

Mackinaw River Watershed Management Plan
Mud Creek Subwatershed

Prepared by Mary Jo Adams
for
The Nature Conservancy
Illinois Environmental Protection Agency

Second Draft

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COMPONENT #1: MISSION STATEMENT

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.

COMPONENT #2: WATERSHED DESCRIPTION

The Mud Creek subwatershed is located primarily in Tazewell County, Illinois. This subwatershed contains 29,744 acres (15% of Tazewell County). The drainage area 46.6 square miles, or 4% of the Mackinaw River basin. (IDNR, Mackinaw River Area Assessment, Vol. 1, pg. 3-1). The Illinois EPA watershed identifier is ILDKG01.

The watershed deliniation encompasses the Tazewell County hydrologic unit area 07130004-070, Section 13. There are no major lakes in this watershed.

The subwatershed is almost entirely private access, with the only public access to the waterbody at county and state highway bridges.

COMPONENT #3: WATERSHED ACTIVITIES

Watershed activities in the Mud Creek subwatershed area have included:

<u>Date</u>	<u>Type of Activity</u>	<u>Success</u>	<u>Reasons for Success</u>
2/1996	SWCD Annual Meeting, presentation of Mackinaw River Project	Yes	Landowner awareness
3/1997	SWCD Informational meetings for CRP	Yes	Interest in sign-ups
1996-1997	CRP sign-ups	Yes	Landowner interest
1997-1998	CRP and EQIP sign-ups	Somewhat	Landowner interest

COMPONENT #4: WATERSHED RESOURCE INVENTORY

Waterbodies:

Mud Creek is a fourth order tributary of the Mackinaw River. Its headwaters arise in Woodford County approximately 3 miles northeast of the village of Deer Creek, and it flows southward for 18 miles until it reaches the Mackinaw River just south of Rt. 9 between the towns of Mackinaw and Tremont. Two smaller tributaries, Deer Creek and Willow Creek flow into Mud Creek.

Mud Creek is considered a perennial stream with a continuous flow during the year, with the level fluctuating based on the amount of seasonal rainfall. A fourth order tributary of the Mackinaw River, it has a mean width of 10 feet, a depth of .7 feet, a velocity of .02 ft/sec. and a discharge of .14 cfs. Based on IEPA data from 1987 (site DKG-01), it had a water quality index of 65.1, which indicates moderate water quality problems.

Physical Data: Instream cover: 6%, Pool: 25%, Riffle: 30%. Shade: 25%, Silt/Mud: 8%, Sand: 13%, Fine gravel: 11%, Medium gravel: 13%, Coarse gravel: 33%, Small cobble: 13%, Large cobble: 9%, Boulder: 0%, Bedrock: 0%, Claypan: 0%, Plant detrius: 0%, Vegetation: 0%, Submerged logs: 0%, Other: 0%. **IBI: 41.1, Category:B** (IEPA, Intensive Survey of the Mackinaw River Basin, 1987)

Chemical Data: Water temp.: 8, Dissolved Oxygen: 10, ph: 0, Phosphorus: 33, Total Suspended Solids: 84, Total Dissolved Solids: 14, Metals:10, Ammonia:10, **total WQI: 65.1** (values range from 0 (no problems) to 100 (severe problems). Elevated levels were found for the following: Fecal coliform: 30,000/100ml; Fecal strep: 700,008/100/ml; Nitrates: 3.7ml/l, Suspended solids: 262mg/l; Aluminum: 3,369ug/l; Iron: 3,958 ug/l, and Manganese: 691 ug/l.

Biological data: MBI: 7.7 (poor); AIBI: 44.7, PIBI: 42.3.

There are no trends to report, since this site (DKG-01) was not used in the 1994 IEPA study. This data would be useful to detect any significant increases or declines in water quality parameters.

There are only two small lakes located within the Mud Creek watershed. One is located just north of the village of Deer Creek (less than 20 acres), and the other (less than 10 acres) near 2800E and 1800N. Both of these lakes are located on private property. The number of farm ponds has been estimated at 25 ponds. (Tazewell County NRCS)

The overall use of Mud Creek is to serve as a means to transport water drained from agricultural fields, and as a source for water for livestock. It is not used as a source of a public water supply. Recreational uses such as fishing, swimming, hunting, etc. would be limited only to those who own property along Mud Creek. There is no public access. This subwatershed does provide habitat for a variety of aquatic life forms.

Designated Use/Support:

According to the Illinois EPA Water Quality Report, in 1987 the overall designated use was 01R (partial support/Minor impairment), and for Aquatic Life 04R (partial support/Minor impairment).

Impairments:

Within this subwatershed, causes of impairment listed by the Illinois Water Quality Report are as follows: 09S (nutrients, slight), and 11M (siltation, moderate).

According to the Mackinaw River Planning team, the following causes of impairment have been identified:

Sedimentation: an increase in velocity and volume of water resulting in increased erosion.

Nutrients: excess nitrogen

High levels of suspended solids and turbidity

High levels of Fecal coliform, Fecal strep

Altered hydrology

Loss of riparian habitat

Sources of Impairments:

The sources for impairment in water quality are largely of rural origin. The Illinois Water Quality Report lists the sources as agricultural (10M, Agriculture, Moderate). As there are no large urban areas within this subwatershed, and only one small rural village (Deer Creek), the potential sources of impairment from urban areas is minimal. According to the 1994 Illinois EPA Survey of the Mackinaw River Watershed, there are three sites identified in the Mud Creek subwatershed as having a high potential as a source for impairment: one near the village of Deer Creek. One source has a moderate potential as a source for impairment, and two sites as have a slight potential as a source for impairment. (map, pg. 104) The Illinois EPA document, while implicating certain locations as sources of impairments, does not qualify the actual impact of these potential sources.

Agricultural practices which would be considered sources of impairment would be the following:

Row crop production

Application of farming chemicals

Livestock waste

Rural septic systems

Removal of streamside vegetation

Alteration of the hydrologic regime sources of impairment would be the following:

Increased flood flows, reduced base flows

Increased drainage and loss of wetlands

Stormwater runoff from impermeable surfaces

Urban sources would include:

Stormwater runoff from roads and highways

Sewage treatment facility in Deer Creek

Groundwater:

The subwatershed of Mud Creek is a confined aquifer.

The village of Deer Creek obtains its public water supply from a sand and gravel aquifer with a well depth of 335 feet. There is a relatively low potential for contamination of groundwater.

Capture zone: none delineated. Re-charge area: none delineated. Wellhead protection area: within 1,000 feet. Priority Groundwater Protection Planning region: yes

Water wells: As this is almost entirely a rural area, the majority of active water wells are from rural homesteads and farms. The reported number of private wells within Tazewell County is 1647, however, the total number of private wells within this subwatershed is not known at present, but could be estimated from the Illinois State Water Survey Private Well Database. The village of Deer Creek has one active well which supplies services to a population of 684 residents. In 1995, 20,7000 total gallons were used, with a per capita use of 83 gallons per day.

Abandoned wells: there are no listed abandoned wells for this subwatershed.

Irrigation:

There are no known irrigation systems within this watershed.

Drainage:

The effects of surface drainage within this watershed results in an increase in soil erosion, therefore there is a decrease in water quality. The majority of surface drainage would come from surface runoff from farm fields and from roadways and storm sewers associated with the village of Deer Creek and Interstate 74.

The effects of subsurface drainage result in an increase in water volume and altered hydrology. Subsurface drainage would come from farm field tile systems. There is no record of the extent of drainage systems.

There are no active Drainage districts within this subwatershed.

Floodplain Boundaries:

Flooding frequency and history: no data available

Flood structures: none located within this subwatershed

Flood plain boundaries: a FIRM map (flood insurance rate) is available from the SWCD of Tazewell County which indicates flood plain boundaries/100 year flood zone.

Flood damage estimates: no flood damage estimates are available
(Flooding and high flow data regarding the Mackinaw River Watershed can be found in the IDNR Mackinaw River Area Assessment, Vol I. pg. 3-29)

Municipal/Industrial:

There are no landfill sites located in this watershed, and no industrial or manufacturing plants. Stormwater runoff from the village of Deer Creek flows into Mud Creek, as does runoff from Interstate 74, which crosses Mud Creek southwest of Deer Creek. There are four underground storage tanks, and five sites with the possible use and storage of paints, solvents, and oils. (Schnieder, 1995). Three leaking underground storage tanks (1992, 1993) are identified as point-source pollution. As of 1995, a secondary wastewater sewage treatment plant, processing domestic wastewater was operating in Deer Creek, and discharging effluent into Mud Creek. High fecal coliform and fecal strep levels were found in Mud Creek in 1987.

Riparian Corridors:

Streambank erosion: The amount and extent of streambank erosion has not been surveyed.

Existing vegetation: The type of existing vegetation occurring along Mud Creek is primarily cool season grasses, trees, and shrubs. A detailed analysis of vegetation has not been completed. Most of the corridor is bordered by pasture or cropland. No riparian trees exist in the upper reaches (first 10 miles) of this subwatershed, and the lower section (8 miles) has a variable (from 50 feet to 200 feet) band of trees.

Filter strips: There are approximately 3 miles of filter strips in this subwatershed.

Hydrologic Modifications:

Approximately 1.5 miles of the upper stream has been channelized. There are no dams, and approximately 17 bridges and culverts.

Stormwater Management:

Stormwater ordinance: ? Stormwater Control Practices: ? Discharge location: ?

Combined Sewer Systems: ?

Stormwater management is the responsibility of Tazewell County, who have adopted the Tri-County Stormwater Ordinance.

Wetlands:

Within the Mud Creek watershed, there are approximately 218 acres of wetlands (ISWS, Varner, 1997). Of these wetlands, 22 acres are considered shallow Marsh/Wet areas, 129 acres are Forested wetlands, and 68 acres are shallow water wetlands. This represents a very small percentage (0.06) of the total acres within this subwatershed. Former wetlands existed in greater number in this watershed, but current floodplains are no longer hydrologically connected to the stream channel. The condition of these wetlands are degraded in diversity and hydrologically impaired.

Fish:

There were 26 species of fish identified in Mud Creek. (Illinois EPA, 1987) The list of species present is as follows, including number per species.

Carp: 1	Creek chub: 51
Hornyhead chub: 51	Suckermouth minnow: 96
Striped shiner: 34	Bigmouth shiner: 25
Red shiner: 117	Rosyface shiner: 5
Sand shiner: 445	Redfin shiner: 4
Steelhead shiner: 2	Bluntnose minnow: 799
Common stoneroller: 499	Quillback: 7
Golden redhorse: 92	Northern hogsucker: 17
White sucker: 68	Black bullhead: 1
Stonecat: 9	Centrarchide: 1
Smallmouth bass: 1	Largemouth bass: 2
Green sunfish: 2	Bluegill: 6
Longear sunfish: 11	Total fish: 2306
	AIBI: 44.7

Fish size: data not available

Fish kills: A fish kill was reported in September of 1986 on Mud Creek. The cause was determined to be agricultural related.

Habitat: The IBI rating (1987) for Mud Creek was 41.1 (Mean for the basin= 43.6)

This indicates that Mud Creek is a highly valued aquatic resource.

Priority Waterbody:

Mud Creek (entire Mackinaw River watershed) was designated as a priority area for the EQIP program for 1997 and 1998, and is proposed for 1999. All agricultural areas bordering waterways in this subwatershed are considered high priority areas for the CRP and CREP federal farm program. Mud Creek (as part of the Mackinaw River Partnership) is part of the C-2000/Ecosystem Partnership Program administered by the Illinois Department of Conservation.

The Nature Conservancy has classified Mud Creek as a Zone B, which has a high priority for restoration.

The Illinois EPA has designated Mud Creek as a Non-Priority for Multiple Programs Interests in its 1997 Targeted Watershed Approach.

Soil Classification:

There are five different soil associations found within this subwatershed.

The most common is the Tama-Ipava-Sable Association (#2 on map). This covers 44.4 percent of the subwatershed, or 11,205 acres. Characteristics of these soils are as follows:

<u>Soil</u>	<u>Composition</u>	<u>Slope</u>	<u>Water Table</u>	<u>Permeability</u>	<u>LUC</u>	<u>EI</u>	<u>Hydric</u>
Ipava	Silt loam	nearly level	1.0-3.0 ft.	0-18 inches	I	2.8	no
Sable	Silty clay loam	nearly level	0.5-2.0 ft.	0-8 inches	IIW	2.8	yes
Tama	Silt loam	1-5%	4.0-6.0 ft.	0-12 inches	II E	3.4	no

The next most common soil association is the Birkbeck-Miami-Hennepin. (#5 on map). This soil covers 19.8 percent of the subwatershed, or 4,999 acres. Characteristics of these soils are as follows:

<u>Soil</u>	<u>Composition</u>	<u>Slope</u>	<u>Water Table</u>	<u>Permeability</u>	<u>LUC</u>	<u>EI</u>	<u>Hydric</u>
Birkbeck	Silt loam	5-10%	3.0-6.0 ft.	0-7 inches	III E	17.1	no
Miami	Silt loam	5-10%	>6.0 ft.	0-7 inches	III E	15.6	no
Hennepin	Loam	20-35%	>6.0 ft.	0-5 inches	VI E	3.2	no

A similar percentage of the subwatershed (19.6 percent or 4,946 acres) is made of the Ipava-Sable Association. The location of this soil association is indicated on the map as area #1. The specific characteristics of these soils has already been described above.

Approximately 3,478 acres, or 13.8 percent of the Mud Creek subwatershed consists of soils of the Rosetta-Stronhurst Association. Characteristics of these soils are as follows:

<u>Soil</u>	<u>Composition</u>	<u>Slope</u>	<u>Water Table</u>	<u>Permeability</u>	<u>LUC</u>	<u>EI</u>	<u>Hydric</u>
Rosetta	Silt loam	1-5%	4.0-6.0 ft.	0-7 inch.	II e	6.6	no
Stronhurst	Silt loam	nearly level	1.0-3.0 ft.	0-7 inch.	II w	3.7	no

The smallest percentage (2.5%, 627 acres) is the Ross-Landes-Lawson Association. (#9 on map). These soils are frequently flooded. Characteristics of these soils are as follows:

<u>Soil</u>	<u>Composition</u>	<u>Slope</u>	<u>Water Table</u>	<u>Permeability</u>	<u>LUC</u>	<u>EI</u>	<u>Hydric</u>
Ross:	Silt loam	nearly level	4.0-6.0 ft.	0-13 inches	II W	3.2	no
Landes:	Fine sandy loam	nearly level	> 6.0 ft.	0-21 inches	III W	2.5	no
Lawson:	Silt loam	nearly level	1.0-3.0 ft.	0-11 inches	III W	2.8	no

