Mackinaw River Project

Mackinaw River Watershed Management Plan

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Preface

From the Members of the Mackinaw River Executive Committee

A river can mean many different things to many different people. For some, it is a source of water for their homes or livestock. For others, it is a source of recreation; a place to enjoy fishing, boating, and/or nature watching. A river can be both a joy and a problem. For many of us, it has a potential to affect our lives, both positively and negatively. There are those who seek to control rivers, attempting to persuade them to conform to our needs. Others just want to leave them alone, and let a river do what a river will do.

Those of us who belong to the Executive Committee of the Mackinaw River Project have put forth a tremendous volunteer effort in order to craft a watershed management plan that will benefit not only those of us who will live and work along the Mackinaw River, but will benefit the river itself. We are all individuals for whom the Mackinaw River means different things. We have diverse viewpoints, interest, and ideas about the river and the project. But we were able to come together, meet with many other individuals and groups, learn more about rivers and watersheds, and then help in the development of this watershed management plan. Why did we do this? There are many different answers, but perhaps the one answer that we could all agree on is that in some way or another, we *care* about the Mackinaw River. It *does* affect our lives. We *do* want to see it flowing clear and clean, to remain a rich resource for future generations.

It was to this end, the protection and preservation of this resource, that our efforts to write a watershed management plan were directed. Those of us on the Executive Committee live and work within this watershed. We have history, experiences, and shared knowledge behind us. We have helped in writing a plan that we feel will work, not only for us, but for most of us who also live and work in this watershed. We have written this plan to be shared among all of its

residents, both rural and in communities. For this plan to be a success, everyone needs to see what changes they can make. It could be something very simple, such as creating a grass waterway. It could also be very complex and expensive, such as a sewage treatment facility. Changes do need to be made. And changes do present challenges and difficulties. However, the benefits obtained from making these changes will be real. The negative impacts that the river can make in our lives, such as flooding and contaminated water are significant. The positive impacts are also equally significant. Every person within this watershed, either directly or indirectly, benefits from a healthy river, from clean, clear water.

Please look at the Mackinaw River Watershed Management Plan carefully. Somewhere within this plan contains information relevant to you, a watershed resident. We hope that it will get you thinking about ways that you can make some changes that would benefit our watershed. It might prompt questions or concerns. Keep in mind that the recommendations contained in this watershed management plan are only that - recommendations. The final decision is up to you, to do something or do nothing at all. Those of us on the Executive Committee hope that you will decide to adopt this plan as your own, and start making those changes that will keep the Mackinaw River and its watershed a precious and viable resource for not just us, but for future generations to come.

Written by Mary Jo Adams, Secretary
Mackinaw River Executive Committee

Section I
Introduction

From Jim McMahon, Mackinaw River Project Director

This is a watershed management plan for the Mackinaw River. It was developed for everyone who lives in the watershed as well as the local governments and state and federal agencies that will help us achieve the goal of protecting this river and the land that drains to the river. Farmers, townspeople, elected officials, and agency staff who work in the watershed are all asked to read it.

Some people ask, why protect the Mackinaw? It is a relatively high quality river which meets 'full use' attainment, an Illinois EPA term which means that it fully provides for human uses such as fishing, swimming, and drinking water. These same people would suggest that no work is necessary or that we should focus precious state and federal dollars on more heavily degraded rivers. However, the Mackinaw is a special river, an important place to work for another reason.

The Mackinaw is one of the only rivers in the midwest that has not yet been severely degraded by human uses. Natural features such as the moraine depositions which form the banks of the river and hold it in place and a strong groundwater influence which keeps it flowing in times of drought have protected it from the extensive impacts of the land use in the watershed. The rolling ground along the river has not been farmed and provides vegetated cover which protects the river from erosion and sedimentation. However, the Mackinaw is a river under stress.

The Mackinaw once ran clear and clean. The first explorers in the area remarked on its clarity and the rich timber and prairie which surrounded it. Heavy sediment loads occasionally moved through the river system but they were catastrophic events, not the common persistent sediment that you can now see in the river from the first spring rain until late into the fall each year. It is this

persistent sediment that chokes out life within the river. Sensitive fish and mussels once found in abundance, are now either gone from the river, or are so rare that an intensive study may find one, two, or a dozen individuals during many days of effort. It is these unusual features that make the Mackinaw a special place.

In my opinion, we humans have lost touch with a part of what is important in life. We analyze everything in terms of its impact on us. People have asked me, so what good are these mussels you want to protect? And I am tempted to say that they are good eating, but the truth is that we can survive without them. Ecosystems are complex too and we do not fully comprehend how they work. I would suggest to you that it is this complexity, this not fully understanding a thing, which makes life interesting. Complexity provides a mystery in life which intrigues our minds and makes us wonder. But the complexity, the mystery and wonder have been superseded by the simple and mundane.

The Mackinaw is a much simpler river system than it used to be. A rich variety of fish and mussel species has been gradually replaced with fewer, more 'generic' species. At the upper end of the forested parts of the river there are still a few places with variety, but at the lower end of the river, in Tazewell County, the variety that should be there is all but gone. If you ask the farmers in Tazewell County about mussels they won't be able to tell you much, but they can definitely tell you about flooding and the loss of 'farm ground' to the river during these floods. But flooding is just the symptom of a serious problem.

The biggest problem affecting the Mackinaw is how we drain the watershed and the impact this has on water volumes in the river. We have drained our towns and farms so effectively that water charges down the river after a rainstorm. Then, late in the summer, the river drops low and dry in places because water that would naturally have been held in the landscape and slowly drained into the river during these times is long gone. Along with the high water after a rain come huge amounts of soil suspended as individual particles so small

that they remain suspended all summer or settle out in pools, smothering the life within the river bottom.

This sediment comes from many places, but it turns out that the vast majority of it comes from farmland which already meets what is known as 'T'. 'T' is the amount of soil that can be lost from farmland without impacting the agricultural productivity of the land. It is based upon the rate at which soil is produced from the degradation of organic material such as bean and corn stubble. The idea is that a farmer must maintain his soil in order to continue farming that ground. But 'T' is not good enough to maintain a river's health.

This was new information to those of us working on the Mackinaw River Project. None of us had ever heard before that 'T' was inadequate to meet Illinois EPA's long term objectives for the reduction of nonpoint source pollution in surface waters. The good news is that soil loss can be reduced beyond 'T' by combining a number of 'best management practices' on farmland. These are practices which already exist and can be used to compliment each other, such as contour farming and no till. This watershed plan has goals for these types of practices so that we can reduce soil loss even further.

Soil loss on farmland is not the only problem plaguing the Mackinaw. Runoff from towns and roads is a major contributor. Other problems are the loss of wetlands which naturally retain and clean surface waters and which provide a continuous source of water to the river throughout the year, the farming of floodplain land which naturally would clean the river during flooding if it was planted with grasses or native vegetation, the farming of land along small ditches and streams where soil erosion begins, livestock in the river which trample the banks and bed, and soil loss from forested lands which have been neglected now for many years.

When The Nature Conservancy first expressed interest in protecting the Mackinaw River the biggest concern of landowners was the potential for them to lose their property rights. They liked things the way they were and did not want a group of agencies and an environmental organization tromping around the

watershed figuring out how to 'protect' this river. Instead, they insisted that they be central to any watershed management plan that was developed. As a result of their fears, we implemented a process which enabled landowners from the Mackinaw to write this plan. Some said it couldn't be done. I myself doubted our ability to do it.

We overcame initial distrust and differences and participated together in a process in which farmers, townspeople, agency staff, and The Nature Conservancy collaborated to write this watershed plan. The plan is built upon voluntary action. Nothing within this plan is mandated, however we will not reach our goals without your help.

Farmers and townspeople wrote these goals. These goals are far-reaching and envision a Mackinaw which no longer exists. We strive herein to reduce the amount of water and sediment in the river through dramatic changes in land use practices throughout the watershed. The success of this vision for what the Mackinaw can be is held in your hands.

Sometimes I wonder if what we have crafted here is even possible, but my confidence in our eventual success is buoyed by the experience of working with the people who wrote this plan. They are good people and they are committed to making this plan happen. If you doubt that, then call any one of them yourself and ask them about the process, ask them what they have learned about this river. Ask them what you can do to help. *(See Special Acknowledgments - a list of those individuals who contributed to this watershed management plan)*

This vision for what the Mackinaw could be is grand. Will we accomplish what we have set out to do or will the river continue in its gradual decline until we notice one day that the fishing isn't quite as good or there comes a day when children digging in the stream, as children will do, find no mussels at all? It is a plan by and for the people who live, work, and play here. It is a plan for your great, great grandchildren.

This plan is only a starting point. From it, we must make those life decisions about where we will build our homes, how we will protect farmland as

we will farm, whether to tile out the last existing wetlands on farm ground, plant grass along a ditch and get by with a few less rows of corn, or build a detention basin in a new housing development. There's a lot of history, momentum, indifference, and culture which can stop us. Or, perhaps those of you who can do something will agree that, yes, we need a little bit more mystery in our lives. This plan is a call for individual action, a personal request for your help. We hope you will join in the protection of the Mackinaw River!

Section II
Resource Inventory

Introduction

The Mackinaw River is a high quality stream with relatively high biological diversity. Nevertheless, excessive sedimentation and high stream flows following storm events are the primary influences that reduce water quality. These arrive in the river from nonpoint sources, so named because they are intermittent, diffuse runoff of pollutants from a variety of sources, including agriculture, construction erosion, urban runoff, hydrologic modifications, and resource extraction activities. Pollution from domestic and industrial wastewater, leaking underground storage tanks from gas stations, agricultural chemical handling facilities and many small industrial sites contribute nutrients and chemicals to the river and its' tributaries. To further reduce pollution effects in the river, agricultural land, most of which meets generally accepted criteria of less erosion than 'T', the rate of soil formation (NRCS, 1997), must be managed to further reduce soil erosion. Point source pollution from domestic sewage may be reduced by changing waste handling practices at a relatively few places. Many small contributions to pollution and runoff combine to produce the total quality of the river and its tributaries. In order to achieve improved water quality, these diverse sources of pollution must be further reduced.

Location and Size of the Watershed

The Mackinaw River Watershed joins the Illinois River at Pekin, Illinois. Its watershed drains about 1,138 square miles, or 728,320 acres (Eicken and Fitzgerald, 1988; cited in Gough ,1994), falling from an elevation of 951 feet to 492 feet. The main channel is approximately 129 miles long and has about 392 miles of tributaries (Gough, 1994). Major tributaries, from east to west, include Henline Creek, Turkey Creek, Money Creek, Sixmile Creek, Denman Creek,

Panther Creek, Walnut Creek, Rock Creek, Mud Creek, Prairie Creek, Little Mackinaw Creek, Dillon Creek and Hickory Grove Ditch (Table II-1).

Table II-1

Major Tributaries of the Mackinaw River in 1994

Index of Biotic Integrity was predicted from specific habitat variables and should be compared only between streams of the same order. Quality is assessed from physical characteristics of the stream which determine aquatic habitat.

	Drainage Area				
Tributary	Order of Stream	Square Miles	Acres	Index of Biotic Integrity	Quality
Hickory Grove Ditch	4th	13.5	8,649	39.4	Moderate
Little Mackinaw River	4th	47.2	20,208	40.9	Moderate
Prairie Creek	3rd	24.0	15,360	40.3	Moderate to highly valued
Walnut Creek	4th	72.9	46,656	43.0	Highly valued
Money Creek	4th	71.3	45,632	33.1	Moderate
Henline Creek	3rd	34.9	22,336	38.2	Moderate

(Source: Short, M. B., T. G. Kelly, J. E. Hefliey, and W. H. Ettinger. 1996. An Intensive Survey of the Mackinaw River Basin, 1994. Illinois Environmental Protection Agency, Division of Water Pollution Control, 4500 South Sixth Street Road, Springfield, Illinois 62706.)

The northeastern boundary of the watershed is the Minonk Moraine. The watershed is limited on the northeast also by the El Paso Moraine. North of Congerville the Eureka moraine shapes the boundary in Woodford County. The river flows through a gap in the Bloomington Moraine and the Le Roy-Shelbyville Moraine before it flows through flat areas of southwestern Tazewell County near the confluence with the Illinois River south of Pekin (Gough, 1994). The Mackinaw River drains the fourth largest subwatershed of the Illinois River system, after the Spoon, LaMoine and Vermillion Rivers (IEPA, 1996).

Water Quality

Under the authority of the Clean Water Act (see Part III, Existing Water Protection Programs), the Illinois Environmental Protection Agency gathers data to enable the evaluation of water quality in Illinois streams and rivers. In 1987 and 1994, an intensive river basin survey was conducted to measure physical, chemical and biological parameters of the Mackinaw River and its' organisms throughout the year (Short et al., 1996). With the exception of the lower 7.7 miles, the Mackinaw River is rated as fully supporting the aquatic life use, the highest quality rating assigned. Water quality ratings for each section of the Mackinaw River and each tributary are summarized in Table II-2 (located at the end of this section).

Water of the highest quality is said to be suitable for full aquatic life. Other appropriate uses may be designated for each section, such as fish consumption and swimming. Frequently, the appropriateness of some uses have been determined by direct chemical and biological measurements at monitoring stations, or from samples provided by citizen volunteer monitoring teams. However, some regions of the river and tributaries have not been directly sampled every year. In these streams, water quality and, hence, appropriate uses, were determined based on records of organisms living in the stream. Some organisms are unable to survive in water with pollutants present in even small amounts, so the presence of those species in the water indicates that quality is very good.

Political Jurisdictions

The Mackinaw River originates in Ford County near Sibley and flows through northern McLean County, Woodford County and Tazewell County, where it empties into the Illinois River below Pekin and the Powerton Lake Fish and Wildlife Area. Small portions of Livingston and Mason Counties lie within the watershed. Townships included in the watershed are: Ford County-- part of Sullivant Township; McLean County-- Cropsey, Anchor, Lawndale, Martin, Chenoa, Lexington, Blue Mound, Gridley, Money Creek, Towanda, Hudson, Normal (north), White Oak, Dry Grove and Danvers Townships; Woodford County -- El Paso, Panola, Minonk, Clayton, Greene, Palestine, Kansas, Montgomery, Olio, Cruger and Roanoke Townships; Tazewell County -- Little Mackinaw, Hopedale, Dillon, Sand Ridge, Spring Lake (part), Cincinnati (part), Elm Grove, Tremont, Mackinaw, Morton (part), and Deer Creek Townships; Livingston County -- a very small part of Waldo Township; and Mason County -- Manito Township.

Populations, according to 1990 US Census, are listed in Table II-3 for towns in the watershed. Recognized municipalities include Sibley, Lexington, Gridley, Hudson, Danvers, Colfax, Towanda, Carlock, Kappa, Morton, Tremont, Mackinaw, South Pekin, Hopedale, Green Valley, Deer Creek, Manito, Eureka, Metamora, El Paso, Roanoke, Goodfield, Benson, Congerville, and Secor. Less than half of residents live in towns and villages in the Mackinaw River watershed. Most of them are described by the US Census Bureau as being an "outside urbanized area." Only Morton is large enough to qualify as an "inside urbanized area," under Census Bureau criteria.

Table II-3
Towns in the Mackinaw River Watershed, 1990 Population

County	Municipality	1990 Population
Ford	Sibley	368
Mason	Manito	1705
	Total	*2073*
McLean (partial)	Lexington	1809
	Gridley	1304
	Hudson	1006
	Danvers	981
	Colfax	856
	Towanda	856
	Carlock	391
	Kappa	148
	Total	*6495*
Tazewell	Morton	13799
	Tremont	2088
	Mackinaw	1331
	South Pekin	1184
	Hopedale	794
	Green Valley	728
	Deer Creek	642
	Total	*20,566*
Woodford	Eureka	4435
	Metamora	2520
	El Paso	2483
	Roanoke	1910
	Goodfield	464
	Benson	407
	Congerville	386
	Secor	405
	Total	*13,010*
Total Watershed Population		**42,144**

Source: 1990 US Census.

Demography

Mackinaw River watershed residents numbered more than 70,000 persons in the 1990 U.S. Census (Table II-4) (US Census, 1990). About 53,000 people live in rural areas.

Table II-4

Demographic Characteristics of Mackinaw River Watershed Residents, extracted from 1990 US Census

Some township populations were estimated, based on area in the watershed. [a]Persons in "Towns and villages" and "Rural" do not add to "Total Population." For census purposes, most towns and villages in the watershed are classified "Rural"

	Tazewell County	Woodford County	McLean County (partial)	Others	Total
Total Population % of Watershed	33,264 46.2%	18,139 25.2%	17,199 23.9%	3,355 4.6%	71,957
Towns and Villages[a] % of Towns in Watershed	20,566 48.8%	13,010 30.8%	6,495 15.4%	2,073 4.9%	42,144
Rural[a] % County Population % of Rural Watershed	18,593 55.9% 35.1%	13,704 75.5% 25.9%	17199 100% 32.5%	3,355 100% 6.3%	52,851 73.5%
Farm % County Population % of Farm Population in Watershed	1,528 4.6% 25.5%	2,207 12.2% 36.9%	1,969 11.4% 32.9%	276 8.2% 4.6%	5,980
Median Age	34	34	34	34	34
Median Household Income	$30,933	$34,375	$34,949	$26,369	$33,215
% Households earning Farm Self-employment Income	3%	10%	11.7%	11.0%	
Persons Primarily Employed in Farming	1,239 3.2%	824 2.5%	376 1.8%	115 3.4%	2,639 2.8%
Education (Age 18 and older) Less than High School	21.2%	19.6%	17.9%	26.3%	20.1%
High School Graduation	36.8%	37.7%	37.9%	49.2%	37.2%
More than High School	41.9%	42.6%	41.6%	24.3%	41.7%

The largest urban area is Morton, in Tazewell County, although communities of several hundred to several thousand occur in all counties, totaling more than 42,000 residents of towns and villages (Tables II-3 and II-4). Median income per household is similar in all counties (Table II-3), but is highest in McLean County, $34,373, and lowest in Ford, Livingston and Mason County areas. Median age in all counties is 34 years; however, it varies from 31 to 61 years among townships. Several low population townships have few or no children. Townships with small towns include a more typical age distribution with children, working-age adults and older adults. Although the land in the watershed is largely used for agriculture, a relatively small proportion of the population is primarily employed in farming, ranging from 1.8 percent in northern McLean County to 3.4 percent in Livingston, Mason and Ford County areas. A slightly larger proportion of households, from 3 percent to 11.7 percent, reported self-employment income from farming.

Education level of residents aged 18 and older is relatively high, with more than 41 percent achieving education beyond high school graduation, and more than 85 percent achieving at least high school graduation. US Census statistics count eighteen-year olds still enrolled in high school, so these numbers slightly under-represent the education level of the population. Residents of the watershed in Ford, Livingston and Mason Counties have a slightly lower level of educational attainment than that of the three largest counties. According to US Census categories the racial makeup of residents is more than 99 percent "White." However a small number of residents claim minority race, including "Black," "American Indian, Eskimo or Aleut," "Asian or Pacific Islander," and "other."

Land Use

The Mackinaw River watershed includes 728,320 acres (Table II-5) (Eicken and Fitzgerald, 1988; cited in Gough ,1994; NRCS, 1997). Only 1 percent of the land is occupied for urban uses, and less than 1 percent for roads, railroads, and abandoned railroads.

Table II-5

Land Use in Mackinaw River Watershed

Land Cover Class	Acres	Square Miles	Percent of Watershed
High density urban	1,871.55	2.92	0.26
Medium density urban	2,809.31	4.39	0.39
Low density urban	2,475.70	3.87	0.34
Major roadways	3,552.40	5.55	0.49
Active railroads	1,245.02	1.95	0.17
Abandoned railroads	736.17	1.15	0.10
Row crop	542,372.20	847.46	74.46
Small grains	17,243.13	26.94	2.37
Urban grassland	4,397.75	8.87	0.60
Rural grassland	98,108.82	153.30	13.47
Deciduous forest: closed canopy	25,776.89	40.28	3.54
Deciduous forest: open canopy	9,873.46	15.43	1.36
Coniferous forest	192.58	0.30	0.03
Open water	3,204.17	9.54	0.44
Perennial streams	6,104.17	9.54	0.84
Shallow marsh/wet meadow	797.99	1.25	0.11
Deep marsh	37.30	0.06	0.01
Forested wetlands	6,007.56	9.39	0.23
Shallow water wetlands	1,671.63	2.61	0.23
Barren land	0.63	0.00	0.00
Totals	**728,480.21**	**1,138.27**	**100.00**

Source: Natural Resource Conservation Service, 1997. Mackinaw River Basin Inventory and Evaluation of Erosion and Sedimentation and an Assessment of the Conservation Treatment Needs. USDA, Natural Resource Conservation Service, 1902 Fox Drive, Champaign, IL 61820

Nearly 75 percent of the watershed is planted to row crops and 2.3 percent to small grains. Rural grasslands, including pastures and uncultivated grassy areas, occupy more than 13 percent of the watershed, forests of all types about 5 percent, and open water and wetlands 2.5 percent. If "rural grasslands," a category that includes grazed pastures, are included in the tally, nearly 20 percent of the watershed is covered by non-crop vegetation. Most forested land is concentrated on glacial ridges and areas directly adjacent to the Mackinaw River and its' tributaries.

Endangered Species

In the three counties comprising the largest portion of the Mackinaw watershed, McLean, Tazewell and Woodford, twenty-one species of animals that are endangered or threatened in Illinois have been recorded (see Table II-6, Herkert, 1991, 1992 - located at the end of this section). Most are thought to be permanent or regular seasonal residents. These important natural resources include five species of mussels, one amphibian, two reptiles, eleven birds and one mammal. Most require either rare habitats, such as prairie or savanna, or rare large tracts of forest.

Thirty-three threatened and endangered plant species have been found in the watershed and nearby streams, including three which are threatened nationally. Rare species occur in unusual habitats, such as gravel islands in the shallow water areas of the Mackinaw and its tributaries, rock outcrops and hill prairies, savannas, bottomland forests and wetlands. Most of these types of habitats across the state and nation have been destroyed by grazing, logging, urban development, cessation of fires or conversion to agriculture.

The remaining natural areas in the Mackinaw River watershed contribute to the high water quality by protecting the soil from runoff and erosion, as well as constituting an area of high biological diversity in a mostly agricultural state. Many of these important species are in habitats protected by established natural areas and preserves, but others occur on privately owned land maintained as high quality biological resources by private landowners.

The value of the forested areas along the Mackinaw River is greater because a large contiguous tract provides habitat to some area-sensitive species in addition to forming a causeway linking natural habitats along the river. While properties along the river and streams may be owned by a large number of persons, the ecosystem within the area acts as a linked network irrespective of political and legal boundaries.

Public and Private Natural Areas

Natural habitat may be protected from development by one of several legal categories or by public or private ownership for wildlife habitat or recreational park uses. Protected areas in the Mackinaw River watershed include four Illinois Nature Preserves, a State Fish and Wildlife Area, a County Park, and several privately owned natural areas.

Nature Preserves hold the highest level of protection by Illinois law to protect high quality natural communities in perpetuity (McFall and Karnes, 1992). An Illinois Nature Preserve receives the designation after approval of the Illinois Nature Preserves Commission and the approval of the Governor. It may be removed from protection as a Nature Preserve only by agreement of three entities --the Illinois Nature Preserves Commission, the State Legislature and the Governor. A Nature Preserve may be owned by the state, a private organization or individual. Nature Preserves in the Mackinaw River watershed at this time include Manito Prairie, Ridgetop Hill Prairie, Mehl's Bluff and ParkLands Nature Preserve, not to be confused with the Merwin Preserve, owned by ParkLands Foundation, a private foundation.

ParkLands Nature Preserve is a 40 acre tract, dedicated in 1990, within the larger Mackinaw River State Fish and Wildlife Area near the Village of Mackinaw in Tazewell County. It was established to protect the Illinois endangered heart-leaved plantain that grows on gravel beds in the tributaries of the river. The Preserve maintains the forested area surrounding the gravel beds which slows water runoff from rains and reduces erosion that would destroy the plant's habitat. The Nature Preserve and the State Fish and Wildlife area are owned and managed by the Illinois Department of Natural Resources (McFall and Karnes, 1992).

Mehl's Bluff Nature Preserve, Tazewell County, is a privately owned 24.6 acre tract, dedicated in 1988, surrounded by the state-owned Mackinaw River State Fish and Wildlife Area. The Preserve encompasses high bluffs, floodplain forest, seep springs and gravel beds along the Mackinaw River, and supports the

Illinois endangered heartleaf plantain, as well as rare hill prairie and savanna remnants. The large forest complex, of which it is a part, provides habitat for forest-interior birds that require large areas (McFall and Karnes, 1992).

Ridgetop Hill Prairie Nature Preserve in Woodford County comprises 16 acres, dedicated in 1984, owned by ParkLands Foundation, Bloomington, IL, a private foundation dedicated to preserving natural lands. The Preserve supports a rare and diverse hill prairie on a bluff along the Mackinaw River, forested slopes and a bottomland forest in the floodplain (McFall and Karnes, 1992).

Manito Prairie Nature Preserve, 19.6 acres in Tazewell County, owned by Illinois Department of Natural Resources, is on a sand and gravel terrace above the Illinois River floodplain and a few miles from both the Mackinaw River and its outlet into the Illinois River. Dedicated in 1985, the Preserve includes a high quality gravel hill prairie, sand prairie and dry-mesic forest that support several rare plants and animals (McFall and Karnes, 1992).

Other natural areas include several large tracts along the Mackinaw River that were established for a diversity of purposes. ParkLands Foundation, a private land-preservation trust founded in 1967 and funded entirely by member donations, protects and restores forests, savannas, prairies, wetlands, and shrubby grasslands along several miles of the Mackinaw River in McLean County, west of Lexington. The 700-acre Merwin Preserve provides a large contiguous forest with habitats for species that require a very large area, as well as restored prairies and savannas. Public access for recreational walking and nature observation is encouraged (Roger C. Anderson, Illinois State University, Normal, IL, personal communication).

The Mackinaw River State Fish and Wildlife Area northeast of the Village of Mackinaw provides more than 500 acres for hunting and fishing. Forests, shrub and grassland areas protect the land, and support wildlife and a variety of native plant communities along the River (McFall and Karnes, 1992). Comlara Park, the McLean County park, surrounds the Evergreen Lake impoundment. Forests, fields, wetlands and restored prairies provide opportunities for nature

observation and hiking, along with camping and boating facilities. Evergreen Lake was selected for establishing a county park in order to protect the water, which is used by Bloomington, IL, as a drinking water source.

An additional artificial lake, Lake Bloomington, is used for drinking water. Surrounding land is subject to some regulation by the City of Bloomington, because of its importance. Home sites and a small park ring the lake. Lake Eureka was used as a water source until early 1995 and is surrounded by woodland and recreational development (Schneider et al., 1995).

Wetlands

Few large natural wetlands remain in the Mackinaw River watershed. Much of the headwaters area around Sibley was formerly a poorly drained marsh which absorbed rainfall and reduced runoff after rain events, compared to current conditions (USDA, 1990). In addition, most natural river systems have small wetlands associated with streamside areas where topography permits, also reducing runoff (Demissie and Kahn, 1993). None of these wetlands remain. Three man-made wetlands have been constructed in recent years. Two are on tributaries approaching Lake Bloomington, the drinking water reservoir formed from Money Creek. They were built to maximize removal of nitrogen from water entering the lake in order to improve drinking water quality. A third is being constructed near Sibley to reduce peak water flows of the Mackinaw (James McMahon, The Nature Conservancy, Illinois Field Office, Mackinaw River Project, personal communication).

Loss of wetlands in the watershed is thought to contribute to increased peak flow and reduced low flow levels of rivers (Demissie and Kahn, 1993). Ten years of rainfall and flow records from 30 watersheds in Illinois, with and without wetlands, showed that presence of wetlands reduced peak flows of water following storm events and slowed release of water to channels, resulting in a higher level of lowest flow following rain-free times. Statewide, for each

increase of 1 percent of the watershed in wetlands the peak flow was reduced 3.7 percent, while in central Illinois peak flow was reduced 8.7 percent for each 1 percent increase in wetlands (Demissie and Kahn, 1993). Restoring more nearly natural hydrology of the watershed could improve water quality and reduce flooding.

Soils

Detailed soil surveys have been prepared by the USDA Natural Resources Conservation Service (NRCS) (formerly Soil Conservation Service), in cooperation with Illinois Agricultural Experiment Station, for all counties in the watershed. Maps and soil descriptions for Ford, Mason, and Tazewell Counties have been published and are available from NRCS offices. Other counties have detailed information available in unpublished form for use with large scale maps in the NRCS offices.

Soil type and topography, as well as plant cover, determines the impact of stormwater on runoff. Soils that are easily dislodged by rainfall's force experience great amounts of erosion. Soil removed from fields by stormwater becomes sediment that pollutes streams and the river. Erosion removes the surface layers, highest in fertilizer elements, and carries both particles and attached fertilizer to the stream. In addition, certain fertilizer elements may be carried with runoff as dissolved nutrients.

All soil types do not erode equally easily. The percentage of A, B, C, D, E class soils -- Erodability Indexes -- for the watershed is not available at this time. However, these percentages will be provided in each of the subwatershed plans as they are developed. Flatter areas that do not drain quickly have less erosion and greater infiltration of rainfall. If infiltration rate is poor, due to slope or soil surface, runoff is greater. If rain infiltrates less and runs off faster from bare ground than vegetated land, peak flows are higher with the same amount of rainfall (Gough, 1994). If water flows quickly to the river, water levels rise

quickly and subside quickly. If infiltration is great, water drains slowly from the land to streams, and Mackinaw River water levels remain more constant.

The soils in the Mackinaw River watershed were formed from glacial outwash, till and loess. Drainage varies from poorly drained with a seasonally high water table in the Sibley area to very well drained sandy soil in the Manito area. Most of the watershed is moderately well drained silty or silty clay soils on moderately sloped to level land, while regions near the river are well-drained silty soils on steeper slopes (USDA, 1990, 1995, 1996).

In the small portion of Ford county within the Mackinaw River watershed soils are Drummer-Dana-Raub association and Drummer-Brenton association (USDA, 1990). Both are somewhat poorly drained soils formed from loess and underlying glacial outwash, with seasonally high water tables.

Moving downstream to McLean County, the soils are somewhat more well-drained. Soil associations include Chenoa-Drummer-Graymont, Drummer-Benton, Chenoa-Ashkum-Varna, Parr-Lisbon-Drummer, and Ipava-Sable. Near the river Strawn-Mayville-Birkbeck soils occur on the most steeply sloped ridges (USDA, unpublished).

Woodford County soils are gently sloping, poorly to moderately well drained silty soils to silty clay soils formed from loess, including Drummer-Flanagan association, Chenoa-El Paso-Graymont association, and Ipava-Sable-Tama association. Near the river soils are Miami-Birkbeck-Hennepin association and Saybrook-Catlin-Tama association on moderate to steep slopes, poorly to moderately well drained on lower slopes to very well drained on upper slopes (USDA, unpublished).

In Tazewell County the river flows through Ross-Landes-Lawson association, nearly level, well drained, frequently flooded, loamy and silty soils formed in alluvium. Tributaries flow through Birkbeck-Miami-Hennepin association soils, sloping to very steep, well drained soils that formed in glacial till or loess and glacial till. Upland from the river and tributaries soil associations include Plano-Elburn-Sable, Rozetta-Stronghurst, Birkbeck-Miami-Hennepin,

Tama-Ipava-Sable, and Ipava-Sable. All are better drained soils formed from loess, varying somewhat in slope and drainage.

Downstream from Green Valley, in Tazewell county, and the small part of Mason county that drains into the Mackinaw through the Quiver Ditch, soils are formed from different geologic and glacial processes than the valley upstream. Tazewell County soils are Onarga-Jasper-Dakota association, nearly level to sloping, well drained, loamy soils over sand and Titus-Ambrose-Beaucoup association, nearly level, poorly drained, and formed in alluvium (USDA, 1996). Mason County soils in stream terraces include Marshan-Udolph association soils and Selma-Harpster association soils, while farther from the drainage dunes and terraces include Onarga-Dakota-Sparta association soils (USDA, 1995). In general they are more poorly drained than other soils in the watershed, while having a high proportion of sand.

Soil Erosion and Land Management

Soil erosion is the removal of soil from a surface by wind or water. Water erosion is the primary form in the Mackinaw River watershed and results in sedimentation of waterways when surface soil is removed from bare land. Soil erosion rates are determined by rainfall totals and intensity, slope steepness and distance, soil texture, agricultural management and surface cover--vegetative, row crop or impervious. Rainfall totals and intensity can only be determined after the event, so other factors are used to estimate soil erosion based on potential erosion capability of surfaces. Sheet and rill erosion occurs as rain washes a little (e.g., 1/4 inch) soil loose from a surface; soil may be re-deposited on the same field or may be washed off the field. Ephemeral erosion forms a small gully (e.g., 4 - 12 inches) in a field as water travels through natural contours. Gully erosion includes the larger, more visible gullies (e.g., 2-8 feet) that result in major loss of soil from a field. Scour erosion occurs when flood waters cross open unprotected land, such as bottomland crop fields. All these types of soil erosion form from the force of rainfall falling on and flowing across soil surfaces. Streambank erosion occurs

from the force of water flowing against the unprotected bank, a different process than sheet, rill and gully erosion. Faster stream flows during flooding exert greater force on the streambank. Greater amounts of water flowing through a channel during peak flows undermines the bank and causes erosion of large amounts of silt into the channel. Keeping water from entering the river system quickly after rains helps keep streambanks stable.

Soil erosion at a rate equal to the rate of soil formation is defined as 'T', or "tolerable," in terms of maintaining fertility on farmland. In the Mackinaw River valley 82 percent of watershed cropland is at 'T' or less than 'T'. Seventeen percent of cropland is estimated to erode at greater than 'T' (NRCS, 1997). According to NRCS data, sheet and rill erosion deliver the greatest quantity of sediment to the Mackinaw River, but significant amounts are also delivered by ephemeral, gully and streambank erosion (see Table II-7).

Table II-7
Annual Erosion and Sedimentation in the Mackinaw River Watershed

Erosion includes all soil that is loosened from a surface and has the potential to result in sediment in the waterway. Rate of sediment delivery is based on standard conversion factors for the types of erosion listed.

Type	Erosion	Sediment Delivery	Sedimentation
	(tons)	*(rate)*	*(tons)*
Sheet & Rill	3,077,400	0.70	2,154,180
Ephemeral	280,000	0.80	224,000
Gully	250,000	0.85	212,000
Streambank	200,000	1.00	200,000
Total	**3,807,400**		**2,790,180**

(Source: NRCS, 1997.)

An estimated total of 2,154,180 tons of sediment are delivered to the river annually. Table II-7 shows that most of the total sheet and rill erosion comes from cropland that is at or below 'T', the accepted rate of erosion for maintenance of fertility, according to the Illinois Department of Agriculture. These low rates of erosion have been achieved by conversion of conventional farm practices to conservation tillage practices and other best management practices to hold the water on the land longer and permit it to flow more slowly. Current best management practices have reduced water erosion from formerly higher levels, but significant amounts of erosion remain due to the agricultural nature of the watershed. The USDA Conservation Reserve Program has enrolled 6,788 acres into permanent grass cover for ten or more years. About half of these contracts which removed fragile lands from crop production will expire by the year 2000 (NRCS, 1997).

Table II-8

Sheet and Rill Erosion in tons per acre per year from Cropland in the Mackinaw River Watershed

Erosion is calculated from acres eroding at acceptable levels or 0 to 1 'T' (3.5 tons per year), from slightly high levels of 1 to 2'T' (7.5 tons per year), and greater than 2 'T' (15 tons per year).

The watershed is distributed in the six counties as follows: McLean County 42%, Woodford County 28%, Tazewell County 26% and Ford, Livingston, and Mason Counties 4%.

County	0 to 1 'T'	1 to 2 'T'	Over 2 'T'	Total
McLean	897,225	281,250	93,750	1,272,225
Woodford	634,550	140,700	62,550	827,800
Tazewell	555,450	130,500	115,500	801,450
Ford, Mason and Livingston	86,555	24,525	9,000	120,080
Total	2,173,780	576,975	280,800	3,021,555

(Source: NRCS, 1997)

Although less than 5 percent of the Mackinaw River Watershed, urbanized areas and highways contribute greater runoff per acre than agricultural land uses. The use of impervious materials in urbanized areas reduces infiltration and increases runoff from those sites. Urbanized forested areas, housing developments among the forests of the river valley, fragment the forest and increase runoff from house and lawn sites. Erosion rates from construction sites are often 8 or more times higher than agricultural areas, carrying sediment that erodes from exposed soil (C. Davis, Illinois EPA, Bureau of Water, personal communication). Sediment control measures, such as those described in the "Tazewell County Erosion, Sediment and Stormwater Control Ordinance," are designed to minimize damage to surrounding waterways during construction activities. In addition, stormwater carries fertilizer nutrients and pesticides from urban lawns and streets. Stormwater detention basins or wetlands could filter sediment and chemicals from stormwater before it enters nearby waterways.

Streambank erosion occurs along the 522.3 miles of Mackinaw River and its tributaries, equaling 1,045 streambank miles, calculated by miles of stream times two banks, assuming all streams form a single channel. Based on aerial photos, approximately 102 miles of streambanks need stabilization, re-vegetation and protection to reduce streambank erosion (NRCS, 1997).

Point Source Pollution and Wastewater Discharge

A point source is one that enters the environment at a single location, such as a pipe or a ditch. Point source pollution in the Mackinaw River Watershed was assessed by an intensive study under the supervision of Professor Daniel Schneider of the University of Illinois Department of Urban and Regional Planning (Schneider et al. 1995). Land uses and sites which are at risk of producing point source pollution were identified through current records obtained from the Illinois Environmental Protection Agency (Illinois EPA), United States Environmental Protection Agency (U.S. EPA), Illinois State Geological Survey, Illinois State Water Survey (ISWS) and libraries of the University of Illinois.

Sources in the watershed included leaking underground storage tanks, toxic releases to air, landfills, wastewater treatment plants, wildcat sewers, hazardous waste handling facilities, former coal gasification sites, surface and underground mine activity sites, and electrical substations and underground pipelines (Table II-9).

Table II-9
Potential Point Sources of Pollution in the Mackinaw River Watershed

Identified by researchers in the Department of Urban and Regional Panning, University of Illinois, August 12, 1995.

Source	Ford	Mason	McLean	Tazewell	Woodford	Watershed
Registered Underground Storage Tanks (USTs)	18	26	68	189	201	502
Leaking Underground Storage Tanks	2	1	25	40	39	107
Controlled or Permitted Toxic Releases to Air	0	0	13	33	11	57
Landfills	0	0	0	2	0	2
Wastewater Treatments Plants	0	1	6	12	4	23
Wildcat Sewers	0	0	0	1	4	5
RCRA-Waste Handling Facilities	0	0	0	1	1	2
Coal Gasification Plants (prior to 1920s)	0	0	0	0	1	1
Coal Mine sites	0	0	3	0	1	4

(Source: Schneider, D., R. J. Farrell, D. Fathke, J. Kowalski, T. Mahr. 1995. Point Source Pollution in the Mackinaw River Watershed. University of Illinois, Department of Urban and Regional Planning. 907 - 1/2 West Nevada, Urbana, Illinois 61801)

In addition, historic land uses for communities in the watershed were identified and may be consulted in the publication (Schneider et al. 1995). Both active and abandoned sites cause contamination of soil, but pollutants may be washed into waterways through erosion and movement of groundwater. Wastewater treatment plants and wildcat sewers discharge directly to waterways, adding fertilizer nutrients and suspended organic solids to the water.

Several communities discharge collector sewers into the tributaries or main stream of the Mackinaw River. Microbiological and physicochemical surveys of the water near sewage outfalls into the stream have revealed chemical and physical indicators of high quality water, but high microbiological counts, indicating that the water discharging into the streams carry significant amounts of untreated sewage (Kelley, 1996). Tests were conducted on water samples collected at 17 locations on the Mackinaw River and its tributaries. The sites were selected to determine the worst-case situation, instead of the average condition of the river. Sampling locations included locations near Sibley, Anchor, Colfax (southeast and northwest), Cooksville, Towanda, Lexington (southeast, northeast, northwest, west) Minonk, Roanoke, Congerville and Hudson, on the Mackinaw River, Money Creek, Crooked Creek, Turkey Creek, Little Panther Creek, West Branch of Panther Creek, Six-Mile Creek, Panther Creek, and an unnamed creek near Congerville. Ten of the 17 stations were on the main channel of the Mackinaw River.

Microbiological tests revealed that samples ranged from 10 to 1000 times higher than the levels of bacteria recommended for recreational waters. Disease risk theoretically exists for persons wading or swimming in the river at these locations. In addition, the tests demonstrate the potential for greater concerns about the effects of wastewater on the river as small communities grow without properly functioning sewage treatment facilities. Most small communities in the watershed have no central sewage treatment lagoons or treatment facility. In addition, homes with septic tanks and drain fields are rarely inspected by health departments unless the facility obviously fails and causes a nuisance on a neighbor's property.

In addition to human waste contamination, animal waste contamination was detected from the tests (Kelley, 1996). Improper or inadequate management of animal wastes, as well as some wild animals, may contribute microorganisms to the river and its tributaries. Although human contact with polluted water in the

Mackinaw River may be infrequent, a potential for disease transmission exists when recreational users contact either human or animal waste.

Communities with sewage treatment are listed in Table II-10 (located at the end of this section). Schneider et al. (1995) reported that as early as 1940 Illinois Department of Public Health proposed construction of sewage treatment facilities at several towns in the watershed that still have no treatment, including Sibley, Lexington, and Benson. Towns with no sewers must have septic systems and drain fields of adequate size to meet current building requirements. Old homes may have inadequate septic systems that do not properly treat domestic sewage or, in some cases, no septic system at all. County Public Health Departments inspect septic systems in response to complaints.

Conclusions

Table II-11 summarizes by source type the number and percentage of potential sources of stream impairment in the Mackinaw River Watershed, detailed by Short et al. (1996).

Table II-11
Summary of Potential Sources of Stream Impairment in the Mackinaw River Watershed (Summarized by Source Type)

Source Type	Number of Potential Sources				Percentage		
	Total	*High*	*Moderate*	*Slight*	*High*	*Moderate*	*Slight*
Agricultural	275	23	53	199	26.7	70.7	93.0
Municipal	54	44	8	2	51.2	10.7	0.9
Other	46	19	14	13	22.1	18.7	6.1
Totals	375	86	75	214	100	100	100

(Source: Short, M. B., T. G. Kelly, J. E. Hefley, and W. H. Ettinger. 1996. An Intensive Survey of the Mackinaw River Basin 1994. Illinois Environmental Protection Agency, Division of Water Pollution Control, 4500 South Sixth Street Road, Springfield, IL 62706.)

Agricultural sources present the largest number of sites, due to the predominance of agriculture in the watershed. However, most agricultural sources were rated as having "slight" potential for stream impairment, while more than half the municipal sources had a "high" potential for harm. The Mackinaw River Project plans to reduce the impact on the watershed from both agricultural and municipal pollution.

This report presents information collected for the Mackinaw River Project about the characteristics of the Mackinaw River watershed. Most of the information was obtained from public sources or with the assistance of employees in government agencies, detailed in the reference list. More detailed information can be obtained about any local area in the watershed from many of the same sources. Assessment of conditions in the watershed and the causes of existing stresses on the river system permitted the Mackinaw River Project Planning Team and Action Teams to evaluate problems and set priorities for proposed solutions. The Planning Team will continue to use this and similar information to evaluate future recommendations.

Table II-2
Water Quality Rating and Supported Uses of the Mackinaw River and Tributaries, Causes and Sources of Impairments to Water Quality

a : Uses: Codes represent the following
- 02 = Fish consumption
- 04 = Supports aquatic life
- 05 = Swimming

b : Overall Status & Ratings: (Illinois EPA evaluations) include
- F = Fully supported by water quality
- T = Threatened; water quality may decline if current activities continue
- R = Partial support / Minor impairment of water quality
- D = Partial support / Moderate impairment of water quality
- N = Not supported by water quality
- no code = indicates activity occurs, but no data available to determine if it should be supported

Monitoring Station	Name	Miles	Overall Status [b]	Uses [a] (rating [b])	Causes of Impairment	Sources Contributing to Impairment
DK01	Mackinaw R.	7.71	R	02; 04(R); 05	Slight effects: nutrients, siltation	Slight contribution: agriculture, channelization, hydrologic/habitat modification
DK12	Mackinaw R.	20.75	F	02; 04(F); 05(F)		
DK19	Mackinaw R.	7.19	F	02; 04(F); 05		
DKC01	Dillon Cr.	15.89	F	02; 04(F); 05		
DK04	Mackinaw R.	9.95	F	02; 04(F); 05(N)		
DK15	Mackinaw R.	3.99	F	02; 04(F); 05(N)		
DK13	Mackinaw R.	5.66	F	02; 04(F); 05(R)		
DK16	Mackinaw R.	5.70	F	02; 04(F); 05(N)		
DKH01	Alloway Cr.	6.06	F	02; 04(F), 05		
DKI01	Rock Cr.	17.60	F	02; 04(F); 05		
DK1A	Funks Branch	5.22	F	02; 04(F); 05		
DKZF	Hollands Cr.	2.88	F	02; 04(F); 05		
DK20	Mackinaw R.	15.28	F	02; 04(F); 05		
DK17	Mackinaw R.	8.50	F	02; 04(F); 05		
DK18	Mackinaw R.	17.39	F	02; 04(F); 05		
DK21	Mackinaw R.	20.97	F	02; 04(F); 05		
DKM01	Denman Cr.	9.66	F	02; 04(F); 05		
DKN01	Sixmile Cr.	27.88	F	02; 04(F); 05		

Monitoring Station	Name	Miles	Overall Status [b]	Uses [a] (rating [b])	Causes of Impairment	Sources Contributing to Impairment
DKO01	Wolf Cr.	3.49	F	02; 04(F); 05		
DKR01	Buck Cr.	12.10	F	02; 04(F); 05		
DKS	Turkey Cr.	10.96	F	02; 04(F); 05		
DKU	Patton Cr.	5.02	F	02; 04(F); 05		
DKZG	Loving Branch	2.91	F	02; 04(F); 05		
DKB01	Hickory Grove Dt.	3.00	F	02; 04(F); 05		
DKB01	Indian Cr.	6.08	D	02; 04(D); 05	Moderate effects: nutrients, siltation. Slight effects: organic enrichment/ Dissolved oxygen, Flow alteration	Moderate contribution: point source municipal pollution; Slight contribution: agriculture, hydrologic or habitat alteration, channelization
DKE01	Little Mackinaw R.	17.13	F	02; 04(F); 05		
DKEA	Sargent Slough	9.43	F	02; 04(F); 05		
DKF11	Prairie Cr.	13.92	F	02; 04(F); 05		
DKG01	Mud Cr.	17.89	R	02; 04(R); 05	Slight effects: nutrients. Moderate effects: siltation	Moderate contribution: agriculture
DKGA	Willow Cr.	3.77	R	02; 04(R); 05	Slight effects: nutrients. Moderate effects: siltation.	Moderate contribution: agriculture
DKGB	Deer Cr.	13.69	R	02; 04(R); 05	Slight effects: nutrients. Moderate effects: siltation	Moderate contribution: agriculture
DKJ01	Walnut Cr.	23.40	F	02; 04(F); 05		
DKJA	Mill Cr.	5.68	F	02; 04(F): 05		
DKK01	Panther Cr.	4.96	F	02; 04(F); 05		
DKK02	Panther Cr.	19.42	F	02; 04(F); 05		
DKKA	Olive Brch.	4.47	F	02; 04(F); 05		
DKKG	Red R.	7.50	F	o2; 04(F); 05		
DKKB01	W. Panther Cr.	14.01	F	02; 04(F); 05		
DKKC02	E. Panther Cr.	12.02	F	02; 04(F); 05		
DKP02	Money Cr.	44.11	F	02; 04(F); 05		
DKV01	Henline Cr.	14.42	F	02; 04(F); 05		
DKT01	Crooked Cr.	16.57	F	02; 04(F); 05		

(Source: Illinois Water Quality Report, Volumes I and II. State of Illinois Environmental Protection Agency. IEPA/BOW/96-060. September 1996.)

Table II-6
Endangered Species Reported to Occur in Tazewell, Woodford and McLean Counties

Status key: E=Endangered IL= Illinois Status
T=Threatened US= Federal Status

Invertebrates

Species	Common Name	Status	Habitat	Counties		
				Tazewell	Woodford	McLean
Alasmodonta viridis	Slippershell (mussel)	E (IL)	Stream, sandy bottom, clean water		x	x
Lasmigona compressa	Creek heelsplitter (mussel)	T (IL)	Creeks, clean water, fine gravel or mud bottoms, riffles		x	x
Lampsilis higginsi	Higgin's eye pearly mussel	E (IL, US)	River, mud-gravel substrate	x		
Uniomeris tetralasmus	Pondhorn (mussel)	T (IL)	Creeks, clean shallow water, mud bottom		x	x
Villosa iris	Rainbow (mussel)	E (IL)	Shallow creeks, below riffles, sandy or sand/mud bottoms)			x

Amphibian

Species	Common Name	Status	Habitat	Counties		
				Tazewell	Woodford	McLean
Pseudacris streckeri	Illinois chorus frog	T (IL)	Open sandy areas of river lowlands	x		

Reptiles

Species	Common Name	Status	Habitat	Counties		
				Tazewell	Woodford	McLean
Heterodon nasicus	Western hognose snake	T (IL)	Dry prairies	x		
Kinosternon flavescens	Illinois mud turtle	E (IL)	Semi-permanent ponds in sand areas.	x		

Fish

Species	Common Name	Status	Habitat	Counties		
				Tazewell	Woodford	McLean
Lepomis punctatus	Spotted sunfish	T (IL)	Vegetated bottomland lakes over mud or sand, clean water	x		

Birds

Species	Common Name	Status	Habitat	Counties		
				Tazewell	Woodford	McLean
Accipiter cooperi	Cooper's hawk	E (IL)	Mature forests, forest edge			x
Assio flammeus	Short-eared owl	E (IL)	Large grasslands			x
Bartramia longicauda	Upland sandpiper	E (IL)	Large short grasslands, pastures			x
Casmerodius albus	Great egret	E (IL)	Flood plain forest	x	x	
Catharus fuscescens	Veery	T (IL)	Large forests	x		x

Birds (continued)

Species	Common Name	Status	Habitat	Counties		
				Tazewell	Woodford	McLean
Certhia americana	Brown creeper	T (IL)	Floodplain forests, old trees		x	
Ixobrychus exilis	Least bittern	E (IL)	Marsh & shallow lakes	x		
Lanius ludovicianus	Loggerhead shrike	T (IL)	Mixed agric., shrubs, grassland	x		x
Nycticorax nycticorax	Black-crowned night heron	E (IL)	Bottomland forests and marsh	x		x
Pandion haliaetus	Osprey	E (IL)	Near lakes, rivers	x		
Podilymbus podiceps	Pied-billed grebe	E (IL)	Large wetlands	x		x

Mammals

Species	Common Name	Status	Habitat	Counties		
				Tazewell	Woodford	McLean
Lutra canadensis	River otter	E (IL)	Extensive woodlands with riparian habitat		x	

Plants

Species	Common Name	Status	Habitat	Counties		
				Tazewell	Woodford	McLean
Agropyron subsecundum	Bearded wheatgrass	E (IL)	Mesic prairies, wet dolomite outcrops	x		

Plants (continued)

Species	Common Name	Status	Habitat	Counties		
				Tazewell	Woodford	McLean
Arctostaphylos uva-ursi	Bearberry	E (IL)	Sand deposits, sandstone outcrops	x		
Aster schreberi	Schreber's aster	T (IL)	Rich mesic ravine forests	x		
Astragalus tennesseensis	Tennessee milk-vetch	E (IL)	Dolomite and dry gravel prairies	x		
Berberis canadensis	Alleghany barberry	E (IL)	Sandstone bluff		x	
Besseya bullii	Kitten tails	T (IL)	Sand savannas, dry gravel prairies	x		
Boltonia decurrens	Decurrent false aster	T (IL) T (US)	Floodplain temporary habitats	x	x	
Carex laxiculmis	Spreading sedge	E (IL)	Mesic forests	x		
Cypripedium candidum	White lady's slipper	E (IL)	Wet-mesic prairies		x	x
Cypripedium reginae	Showy lady's slipper	E (IL)	Variety of moist habitats	x	x	
Epilobium strictum	Downy willow herb	T (IL)	Open calcareous bogs, fens, seeps		x	
Filipendula rubra	Queen-of-the-prairie	T (IL)	Fens, mesic sand prairies, seeps	x		
Helianthus giganteus	Tall sunflower	E (IL)	Fens and sedge meadows		x	
Hymenoxys acaulis var. *glabra*	Lakeside daisy	E (IL) T (US)	Dolomite prairies	x		
Liatris scariosa var. *nieulandii*	Blazing star	T (IL)	Silt-loam savannas			x

Plants (continued)

Species	Common Name	Status	Habitat	Counties		
				Tazewell	Woodford	McLean
Microseris cuspidata	Prairie dandelion	E (IL)	Dry-mesic prairies	x		
Milium effusum	Millet grass	E (IL)	Openings in hardwood forests			
Mimulus glabratus	Yellow monkey flower	E (IL)	Calcareous seeps		x	
Orobanche ludoviciana	Broomrape	E (IL)	Blowouts in dry and sand prairies , alluvial floodplains	x		
Plantago cordata	Heart-leaved plantain	E (IL)	Sand or gravel bars of shallow, clear-water streams under a forest canopy.		x	
Plantathera flava var *herbiola*	Tubercled orchid	T (IL)	Wet-mesic sand prairies and associated thickets	x		
Plantathera leucophaea	Prairie white-fringed orchid	E (IL) T (US)	Mesid to wet prairies			x
Polanisia jamesii	James' clammyweed	E (IL)	Colonizing species of open sand prairies	x		
Rhamnus alnifolia	Alder buckthorn	E (IL)	Calcareous bogs, sand prairies, fens	x		
Spiranthes lucida	Yellow-lipped ladies' tresses	E (IL)	Calcareous habitats		x	
Thuja occidentalis	Arbor vitae	T(IL)	Lake Michigan glacial bluffs, adjacent ravines, sandstone and limestone cliffs, forested fen		x	
Triglochin maritima	Common bog arrowgrass	E(IL)	Fens and interdunal swales		x	
Triglochin palustris	Slender bog arrowgrass	E(IL)	Spring runs in fens and interdunal swales		x	

Plants (continued)

Species	Common Name	Status	Habitat	Counties		
				Tazewell	Woodford	McLean
Veratrum woodii	False hellebore	T (IL)	Mesic upland and ravine forests			x
Veronica americana	American brooklime	E (IL)	Wet ground around seeps, springs, streams marshes and fens	x		
Veronica scutellata	Marsh speedwell	T (IL)	Marshes, wetlands		x	

(Source: Herkert, J. 1991 and 1992.. Endangered and Threatened Species of Illinois: Status and Distribution. Volume 1 - Plants. Volume 2 - Animals. Illinois Endangered Species Protection Board. Springfield, Illinois.)

Table II-10

Identified Public and Industrial Sewage Treatment Facilities in the Mackinaw River Watershed

"No sewers" indicates the town has no collection system. "Wildcat sewers" are sanitary sewers that discharge untreated domestic waste into a water source.

Community	Type of Facility	Most Recent Construction	Discharge to Stream
FORD COUNTY			
Sibley	No sewers		
McLEAN COUNTY			
Anchor	No sewers		
Carlock	No sewers		
Colfax	Secondary treatment	1990	Mackinaw River
Cooksville	No sewers		
Gridley	Secondary	1976	Buck Creek
Hudson	No sewers		
McLean County Parks & Recreation (Comlara Park)	Tertiary	mid-1970's	Evergreen Lake
East Bay Camp	Tertiary	mid-1970's	Lake Bloomington
Lexington	Some sewers, No treatment		Turkey Creek
Towanda	No sewers		
Grade School	Secondary	1991	Tributary of Money Creek
Unocal Corporation - Zorn Transport	No data	1993	No data
MASON COUNTY			
Manito	Secondary	1975	Hickory Grove Ditch
TAZEWELL COUNTY			
Deer Creek	Secondary	1990	Mud Creek
Green Valley	Secondary	1980	Mackinaw River
Hopedale	Secondary	1971	Indian Creek
Indian Creek Industrial Park	Secondary	1977	Indian Creek
Mackinaw	Secondary	1985	Mackinaw River
Morton	Advanced secondary	1972	Prairie Creek
Libby Pumpkin Cannery/Nestle	Secondary	1972	Land application
South Pekin	Wildcat sewer, No treatment		Ditch draining to Mackinaw River.
Tremont	Secondary	1986	Dillon Creek
Grandview Homeowners	Secondary	1971	Prairie Creek
Tazewell County Health Facility	Secondary	NA	Dillon Creek

Community	Type of Facility	Most Recent Construction	Discharge to Stream
WOODFORD COUNTY			
Benson	Wildcat sewer, No treatment		Panther Creek
Congerville	Secondary	1964	Mackinaw River
Congerville area	Wildcat sewer, No treatment		Rock Creek
El Paso	Secondary	1968	panther Creek
Woodford County Swine Breeders	Treatment, unknown type		Panther Creek
Eureka	Advanced secondary	1973	Walnut Creek
IDOT Rest Area #1	Secondary	1972	Mackinaw River
IDOT Rest Area #2	Secondary	1972	Mackinaw River
Goodfield	Secondary	1980	Mackinaw River
Timberline Mobile Homes	Secondary	1975	No data
Metamora	Secondary	1979	Walnut Creek
Roanoke	Secondary	1970	Panther Creek
N/A near Kappa	Wildcat sewer, no treatment		Mackinaw River
N/A near Secor	Wildcat sewer, no treatment		Panther Creek
Excel Foundry	Cooling pond	1983	Mackinaw River

(Source: Schneider, D., R. J. Farrell, D. Fathke, J. Kowalski, T. Mahr. 1995. Point Source Pollution in the Mackinaw River Watershed. University of Illinois, Department of Urban and Regional Planning, 907 - 1/2 West Nevada, Urbana, Illinois 61801)

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