THE FRESHWATER MUSSELS (MOLLUSCA: BIVALVIA: UNIONIDAE) OF THE MACKINAW RIVER IN ILLINOIS

FINAL REPORT

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INTRODUCTION

Illinois is fortunate in that its freshwater mussel fauna has been studied for over 100 years (Calkins, 1874; Strode, 1892; Baker, 1898, 1906; Zetek, 1918; van der Schalie & van der Schalie, 1950; Parmalee, 1967). Many river systems have been surveyed and resurveyed periodically and changes in the fauna are well documented (Wilson & Clark, 1912; Danglade, 1914; Baker, 1922, 1926; Parmalee 1956; Matteson & Dexter, 1966; Starrett, 1971; Miller, 1972; Suloway 1975; Suloway, 1981; Suloway, et al., 1981). However, no comprehensive study on the mussels of the Mackinaw River drainage has been conducted and, consequently, historical as well as current information on the mussel fauna is limited.

In his "Catalogue of the Mollusca of Illinois", F.C. Baker (1906) reported 11 species of mussels from the Mackinaw River at Kappa, in Woodford County (Table 1). Additional records were obtained by Dr. Max R. Matteson during a statewide mussel survey of the interior streams of Illinois in the late 1950's and early 1960's (unpubl. data). Matteson collected 19 species of mussels from ten localities in the Mackinaw River drainage from 1948-57 (Table 1 & Appendix I). Another lot of specimens simply labeled Mackinaw River, 1949 was found in the INHS collection. This lot contained another species, *Uniomerus tetralasmus* (Say, 1831), which was not present in the other collections.

Parmalee (1967) collected mussels from the Mackinaw River at approximately the same time as Matteson. Records are available in the Illinois State Museum, Springfield, for 11 species collected by Parmalee in the Mackinaw drainage from 1955 to 1966 (Table 1 & Appendix II).

In August of 1984, Jon Duyvejonck of the U.S. Army Corps of Engineers (USACOE), Rock Island District, inspected from a boat, a seven mile stretch of the Mackinaw River in Woodford County from Highway 8 downstream to the Congerville blacktop (J. Duyvejonck, pers. comm.). He reported that numerous shells were present "on practically every gravel bar" and that "mussel beds were very abundant". Duyvejonck sampled at one site on this stretch (0.4 to 0.8 km downstream of the Woodford County Highway 8 bridge) and collected 13 species of living mussels with an additional four represented by dead shells only (Table 1). No indication as to the number of individuals was given .

Table 1. Comparison of the numbers of species of unionid mussels collected from the Mackinaw River drainage during past studies.

Species	Baker (1906)	Matteson (1948-57)	Ill. State Museum (1955-66)	U.S. Army Corp. Eng. (1984)	INHS (1987)
Actinonaias ligamentina (Lamarck, 1819)	-	-	-	-	xx
Alasmidonta marginata Say, 1818	+	-	-	-	+
Alasmidonta viridis (Rafinesque, 1820)	+	+	+	-	xx
Amblema plicata (Say, 1817)	+	x	+	+	+
Anodonta grandis Say, 1829	+	+	+	-	+
Anodontoides ferussacianus (I. Lea, 1834)	-	+	+	-	+
Arcidens confragosus (Say, 1829)	-	-	-	x	-
Elliptio dilatata (Rafinesque, 1820)	-	x	-	+	xx
Fusconaia flava (Rafinesque, 1820)	+	+	-	+	+
Lampsilis cardium (Rafinesque, 1820)	+	+	-	+	+
Lampsilis siliquoidea (Barnes, 1823)	+	+	+	+	+
Lampsilis teres (Rafinesque, 1820)	-	+	-	+	+
Lasmigona complanata (Barnes, 1823)	+	+	-	+	+
Lasmigona compressa (I. Lea, 1829)	-	-	+	-	+
Lasmigona costata (Rafinesque, 1820)	+	-	+	+	x
Leptodea fragilis (Rafinesque, 1820)	-	+	-	+	+
Megalonaias nervosa (Rafinesque, 1820)	-	-	-	x	-
Pleurobema sintoxia (Rafinesque, 1820)	-	x	+	+	+
Potamilus alatus (Say, 1817)	-	-	-	-	+
Potamilus ohiensis (Rafinesque, 1820)	-	+	-	-	+
Quadrula pustulosa (I. Lea, 1831)	-	x	-	+	+
Quadrula quadrula (Rafinesque, 1820)	-	+	-	+	+
Strophitus undulatus (Say, 1817)	-	+	+	x	+
Toxolasma parvus (Barnes, 1823)	+	+	-	-	+
Tritogonia verrucosa (Rafinesque, 1820)	-	-	-	-	x
Truncilla donaciformis (I. Lea, 1828)	-	+	-	-	+
Truncilla truncata Rafinesque, 1820	-	-	-	x	-
Uniomerus tetralasmus (Say, 1831)	-	+	-	-	x
Venustaconcha ellipsiformis (Conrad, 1836)	+	+	+	+	+
Villosa iris (I. Lea, 1830)	-	-	+	-	-
Total number of species = 30	11	20	11	17	26

+ = live specimens collected
x = recently dead shell only
xx = sub-fossil or old dead shell only

A limited survey was conducted in the middle portion of the drainage in 1984-85 by INHS for the Illinois Department of Transportation (IDOT) (Kasprowicz & Wetzel, 1986). Ten sampling stations were grouped at or near U.S. Highway 51 and a total of 17 species was found (Appendix III).

The objectives of this study were to obtain data on the present distribution and relative abundance of unionid mussels at 25 sites in the Mackinaw River drainage in Tazewell, Woodford, and McLean counties.

METHODS

Sampling of mussels was carried out at 25 sites in the Mackinaw River basin (Figure 1 & Table 2). Eleven of those sites were located in an area of the drainage slated for flooding by a proposed dam and reservoir (Figure 2). All sites visited by M.R. Matteson from 1948-57 were revisited and resampled. Living mussels and valves of dead specimens were collected by hand for four man-hours at each site. Voucher specimens of all species were taken at each site and deposited in the Mollusc Collection of the Illinois Natural History Survey, Champaign, Illinois. An effort was made to sample all available habitats, but particular emphasis was placed on areas that appeared likely to support mussels (i.e., gravel riffles, runs, and pools).

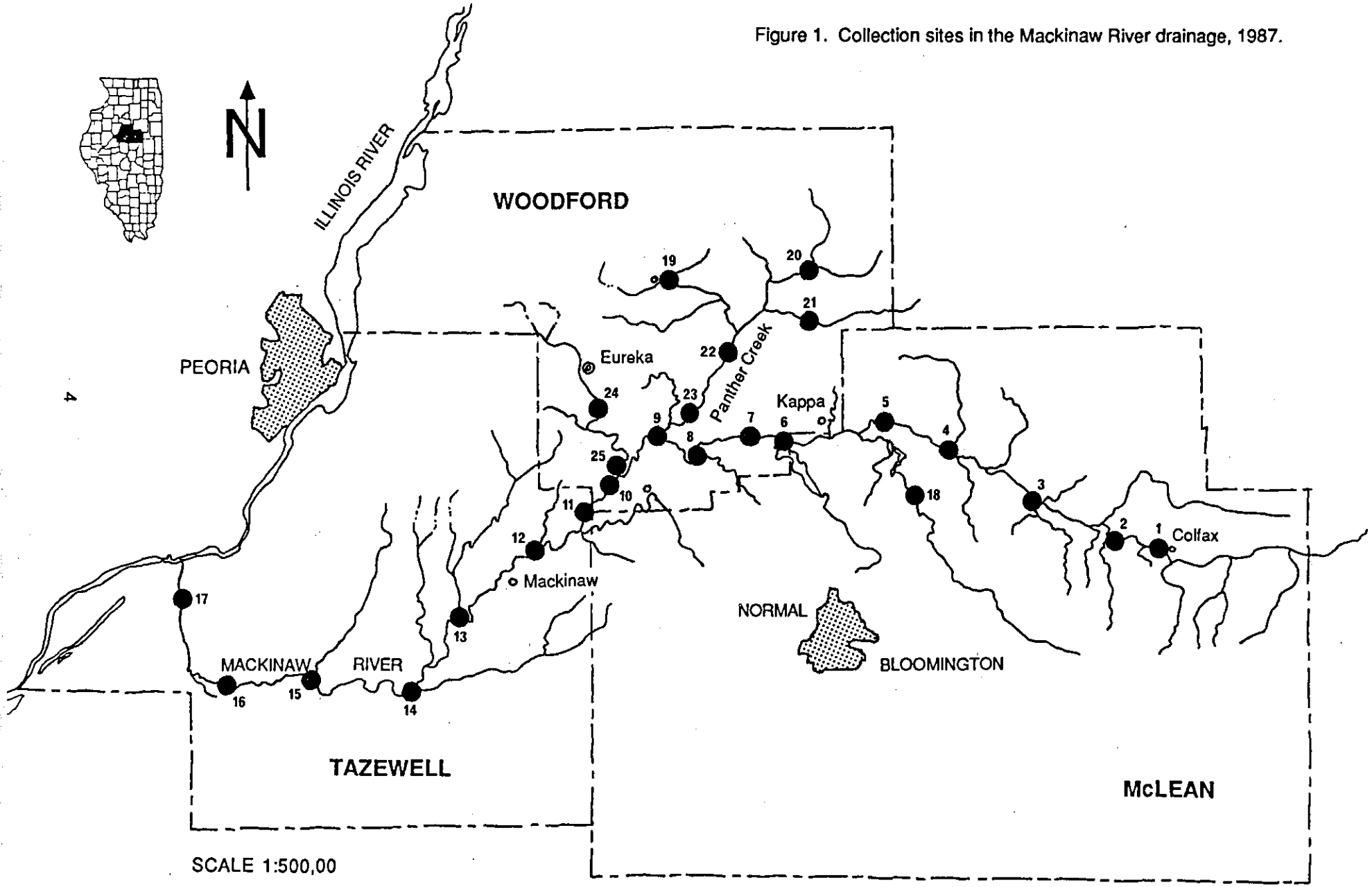
The nomenclature in this report follows a draft list (to be published in early 1988) of molluscs prepared by the Council of Systematic Malacologists and the Committee on Scientific and Common Names of the American Malacological Union (AMU) except as follows: 1) subspecies are not recognized, 2) members of the *Pleurobema cordatum* complex are recognized following Stansbery (1983).

Distribution maps are given for all species reported from the drainage (Appendix IV), and photographs of all species are provided in Appendix V.

RESULTS AND DISCUSSION

A search of museum collections and the literature revealed a total of 30 species recorded from the Mackinaw River drainage (Table 1). None of the species are currently listed as federally endangered or are under consideration for federal listing (USFWS, 1984). However, three species recorded from the drainage have been proposed for listing as endangered in Illinois: *Alasmidonta viridis* (Rafinesque, 1820), *Lasmigona compressa* (I. Lea, 1829), and *Villosa iris*

Figure 1. Collection sites in the Mackinaw River drainage, 1987.



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ONE INCH EQUALS APPROXIMATELY 8 MILES

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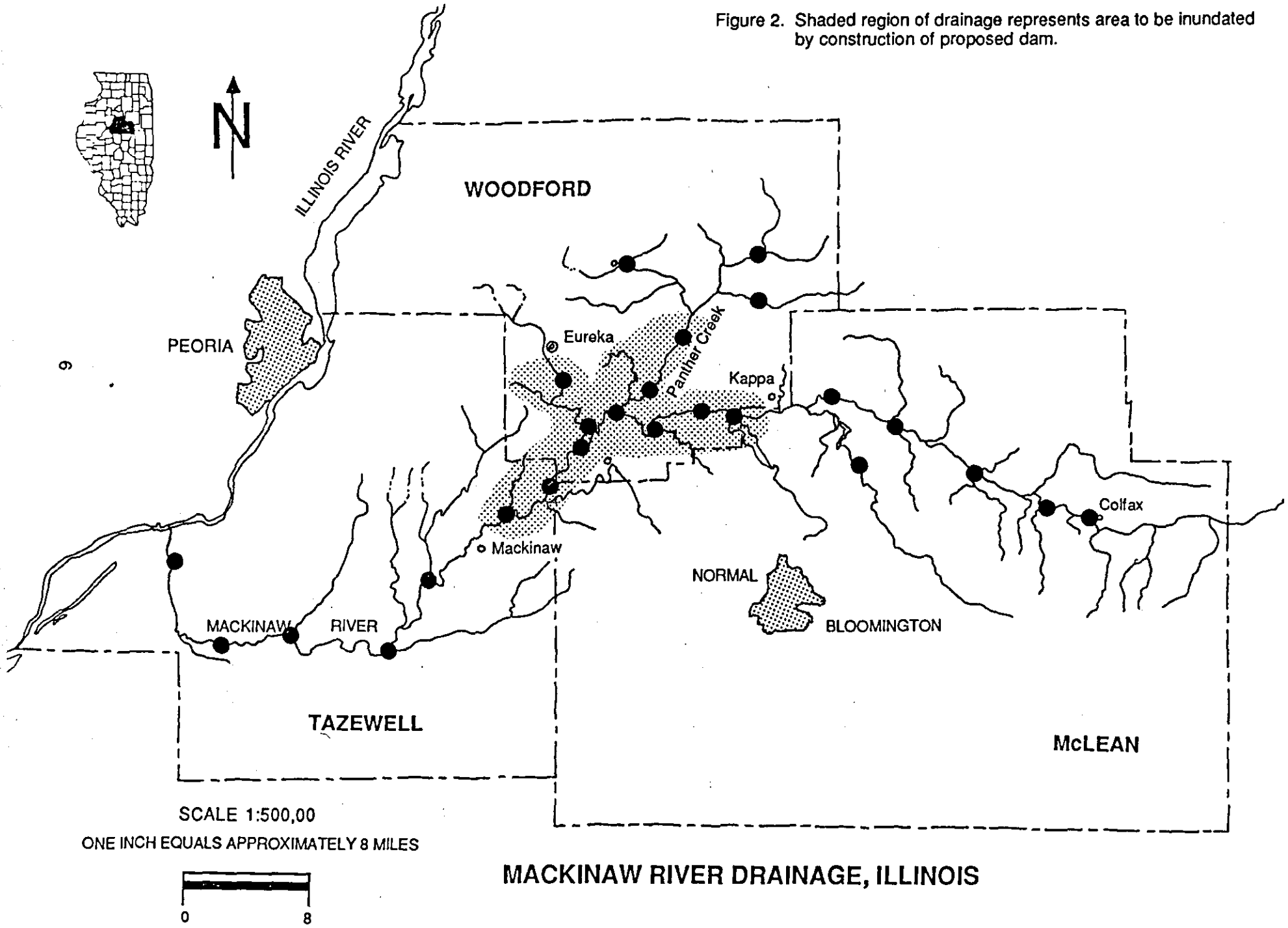
MACKINAW RIVER DRAINAGE, ILLINOIS

Table 2. Location of Collection Sites in the Mackinaw River, 1987.

1. Mackinaw River, 1 mile W Colfax, McLean Co., IL. T24N, R5E, sec. 4.
2. Mackinaw River, 3 miles W Colfax, McLean Co., IL. T24N, R5E, sec. 6.
3. Mackinaw River, 1 mile SW Pleasant Hill, McLean Co., IL. T25N, R4E, sec. 21.
4. Mackinaw River, 1 mile W Clarksville, McLean Co., IL. T25N, R3E, sec 3.
5. Mackinaw River, 4.5 miles SW Gridley, McLean Co., IL. T26N, R2E, sec. 36.
6. Mackinaw River, 2.5 miles WSW Kappa, Woodford Co., IL. T25N, R1E, sec. 1.
7. Mackinaw River, 4 miles W Kappa, Woodford Co., IL. T25N, R1E, sec. 3.
8. Mackinaw River, 2.5 miles NE Congerville, Woodford Co., IL. T25N, R1E, sec. 7.
9. Mackinaw River, 3 miles N Congerville, Woodford Co., IL. T25N, R1W, sec. 3.
10. Mackinaw River, 2 miles NW Congerville, Woodford Co., IL. T25N, R1W, sec. 17.
11. Mackinaw River, 2 miles S Goodfield, Tazewell Co., IL. T25N, R2W, sec. 36.
12. Mackinaw River, 1 mile NW Mackinaw, Tazewell Co., IL. T24N, R2W, sec. 8.
13. Mackinaw River, 4 miles SW Mackinaw, Tazewell Co., IL. T24N, R3W, sec. 27.
14. Mackinaw River, 3 miles NW Hopedale, Tazewell Co., IL. T23N, R3W, sec. 17.
15. Mackinaw River, 6 miles NNW Delavan, Tazewell Co., IL. T23N, R4W, sec. 7.
16. Mackinaw River, 2.5 miles N Green Valley, Tazewell Co., IL. T23N, R5W, sec. 15.
17. Mackinaw River, 3.5 miles SW Crescent, Tazewell Co., IL. T24N, R6W, sec. 24.
18. Money Creek, 2.5 miles N Towanda, McLean Co., IL. T25N, R3E, sec.29.
19. West Branch Panther Creek, at Roanoke, Woodford Co., IL. T27N, R1W, sec. 14.
20. Panther Creek, 2.3 km N Panola, Woodford Co., IL. T27N, R2E, sec. 17.
21. East Branch Panther Creek, 2.7 km SSE Panola, Woodford Co., IL. T27N, R2E, sec. 31.
22. Panther Creek, 1.5 miles S Secor, Woodford Co., IL. T26N, R1E, sec. 17.
23. Panther Creek, 3.5 miles SSW Secor, Woodford Co., IL. T26N, R1E, sec. 30.
24. Walnut Creek, 3 miles SSE Eureka, Woodford Co., IL. T26N, R1W, sec. 31/32.
25. Walnut Creek, 2 miles E Goodfield, Woodford Co., IL. T25N, R1W, sec. 4.

Figure 2. Shaded region of drainage represents area to be inundated by construction of proposed dam.



MACKINAW RIVER DRAINAGE, ILLINOIS

(I. Lea, 1829); and two, *Uniomerus tetralasmus* and *Venustaconcha ellipsiformis* (Conrad, 1836), have been proposed for listing as threatened in Illinois.

A total of 26 species was collected from 25 sites in the Mackinaw River, Illinois, from 12 May to 1 September 1987. Of those 26 species, 20 were collected live and six others were represented as dead shells only (Tables 1,3 & 4). A total of 701 individuals was collected during 100 man-hours of sampling for an average of seven individuals per man-hour. This figure is lower than those reported for other midwestern streams in recent years (Table 5). The number of individuals per site ranged from one to 108 and the number of live species from one to 12 (Table 3). The top five species in terms of abundance were *Lampsilis cardium* (Rafinesque, 1820), *Lasmigona complanata* (Barnes, 1823), *Leptodea fragilis* (Rafinesque, 1820), *Lampsilis siliquoidea* (Barnes, 1823), and *Strophitus undulatus* (Say, 1817). Together they comprised 71 percent of the living mussels collected (Table 4).

The proposed dam and reservoir would have a major negative impact on the diversity of aquatic life, including the mussel populations, of the Mackinaw River. The flowing water environment would change to a standing water environment, and most of the mussels would disappear from the inundated portion of the stream system. A few species tolerant of standing water (e.g., *Anodonta grandis* Say, 1829, *Lampsilis siliquoidea*, & *Quadrula quadrula* (Rafinesque, 1820)) would survive and perhaps become more common, but most of the stream species, including *Lasmigona compressa*, *Pleurobema sintoxia* (Rafinesque, 1820), and *Venustaconcha ellipsiformis*, would disappear. The diversity and abundance of mussels in the inundated region of the Mackinaw River would be greatly reduced.

The location proposed for the reservoir includes some of the best aquatic habitats in the Mackinaw drainage, and construction of a reservoir would have an even more detrimental impact on the total mussel populations than its size suggests. Four hundred-thirteen individuals were found in the area to be inundated but only 271 individuals were found outside the area, even though only 11 sites were located within, and 14 sites were located outside, the reservoir area. The smallest number of individuals collected from a site within the impact area was nine. In contrast, six of the 14 sites outside the impact area had nine or fewer individuals. Numbers of species within the impact area ranged from five to 12, with an average of eight. Numbers of species outside the impact area ranged from one to 12, with an average of four.

Because the life cycle of almost all freshwater mussels includes a larval stage that is parasitic and dependant on fishes for dispersal, the negative impact of the dam and reservoir on mussel

Table 3. Site by site listing of all mussel species collected in the Mackinaw River, 1987.

Species	1	2	3	4	5	6	7	8	9	10	11	12	13
Actinonaias ligamentina (Lamarck, 1819)													
Alasmidonta marginata Say, 1818	2		x	x		2	x						1
Alasmidonta viridis (Rafinesque, 1820)													
Amblema plicata (Say, 1817)		15	5	x	x	x	x	x	x	x	x	x	
Anodonta grandis Say, 1829	1			x	x								
Anodontoides ferussacianus (I. Lea, 1834)		x	1									x	
Elliptio dilatata (Rafinesque, 1820)													
Fusconaia flava (Rafinesque, 1820)		1	2	x	x	x	x	1	1		x	x	
Lampsilis cardium (Rafinesque, 1820)	4	5	14	6	9	11	14	8	9	16	x	2	x
Lampsilis siliquoidea (Barnes, 1823)	15	2	22	3	3	1	5			2	1	x	
Lampsilis teres (Rafinesque, 1820)	2		1		2	x	x		4	3	x	1	x
Lasmigona complanata (Barnes, 1823)	4	4	6	1	16	3	4	3	2	1	1	4	1
Lasmigona compressa (I. Lea, 1829)	1												
Lasmigona costata (Rafinesque, 1820)						x		x			x		
Leptodea fragilis (Rafinesque, 1820)			3	2	3	6	7	8	8	11	5	6	17
Pleurobema sintoxia (Rafinesque, 1820)		1	5				3						
Potamilus alatus (Say, 1817)					5	1	3	x	1	1	1		
Potamilus ohiensis (Rafinesque, 1820)									1	x	1	1	3
Quadrula pustulosa (I. Lea, 1831)			5		2	1	x	x	x	x	x	x	
Quadrula quadrula (Rafinesque, 1820)			1	x			x	1		1	x	x	
Strophitus undulatus (Say, 1817)		x	x	x	1	2	6	x	1	3		x	
Toxolasma parvus (Barnes, 1823)													
Tritogonia verrucosa (Rafinesque, 1820)													
Truncilla donaciformis (I. Lea, 1828)							1		1			x	1
Uniomerus tetralasmus (Say, 1831)													
Venustaconcha ellipsiformis (Conrad, 1836)		x	5	x			2	x	x	2			
INDIVIDUALS/SITE (LIVE)	29	28	70	12	41	27	45	21	28	40	9	14	23
SPECIES/SITE (LIVE)	7	6	12	4	8	8	9	5	9	9	5	5	5
SPECIES/SITE (DEAD)	0	3	2	7	3	4	6	6	3	3	7	8	2
SPECIES/SITE (TOTAL)	7	9	14	11	11	12	15	11	12	12	12	13	7

Table 4. Numbers, relative abundance, and percent composition of mussels collected in the Mackinaw River, 1987.

Species	TOTAL	RANK	Percent Comp.	Cummulative %
Lampsilis cardium (Rafinesque, 1820)	137	1	19.54	-
Lasmigona complanata (Barnes, 1823)	137	1	19.54	39.08
Leptodea fragilis (Rafinesque, 1820)	93	3	13.27	52.35
Lampsilis siliquoidea (Barnes, 1823)	72	4	10.27	62.62
Strophitus undulatus (Say, 1817)	62	5	8.84	71.46
Lampsilis teres (Rafinesque, 1820)	36	6	5.14	76.60
Quadrula pustulosa (I. Lea, 1831)	27	7	3.85	80.45
Quadrula quadrula (Rafinesque, 1820)	23	8	3.28	83.73
Amblema plicata (Say, 1817)	20	9	2.85	86.58
Fusconaia flava (Rafinesque, 1820)	18	10	2.57	89.15
Anodontoides ferussacianus (I. Lea, 1834)	17	11	2.43	91.58
Potamilus alatus (Say, 1817)	13	12	1.85	93.43
Venustaconcha ellipsiformis (Conrad, 1836)	12	13	1.71	95.14
Pleurobema sintoxia (Rafinesque, 1820)	10	14	1.43	96.57
Potamilus ohiensis (Rafinesque, 1820)	8	15	1.14	97.71
Alasmidonta marginata Say, 1818	6	16	0.86	98.57
Truncilla donaciformis (I. Lea, 1828)	4	17	0.57	99.14
Lasmigona compressa (I. Lea, 1829)	3	18	0.43	99.57
Toxolasma parvus (Barnes, 1823)	2	19	0.29	99.86
Anodonta grandis Say, 1829	1	20	0.14	100.00
Actinonaias ligamentina (Lamarck, 1819)	-	-	-	-
Alasmidonta viridis (Rafinesque, 1820)	-	-	-	-
Elliptio dilatata (Rafinesque, 1820)	-	-	-	-
Lasmigona costata (Rafinesque, 1820)	-	-	-	-
Tritogonia verrucosa (Rafinesque, 1820)	-	-	-	-
Uniomerus tetralasmus (Say, 1831)	-	-	-	-
SPECIES/SITE (LIVE)	**20**			
SPECIES/SITE (DEAD)	**6**			
SPECIES/SITE (TOTAL)	**26**			

Table 5. A comparison of the number of live mussels collected per man-hour in midwestern stream surveys (1981-1988).

River	Sites	Live Species	Individuals	Man-hours	Individuals/man-hour	Source
Mackinaw River, Illinois	25	20	701	100	7.0	This study
Vermilion River, Illinois	29	22	639	87	7.3	Suloway, et al., 1981b
Embarras River, Illinois	25	27	993	100	9.9	Cummings, et al., 1988
Kaskaskia River, Illinois	19	23	498	51	9.8	Suloway, et al., 1981a
Tippecanoe River, Indiana	16	34	1499	64	23.4	Cummings, et al., 1987

populations would extend beyond the inundated area of the river system. Fishes would no longer be able to migrate up and down the river because of the dam, and larval mussels would not be distributed to suitable habitats. Populations of certain species of mussels would almost certainly decline throughout the river system.

SPECIES ACCOUNTS

In the following accounts, each species is discussed with respect to its historical and present distribution and status in the Mackinaw River. These accounts are organized by rarity of the species with proposed state endangered species treated first, followed by proposed state threatened species, and then other species. The species are listed alphabetically within these groups. Comparisons are made with data from earlier studies on the mussel fauna of the Mackinaw River (Baker, 1906; Matteson, unpubl.; Parmalee, 1967; USACOE, unpubl.; Kasprowicz & Wetzel, 1986).

PROPOSED STATE ENDANGERED SPECIES

Alasmidonta viridis (Rafinesque, 1820) - slippershell mussel

Present only in central and northern Illinois, the slippershell has been collected live from only the Sangamon River in the last 20 years (Bob Schanzle, IDOC, pers. comm.). Stated by Parmalee (1967) to be common in Panther Creek, Woodford County, this mussel was collected from East Branch Panther Creek in 1987 as weathered dead shells only. Additional records are available from the Mackinaw River proper (Appendix IV), but no individuals of *A. viridis* (live or dead) were found there in this study.

Lasmigona compressa (I. Lea, 1829) - creek heelsplitter

This species has a distribution similar to that of *A. viridis* within Illinois. Primarily found in small streams and the headwaters of large rivers in central and northen Illinois, the creek heelsplitter was collected live at two sites in the Mackinaw River in 1987. One of these locations is within the area of flooding by the proposed dam. If the area is inundated, this species would most likely be extirpated from that portion of the drainage. Two additional records exist from Panther Creek collected in 1955 (ISM #676429-30).

Villosa iris (I. Lea, 1829) - rainbow

A single individual of *V. iris* from the Mackinaw River is present in the Illinois State Museum (#676697). This is the only record of this species from the drainage. This specimen has not been

examined by us. It was collected from Gridley Road, McLean County in 1966. No individuals were found in this survey, and it may be extirpated from the drainage.

PROPOSED STATE THREATENED SPECIES

Uniomerus tetralasmus (Say, 1831) - pondhorn

A widely distributed but generally uncommon species in Illinois (Pamalee, 1967). Typically an inhabitant of ponds or slow moving creeks and backwaters, one half valve of *U. tetralasmus* was collected from East Branch Panther Creek in 1987. Although collected live by Matteson in the Mackinaw River in 1949 (no site specific locality data given), its present status in the river is either rare or extirpated. Sub-fossil valves were collected by INHS biologists in 1985 from Six-Mile Creek. No other records from the drainage are known.

Venustaconcha ellipsiformis (Conrad, 1836) - ellipse

A northern species in Illinois, *V. ellipsiformis* was found live at four sites in the Mackinaw River in 1987. Shells were found at five additional sites, bringing the total to nine for the drainage. Two of the four sites where the species was found to be living are within the area of the proposed reservoir. This mussel usually inhabits small streams with a mixed sand and gravel substrate in riffles with a swift current, normally at depths of less than one foot (Pamalee, 1967). If constructed, the dam would inundate a large portion of the range for this species in the Mackinaw River and further threaten its survival in Illinois.

OTHER SPECIES

Actinonaias ligamentina (Lamarck, 1819) - mucket

Collected from only two sites as weathered dead shells, these are the first reported records of the mucket in the drainage. Although abundant in the Kankakee River, this species was extirpated from the Illinois River proper before 1930 (Starrett, 1971).

Alasmidonta marginata Say, 1818 - elktoe

Reported by Baker (1906) from the Mackinaw River at Kappa, the elktoe was found live at four sites in 1987. Shells were collected at four additional sites to bring the total to eight. Only six live individuals were found.

Amblema plicata (Say, 1817) - three-ridge

Although collected from 15 sites throughout the Mackinaw drainage in 1987, live individuals were found at only two upstream sites. A similar situation was found in the Embarras and Tippecanoe rivers (Cummings, et al., 1987; 1988), where shells were present at nearly every site but live individuals were lacking. The reasons for the decline of the species are unknown.

Anodonta grandis Say, 1829 - giant floater

Only one live individual of the giant floater was found during this study, but shells were collected at four additional sites in the upstream portion of the drainage. Although uncommon in this study, *A. grandis* is common in quiet, moderately deep, mud-bottom ponds or sloughs throughout the state (Parmalee, 1967).

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

Reported by Pamalee (1967) to be numerous in Panther Creek, it was found at every site sampled on that stream in 1987. This species was also found in the headwaters of the Mackinaw River and in Walnut Creek.

Arcidens confragosus (Say, 1829) - rock pocketbook

Collected as a dead shell in a U.S. Army Corps of Engineer reconnaissance survey of the Mackinaw River in August 1984 (J. Duyvejonck, pers. comm.). This is the only known record for this species in the drainage. However, no voucher specimens were taken and this record needs to be verified.

Elliptio dilatata (Rafinesque, 1820) - spike

Only one old weathered shell of this mussel was found in 1987. Additional records exist for three other sites in the lower half of the river (Appendix IV). Once locally abundant in the Illinois River, it has now disappeared (Parmalee, 1967; Starrett, 1971) and is declining in other drainages where it was formerly common.

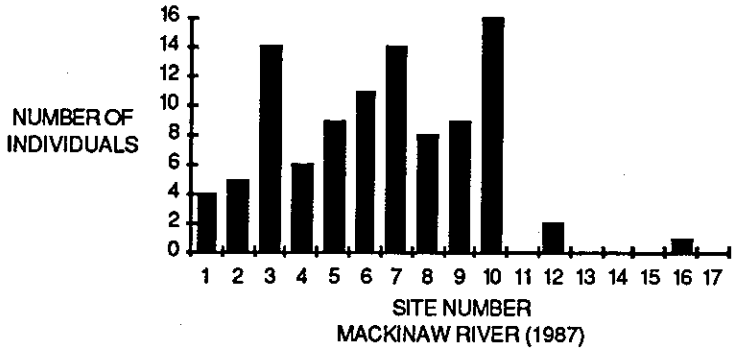
Fusconaia flava (Rafinesque, 1820) - Wabash pigtoe

A widespread and common mussel throughout Illinois. The Wabash pigtoe was found live at seven sites in the Mackinaw River in 1987 and records are available throughout the drainage (Appendix IV). The largest population was at site 23 on Panther Creek where it ranked fourth in abundance for all species collected.

Lampsilis cardium (Rafinesque, 1820) - plain pocketbook

One of the most widespread and common species found in Illinois, the plain pocketbook was the dominant species collected in the Mackinaw River in 1987 (Table 4). Present at 19 of the 25 locations sampled, it was collected live at 16 sites. It was most common in the middle and upper sections of the Mackinaw River proper (see graph below).

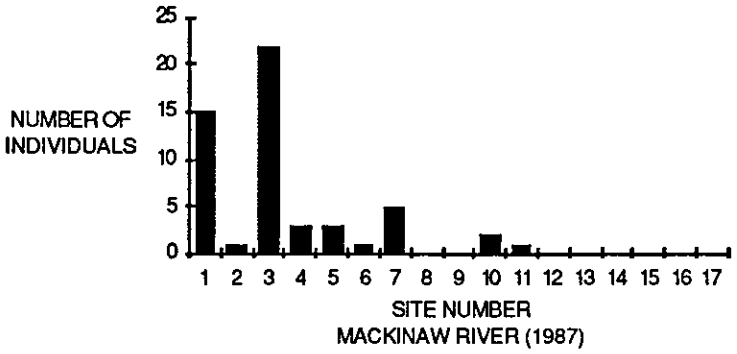
Lampsilis cardium (Rafinesque, 1820)
plain pocketbook



Lampsilis siliquoidea (Barnes, 1823) - fat mucket

Like the plain pocketbook, *L. siliquoidea* is one of the most common mussels in Illinois. This species ranked 4th in order of abundance for the drainage as a whole in 1987 (Table 4). Historically present throughout the river, it occurred only in the middle and upper portion of the drainage in 1987 (see graph below).

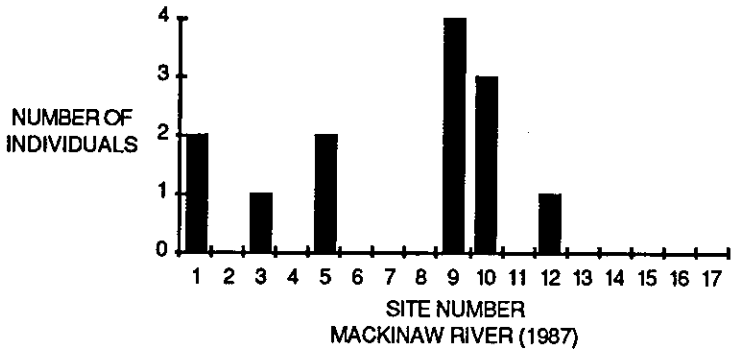
Lampsilis siliquoidea (Barnes, 1823)
fat mucket



Lampsilis teres (Rafinesque, 1820) - yellow sandshell

Although typically a large river species (Parmalee, 1967), the yellow sandshell will occasionally inhabit smaller streams. Basically a southern species, *L. teres* is near the northern limit of its range in Illinois in the Mackinaw River. This species ranked 6th in order of abundance in 1987 and was most common in the mid-section of the drainage near the confluence of Panther Creek and the Mackinaw River (see graph below).

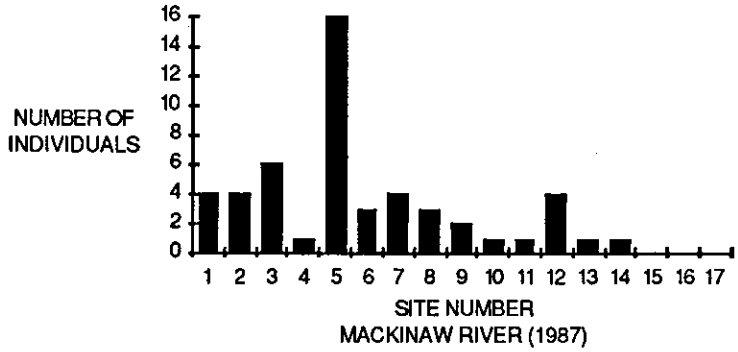
Lampsilis teres (Rafinesque, 1820)
yellow sandshell



Lasmigona complanata (Barnes, 1823) - white heelsplitter

Lasmigona complanata was tied with *Lampsilis cardium* as the most abundant species in the Mackinaw River in 1987 (Table 4). Found live at 21 of 23 sites sampled, the white heelsplitter is widespread and common in the drainage (see graph below). Occurring in a wide variety of habitats, this mussel is known from every major drainage in the state.

Lasmigona complanata (Barnes, 1823)
white heelsplitter



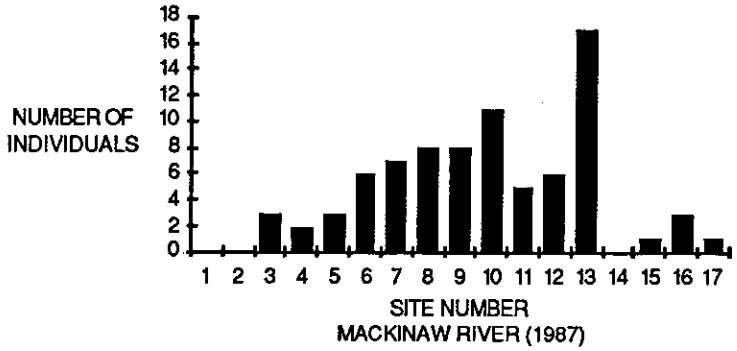
Lasmigona costata (Rafinesque, 1820) - fluted-shell

Reported live from the Mackinaw River in 1984 (J. Duyvejonck, pers. comm.), no living *L. costata* was found in 1987. Weathered shells were collected at three sites in the mid-section of the river in Woodford and Tazewell counties.

Leptodea fragilis (Rafinesque, 1820) - fragile papershell

A widespread and common species in Illinois (Parmalee, 1967), the fragile papershell ranked 3rd in order of abundance in the Mackinaw River in 1987 (Table 4). It was present throughout the drainage and was the only species taken at site 17 (see graph below).

Leptodea fragilis (Rafinesque, 1820)
fragile papershell



Megalonaias nervosa (Rafinesque, 1820) - washboard

Collected as a dead shell in a U.S. Army Corps of Engineer reconnaissance survey of the Mackinaw River in August 1984 (J. Duyvejonck, pers. comm.). This is the only known record for this species in the drainage. However, no voucher specimens were taken and this record needs to be verified.

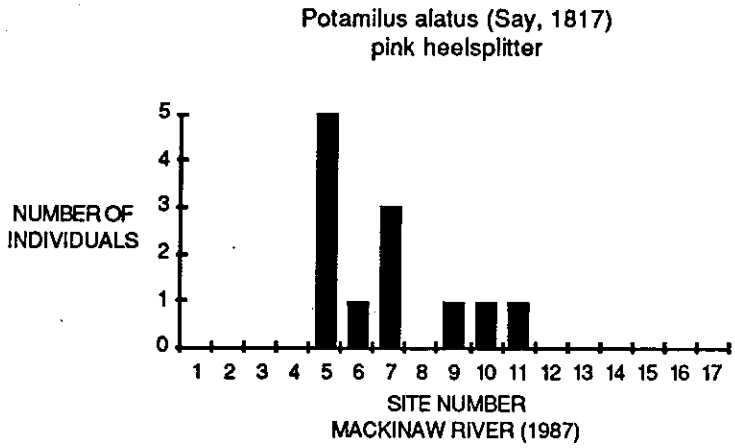
Pleurobema sintoxia (Rafinesque, 1820) - round pigtoe

The small stream form or species of the *P. cordatum* complex, the round pigtoe was found live at four sites in the Mackinaw River drainage in 1987. Historical records are available from five additional sites throughout the river (Appendix IV).

Potamilus alatus (Say, 1817) - pink heelsplitter

This is the first reported occurrence of this species in the drainage. The pink heelsplitter was found live at seven sites in the mid-section of the Mackinaw in 1987 (see graph below). It ranked

12th in order of abundance for the drainage and comprised 1.85 percent of the live mussels collected (Table 4).



Potamilus ohiensis (Rafinesque, 1820) - pink papershell

Typically an inhabitant of large to medium sized streams, the pink papershell was found live at six sites in 1987. All were located in the middle and lower reaches of the river, with one individual collected in Panther Creek.

Quadrula pustulosa (I. Lea, 1831) - pimpleback

One of the most common species in Illinois, *Q. pustulosa* ranked 7th in order of abundance for the Mackinaw River in 1987 (Table 4). It was found at 12 sites on the river, but was live at only five of those sites. It was most common at site 23 where it was the 2nd most abundant species.

Quadrula quadrula (Rafinesque, 1820) - mapleleaf

A widely distributed mussel in Illinois, *Q. quadrula* ranked 8th in order of abundance for the Mackinaw River in 1987. It was found live at five sites, all in the upper two thirds of the drainage.

Strophitus undulatus (Say, 1817) - squawfoot

A common Illinois mussel, the squawfoot was collected live at 11 sites in the Mackinaw River in 1987. It was most abundant in the mid-section of the drainage, particularly in Panther Creek (Table 3). It ranked 5th overall in order of abundance and comprised 8.84 percent of the individuals collected live (Table 4). Although historically present in the lower portion of the drainage, no live *S. undulatus* were found there in 1987.

Toxolasma parvus (Barnes, 1823) - lilliput

The smallest Illinois mussel, the lilliput is found statewide in both streams and lakes (Parmalee, 1967). In 1987 this species was found live at only one site, in Money Creek. A dead shell of this species was collected from Panther Creek in 1987, and two live specimens were found near Colfax in 1948 (Appendix IV).

Tritogonia verrucosa (Rafinesque, 1820) - pistolgrip

Only one dead shell of this species was collected in the Mackinaw River in 1987. This is the only reported occurrence of this species in the drainage.

Truncilla donaciformis (I. Lea, 1828) - fawnsfoot

This species is usually associated with medium to large rivers (Parmalee, 1967). Nearly extirpated from the Illinois River (Starrett, 1971), the fawnsfoot was found live at four sites in the middle and lower portion of the Mackinaw River in 1987.

Truncilla truncata Rafinesque, 1820 - deertoe

Collected as a dead shell in a U.S. Army Corps of Engineer reconnaissance survey of the Mackinaw River in August 1984 (J. Duyvejonck, pers. comm.). This is the only known record for this species in the drainage. However, no voucher specimens were taken and this record needs to be verified.

INTRODUCED SPECIES

Corbicula fluminea (Muller, 1774) - Asiatic clam

This small bivalve was first reported from the Ohio River in Illinois in 1962 (Fetchner, 1962). It has since spread as far north as Rock Island and probably occurs statewide. This is the first reported occurrence of this species in the Mackinaw River. It was collected from nine sites, mostly in Panther Creek.

ACKNOWLEDGEMENTS

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Appendix I. Collection Sites of Max R. Matteson 1948-1957.

1. Mackinaw River, 1 mi W Colfax, McLean Co., IL, T24N, R5E, sec. 4. 15 October 1948.

Species	Live	Dead	Sub-fossil
Anodonta grandis	1	-	-
Anodontoides ferussacianus	5	-	-
Lampsilis siliquoidea	1	-	-
Toxolasma parvus	2	-	-
Venustaconcha ellipsiformis	4	-	-

2. Mackinaw River, 3 mi W Colfax, McLean Co., IL, T24N, R5E, sec. 6. 22 October 1948.

Species	Live	Dead	Sub-Fossil
Alasmidonta viridis	-	-	1
Anodonta grandis	1	-	-
Anodontoides ferussacianus	8	-	-
Fusconaia flava	1	-	-
Lampsilis siliquoidea	1	-	-
Venustaconcha ellipsiformis	3	-	-

3. Walnut Creek, 2 mi E Goodfield, Woodford Co., IL, T25N, R1W, sec. 4. (Mackinaw River Drainage) 7 July 1956.

Species	Live	Dead	Sub-Fossil
Lampsilis cardium	7	-	-
Lampsilis siliquoidea	4	-	-
Lampsilis teres	2	-	-
Strophitus undulatus	1	-	-

4. West Branch Panther Creek, at Roanoke, Woodford Co., IL, T27N, R1W, sec. 14. (Mackinaw River Drainage) 6 August 1957.

Species	Live	Dead	Sub-Fossil
Anodonta grandis	1	-	-
Venustaconcha ellipsiformis	1	-	-

5. Mackinaw River, 2 mi NW Congerville, Woodford Co., IL, T25N, R1W, sec. 17. 21 October 1956.

Species	Live	Dead	Sub-Fossil
Anodontoides ferussacianus	1	-	-
Lampsilis cardium	2	-	-
Leptodea fragilis	2	-	-
Strophitus undulatus	1	-	-

6. Mackinaw River, 4 mi SW Mackinaw, at Vaughter bridge, Tazewell Co., IL, T24N, R3W, sec. 27. 21 October 1956.

Species	Live	Dead	Sub-Fossil
Amblema plicata	-	x	-
Elliptio dilatata	-	x	-
Fusconaia flava	-	x	-
Lampsilis cardium	4	-	-
Lampsilis siliquoidea	4	-	-
Lampsilis teres	-	x	-
Leptodea fragilis	2	-	-
Pleurobema sintoxia	-	x	-
Quadrula pustulosa	-	x	-
Strophitus undulatus	1	-	-
Venustaconcha ellipsiformis	1	-	-

7. Mackinaw River, 3 mi NW Hopedale, at Ill. Rt. 121 bridge, Tazewell Co., IL, T23N, R3W, sec. 17. 21 October 1956.

Species	Live	Dead	Sub-Fossil
Lampsilis teres	2	-	-
Leptodea fragilis	1	-	-

8. Mackinaw River, 6 mi NNW Delavan, Tazewell Co., IL, T23N, R4W, sec. 7. 20 October 1986.

no mussels found

9. Mackinaw River, 2.5 mi N Green Valley, at Ill. Rt. 29, Tazewell Co., IL, T23N, R5W, sec. 15. 20 October 1956.

Species	Live	Dead	Sub-Fossil
Fusconaia flava	1	-	-
Lampsilis teres	1	-	-
Lampsilis cardium	2	-	-
Lasmigona complanata	1	-	-
Leptodea fragilis	3	-	-
Quadrula quadrula	1	-	-
Strophitus undulatus	1	-	-
Truncilla donaciformis	1	-	-

10. Mackinaw River, 3.5 mi SW Crescent, Tazewell Co., IL, T24N, R6W, sec. 24. 20 October 1956.

Species	Live	Dead	Sub-Fossil
Amblema plicata	-	x	-
Elliptio dilatata	-	x	-
Lampsilis cardium	-	x	-
Lasmigona complanata	-	x	-
Leptodea fragilis	5	-	-
Potamilus ohiensis	2	-	-
Strophitus undulatus	-	x	-

Appendix II. Illinois State Museum Records 1955-1966.

1. Mackinaw River, at Gridley Road, McLean Co., IL, 3 & 16 July 1966, 6 August 1966.

Species	Live
Amblema plicata	4
Anodonta grandis	1
Lampsilis siliquoidea	1
Lasmigona costata	1
Pleurobema sintoxia	4
Strophitus undulatus	1
Venustaconcha ellipsiformis	9
Villosa iris	1

2. Panther Creek, Greene Township, Woodford Co., IL, late summer, early fall 1955.

Species	Live
Alasmidonta viridis	6
Anodontoides ferussacianus	12
Lasmigona compressa	1

Appendix III. Collection Sites of INHS Personnel 1984-1985.

1. Panther Creek, 2.3 km N Panola. Woodford Co., IL, T27N, R2E, sec. 17 (Mackinaw River Drainage).

Species	Live	Dead	Sub-Fossil
Amblema plicata	-	-	xx
Anodonta grandis	1	-	-
Anodontoides ferussacianus	10	-	-
Lampsilis siliquoidea	2	-	-
Lasmigona complanata	17	-	-
Strophitus undulatus	1	-	-

2. East Branch Panther Creek, 2.7 km SSE Panola, Woodford Co., IL, T27N, R2E, sec. 31 (Mackinaw River Drainage).

Species	Live	Dead	Sub-Fossil
Alasmidonta viridis	-	-	xx
Anodontoides ferussacianus	6	-	-
Lampsilis siliquoidea	2	-	-
Lasmigona complanata	4	-	-
Strophitus undulatus	1	-	-

3. Mackinaw River, 1 mi W Colfax, McLean Co., IL, T24N, R5E, sec. 4.

Species	Live	Dead	Sub-Fossil
Amblema plicata	3	-	-
Anodontoides ferussacianus	2	-	-
Fusconaia flava	1	-	-
Lampsilis cardium	4	-	-
Lampsilis siliquoidea	16	-	-
Lampsilis teres	1	-	-
Lasmigona complanata	9	-	-
Pleurobema sintoxia	1	-	-
Strophitus undulatus	1	-	-

4. Mackinaw River, 4.5 mi W Lexington, McLean Co., IL, T25N, R3E, sec. 3.

no mussels found.

5. Mackinaw River at mouth of Loving Creek, 7 mi WNW Lexington, McLean Co., IL, T25N, R3E, sec. 31.

no mussels found.

6. Mackinaw River, 7.5 km SW Gridley, McLean Co., IL, T26N, R2E, sec. 36.

Species	Live	Dead	Sub-Fossil
Amblema plicata	-	-	xx
Lampsilis radiata siliquoidea	1	-	-
Lampsilis ventricosa	-	-	xx
Leptodea fragilis	1	-	-
Quadrula pustulosa	-	-	xx
Venustaconcha ellipsiformis	-	-	xx

7. Mackinaw River, 1.6 km SSE Kappa, McLean Co., IL, T25N, R2E, sec. 4.

Species	Live	Dead	Sub-Fossil
Anodontoides ferussacianus	1	-	-
Lampsilis cardium	6	-	-
Lampsilis siliquoidea	3	-	-
Lampsilis teres	1	-	-
Pleurobema sintoxia	1	-	-
Quadrula pustulosa	1	-	-
Quadrula quadrula	1	-	-

8. Mackinaw River, 4 km WSW Kappa, Woodford Co., IL, T25N, R1E, sec. 1.

Species	Live	Dead	Sub-Fossil
Alasmidonta viridis	-	-	xx
Amblema plicata	-	-	xx
Anodontoides ferussacianus	1	-	-
Lampsilis cardium	1	-	-
Lampsilis teres	-	-	xx
Lasmigona complanata	-	x	-
Leptodea fragilis	-	x	-
Potamilus alatus	-	x	-
Quadrula pustulosa	1	-	-
Strophitus undulatus	-	x	-

9. Six-mile Creek, 9.3 km N Normal, McLean Co., IL, T25N, R2E, sec. 28.

Species	Live	Dead	Sub-Fossil
Lampsilis siliquoidea	-	-	xx
Uniomerus tetralasmus	-	-	xx

10. Six-mile Creek, below Dam at Evergreen Lake, McLean Co., IL, T25N, R2E, sec. 20.

Species	Live	Dead	Sub-Fossil
Amblema plicata	-	x	-
Anodonta grandis	-	x	-
Lampsilis cardium	1	-	-
Lampsilis siliquoidea	-	x	-
Lampsilis teres	1	-	-
Lasmigona complanata	-	x	-
Leptodea fragilis	-	x	-
Quadrula quadrula	-	x	-

Appendix IV. Distribution maps of the freshwater mussels (Unionidae) of the Mackinaw River drainage, Illinois.

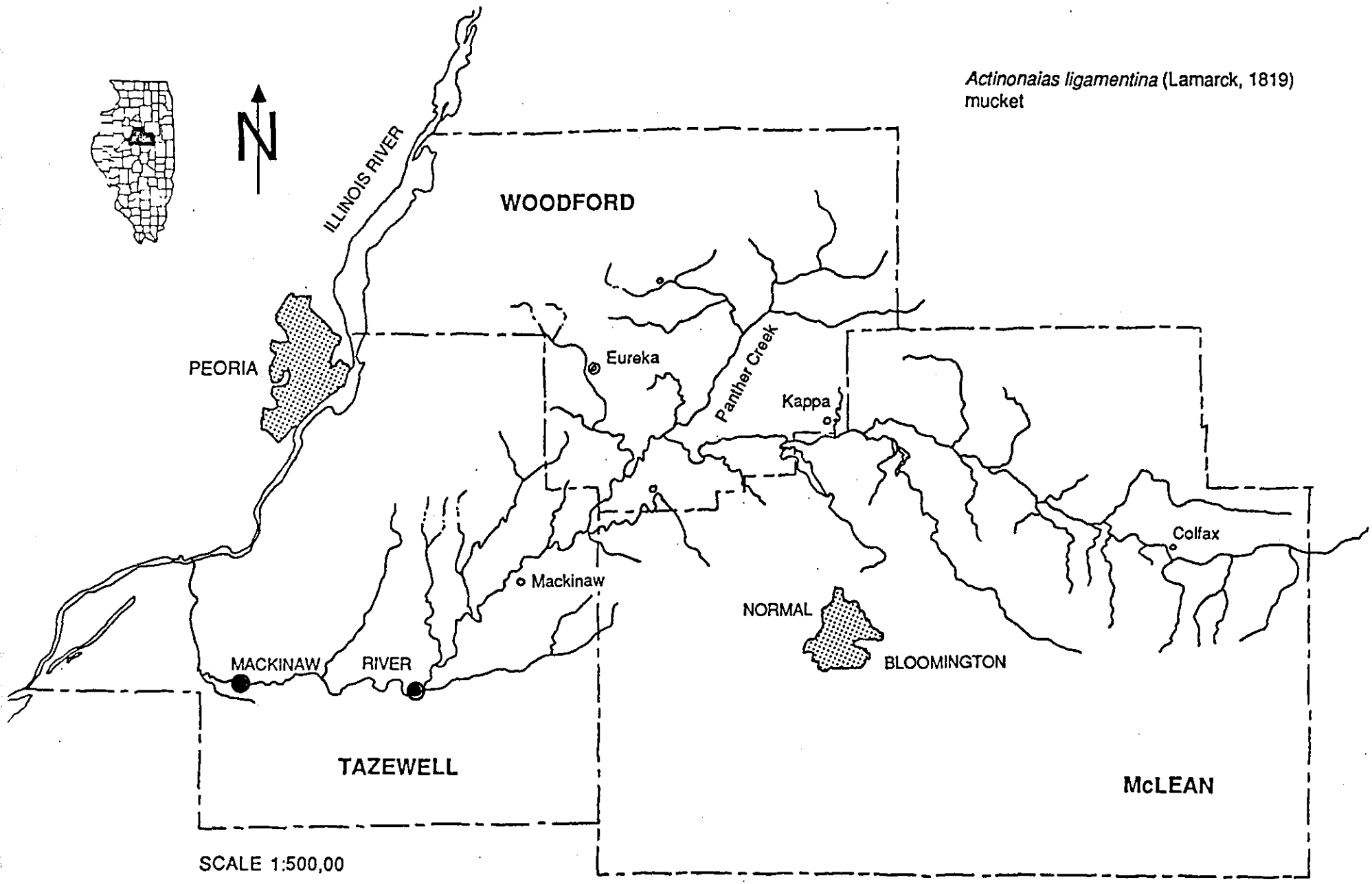
KEY TO MAP SYMBOLS

● = Live 1987

● = Dead Shell 1987

▲ = Other Records

Actinonaias ligamentina (Lamarck, 1819)
mucket



SCALE 1:500,00

ONE INCH EQUALS APPROXIMATELY 8 MILES

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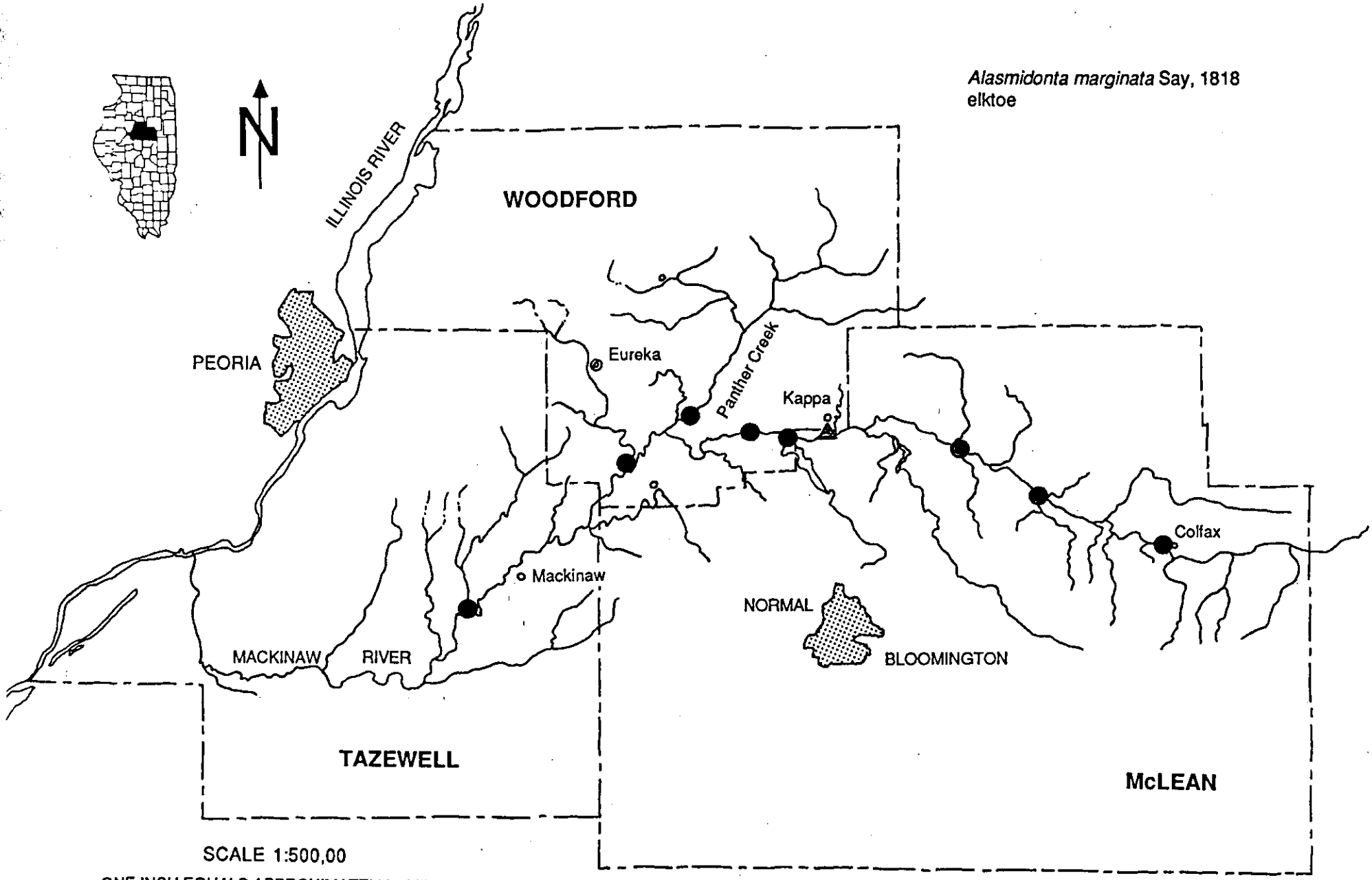
MACKINAW RIVER DRAINAGE, ILLINOIS

Alasmidonta marginata Say, 1818
elktoe



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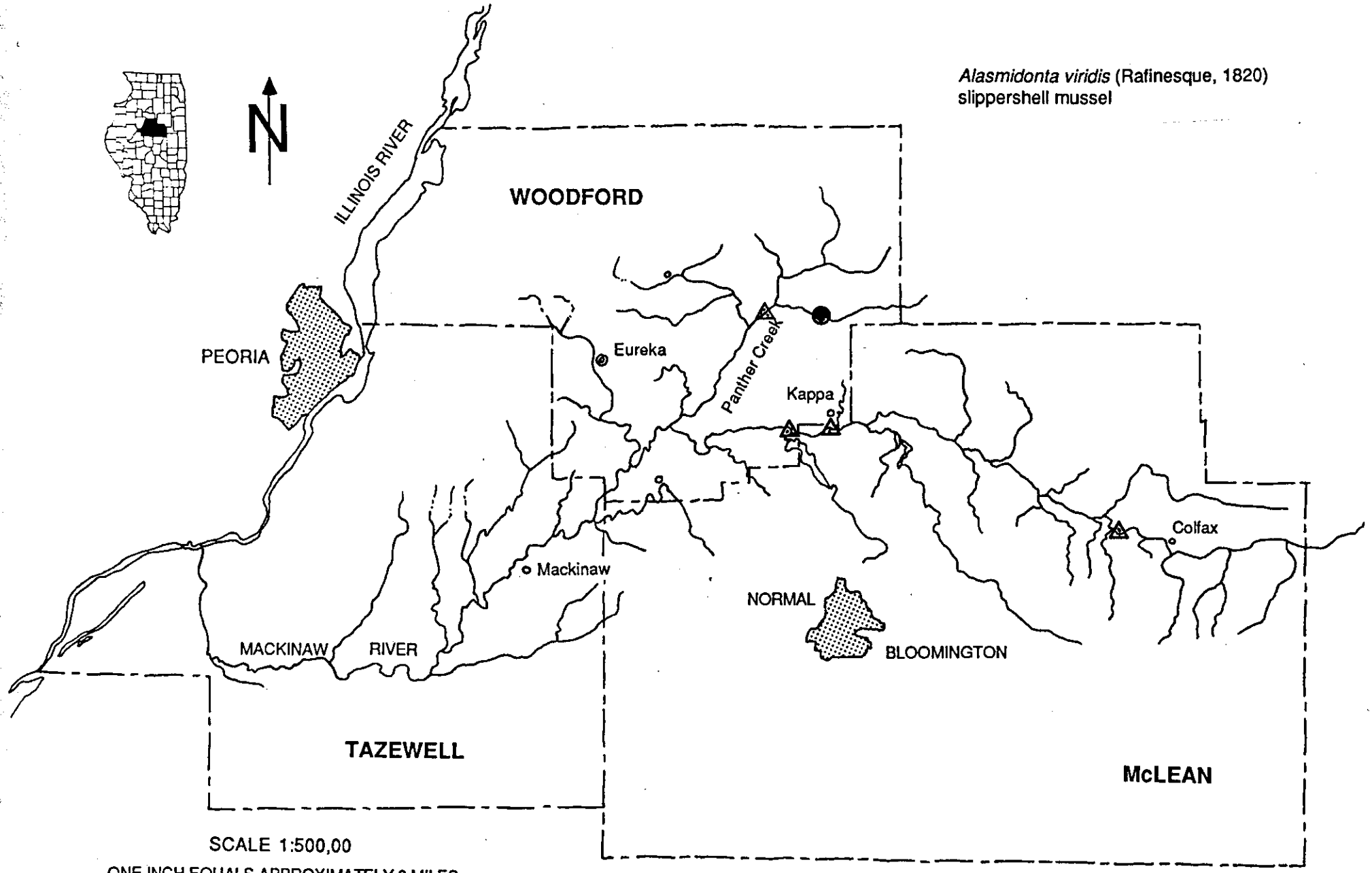
MACKINAW RIVER DRAINAGE, ILLINOIS



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ONE INCH EQUALS APPROXIMATELY 8 MILES

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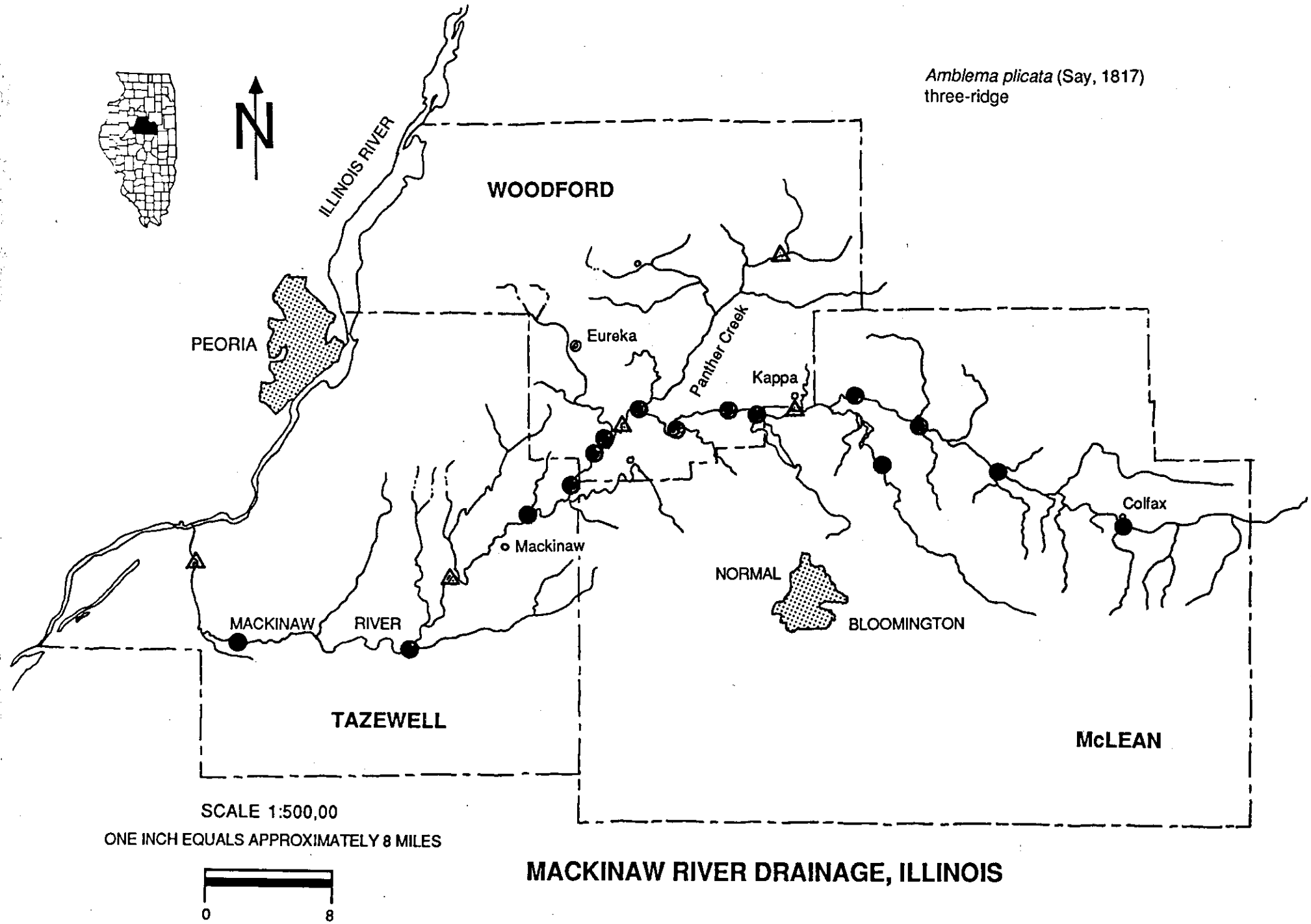
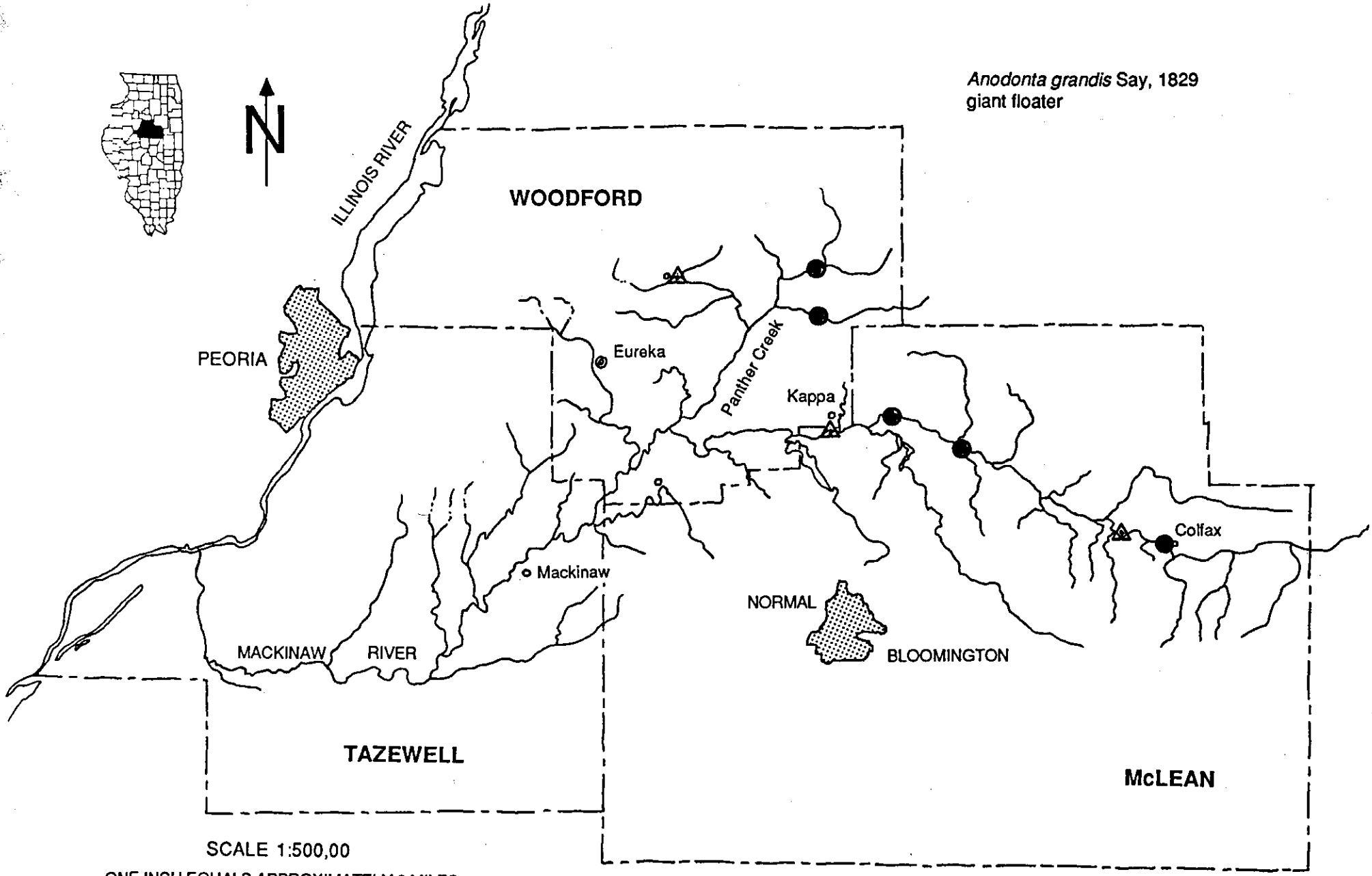
MACKINAW RIVER DRAINAGE, ILLINOIS



MACKINAW RIVER DRAINAGE, ILLINOIS



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ONE INCH EQUALS APPROXIMATELY 8 MILES

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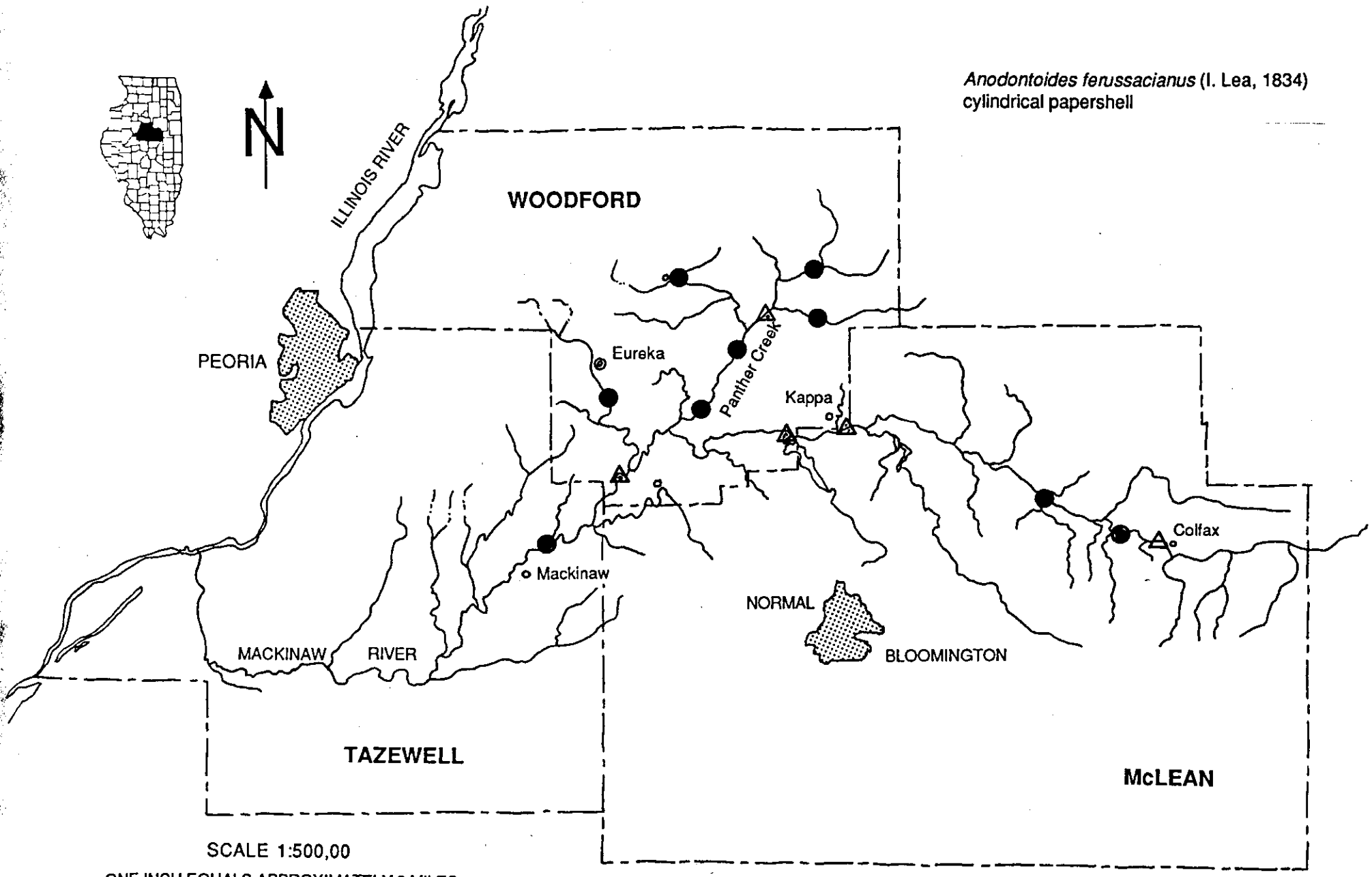
MACKINAW RIVER DRAINAGE, ILLINOIS



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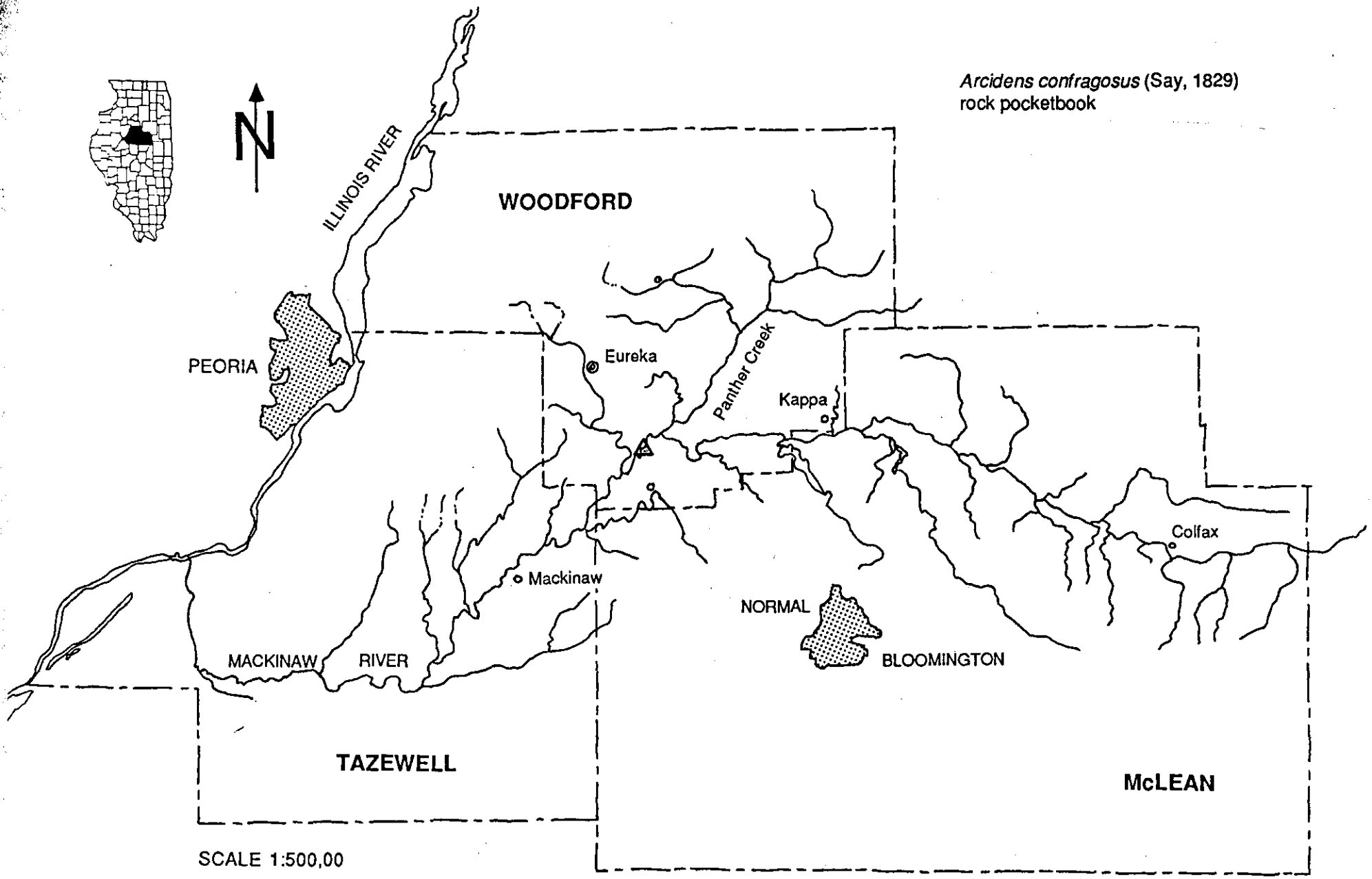
MACKINAW RIVER DRAINAGE, ILLINOIS



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ONE INCH EQUALS APPROXIMATELY 8 MILES

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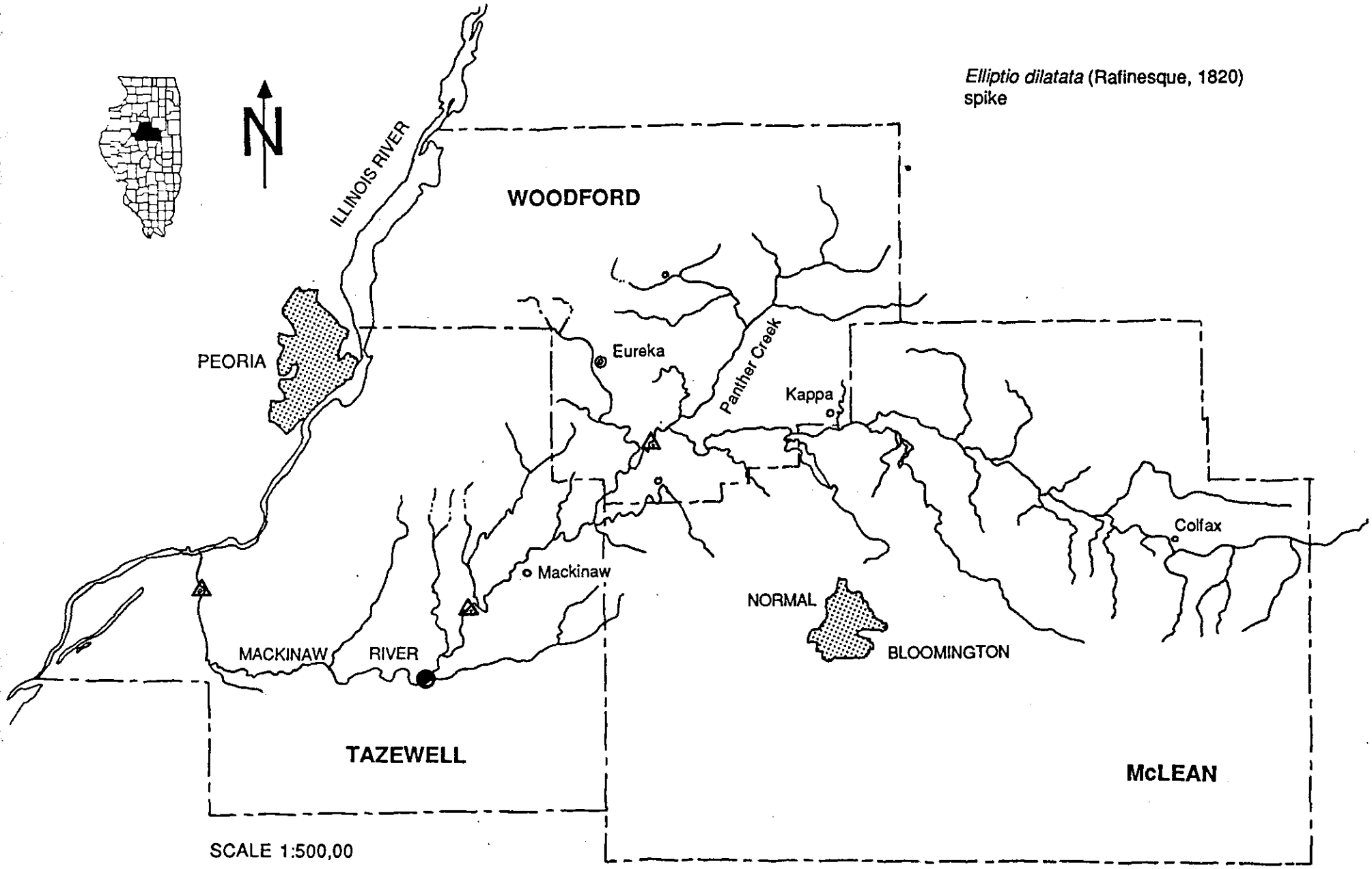
MACKINAW RIVER DRAINAGE, ILLINOIS



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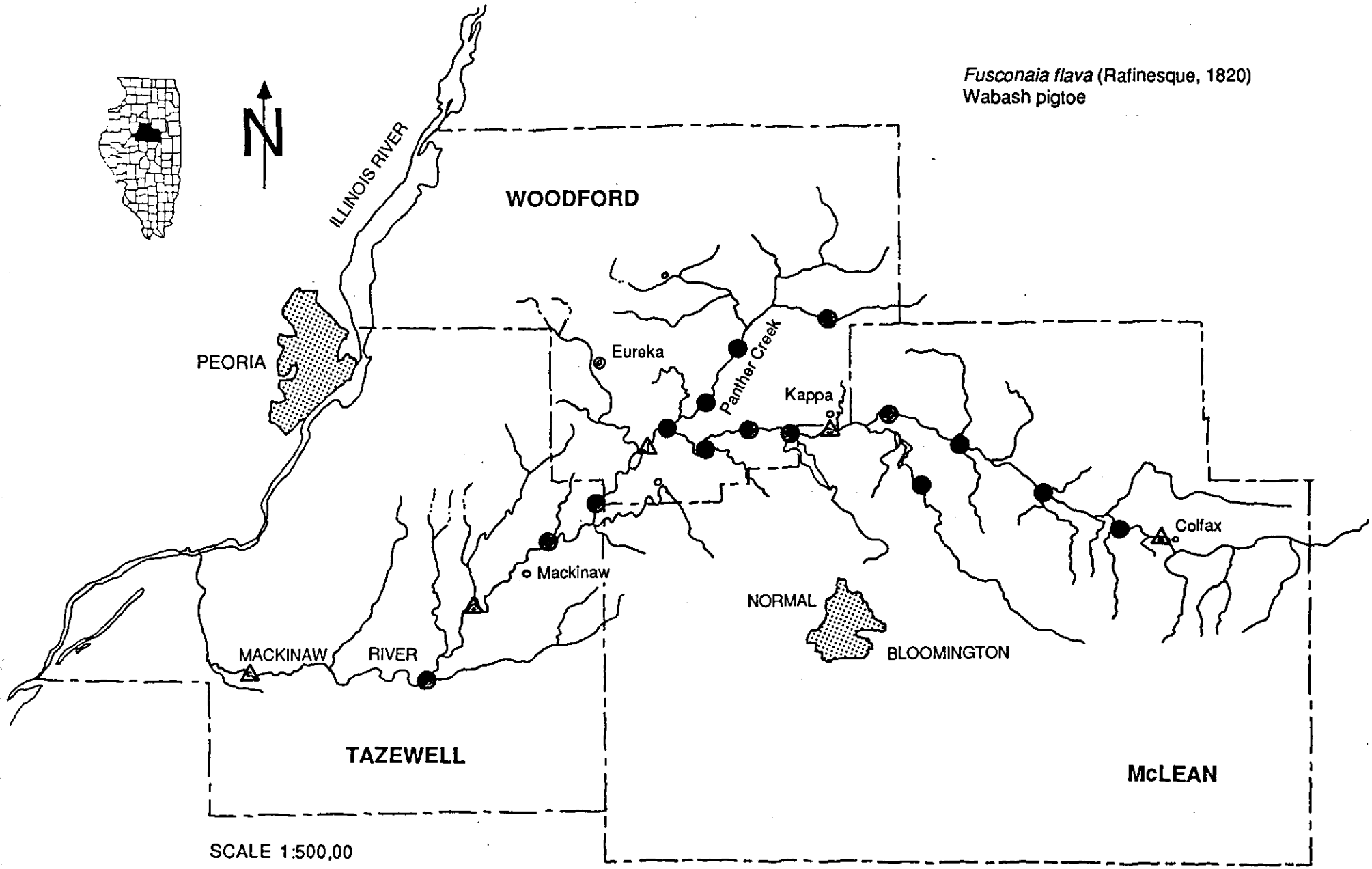
ONE INCH EQUALS APPROXIMATELY 8 MILES

0 8

MACKINAW RIVER DRAINAGE, ILLINOIS



SCALE 1:500,00

ONE INCH EQUALS APPROXIMATELY 8 MILES

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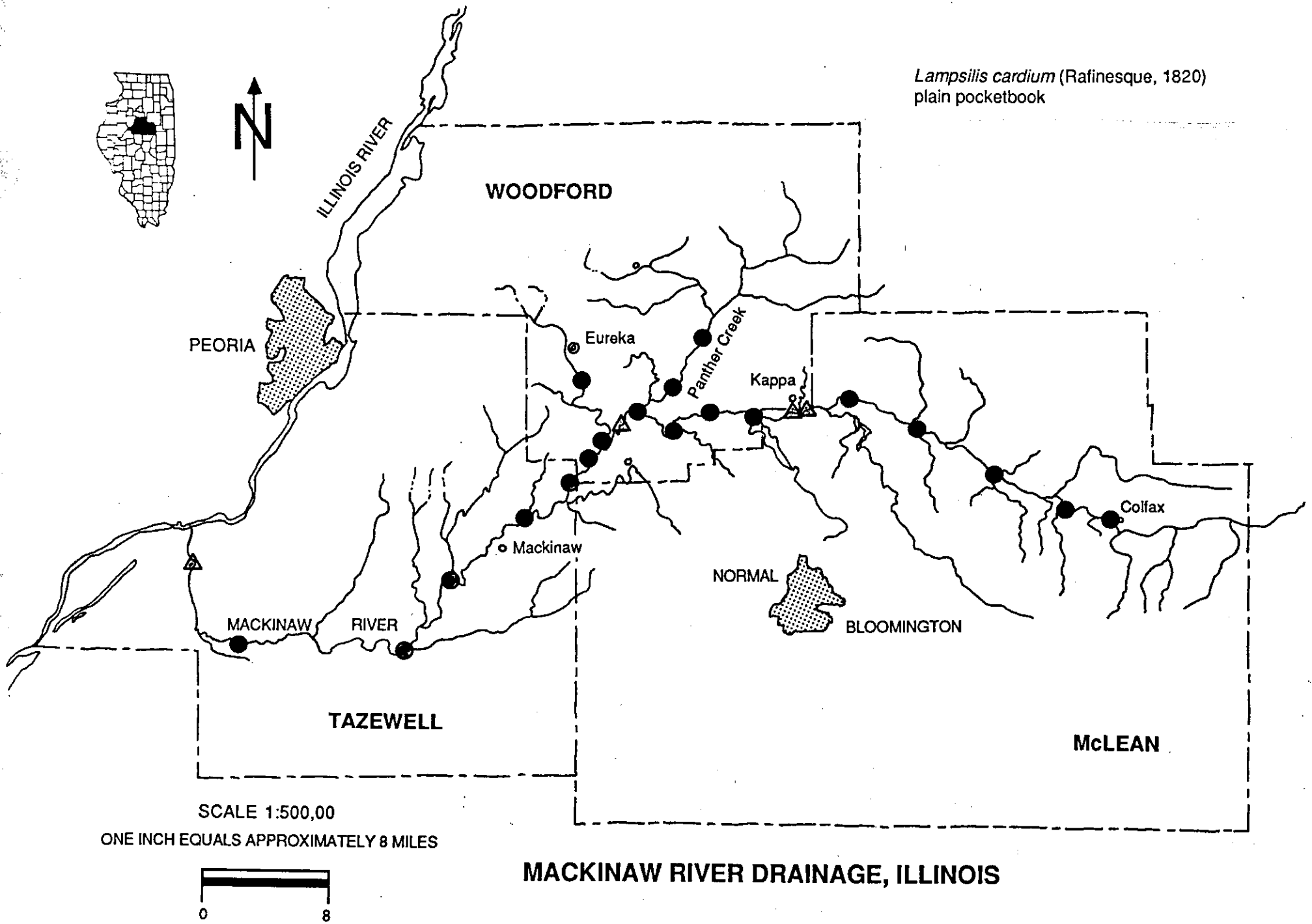
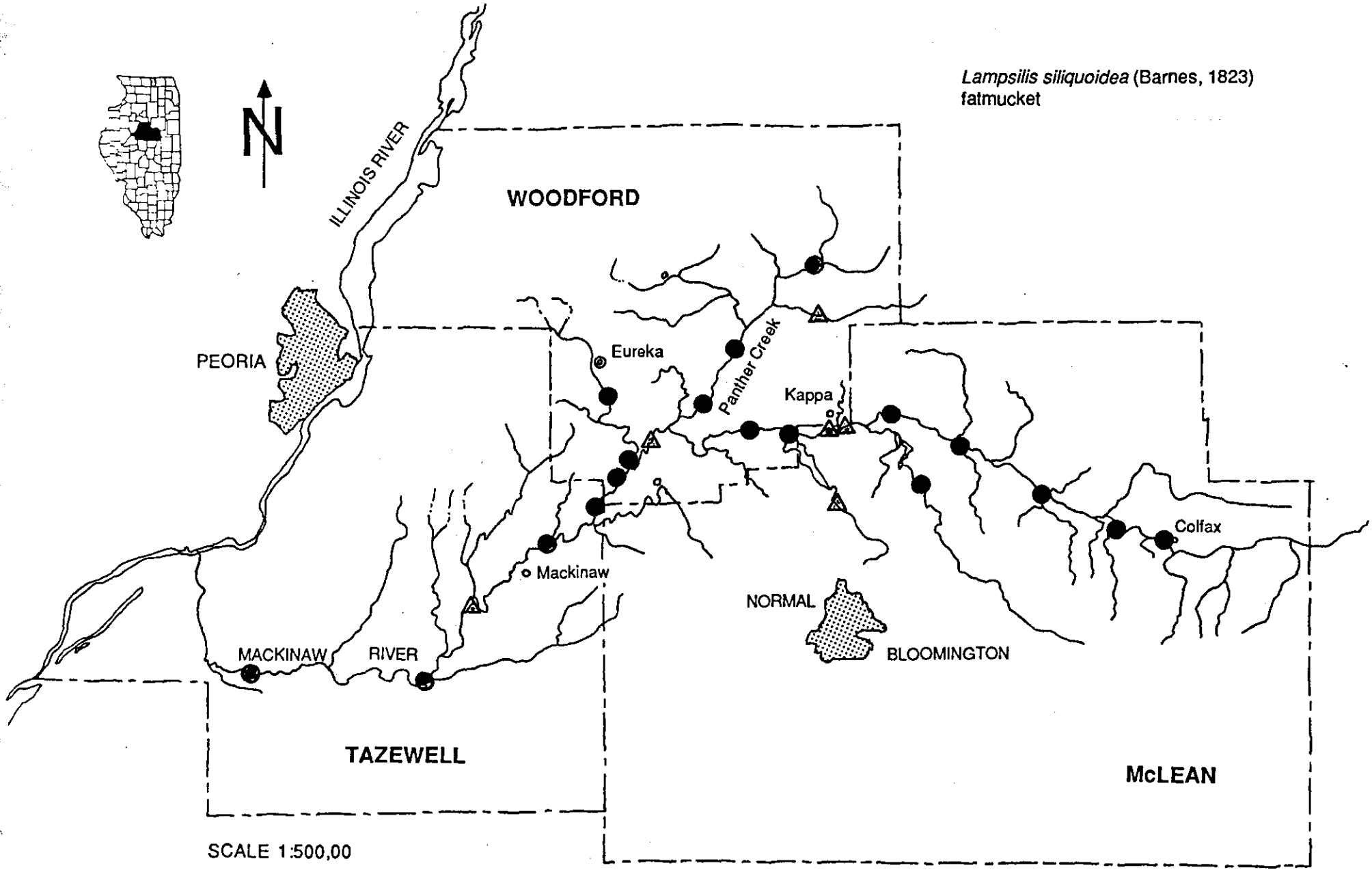
MACKINAW RIVER DRAINAGE, ILLINOIS



MACKINAW RIVER DRAINAGE, ILLINOIS



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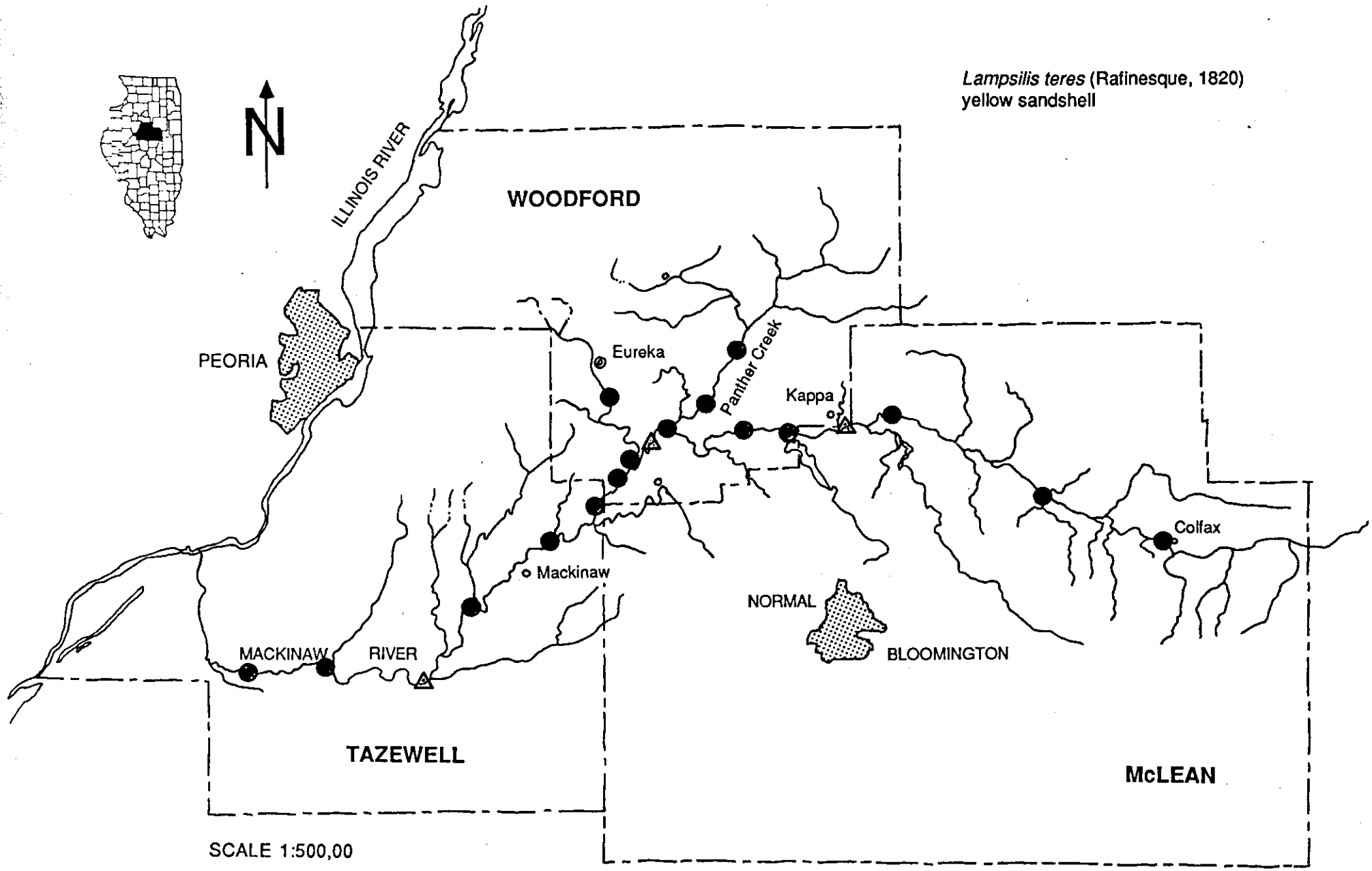
MACKINAW RIVER DRAINAGE, ILLINOIS



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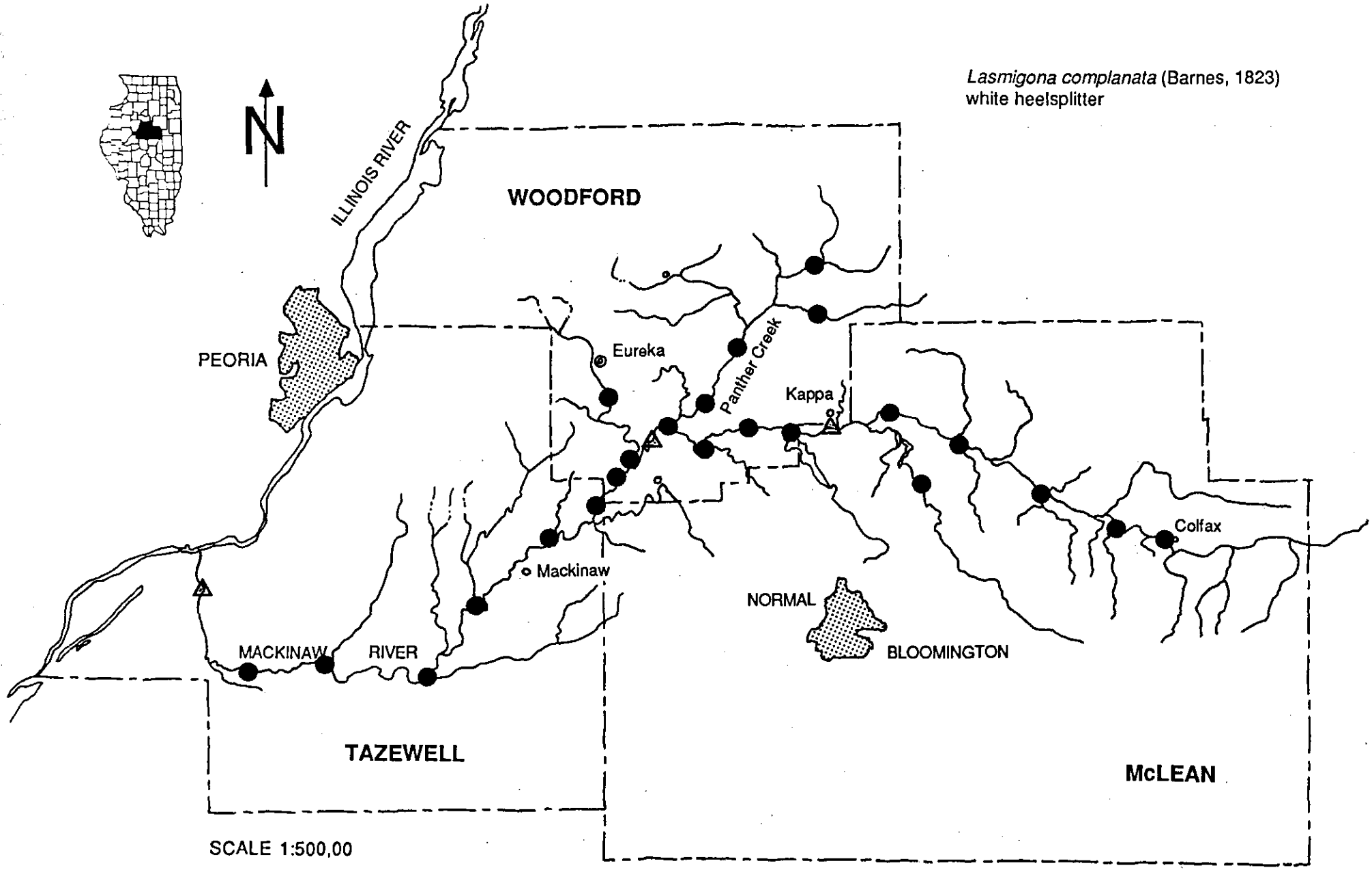
MACKINAW RIVER DRAINAGE, ILLINOIS



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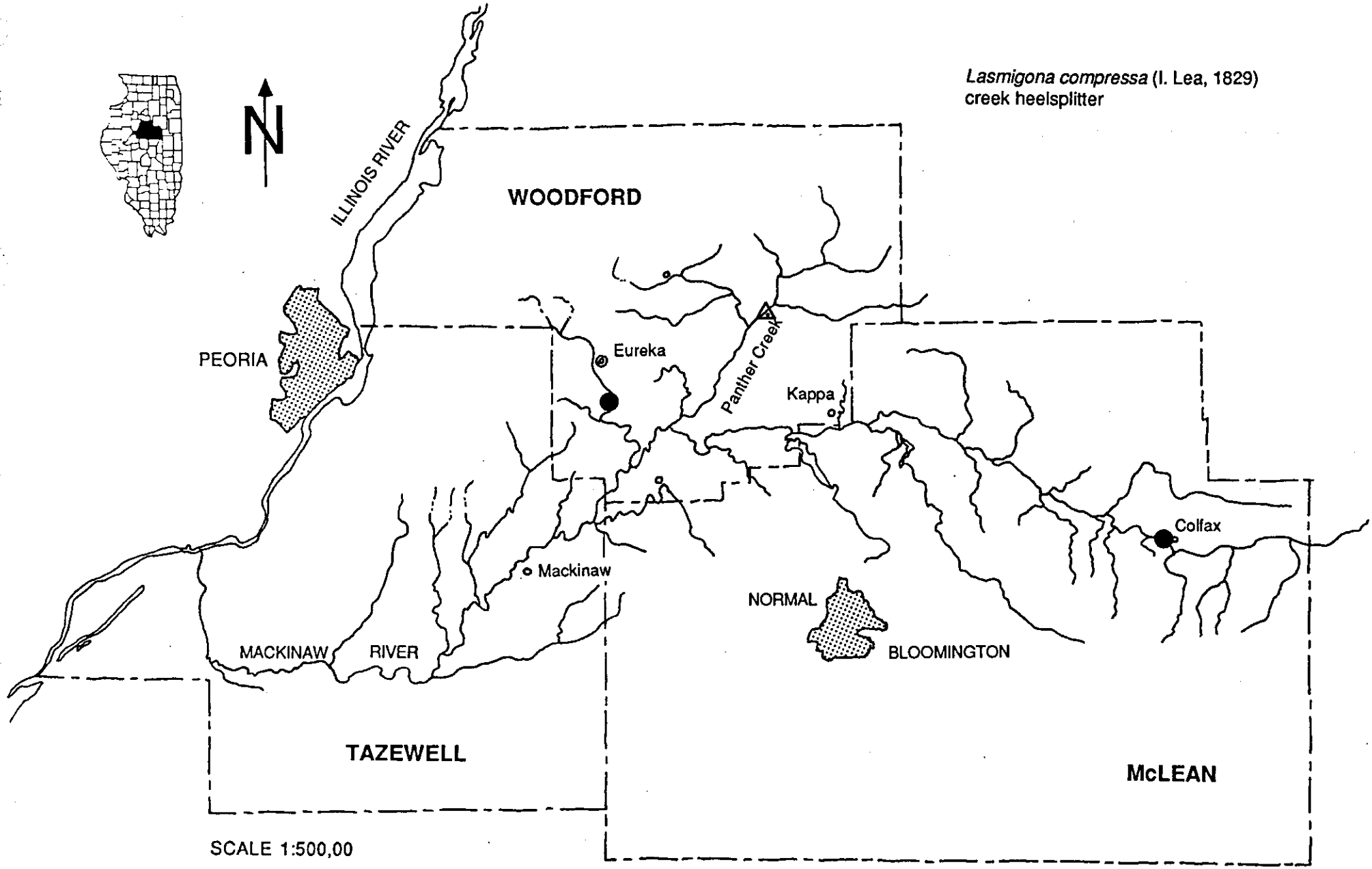
MACKINAW RIVER DRAINAGE, ILLINOIS



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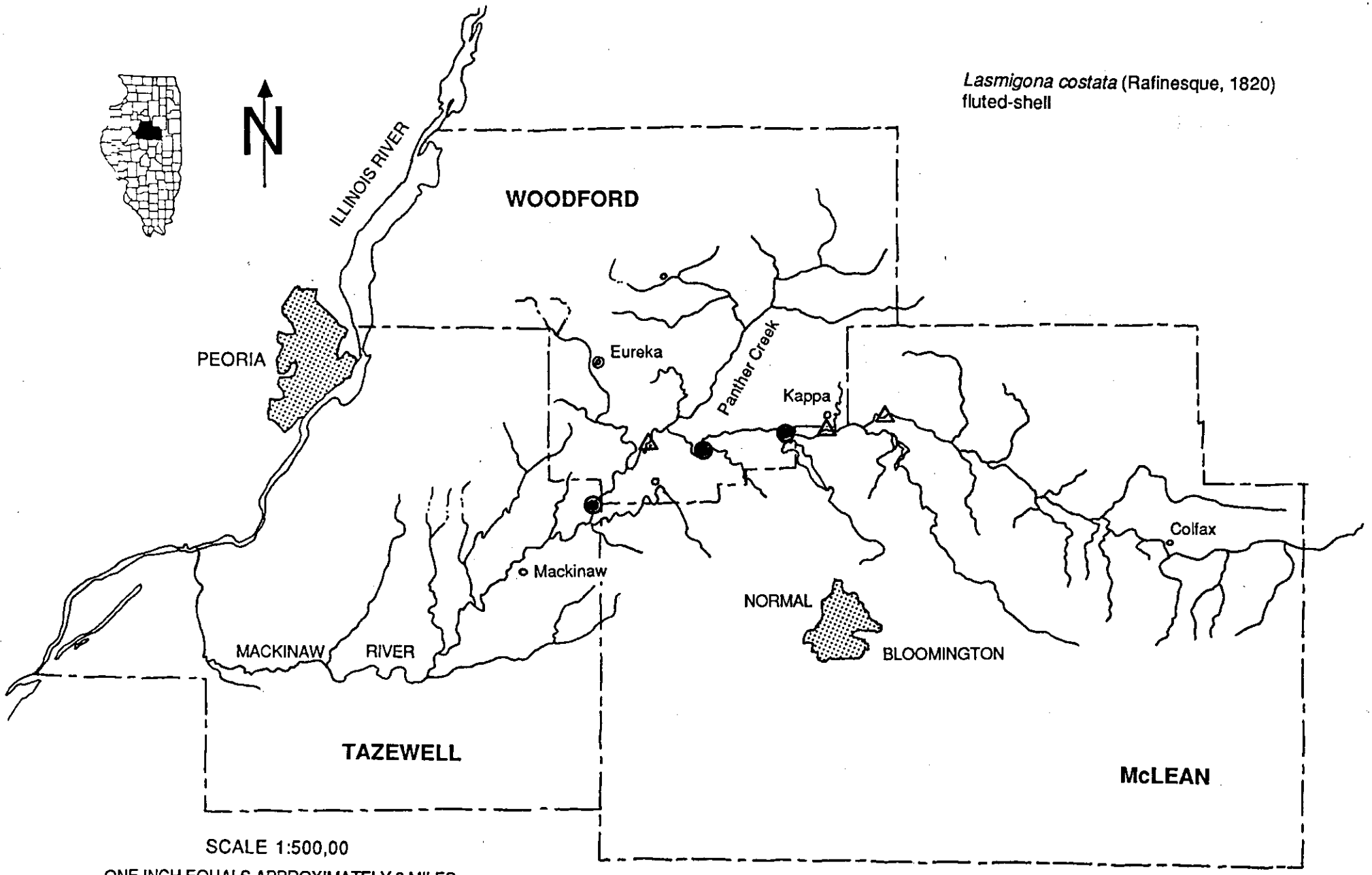
MACKINAW RIVER DRAINAGE, ILLINOIS



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ONE INCH EQUALS APPROXIMATELY 8 MILES

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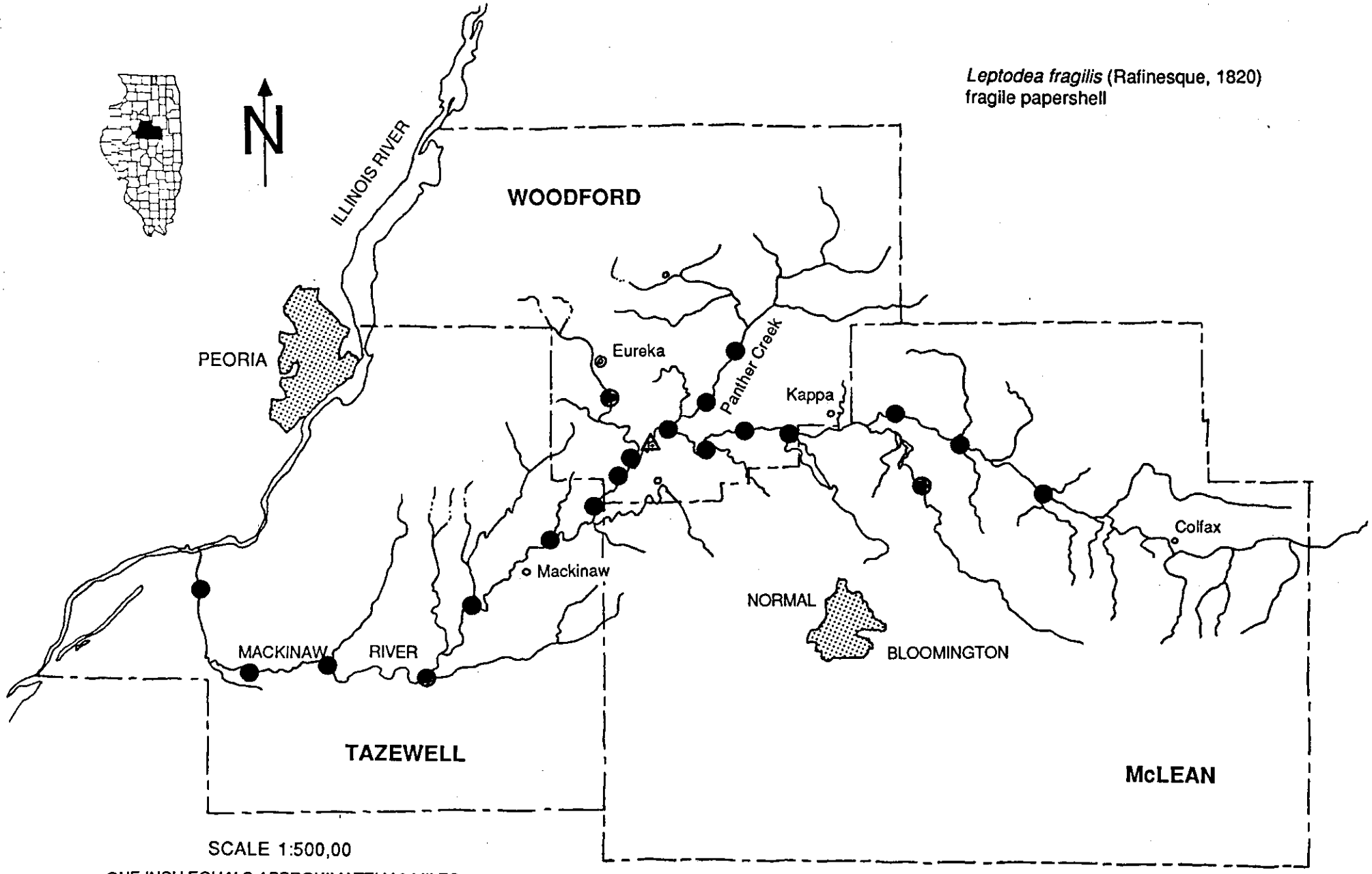
MACKINAW RIVER DRAINAGE, ILLINOIS



SCALE 1:500,00

ONE INCH EQUALS APPROXIMATELY 8 MILES

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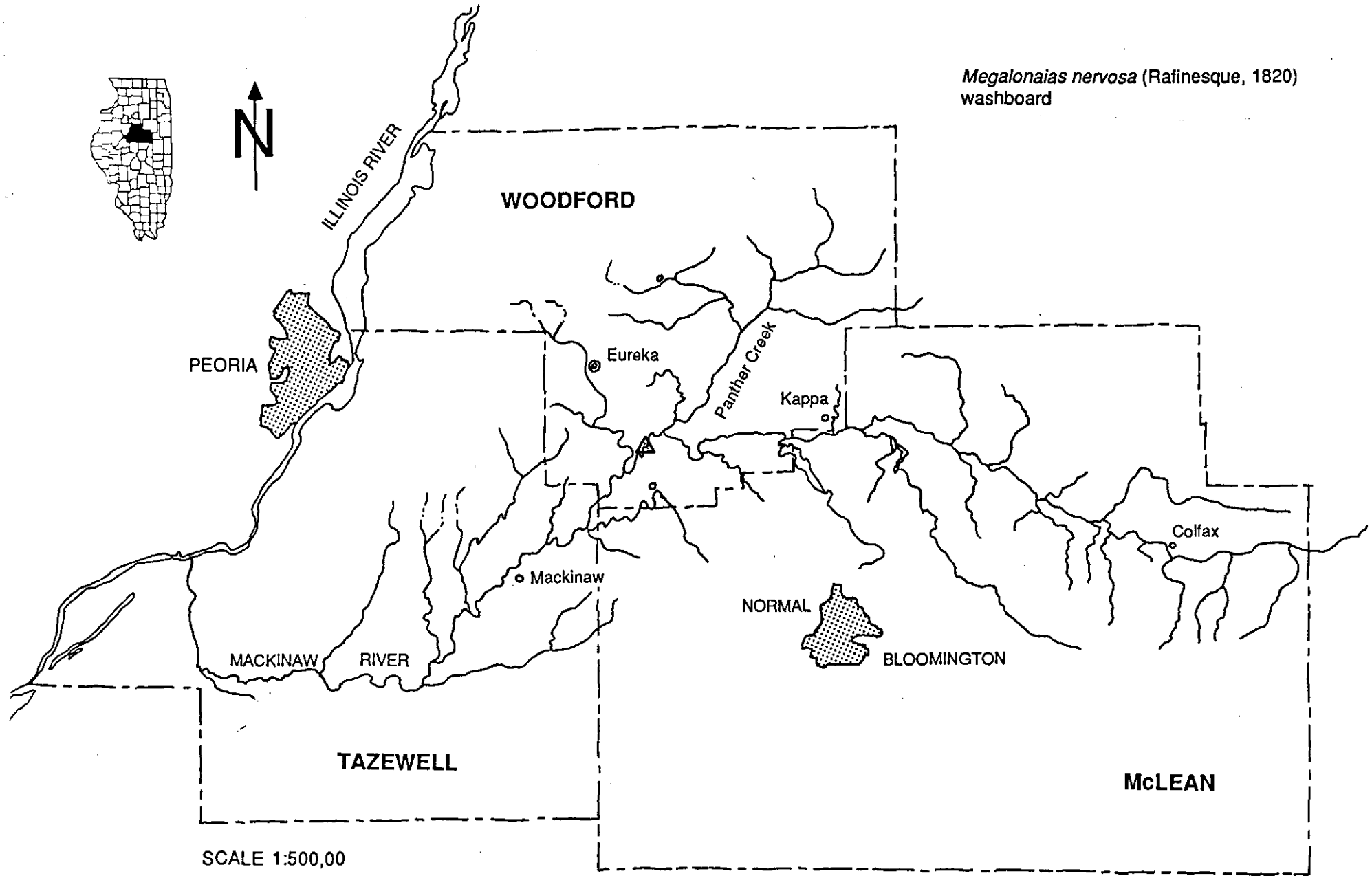
MACKINAW RIVER DRAINAGE, ILLINOIS

Megalonaias nervosa (Rafinesque, 1820)
washboard



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ONE INCH EQUALS APPROXIMATELY 8 MILES

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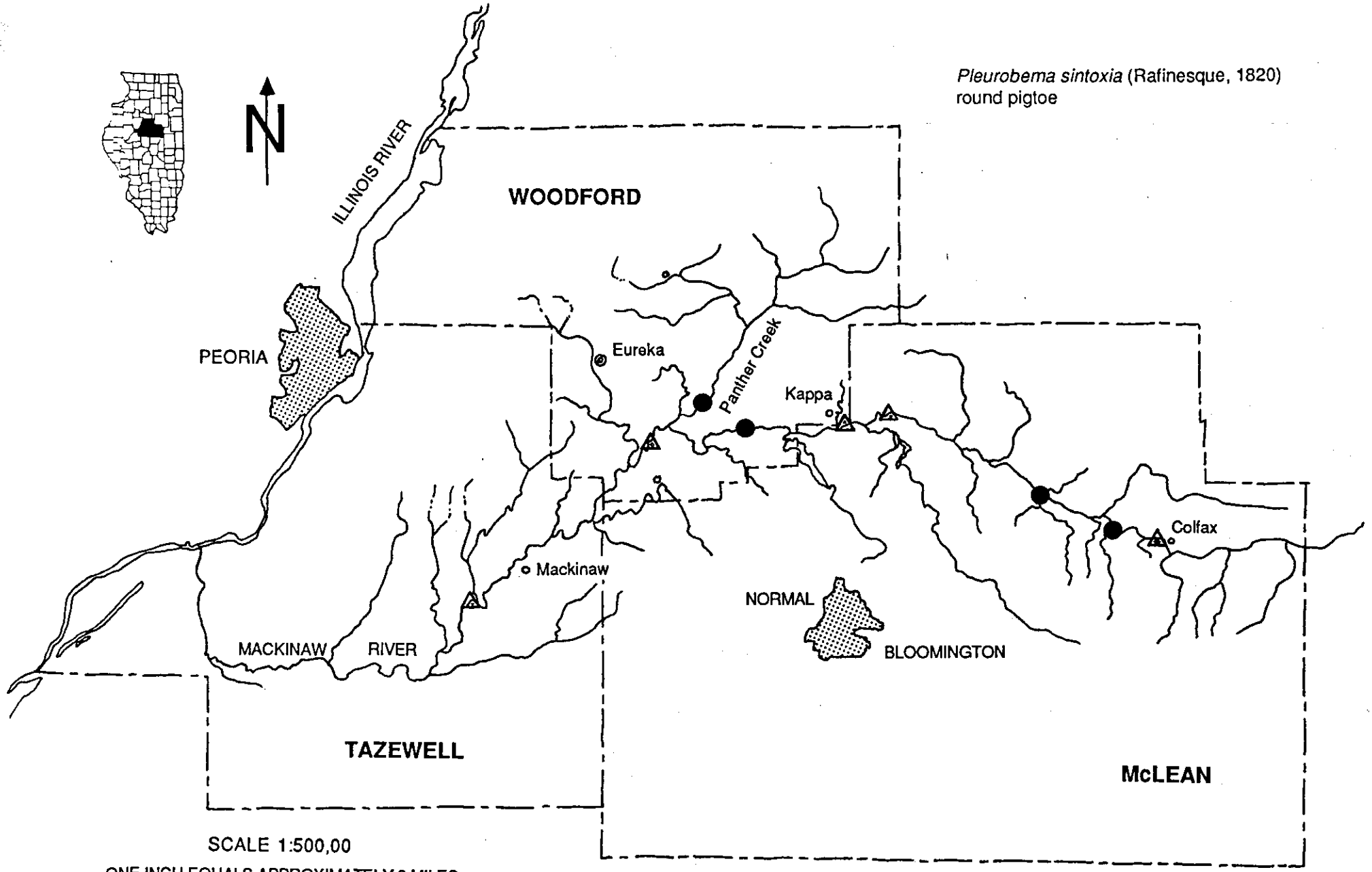
MACKINAW RIVER DRAINAGE, ILLINOIS



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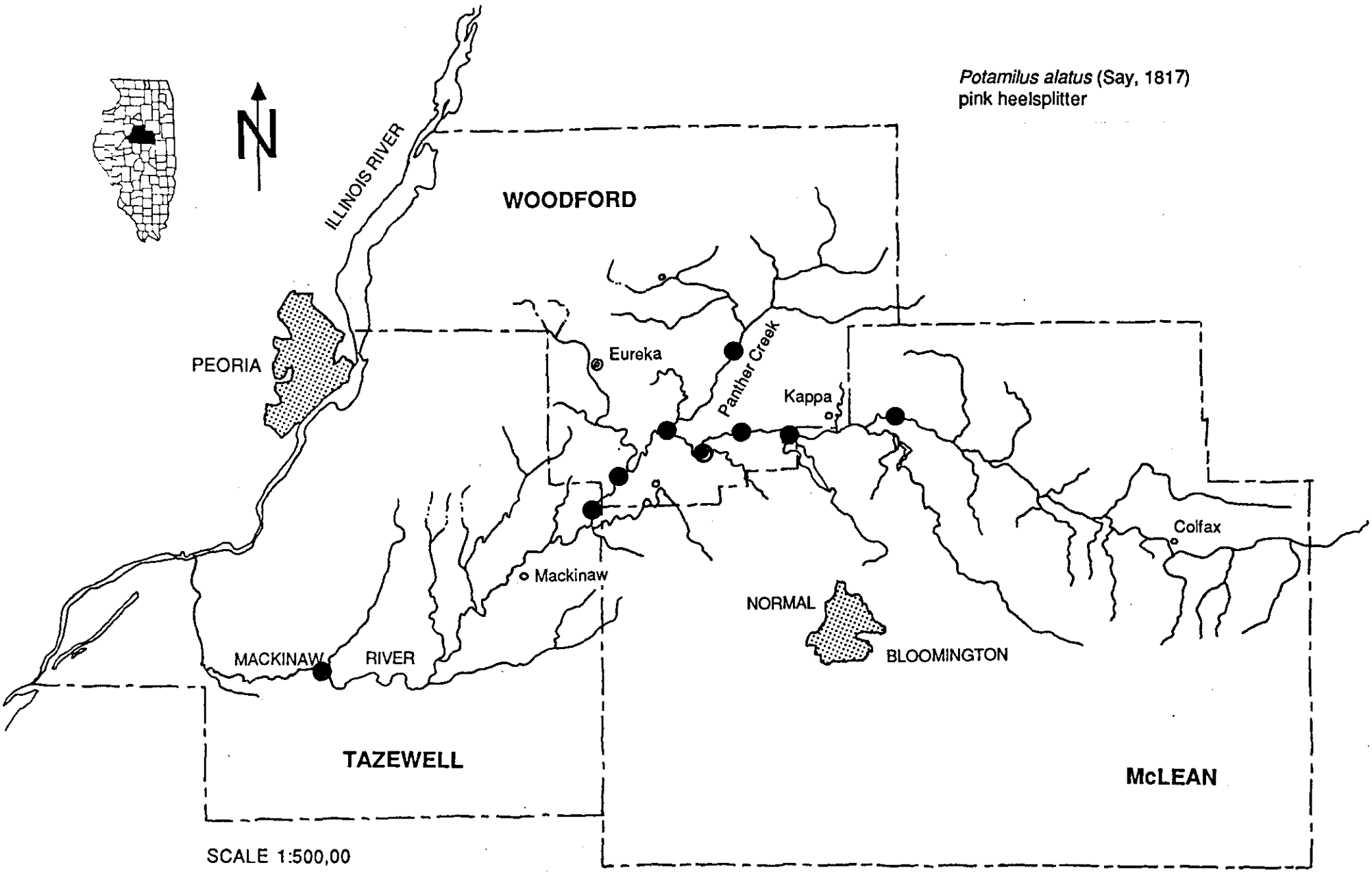
MACKINAW RIVER DRAINAGE, ILLINOIS



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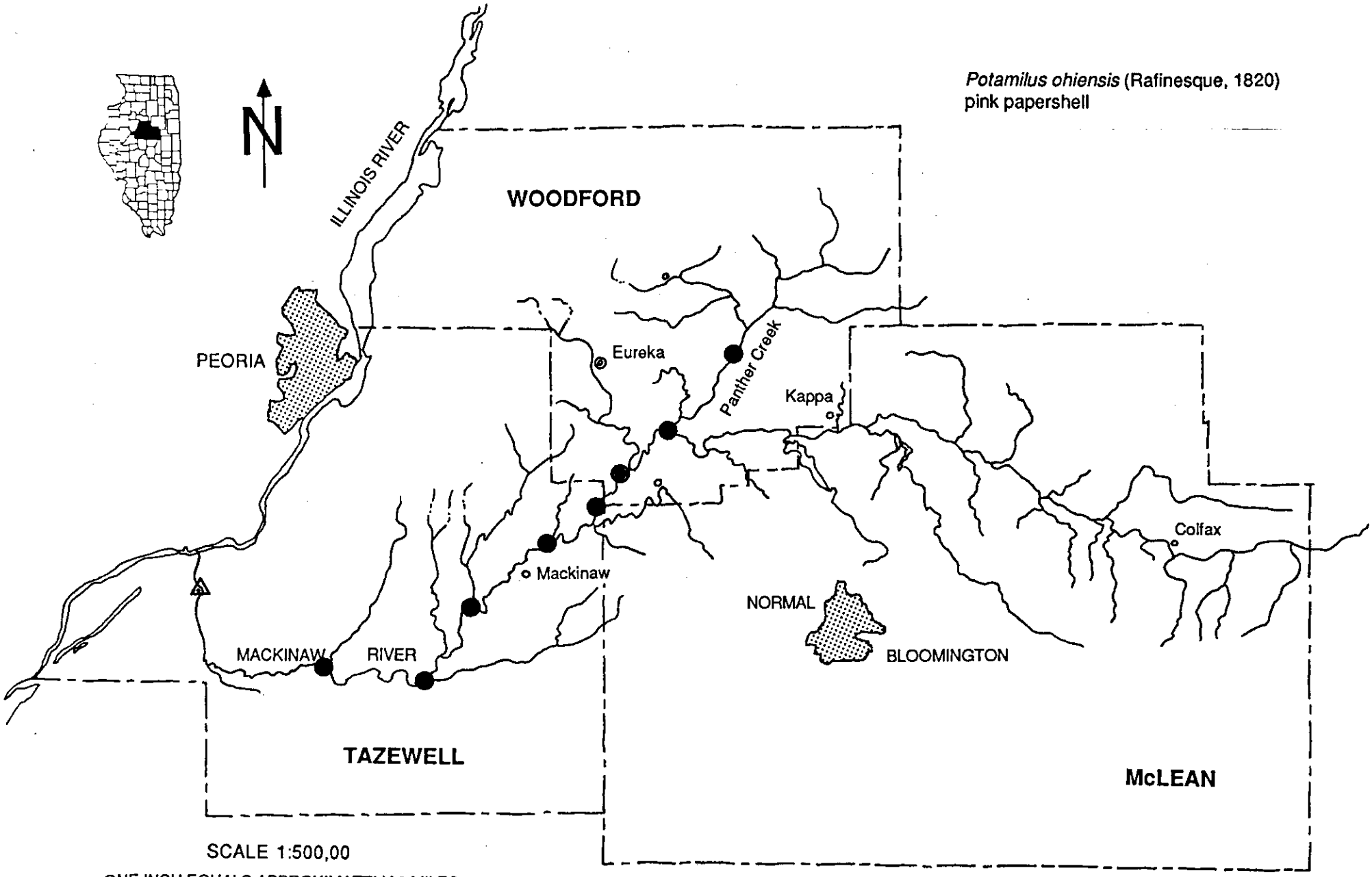
MACKINAW RIVER DRAINAGE, ILLINOIS



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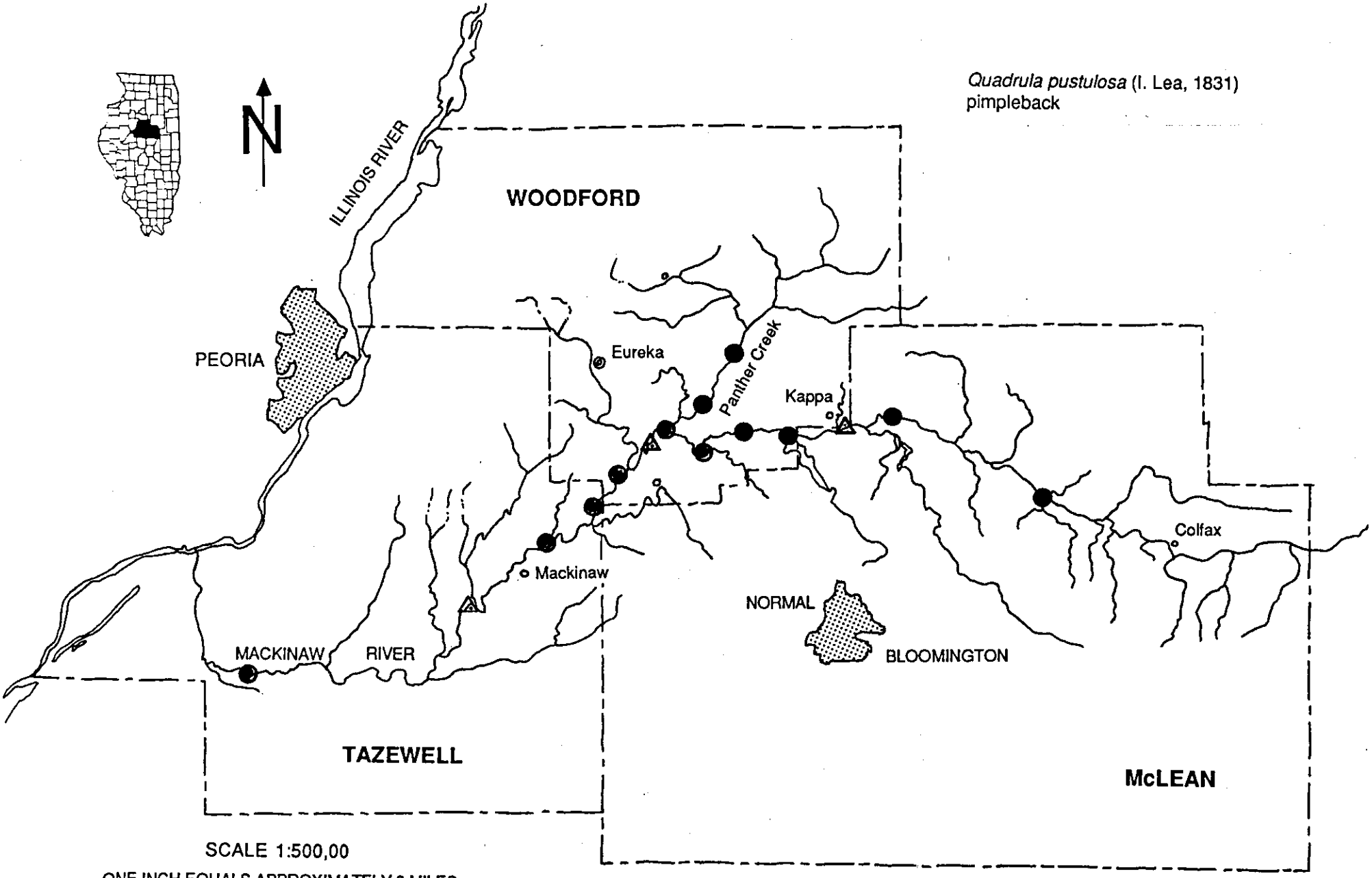
MACKINAW RIVER DRAINAGE, ILLINOIS



SCALE 1:500,00

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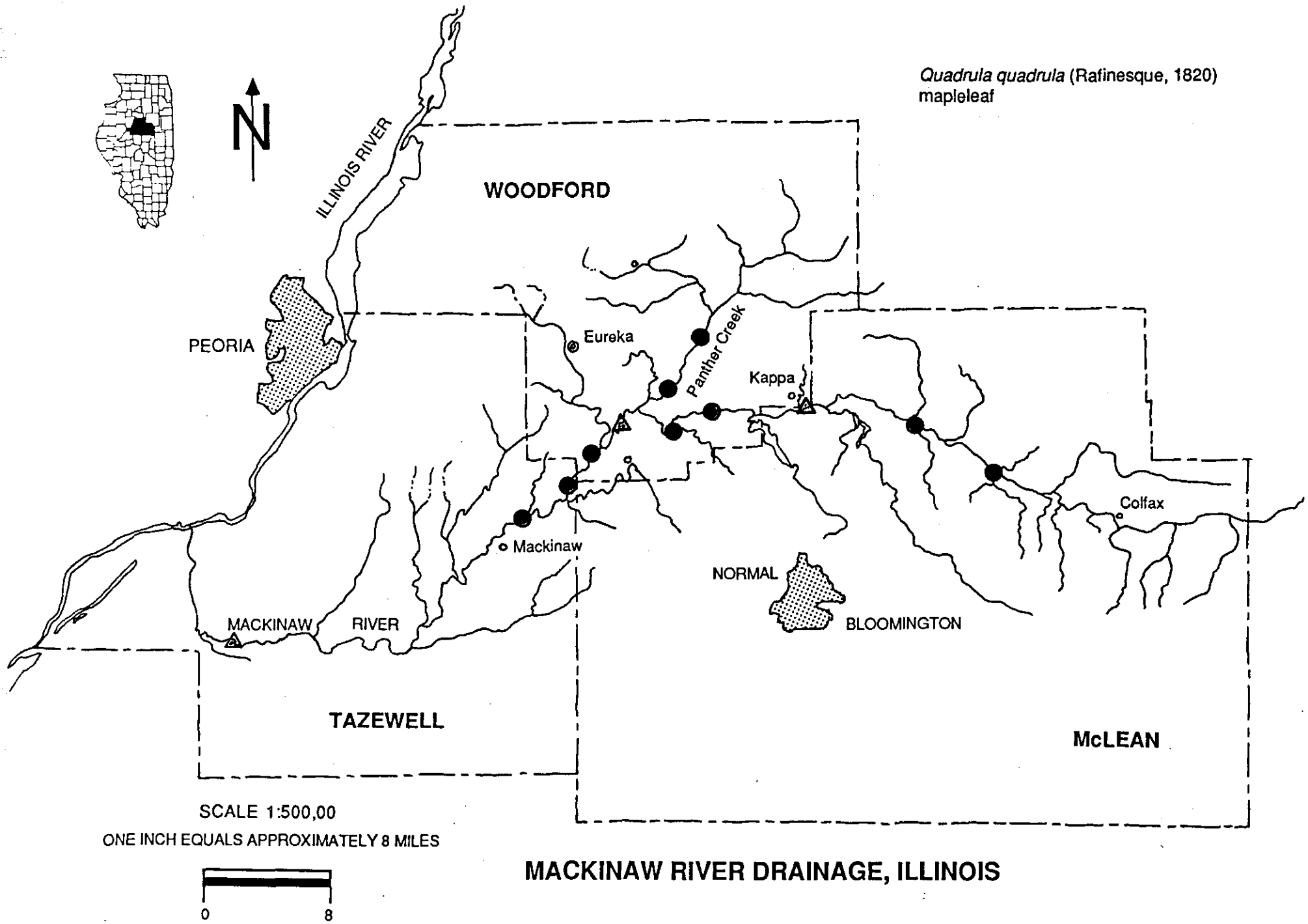
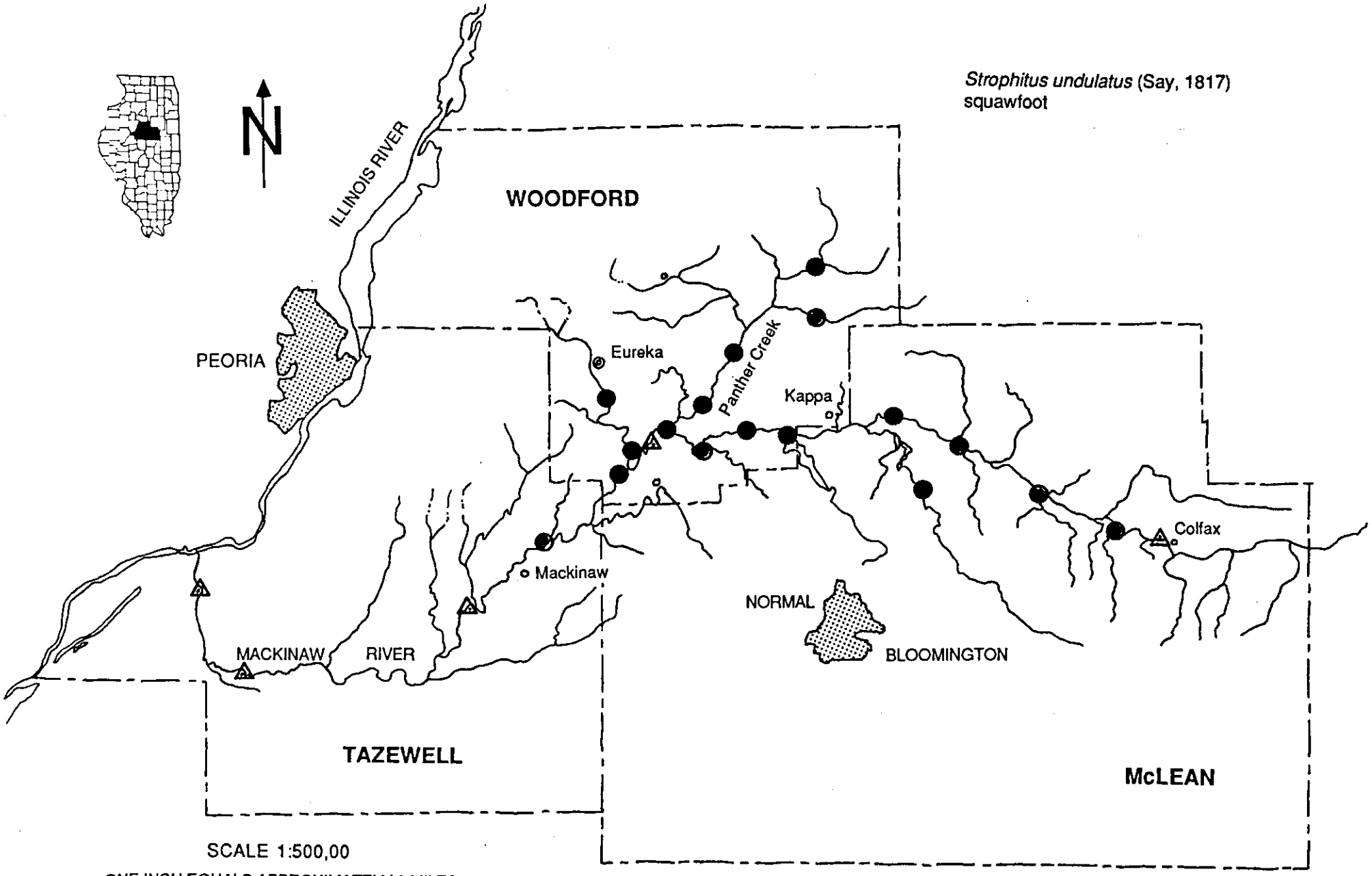
MACKINAW RIVER DRAINAGE, ILLINOIS



MACKINAW RIVER DRAINAGE, ILLINOIS



SCALE 1:500,00

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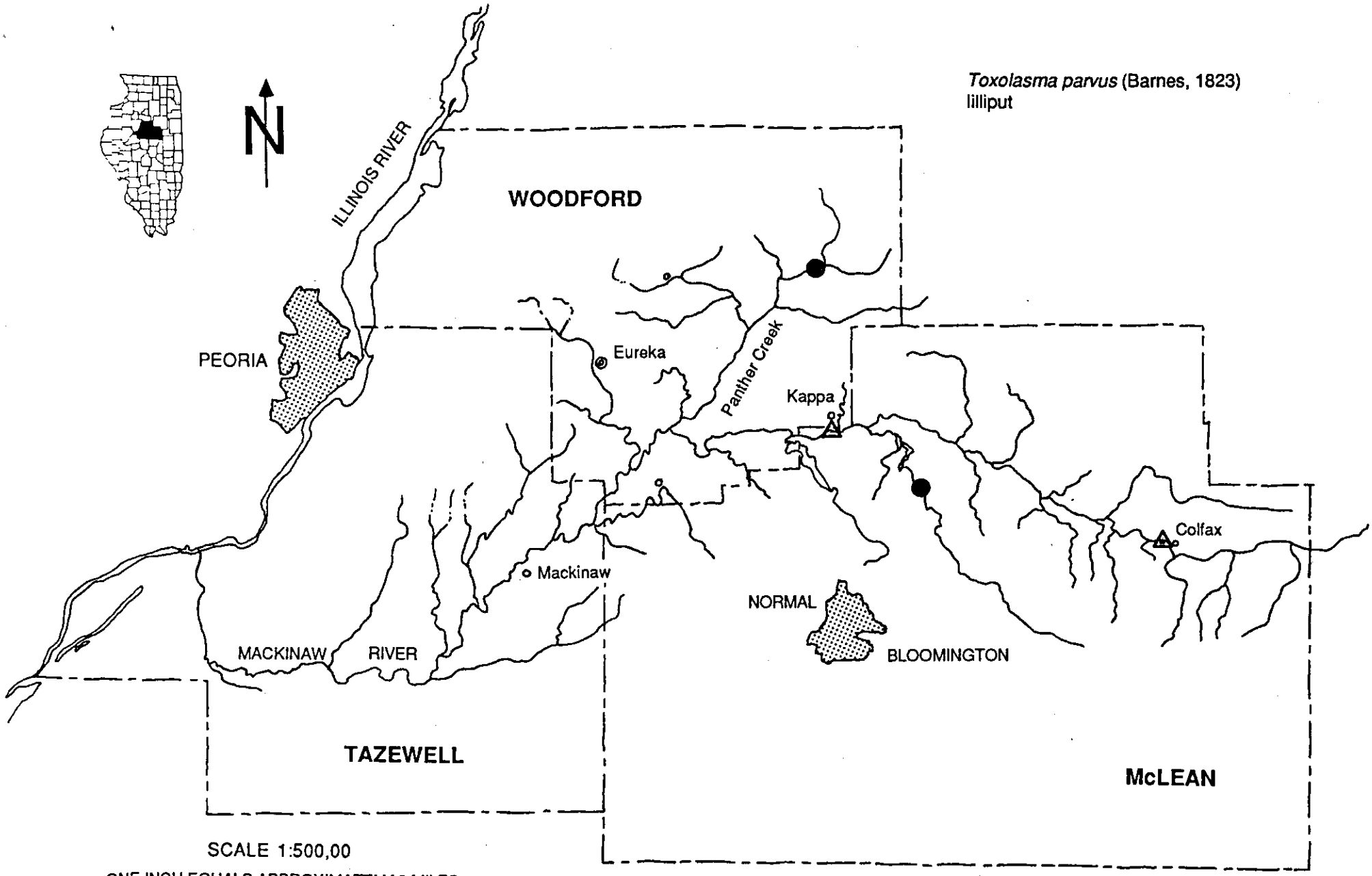
MACKINAW RIVER DRAINAGE, ILLINOIS



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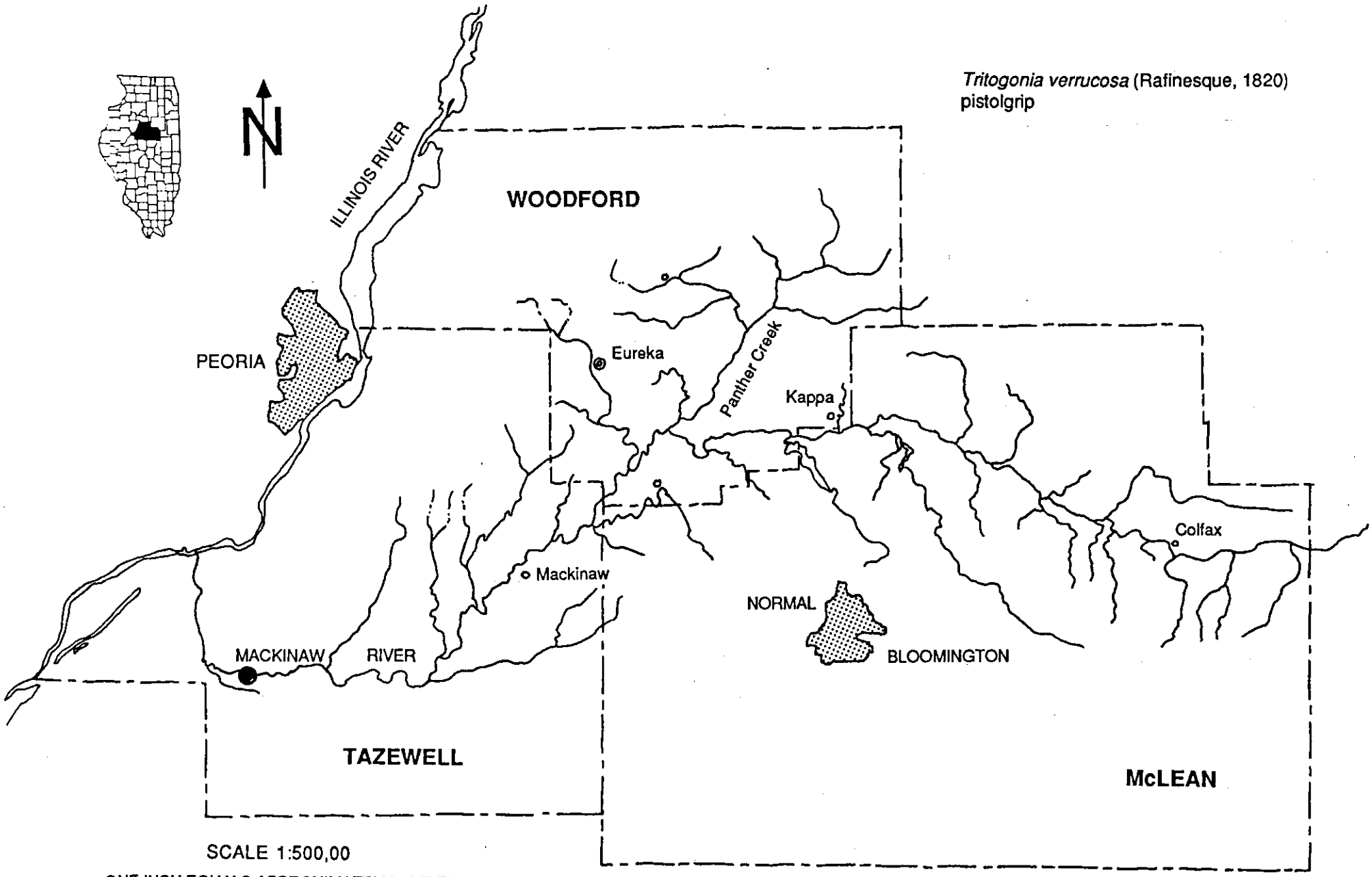
MACKINAW RIVER DRAINAGE, ILLINOIS



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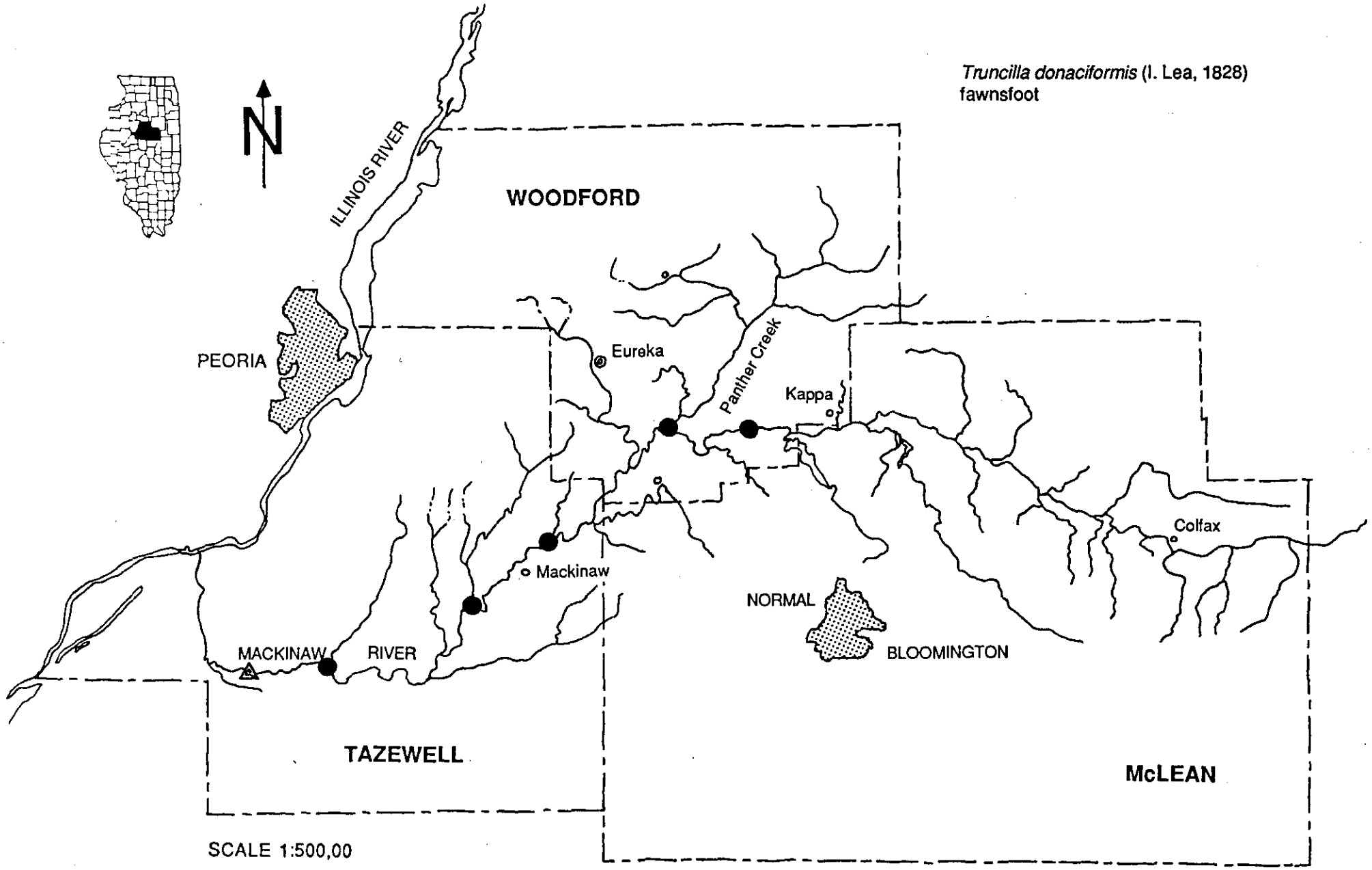
MACKINAW RIVER DRAINAGE, ILLINOIS



SCALE 1:500,00

ONE INCH EQUALS APPROXIMATELY 8 MILES

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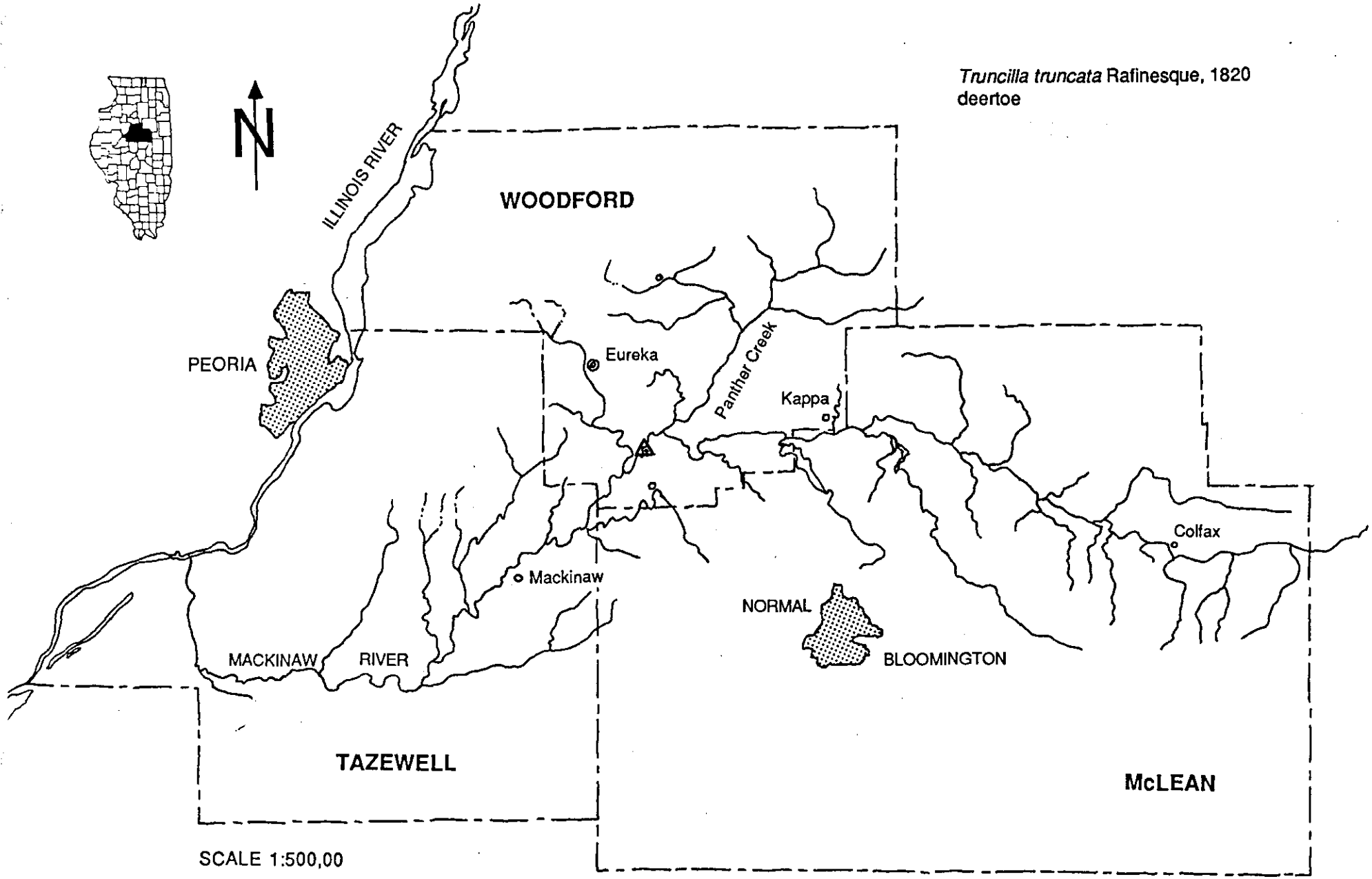
MACKINAW RIVER DRAINAGE, ILLINOIS

Truncilla truncata Rafinesque, 1820
deertoe



SCALE 1:500,00

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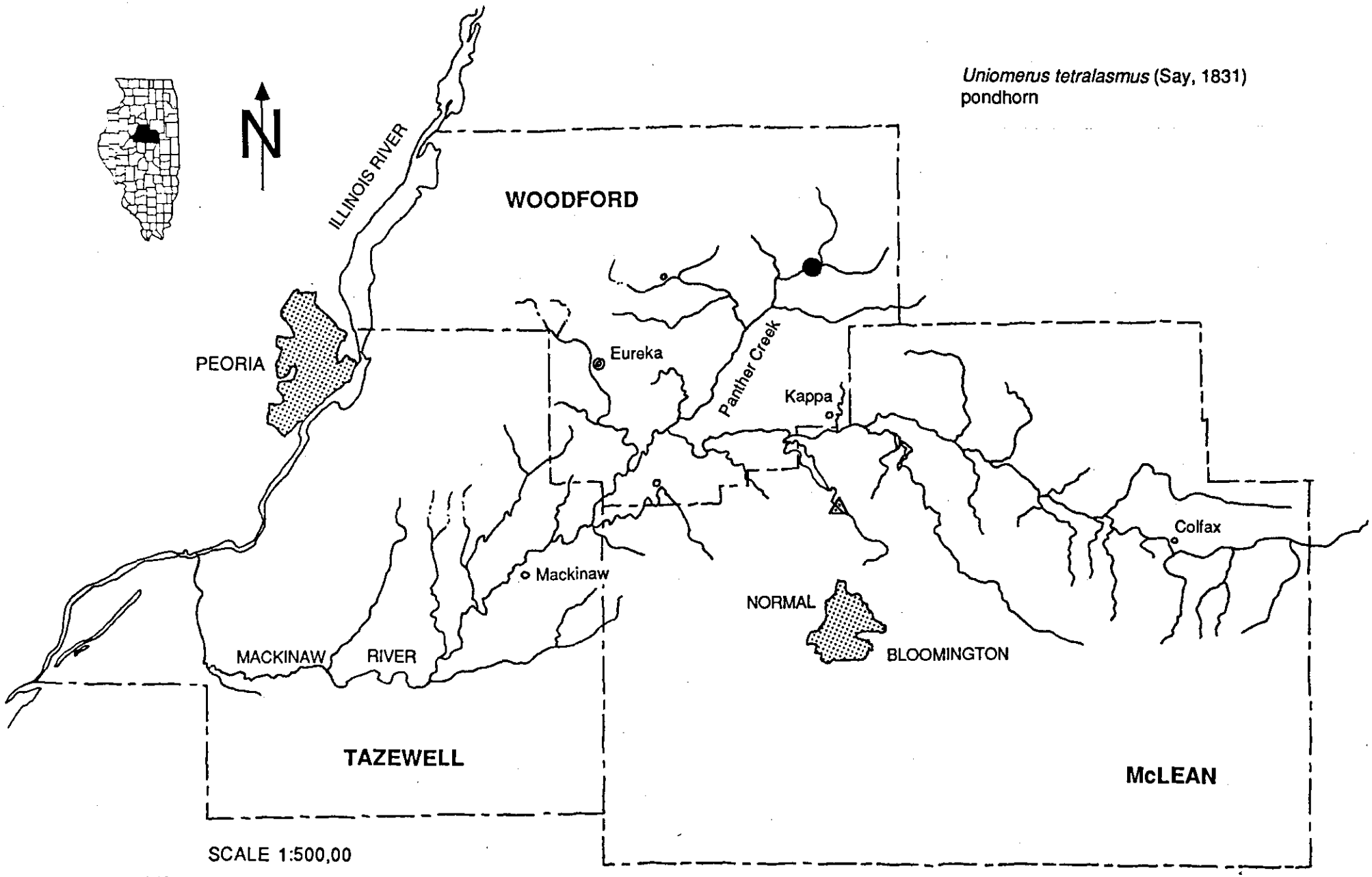
MACKINAW RIVER DRAINAGE, ILLINOIS

Uniomerus tetralasmus (Say, 1831)
pondhorn



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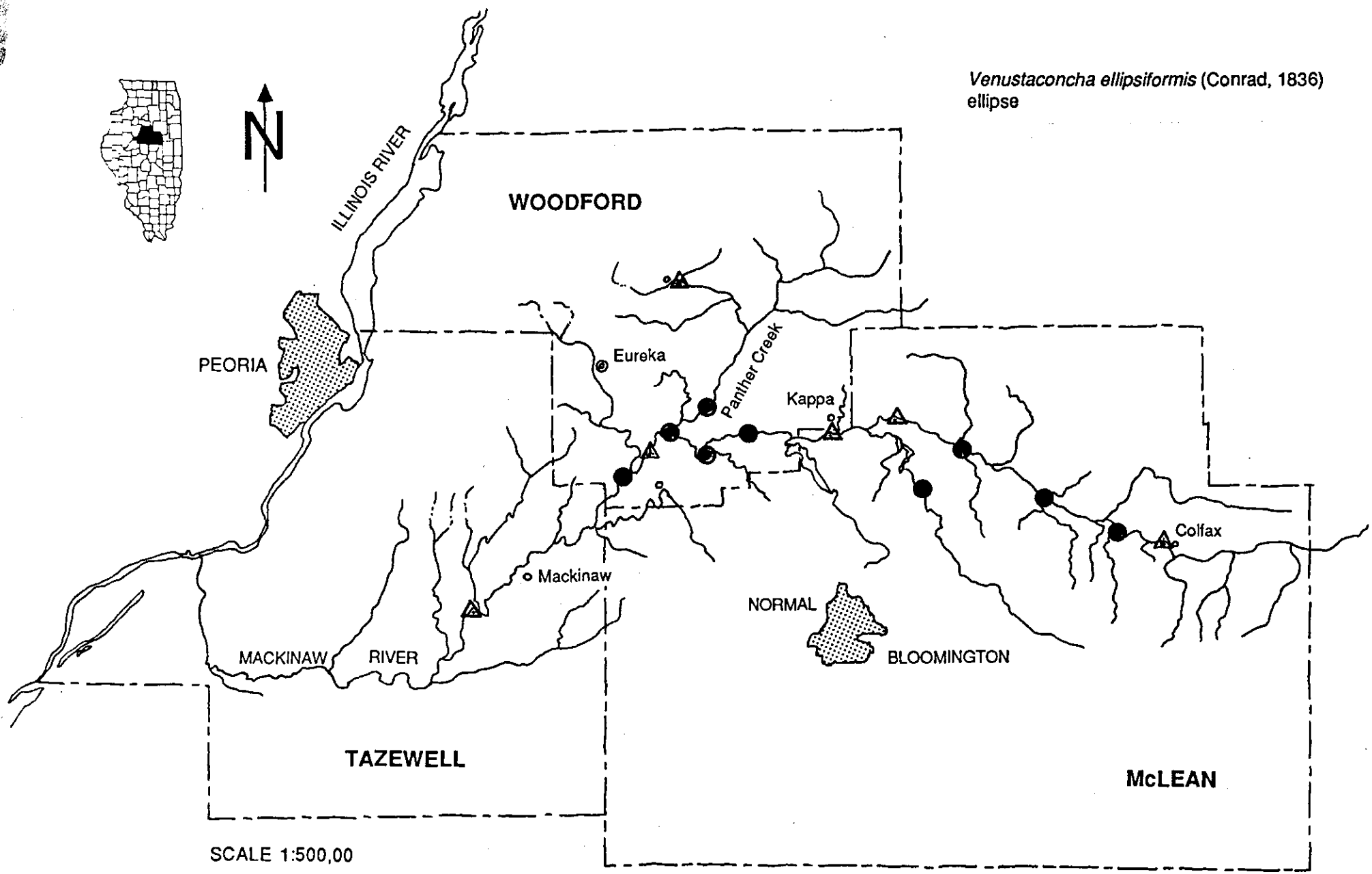
MACKINAW RIVER DRAINAGE, ILLINOIS



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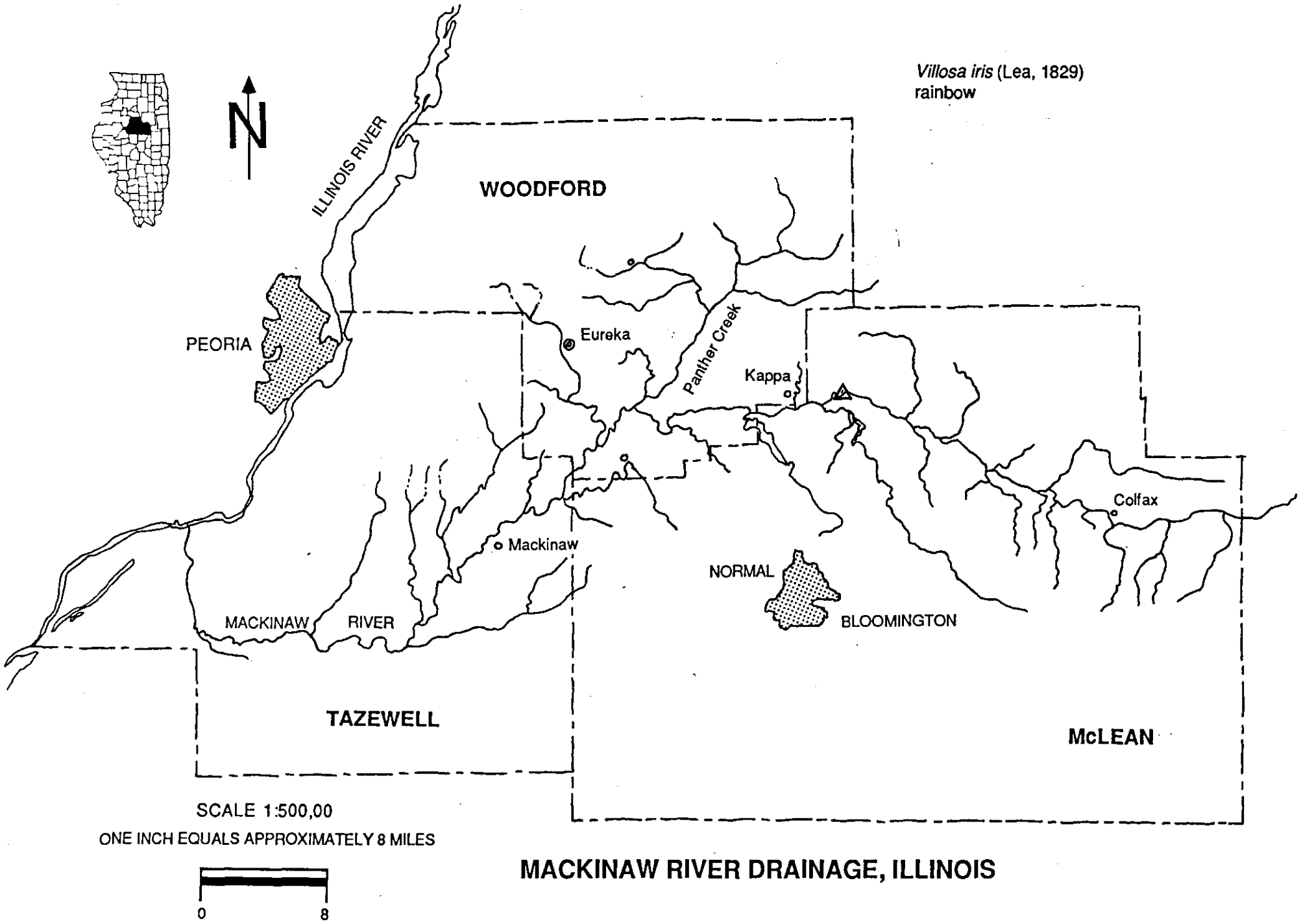
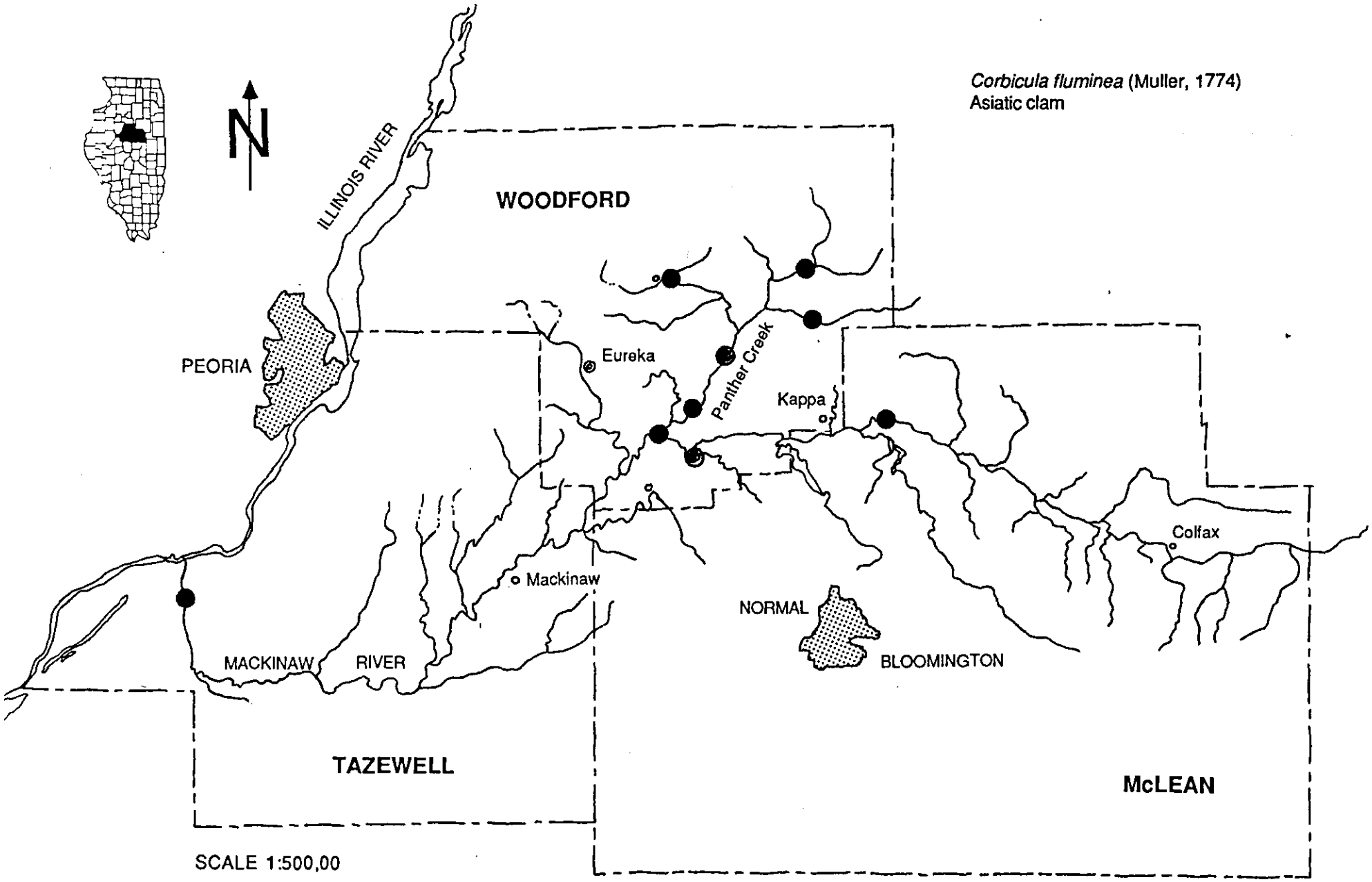
MACKINAW RIVER DRAINAGE, ILLINOIS



MACKINAW RIVER DRAINAGE, ILLINOIS



SCALE 1:500,00

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MACKINAW RIVER DRAINAGE, ILLINOIS

Appendix V. Key to photographs of the freshwater mussels (Unionidae) of the Mackinaw River drainage, Illinois.

1. *Actinonaias ligamentina* (Lamarck, 1819)
   mucket
2. *Alasmidonta marginata* Say, 1818
   elktoe
3. *Alasmidonta viridis* (Rafinesque, 1820)
   slippershell mussel
4. *Amblema plicata* (Say, 1817)
   three ridge
5. *Anodonta grandis* Say, 1829
   giant floater
6. *Anodontoides ferussacianus* (I. Lea, 1834)
   cylindrical papershell
7. *Arcidens confragosus* (Say, 1829)
   rock pocketbook
8. *Elliptio dilatata* (Rafinesque, 1820)
   spike
9. *Fusconaia flava* (Rafinesque, 1820)
   Wabash pigtoe
10. *Lampsilis cardium* (Rafinesque, 1820)
    plain pocketbook
11. *Lampsilis siliquoidea* (Barnes, 1823)
    fatmucket
12. *Lampsilis teres* (Rafinesque, 1820)
    yellow sandshell
13. *Lasmigona complanata* (Barnes, 1823)
    white heelsplitter
14. *Lasmigona compressa* (I. Lea, 1829)
    creek heelsplitter
15. *Lasmigona costata* (Rafinesque, 1820)
    fluted-shell
16. *Leptodea fragilis* (Rafinesque, 1820)
    fragile papershell
17. *Megalonaias nervosa* (Rafinesque, 1820)
    washboard
18. *Pleurobema sintoxia* (Rafinesque, 1820)
    round pigtoe
19. *Potamilus alatus* (Say, 1817)
    pink heelsplitter
20. *Potamilus ohiensis* (Rafinesque, 1820)
    pink papershell
21. *Quadrula pustulosa* (I. Lea, 1831)
    pimpleback
22. *Quadrula quadrula* (Rafinesque, 1820)
    mapleleaf
23. *Strophitus undulatus* (Say, 1817)
    squawfoot
24. *Toxolasma parvus* (Barnes, 1823)
    lilliput
25. *Tritogonia verrucosa* (Rafinesque, 1820)
    pistolgrip
26. *Truncilla donaciformis* (I. Lea, 1828)
    fawnsfoot
27. *Truncilla truncata* Rafinesque, 1820
    deertoe
28. *Uniomerus tetralasmus* (Say, 1831)
    pondhorn
29. *Venustaconcha ellipsiformis* (Conrad, 1836)
    ellipse
30. *Villosa iris* (I. Lea, 1829)
    rainbow
31. *Corbicula fluminea* (Muller, 1774)
    Asiatic clam

Note: Specimens photographed were not necessarily collected from the Mackinaw River.