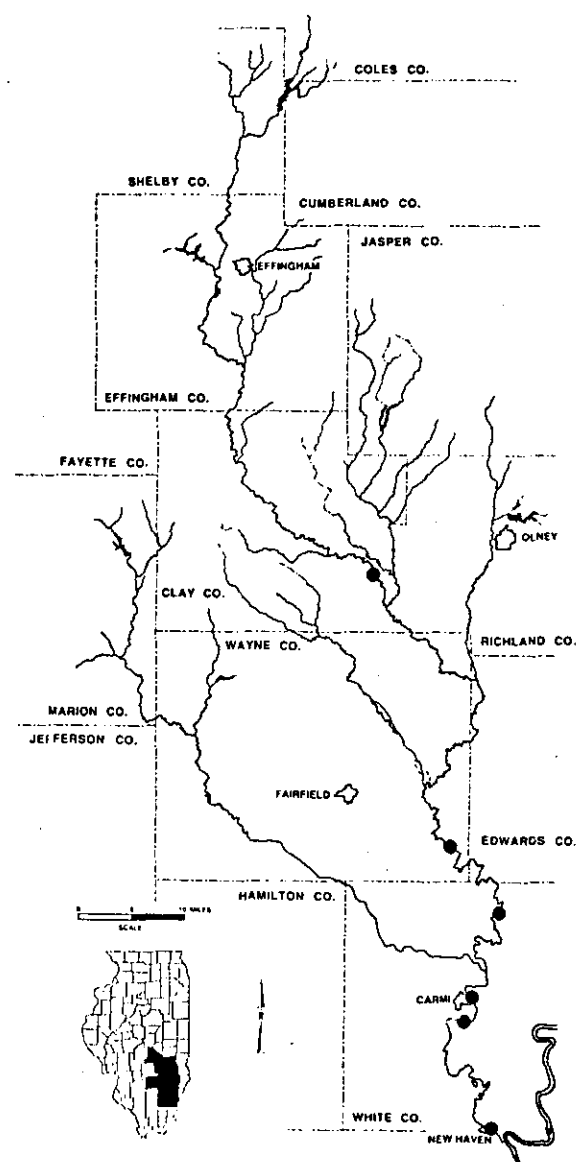
*Leptodea fragilis* (Rafinesque, 1820)  
fragile papershell



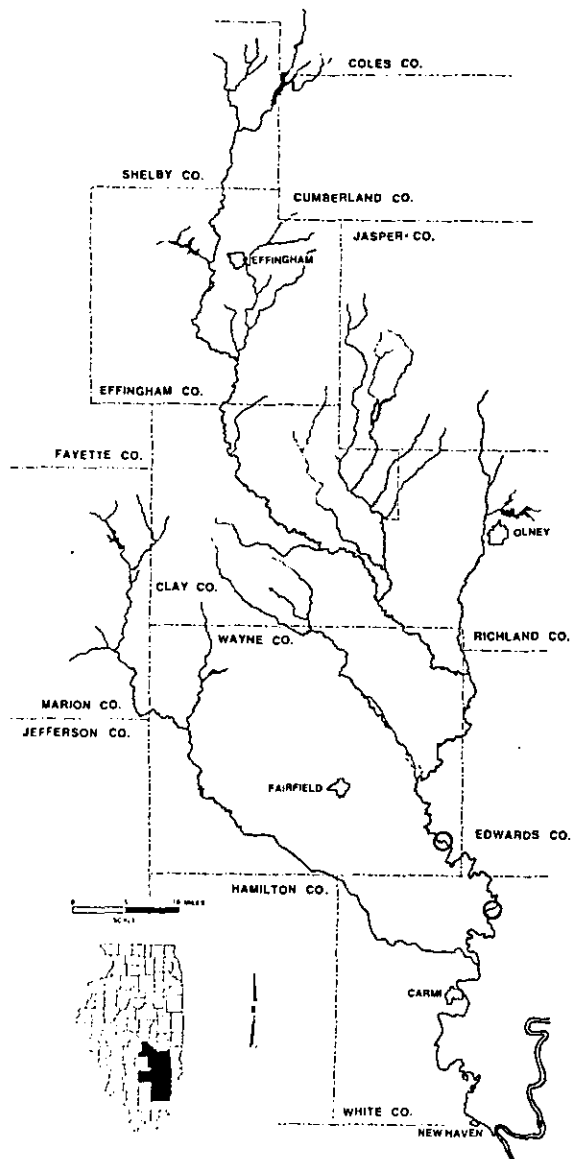
*Ligumia subrostrata* (Say, 1831)  
pondmussel



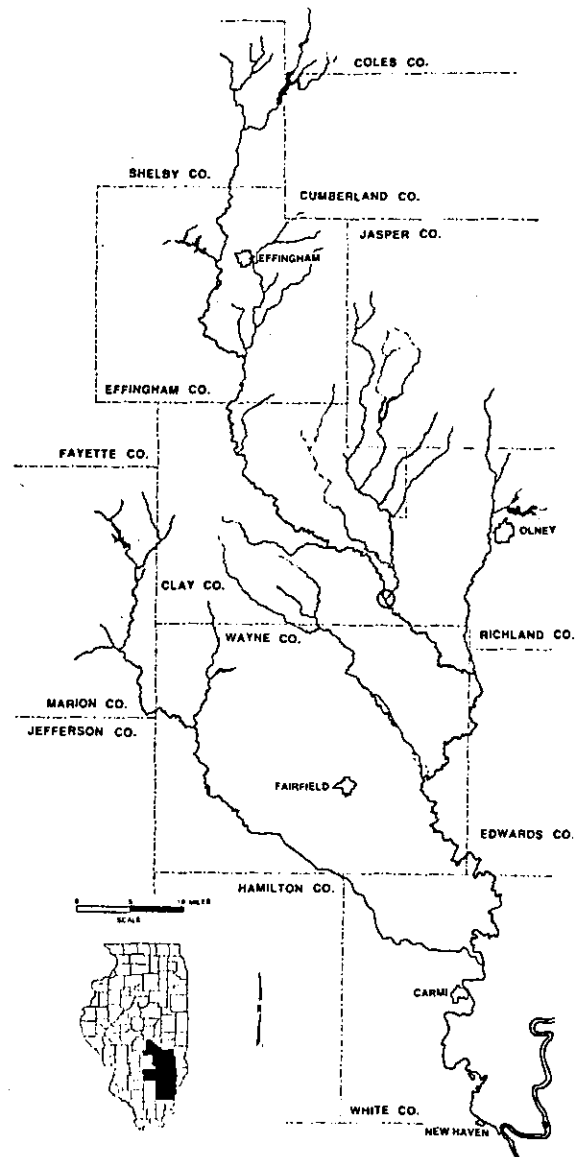
*Megalonias nervosa* (Rafinesque, 1820)  
washboard



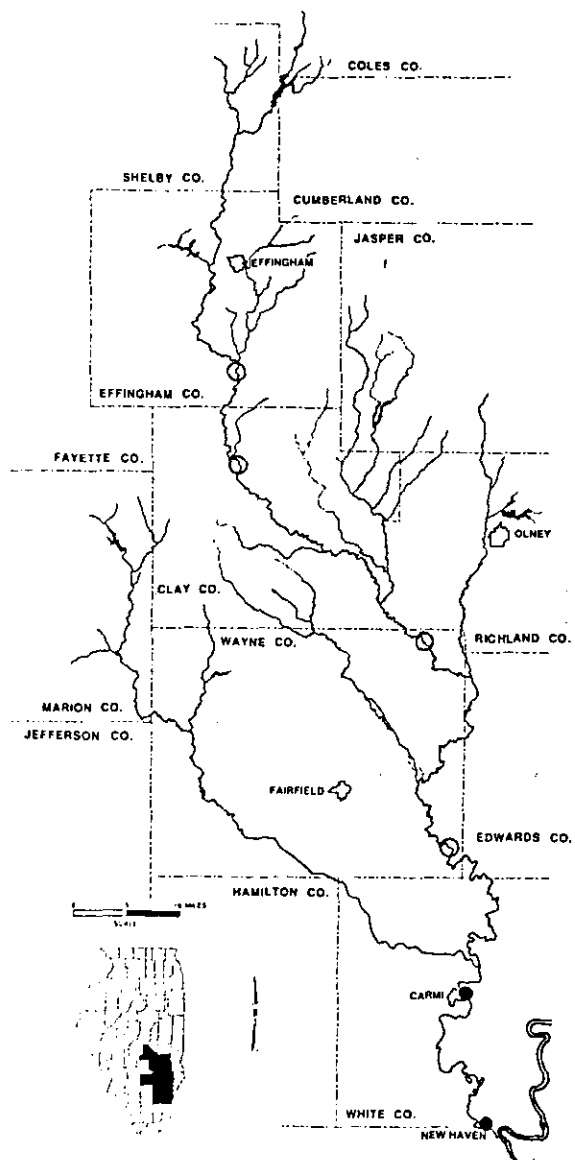
*Obliquaria reflexa* (Rafinesque, 1820)  
three-horn wartyback



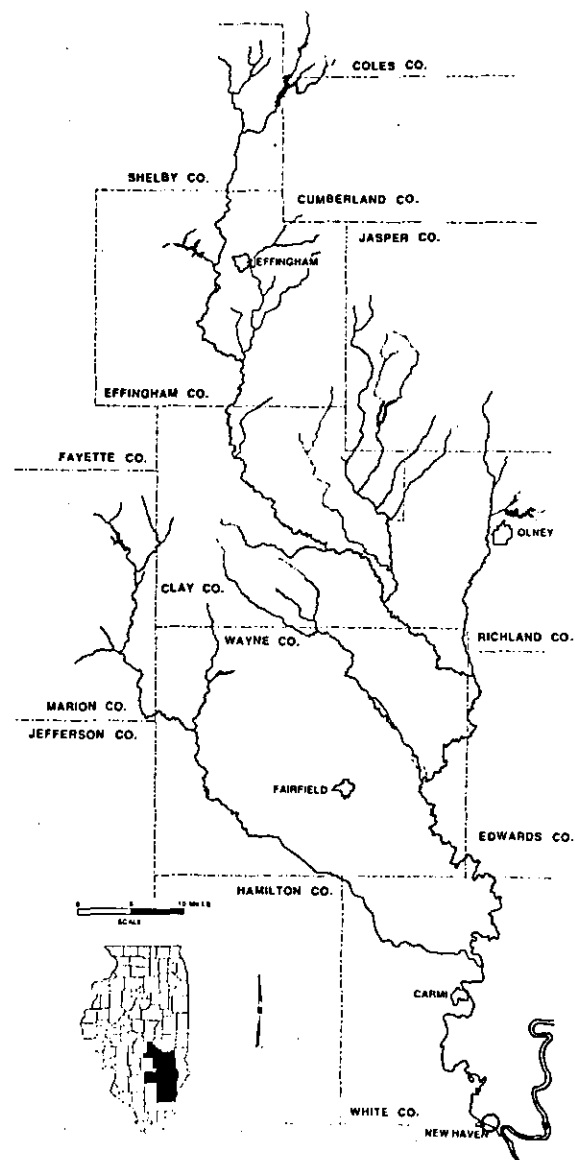
*Pleurobema rubrum* (Rafinesque, 1820)  
pyramid pigtoe



*Pleurobema sintoxia* (Rafinesque, 1820)  
round pigtoe

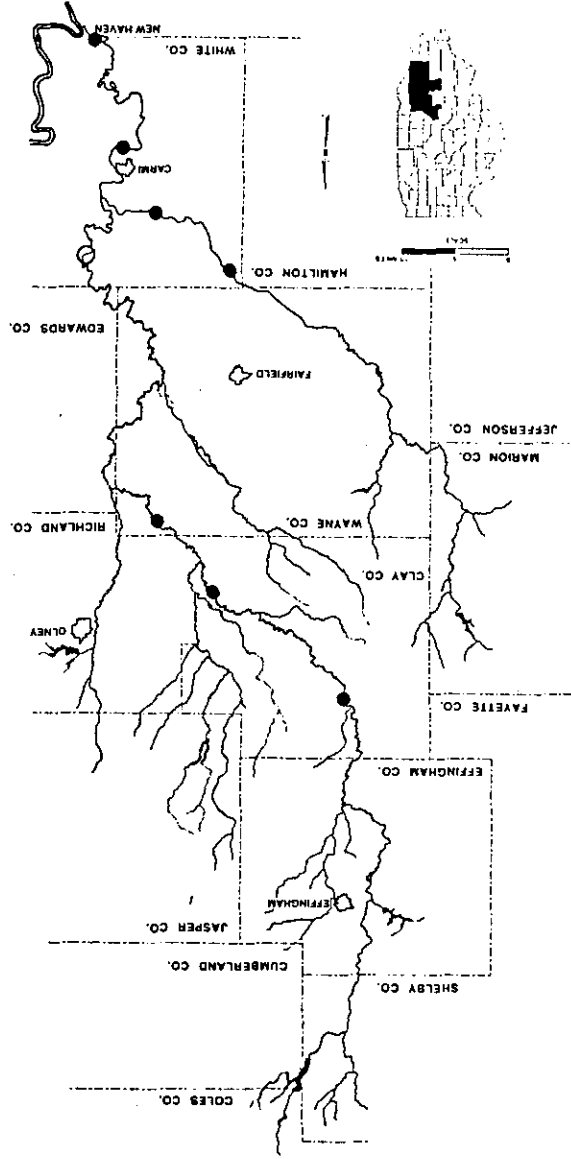


*Potamilius alatus* (Say, 1817)  
pink heelplitter

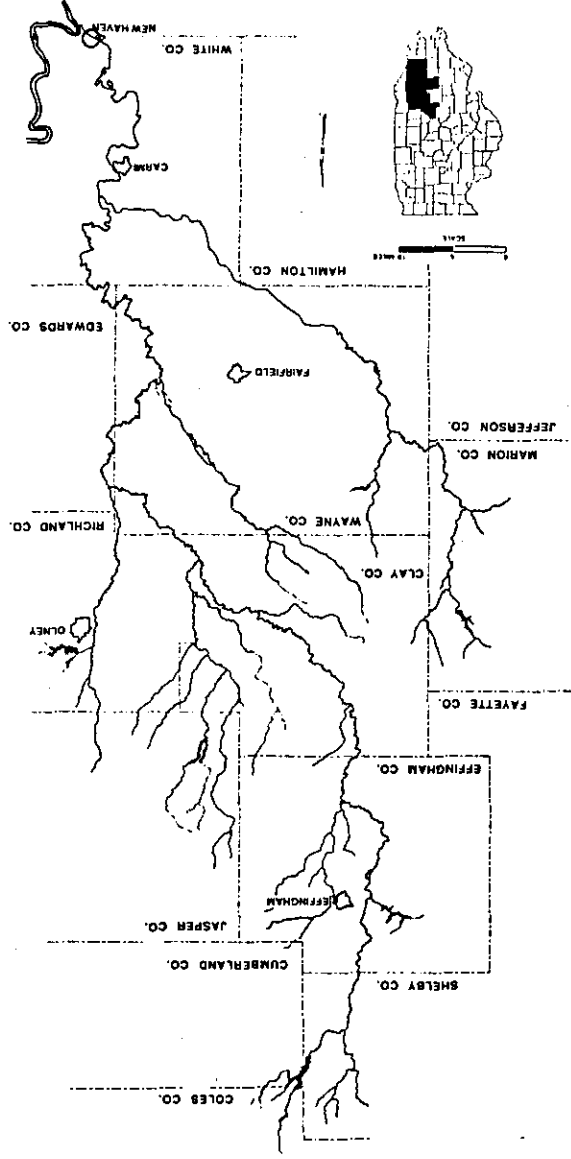


*Potamilius capax* (Green, 1832)  
fat pocketbook

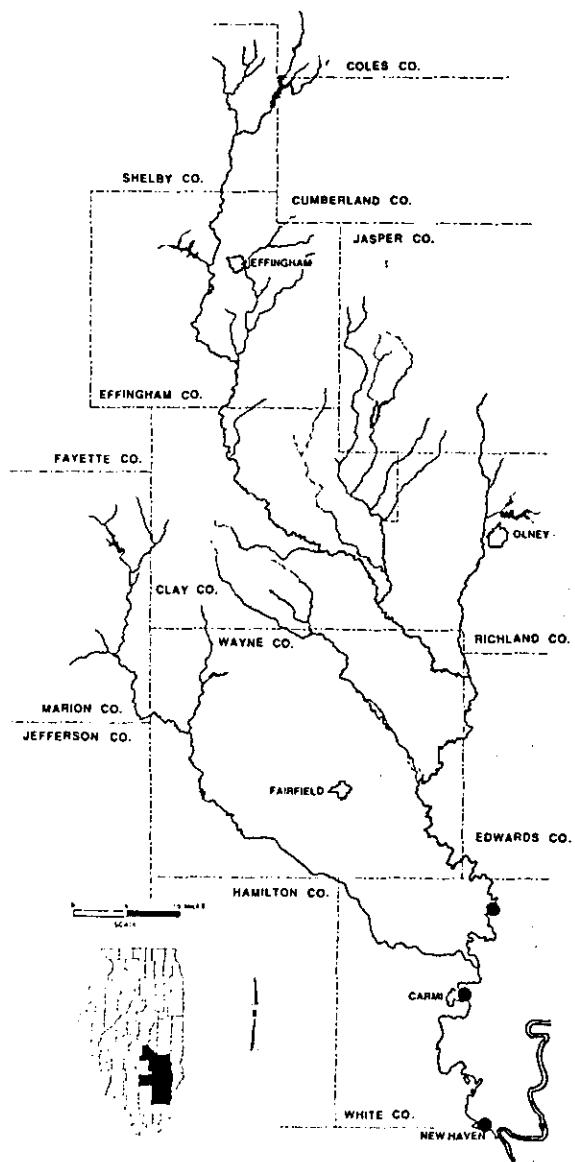
*Potamillus ohienis* (Rattnesque, 1820)  
pink papershell



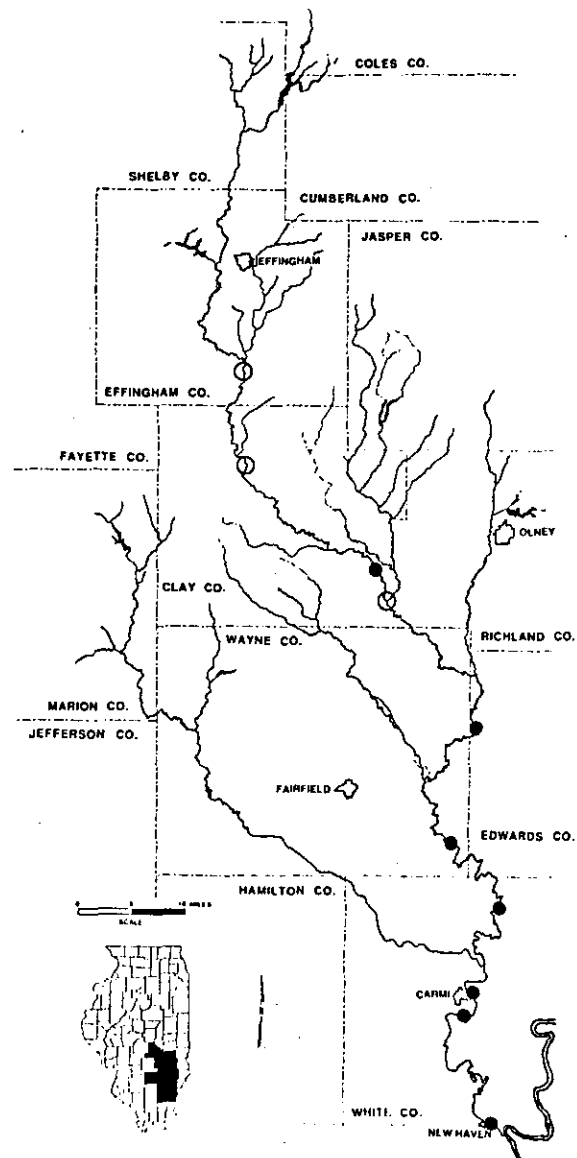
*Pygobranchnus fasciatus* (Rattnesque, 1820)  
kidneyshell



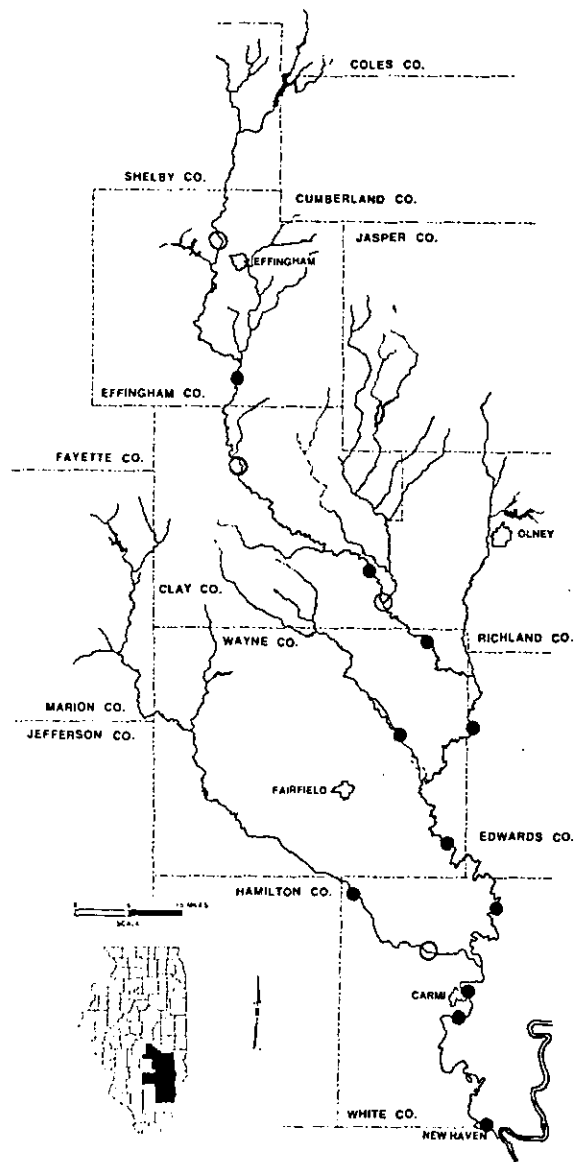




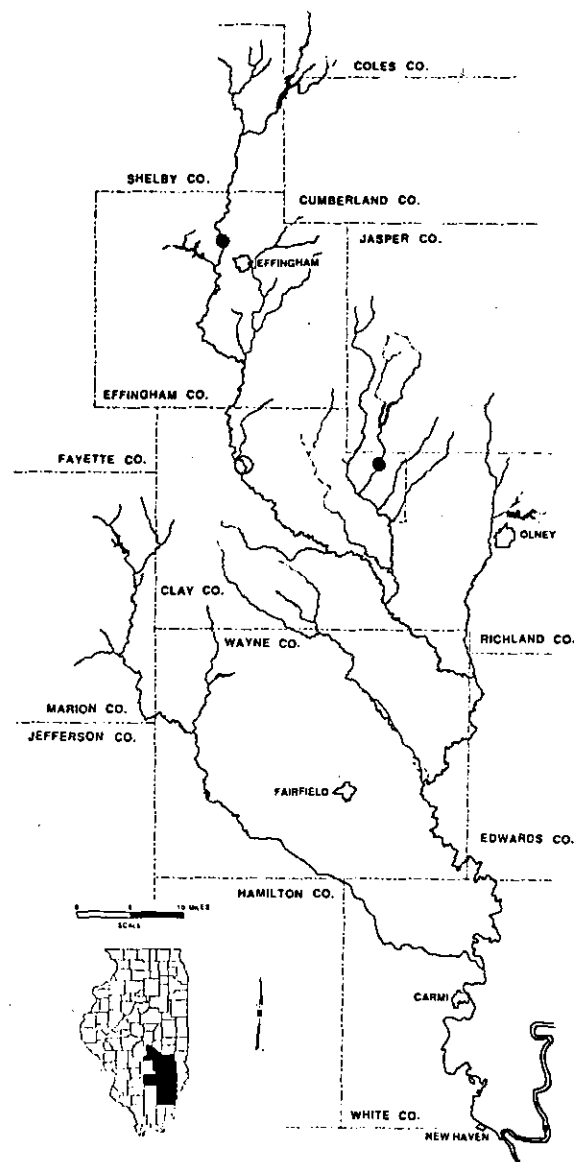
*Quadrula nodulata* (Rafinesque, 1820)  
wartyback



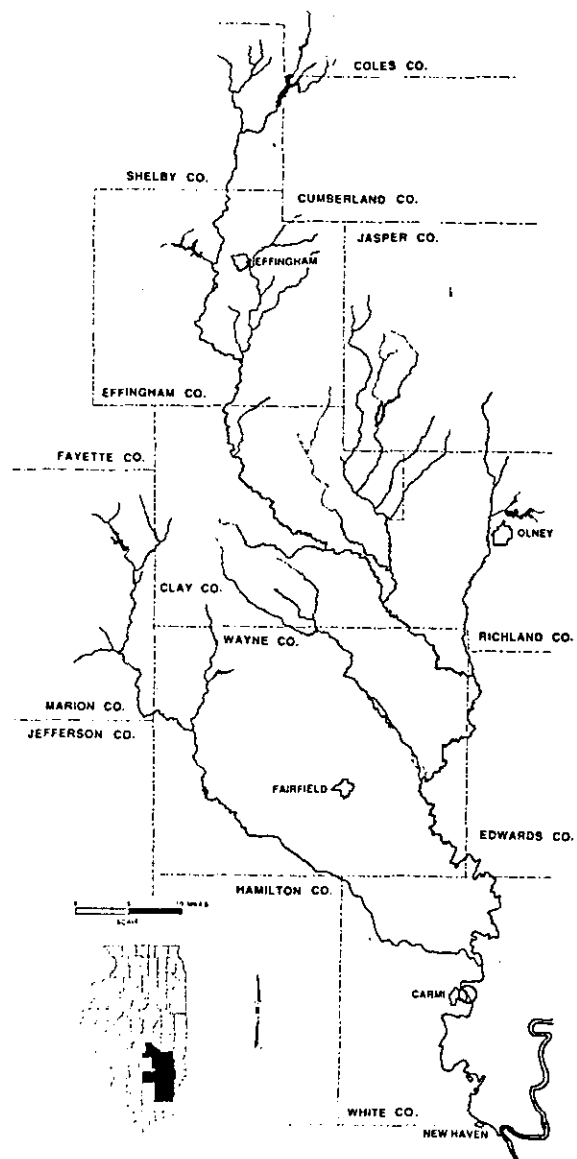
*Quadrula pustulosa* (I. Lea, 1831)  
pimpleback



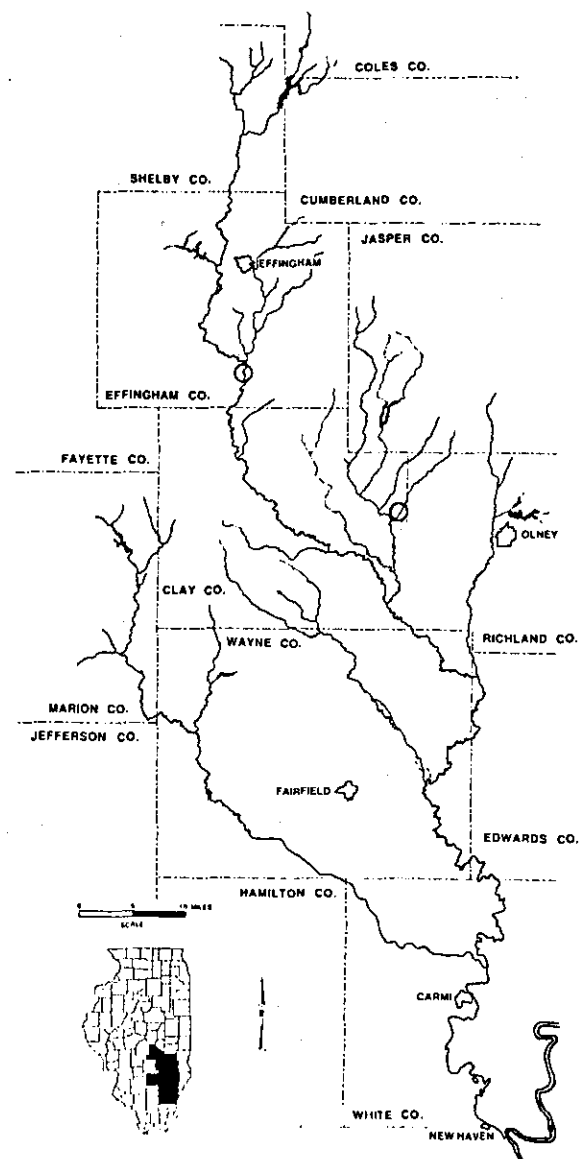
*Quadrula quadrula* (Rafinesque, 1820)  
mapleleaf



*Strophitus undulatus* (Say, 1817)  
squawfoot

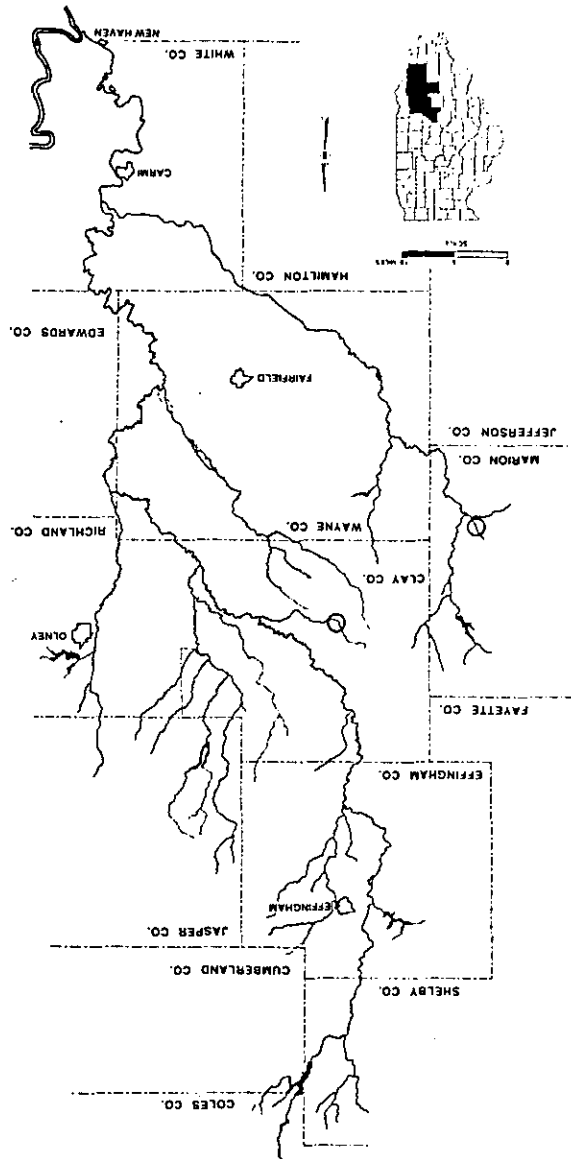


*Toxolasma lividus* (Rafinesque, 1831)  
purple lilliput

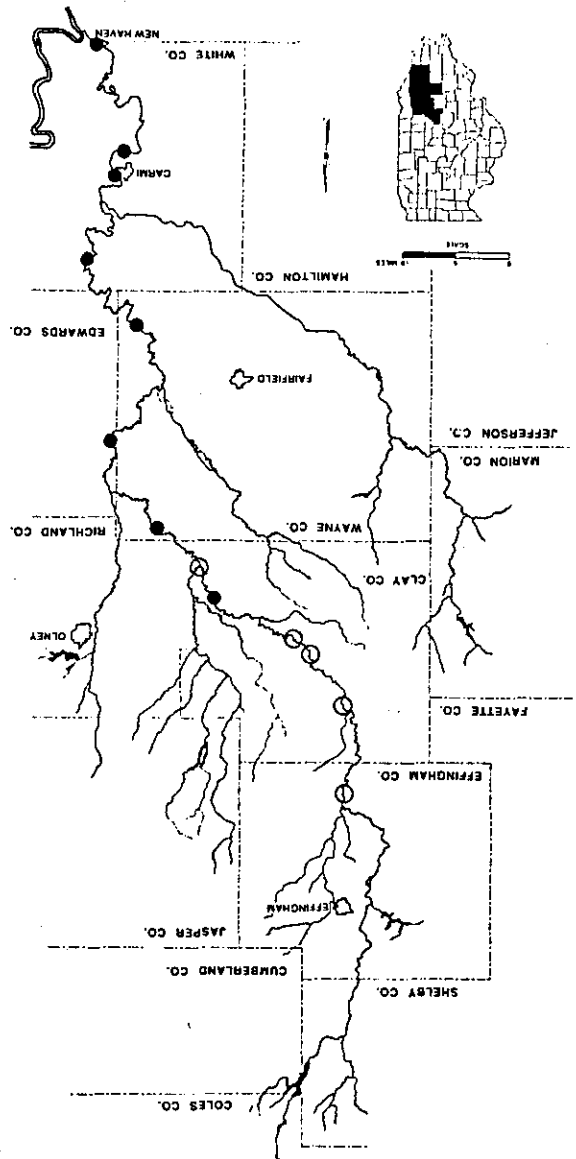


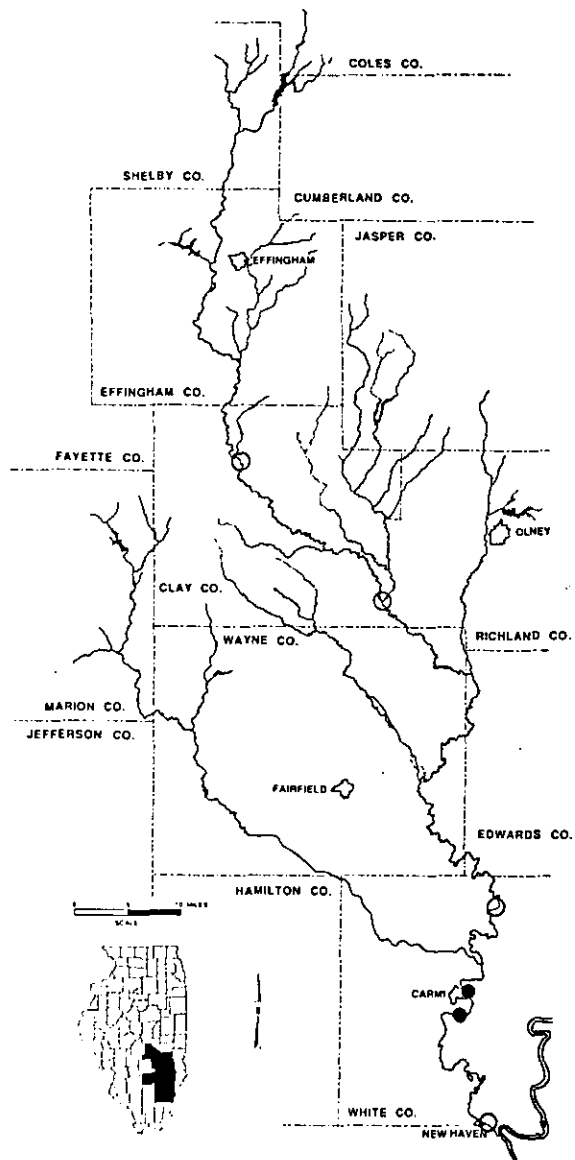
*Toxolasma parvus* (Barnes, 1823)  
lilliput

*Toxolasma texensis* (Lee, 1857)  
Texas Illinois

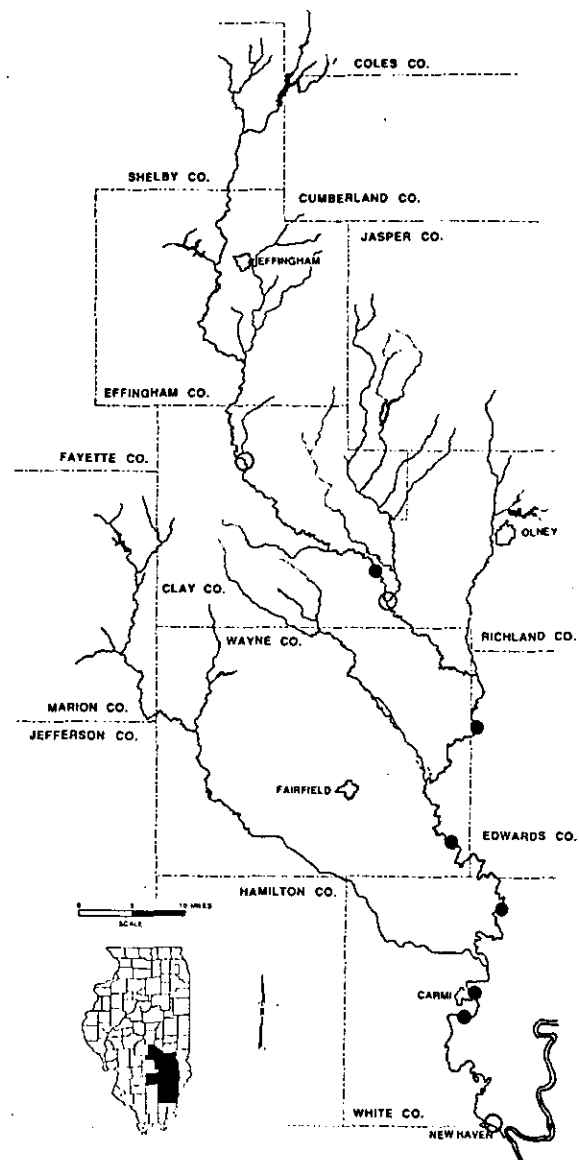


*Trigonia verrucosa* (Rafinesque, 1820)  
Illinois

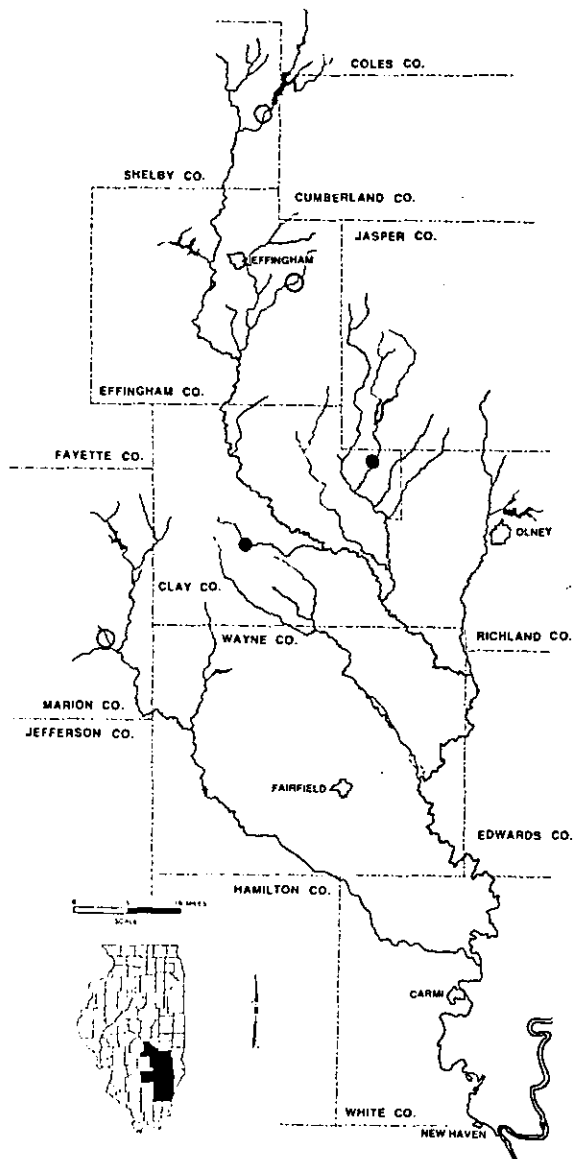




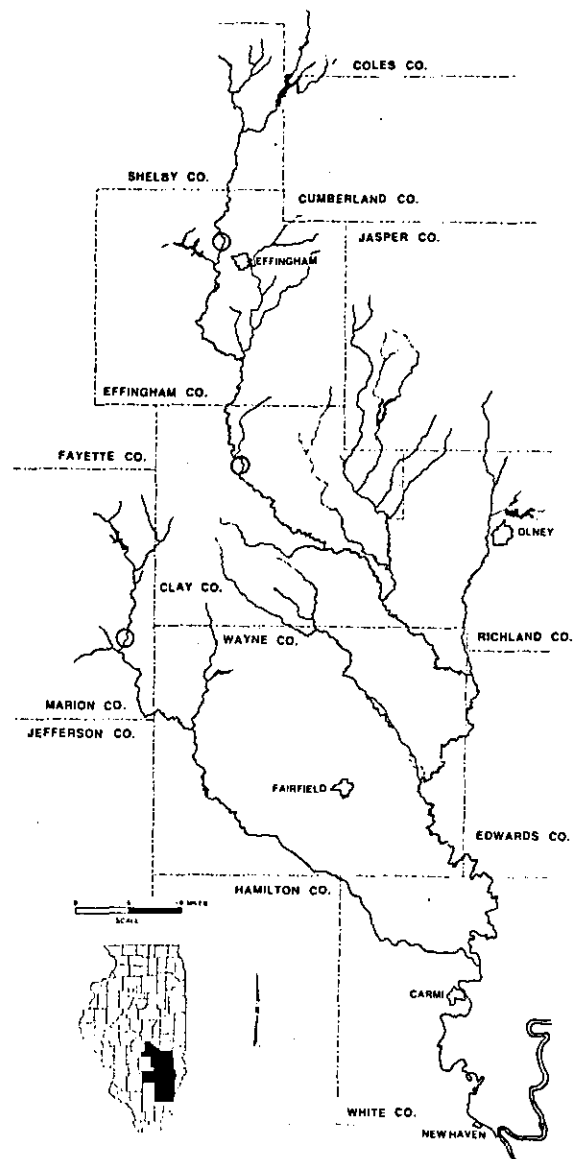
*Truncilla donaciformis* (I. Lea, 1828)  
lawnfoot



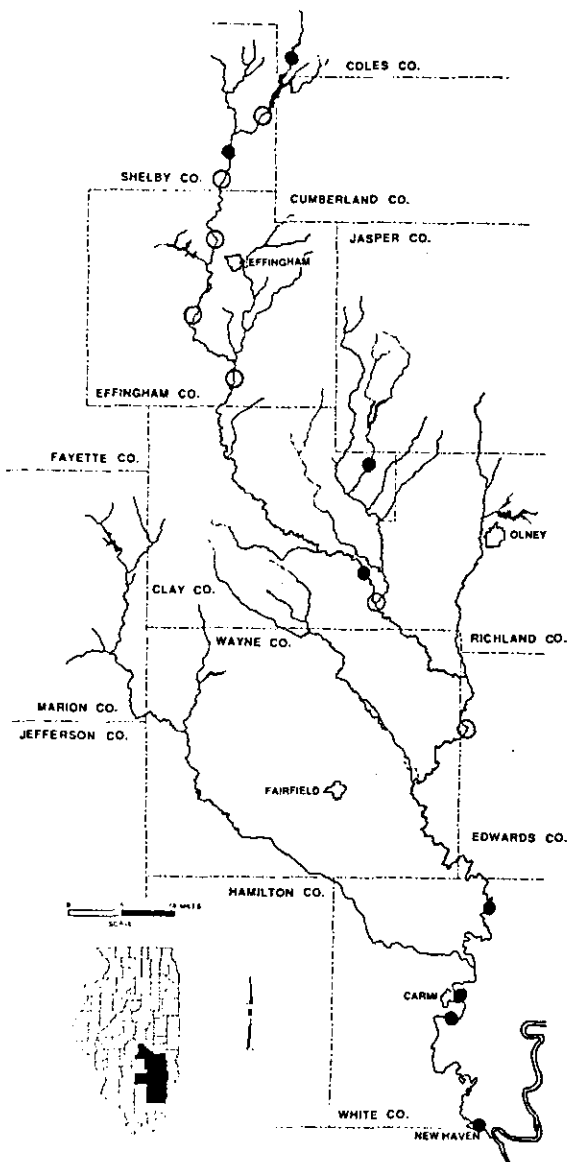
*Truncilla truncata* (Rafinesque, 1820)  
deertoe



*Unlomerus tetralasmus* (Say, 1831)  
pondhorn



*Villosa ilenosa* (Conrad, 1834)  
little spectacle case



*Corbicula fluminea* (Möller, 1774)  
 Asiatic clam

Appendix II.

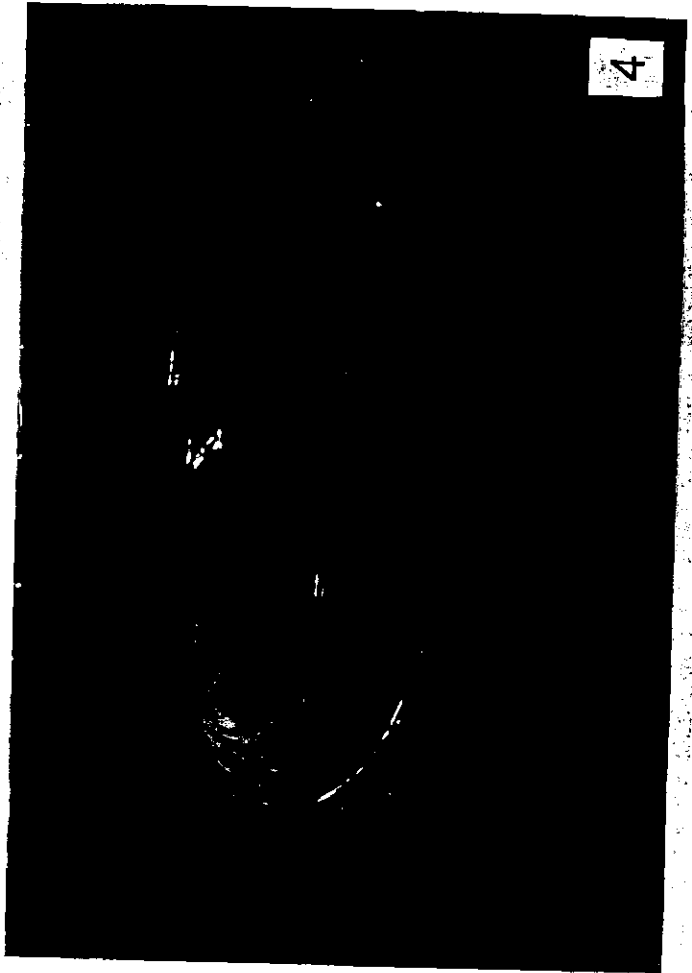
Photographs of the freshwater mussels (Unionidae)  
of the Little Wabash River drainage.



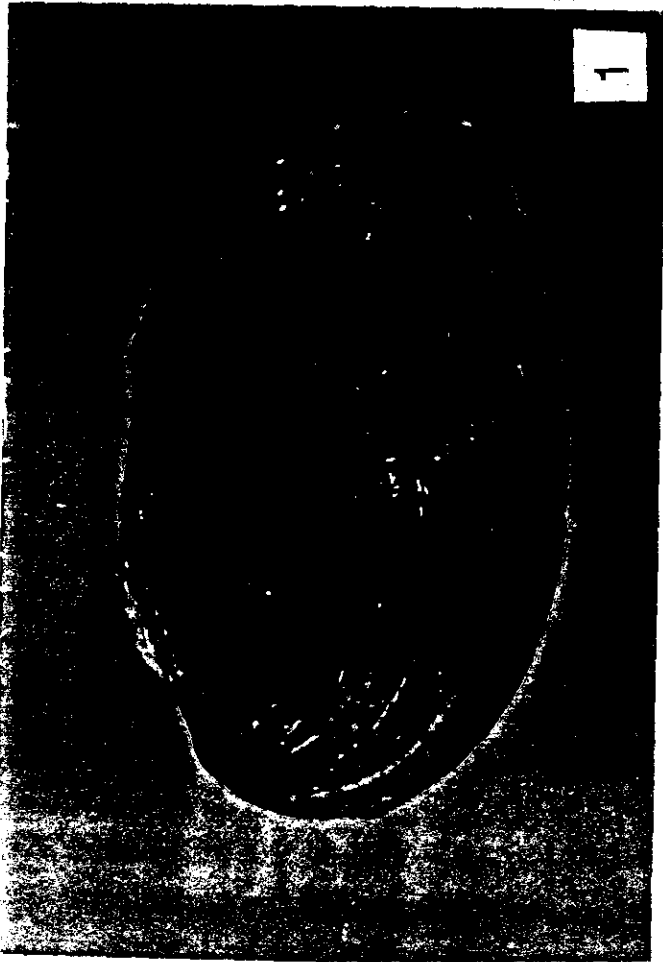
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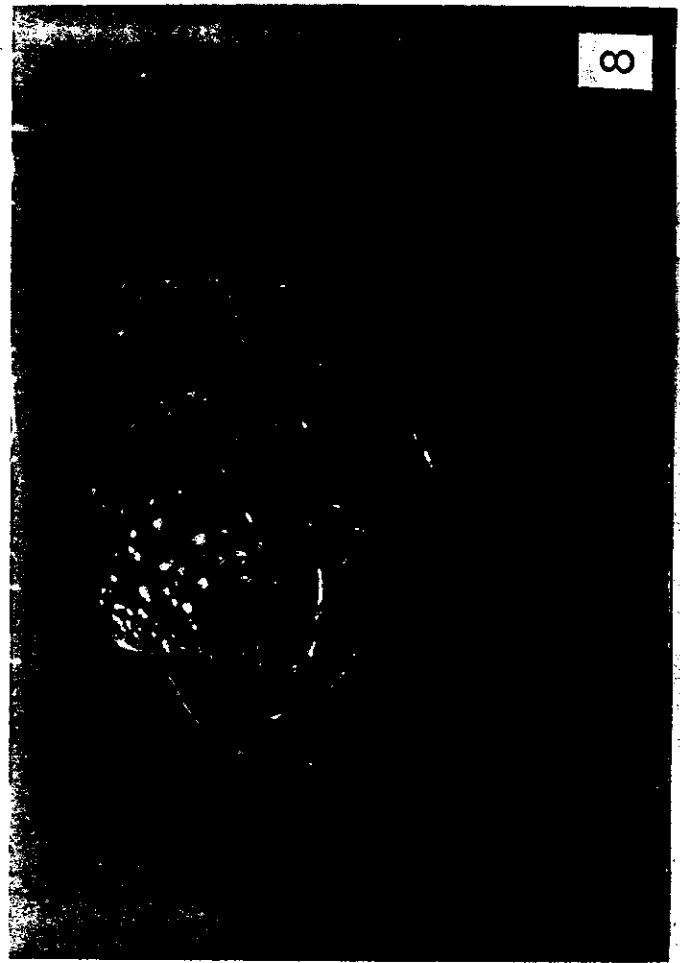
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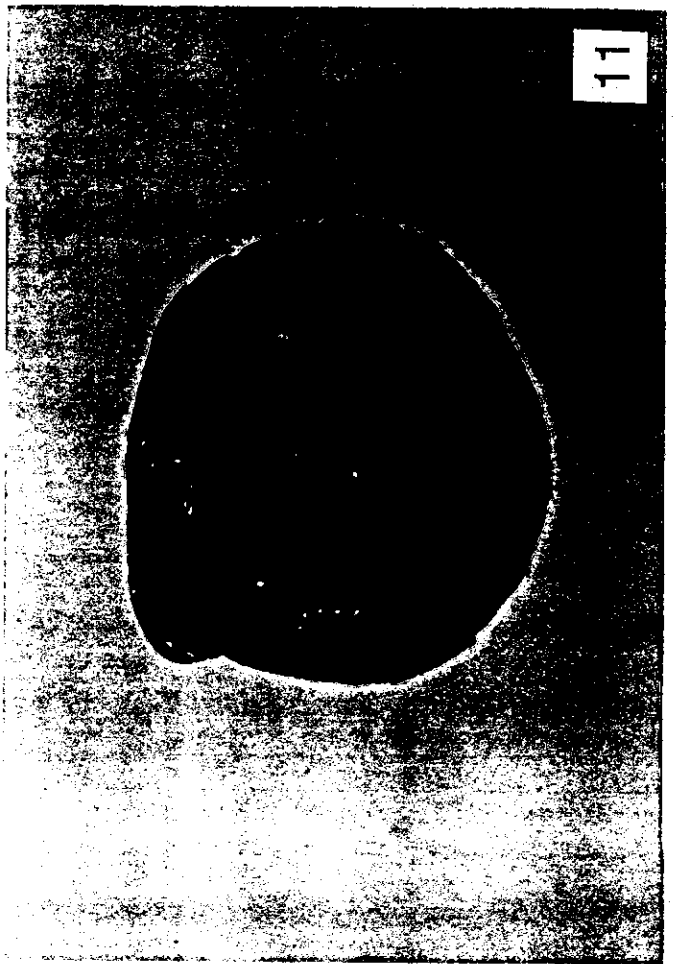


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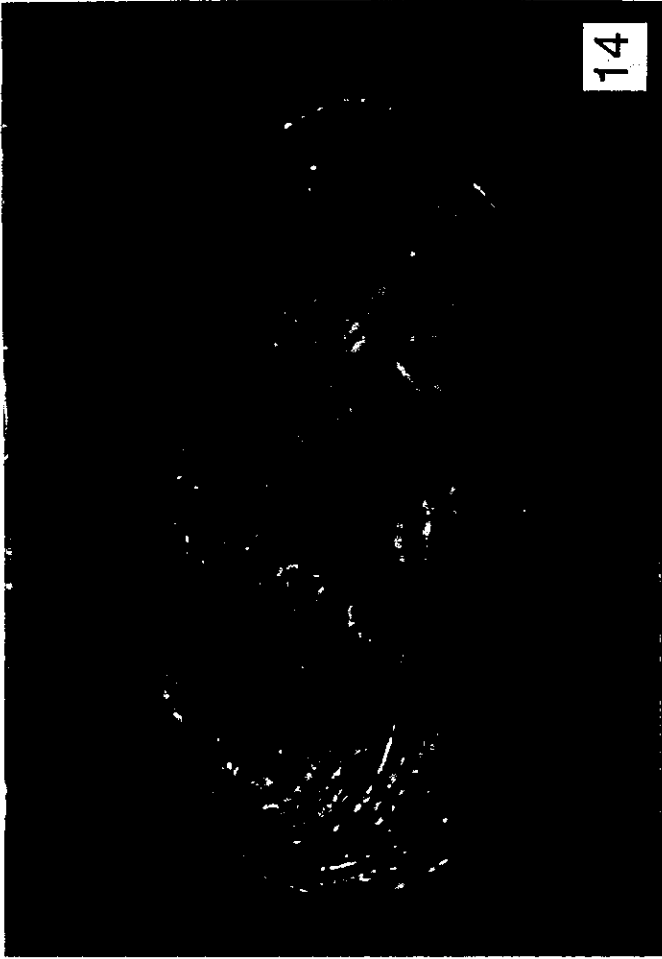


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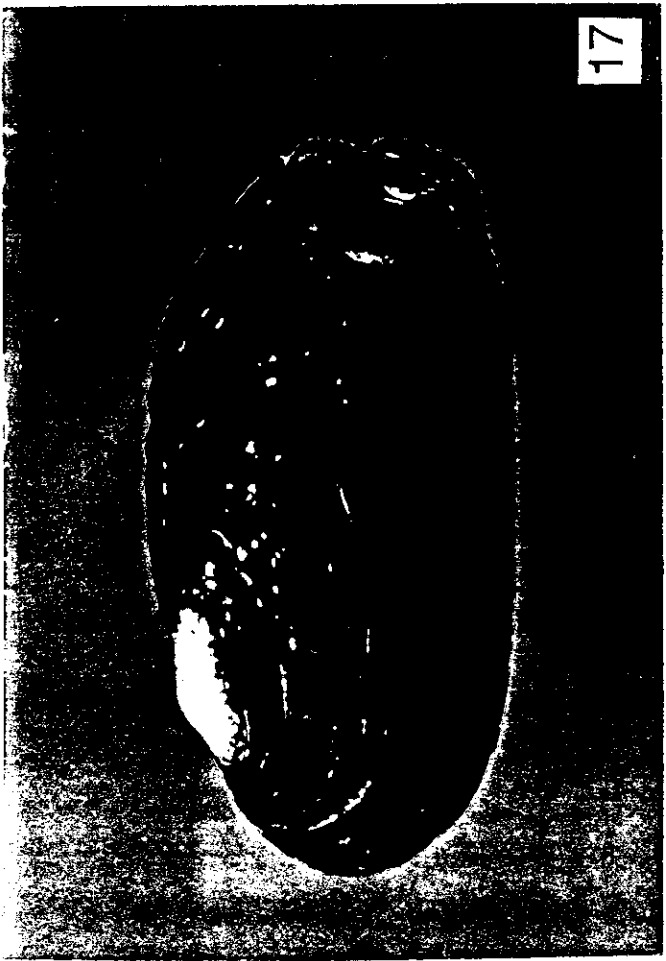
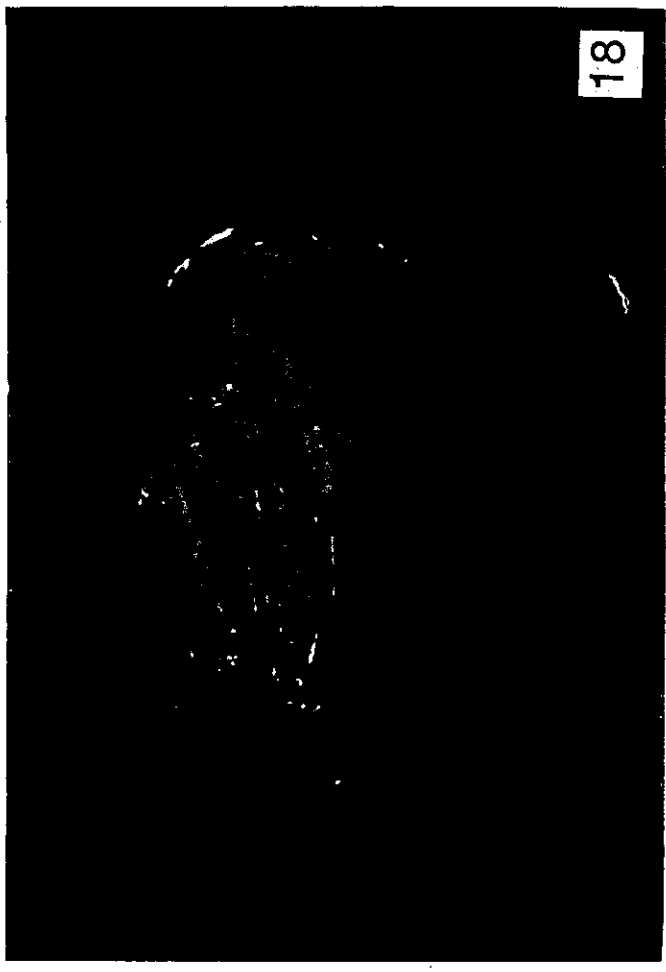




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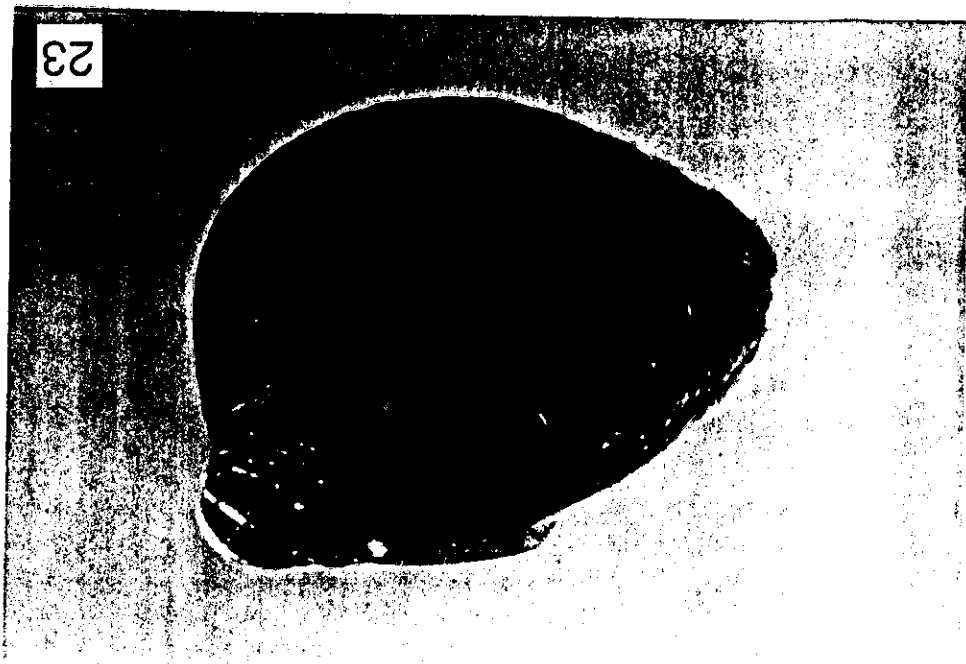
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24



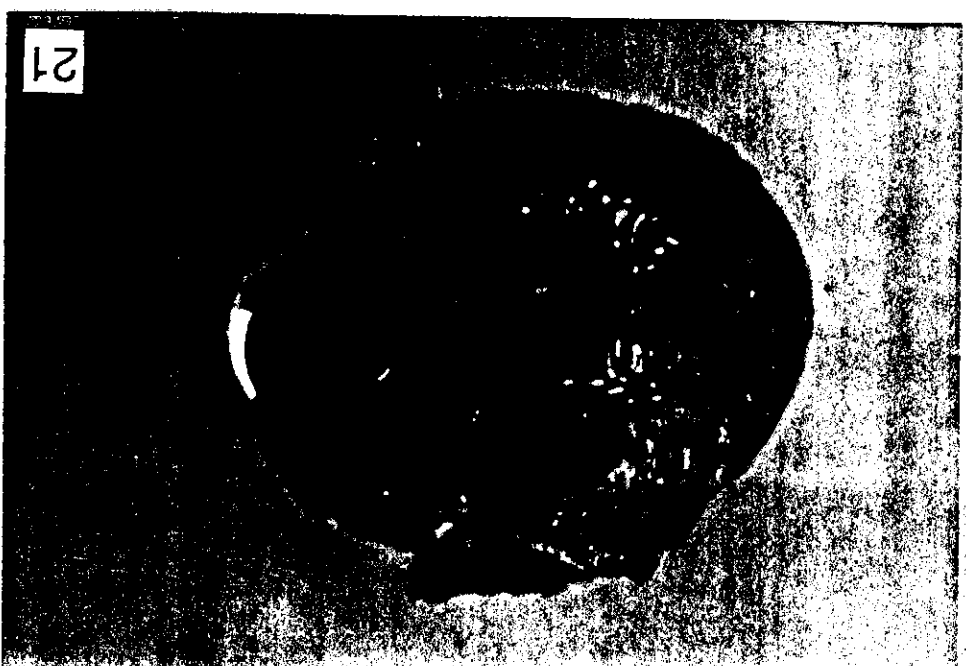
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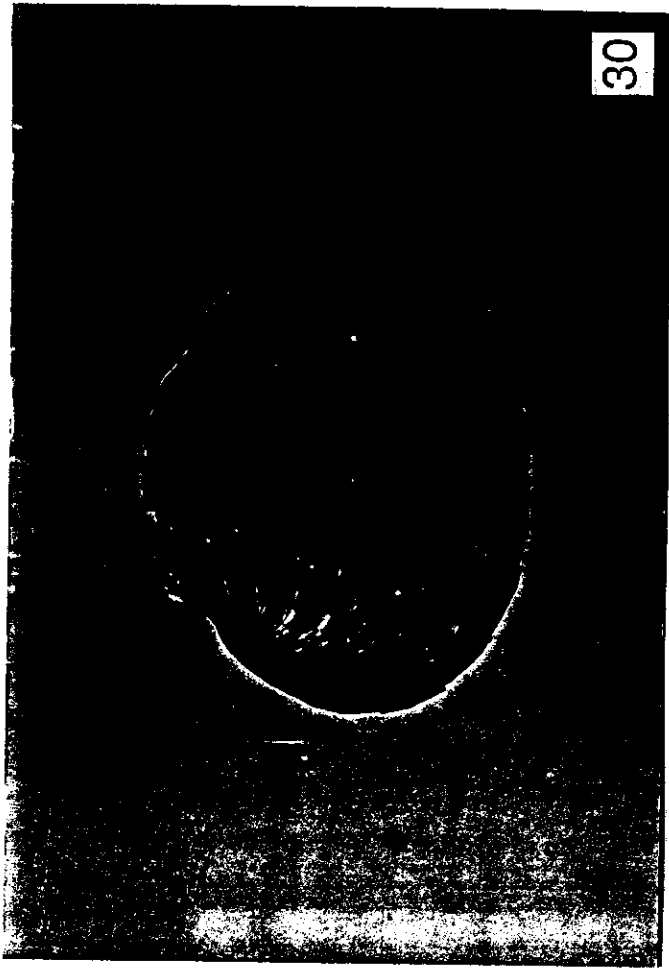
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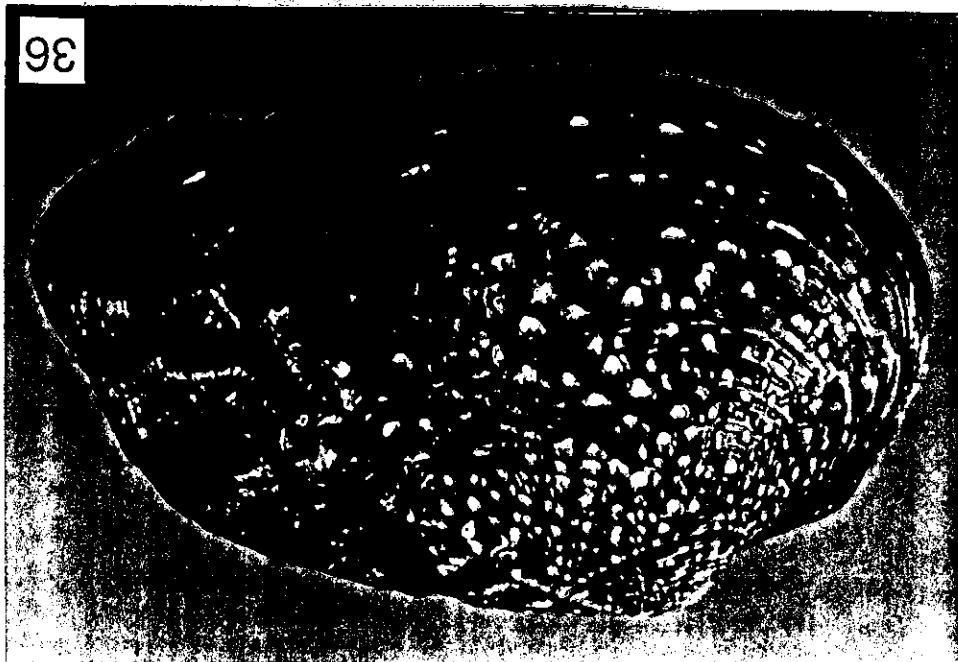


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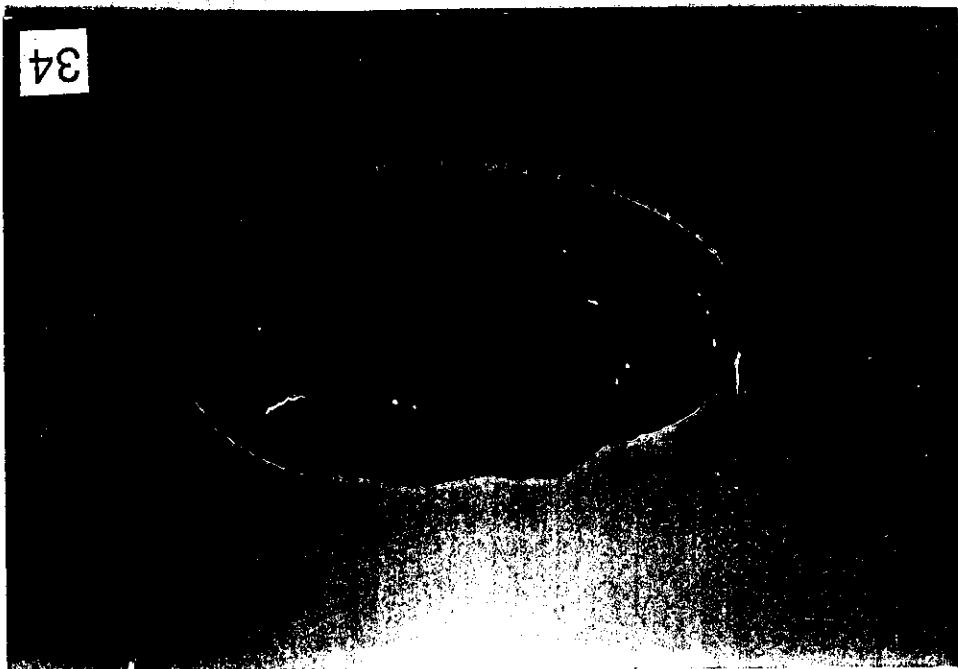
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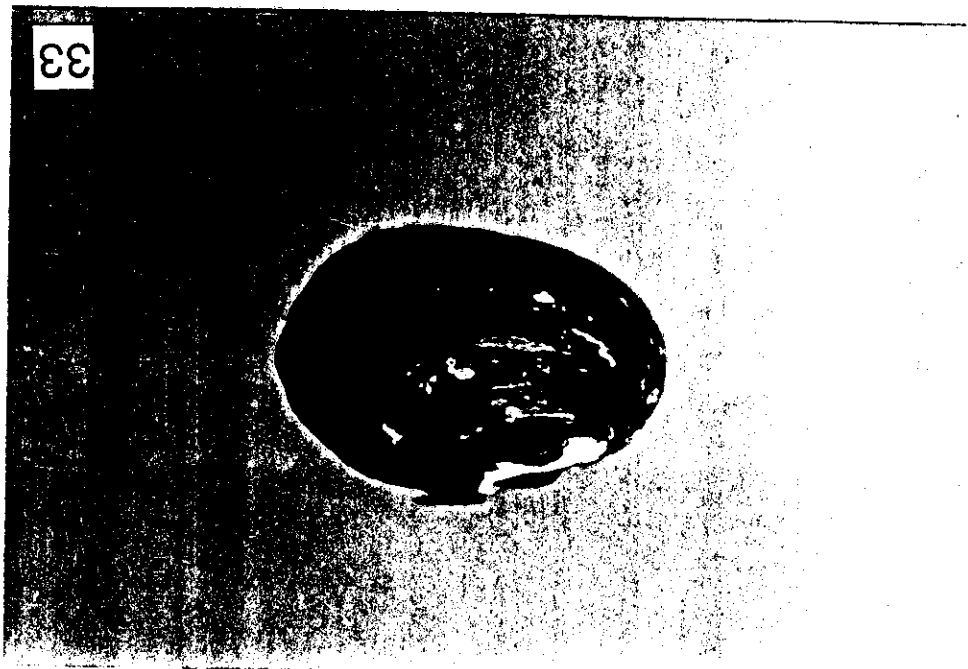
35



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37

