



Mackinaw River Project

Summary of the Mackinaw River Watershed Management Plan

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Acknowledgments

The Mackinaw River Watershed Management Plan is dedicated to the people of the Mackinaw River Watershed.

Special thanks to: the Mackinaw River Executive Committee; Planning Team Members; Action Team Members; Technical Advisory Committee Members; Mackinaw Valley Improvement Association; Natural Resources Conservation Service; Local Soil and Water Conservation Districts; Local Farm Bureaus; Illinois Department of Natural Resources; The Nature Preserves Commission, Prairie Rivers Resource Conservation and Development; The Nature Conservancy of Illinois; and Illinois Environmental Protection Agency.

This bound version of the plan does not include the subwatershed plans, watershed maps, or resources. To view a copy of the full plan with these components or for additional copies of this plan please contact the Illinois Environmental Protection Agency, Bureau of Water, Planning Section, P.O. Box 19276, Springfield, Illinois 62794-9276, Phone: (217) 782-3362, Fax: (217) 785-1225.

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As of August 1998, the Mackinaw River Executive Committee will form the Mackinaw River Watershed Executive Council, a permanent non-profit organization.

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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.

Section I **Introduction**

This document is a summary of the original Mackinaw River Watershed Management Plan, with four parts: Introduction, Resource Inventory, Existing Water Protection Programs - Agencies and Laws, and the Mackinaw River Watershed Action Plan. Appended to each section is a list of references that document facts cited in the report. Readers may find the original references useful for further investigation. This summary report contains almost all of the data tables from the full Mackinaw River Watershed Management Plan, excluding subwatershed plans, with abbreviated discussion. Readers who wish to investigate the extended discussions of issues presented here are encouraged to consult the full-length plan.

The Mackinaw River Project Planning Team worked with experts and Action Teams for over a year to pursue their initial purpose -- to form a Mackinaw River Watershed Management Plan, with agreed upon strategies, leading to achievable goals, to be met by specific recommendations. They agreed to work first toward correction of the problems that the Planning Team believed were most important to improve water quality.

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. The water quality of the river and its' tributaries is affected by an accumulation of pollution and runoff. 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 drains the fourth largest subwatershed of the Illinois River system, after the Spoon, LaMoine and Vermillion Rivers (IEPA, 1996), originating near Sibley, Illinois and joining the Illinois River at Pekin, Illinois. 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. 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, Illinois 62706.)

Mackinaw River Watershed	1,138 sq. miles, 728,320 acres
Maximum elevation	951 feet
Minimum elevation	492 feet
Main channel	131 miles
Tributaries	about 392 miles

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. Those sections of the river and tributaries that did not receive the highest quality rating were comprised slightly to moderately by channelization in the lower 7.7 miles of the main channel, and by nutrients and sedimentation that affect Indian Creek, Mud Creek, Willow Creek, and Deer Creek. Illinois EPA reported that sediment and nutrients resulted from habitat modification, agricultural practices and point source municipal pollution. Interested readers are encouraged to consult the expanded Mackinaw River Watershed Management Plan, including Table II-2 (located at the end of this section).

Political Jurisdictions

Counties and Townships in the Mackinaw River Watershed include:

Tazewell County

Little Mackinaw; Hopedale; Dillon; Sand Ridge; Spring Lake (part); Cincinnati (part); Elm Grove; Tremont; Mackinaw; Morton (part); and Deer Creek.

McLean County

Cropsey; Anchor; Lawndale; Martin; Chenoa; Lexington; Blue Mound; Gridley; Money Creek; Towanda; Hudson; Normal (north); White Oak; Dry Grove and Danvers.

Woodford County

El Paso; Panola; Minonk; Clayton; Greene; Palestine; Kansas; Montgomery; Olio; Cruger; and Roanoke.

Livingston County

A very small part of Waldo Township.

Ford County
Part of Sullivant Township.

Mason County
Manito Township.

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

County	Municipality	1990 Population
Ford Mason	Sibley	368
	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. ^aPersons 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%

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

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. 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. 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 especially great because a large contiguous tract provides habitat to some area-sensitive species in addition to forming a causeway linking natural habitats along the river.

An expanded inventory of living resources has recently been published by the critical trends assessment program under the direction of Illinois Department of Natural Resources. This list includes plant, birds, mammals, insects, fish and fresh water mussels.

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). 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.

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 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. Land surrounding Lake Bloomington, a drinking source, 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 to Lake Bloomington for controlling nitrogen entering the lake, and one 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, 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).

Soils

Soil type and topography, as well as plant cover, determines the impact of stormwater runoff. 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 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.

Types of soil erosion, in increasing intensity include: sheet and rill erosion (removal of a thin layer of soil), ephemeral erosion (forms a small gully in a field), gully erosion (forming larger, more visible gullies with major soil loss), scour erosion (flood waters cross open unprotected land). 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, undermining the bank and causing 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
	<i>(tons)</i>	<i>(rate)</i>	<i>(tons)</i>
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. Lower rates of erosion may occur naturally in some parts of the watershed, or have been achieved by conversion of conventional farm practices to conservation tillage practices and other best management practices. These best management practices are designed 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 Planning,
 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. In addition to human waste contamination, animal waste contamination was detected from the tests (Kelley, 1996). Communities with sewage treatment are listed in Table II-10 (located at the end of this section).

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		
	<i>Total</i>	<i>High</i>	<i>Moderate</i>	<i>Slight</i>	<i>High</i>	<i>Moderate</i>	<i>Slight</i>
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 summary report includes most of the tables from the full length Mackinaw River Watershed Management Plan. The 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	<u>Slight effects</u> : nutrients, siltation	<u>Slight contribution</u> : 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		
DKIA	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		

Mackinaw River Watershed Management Plan

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	<u>Moderate effects:</u> nutrients, siltation. <u>Slight effects:</u> organic enrichment/ Dissolved oxygen, Flow alteration	<u>Moderate contribution:</u> point source municipal pollution; <u>Slight contribution:</u> 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	<u>Slight effects:</u> nutrients. <u>Moderate effects:</u> siltation	<u>Moderate contribution:</u> agriculture
DKGA	Willow Cr.	3.77	R	02; 04(R); 05	<u>Slight effects:</u> nutrients. <u>Moderate effects:</u> siltation.	<u>Moderate contribution;</u> agriculture
DKGB	Deer Cr.	13.69	R	02; 04(R); 05	<u>Slight effects:</u> nutrients. <u>Moderate effects:</u> siltation	<u>Moderate contribution;</u> 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	02; 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
<i>Alasmodonta viridis</i>	Slippershell (mussel)	E (IL)	Stream, sandy bottom, clean water		x	x
<i>Lasmigona compressa</i>	Creek heelsplitter (mussel)	T (IL)	Creeks, clean water, fine gravel or mud bottoms, riffles		x	x
<i>Lampsilis higginsii</i>	Higgin's eye pearly mussel	E (IL, US)	River, mud-gravel substrate	x		
<i>Unio tetrasmus</i>	Pondhorn (mussel)	T (IL)	Creeks, clean shallow water, mud bottom		x	x
<i>Villosa iris</i>	Rainbow (mussel)	E (IL)	Shallow creeks, below riffles, sandy or sand/mud bottoms)			x

Amphibian

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

Reptiles

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

Fish

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

Birds

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

Birds (continued)

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

Mammals

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

Plants

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

Plants (continued)

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

Plants (continued)

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

Plants (continued)

Species	Common Name	Status	Habitat	Counties		
				Tazewell	Woodford	McLean
<i>Veratrum woodii</i>	False hellebore	T (IL)	Mesic upland and ravine forests			x
<i>Veronica americana</i>	American brooklime	E (IL)	Wet ground around seeps, springs, streams marshes and fens	x		
<i>Veronica scutellata</i>	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			
<i>Sibley</i>	No sewers		
McLEAN COUNTY			
<i>Anchor</i>	No sewers		
<i>Carlock</i>	No sewers		
<i>Colfax</i>	Secondary treatment	1990	Mackinaw River
<i>Cooksville</i>	No sewers		
<i>Gridley</i>	Secondary	1976	Buck Creek
<i>Hudson</i>	No sewers		
McLean County Parks & Recreation (Comlara Park)	Tertiary	mid-1970's	Evergreen Lake
East Bay Camp	Tertiary	mid-1970's	Lake Bloomington
<i>Lexington</i>	Some sewers, No treatment		Turkey Creek
<i>Towanda</i>	No sewers		
Grade School	Secondary	1991	Tributary of Money Creek
Unocal Corporation - Zorn Transport	No data	1993	No data
MASON COUNTY			
<i>Manito</i>	Secondary	1975	Hickory Grove Ditch
TAZEWELL COUNTY			
<i>Deer Creek</i>	Secondary	1990	Mud Creek
<i>Green Valley</i>	Secondary	1980	Mackinaw River
<i>Hopedale</i>	Secondary	1971	Indian Creek
Indian Creek Industrial Park	Secondary	1977	Indian Creek
<i>Mackinaw</i>	Secondary	1985	Mackinaw River
<i>Morton</i>	Advanced secondary	1972	Prairie Creek
Libby Pumpkin Cannery/Nestle	Secondary	1972	Land application
<i>South Pekin</i>	Wildcat sewer, No treatment		Ditch draining to Mackinaw River.
<i>Tremont</i>	Secondary	1986	Dillon Creek
Grandview Homeowners	Secondary	1971	Prairie Creek
Tazewell County Health Facility	Secondary	NA	Dillon Creek
Community	Type of Facility	Most Recent	Discharge to Stream

		Construction	
WOODFORD COUNTY			
<i>Benson</i>	Wildcat sewer, No treatment		Panther Creek
<i>Congerville</i>	Secondary	1964	Mackinaw River
Congerville area	Wildcat sewer, No treatment		Rock Creek
<i>El Paso</i>	Secondary	1968	panther Creek
Woodford County Swine Breeders	Treatment, unknown type		Panther Creek
<i>Eureka</i>	Advanced secondary	1973	Walnut Creek
IDOT Rest Area #1	Secondary	1972	Mackinaw River
IDOT Rest Area #2	Secondary	1972	Mackinaw River
<i>Goodfield</i>	Secondary	1980	Mackinaw River
Timberline Mobile Homes	Secondary	1975	No data
<i>Metamora</i>	Secondary	1979	Walnut Creek
<i>Roanoke</i>	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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Section III Existing Water Protection Programs – Agencies and Laws

Introduction

Existing programs which influence the quality of water in the Mackinaw River and its' tributaries are spread among all levels of government, federal and state laws, county ordinances, as well as voluntary programs. Many human activities which ultimately effect Illinois' water resources are regulated by enforcement programs, such as control of point source pollution from industry and sewage treatment plants, homeowner sewage treatment systems and animal waste disposal structures. Other activities, particularly agricultural practices, are more likely to be affected by incentive programs and technical assistance offered through a combination of federal, state and local government.

Table III -1
Entities with Programs that Affect Water Quality in the
Mackinaw River Watershed

Entity	Program
<i>Federal</i>	US Department of Agriculture
	USDA Natural Resource Conservation Service
	US Army Corps of Engineers
	US Department of Interior
<i>State</i>	Illinois Environmental Protection Agency
	Illinois Pollution Control Board
	Illinois Department of Agriculture
	Illinois Department of Public Health
	Illinois Department of Natural Resources
	Illinois State Water Survey
	Illinois Natural History Survey
	Illinois State Geological Survey
	Illinois Stream Information Service
<i>Local</i>	Soil and Water Conservation District
	County Government
	County Health Departments
	Municipalities
	Tri-County Regional Planning Commission
	Drainage Districts

Table III - 2
 Important Programs and Laws that Affect Water Quality

Entity	Program
<i>Federal</i>	Clean Water Act
	1985 Food Security Act
	1995 Market Transition Act
	National Environmental Policy Act
<i>State</i>	Illinois Environmental Protection Agency
	Illinois Livestock Waste Regulations
	Build Illinois Conservation Practices Program
	Watershed Land Treatment Program
	Conservation 2000 Program
	Interagency Wetland Policy Act
	Illinois Public Health Act
	Illinois Private Sewage Disposal Code
<i>Local</i>	Model Soil Erosion Control Ordinance
	County Zoning Ordinances
	Municipal Ordinances
	County Private Sewage Disposal Ordinances

Both voluntary and regulatory programs exist at the federal, state and local levels. Even more confusing, entities at the federal, state and local levels provide administrative services for most of these programs. Entities from one level may administer programs at multiple levels. In the Mackinaw River watershed, entities with programs include federal, state and local agencies shown in Table III-1. Some important laws that affect water quality are listed in Table III-2.

Illinois Environmental Protection Agency (Illinois EPA)

As part of its responsibilities, **Illinois EPA** implements the several federal and state laws that protect water quality, the federal **Clean Water Act (CWA)** and the **Illinois Environmental Protection Act**, regarding water pollution, agricultural related water pollution, field application of livestock waste; public waste supplies. Illinois EPA shares responsibility with the Illinois Pollution Control Board, described below.

Federal and state laws provide state agencies with authority for regulation of activities which influence water quality and also mandate enforcement agencies to obtain information about water quality, for setting standards and determining water quality trends. The federal water pollution control law, the **Clean Water Act** (33 U. S. C. § 1251 *et seq.*), prohibits "the discharge of any pollutant by any person" except in compliance with the law (Section 301) (Sullivan, 1995) . Although the law applies to the entire nation, responsibility for establishing permit limits, inspection and enforcement is normally transferred to the pertinent state, in this case, the Illinois Environmental Protection Agency. Both point source and nonpoint source pollutants are regulated by the Clean Water Act.

As the law is applied, a "permit to discharge pollutants," called National Pollutant Discharge Elimination System (NPDES) permit, is required for the operation of municipal wastewater treatment plants and industries. Nonpoint source pollution is addressed in the Clean Water Act by mandating each state designated water pollution control agency to develop programs to reduce nonpoint source pollution from sources such as agricultural and urban stormwater runoff, including soil erosion from construction activities. Animal wastes generated by feedlot operations are regulated by **Illinois Livestock Waste Regulations** (Illinois Administrative Code, Title 35, Parts 501-505) (Illinois Gateway). A NPDES Permit from Illinois EPA is required for some facilities. Regulations have been approved by the **Illinois Pollution Control Board** (Title 35, Part 505, see Illinois Pollution Control Board, below) (Illinois Gateway).

In addition to the state and federal laws to control nonpoint source pollution, counties and municipalities have developed **county and municipal ordinances** which may require more stringent control measures for control of soil erosion through building permits. For example, Tazewell and Woodford counties have adopted the **Model Soil Erosion Control Ordinance** developed by the **Tri-County Regional Planning Commission** (Tazewell County). All counties in the watershed conduct zoning activities through an office of their county government.

Illinois Pollution Control Board

The **Illinois Pollution Control Board** is a quasi-legislative and quasi-judicial body created by the Illinois Environmental Protection Act ([PCB], 1997). As an agency for the State of Illinois, it adopts standards and regulations for activities that result in pollution of the environment, in order to meet federal environmental protection laws. Among its activities as an environmental court of law, it hears contested cases involving decisions of the Illinois EPA, as well as local government citing decisions about pollution control facilities (Illinois Administrative Code, Title 35, Parts 200-1400). Livestock waste regulations were approved by the Illinois Pollution Control Board (Illinois Administrative Code, Title 35, Parts 501-505).

Illinois Department of Agriculture (Illinois DOA)

The **Illinois Department of Agriculture (Illinois DOA)** promulgates programs established by the U.S. agriculture laws, as well as those established by the Illinois General Assembly. Agricultural crop production may result in increased soil erosion and pesticide or fertilizer runoff. Programs administered through Illinois Department of Agriculture **Conservation Practices Program** and **Watershed Land Treatment Program** encourage voluntary Best Management Practices and the implementation of conservation tillage to reduce soil erosion on highly erodible acres. The goals of **Illinois T-2000** are to encourage farm practices to reduce soil erosion to the rate of soil formation 'T' by the year 2000, in order to conserve productive capacity of soils and improve water quality.

The Landowners Guide to Natural Resources Management Incentives ([NRCC], 1997) provides extensive information about specific programs and incentives available to landowners. Illinois DOA works with local **Soil and Water Conservation Districts** to administer many of these programs, including portions of the **Conservation 2000 Program** and the **Build Illinois Conservation Practices Program**.

Soil and Water Conservation Districts (SWCD)

Soil and Water Conservation Districts (SWCD) have been established by local vote of property owners. They are the purveyors of natural resource information at the local level, and as such act as a unit of local government. District Directors are elected by local landowners. As identified in the Illinois Soil and Water Conservation District Act, the districts have the mission to be responsible for the protection and conservation of soil and water and related resources. Soil and Water Conservation District personnel maintain land use records, including locations utilizing specific conservation practices ([SWCD]).

Natural Resources Conservation Service (NRCS)

Personnel of the **USDA Natural Resources Conservation Service (NRCS)** provide **technical assistance** through the Soil and Water Conservation Districts. The NRCS, formerly Soil Conservation Service, was established by the U. S. Department of Agriculture as a means to implement conservation practices mandated under the federal agriculture legislation and to assist local agricultural producers.

Federal agriculture laws, e.g., **1985 Food Security Act, 1995 Market Transition Act**, provide conservation programs which reduce soil erosion, primarily the **Conservation Reserve Program** and the **Wetland Reserve Program**, administered through the U. S. Department of Agriculture NRCS. These programs are implemented at the federal level, but participants sign up at the local level. Agricultural activities also have the potential to destroy critical wetland habitat. The **1985 Food Security Act, Swampbuster Provision** denies participation in USDA Farm Program benefits to any landowner and/or operator who destroys wetlands for agricultural production.

Other Agencies

Illinois EPA shares responsibilities for monitoring of water supplies and quality with the **Illinois State Water Survey**, the **Illinois State Geological Survey**, the **Illinois Stream Information Service** maintained by the **Illinois Natural History Survey**, and the **Illinois Department of Natural Resources**. Protection of wetlands is required by the Clean Water Act Section 404 and the 1985 Food Security Act / Swampbuster Provision, and in Illinois, is controlled through an **Interagency Wetland Policy Act**, an agreement between Illinois EPA, Illinois Department of Natural Resources and Illinois Department of Agriculture ([Illinois EPA]). A **National Wetlands Inventory** map, prepared by Illinois Department of Natural Resources (at the time Department of Conservation) in conjunction with the U.S. Department of the Interior, provides information needed by Natural Resources Conservation Service and Illinois EPA.

US Army Corps of Engineers (USACE)

Wetlands and floodplains are important for controlling stream flow and maintaining high water quality. The **U.S. Army Corps of Engineers (USACE)** regulates activities in floodplains, such as construction, dredging and filling, by issuing permits in compliance with the **Clean Water Act Section 404**. In addition, the **National Environmental Policy Act** requires the Corps to minimize or prevent environmental impact in national waterways. All counties in the Mackinaw watershed regulate construction, as well as dredge and fill activities, in floodplains, through local zoning ordinances or through a soil erosion ordinance.

Local **Drainage Districts**, which encompass the watershed of small or large streams, were organized in the early part of the 20th century, for the purpose of building and maintaining drainage ditches to foster agricultural development. An Inventory of Illinois Drainage and Levee Districts (State of Illinois, 1971) listed active and inactive drainage districts at the time of publication, acreage,

Township-Range location, and included detailed maps. Some are still in existence. Much of Illinois' agricultural landscape is drained, contributing to loss of original wetland habitat. Channelized streams were straightened and deepened, in an effort to speed removal of water from fields. However, water that rapidly flows off upland areas often causes flooding downstream. As a result, stream channelization is often thought to conflict with protection of water quality.

Illinois Department of Public Health

Certain environmental protection activities are regulated because they have importance to public health. The **Illinois Department of Public Health**, with its **County Departments of Health**, is responsible for setting standards and enforcing regulations for sources and treatment of drinking water, protecting recreational waters and regulating private sewage disposal (**77 Illinois Administrative Code, Chapter 1, subchapter, Part 905**). Requiring homeowners to meet the **Private Sewage Disposal Code** ([PSDC]) protects the aquatic environment and improves water quality, in addition to preventing spread of human disease. **Local Public Health Departments** are responsible for enforcement. **County ordinances** have been adopted for private sewage disposal by all counties in the Mackinaw River Watershed.

Table III-3 (located at the end of this section) summarizes the programs and agencies which operate to reduce the negative impact of human activities on water quality. Agricultural programs are summarized from the Landowners Guide to Natural Resources Management Incentives, written by the Illinois Natural Resources Coordinating Council ([NRCC], 1997). Programs developed to control nonpoint source pollution under mandates of the Clean Water Act Section 319 are summarized from "Illinois' Nonpoint Source Management Program," Illinois EPA, Bureau of Water, IEPA/WPC/94-243 ([IEPA], 1994).

Table III - 3
Existing Programs that Protect Water Quality from Pollutants

Activity	Pollutants	Protection Activities, Agencies and Programs
Agriculture--crop production	Soil erosion, pesticide and fertilizer runoff	Voluntary incentive programs to encourage best management practices. IEPA –Clean Water Act, Section 319 IDOA –Conservation Practices Program, Watershed Land Treatment Program, Illinois T-2000. Best management practices, conservation tillage SWCD, NRCS -- local enrollment
Agriculture--animal production	Animal wastes: Nutrients, bacteria, un-decomposed organic matter, land application and manure lagoons	Regulations: IEPA –Clean Water Act Illinois Pollution Control Board Illinois Livestock Waste Regulations. NPDES permit required for some facilities Best Management Practices
Habitat destruction: wetland destruction, stream channelization	Loss of critical habitat, habitat and stream channel destruction downstream from channelization	USDA –1985 Food Security Act/Swampbuster Provision. IEPA –Clean Water Act Section 404, IEPA, IDNR, IDOA -- Illinois Interagency Wetland Policy Act US Army Corps of Engineers Definitions: US Fish and Wildlife Service
Dredge and Fill disposal, potential damage to flood plain and areas near waterways	Soil-borne pollutants (nutrients, toxic chemicals), destruction of wetlands	IEPA –Clean Water Act prohibits dumping, unless under Sec. 404 permit, in compliance with National Environmental Policy Act. US Army Corps of Engineers issues permits and designates dumping areas
Construction, especially of housing developments and highways.	Soil erosion	IEPA –Clean Water Act, Section 319 programs. County Zoning Offices --Enforce county and municipal soil erosion control ordinances, through building permits

Table III-3
Existing Programs that Protect Water Quality from Pollutants
 (continued)

Activity	Pollutants	Protection Activities, Agencies and Programs
Stormwater	Spills from industry and commercial sites	IEPA –Clean Water Act (1987 amendments) Stormwater permits, Best Management Practices, Spill notification requirements
Municipal sewage	Nutrients, few toxic substances	IEPA –NPDES Permit limitations
Private sewage disposal (Septic systems, drain fields, aerators)	Nutrients, bacteria, un-decomposed organic matter, household chemicals	County Departments of Public Health --Enforce County ordinances, which must equal or exceed state IDPH regulations. Enforced through minimal lot size for building and septic installation inspections.
Trailer parks, sewage disposal	Nutrients, bacteria, un-decomposed organic matter, household chemicals	IEPA –Clean Water Act, NPDES permits
Recreational parks, sewage disposal	Nutrients, bacteria, un-decomposed organic matter, household chemicals	IEPA –Clean Water Act, NPDES permits.
Industry, discharge to waterbody	Nutrients, toxic substances	IEPA –Clean Water Act, NPDES Permit limitations
Industry, discharge to public sanitary sewer system	Nutrients, toxic substances	IEPA –Clean Water Act, Pretreatment program
Power plants	Thermal discharge (usually hot water effluent)	IEPA –Clean Water Act, Section 316

Source: Illinois' Nonpoint Source Management Program. 1994. Illinois Environmental Protection Agency. IEPA/WPC/94-243. Illinois EPA, Bureau of Water, P.O. Box 19276, Springfield, IL 62793-9276.

References

[CWA] Clean Water Act. 33 U. S. C. § 1251 *et seq.* Section 101(a)(1) and (2), 33 U.S. C. Par. 1251(a)(1) and (2).

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[Illinois EPA] Illinois Environmental Protection Agency. 1994. Illinois' Nonpoint Source Management Program. IEPA/WPC/94-243. IEPA, Bureau of Water, 2200 Churchill Road, Springfield, IL 62794-9276.

[NRCC] Landowners guide to Natural Resources Management Incentives. 1997. Illinois Natural Resources Coordinating Council. Illinois Department of Natural Resources, 325 West Adams Street, Springfield, IL 62704-1892.

[PCB] Citizens Information Guide. 1997. Illinois Pollution Control Board, James R. Thompson Center, Suite 11-500, 100 W. Randolph St., Chicago, IL 60601. http://www.state.il.us/pcb/citizens/citizn_a.htm

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Sullivan, Thomas F. P., ed. 1995. Environmental Law Handbook. Government Institutes, Inc. Rockville, MD.

[SWCD] Illinois Soil and Water Conservation Districts Act. Ill. Compiled Statutes, Ch. 70, Par. 405/1 *et seq.* Illinois Department of Agriculture Bureau of Soil and Water Conservation, P. O. Box 19281, State Fairgrounds, Springfield, IL 62794-9281.

Tazewell County, Illinois, Erosion, Sediment and Stormwater Control Ordinance. Section 7-7-1 *et seq.* Approved March 27, 1996.

Section IV

Mackinaw River Watershed Action Plan

Introduction

The Mackinaw River Project Planning Team worked with experts and Action Teams for a year to pursue their initial purpose - to form the Mackinaw River Watershed Management Plan, with agreed upon strategies, leading to achievable goals, to be met by specific recommendations. They agreed to work first toward correction of the problems that the Planning Team believed were most important to improve water quality, based on information presented in the previous sections.

Mission of the Project

The Project Planning Team Purpose and Function Statement reads:

"We intend to preserve and enhance the natural resources of the Mackinaw River watershed through education, good management practices and voluntary cooperation while respecting property owner rights. We believe that:

- ◆ People can make the world a better place.
- ◆ Cooperation and compromise are essential to achieve common goals.
- ◆ Integrity is essential to all good relationships.
- ◆ Knowledge is power.
- ◆ When we treat others with consideration we promote good will.
- ◆ Private property rights are essential for freedom.
- ◆ Conserving our resources now is essential for future generations.
- ◆ Each person is accountable for his/her actions.

- ◆ Agriculture is essential to the economic activity of this country.
- ◆ The benefits of change must be understood to be accepted.
- ◆ Landowners are responsible for their land.
- ◆ The decisions used to guide an area are better and more informed when they come through consensus of the people who live in that area.
- ◆ And we believe that voluntary action is essential to the success of the Mackinaw River Project."

Fundamental values formed the framework for their mission. This description of the mission is quoted from Robert Reber's "The Mackinaw" (*The Illinois Steward*, offprint, December 1996, 8 p.).

- ◆ What is good for the river is good for its people. Humans are dependent on healthy, functioning ecosystems. Land health and human health are inextricably linked.
- ◆ To find the common good, a holistic approach is needed that considers all aspects of the watershed--the land, its people, and their lives. People themselves have to help form the plan, carry it out, and benefit from it.
- ◆ The views and values of the citizens must be considered and incorporated into the plan.
- ◆ If the citizenry is aware of issues of broad importance and given sound information to act on, they will voluntarily do what is best for the common good: the long-term benefit of society.
- ◆ Given the opportunity, nature heals itself when original problems are corrected. Preservation and restoration efforts should allow nature to take the lead; humans can assist but should not attempt to overpower nature.

(Reber, 1996, page 6)

Objectives

The Planning Team agreed to adopt recommendations that would meet these objectives:

- ◆ A percentage reduction in water volume, velocity and frequency of extreme flood events over a given period of time under normal or average weather conditions
- ◆ Observable, measurable reduction in bank erosion and an increase in amount (length and width) of streambank protection/vegetation
- ◆ An increase in the average Index of Biological Integrity including other aquatic species
- ◆ Reduced sediment loads
- ◆ Perceived reduction in soil erosion
- ◆ Reduction of untreated sewage.

Parameters

The recommendations must operate within these agreed upon parameters:

- ◆ No aspect of this project will undermine the property rights of landowners.
- ◆ We will address both symptomatic and systemic issues.
- ◆ We will evaluate long-term as well as short-term consequences and costs of each recommendation.

Strategies

The Planning Team agreed to six strategies to reach these objectives:

1. Coordinate with agencies in order to eliminate our duplicating their efforts.
2. Promote agricultural practices to limit flooding, run-off, pollution, top soil loss and streambank erosion.

3. Improve the diversity of natural plant, aquatic and animal communities within the watershed.
4. Enhance participation of local communities/developers/civic/business leaders in programs to control runoff, bank erosion, pollution and soil loss.
5. Educate rural and urban landowners, civic and business leaders and children about the project.
6. Clarify laws and issues regarding private property rights.

Recommendations of the Planning Team

On February 22-23, 1997, the Mackinaw River Project Planning Team adopted fifteen major recommendations from six Action Teams and established goals to be achieved within 5, 10 and 15 years. The Planning Team will reconvene and evaluate the goals and recommendations, make adjustments and move forward again.

Goals were selected because the Planning Team believed they concur with the goals established at the initiation of the Mackinaw River Project and the assessment of watershed needs (Section II, Resource Inventory). The following sections present specific recommendations, goals to be met within a specified time, and costs and benefits of each recommendation. Gaps not addressed by the Action Teams were identified and committees formed to research potential solutions. Solutions to identified gaps will be considered at the annual reevaluation meeting.

Recommendations are categorized by the strategies they follow in order to meet the objectives of the Planning Team. Several recommendations meet both agricultural and biological diversity objectives. Wetland restoration, streambank stabilization and woodland establishment reduce negative impacts of agricultural practices on water quality as well as improve habitat for enhanced biological diversity. As a result these recommendations are presented separately from recommendations that are uniquely agricultural strategies.

Agriculture

Strategy

Promote agricultural practices to limit flooding, runoff, pollution, top soil loss and streambank erosion.

Recommendations

Recommendation #1:

Encourage the acceptance of agricultural practices outlined in the booklet "Conservation Choices" published by the USDA Soil Conservation Services, in order to meet the following goals:

Best Management Practice	Goal after 5 years	Goal after 10 years	Goal after 15 years
<i>Crop Residue Management</i>			
1-year no-till	42,000 acres	52,000 acres	62,000 acres
2-year no-till	7,500 acres	9,500 acres	11,500 acres
<i>Critical Areas Planting/ CRP</i> (% eligible acres)	25%	40%	60%
<i>Water & Sediment Control Basins</i> (# of structures)	4,200	5,200	6,200
<i>Grassed Waterways</i> (acres)	300 acres	400 acres	500 acres
<i>Filter Strips</i> (Total miles = 11,500*)	300 miles	400 miles	500 miles
<i>Farm Ponds to Retain Stormwater</i> (number)	300	400	500
<i>Terraces</i> (acres treated)	42,000 acres	52,000 acres	62,000 acres
<i>Grade Control Structures</i> (number)	240	300	360
<i>Management Intensive Grazing</i> (acres treated)	9,600 acres	11,600 acres	13,600 acres
<i>Contour Farming</i> (acres treated)	360 acres	450 acres	540 acres
<i>Nutrient Management</i> (% cropland)	50%	70%	90%
<i>Pesticide Management</i> (% cropland)	50%	70%	90%

Benefits

Meeting these stated goals will bring into recommended conservation practices 60 percent of the estimated treatment needs of the Mackinaw River watershed, as determined by USDA NRCS “Mackinaw River Basin Inventory and Evaluation of Erosion and Sedimentation and an Assessment of the Conservation Treatment Needs,” prepared for The Mackinaw River Project and The Nature Conservancy, January 1997.

Cost

Practice	Cost /acre	Cost after 5 years	Cost after 10 years	Cost after 15 years
Crop Residue Management				
1-year no-till	\$10/Acre	\$420,000	\$500,000	\$620,000
2-year no-till	\$10/Acre	\$ 75,000	\$ 95,000	\$115,000
Total		\$495,000	\$595,000	\$735,000
Critical Area Planting	\$100/acre	\$170,000	\$275,000	\$410,000
100% = 6788 A.				
Water & Sediment Control Basin	\$1500/ installation, ave.	\$6.3 million	\$7.8 million	\$9.3 million
Grassed Waterways	\$1000/acre	\$300,000	\$400,000	\$500,000
100% = 1990 A.				
Filter Strips 100%=102 mi 66 ft. wide	\$960/ mile; or \$120/acre	\$78,000	\$104,000	\$3 million
Farm Ponds	Variable	Cost not available at time of printing		
Terrace	Variable	Cost not available at time of printing		
Grade Control Structure	\$4000	\$960,000	\$1.2 million	\$1.5 million
Management Intensive Grazing	Variable \$0 -\$17,000/acre Fencing \$2-\$20/foot Seeding \$20-\$80 / acre Fertilization \$20-\$100 / acre Livestock drinking water source \$0 - \$5000 / site Total cost not available at time of printing			
Contour Farming	No additional cost			
Nutrient Management	Variable: \$0.50 to \$10 per acre	Cost not available at time of printing		
Total estimated costs available at time of printing		\$8,393,000	\$10,374,000	\$15,445,000

Agriculture

Recommendations

Recommendation #2:

Secure additional staff members as needed to carry out the recommendations of these action plans.

Benefits

Most agricultural conservation practices require agency personnel to distribute information about government programs available for enrollment, hold public informational meetings, spend time with individual landowners completing the necessary applications in order to qualify. Significantly greater efforts than can be met with current staff are anticipated to meet the identified goals.

Cost

Cost of additional staff

Additional 20% of project costs

Agriculture and Biological Diversity

Strategy (Agriculture)

Promote agricultural practices to limit flooding, runoff, pollution, top soil loss and streambank erosion.

Strategy (Biological Diversity)

To improve the diversity of natural plant, aquatic and animal communities within the watershed.

Joint Recommendations

Practice	Goal after 5 years	Goal after 10 years	Goal after 15 years
Streambank Stabilization	60 miles	75 miles	90 miles
Wetland Establishment or Enhancement	7,500 acres	15,000 acres	22,500 acres
Woodland Management	10,000 acres	12,500 acres	15,000 acres
Forest and Prairie Planting			15,000 acres

Recommendation #1:

Stabilize streambanks; encourage use of natural materials and native vegetation; establish grass buffers along drainage ditches and other waterways where needed with an emphasis on tributary locations which are most effective.

- A.** Identify stream mileage within the Mackinaw River basin that has potential for streambank stabilization, riparian corridor or filter strip development.
- B.** Provide information to landowners and incentives for participation.

- C. Work toward implementation of legislation to allow an annual state income tax credit for row crop land converted to permanent vegetative cover, through a private land wildlife habitat plan.
- D. Promote streambank stabilization, riparian corridors and grass filter strips to landowners within the Mackinaw River watershed.

Benefits

Protection of stream corridors will provide acres for wildlife habitat, reduce streambank erosion, reduce soil erosion, improve water quality and aquatic habitats, and reduce sediment loads downstream in the Illinois and Mississippi River systems.

Cost

Streambank Stabilization (<i>\$20/ linear foot times miles</i>)	
After 5 years	\$6.4 million
After 10 years	\$7.9 million
After 15 years	\$10 million
Signs and posts for landowner recognition	\$34.00/landowner
Income tax credit for riparian farmland converted to permanent cover	\$140.00/acre
Total tax credit (<i>250 landowners, 15 acres/landowner</i>)	\$525,000.00

Agriculture and Biological Diversity

Joint Recommendations

Recommendation #2:

Identify and promote restoration of suitable wetland habitat and promote side stream storage such as slough and backwater lakes.

- A. Develop an incentive program for wetland development, including recommending legislation to allow an annual state income tax credit for rowcrop land converted to permanent vegetative cover in a private land wildlife habitat plan than includes wetlands.
- B. Determine status of existing wetlands, sloughs and backwater lakes and identify those which can be developed and those that pre-exist.
- C. Promote restoration and development of existing and potential wetlands, sloughs and backwater lake habitats.

Benefits

Improved Water Quality

Wetlands can provide natural pollution control to improve water quality, by filtering nutrients, chemicals, bacteria and sediment from surface waters.

Wetlands are also effective sinks for pesticides, herbicides, and metals and can be used to treat animal wastes, urban sewage, and stormwater runoff. Wetlands slow runoff and store water, reduce soil erosion, reduce flood peaks and reduce bank erosion. Stored water replenishes groundwater supplies. Reducing flooding results in lessened bank erosion and sedimentation and improved water quality.

Enhanced Biological Diversity

Wetlands increase biological diversity by providing nesting, feeding and breeding habitat for waterfowl, amphibians, and many other types of wildlife. More than 5,000 plant species, 190 species of amphibians, and one-third of all U.S. native bird species are supported by wetlands.

Cost

Income tax credit, lost state revenue	\$140/acre
Revenue after 5 years (7500 acres)	\$1.05 million
Revenue after 10 years (15,000 acres)	\$2.1 million
Revenue after 15 years (22,000 acres)	\$3.15 million
Signs and posts for wetland areas	\$34/landowner
Wetland Establishment, per acre	Estimated \$500
Cost after 5 years	\$3.75 million
Cost after 10 years	\$7.5 million
Cost after 15 years	\$11.25 million

Agriculture and Biological Diversity

Joint Recommendations

Recommendation #3:

Increase percent of watershed in forest, focusing on historically wooded areas, riparian zones or highly erodible lands, to meet the acreage goals delineated in this Plan. Manage existing woodlands for timber production, soil protection and natural habitat; plant additional acres with trees to expand forested area.

Benefits

Woodland management goals, including tree planting will reduce sedimentation by replacing forest vegetation on highly erodible forest soils, especially those in the lower Mackinaw River valley. Woodland management that reduces the effect of Sugar Maples and enhances healthy understory vegetation will help hold soil in place and reduce sedimentation. Greater natural vegetation will slow runoff and assist in the reduction of flood peaks and intensity.

Cost

Costs are included under Recommendation #1, Biological Diversity.

Agriculture and Biological Diversity

Joint Recommendations

Recommendation #4:

Encourage planting grasslands to native prairie species, especially on highly erodable acres, filter strips and buffer areas.

Benefits

Grass cover on filter strips, agricultural buffers and CRP acres reduces soil erosion, enhances soil quality and provides wildlife cover. Native grassland would provide habitat for native species, enhancing biodiversity, while simultaneously meeting the needs of soil protection.

Cost

Costs are included in Recommendation #1, Biological Diversity.

Summary of Costs for Joint Recommendations of Agriculture and Biological Diversity Action Teams

Practice	Cost / unit	Cost after 5 years	Cost after 10 years	Cost after 15 years
Streambank Stabilization	\$20/linear ft.	\$6.4 million	\$7.9 million	\$10 million
Wetland Establishment	\$500/acre	\$3.75 million	\$7.5 million	\$11.25 million
Woodland Management	Variable	Cost not available at time of printing		
Prairie and Forest Planting	\$500/acre	\$7.5 million		
Total estimated cost available at time of printing		\$10.35 million	\$15.4 million	\$28.75 million

**Impacts of Planned Conservation Practices on
Nonpoint Source Pollution - Mackinaw River Basin
(March 1997)**

Source: USDA Natural Resources Conservation Service

Conservation Practice	Resource Concerns			
	Sediment	Nutrient Management	Agricultural Waste	Pesticide Use
Crop Residue Management: 1-yr no-till	SIG	MOD	SL	MOD
Crop Residue Management: 2-yr no-till	SIG	MOD	SL	MOD
Critical Area Planting or CRP	SIG	SIG	SIG	MOD
Water and Sediment Control Basins	SIG	SL	SL	SIG
Grass Waterway	SIG	MOD	SL	MOD
Filter Strip	SIG	MOD	SL	MOD
Streambank Stabilization	SIG	SL	SL	SL
Pond	N	N	N	SL
Terrace	SIG	SIG	SL	SIG
Grade Control Structure	SIG	N	SL	N
Management Intensive Grazing	SL	MOD	SIG	SL
Contour Farming	MOD	MOD	SL	SIG
Nutrient Management	N	SIG	SIG	SL
Pesticide Management	SL	N	N	SIG
Wetland Establishment or Enhancement	SIG	SIG	SIG	SIG
Tree Planting	SIG	MOD	SL	MOD
Woodland Management	SIG	SL	SL	SL

Legend: SIG = Significant positive impact;
MOD = Moderate positive
impact:
SL = Sight positive impact;
N = Negligible impact.

Biological Diversity

Strategy

To improve the diversity of natural plant, aquatic and animal communities within the watershed.

Recommendations

Recommendation #1:

Identify and enhance or restore natural plant areas compatible with soil type and historical use. Establish, restore or widen riparian zones where desirable.

- A.** Within two years, identify at least one location of each natural community type known to occur in the watershed where the natural community can be enhanced or restored. For natural communities that were previously known in the watershed but no existing examples are known, identify suitable locations where the natural community can be recreated.
- B.** Establish a green corridor linking protected natural lands. High priority should be given to connecting protected natural lands.
- C.** Restore and/or protect large forests (>100 acres) where feasible.
- D.** Support private restoration efforts on ParkLands Foundation lands.
- E.** Protect and restore high-quality natural areas recognized by the Illinois Natural Areas Inventory where feasible. The committee will secure the locations of these areas and identify the practices needed and funds required.
- F.** Enhance landowner awareness of wildlife and habitat improvement programs including Acres for Wildlife, streambank stabilization programs, wetland reserve program, and the C2000 Ecosystem partnership. This goal should be substantially completed within 5 years, largely through efforts of the Education Action Team.

Benefits

Improved natural diversity of plant and animal species will enhance the quality of life for residents and visitors to the Mackinaw River watershed. Conversion of sensitive land to natural cover will reduce erosion and sedimentation by increasing infiltration and reducing runoff. Protective natural land cover will reduce streambank and scour erosion. Natural vegetative cover will improve water quality and improve habitat conditions for both aquatic and upland native species. Increased quantity and quality of wildlife habitat in the river watershed and central Illinois region will result from restoration and improved management of wetland, woodland and natural prairie areas. Economic returns (retail sales) will increase from hunting, fishing and other recreational uses because of improved wildlife habitat and overall ecological conditions. Farmers in other counties have benefited from leasing hunting rights to outside groups or individuals. Economic returns to farmers may increase through higher grain prices if 29,000 acres of sensitive land are converted from cropland to other uses.

Cost

Technical assistance to identify natural community types	\$10,000
Land acquisition or easement costs	Undetermined
Voluntary or no cost participation is anticipated on most sites. Easement attainment on special needs basis.	
Restoration of natural plant and animal communities	\$300 - \$500 / acre
Total restoration costs	\$8.7 million - \$14.5 million
Establish or restore one large scale landscape (600-1000 acres)	\$2 million
Total acquisition and restoration costs	\$8,720,000 - \$14,520,000

Biological Diversity

Recommendations

Recommendation #2:

Seek public and private funding for stream restoration and biological restoration.

Benefits

Obtaining funding is essential to achieve identified goals of improving biodiversity through restoration of habitat. Many benefits of an improved watershed environment accrue to the general public, beyond the residents of the watershed.

Cost

No cost available at time of printing.

Biological Diversity

Recommendations

Recommendation #3:

Recognize landowners, local governmental units, agencies, etc. (plaque, marker, certificate of appreciation) using good land management practices (e.g. leaving wooded riparian zones along a corridor).

- A.** Within one year have in place a program to recognize landowners for good management practices, with a custom certificate for their home or office and/or signs on property.
- B.** Within one year, develop criteria for signs and certificates.
- C.** Within one year, identify landowners eligible for recognition, who have protected wooded riparian zones, planted trees or native grasses, created wetlands, stabilized streambanks, etc.
- D.** Simultaneously with recognition programs, work with local schools to have their students from this community present the award to the landowner.

Benefits

Give landowners the recognition they deserve. Visible signs make the public aware of the project, and may bring other landowners into the programs.

Cost

Signs and posts (300 landowners)	\$34.00/landowner
Total costs of recognition	\$10,200

Community Issues

Strategy

Enhance participation of local communities, developers, and civic and business leaders in programs to control runoff, bank erosion, pollution and soil loss.

Recommendations

Recommendation #1:

Control stormwater runoff and erosion.

- A.** Within fifteen years, contact communities to encourage communities to adopt Best Management Practices as identified in the publication, Illinois EPA's "Urban Best Management Practices."
- B.** Within fifteen years, conduct site investigations and engineering studies to identify and prioritize stormwater runoff and erosion control projects for communities interested in adopting urban best management practices.
- C.** Within fifteen years, construct urban stormwater runoff and erosion control demonstration projects/models.
- D.** Within fifteen years, find a good example and encourage adoption of a model ordinance for stormwater runoff in urban and developing areas.
- E.** Within fifteen years, secure a staff person to contact and assist communities to reduce stormwater runoff through implementation of a stormwater ordinance and/or implementation of urban best management practices.
- F.** Within fifteen years assist communities in efforts to initiate erosion control on 60 percent of urban acres.

Benefits

Approximately 30,400 acres of the watershed is in small and large urban areas. Urban development and the increased use of impervious materials in all communities add to the stormwater runoff and erosion problems in the river watershed, especially to the peak flow of water. Stormwater management in these areas has the potential to greatly reduce peak flows, greater than the less than 5 percent of the watershed that is urbanized. A demonstration of best management practices provides an effective educational tool to persuade similar communities to plan for stormwater runoff from future developments. Demonstration projects that are developed now will help people in the future make wiser decisions.

Cost

These preliminary estimates of costs will be further refined during the first year of implementation of the Plan.

Engineering and site investigations to identify and prioritize projects for interested communities	\$200,000
Construction of demonstration stormwater control projects/models for interested communities	\$600,000

Community Issues

Recommendations

Recommendation #2:

Improve wastewater disposal within the Mackinaw River Watershed.

- A. Within fifteen years work with Illinois EPA Bureau of Water to establish specific guidelines for design, construction, maintenance, and operation of constructed wetland wastewater treatment facilities.
- B. Within fifteen years provide for technical assistance for participating communities to study wastewater problems and alternative solutions.
- C. Within fifteen years work with participating communities to construct alternative wastewater disposal solutions including, but not limited to, wetlands and demonstration wastewater treatment sites.
- D. Within fifteen years work with schools, colleges, universities, trade associations, etc. to develop educational components on best management practice demonstration sites.

Benefits

Excessive nutrients and sediment contribute to reduced water quality on some portions of the Mackinaw River and its tributaries that are ranked by Illinois EPA as "Fair, Minor Impaired, and Moderate Impaired" in water quality. Illinois EPA identified municipal point source pollution as a contributing source of pollution. (See Part II, Watershed Inventory -- Water Quality) A demonstration wastewater control facility suitable for a small community will educate people and permit future decision-makers to make wiser choices.

Cost

Engineering and site investigation, technical assistance for participating communities to study wastewater problems and alternative solutions.	\$200,000
Construction of alternative solutions, including demonstration wetlands and wastewater treatment sites for participating communities.	\$400,000

Community Issues

Recommendations

Recommendation #3:

Reduction of roadway-easement area stormwater runoff.

- A. Within fifteen years study and coordinate with township, county, and state highway departments for implementation of policies and alternative solutions for runoff reduction.
- B. Within fifteen years engineer and construct best management practice demonstration sites.

Benefits

The impervious surfaces of roadways cause stormwater runoff to be accelerated onto nearby land. Many township and county roads, as well as state and interstate highways, cross the Mackinaw River and its tributaries, permitting stormwater runoff to flow directly into the river. In addition, roadside ditches often contribute to sediment loads carried by stormwater to the river. De-icing chemicals used on roadways contribute pollutants to the waterways. Chemical spills resulting from accidents have the potential to pollute nearby streams. Alternative stormwater runoff management systems may reduce highway impact on the river system. In addition, roadsides provide opportunities for planting natural vegetation that provide habitat corridors for native species and diversify the landscape.

Cost

Engineering and site evaluation	\$100,000
Construction of BMP demonstration sites	\$200,000

Education

Strategy

Educate rural and urban landowners, civic and business leaders and children about the Mackinaw River Project.

Recommendations

Recommendation #1:

Develop a network of educational activities through which information about the Mackinaw River watershed and the Mackinaw River Project can be disseminated.

- A. Within five years conduct a feasibility study to initiate the process of planning and designing a multi-purpose experiential Education /Conference Center that will be operated and funded as a private foundation. Coordinate this effort with organizations such as USDA/NRCS and the Illinois River Project.
- B. Within one year organize and facilitate the first annual Mackinaw River Festival that will celebrate the beauty and uniqueness of the river system. The festival will include music, unique arts and crafts, various displays (historical, environmental, agricultural, etc.).
- C. Within one year develop and coordinate the first annual Mackinaw River Conference to provide a functional understanding of the Mackinaw River watershed and the goals of the Mackinaw River Project.
- D. Within five years coordinate existing workshops and develop new workshops pertinent to the Mackinaw River Project and the care and management of river system conservation throughout the Mackinaw River watershed.

Benefits

All these recommendations facilitate educating interested citizens and landowners, agencies, environmental organizations, agricultural organizations, youth organizations and educational institutions about implementing the recommendations of the Mackinaw River Project. Public events disseminate information about agricultural BMP's and available programs. A Conference

Center provides a focal site to develop demonstration plots for agricultural BMP's and native plants, to demonstrate improved biological diversity and to increase participation of local municipalities. Classes, conferences and other educational efforts will educate rural and urban landowners and residents. After the first year, the Festival has the potential to make a profit, which could support other educational projects in the watershed.

Cost

Feasibility study to plan a Conference Center	\$2,000
First Mackinaw River Festival (<i>first year only</i>)	\$10,000
Mackinaw River Conference	\$5,513
Coordinate workshops	\$2,468
Lesson Plans	<u>\$4,895</u>
Total	\$24,876

Education

Recommendations

Recommendation #2:

Within five years organize and train six citizen habitat-monitoring / stewardship teams that will collect valuable biological, chemical and hydrological data at six locations throughout the Mackinaw River watershed over a period of two years.

Benefits

These teams will increase public awareness about nonpoint source pollution and its effect on the Mackinaw River system through public presentations, community displays of their monitoring/stewardship efforts and community awareness activities. These teams will also be involved in the implementation of best management practices and monitoring the effects these projects have on water quality in the Mackinaw River system.

Cost

Six citizen-monitoring teams	\$33,210
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Education

Recommendations

Recommendation #3:

Within five years develop environmental lesson plans specific to the Mackinaw River watershed.

- A. On an ongoing basis, expose young people to science as a profession and to the science operating within the Mackinaw River watershed.
- B. Within five years develop a Mackinaw River lab manual, an educational tool for grades K through 12 to be written and used by educators. This manual will contain experiential, investigative learning exercises specific to the Mackinaw River watershed for all age groups, to be published and distributed to interested educators.

Benefits

Educational activities in the schools should spread information about the Mackinaw River Project Watershed Management Plan and the watershed to families of school children, also.

Cost

Mackinaw River Lab Manual

Cost included in workshop

Agency Coordination

Strategy

Enhance participation of local communities, developers, and civic and business leaders in programs to control runoff, streambank erosion, pollution, and soil loss.

Recommendations

Recommendation #1:

Make “Landowners Guide to Natural Resource Management Incentives” available to individual landowners/operators within the Mackinaw River watershed.

Benefits

Landowners' knowledge of available agricultural and conservation programs will encourage the participation necessary to meet Watershed Management Plan goals.

Cost

Print and mail "Landowners Guide...." **\$5,000**

Agency Coordination

Recommendations

Recommendation #2:

Seek, recognize, encourage, and support efforts which diversify agency participation in achieving the overall goals of the Mackinaw River Watershed Management Plan.

Benefits

Goals will most effectively be met by the participation of all available agencies and programs. It is important to avoid duplication of effort and to make the available programs easily understood by interested citizens. Landowners will be more likely to select best management practices that improve water quality if enrollment in programs is easy. If a landowner can learn about and choose a suitable program from a single office it will simplify enrollment and improve participation. Cooperation between landowners who will apply best management practices and Agencies that supply technical and financial assistance will promote maximum progress toward achieving the goals of the Mackinaw River Project.

Cost

Cost not available at time of printing.

Agency Coordination

Recommendations

Recommendation #3:

Adopt an organizational structure for Implementation of the Mackinaw River Watershed Management Plan.

Benefits

The Mackinaw River Project Planning Team agreed that a permanent organization structure will be necessary to meet watershed goals over the years, in order to sustain citizen interest and efforts.

Cost

Cost not available at time of printing.

Mackinaw River Watershed Implementation Cost Summary

Objective	Total Estimated Cost after 15 years
Agriculture	
Recommendation #1	\$15,445,000
Recommendation #2	\$3,089,000
Agriculture and Biodiversity	
Recommendation #1	\$10,533,500
Recommendation #2	\$14,408,500
Recommendation #3	Cost included under Recommendation #1, Biological Diversity
Recommendation #4	Cost included under Recommendation #1, Biological Diversity
Biological Diversity	
Recommendation #1	\$14,520,000
Recommendation #2	No cost available at time of printing
Recommendation #3	\$10,200
Community Issues	
Recommendation #1	\$800,000
Recommendation #2	\$600,000
Recommendation #3	\$300,000
Education	
Recommendation #1	\$24,876
Recommendation #2	\$33,210
Recommendation #3	Cost included in workshop
Agency Coordination	
Recommendation #1	\$5,000
Recommendation #2	Cost not available at time of printing
Recommendation #3	Cost not available at time of printing
Total Estimated Cost for Implementation	\$59,769,286

Gaps

Two committees were formed to address several gaps in the first

Mackinaw River Watershed Management Plan that the Planning Team identified. Gaps will be reconsidered for recommendation when the Action Plan is periodically re-evaluated. One committee will investigate issues related to livestock waste management, timberland zoning and development, access and property rights, and river cleanup. Committee members agreed that significant progress occurred in the one and one-half year existence of the Mackinaw River Project Planning Team and recognized that a continuing effort is necessary to assess problems and recommend solutions to reach long-term goals identified in this document. A committee was assigned to research and present proposals in January 1998 to form a long-term structure for the Mackinaw River Project.

Gaps in the recommendations that were identified by the Planning Team usually resulted from inadequate time to investigate background and solutions properly. Livestock waste management rules are currently the focus of Illinois Pollution Control Board rule-making procedures (see Part III. Existing Watershed Programs -- Agencies and Laws, this document). The committee believed better recommendations may be made after the state rules are adopted. Conflicting land uses were not directly addressed by any recommendations presented in this document. Residential development on timberland along the Mackinaw River acutely conflicts with maintaining and expanding biodiversity. County zoning, especially McLean County, designates timber ground for residential development. As a result, fragmentation and loss of forest habitat occur. In addition, individual homeowners escape requirements to control stormwater runoff. The Gaps committee also received an assignment to continue developing a proposal for stream cleanup concentrating on bridge sites and visible locations. Issues of access to the river for canoeing and the maintenance of private property rights were not possible to resolve in the time available. Monitoring issues of access and property rights was assigned to the Gaps committee, also.

Implementation

All recommendations can be independently implemented in any order. Implementation requires major funding from granting agencies, such as Illinois Environmental Protection Agency and Illinois Department of Agriculture. The Nature Conservancy will continue to be the guiding entity for an additional year. In addition, because most of the recommendations involve enrollment of individual landowners in conservation programs, one additional staff person will be necessary for the Soil and Water Conservation District in each of the three major counties, McLean, Woodford and Tazewell, to handle the anticipated increased work load.

Other Proposals

Several recommendations from Action Teams were not adopted by the Planning Team. Some were good ideas that were not developed by the Action Teams because of lack of time and interested workers. Others were not adopted because, although they might be good ideas, the Planning Team concluded the ideas were not effective in meeting the primary goals of the Project, or the needs were being met by existing programs in the state.

These ideas might be of interest to residents of other watersheds, or to Mackinaw River watershed residents in the future.

1. Storm Sewer Awareness Action Plan, accomplished by stenciling city storm drains. The objective is to inform citizens that sewers drain into a particular body of water, and discourage dumping of oil and debris in storm sewers. Although this program has been effective in other cities, the committee wished to concentrate on recommendations that targeted reduction in runoff and sedimentation to the river. This activity was referred to the Education Committee to consider for a workshop.

2. Home*A*Syst Educational Program to educate and promote better practices regarding household hazardous waste, solid waste, homeowner use of pesticides and fertilizer, and private sewage disposal.
3. Used Oil Collection Events.
4. Used Tire and Household Hazardous Waste Collections.
5. Paint Exchange.

Conclusions

The recommendations proposed in this document were selected by the Mackinaw River Project Planning Team to reduce stormwater runoff and sedimentation to the river, reduce peak flow water levels in the river, protect and stabilize streambanks, reduce untreated sewage and increase biodiversity in the watershed. Many people spent much time developing these recommendations. The watershed residents who served on the committees freely contributed their time for the benefit of long-term quality of life in the Mackinaw River watershed. Implementation of the recommendations will require a long-term commitment, requiring many years to reach the goals identified in this document. In order to benefit from experience gained in the first years of implementation, goals should be reevaluated annually. Residents of the watershed can take pride in looking to a stable diverse environment that can persist for an unlimited future. To become involved in the project contact The Nature Conservancy, Illinois Field Office, 1201 S. Main, Eureka, Illinois 61530, Phone (309)673-6689. Please protect and enjoy the river and its' watershed!









References

- Reber, Robert. 1996. "The Mackinaw." *The Illinois Steward*, offprint, December 1996, 8 p.
- State of Illinois. 1997. *Landowners Guide to Natural Resources Management Incentives*. Illinois Natural Resources Coordinating Council.
- Suloway, Liane and Marvin Hubbell. 1994. "Wetland Resources of Illinois, An Analysis and Atlas," Illinois Natural History Survey Special Publication 15, July 1994.
- USDA. 1993. *Conservation Choices*. U.S. Department of Agriculture Soil Conservation Service, Champaign, IL U.S. Government Printing Office :1993-546-416.
- [NRCS] Natural Resources Conservation Services. 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.



Mackinaw River Project

Mackinaw River Watershed Management Plan List of Resource Materials

-  An Intensive Survey of the Mackinaw River Basin 1994
Illinois Environmental Protection Agency
-  An Intensive Survey of the Mackinaw River Basin 1987
Illinois Environmental Protection Agency
-  Mackinaw River Basin - Inventory and Evaluation of Erosion and Sedimentation and an Assessment of the Conservation Treatment Needs
United States Department of Agriculture/Natural Resources Conservation Service
-  Geomorphic Stream Habitat Assessment, Classification, and Management - Recommendations for the Mackinaw River Watershed, Illinois
Steve Gough & Associates
-  Assessment of the Water Quality, Fish and Mussel Communities of the Mackinaw River, Illinois
The Nature Conservancy of Illinois
-  Aquatic Classifications and Conservation of Aquatic Communities in the Mackinaw River, Illinois
The Nature Conservancy of Illinois
-  The Condition of Illinois Water Resources 1972-1996
Illinois Environmental Protection Agency
-  Mobilizing the Watershed Community: Linking Land, Water, and People
Illinois Environmental Protection Agency

Other Resource Materials (not provided*)



Illinois Water Quality Report 1994-1995 Volume I and II
Contact: Illinois Environmental Protection Agency
☎ (217) 782-3362



Targeted Watershed Approach - A Data Driven Prioritization
Contact: Illinois Environmental Protection Agency
☎ (217) 782-3362



Comprehensive Planning Assistance for the Mackinaw River Watershed - Farm Operator Study; Point Source Pollution, Geomorphology
University of Illinois - Department of Urban and Regional Planning
Contact: The Nature Conservancy of Illinois
☎ (309) 673-6689



Mackinaw River Area Assessment - Volume 1 and 2
Contact: Illinois Department of Natural Resources - DNR Clearinghouse
☎ (217) 781-7498

* Because of size limitations, these resource materials are not included in this document.
Please refer to contact for more information.

LIST OF RESOURCES

Components of Watershed Management Plan	Information / Technical Assistance	Education	Funding Assistance/Cost Share Programs
Watershed Description	NRCS, SWCDs, IEPA, INHS, ISWS, ISGS, INHS, USGS	CTIC	
Watershed Activities	IEPA, SWCD's, NRCS, USEPA, Other	USEPA, NRCS, SWCD's, IEPA, Local Univs.	
Waterbodies / Water Quality	IEPA, ISWS, ISGS, Cty. Health Dept., USEPA, IDOA, CES NRCS, SWCDs, Publ. Water Supl.	IEPA, Cty. Health Dept., SWCDs, USEPA	
Groundwater	IEPA, ISWS, ISGS	Cty. Health Dept., USEPA, IEPA, SWCD's	
Irrigation	ISWS		
Drainage	Local Drain. Distr.,		
Floodplain Boundaries	SWCD, USACE		
Municipal / Industrial	IEPA, USEPA		USEPA, IEPA
Riparian Corridors / Streambank Stabilization	SWCD's, ISWS, IDNR, NRCS	SWCD's, NRCS, IDOA	NRCS, IDNR, IEPA, IDOA
Hydrologic Modifications	Local Drain. Distr., USACE, NRCS, SWCD's, IEPA		NRCS, USACE, IDOA, IEPA
Components of	Information /	Education	Funding

Table Key

Cty. Boards - County Boards
Cty. Health Dept. - County Health Department
Cty. Planning Comm. - County Planning Commission
CES - Cooperative Extension Service
CTIC - Conservation Technology Information Center
IDOA - Illinois Department of Agriculture
IDNR - Illinois Department of Natural Resources
 ***ISWS** - Illinois State Water Survey
 ***ISGS** - Illinois State Geological Survey
 ***INHS** - Illinois Natural History Survey
IEPA - Illinois Environmental Protection Agency
IPCB - Illinois Pollution Control Board
Local Drain. Distr. - Local Drainage Districts
Local Land Trust Orgs. - Local Land Trust Organizations
Local Schls. & Univs. - Local Schools and Universities
NRCS - Natural Resource Conservation Service
Other - Zoos, Museums, Environmental Organizations
Publ. Water Supl. - Public Water Supplies
Reg. Planning Grps. - Regional Planning Groups
Stormwater Comm. - Stormwater Management Commissions
SWCD - Soil and Water Conservation Districts
TNC - The Nature Conservancy
Twp. Boards - Township Boards
USACE - United States Army Corps of Engineers
USDA - United States Department of Agriculture
USEPA - United States Environmental Protection Agency
USF&W - United States Fish and Wildlife

*Entities within Illinois Department Natural Resources

Please Note: Although this list is not all-inclusive it will provide information that you will need to begin the watershed management planning process.

Other potential resources may include: scouting troops, church and civic organizations, local businesses and libraries, historical societies, public utilities, and county farm bureaus.

Group facilitation may also be available through IEPA, IDNR, NRCS, ~~Table Key~~ resources.

Cty. Boards - County Boards
Cty. Health Dept. - County Health Department
Cty. Planning Comm. - County Planning Commission
CES - Cooperative Extension Service
CTIC - Conservation Technology Information Center

Watershed Management Plan	Technical Assistance		Assistance/Cost Share Programs
Stormwater Management	IEPA, Cty. Boards, Reg. Planning Grps., Stormwater Comm.	IEPA	USACE
Wetlands	USDA, NRCS, IDNR, IEPA, USACE, USEPA	USEPA	USDA, NRCS, USF&W, IEPA
Aquatic Species	IEPA, INHS, IDNR, Other	INHS, IDNR, Other	IDNR (Habitat), Other
Priority Waterbodies	IEPA, NRCS, IDOA, USDA, IDNR	NRCS, IEPA, SWCD's	NRCS, USDA, SWCD's
Soils	NRCS, SWCDs, USGS, ISWS, IDOA	NRCS	NRCS, IDOA, Cty. Boards
Geology	ISGS	Other	
Topography	NRCS, SWCD's, USGS		
Land Use	CES, ISWS, USGS, NRCS, SWCDs, IEPA, IDNR	CES	
Air Quality	IEPA, USEPA	IEPA	
Wildlife	IDNR	IDNR	IDNR (Habitat)
Socio-Economic / Human Resources	Cty. Planning Comm., U.S. Census, CES	CES	



Mackinaw River Project

Mackinaw River Watershed Management Plan List of Subwatershed Management Plans

<u>Subwatershed Management Plan</u>	<u>County (s)</u>
Upper Mackinaw River (Phase I)*	McLean/Ford
Upper Mackinaw River (Phase II)	
Money Creek	McLean
Henline Creek	McLean/Livingston
Mud Creek*	Tazewell/Woodford
Lower Mackinaw River	Tazewell/Mason
Indian Creek	Tazewell
Prairie Creek	Tazewell
Middle Mackinaw River	Tazewell/McLean/Woodford
Little Mackinaw River	Tazewell/McLean/Woodford
Hickory Grove Ditch	Tazewell/Mason
Panther Creek, West Branch*	Woodford
Panther Creek, East Branch	Woodford
Panther Creek, Mainstem	Woodford
Walnut Creek	Woodford/Tazewell

*Indicates subwatershed management plan, completed June 1998 and included within this document.
The remaining subwatershed management plans will be added as they are developed.