PRODUCTION NOTE

University of Illinois at
Urbana-Champaign Library
ILLINOIS
NATURAL HISTORY
SURVEY

BIOLOGICAL AND SOIL SURVEY OF FAP 412 FROM OGLESBY,
LASALLE COUNTY TO BLOOMINGTON, MCLEAN COUNTY, ILLINOIS
COMPONENT 3.2: MUSSELS (MOLLUSCA: UNIONIDAE)

FINAL REPORT 02 APRIL 1986

Section of Faunistic Surveys
and Insect Identification
Technical Report

by

Jeanine M. Kasprowicz
Mark J. Wetzel

For

Illinois Department of Transportation
Bureau of Location and Environment
2300 South Dirksen Parkway
Springfield, IL 62764
# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>LIST OF FIGURES</td>
<td>iii</td>
</tr>
<tr>
<td>LIST OF TABLES</td>
<td>v</td>
</tr>
<tr>
<td>INTRODUCTION</td>
<td>1</td>
</tr>
<tr>
<td>DESCRIPTION OF STUDY AREA</td>
<td>2</td>
</tr>
<tr>
<td>METHODS</td>
<td>20</td>
</tr>
<tr>
<td>RESULTS</td>
<td>20</td>
</tr>
<tr>
<td>DISCUSSION</td>
<td>21</td>
</tr>
<tr>
<td>Historical Records</td>
<td>21</td>
</tr>
<tr>
<td>Federal and State Endangered and Threatened Mussels in Illinois</td>
<td>23</td>
</tr>
<tr>
<td>SPECIES ACCOUNTS OF ENDANGERED AND THREATENED ILLINOIS MUSSELS</td>
<td>25</td>
</tr>
<tr>
<td>FOUND IN THE FAP 412 STUDY AREA</td>
<td></td>
</tr>
<tr>
<td>ACKNOWLEDGEMENTS</td>
<td>26</td>
</tr>
<tr>
<td>LITERATURE CITED</td>
<td>26</td>
</tr>
</tbody>
</table>
LIST OF FIGURES

Figure 1. Location of FAP 412 study sites in Marshall County, Illinois, surveyed for fishes, unionid mussels, aquatic invertebrates, phytoplankton, zooplankton, and water quality during October and November 1984, and May 1985: Sandy Creek (SC1) (Taken from Illinois Department of Transportation county highway maps, 1982 ed.). ......................................................... 3

Figure 2. Location of FAP 412 study sites in Woodford County, Illinois, surveyed for fishes, unionid mussels, aquatic invertebrates, phytoplankton, zooplankton, and water quality during October and November 1984, and April and May 1985: Mackinaw River (MRDS6); East Branch of Panther Creek (EBPC3); and Panther Creek (PC2) (Taken from Illinois Department of Transportation county highway maps, 1982 ed.). ............... 4

Figure 3. Location of FAP 412 study sites in McLean County, Illinois, surveyed for fishes, unionid mussels, aquatic invertebrates, phytoplankton, zooplankton, and water quality during October and November 1984, and April and May 1985: Mackinaw River (MRUS4 and MRC5); and Sixmile Creek (6MC7) (Taken from Illinois Department of Transportation county highway maps, 1982 ed.). .......................................................... 5

Figure 4. Location of FAP 412 study sites in LaSalle County, Illinois, surveyed for fishes, unionid mussels, aquatic invertebrates, phytoplankton, zooplankton, and water quality during May 1985: Bailey Creek (BC8) (Taken from Illinois Department of Transportation county highway maps, 1982 ed.). ............... 6

Figure 5. Location of FAP 412 Station SC1 at Sandy Creek, 3.7 km NNW Wenona, Marshall County, Illinois, surveyed for fishes, unionid mussels, aquatic macroinvertebrates, phytoplankton, zooplankton, and water quality during October and November, 1984, and April and May, 1985 (enlarged from the Wenona, Ill. (15', 1934 ed.) USGS topographic quadrangle map). ....................... 8

Figure 6. Location of FAP 412 Station PC2 at Panther Creek, 2.3 km N Panola, Woodford County, Illinois, surveyed for fishes, unionid mussels, aquatic macroinvertebrates, phytoplankton, zooplankton, and water quality during October and November, 1984, and April and May, 1985 (enlarged from the Benson, Ill. (7.5' series, 1983 provisional metric ed.) USGS topographic quadrangle map). ....................... 9

(List of figures concluded on next page)
LIST OF FIGURES
(concluded)

Figure 7. Location of FAP 412 Station EBPC3 at East Branch of Panther Creek, 2.7 km SSE Panola, Woodford County, Illinois, surveyed for fishes, unionid mussels, aquatic macroinvertebrates, phytoplankton, zooplankton, and water quality during October and November, 1984, and April and May, 1985 (enlarged from the Benson, Ill. (7.5' series, 1983 provisional metric ed.) USGS topographic quadrangle map). ............................ 11

Figure 8. Location of FAP 412 Station MRUS4 at the Mackinaw River, 7.5 km SW Gridley, McLean County, Illinois, surveyed for fishes, unionid mussels, aquatic macroinvertebrates, phytoplankton, zooplankton, and water quality during October and November, 1984, and April and May, 1985 (enlarged from the Gridley, Ill. (7.5' series, 1981 ed.) USGS topographic quadrangle map). .......................... 12

Figure 9. Location of FAP 412 Station MRC5 at the Mackinaw River, 1.6 km SSE Kappa, McLean County, Illinois, surveyed for fishes, unionid mussels, aquatic macroinvertebrates, phytoplankton, zooplankton, and water quality during October and November, 1984, and April and May, 1985 (enlarged from the El Paso, Ill. (7.5' series, 1970 ed., 1979 PR) USGS topographic quadrangle map). .......................... 14

Figure 10. Location of FAP 412 Station MRDS6 at the Mackinaw River, 4 km WSW Kappa, Woodford County, Illinois, surveyed for fishes, unionid mussels, aquatic macroinvertebrates, phytoplankton, zooplankton, and water quality during October and November, 1984, and April and May, 1985 (enlarged from the El Paso, Ill. (7.5' series, 1970 ed., 1979 PR) USGS topographic quadrangle map). .......................... 16

Figure 11. Location of FAP 412 Station 6MC7 at Sixmile Creek, 9.3 km N Normal, McLean County, Illinois, surveyed for fishes, unionid mussels, aquatic macroinvertebrates, phytoplankton, zooplankton, and water quality during October and November, 1984, and April and May, 1985 (enlarged from the Normal West, Ill. (7.5' series, 1970 ed., 1979 PR) USGS topographic quadrangle map). .......................... 18

Figure 12. Location of FAP 412 Station BC8 at Bailey Creek, 1.7 km W Tonica, LaSalle County, Illinois, surveyed for fishes, unionid mussels, aquatic macroinvertebrates, phytoplankton, zooplankton, and water quality during April and May, 1985 (enlarged from the Tonica, Ill. (7.5' series, 1983 provisional metric ed.) USGS topographic quadrangle map). .......................... 19
LIST OF TABLES

Table 1. Locations of FAP 412 aquatic sites surveyed for fishes, unionid mussels, aquatic invertebrates, phytoplankton, zooplankton, and water quality in LaSalle, Marshall, McLean, and Woodford counties in Illinois during October and November of 1984, and April and May of 1985. ........................................ 7

Table 2. Species and numbers of unionid mussels collected from Mackinaw River basin locations (Mackinaw River, Panther Creek, East Branch of Panther Creek, and Sixmile Creek), Sandy Creek, and Bailey Creek, in LaSalle, Marshall, McLean, and Woodford counties, Illinois, during Autumn 1984 and Spring 1985*. ................................. 22

Table 3. Comparison of species and numbers of unionid mussels collected from the Mackinaw River drainage during past and present surveys. ........................................ 24
INTRODUCTION

The Illinois Department of Transportation (IDOT), Bureau of Location and Environment, is required to comply with Section 404(b)1 of the Clean Water Act when projects have the potential to impact on aquatic environments. In addition, IDOT also is required by Section 7 of the Endangered Species Act of 1973, as amended, to conduct a biological inventory for the purpose of identifying federally listed endangered and threatened species likely to be affected by its highway construction projects. IDOT also wishes to consider in a similar fashion those species listed as endangered or threatened in Illinois by the state Endangered Species Protection Board. In many cases, the general distribution patterns of these species are known, but specific records from the project area are not available. Usually a field reconnaissance and review of appropriate publications and museum records are necessary to determine whether or not a species actually occurs or is thought likely to occur in a project area.

In conjunction with the proposed IDOT project FAP 412, in which a four-lane limited access highway will be constructed between Normal in McLean County and Oglesby in LaSalle County, the Illinois Natural History Survey was asked to conduct such an inventory to determine the actual or likely occurrence of mussel species within the project area. Particular attention was given to federal and state endangered and threatened species, which, based upon past records and information about habitat preferences, were known or thought likely to occur in watersheds within the project area. These watersheds included the Mackinaw River basin, with stations on the Mackinaw River, Panther Creek, East Branch of Panther Creek, and Sixmile Creek, one station on Sandy Creek, a small tributary of the Illinois River, and one station on Bailey Creek, a small tributary of the Vermilion River (Illinois River drainage).

Objectives

The objectives of this mussel survey were: (1) To determine the present distribution and abundance (density) of mussels in aquatic habitats which may be impacted by the construction of FAP 412; (2) to document the historical changes in mussel populations within the these habitats, if known; and (3) to recognize endangered and threatened mussels which are known from these habitats.
DESCRIPTION OF STUDY AREA

Eight sites occurring within the project area were visited during the course of this study (Figures 1 through 4). All eight sampling locations are located in the Grand Prairie Section of the Grand Prairie Natural Division (Schwegman 1973). The presettlement vegetation was largely tall-grass prairie, while forests occupied the river valleys and moraines (Mohlenbrock 1975). Station number, general descriptions, and legal descriptions of these sampling sites are listed in Table 1. Legal descriptions were obtained from U.S. Geological Survey quadrangle maps with scales of either 1:24,000 (7.5' series) or 1:62,500 (15' series).

STATION SC1: SANDY CREEK (Figures 1, 5)

The vegetation along Sandy Creek at this location is bordered by a narrow grassland dominated by Phalaris arundinacea (canary reed grass). The roadside and a pasture north of the creek and east of U.S. 51 are dominated by Poa pratensis (Kentucky blue grass) and Festuca pratensis (meadow fescue), with occasional Tragopogon dubius (goat's beard), Rumex altissimus (pale dock), and Carduus nutans (nodding thistle). Cropland occurs beyond the grassy creek border.

Sampling for aquatic components at Sandy Creek was conducted within a reach approximately 120 m in length, delineated by a point 10 m downstream of the centerline of the existing U.S. Route 51 bridge and extending to a point 110 m upstream of that centerline. Stream width varied from between 0.75 and 2.5 meters. Stream depth varied between 0.1 and 0.75 meters. Stream substrate in pools consisted primarily of clay, with a fine silt covering, intermingled with frequent patches of blue-green algae. Riffle areas consisted of a silt and sand mixture, with frequent flat rocks lining the bottom and sides of the channel.

STATION PC2: PANTHER CREEK (Figures 2, 6)

West of U.S. Route 51, Panther Creek is bordered by a narrow grassland strip containing Phalaris arundinacea (canary reed grass) and Bromus inermis (awnless brome grass). Beyond this grassland strip is cropland. East of U.S. Route 51, Panther Creek is bordered by a discontinuous, riparian strip of young trees on both banks, including Salix nigra (black willow), Acer negundo (box elder), Morus rubra (red mulberry), Crataegus sp. (hawthorn), and Celtis occidentalis (hackberry). South of this border strip is a roadside park with scattered tree plantings and an understory of introduced cool-season grasses. North of this border strip is a narrow non-native grassland strip followed by a blue grass pasture which includes various Carex spp. and Juncus spp.
Figure 1. Location of FAP 412 study sites in Marshall County, Illinois, surveyed for fishes, unionid mussels, aquatic invertebrates, phytoplankton, zooplankton, and water quality during October and November 1984, and May 1985: Sandy Creek (SC1) (Taken from Illinois Department of Transportation county highway maps, 1982 ed.).
Figure 2. Location of FAP 412 study sites in Woodford County, Illinois, surveyed for fishes, unionid mussels, aquatic invertebrates, phytoplankton, zooplankton, and water quality during October and November 1984, and April and May 1985: Mackinaw River (MRDS6); East Branch of Panther Creek (EBPC3); and Panther Creek (PC2) (Taken from Illinois Department of Transportation county highway maps, 1982 ed.).
Figure 3. Location of FAP 412 study sites in McLean County, Illinois, surveyed for fishes, unionid mussels, aquatic invertebrates, phytoplankton, zooplankton, and water quality during October and November 1984, and April and May 1985: Mackinaw River (MRUS4 and MRC5); and Sixmile Creek (6MC7) (Taken from Illinois Department of Transportation county highway maps, 1982 ed.).
Figure 4. Location of FAP 412 study sites in LaSalle County, Illinois, surveyed for fishes, unionid mussels, aquatic invertebrates, phytoplankton, zooplankton, and water quality during May 1985: Bailey Creek (BC8) (Taken from Illinois Department of Transportation county highway maps, 1982 ed.).
<table>
<thead>
<tr>
<th>Location Details</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. (SCI) IL, Marshall County, Sandy Creek, 3.7 km NNW Wenona; at U.S. Rt. 51, from 50m downstream to 120m upstream bridge. 3rd PM: T.30N, R.1E, SE/4, NE/4, SW/4, NW/4, Sec. 11 &amp; SW/4, NW/4, SW/4, Sec. 12. Wenona, Ill. (15', 1934 ed.) USGS quadrangle map.</td>
<td></td>
</tr>
<tr>
<td>2. (PC2) IL, Woodford Co., Panther Creek, 2.3 km N Panola; at roadside park, 40m upstream to 100m downstream. 3rd PM: T.27N, R.2E, NE/4, SW/4, NW/4, Sec. 17 (upstream bridge), and SE/4, SW/4, NW/4, Sec. 18 (downstream bridge). U.T.M.: 4518800m N, 329000m E, Zone 16. Benson, Ill. (7.5' series, 1983 provisional metric ed.) USGS quadrangle map.</td>
<td></td>
</tr>
<tr>
<td>3. (EBPC3) IL, Woodford Co., East Branch of Panther Creek, 2.7 km SSE Panola; 120m upstream to 120m downstream. 3rd PM: T.27N, R.2E, SE/4, NE/4, Sec. 31 (downstream bridge), and S/2, SW/4, NW/4, Sec. 32 (upstream bridge). U.T.M.: 4513850m N, 329100m E, Zone 16. Benson, Ill. (7.5' series, 1983 provisional metric ed.) USGS quadrangle map.</td>
<td></td>
</tr>
<tr>
<td>4. (MRUS4) IL, McLean Co., Mackinaw River, 7.5 km SW Gridley (3 km SSE Kappa); 25 to 150m downstream county road bridge. 3rd PM: T.26N, R.2E, E/2, NW/4, Sec. 36. U.T.M.: 4504750m N, 335800m E, Zone 16. Gridley, Ill. (7.5' series, 1981 ed.) USGS quadrangle map.</td>
<td></td>
</tr>
<tr>
<td>8. (BC8) IL, LaSalle Co., Bailey Creek, 1.7 km W Tonica; 10 to 80m upstream of bridge. 3rd PM: T.32N, R.1E, SW/4, SE/4, SW/4, NE/4, Sec. 27. U.T.M.: 4564400m N, 324350m E, Zone 16. Tonica, Illinois (7.5', 1983 provisional metric ed.) USGS quadrangle map.</td>
<td></td>
</tr>
</tbody>
</table>
Figure 5. Location of FAP 412 Station SCl at Sandy Creek, 3.7 km NNW Wenona, Marshall County, Illinois, surveyed for fishes, unionid mussels, aquatic macroinvertebrates, phytoplankton, zooplankton, and water quality during October and November, 1984, and April and May, 1985 (enlarged from the Wenona, Ill. (15', 1934 ed.) USGS topographic quadrangle map).
Figure 6. Location of FAP 412 Station PC2 at Panther Creek, 2.3 km N Panola, Woodford County, Illinois, surveyed for fishes, unionid mussels, aquatic macroinvertebrates, phytoplankton, zooplankton, and water quality during October and November, 1984, and April and May, 1985 (enlarged from the Benson, Ill. (7.5' series, 1983 provisional metric ed.) USGS topographic quadrangle map).
Sampling for aquatic components at Panther Creek was conducted within a reach approximately 120 m in length, delineated by a point 100 m downstream of the centerline of the existing U.S. Route 51 bridge and extending to a point 20 m upstream of that centerline. Stream width varied from between 2.0 and 5.5 meters. Stream depth varied between 0.1 and 1.5 meters. Stream substrate in pools consisted primarily of sand, intermingled with patches of pea-sized gravel. Substrate in riffle areas consisted of a gravel and sand mixture.

STATION EBPC3: EAST BRANCH OF PANTHER CREEK (Figures 2, 7)

The East Branch of Panther Creek at this location is bordered by narrow grassy strips dominated by Phalaris arundinacea (canary reed grass) and Bromus inermis (awnless brome grass). Disturbance adapted forbs including Cicuta maculata (water hemlock), Apocynum canabinum (dogbane), Carduus nutans (nodding thistle), and Boehmaria cylindrica (false nettle) are occasional. Sapling size Acer negundo (box elder), Acer saccharinum (silver maple), Gleditsia triacanthos (honey locust), and Ulmus rubra (slippery elm) occur as occasional stream side thickets. Beyond this riparian strip occur a Poa pratensis (Kentucky blue grass) dominated residential lawn, pasture composed of cool-season introduced grasses, and cropland.

Sampling for aquatic components in the East Branch of Panther Creek was conducted within a reach approximately 250 meters in length, delineated by a point 130 m downstream of the centerline of the existing U.S. Route 51 bridge and extending to a point 120 m upstream of that centerline. Stream width varied between 3.0 and 5.5 meters. Stream depth varied between 0.1 and 1.5 meters. Stream substrate in pools consisted primarily of sand, intermingled with patches of pea-sized gravel. Substrate in riffle areas consisted of a gravel and sand mixture.

STATION MRUS4: MACKINAW RIVER (Figures 3, 8)

Exclusive regrowth thickets of Acer negundo (box elder) and Acer saccharinum occur on the inner slope of a levee built along the south bank of the Mackinaw River at this location. Acer saccharinum, Fraxinus pennsylvanica (green ash), and Ulmus americana (American elm) occur sporadically as young to mature trees (up to 80 cm dbh) where the young maple thickets are not formed. Beneath this narrow canopy Crataegus mollis (red haw), Populus deltoides (cottonwood), Gleditsia triacanthos (honey locust), and Prunus serotina (black cherry) form the subcanopy together with the shrub Rosa multiflora and vine Vitis sp. Young Salix spp. (willows) colonize the streamside gravel bars as 1 to 2 m high thickets together with sometimes dense herbaceous growth of Phalaris arundinacea (canary reed grass), Ambrosia trifida (giant ragweed), Boehmaria cylindrica (false nettle), and Rumex sp. (dock). Sagittaria sp. is an occasional occupant of open sites along the gravel bar.

No levee is formed on the north Mackinaw River bank; a young floodplain forest lines the river with occasional mature trees. Acer saccharinum dominates while Juglans nigra is locally abundant. The common to occasional subcanopy
Figure 7. Location of FAP 412 Station EBPC3 at East Branch of Panther Creek, 2.7 km SSE Panola, Woodford County, Illinois, surveyed for fishes, unionid mussels, aquatic macroinvertebrates, phytoplankton, zooplankton, and water quality during October and November, 1984, and April and May, 1985 (enlarged from the Benson, Ill. (7.5' series, 1983 provisional metric ed.) USGS topographic quadrangle map).
Figure 8. Location of FAP 412 Station MRUS4 at the Mackinaw River, 7.5 km SW Gridley, McLean County, Illinois, surveyed for fishes, unionid mussels, aquatic macroinvertebrates, phytoplankton, zooplankton, and water quality during October and November, 1984, and April and May, 1985 (enlarged from the Gridley, Ill. (7.5' series, 1981 ed.) USGS topographic quadrangle map).
includes *Acer negundo, Ulmus rubra* (slippery elm), *Crataegus mollis*, and *Morus alba* (white mulberry). *Sambucus canadensis* (elderberry) and *Smilax rotundifolia* (catbrier) are the common shrub and vine. *Phalaris arundinacea* and *Acer saccharinum* seedlings occupy in-stream gravel bars.

Beyond this riparian vegetation occur cropland, an old field dominated by disturbance adapted forbs and shrubs, and a grazed shrubland containing *Crataegus mollis* and *Rosa multiflora*.

Sampling for aquatic components at this upstream Mackinaw River location was conducted within a reach approximately 120 meters in length, beginning at a point 40 meters downstream of the centerline of the county road bridge and extending to a point 160 meters downstream of that centerline. Stream width varied between 2.0 and 15.0 meters. Stream depth varied between 0.1 and 1.5 meters. Stream substrate in pools consisted primarily of sand and gravel, intermingled with frequent smooth cobble. Substrate in riffle areas consisted of a smooth cobble, gravel, and sand mixture.

**STATION MRC5: MACKINAW RIVER** (Figures 3, 9)

Floodplain forest occurs as a riparian strip along both banks of the Mackinaw River at this location. Cropland occurs beyond this riparian forest strip in the floodplain north of the river while mesic upland forest occurs on the NE facing slope south of the river.

The riparian forest north of this Mackinaw River location is a discontinuous strip 1 to 5 m wide dominated by young *Acer saccharinum* (silver maple) with common to occasional *Acer negundo* (box elder) and *Ulmus rubra* (slippery elm). *Toxicodendron radicans* (poison ivy), *Rudbeckia laciniata* (goldenglow), *Boehmoria clyndrica* (false nettle), and *Ambrosia trifida* (giant ragweed) form the common understory. South of the river, the floodplain forest is mature (averaging 30 to 46 cm dbh) with scattered large trees. The dominant canopy species is *Acer saccharinum* (occasional specimens up to 110 cm dbh) while *Populus deltoides* (cottonwood, up to 130 cm dbh), *Fraxinus pennsylvanica*, *Juglans nigra* (black walnut), and *Platanus occidentalis* (sycamore) are common to occasional members of the canopy. The common to occasional subcanopy species are *Acer negundo, Fraxinus pennsylvanica, Staphlea trifolia* (bladdernut), *Ulmus rubra*, and *Cornus drummondi* (smooth leaved dogwood). The shrubs and vines present include *Euonymus atropurpureus* (wahoo), *Amorpha fruticosa* (false indigo), *Cephalanthus occidentalis* (buttonbush), *Sambucus canadensis* (elderberry), *Toxicodendron radicans, Smilax rotundifolia* (catbrier), and *Vitis sp.* (grape vine). *Laportea canadensis* (wood nettle), *Rudbeckia laciniata, Boehmoria clyndrica*, and *Elymus virginicus* (Virginia wild rye) form the common herbaceous understory.

A young to mature mesic upland forest occurs on the NE facing slope. The common canopy species include *Acer saccharum* (sugar maple), *Quercus rubra* (northern red oak), and *Tilia americana* (basswood) with occasional *Quercus macrocarpa* (bur oak). The subcanopy contains *Staphlea trifolia, Tilia americana, Ulmus rubra, Acer saccharum*, and *Carya cordiformis* (bitternut hickory).
Figure 9. Location of FAP 412 Station MRC5 at the Mackinaw River, 1.6 km SSE Kappa, McLean County, Illinois, surveyed for fishes, unionid mussels, aquatic macroinvertebrates, phytoplankton, zooplankton, and water quality during October and November, 1984, and April and May, 1985 (enlarged from the El Paso, Ill. (7.5' series, 1970 ed., 1979 PR) USGS topographic quadrangle map).
Of special interest is a small hill prairie which persists on a narrow ridge above the NE facing slope at the south end of the study area. Although this community is small and has been somewhat degraded by invading forest species and weeds, forb diversity is high. Some of the forbs present include: Echinacea pallida (pale coneflower), Comandra richardiana (false toadflax), Solidago rigida (stiff goldenrod), Coreopsis tripteris (tall tickseed), C. palmata (prairie Coreopsis), Silphium terebinthinaceum (prairie dock), Amorpha canescens (lead plant), Polytaenia nuttallii (prairie parsley), Sisyrinchium campestre (blue-eyed grass), Lithospermum canescens (hoary puccoon), Ratibida pinnata (yellow coneflower), Euphorbia corollata (flowering spurge), Polygala senega (seneca snakeroot), and Tradescantia sp. (spiderwort).

Sampling for aquatic components at this central Mackinaw River station was conducted within a reach approximately 60 meters in length, beginning at a point 15 meters upstream of the centerline of the Illinois Central Gulf Railroad bridge and extending to a point 75 meters upstream of that centerline. Stream width varied between 7.0 and 8.5 meters. Stream depth varied between 0.5 and 1.5 meters. Stream substrate in the channel consisted primarily of sand and gravel. No defined pool or riffle areas were present at this site. Small backwater areas along the shore consisted of stick and leaf detritus intermixed with silt and sand.

STATION MRDS6: MACKINAW RIVER (Figures 2, 10)

Today the forests along the Mackinaw River generally are confined to narrow riparian strips in the floodplain and on slopes adjacent to the river. Cropland predominates beyond the riparian forest strips and forested slopes. The vegetation along an approximately 400 m segment of the Mackinaw River is described below.

A young to mature (30 to 70 yrs. old) floodplain forest with scattered large trees borders the Mackinaw River at this location. This community is confined to a riparian strip on each bank although it occupies a slightly broader area within a bend in the river on the west bank. The dominant canopy tree is Acer saccharinum (silver maple) while common to occasional canopy species include Juglans nigra (black walnut), Tilia americana (basswood), Fraxinus pennsylvanica (green ash), Populus deltoides (cottonwood), Salix nigra (black willow), and Gleditsia triacanthos (honey locust). The common subcanopy species include Cercis canadensis (redbud), Acer negundo (box elder), and Ulmus rubra (slippery elm). Occasional subcanopy species include Celtis occidentalis (hackberry), Prunus serotina (black cherry), Salix nigra, Crataegus sp. (hawthorn), and Morus rubra (red mulberry). Common shrubs and vines present include Sambucus canadensis (elderberry), Ribes missouriense (gooseberry), Toxocodendron radicans (poison ivy), Parthenocissus quinquefolia (Virginia creeper), Smilax rotundifolia (cathbrier), and Vitis spp. (grape vines). The herbaceous understory was formed by dense colonies of Laportea canadensis (wood nettle), Rudbeckia laciniata (goldenglow), Boehmnia cylindrica (false nettle), Phalaris arundinacea (canary reed grass), Elymus virginicus (Virginia wild rye), Lysimachia numularia (moneywort), and Rumex sp. (dock).
Figure 10. Location of FAP 412 Station MRDS6 at the Mackinaw River, 4 km WSW Kappa, Woodford County, Illinois, surveyed for fishes, unionid mussels, aquatic macroinvertebrates, phytoplankton, zooplankton, and water quality during October and November, 1984, and April and May, 1985 (enlarged from the El Paso, Ill. (7.5' series, 1970 ed., 1979 PR) USGS topographic quadrangle map).
A young to mature (30 to 50 yr. old) mesic upland forest occurs on a gentle SW facing slope on the east river bank in the northern 1/4 of the study area. This community is strongly dominated by *Juglans nigra* with common to occasional *Tilia americana*. *Cercis canadensis*, *Ulmus rubra*, and *Prunus serotina* form the subcanopy. The herbaceous understory includes *Polygonatum commutatum* (Solomon's seal), *Asarum canadense* (wild ginger), and *Glyceria striata* (fowl manna grass).

Sampling for aquatic components at this downstream Mackinaw River station was conducted within a reach approximately 80 meters in length. Stream width varied between 6.0 and 8.0 meters. Stream depth varied between 0.5 and 1.5 meters. Stream substrate in channel pools consisted primarily of sand and gravel, intermingled with frequent cobble. Substrate in channel riffle areas consisted of a smooth cobble, gravel, and sand mixture.

STATION 6MC7: SIXMILE CREEK (Figures 3, 11)

A regrowth riparian strip of floodplain forest borders Sixmile Creek east of U.S. Route 51. The common to occasional woody plants present include *Acer negundo* (box elder), *Salix nigra* (black willow), *Acer saccharinum* (silver maple), *Morus rubra* (red mulberry), *Ulmus pumila* (Siberian elm), *Crataegus* sp. (hawthorn), *Maclura pomifera* (osage orange), *Celtis occidentalis* (hackberry), and *Prunus serotina* (black cherry). *Phalaris arundinacea* (canary reed grass), *Boehmara cylindrica* (false nettle) form the common herbaceous understory. Beyond this regrowth woody strip to the north is cropland. South of the riparian strip is an old field in early succession dominated by disturbance adapted forbs. *Ambrosia trifida* (giant ragweed) is abundant while *Conium maculatum* (poison hemlock), *Chenopodium album* (lamb's quarters), *Brassica* sp., *Pastinaca sativa* (parsnip), *Rumex crispus* (curly dock), and *Capsella bursa-pastoris* (shepherd's-purse) are common to occasional.

Sampling for aquatic components at this Sixmile Creek station was conducted within a reach approximately 100 meters in length, beginning at a point 30 meters upstream of the centerline of the U.S. Route 51 bridge and extending to a point 130 meters upstream of that centerline. Stream width varied between 2.0 and 4.0 meters. Stream depth varied between 0.1 and 1.5 meters. Stream substrate in pools consisted primarily of a silt, sand, and gravel mixture, intermingled with frequent smooth cobble and bricks. Substrate in riffle areas consisted of a smooth cobble, gravel, and sand mixture, with some bricks. Other discarded items within the sampling area included corrugated metal roofing, a bedspring, and small gauge construction I-beams.

STATION BC8: BAILEY CREEK (Figures 4, 12)

A narrow grassland strip dominated by *Bromus inermis* (awnless brome grass) with occasional *Barbarea vulgaris* (yellow rocket), *Polygonum* sp. (knotweed), and *Eupatorium* sp. (Joe-Pye weed) borders Bailey Creek at this location. *Bromus inermis* occurs as an emergent in the stream. Numerous junked automobiles line the south creek bank east of the stream. Cropland borders both creek banks.
Figure 11. Location of FAP 412 Station 6MC7 at Sixmile Creek, 9.3 km N Normal, McLean County, Illinois, surveyed for fishes, unionid mussels, aquatic macroinvertebrates, phytoplankton, zooplankton, and water quality during October and November, 1984, and April and May, 1985 (enlarged from the Normal West, Ill. (7.5' series, 1970 ed., 1979 PR) USGS topographic quadrangle map).
Figure 12. Location of FAP 412 Station BC8 at Bailey Creek, 1.7 km W Tonica, LaSalle County, Illinois, surveyed for fishes, unionid mussels, aquatic macroinvertebrates, phytoplankton, zooplankton, and water quality during April and May, 1985 (enlarged from the Tonica, Ill. (7.5' series, 1983 provisional metric ed.) USGS topographic quadrangle map).
Sampling for aquatic components at this Bailey Creek station was conducted within a reach approximately 80 meters in length, beginning at a point 10 meters upstream of the centerline of the county road bridge and extending to a point 90 meters upstream of that centerline. Stream width varied between 2.0 and 3.0 meters. Stream depth varied between 0.1 and 0.9 meters. Stream substrate in pools consisted primarily of a silt/sand mixture. Substrate in riffle areas consisted of a silt, sand, and gravel mixture. Numerous patches of algae attached to riparian vegetation were trailing in the water.

METHODS

Unionid mussels were sampled at each of the localities described in Table 1. With the exception of the Bailey Creek location (Station BC8), all sampling sites were visited in October and November of 1984 and again in April and May of 1985. The Bailey Creek location was added to the Spring 1985 collection at the request of IDOT.

All sampling was done by wading and hand-picking. A variety of habitats, including those associated with various substrates in riffle, pool, and backwater areas, was sampled. In most cases, specimens were identified to species level in the field, counted, and replaced in the substrate from which they were collected. At least one voucher specimen of each species was retained and deposited in the INHS Mollusk Collection, but care was taken not to deplete populations. As conditions were often unfavorable (the water was often too deep and/or too cold to sample efficiently) and populations were generally sparse, no attempt was made to sample quantitatively; numbers reported represent broad estimates of relative abundance. Nomenclature follows Bogan (1985).

RESULTS

A total of 119 live individuals representing 12 species was found within the study area during the present survey (Table 2). Many more of these were found during the Autumn 1984 collection because in most cases, water levels were lower at that time and sampling was more efficient.

Mussels were collected in greatest abundance from Sandy Creek, a direct tributary of the Illinois River (Station SC1), with 53 individuals of *Anodontaoides ferussacianus* being taken here during the Autumn 1984 collection. At all other sites, observed densities were considerably lower. The second largest population was present at Panther Creek (Station PC2), where 22 individuals representing four species were collected during the Autumn of 1984.

The greatest number of species collected alive during this survey was seven, taken from the central Mackinaw River location (Station MRC5).

A few shells but no live mussels were found at the Sixmile Creek location (Station 6MC7). However, two live mussels (one *Lampsilis ventricosa* and one *L. teres*) were found below the spillway at Evergreen Lake (an impoundment of
Sixmile Creek). This location was not a regular FAP 412 aquatic sampling location, but was within the FAP 412 project area. This site was visited after INHS biologists, conducting avifaunal studies for the FAP 412 project, reported mussel shells from this area. Bailey Creek, a tributary of the Vermilion River (Illinois River drainage) (Station BC8), yielded neither living mussels nor dead shells.

The mussel fauna present within the study area appears to be rather sparse. No significant beds were found during this survey, and all species collected alive are fairly common and widespread elsewhere in Illinois.

DISCUSSION

Historical Records

Since few studies of the unionid mussels of the Mackinaw River drainage have been conducted, historical as well as current information on the fauna is limited. Baker's (1906) catalogue of Illinois mollusks records 11 species of mussels from the Mackinaw River at Kappa, in Woodford County, but this seems to be the extent of published historical records for the area. Published records of unionid mussels from Sandy Creek in Marshall County and Bailey Creek in LaSalle County are lacking. Although Calkins (1874) discussed limited distributions of unionid mussels in LaSalle County, references were made only to the Fox, Illinois, and Vermilion rivers.

More recent records of mussels in the Mackinaw River drainage were obtained by Dr. M. R. Matteson during the statewide survey he conducted in the late 1950's and early 1960's (unpubl. data from the INHS Mollusk Collection). Matteson collected 52 individuals representing 13 species of mussels from six locations on the Mackinaw River in Tazewell and Woodford counties in 1956, and 2 individuals representing two species from one location on the West Branch of Panther Creek in Woodford County in 1957. All of Matteson's Mackinaw River locations were downstream of the present FAP 412 project area. Matteson's closest collecting site to the FAP 412 project area was located at the U.S. Route 150/Mackinaw River bridge northwest of Congerville, 20.2 river miles (33.7 km) downstream of FAP 412 aquatic sampling station MRDS6.

Four species collected by Matteson were not taken alive during the present FAP 412 survey; however, 3 species collected during the present study were not taken by Matteson. These differences are more likely a reflection of small sample sizes than of real differences in the fauna. Matteson's remark "Seems there never were many live ones in this river", (unpublished field notes, INHS Mollusk Collection) is consistent with our observations of the small, sporadic populations encountered during the present study.

Parmalee (1967) collected mussels from the Mackinaw River roughly during approximately the same time as Matteson. Parmalee noted that Panther Creek (Woodford County) was a site of local abundance for two mussel species, Anodontaferussacianus and Alasmidonta viridis. Although Anodontaferussacianus was the most commonly collected mussel during the present FAP 412 mussel survey, Alasmidonta viridis was not collected at all except as "subfossil" shells.
Table 2. Species and numbers of unionid mussels collected from Mackinaw River basin locations (Mackinaw River, Panther Creek, East Branch of Panther Creek, and Sixmile Creek), Sandy Creek, and Bailey Creek, in LaSalle, Marshall, McLean, and Woodford counties, Illinois, during Autumn 1984 and Spring 1985*.

<table>
<thead>
<tr>
<th>SPECIES</th>
<th>SC1</th>
<th>PC2</th>
<th>EBPC3</th>
<th>MRUS4</th>
<th>MRC5</th>
<th>MRDS6</th>
<th>6MC7 †BC8</th>
</tr>
</thead>
<tbody>
<tr>
<td>Actinonaias ellipsiformis</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alasmidonta viridis</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Amblema plicata</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Anodonta grandis</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Anodontoides ferussacianus</td>
<td>53(5)</td>
<td>7(3)</td>
<td>3(3)</td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Toxolasma parvus</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lampsilis radiata siliquoides</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>L. teres</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>L. ventricosa</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lasmigona complanata</td>
<td>x</td>
<td>12(5)</td>
<td>(4)</td>
<td>1</td>
<td>x</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Leptodea fragilis</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pleurobema cordatum</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Potamilus alatus</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Quadrula pustulosa</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q. quadrula</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Strophitus undulatus</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Uniomerus tetralasmus</td>
<td>xx</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Number of species collected alive (Autumn 1984 and Spring 1985 combined)

|          | 2 | 5 | 4 | 2 | 7 | 3 | 0 | 0 |

*Numbers in parentheses refer to species collected alive during the Spring 1985 collection. All other numbers refer to species collected alive during the Autumn 1984 collection.

†Station BC8, added by IDOT for study in the Spring of 1985, was not collected during Autumn of 1984.

x = Mussels collected only as recently (not badly worn) dead shells during either collection.

xx = Mussels collected only as well-worn ("subfossil") dead shells during either collection.
In August of 1984, Jon Duyvejonck of the U. S. Army Corps of Engineers, Rock Island District, inspected, from a boat, a seven mile stretch of the Mackinaw River in Woodford County, from Woodford County Highway 8 downstream to the Congerville blacktop (Jon Duyvejonck, pers. comm.). (This stretch of the Mackinaw River also lies downstream of the present study area and overlaps some of Matteson's stations). Duyvejonck 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 12 (13 if Fusconaia flava flava and Fusconaia flava undata are considered separate species) species of mussels. No indication of the number of individuals present was given. Five species collected by Duyvejonck were not collected during the present FAP 412 mussel survey; four species found during the present survey were not collected by Duyvejonck.

On 29 April 1985, INHS biologists surveyed four sites on the Mackinaw River, upstream of the FAP 412 project area (between Colfax and a site 3.0 km E Lake Bloomington spillway, 4.2 km upstream of FAP 412 Station MRUS4). Live mussels were found at only one of these sites (25m upstream of Illinois Route 165 bridge, 1.6 km W Colfax, McLean County), where 38 individuals of 8 species were collected (referred to as "INHS 1985" in Table 3). Two species (Amblema plicata and Fusconaia flava) which were not collected alive during the FAP 412 mussel survey were collected from this Colfax site.

Results of past and present mussels surveys on the Mackinaw River drainage within the FAP 412 project area are summarized in Table 3.

Federal and State Endangered and Threatened Mussels in Illinois

Approximately 50 percent of the known species of freshwater mussels in the world occur in eastern North America (Stansbery 1970), achieving their greatest diversity in the Mississippi River basin (Johnson 1970). Significant depletions in both numbers of individuals and species have occurred in the last century throughout the country and have been documented for river systems such as the Illinois (Starrett 1971); Kankakee (Brigham et al. 1981; Suloway 1981); Kaskaskia (Suloway et al. 1981); Little Wabash (L. Suloway, unpublished); Ohio and Tennessee (Stansbery 1971); Rock (Miller 1972); Vermilion (Matteson and Dexter 1966; Suloway 1975); and the Wabash (Krumholz et al. 1970). A special case can be made for the protection of this unique fauna (Brigham et al. 1981).

In response to the decline in mussel populations, federal and state governments have enacted legislation to protect several species. The federal government currently lists 22 species of mussels found in the United States as endangered (U. S. Department of the Interior [USDI] 1984 a). Lists of endangered, threatened, rare, or protected mussels also have been established by several states adjacent to or near Illinois, including Alabama (Stansbery 1976); Arkansas (Sam Barkley, Arkansas Game and Fish Commission, pers. comm.), Indiana (Indiana Revised Statutes 1984), Kentucky (Babcocock 1977, Branson et al. 1981); Michigan (van der Schalie 1975), Minnesota (Anon. 1984), Missouri (Wilson 1984); and Ohio and Wisconsin (McGaugh and Genoways 1976).
Table 3. Comparison of species and numbers of unionid mussels collected from the Mackinaw River drainage during past and present surveys.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Alasmidonta marginata</td>
<td>+</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Alasmidonta viridis</td>
<td>+</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Actinonaias ellipsiformis</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Amblema plicata</td>
<td>+</td>
<td>-</td>
<td>+</td>
<td>+</td>
<td>-</td>
</tr>
<tr>
<td>Anodonta grandis</td>
<td>+</td>
<td>+</td>
<td>-</td>
<td>-</td>
<td>+</td>
</tr>
<tr>
<td>Anodontoides ferussacianus</td>
<td>-</td>
<td>+</td>
<td>-</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Toxolasma parvus</td>
<td>+</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Elliptio dilitata (?)</td>
<td>-</td>
<td>-</td>
<td>+</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Fusconaia flava</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>-</td>
</tr>
<tr>
<td>Lampis radiata siliquoidea</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Lampis teres</td>
<td>-</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Lampis ventricosa</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Laeviscomira complanata</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Laeviscomira costata</td>
<td>+</td>
<td>-</td>
<td>+</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Leptodea fragilis</td>
<td>-</td>
<td>+</td>
<td>+</td>
<td>-</td>
<td>+</td>
</tr>
<tr>
<td>Pleurobema cordatum</td>
<td>-</td>
<td>-</td>
<td>+</td>
<td>-</td>
<td>+</td>
</tr>
<tr>
<td>Potamilus laevisissima</td>
<td>-</td>
<td>+</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Quadrula pustulosa</td>
<td>-</td>
<td>-</td>
<td>+</td>
<td>-</td>
<td>+</td>
</tr>
<tr>
<td>Quadrula quadrula</td>
<td>-</td>
<td>+</td>
<td>+</td>
<td>-</td>
<td>+</td>
</tr>
<tr>
<td>Strophitus undulatus</td>
<td>-</td>
<td>+</td>
<td>-</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Truncilla donaciformis</td>
<td>-</td>
<td>+</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

Number of species 11 13 13 8 11

† Includes collections of Matteson from the West Branch of Panther Creek.

†† Includes only Mackinaw River basin mussels (Mackinaw River, Panther Creek, East Branch of Panther Creek, and Sixmile Creek). Species collected during this study from Sandy Creek (SC1) and Bailey Creek (BC8) are not included.
Illinois (Illinois Administrative Code 1984) recently emended their list of endangered and threatened species of vertebrates and plants to include nine federally endangered mussels presently occurring or known to formerly have occurred in Illinois waters. A number of freshwater mussels presently occurring or known to have occurred formerly in Illinois were proposed to the Endangered Species Technical Advisory Committee for state listing by INHS personnel on 26 March 1985 (Liane Suloway, pers. comm.).

None of the mussels found during the present FAP 412 mussel survey either as live specimens or as dead shells are presently listed or are under consideration for listing as federally endangered or threatened species (USDI 1984b). Of those species recommended for state listing as endangered or threatened (L. Suloway, 1985, pers. comm.), two (Alasmidonta viridis and Unionmerus tetralasmus) were collected as "subfossil" shells. Species accounts for these two mussels are included below.

**SPECIES ACCOUNTS OF ENDANGERED AND THREATENED ILLINOIS MUSSELS FOUND IN THE FAP 412 STUDY AREA**

*Alasmidonta viridis* (Rafinesque)

Clarke (1981) listed historical records of Alasmidonta viridis in Illinois from Kents Creek and the Rock River (Winnebago County); an unnamed tributary of the Illinois River (Fulton County); and the Sangamon River (Menard County). Baker's (1906) records also include Hickory Creek (Des Plaines River drainage, Will County); the Kishwaukee River (Mercer County); LaSalle County; Edwards Creek, Wabash River; Algonquin (McHenry County); the Spoon River; and the Mackinaw River (near Kappa, Woodford County). Parmalee (1967) stated that Alasmidonta viridis occurred "only in central (Spoon River) and northern Illinois". Matteson (INHS Mussel Collection) collected this species only from the upper DuPage River (DuPage County) in 1956 and 1958, and from the upper Sangamon River (Champaign and McLean counties) in 1956.

During the present FAP 412 mussel survey, *Alasmidonta viridis* was collected as dead ("subfossil") shells from the Mackinaw River (Station MRDS6) and from the East Branch of Panther Creek (Station EBPC3). Shells of this species were among the most abundant of those found along the banks of East Branch of Panther Creek. Finding so many shells but no live individuals suggests that the once-abundant population of *A. viridis* in Panther Creek (Parmalee 1967) has disappeared or has been reduced so severely as to escape detection.

*Unionmerus tetralasmus* (Say)

Baker (1906) recorded Unionmerus tetralasmus in Illinois from "Washington and Perry counties, in creeks and ponds"; the Big Muddy River; Phelps Lake (Fulton County); and "Sidney and Urbana, Champaign County". According to Parmalee (1967), *U. tetralasmus* was widely distributed in Illinois ("except for the northeastern quarter"), although "generally uncommon and only very locally...numerous". Matteson collected this species from Kickapoo Creek (McLean County) and the South Fork of the Sangamon River (Christian County) in 1957 and 1960, respectively. Matteson also found this species in the upper Kaskaskia River and one of its tributaries, Lake Fork Creek (both in Douglas County) in 1956. However, a recent mussel survey of the Kaskaskia River...
failed to recover any live specimens of *U. tetralasmus* (Suloway, Suloway, and Herricks 1981).

During the present study, dead shells (worn although still paired) of *Uniomerus tetralasmus* were found at Sixmile Creek in McLean County (Station 6MC7) and at Sandy Creek in Marshall County (Station SC1). Few other shells and no live mussels were present at the Sixmile Creek location, which suggests that conditions here may not support mussels, including *U. tetralasmus*. A good-sized population of *Anodontoides ferussacianus* was present at the Sandy Creek location in Marshall County (Station SC1), however, so it is more likely that individuals of *U. tetralasmus* may persist in the area.

Twenty-one species of mussels have been recorded from the Mackinaw River and its tributaries, 19 of which have been collected since the 1950's. None of these species presently is listed or under consideration for listing as federally endangered or threatened species.

ACKNOWLEDGEMENTS

The authors wish to thank Survey malacologist Liane Suloway for her input throughout this project. Douglas A. Carney, Lorrie L. Crossett, Kevin S. Cummings, James E. Gardner, Mary Jackson, and Sherri L. Sandberg provided field assistance on various occasions. We thank Mary Kay Solecki and John B. Taft, INHS botanists, for providing botanical habitat characterizations of the sampling sites. Dr. Lawrence M. Page and Kevin S. Cummings provided valuable critique and Dr. Wallace E. LaBerge kindly reviewed this manuscript.

LITERATURE CITED

Anon. 1984. Minnesota official list of endangered, threatened, and special concern plants and animals. January. [unpaged].


Indiana Revised Statutes. 1984. Discretionary order no. W-12, revised August 1984. Endangered, threatened, and special concern wildlife. Section 6. 310 IAC 3-3-6, amended. [pers. comm. from James M. Ridenour, Director, Indiana Department of Natural Resources] [5 pp.]


