

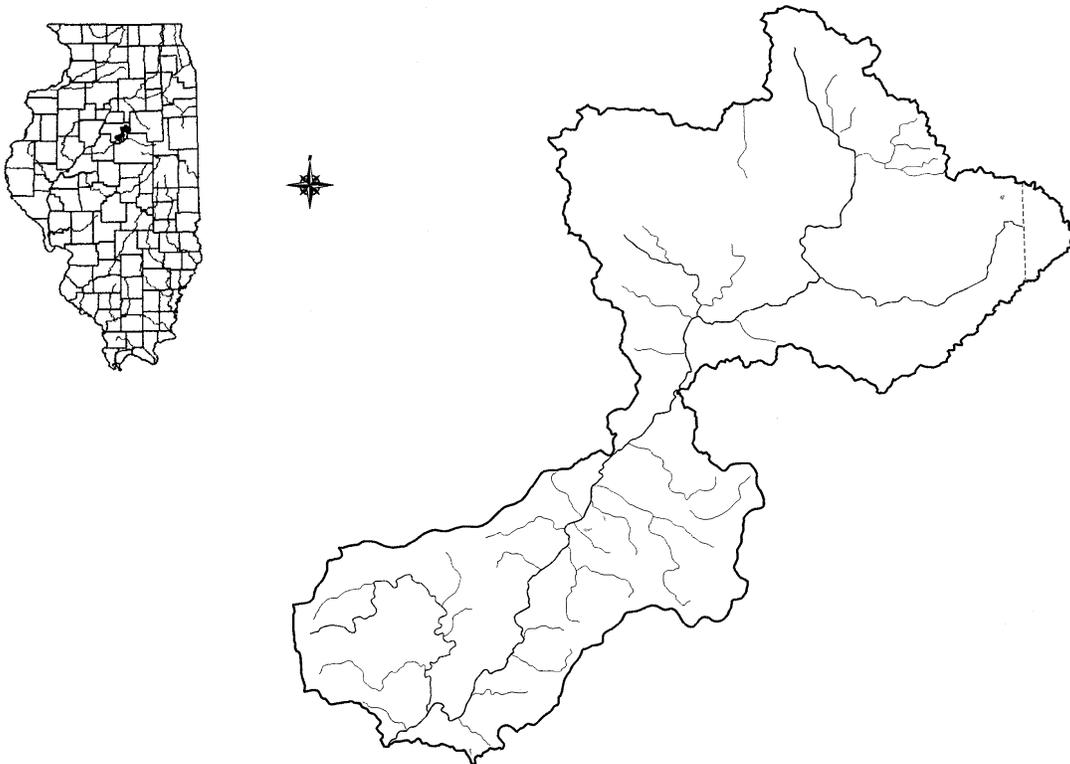


Mackinaw River Project

Mackinaw River Subwatershed Management Plan Panther Creek, West Branch

Printed June 1998

Prepared by Mary Jo Adams



Printed on Recyclable Paper

Table of Contents

Component #1, Mission Statement	1
Component #2, Watershed Description	1
Component #3, Watershed Activities	2
Component #4, Watershed Resource Inventory	5
Waterbodies	5
Water Quality Index Values	5
Physical Data	6
Biological Data	6
Designated Use/Designated Use Support	7
Causes of Impairments	7
Source of Impairments	7
Groundwater	9
Irrigation	10
Drainage	10
Floodplain Boundaries	10
Municipal/Industrial	11
Riparian Corridors	11
Hydrologic Modifications	12
Stormwater Management	12
Wetlands	14
Fish	14
Priority Waterbody	16
Soil Classification	17
Soil Erosion	18
Geology	19
Topography	20
Land Use	20
Air Quality	23
Wildlife	24
<i>Threatened or Endangered Species</i>	24
<i>Birds</i>	25
<i>Mammals</i>	25
<i>Butterflies and Skippers</i>	26
<i>Amphibians and Reptiles</i>	26
Socio-Economic/Human Resources	28

Component #5, Problem Statement..... 30

Component #6, Goals and Objectives 31

Components #7, #8, and #9, Implementation Strategies,
Cost Summary, and Measuring Progress..... 32

 Strategy #1: Agricultural Best Management Practices 32

 Strategy #2: Wetlands..... 33

 Strategy #3: Wetlands for Communities..... 34

 Strategy #4: Streambank Stabilization 35

 Strategy #5: Biological Diversity 36

 Strategy #6: Stormwater Control..... 37

 Strategy #7: Nutrient Management 38

 Strategy #8: Education..... 39

References..... 41

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.

This mission statement was written and adopted by the Mackinaw River Project (MRP) Planning Team in 1996. Restoration is a strong component of enhancement and is included in the goals, objectives, and strategies of this subwatershed plan.

Component #2 Watershed Description

Panther Creek, a fifth order tributary of the Mackinaw River, is located in Woodford County, Illinois. The mouth of Panther Creek is located at Mackinaw River mile 64.7, approximately 3 miles north of the town of Congerville. The West Branch of Panther Creek, a fourth order tributary of the Mackinaw River, is also located in Woodford County. It arises 4.8 miles west of the town of Roanoke and flows in an east-south-easterly direction for approximately 18.4 miles where it joins the main branch of Panther Creek just north of Woodford County Route 5 between 2200E and 2300E.

The West Branch of Panther Creek subwatershed is approximately 38,000 acres, with a drainage area of 59 square miles. (Illinois EPA data, pg. 2-15, Vol.2 Mackinaw River Assessment, IDNR) The Illinois EPA waterbody identification code for the West Branch of Panther Creek is ILDKKB01.

The watershed delineation encompasses the Woodford County hydrologic unit area 0713004-050, section 14 and 15, and is identified as the West Branch of Panther Creek. (Hydrologic Unit Map, NRCS, Woodford County, 1981)

There are no major lakes in this watershed. The only other bodies of water are a 25 acre sewage lagoon in the town of Roanoke, which drains into the West Branch of Panther Creek, and a 5 acre pond east of Roanoke.

The area is almost entirely private access, with the only public access areas at county highway bridges.

Component #3 Watershed Activities

The West Branch of Panther Creek subwatershed is a Targeted Watershed Approach subwatershed area (Illinois EPA) with a low priority for Multiple Program Interests (Illinois EPA Targeted Watershed Approach, 1997), but also as a high priority area subwatershed concerning groundwater issues.

The Illinois EPA has been the primary funding source for the planning phase of the Mackinaw River Project through the section 319 program for nonpoint source pollution, since 1994. This funding has been used for project staff through The Nature Conservancy, and the facilitation of a community based process to write the Mackinaw River Watershed Management Plan. Extensive community outreach and education has been done within the entire Mackinaw River watershed (see details on these activities below), and watershed management planning tools such as a watershed management planning handbook, and a project video have been produced to help other watershed planning efforts within Illinois. The funding from the Illinois EPA has also been used to establish fifteen demonstrations of best management practices within the Mackinaw River watershed, so that watershed residents can tour the types of conservation practices recommended in the watershed management plan. The Executive Committee for the Mackinaw River Project has chosen the West Branch of Panther Creek subwatershed as a section 319 subwatershed priority area with the Illinois EPA for 1998 and 1999. Funding received as a subwatershed priority area will be directed towards landowner cost share for continued application of conservation practices within the three subwatershed priority areas, and the entire Mackinaw River watershed.

The entire Mackinaw River watershed was designated by the United States Department of Agriculture (USDA) as an interim Environmental Quality Incentive Program (EQIP) priority area in 1996, and an EQIP priority area for 1997 and 1998. Approximately \$337,000 was allocated to the Mackinaw River watershed and made available for conservation practice cost share with landowners. Over 300 EQIP landowner applications were received, and over 100 conservation practices were funded with the 1997 money. In 1998, USDA allocated \$167,000 to the Mackinaw River watershed through EQIP. The number of conservation practices funded with this money is not yet available (Schuler, 1998). An application for redesignation as an EQIP priority area has been submitted to USDA for 1999 (Schuler, 1998).

The West Branch of Panther Creek subwatershed has qualified for the Illinois Department of Natural Resources (IDNR) C2000 funding from 1996 to present and is part of a larger Ecosystem Partnership priority area for the entire Mackinaw River watershed. The Mackinaw River Ecosystem Partnership received over \$250,000 in 1997 and the money was made available to cost share

over fifteen conservation practices with private landowners. In 1998, the Mackinaw River Ecosystem Partnership received \$90,000 in funding to construct five more conservation projects. In the West Branch of Panther Creek subwatershed, Agricultural landowners have been able to access additional C2000 funding through the Conservation Practice Program (CPP) administered by the Woodford County Soil and Water Conservation District (SWCD) office. The USDA Conservation Reserve Enhancement Program (CREP) priority area in Illinois includes the entire Mackinaw River watershed and the sign up for this program has just started. Information concerning landowner participation is not yet available. There have been five Conservation Reserve Program (CRP) sign ups since 1995. Two of the sign ups have been continuous; the other three sign ups have been concentrated (Schuler, 1998). Information concerning the success of these sign up periods will need to be obtained from the Woodford County SWCD in 1998.

Based on the division into Conservation Priority Zone by The Nature Conservancy, the West Branch of Panther Creek is considered to be in a Zone A, which has a high priority for restoration.

Watershed activities in the West Branch of Panther Creek have included slide shows of the Mackinaw River Project by TNC, a presentation to area farmers by TNC, The Mackinaw River Project, NRCS and Woodford County SWCD, two landowner conferences sponsored by the Biology and Agriculture classes of Roanoke- Benson High School, and 3 demonstration/Best Management projects initiated by the Mackinaw River Project/Illinois EPA, IDNR and NRCS. The high school students have also conducted macroinvertebrate sampling at 5 locations within this subwatershed. In addition, 8 sign-ups for EQIP (Environmental Quality Improvement Program) were allocated by the Woodford County NRCS. Specific information on these activities are as follows:

Outreach Activities on West Branch of Panther Creek (Rudin, 1998)

Date	Activity	Success	Reasons for Success
1996	Roanoke Town Council Presentation	yes	Cooperation, concern about water quality issues, interest in development of stormwater ordinance for town
1996-98	Water Quality Sampling by the Roanoke-Benson High School Students	yes	Class enrichment activities, generation of data to be used for "real" science
1997-98	Two annual Conservation Conferences sponsored by the Roanoke-Benson High School Students for all landowners in the West Branch of Panther Creek	yes	Awareness of natural resource issues, two thirds of the landowners present signed up for filter strips along West Branch of Panther Creek
1997	Presentation of Mackinaw River Project (MRP) to Roanoke Rotary	yes	Increased awareness of natural resource issues, provided youth with quality school enrichment opportunities
1997	Neighborhood breakfast for all residents on West Davidson Street in Roanoke	yes	Increased awareness of residents in the community of Roanoke about causes of flooding and possible solutions
1997-98	Roanoke-Benson High School Students obtain over 1500 red oak tree seedlings from Roanoke IGA. They pot the seedlings and participate in tree planting for MRP projects	yes	Continued involvement for the young people of the community to be involved in community conservation
1998	Landowner visits	yes	Awareness of conservation cost-share programs
1998	Environmental Fair sponsored by the Roanoke-Benson High School Students for over 300 elementary students to learn about conservation issues	yes	High School Students providing positive role models for elementary students, enthusiasm from teachers, administrators, and students of all ages in the Roanoke-Benson Unit #60 School District
1998	MRP demonstration Best Management Practices	yes	landowner involvement in conservation

Component #4 Watershed Resource Inventory

Waterbodies

Panther Creek, a fifth order tributary of the Mackinaw River, is located in Woodford County, Illinois. The mouth of Panther Creek is located at Mackinaw River mile 64.7, approximately 3 miles north of the town of Congerville. The West Branch of Panther Creek, a fourth order tributary of the Mackinaw River, is also located in Woodford County. It arises 4.8 miles west of the town of Roanoke and flows in an east-south-easterly direction for approximately 18.4 miles where it joins the main branch of Panther Creek just north of Woodford County Route 5 between 2200E and 2300E.

The West Branch of Panther Creek, with a length of approximately 18 stream miles, is considered a perennial stream with continuous flow during the year. Based on Illinois EPA data from 1987 (site DKKB-01), it has a water quality index of 34.9, which indicates minor water quality problems. The mean WQI value for the entire Mackinaw River watershed was 42.9. (Illinois EPA Survey of the Mackinaw River Basin, Short, 1987).

The only water quality problems detected in the 1987 study were for fecal coliform (2700/100ml). (A more detailed analysis of water quality data can be found in the 1987 Illinois EPA Survey of the Mackinaw River Basin by Matthew Short.)

Since water quality data was not obtained from the same site in the 1994 Illinois EPA report, it is not possible to compare data or to detect any trends. (Closest site was DKK-01, Main Branch of Panther Creek.) However, high levels of fecal coliform were again detected in 1996 downstream of Roanoke, according to a study done by Dr. Tim Kelley of Illinois State University. The sampling site location was different than that of the Illinois EPA location however. Collection of comparative data, using the 1987 Illinois EPA sampling site DKKB-01, would be needed to establish the existence of any decrease in water quality values.

Water Quality Index Values

The following data was collected by the Illinois EPA at site DKKB-01 (West Branch Panther Creek), 1987: Water Temperature = 13, Dissolved Oxygen = 0, pH = 5, Phosphorus = 40, Total Suspended Solids = 22, Total Dissolved Solids =, Toxic Metals = 10, Ammonia = 12 (Values range from 0; no problems to 100; severe problems) WQI = 34.9 (Mean for Mackinaw River Basin = 42.9)

Physical Data

The following physical data was collected by the Illinois EPA at site DKKB-01 (West Branch Panther Creek), 1987

Geological Table	DKKB-01: 1987
Hydraulic Features:	
Stream Order	4.0
Mean Stream Width (ft)	22.0
Mean Stream Depth (ft)	0.8
Mean Thalweg Velocity (ft/s)	0.02
Discharge (cfs)	0.4
Pool (%)	20.0
Riffle (%)	0.0
Substrate	
Silt/Mud (%)	8.0
Sand (%)	8.0
Fine Gravel (%)	12.0
Medium Gravel (%)	13.0
Coarse Gravel (%)	23.0
Small Cobble (%)	10.0
Large Cobble (%)	13.0
Boulder (%)	2.0
Bedrock (%)	0.0
Claypan (%)	2.0
Plant Detrius (%)	0.0
Vegetation (%)	12.0
Submerged Logs (%)	0.0
Other (%)	0.0
Other	
Shading (%)	64.0
Instream Cover (%)	9.0
IBI	41.7
Biotic Potential Category	B

Biological Data

The West Branch of Panther Creek subwatershed received a Macroinvertebrate Biotic Index (MBI) rating of 6.1, an Actual Index of Biological Integrity (AIBI) rating of 49.1 (mean of 48.7 for Mackinaw River Basin), and a Potential Index of Biological Integrity (PIBI) rating of 41.7. This data indicates that this subwatershed is classified as a highly valued aquatic resource. (Intensive Survey of the Mackinaw River Basin, M. Short, 1987)

There are only two relatively small waterbodies located within the West Branch of Panther Creek subwatershed. One sewage treatment lagoon is located just east of the village of Roanoke, and has approximately 25 surface acres, and another lake, approximately 5 acres in size, is located approximately 2.5 miles east of Roanoke, on private property near 2000E between 1300N and 1400N. There are estimated to be 10 farm ponds. (Woodford County NRCS)

The overall use of the West Branch of Panther Creek is to serve as a means to transport water drained from agricultural fields and from the village of Roanoke. It may be used by farmers to water livestock. Recreational uses such as fishing, swimming, hunting, etc. would be limited only to those who own property along the West Branch of Panther Creek. There is no public access. This subwatershed does provide habitat for a variety of aquatic life forms.

Designated Use/Designated Use Support

The designated use for the West Branch of Panther Creek is Full support for Overall Use (01F), and Full support for Aquatic Life (04F). (Illinois Water Quality Report, 1994-1995, Vol. II, pg. 37) Implementation strategies should be directed towards protection of this water resource.

Causes of Impairments

Within this sub-watershed, the causes of impairment in water quality are the same as for the Mackinaw River watershed as a whole, just on a smaller scale. These causes are listed below, which were identified by the Mackinaw River Planning committee. (The Illinois Water Quality Report for 1994-1995 did not indicate either causes or sources of impairments)

Sedimentation: an increase in velocity and volume of water resulting in increased erosion in agricultural fields, streambanks, and urban areas (Slight to moderate), suspended solids and turbidity (slight to moderate), and fecal coliform (moderate to high).

Source of Impairments

The Illinois Water Quality Report for 1994-1995 did not indicate sources of impairment for the West Branch of Panther Creek. However, due to the fact that this subwatershed is primarily rural, with only one urban area (Roanoke), it can be assumed that the sources for impairment in water quality are largely of rural origin. According to the Illinois EPA Intensive Survey of the Mackinaw River in 1994, there were 17 sites identified as having a slight potential for impairment, and all of these were considered rural sources. One site was rated as having a moderate potential (also rural), and five sites were considered as having a high potential of impairment. Two of these sites were urban (Roanoke Concrete and Roanoke Wastewater Treatment facility), and three sites were rural. (Illinois EPA Intensive Survey of the Mackinaw River, 1994, Figure 13, pg. 105)

In 1970, the village of Roanoke constructed a secondary waste treatment facility, processing .22 million gallons per day. The effluent discharge flows into

the West Branch of Panther Creek. Research done by Dr. Tim Kelley of Illinois State University in 1996 indicated a fecal coliform level of up to 97 CFU/1ml. Any level above about 20 CFU/1ml is above recommended maximal levels.

The Illinois EPA document, while implicating certain geographical locations as sources of impairment, does not qualify the actual impact of these potential sources. However, based on the data, and that the majority of potential impairment sources are of rural origin, overall impairment in water quality appears to be minimal. The Illinois EPA document does not link the specific site to the type of land use or management practice, but the following sources would be considered as reasons for impairment in water quality.

Alteration of hydrologic regime:

- ◆ Increased flood flows, reduced base flows
- ◆ Increased drainage and loss of wetlands
- ◆ Stormwater runoff from impermeable surfaces

Agricultural practices:

- ◆ Row crop production
- ◆ Application of farming chemicals
- ◆ Rural septic systems
- ◆ Livestock waste
- ◆ Removal of streamside vegetation

Urban sources:

- ◆ Stormwater runoff from roads and highways
- ◆ Secondary sewage treatment facility in Roanoke
- ◆ Loss of riparian habitat in Roanoke

The following list of causes and sources of impairments is found in the report “Assessment of the Water Quality, Fish, and Mussel Communities in the Mackinaw River, Illinois”, by Dr. Michael Retzer.

Causes and Sources of Impairment in the West Branch of Panther Creek Subwatershed (Retzer, 1997)

Causes	Sources
Sediment Increased total suspended solids Increased turbidity	Altered hydrology, Ag and urban stormwater runoff, high volumes and velocities of water entering the river after a storm event, loss of riparian cover and wetlands
Stormwater	Altered hydrology, Ag and urban stormwater runoff, increased flow from rural and urban impermeable surfaces, subsurface tiling
Increased water temperatures	Altered hydrology, reduced base flows due to subsurface tiling and loss of wetlands, loss of shade providing riparian cover
Fecal bacteria Fecal coliform, fecal streptococci	Human sewage and septic discharge

Groundwater

Aquifers in the Mackinaw River watershed are primarily sand and gravel, confined and separated by till or clay. Tills were deposited in layers by ancient glaciers, and are now named through geologic formations. The West Branch of Panther Creek subwatershed is considered an Unconfined aquifer.

The village of Roanoke obtains its public water supply from a sand and gravel aquifer with well depths from 50-121 feet. There is no defined Recharge area or capture zone. The Wellhead protection area is 1,000 feet, and the subwatershed area is within a Priority Groundwater Protection Planning region.

As this is primarily a rural area, the majority of active water wells are from rural homesteads. There are an estimated 150 private water wells, and the village of Roanoke has 3 active wells providing the water supply for residents. In 1995, 83,800 gallons were used, with a per capita water use of 114 gallons per day. (Table 3-15, Vol. I, Mackinaw Area Assessment, IDNR) There are 2 improperly abandoned wells in this subwatershed, and there exists the possibility of more that have not been reported.

The susceptibility of nitrogen and pesticide leaching is minimal, according to the Illinois Water Quality Report, 1994-1995.

Irrigation

There are no known irrigation systems within this subwatershed.

Drainage

The effects of surface drainage within this subwatershed result 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 pastures, and from roadways and surface storm sewers associated with the village of Roanoke. "Roanoke is surrounded and dissected by tributaries of the West Branch of Panther Creek. Its surface waters drain in all directions toward one or another of these tributaries." (Schnieder, et al., 1995). There does appear to be an increase in surface drainage within this watershed.

The effects of subsurface drainage result in an increase in water volume after a rain event and altered hydrology. The majority of subsurface drainage would come from farm field tile systems. The purpose of tiling is to remove water from saturated fields and farmed wetlands in order to increase agricultural productivity. The effect of this is to increase river discharge after a storm event. Tiles serve to drain the land after the peak event and therefore contribute to a higher sustained discharge. This then lowers the general water table in the area, effectively reducing base flows during dry periods. The purpose of tiling is to remove water from saturated fields and farmed wetlands in order to increase agricultural productivity. The effect of this is to increase river discharge after a storm event. Tiles serve to drain the land after the peak event and therefore contribute to a higher sustained discharge. This then lowers the general water table in the area, effectively reducing base flows during dry periods. There does appear to be an increase in farm field tile systems (J. Schuler, Woodford County NRCS), but no data exists to support this. There is no record of the extent of drainage systems in farm fields within this subwatershed. There are no active Drainage districts within this watershed.

Floodplain Boundaries

Flooding Frequency and History

The only flooding data available for the West Branch of Panther Creek is from information recorded by a resident of the village of Roanoke (Tom Fehr).

Based on his records, which are only for the 1990's, flooding dates for the Roanoke area are the following:

- ◆ 1990: June 20, June 29, and November 27
- ◆ 1993: September 14
- ◆ 1995: May 13
- ◆ 1996: May 27

(Flooding and high flow data regarding the Mackinaw River Basin can be found in the IDNR Mackinaw River Area Assessment, Vol. I. pg. 3-29)

Flood Structures

There are no known flood structures in this subwatershed.

Floodplain Boundaries

A map of the flood plain boundaries is available from FIRM (flood insurance rate map), located at the Woodford County NRCS office. The 100-year flood zone is marked on the map.

Flood Damage Estimates

There are no flood damage estimates available for this subwatershed.

Municipal/Industrial

There are two landfill sites located in this watershed; both are in the Roanoke area. Lewis Martin Farms, Roanoke, has an Illinois EPA land application permit and is considered operational. The Amigoni landfill, located at 27N O1E 26, has a status of CFC (closed Final Cover) (CTAP, 1997).

There is one welding shop in Roanoke with an underground fuel storage tank, and one electrical booster station. Stormwater runoff from the village of Roanoke flows into the West Branch of Panther Creek. There are two NPDES surface impoundment sites within the watershed, both located in Roanoke. One is located at Martin Brothers Implement in Roanoke, the other is the sewerage system of the Village of Roanoke. "In 1988, concentrations of human fecal bacteria were detected in Panther Creek downstream from the Roanoke wastewater treatment plant." (Point Source Pollution in the Mackinaw River Watershed, Schnieder, 1995)

Riparian Corridors

The West Branch of Panther Creek contains approximately 572 total stream miles, including all tributaries and waterways. The West Branch of Panther Creek is primarily a low slope tributary lined with agricultural grasses, and is generally stable. (Gough, 1997)

A detailed survey of the amount and extent of streambank erosion has not been done for this subwatershed. The Woodford County SWCD will complete this survey within the next year.

The type of existing vegetation occurring along the West Branch of Panther Creek is primarily cool-season grasses and trees and shrubs (no detailed survey has been done to date). Pasture or cropland borders most of the corridor. No riparian trees exist until Roanoke (approximately 5 miles), where a thin band exists. This corridor continues until the confluence with the main branch of Panther Creek (approximately 13 miles). The riparian areas are unmanaged woodlands, with a width of 50 feet or less. Approximately 5 miles of filter strips exist along the main corridor of the West Branch of Panther Creek.

Hydrologic Modifications

The upper portion of the West Branch of Panther Creek west of Roanoke and through Roanoke has been channelized. The width of the channel varies from 15 to 30 ft. (J. Schuler). Channeled streams undoubtedly play a role in downstream flooding and sedimentation problems because of their efficiency in carrying stormwater. These channeled ditches do not have floodplains, therefore any capacity for water storage currently does not exist. Downcutting does occur in some areas, with a resulting effect of increased erosion.

Other types of hydrologic modifications include subsurface tiling. Please refer to the **Drainage** section of this report for a discussion about subsurface tiling and its effects on this subwatershed. There are approximately 20 bridges located in this subwatershed, and no dams.

Stormwater Management

Woodford County has adopted the *Model Soil Erosion Ordinance* which was developed by the Tri-County Regional Planning Commission. This ordinance, called the Woodford County Erosion, Sediment, and Storm Water Control Ordinance was put into place on April of 1996. The ordinance describes the type of land projects that are subject to the requirement of a permit, and describes specific standards for the design, and maintenance of control measures for soil erosion, sediment, and storm water. The ordinance states that “no land surface shall be disturbed unless an erosion and sediment control permit, or an

erosion, sediment and storm water control permit, has been issued for that project.” Exceptions to this are:

1. Land disturbing activities which do not involve the construction of any new single or two-family dwellings, and for which the disturbed area is less than 5,000 square feet.
2. Normal agricultural practices
3. Routine maintenance of roads, accesses, and utility service lines.

Furthermore, “the Erosion control Administrator reserves the right to require any non-agricultural, construction development activity, regardless of disturbed area or type of activity, to comply with this article if it is determined to be the cause of or a contributor to an existing or potential erosion, sediment, or storm water impact”.

Those applying for a permit must file the application with the County, in addition to paying a fee and a site specific plan. For any commercial, institutional, multi-family, or industrial project with an area of more than one-half acre, or for a project requiring subdivision approval by a unit of local government with an area of more than one-half acre must also provide the additional information listed below:

1. Existing site conditions map
2. Plan of final site conditions
3. Sediment and Erosion control practices
4. Storm water management plans and controls
5. Schedule or sequence of development of installation of the elements of the site management control measures proposed
6. A detailed estimate of quantities and estimated costs
7. A plan of the continued management and maintenance of such permit control structures.

The issuance of permits, the inspection of control measures, and the enforcement of the ordinance is the duty of an appointed Erosion Control Administrator. Any permit can be revoked by the Erosion Control Administrator if the rules, regulations, or standards of the permit issued are being violated. Any violation is subject to a fine not to exceed \$500 per day. There is an Appeals Board of five members appointed by the County Board Chairman, the Soil and Water Conservation District, and the Tri-County Regional Planning Commission.

The Village of Roanoke has a combined sewer system. There are no other sewer systems within this subwatershed.

Wetlands

Wetlands are an important part of our landscape because they provide critical habitat for many plants and animals and serve an important role in mitigating the effects of storm flow in streams. The hydrogeology of wetlands allows water to accumulate in them longer than in the surrounding landscape, with far-reaching consequences for the natural environment. Wetland sites are important to organisms that require or can tolerate moisture for extended periods of time, and the wetland itself becomes the breeding habitat and nursery for many organisms that require water for early development.

The configuration of wetlands enables them to retain excess rainwater, extending the time the water spends on the upland area. The effect of this retention on the basin is to delay the delivery of water to the main stream. This decreases the peak discharges of storm flow or floods, thus reducing flood damages and the resulting costs. Wetlands also provide valuable water to the stream during periods of low flow. Water seeps from the wetland into the stream, increasing base flows and reducing elevated stream temperatures. The destruction of wetland areas has the opposite effect, increasing peak flood flows and thereby increasing flood damages and costs. During periods of low flow, water does not seep into the stream from upland areas. In stream temperatures increase, and base flows of the stream decrease.

Within the West Branch of Panther Creek, there are 91 acres of non-forested wetlands, and 89 acres of forested wetlands. (IDNR MRAA, Vol. 1, page 1-15). This represents a very small (0.005%) percentage of the total acres within this subwatershed. Former wetlands existed in greater number in this watershed, but the existing floodplains are no longer hydrologically connected to the stream channel. The condition of these wetlands are degraded in diversity and hydrologically impaired.

Fish

The Index of Biological Integrity (IBI) is an aquatic assessment tool used by the Illinois EPA. The IBI evaluates fisheries data by assessment of community structure.

According to 1987 Illinois EPA data, 509 fish were collected at DKKB-01, representing 22 taxa species (1987 Intensive Survey of the Mackinaw River Basin, pg. 44,45). In 1996, M. Retzer repeated data collection and found only 11 taxa species of the 19 total fish collected. This represents a decline of 26 percent in population and a 50 percent decline in diversity. Please find a list of species collected at this site in 1987, and in 1994.

**Fish Species Occurring in 1987 and 1994 at DKKB-01
(Short, 1987, Retzer, 1994)**

<u>Common name</u>	<u>Abundance (1987)</u>	<u>Abundance (1994)</u>
Creek chub	12	3
Hornyhead chub	61	0
Suckermouth minnow	3	1
Striped shiner	97	2
Bigmouth shiner	1	0
Red shiner	5	0
Sand shiner	2	1
Redfin shiner	5	1
Bluntnose minnow	179	3
Common stoneroller	44	1
Golden redhorse	28	0
Northern hogsucker	17	0
White sucker	16	3
Yellow bullhead	1	0
Stonecat	1	0
Smallmouth bass	7	0
Green sunfish	12	0
Longear sunfish	5	0
Rock bass	1	0
Jonny darter	7	1
Orangethroat darter	3	1
Fantail darter	0	1
Shorthead redhorse	2	0

Data is from “Intensive Survey of the Mackinaw River Basin “, M. Short, 1987 and from “Aquatic Classifications and Conservation of Aquatic Communities in the Mackinaw River”, Retzer, 1996.

There were no fish kills reported within this subwatershed.

Habitat: The IBI rating for the West Branch of Panther Creek was **49.1** (1987), an indication of a highly valued aquatic resource. (i.e.: good quality habitat)

Priority Waterbody

The Executive Committee for the Mackinaw River Project has chosen the West Branch of Panther Creek subwatershed as a section 319 subwatershed priority area with the Illinois EPA for 1998 and 1999. Funding received as a subwatershed priority area will be directed towards landowner cost share for continued application of conservation practices within the three subwatershed priority areas, and the entire Mackinaw River watershed. The West Branch of Panther Creek is a Targeted Watershed Approach subwatershed area (Illinois EPA) with a high priority for groundwater issues and a low priority for Multiple Program Interests (Illinois EPA Targeted Watershed Approach, 1997).

The West Branch of Panther Creek subwatershed has been designated by the USDA as an interim EQIP priority area in 1996, and an EQIP priority area for 1997 and 1998. An application for redesignation as an EQIP priority area has been submitted to USDA for 1999 (Schuler, 1998).

The West Branch of Panther Creek subwatershed has qualified for the IDNR C2000 funding from 1996 to present and is part of a larger Ecosystem Partnership priority area for the entire Mackinaw River watershed. In the West Branch of Panther Creek subwatershed, agricultural landowners have been able to access additional C2000 funding through the Conservation Practice Program (CPP) administered by the Woodford County Soil and Water Conservation District office. The USDA Conservation Reserve Enhancement Program (CREP) priority area in Illinois includes the entire Mackinaw River watershed.

Based on the division into Conservation Priority Zones by The Nature Conservancy, the West Branch of Panther Creek is considered to be in a Zone A, which has a high priority for restoration.

Soil Classification

Soil Classifications for West Branch of Panther Creek Subwatershed (Woodford County SWCD, 1998)

Soil Classification	Total Acres	Soil Composition	Slope	Water Table (ft)	Permeability (inches)	Land Use Capability	Erodibility Index	Hydric
Ipava-Sable-Tama	14,456							
Ipava		Silt loam	0-2%	1-3	0-9	I	0.978	no
Sable		Silt clay loam	0-2%	0.5-2	0-16	IIw	0.978	yes
Tama		Silt loam	2-5%	4-6	0-10	IIe	2.98	no
Chenoa-ElPaso-Graymont	9,177							
Chenoa		Silt clay loam	0-2%	1-3	0-14	IIw	0.978	no
El Paso		Silt clay loam	0-2%	0.5-1.5	0-21	IIw	0.978	yes
Graymont		Silt loam	2-5%	4-6	0-10	IIe	4.158	no
Drummer-Flanagan	7,218							
Drummer		Silt clay loam	0-2%	0.5-2	0-11	IIw	0.978	yes
Flanagan		Silt loam	0-2%	1.5-3.5	0-18	I	0.978	no
Harco-Sable-Elkhart	6,525							
Harco		Silt clay loam	0-2%	3-6	0-15	I	1.129	no
Sable		Silt clay loam	0-2%	0.5-2	0-16	IIw	0.978	yes
Elkhart		Silt loam	2-5%	4-6	0-9	IIe	2.980	no
Miami-Birbeck-Hennepin	1,133							
Miami		Silt clay loam	5-10%	3-6	0-9	IIIe	12.82	no
Birbeck		Silt loam	2-5%	3-6	0-9	IIe	3.477	no
Hennepin		Silt loam	25-35%	3-6	0-6	VIe	NA	NA
Ross-Lawson-Sawmill	499							
Ross		loam	0-3%	4-6	0-19	IIw	1.129	no
Lawson		Silt loam	0-2%	1-3	0-22	IIw	0.978	no
Sawmill		Silt clay loam	0-2%	0-2	0-21	IIIw	0.978	yes

Most of the soils found in this subwatershed are considered suitable for agricultural purposes. The majority of acres (65 percent or 20,000 acres) could be considered prime farmland, with 15 percent (16,000 acres) considered HEL (Highly Erodable Land). Overall, the erodability indexes indicate that the soils are generally not highly erodable. The Land Use Classification ratings are from I to III, and are both E (erodable) and W (wet), which indicate that the soils are a combination that support agriculture.

Soil Erosion

Soil erosion is of concern in this subwatershed. As this watershed is almost entirely agricultural, row crop production and some tillage practices expose the soil to erosion. Erosion problems also exist on pastures, forested areas, and areas near where there is urban development (Roanoke). In any given area, some soil erosion will occur naturally. Even agricultural land that is at “1T” (tolerable soil loss), or has a rate of erosion that will sustain soil productivity, may sustain erosion levels that can be detrimental to water quality. Therefore, the total amount of soil erosion, regardless of the cause or whether acres of farmland are at “1T” should be considered.

In the West Branch of Panther Creek, 22,907 acres of farmland are at “1T” or below, 5,079 acres are over “1T” to “2T”, and 2,258 acres are over “2T”. As there is no major urban construction occurring within this watershed, most of the soil erosion is occurring from agricultural sources. The village of Roanoke does contribute to water volume within the streambody after a rain event, but the extent of this contribution to erosion rates has not been estimated.

The soil types with the highest erosion index are the Miami and Birkbeck types, which is a very small percentage of soils within this subwatershed.

There are four distinct types of erosion occurring in the West Branch of Panther Creek. Sheet erosion occurs when unprotected soil is detached by the impact of raindrops and moves uniformly, or in a “blanket” effect from its original location in the field. Rill erosion occurs when stormwater runoff concentrates between crop rows, or in tillage channels, and cuts shallow areas of soil away (Brown et al., 1997). Cropland is the most susceptible to sheet and rill erosion because of frequent periods where the soil is unprotected.

Ephemeral erosion occurs where stormwater runoff concentrates in an area forming large gullies that can still be eliminated by tillage operations. Classic gully erosion occurs when eroded channels too deep to cross with farm equipment are formed in the land. Classic gully erosion causes significant damage, as deep areas of soil are removed where concentrated water flow is unchecked (Brown et al. 1997).

Streambank erosion occurs when streambanks slough into the stream channel. Sloughing is caused by a number of potential sources including streamflows, overbank flows, unstable soil material, heavy equipment use in the floodplain, obstructions in the stream channel, unstable channel bottoms, and livestock trampling. Streambank erosion is of particular concern because one hundred percent of the sediment eroded enters the river channel (Brown et al. 1997).

The following table summarized sheet, rill, ephemeral, gully, and streambank erosion in the West Branch of Panther Creek subwatershed.

Soil Erosion (Brown et al., 1995)

Type	Erosion (tons)	Sediment Delivery Rate	Sedimentation (tons)	Sedimentation transported (tons)	Sedimentation transported (%)
Sheet and Rill	157,282	0.70	115,580		
Ephemeral	12,350	0.80	9,880		
Gully	13,300	0.85	11,305		
Streambank	10,640	1.00	10,640		
Total	193,572		147,405	36,851	25%

Of the total level of sedimentation, it is estimated that approximately 25 percent, or 36,851 tons of sediment is available annually for transport to the stream (Inventory and Evaluation of Erosion and Sedimentation, M. Brown, 1997).

Geology

The geologic foundation of the entire Mackinaw River watershed is bedrock and glacially derived sediments that lie directly beneath the soils and modern sediments at the land surface. The topography of the bedrock surface partly determined the type and distribution of the overlying glacial deposits. These sediments, in turn, determine the area’s groundwater resources, form the parent materials of the region’s rich soils, and play a role in the development of the watershed’s wetland areas. Together, these geologic factors govern the development of the entire range of plant and animal communities within the watershed.

The West Branch of Panther Creek originates on top of the Eureka Moraine where it flows east for approximately 18 miles. It is considered a low slope headwater stream, and its banks vary from clay to silt, with coarser stone imbedded. The bed material is composed of coarse glacial till-gravels and cobbles with sand, with occasional clay or silt in areas. (Gough, 1994)

The sediments that overlie bedrock were deposited by a succession of glaciers that advanced across the area during the Pleistocene Epoch, or Great Ice Age. These sediments fall into two major categories: till and outwash. Overlying the deposits of glacial origin is a windblown silt (loess) of late glacial and postglacial age. Collectively, glacial sediments are called glacial drift.

The land surface of the watershed consists of Wisconsin glacial till and secondarily deposited alluvium and loess subsequent to the glaciation. (A Natural

and Cultural Resource Assessment of the Mackinaw River Basin, 1985) The thickness of Glacial Drift in this watershed is fairly thin, mostly less than 100 feet.

The only mineral produced in the Mackinaw River Watershed is construction sand and gravel. There are no active sand and gravel pits, no areas of significant sand and gravel deposits within this subwatershed. (IDNR Mackinaw River Area Assessment map, Vol. 1, pg. 2-17)

Topography

The West Branch of Panther Creek subwatershed drains an area of approximately 37,630 acres or 59 square miles. The elevation of the subwatershed changes from 736 feet above mean sea level (ft. msl) to 650 ft. msl. Drainage patterns have been drawn for the subwatershed, and a map attached to this report has each stream order indicated.

The drainage density is determined by the total acres in the watershed divided by the miles of stream. The drainage density for the West Branch of Panther Creek was calculated at 66.4 acres per mile.

Land Use

Rural

Agriculture is the dominant land use in this subwatershed (95 percent of total acres), as it is for the entire Mackinaw River watershed. Approximately 32,285 acres (83 percent) are devoted to row crop production, 5,400 acres are in hayland production, 4,479 acres in pasture, and 521 acres in small grains. The dominant crops are corn and soybeans.

The average size of farms in this subwatershed is 300 acres, with a total number of farmsteads of about 60. Data is not available regarding the percent of land in cash rent and the percent of land in crop share farming, nor the number of absentee landowners. Values for agricultural acreage varies from \$3,000 per acre to \$4,000 per acre.

There are from 5,000-10,000 head of hogs in the West Branch of Panther Creek subwatershed. There are no major cattle producers, but many farms do have from 5-50 head of cattle. Five hog confinement operations are located in this subwatershed. There are no open feedlots.

The woodland resources include 981 total acres of woodland, 392 acres of closed canopy deciduous trees, 418 acres of open canopy deciduous trees, and 171 acres of forested wetlands. (ISWS, Varner, 1997) Mesic upland forest is the most prevalent type found in the entire Mackinaw River watershed, and to date,

no detailed data is available for this subwatershed. It can be assumed that the canopy tree species would include various types of oaks, hickories, maples, walnut, black cherry, basswood, and white ash. Subcanopy species would include mulberry, alternate-leafed dogwood, hop hornbeam, paw paw, and Ohio buckeye. (IDNR Mackinaw River Area Assessment, Vol. 1, pg. 4-20) The condition and value of these woodland resources has not been assessed. There are no known commercial or private logging operations within this subwatershed, and human use of the woodland resources would be shade for homes, firewood, and esthetics.

Urban

There are 37.5 acres of major roadways in the West Branch of Panther Creek, and these are State Rt. 116/117 (approximately 10 miles), which passes over the West Branch of Panther Creek, and Woodford County Routes 13 and 5. Active railroads comprise 58.3 acres, and 40 acres are abandoned railroads. (ISWS, Varner, 1997)

The only major municipality is the village of Roanoke, with a population of 1,910 individuals. (1990 census) The population has remained stable from the years 1990 to 1995. A proposed new roadway may impact growth and development in this area. Zoning ordinances are the domain of Woodford County. Woodford County has adopted the *Model Soil Erosion Control Ordinance*, developed by the Tri-County Regional Planning Commission. For details about this ordinance, refer to the section on **Stormwater Management**.

There are no major industries located in this subwatershed. Commercial businesses located in or near Roanoke are gas stations (3), car dealerships (2), a furniture store, grocery store, post office, a trucking company, feed store, grain elevator, and a fertilizer company. There are no airports, railways, or bus services.

Woodford County has a population of 32,653 (1990) individuals, with an increase of 17 percent from 1970 to 1990. There is projected growth of 8 percent in the area, with an increasing number of households moving from the larger urban areas of Bloomington-Normal and Peoria. The development potential for this subwatershed is fairly minimal however, as is it comparatively more distant than that of other locations in the Mackinaw River watershed from major roadways (I-74, I-39, I-55). Most of the growth in Woodford County is located near Metamora, Germantown Hills, Eureka, and Goodfield. If however, a proposed roadway from Peoria to Chicago were approved, it would impact development and growth in this subwatershed. To date, approximately 200 acres are enrolled in the CRP program, which is about 6 percent of the total acres in Woodford County.

Illegal dumps may be present in the West Branch of Panther Creek subwatershed, but no data is present to confirm this. There is one inactive landfill

(Amigoni) located near Roanoke. There are two fertilizer companies, Farm Services and Studer Fertilizer, located in or near Roanoke.

There are 13 Natural Areas and Nature Preserves within the entire Mackinaw River watershed encompassing 2,783 acres of land. None of these areas are located within the West Branch of Panther Creek subwatershed (CTAP, 1997).

The Mackinaw River is a primary fishing site in Central Illinois because of the biological integrity of the stream and its supply of Smallmouth bass and channel catfish. In 1994, Illinois registered 4,985 boats alone within the watershed (CTAP, 1997). It is not known how many of these were registered within the West Branch of Panther Creek subwatershed.

Information is available concerning reported hunting activity in the entire Mackinaw River watershed. Within the West Branch of Panther Creek subwatershed, many residents hunt available grasslands and woodlands, and game harvested is included in these numbers (CTAP, 1997).

Hunting Activity (CTAP, 1997)

Game	# of Hunters	Days Afield	Harvest
Deer (Archery)	2,119	49,006	898
Deer (Shotgun)	3,342	12,541	2,410
Pheasant	6,593	41,375	26,416
Rabbit	5,467	32,392	32,406
Squirrel (Fox)	3,523	20,701	27,134
Squirrel (Gray)	820	3,122	4,395
Dove	2,851	14,372	43,146

**Note - Hunting data is from IDNR's "Hunter Activity and Wildlife Harvest in Illinois: County Averages for 1989-1993.

One abandoned mine is located in this subwatershed area, and it is located in Roanoke. There are no underground cables or pipelines. 29 underground storage tanks are located in or near Roanoke.

There were 38 sign-ups in Woodford County for the 1997 EQIP program. These included terraces, conservation tillage, structures, etc.

The best management practices indicated for this subwatershed (according to the “Mackinaw River Basin Assessment of the Conservation Treatment Needs” report by the USDA) include the following:

Recommended Best Management Practices for the West Branch of Panther Creek Subwatershed (Brown et al., 1996)

Conservation Tillage (acres)	780
Contouring (acres)	32
Terraces (ft)	4,675
WASCOBs (#)	404
Structures (#)	22
Waterways (acres)	76.76
Filterstrips (ft)	265,600

Stormwater runoff and detention/retention basins would be recommended for the village of Roanoke.

Air Quality

There are no controlled or permitted toxic releases to air within this watershed. The climate for Illinois is classified as humid continental. Most of the precipitation occurs between April and September (May, June and July the wettest months), with precipitation average for the entire Mackinaw River watershed at 35 inches per year. The average rainfall yearly for the Roanoke area ranges from 32 to 60 inches per year. (1992-1996). The wettest year was in 1993. The average temperature ranges for the Mackinaw River watershed are from a mean low of 16 degrees F to a mean high of 87 degrees F. The mean annual temperature is 51.8 degrees F. There is not a great deal of year to year variability in mean annual temperatures, but there may be a return to a warming trend. (Mackinaw River Area Assessment, Vol. .1, pg. 3-12)

Wildlife

Threatened or Endangered Species

The following is a list of the threatened and endangered species that occur or are likely to occur in the entire Mackinaw River watershed. Specific locations of many of these organisms were not provided with the data in order to further protect their existence. This information is provided by Dr. Michael Retzer, who performed an extensive freshwater mussel survey within the drainage, and CTAP.

Threatened and Endangered Species Occurring in the Mackinaw River Watershed (Retzer, 1997, CTAP, 1997)

Plants

heart-leaved plantain	State Endangered
spreading sedge	State Threatened
tall sunflower	State Endangered

Birds

Long-eared owl	State Endangered
Short-eared owl	State Endangered
Loggerhead shrike	State Threatened
Brown Creeper	State Threatened

Amphibians and Reptiles

Kirtland's snake	State Threatened
Illinois chorus frog	State Threatened
Illinois mud turtle	State Endangered
Western hognose snake	State Threatened

Mussels

round pigtoe	State Endangered**
slippershell	State Endangered**
elktoe	State Endangered**
rainbow	State Endangered

**indicates that records exist for these species within the upper Mackinaw River subwatershed.

Birds

Bird species will not be listed in this report because the list is far too long. Many species of birds only summer and nest in the Mackinaw River watershed, and migrate to another location to overwinter. For more information on birds, please reference CTAP, Mackinaw River Area Assessment, Volume 1, 1997.

Mammals

Forty-five mammal species are known to exist in the Mackinaw River Basin (CTAP, 1997). Their occurrence is dependent upon adequate habitat and the population status of these species is unknown. Data was not available as to how many of these species are found within the upper Mackinaw River subwatershed. The following list was obtained from CTAP, 1997.

Mammal Species Known or Likely to Occur in the Mackinaw River Watershed (CTAP, 1997)

<u>Common name</u>	<u>Population status</u>
Virginia opossum	Common
masked shrew	Common
northern short-tailed shrew	Common
least shrew	Common
eastern mole	Common
little brown bat	Common
northern long-eared bat	Common
silver-haired bat	Uncommon
eastern pipistrelle	Common
big brown bat	Common
red bat	Common
hoary bat	Uncommon
evening bat	Uncommon
eastern cottontail rabbit	Common
eastern chipmunk	Common
woodchuck	Common
thirteen-lined ground squirrel	Common
Franklin ground squirrel	Uncommon
gray squirrel	Common
fox squirrel	Common
southern flying squirrel	Common
plains pocket gopher	Common
beaver	Common
western harvest mouse	Common

Mammal Species Known or Likely to Occur in the Mackinaw River Watershed (CTAP, 1997) (continued)

<u>Common name</u>	<u>Population status</u>
deer mouse	Common
white-footed mouse	Common
meadow vole	Common
prairie vole	Common
pine vole	Uncommon
muskrat	Common
southern bog lemming	Common
Norway rat (exotic)	Common
house mouse (exotic)	Common
meadow jumping mouse	Uncommon
coyote	Common
red fox	Common
gray fox	Uncommon
raccoon	Common
long-tailed weasel	Common
mink	Common
badger	Uncommon
striped skunk	Common
river otter	State Endangered
white-tailed deer	Common

Butterflies and Skippers

Twenty-one species of butterflies and skippers are known to occur in McLean County within the Mackinaw River Watershed. They are the black swallowtail, zebra swallowtail, cabbage butterfly (exotic), clouded sulfur, bronze copper, Dione copper, eastern tailed blue, spring azure, harvester, hackberry butterfly, tawny emperor, viceroy, question mark, hop merchant, silvery checkerspot, pearl crescent, regal fritillary, great spangled fritillary, variegated fritillary, monarch, and dun skipper (CTAP, 1997).

Amphibians and Reptiles

There are 13 amphibian species and 25 reptile species known or likely to occur in the Mackinaw River watershed (CTAP, 1997). A complete listing providing common name and abundance information is provided.

Amphibian and Reptile Species Known or Likely to Occur in the Mackinaw River Watershed (CTAP, 1997)

<u>Common name</u>	<u>Abundance</u>
smallmouth salamander	Common
tiger salamander	Uncommon
eastern newt	Uncommon
American toad	Common
Fowler's toad	Common
cricket frog	Common
striped chorus frog	Common
Illinois chorus frog	State Threatened
Cope's gray treefrog	Common
eastern gray treefrog	Common
bullfrog	Common
northern leopard frog	Uncommon
plains leopard frog	Uncommon
snapping turtle	Common
painted turtle	Common
Blanding's turtle	Rare
Illinois mud turtle	State Endangered
map turtle	Uncommon
spiny softshell turtle	Uncommon
ornate box turtle	Rare
slender glass lizard	Rare
six-lined racerunner	Rare
eastern hognose snake	Uncommon
western hognose snake	State Threatened
racer	Uncommon
smooth green snake	Uncommon
rat snake	Uncommon
fox snake	Common
bullsnake	Uncommon
milk snake	Uncommon
prairie kingsnake	Common
western ribbon snake	Uncommon
plains garter snake	Common
common garter snake	Common
brown snake	Common
red-bellied snake	Uncommon
Graham's crayfish snake	Uncommon
northern water snake	Common

To date, no specific survey of wildlife species (other than fish and macroinvertebrates) has been done in this subwatershed. Therefore, the existence

of endangered or threatened species is not known at present. However, just north of the confluence with the Main branch of Panther Creek, the Elk Toe (*Alasmidonta marginata*) mussel was found. (Retzer, 1994)

Socio-Economic/Human Resources

There has not been an analysis done on specific demographic data for this subwatershed. The following data represents demographics for Woodford County.

The population of Woodford County is 32,653. Of that number, there are 1,910 people who live in the village of Roanoke. There are an estimated 980 rural residents of the West Branch of Panther Creek subwatershed. The average annual income of Woodford County residents is \$40,037. Woodford County unemployment rate is fairly low. The minority population is very low, less than 1 percent. The median age for Woodford County is 34.1.

The economy of Woodford County is primarily agricultural or agricultural related. (Specific economic characteristics of Woodford County are found in IDNR Mackinaw River Area Assessment, Vol. 2) The only potential source of conflict between farmers and non-farmers would be that of a proposed new roadway which would disrupt farmland and other areas near Roanoke. At present, there are no mega hog farm issues in this subwatershed.

The Panther Creek watershed has 618 acres of major roadways, (37.5 in the West Branch of Panther Creek. The only major roadway is State Route 116/117.

This subwatershed has a very strong agricultural identity, and the village of Roanoke is typical of a small farming related, rural town or village. A rural atmosphere is most definitely present.

Outreach programs that are available to subwatershed residents are through the Woodford County NRCS/SWCD, the University of Illinois Extension Service, The Nature Conservancy via the Mackinaw River Project, the State of Illinois IDNR and through the federal government (USDA) programs such as CRP, CREP, WRP, and EQIP.

The only agricultural association found in this subwatershed is the Woodford County Farm Bureau, which would represent farmers within the West Branch of Panther Creek. The Farm Bureau is located in Eureka.

The Woodford County Soil and Water Conservation District, which would assist landowners within this subwatershed on conservation issues is located in Eureka.

There are no Conservancy districts located in this subwatershed, no drainage districts, and no Federal or State agencies. There are no environmental organizations located in this subwatershed.

The Woodford County seat is located in Eureka. Media/Educational Outlets: The Roanoke Review and the Woodford County Journal are two weekly newspapers available to residents of this subwatershed. These papers cover local (Roanoke and Eureka) and county wide (Woodford) issues. Other media sources are The Peoria Journal Star, located in the Peoria, and the Pantagraph, located in the Bloomington-Normal area.

There are approximately 60 farmsteads located within the West Branch of Panther Creek. The average size of these farms is 300 acres, 78 percent of which have been operated by the same operator for over 10 years. The average farm gross income estimated from 1993 Farm cash receipts is \$75,000. (Woodford County) Statistics from 1996 (Illinois Agricultural Association) show that 23 farms earned \$25,000 or less. Forty percent of farm operators own their farm, 42 percent own some and lease some acreage, and 18 percent lease the entire acreage.

No portion of the West Branch of Panther Creek has recreational opportunities available to the public. Fishing, hunting, and hiking would be the primary recreational pursuits, however, this would be limited to private landowners and their guests.

School age children attend schools within the Roanoke-Benson School District 60. The closest higher educational opportunities are Eureka College (Eureka), Illinois Central College (East Peoria), Bradley University (Peoria), and Illinois State University (Normal).

There has been tremendous interest and support for improving this watershed from the community of Roanoke, and in particular, the students at Roanoke High School. The Woodford County SWCD office staff and John Schuler (NRCS District Conservationist) have also been very supportive and helpful.

Component #5 Problem Statement

Problem #1

High velocity and volume of water after a storm event, caused primarily by altered hydrology, which enters the West Branch of Panther Creek is resulting in an increase in streambank erosion and sedimentation, and thereby a decline in water quality. Altered hydrology may include channelization, subsurface tiling, and the loss of functional wetlands.

Problem #2

High levels of chemical pollutants and fecal coliform concentrations caused by excessive nutrient runoff from agricultural fields, stormwater runoff, and untreated sewage discharge into the West Branch of Panther Creek is resulting in a decline in water quality.

Problem #3

Water quality and wildlife diversity within the West Branch of Panther Creek subwatershed has decreased due to the loss of wetland areas, a decrease in natural riparian areas, and increased water flows due to urbanization and agricultural practices within the subwatershed.

Problem #4

There is lack of awareness about the relationship between land use and the condition of the river/stream, and the value of our water resources. This results in a need for additional conservation practices to improve water quality.

Component #6 Goals and Objectives

Goal #1

To reduce the volume and velocity of water which enters the West Branch of Panther Creek after a storm event, thereby reducing sediment loads and erosion and improving water quality.

Objective #1

- A. To reduce and retain where possible, surface and subsurface runoff on 23,400 acres by promotion of such Best Management practices as Terraces, Conservation Tillage, WASCOS, Contouring, Waterways, Filter Strips, Stormwater detention/retention basins, etc.
- B. To establish wetlands and stable riparian areas on 2,000 acres within the West Branch of Panther Creek subwatershed.

Goal #2

To reduce the levels of chemical pollutants and fecal coliform levels that occur in the West Branch of Panther Creek which would contribute to an improvement in water quality.

Objective #2

- A. Promote the use of conservation tillage practices, grass waterways and filter strips.
- B. Provide education and assistance to landowners to improve riparian corridors.
- C. Provide technical assistance and support for the management of nutrients and human sewage.

Goal #3

To increase the awareness and application of Best Management practices of residents, which will improve water quality within the watershed.

Objective #3

- A. Provide educational opportunities, technical and financial assistance to residents of the watershed to learn about water resources and watershed management.

Components #7, #8, and #9 Implementation Strategies, Cost Summary, and Measuring Progress

Strategy #1: Agricultural Best Management Practices

Utilize NRCS Whole Farm Planning and available funding to reduce soil loss on sixty percent of this subwatershed. Practices could include:

<u>Type</u>	<u>Quantity</u>	<u>Cost Per Unit</u>	<u>Total Cost</u>
Conservation tillage (ac)	4,280	\$10.00	\$42,800
Contouring (ac)	32	variable	no data
Terraces (ft)	4,675	\$5.00	\$23,375
Water and Sediment Control Basins (#)	404	\$1000	\$404,000
Structures (#)	22	\$4000	\$88,000
Waterways (ac)	76.76	\$1300	\$100,000
Filterstrips (ft)	265,699	variable	\$200,000
Total Cost			\$858,175

Schedule of Completion

5 years. Start dates: Summer, 1998, variable sign-up dates thereafter.

Agency-organizational Roles/Resources

USDA/NRCS/SWCD will provide technical assistance and financial assistance. TNC/MRP: outreach and education, promotion of programs.

Environmental Impacts

These Best Management practices will reduce soil erosion, reduce volume and velocity of stormwater, and reduce sediment and nutrients delivered to streambodies. When implemented, these practices will achieve goals #1-3.

Projected Cost

See above

Funding Sources

Federal: USDA (EQIP, CRP, CREP); State: Illinois EPA, IDNR (C-2000); Private: TNC/MRP, Pheasants Forever, Monsanto Green Strip Program

Measuring Progress

Progress can be determined by the number of BMP and acreage enrolled within five years. Stream team (volunteer) water quality monitoring, hydrological data collection, estimation of soil erosion and sedimentation

will also be used to measure progress. The amount of landowner participation in these programs within the watershed can also indicate progress.

*Based upon research by the City of Bloomington, The University of Illinois, and Illinois State University on wetland treatment of surface and subsurface runoff from agricultural fields, the Mackinaw River Project would like to demonstrate field tile treatment wetlands in each subwatershed.

Strategy #2: Wetlands

Identify and promote protection, construction, and/or restoration of suitable wetland areas and promote sidestream storage of water. An increase of 5 percent (2,000 acres) in wetland areas in this subwatershed is desirable.

Schedule of Completion

5 years. Start date: Summer, 1998

Agency-organization Roles/Resources

USDA/NRCS/SWCD: design, technical, and financial assistance; IDNR: financial assistance, seed, trees. TNC/MRP: technical and financial assistance, labor, education and promotion. Illinois EPA: 319 funding. US Fish and Wildlife: funding. Army Corps of Engineers: permits

Environmental Impacts

Wetlands will reduce volume and velocity of water, treat nutrients, and enhance/increase habitat and biological diversity. This will achieve objectives #1-3.

Projected Cost

\$1,200 per acre. Earth work: \$2.70/cubic yard. Water level control structures installed: \$250-2,500 each. Seeding: \$600/acre. Field tile removal: \$500/acre. **Total costs: approximately \$4,625,000.**

Funding Sources

Federal: USDA (CRP, CREP, WRP). State: IDNR(C-2000). Private: TNC/MRP (\$, labor), Pheasants Forever (seed, equipment), Landowners (cost-share, labor, equipment).

Measuring Progress

Progress can be determined by acres constructed or restored, Stream Team (volunteer) monitoring of water quality, and the number of landowners participating.

Strategy #3: Wetlands for Communities

Provide assistance to the village of Roanoke in this subwatershed for the demonstration of constructed wetland treatment of wastewater, including nutrients and human sewage. Quantity: one (Roanoke)

Schedule of Completion

3 years. Start date: Summer, 1998

Agency-organization Roles/Resources

Illinois EPA (permits). USEPA: financial and technical assistance. TNC/MRP: technical, financial assistance. Wetland Initiative: technical and financial assistance. Local government/Village of Roanoke: land acquisition, financial. Army Corp of Engineers (permits).

Environmental Impacts

This strategy will treat nutrients and human sewage in communities wastewater. This achieves objective #2C.

Projected Cost

An estimated \$50,000 to \$100,000 will be used for design and construction of the demonstration wetland. This excludes the cost of land acquisition. **Total costs: estimated at from \$50,000 to \$100,000.**

Funding Sources

Federal: USEPA. State: Illinois EPA, Local community, Private: TNC/MRP, Wetlands Initiative.

Measuring Progress

Ambient water quality monitoring, including nutrients, fecal coliform and fecal strep.

Strategy #4: Streambank Stabilization

Stabilize streambanks where needed, encouraging the use of natural materials and native vegetation (buffer strips). Quantity: fifteen percent (3 miles) of streambank need stabilization in this watershed.

Schedule of Completion

3 years. Start date: Summer of 1998.

Agency-organization Roles/Resources

Illinois EPA (319), USDA/NRCS/SWCD: technical and financial assistance, education/promotion. IDNR (C-2000): financial. TNC/MRP: education and promotion, technical, financial. Pheasants Forever: financial.

Environmental Impacts

Reduction of streambank erosion and sedimentation. Increase habitat and biological diversity. This achieves goal #1 Objective B.

Projected Cost

Critical area seeding: \$190/acre. Vegetative streambank: \$20/linear foot. **Total costs: approximately \$320,220**

Funding Sources

Federal: CREP, CRP. State: IDNR: C-2000. Private: TNC/MRP (funding, labor, equipment), landowners (labor, equipment, cost-share).

Measuring Progress

Miles of streambank stabilized, Stream Team (volunteer) monitoring of stream and assessment of vegetative cover.

Strategy #5: Biological Diversity

Identify and enhance/restore natural plant areas compatible with soil type and historical use. (Historic use refers to Transect notes, centennial photos, and other historical records). Establish, restore or widen riparian zones where desirable. Within 15 years, target a minimum of 10 percent (3,800 acres) of the subwatershed to be in natural cover (Forest, savanna, prairie), with a target of approximately 60 percent (400 acres) of the riparian corridor in native vegetation.

Schedule of Completion

15 years. Start date: Summer, 1998.

Agency-organization Roles/Resources

USDA/NRCS/SWCD: CRP, WHIP, technical assistance. IDNR: funding (C-2000, Forestry Programs, Wildlife Habitat). TNC/MRP: financial and technical assistance. Pheasants Forever: financial

Environmental Impacts

Reduce volume and velocity of water, enhance and increase habitat and biological diversity, reduce erosion and sedimentation. This will achieve objectives #1-3.

Projected Cost

Technical assistance to identify natural community types: \$1,000. Land acquisition/easement costs: variable (based on type and location). Restoration of natural plant communities: \$500 per acre. **Total costs: approximately \$2,201,000.**

Funding Sources

Federal: USDA (CRP, CREP). State: IDNR (C-2000, Forestry Incentive Program, Partners for Wildlife). Private: TNC/MRP (funding, labor, technical assistance), Pheasants Forever(seed, equipment), Landowners (labor, cost-share, equipment)

Measuring Progress

The number of acres restored, number of landowners participating, Stream Teams (volunteer), EcoWatch.

Strategy #6: Stormwater Control

Enhance participation of rural landowners and the village of Roanoke (developers, businesses, civic organizations) in programs to control runoff, bank erosion, pollution, and soil loss. These will include installation of farm ponds, terraces, grade control structures, retention/detention basins, constructed wetlands, stormwater/erosion control ordinances, and Urban BMP's.

Schedule of Completion

15 years. Start date: Summer, 1999.

Agency-organization Roles/Resources

Illinois EPA-319 (funding and technical assistance, NRCS/SWCD (technical assistance, funding), Local government (funding, planning), Army Corps of Engineers (permits), TNC/MRP: education/promotion, financial and technical assistance.

Environmental Impacts

Reduce volume and velocity of water. Objective #1 will be achieved by this strategy.

Projected Cost

Rural - Farm ponds: Earth work \$2.60/cubic yard, overflow pipe \$20-80/ft. Seeding \$190/acre. Estimated costs for 10 farm ponds: \$105,000. Constructed field tile outlet wetlands: \$1,200 per acre, Tile outlet control structure \$2,500 each, Critical seeding \$600/acre. Estimated costs: \$152,000. (Other rural water retention/detention BMP are included in costs projected for Strategy #1.)

Urban - Detention/retention basins: estimated costs \$500,000

Total Costs: \$757,000

Funding Sources

Federal: USDA(EQUIP). State: Illinois EPA (319). Local government: Village of Roanoke. Private: Landowners (cost-share), developers, TNC/MRP.

Measuring Progress

Soil erosion reduction estimates, sedimentation reduction estimates, peak flooding levels (Stream teams).

Strategy #7: Nutrient Management

Provide and promote nutrient management for livestock producers and work with local agricultural chemical dealers to reduce overapplication of fertilizers and pesticides. Provide soil testing on fifty percent of the total acreage (16,350 acres) in row crop production for five years. This strategy will be accomplished through provision of information (newsletters, mailings, conferences, workshops), and the development of farm nutrient and pesticide management plans based on realistic productivity goals. Quantity: For soil testing quantity, see information above. One conference/workshop per year, three newsletters, mailings dependent on programs. (This strategy will be accomplished throughout the watershed.)

Schedule of Completion

5 years. Start date: November, 1998.

Agency-organization Roles/Resources

Illinois EPA (319), USDA/NRCS/SWCD: workshops, funding;
Agricultural businesses: (Monsanto, DuPont) funding, mailing;
TNC/MRP: newsletters, conferences/workshops.

Environmental Impacts

Reduction of nutrient loading, improvement in water quality. This will achieve Objective #2C and #3.

Projected Cost

Soil testing: \$5.25/acre (GPS). For newsletters, mailings, and workshop/Conference Cost, refer to Strategy #8. **Total cost per year: \$85,838. Total cost for 5 years: \$429,188.**

Funding Sources

Federal: USDA (EQIP) for workshops/conference. State: Illinois EPA (319). Private: local agricultural business, Farm Bureau, TNC/MRP, for newsletters and mailings, Landowners.

Measuring Progress

Reduced application of nutrients and pesticides, number of landowner participation, attendance at conferences/workshops.

Strategy #8: Education

Develop a network of educational activities through which information about the watershed and available programs can be disseminated. This would include conferences, newsletters, mailings, a resource handbook, Stream Teams (organization and training) and coordination of workshops, watershed tours, and development of educational materials. (*Note: In order for this to be cost-effective, this strategy needs to be watershed, not sub-watershed wide)

Schedule of Completion

5 years. Start date: Summer 1998.

Agency-organization Roles/Resources

USDA/SWCD: conferences, workshops, mailings, resource handbook.
TNC/MRP: conferences, workshops, newsletters, resource handbook, watershed tours, Stream teams. IDNR: EcoWatch, C-2000, educational materials. Farm Bureaus: meeting facilities, watershed tours.

Environmental Impacts

Increased awareness and participation in conservation practices. This achieves Objective #3.

Projected Cost

Newsletter: \$3,000 per year (three newsletters); mailings: \$1000 per year ; Conference/Workshops: \$8,000 per year (1 per year); Resource handbook: \$60,000. Stream Teams: \$5,500 per team. **Total costs: \$120,000 for five years. Total costs per subwatershed for five years: \$13,000.**

Funding Sources

Federal: USDA/NRCS (EQIP), USEPA. State: IDNR/C-2000, Eco-Watch (training). Private: TNC/MRP, Schools, Farm Bureau.

Measuring Progress

Stakeholder surveys, number of volunteers, participation in conferences/workshops.

**Total Cost Summary for Implementation Strategies
West Branch Panther Creek Subwatershed**

#1: Agricultural Best Management Practices	\$858,175
#2: Wetlands	\$4,625,000
#3: Wetlands for the Village of Roanoke	\$100,000
#4: Streambank Stabilization	\$320,220
#5: Biological Diversity	\$2,201,000
#6: Stormwater Control	\$757,000
#7: Nutrient Management	\$429,188
#8: Education	\$120,000
Total:	\$9,410,583

References

- Anderson, C. , et. al 1985. A Natural and Cultural Resources Assessment of the Mackinaw River Basin: A report submitted to the United States Army Corps of Engineers. Illinois State University, Department of Biological Sciences.
- Brown, K. 1998. Upper Mackinaw River Watershed Maps and Land Use Data. Illinois State Water Survey, Champaign, IL.
- Brown, M., S. Hartzold, K. Bohnhoff, C. Myers, J. Schuler. 1997. 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. Champaign, IL.
- Gough, S. 1994. Geomorphic Reconnaissance and Draft Management Strategy for the Mackinaw River Ecosystem Illinois. DRAFT. The Nature Conservancy, Illinois Field Office. Peoria, IL.
- Gough, S. 1997. Stream Classification and Assessment: A Report to The Nature Conservancy and the Illinois Department of Natural Resources. Steve Gough & Associates. Champaign, IL.
- Illinois Department of Natural Resources. 1997. Mackinaw River Area Assessment, Volume I and II. Springfield, IL.
- Illinois Environmental Protection Agency. 1994-1995. Illinois Water Quality Report, Volume I and II. Springfield, IL.
- Kelley, T. 1996. Monitoring of Physiochemical and Microbial Indicators of Pollution in the Mackinaw River: A Report to The Nature Conservancy.
- Retzer, M. 1997. Aquatic Classifications and Conservation of Aquatic Communities in the Mackinaw River, Illinois. The Nature Conservancy, Illinois Field Office. Peoria, IL.

Retzer, M. 1997. Assessment of the Water Quality, Fish, and Mussel Communities in the Mackinaw River, Illinois. The Nature Conservancy, Illinois Field Office. Peoria, IL.

Retzer, M. 1996. Mackinaw River Drainage Site Conservation Plan. DRAFT. Unpubl. The Nature Conservancy, Illinois Field Office. Peoria, IL.

Schneider, D., R. Farrell, D. Fathke, J. Kowalski, T. Mahr. 1995. Point Source Pollution in the Mackinaw River Watershed. (Report to The Nature Conservancy). Department of Urban and Regional Planning, University of Illinois. Urbana, IL.

Schuler, J. Woodford County NRCS District Conservationist. 1998. Personal interview.

Short, M. 1987. An Intensive Survey of the Mackinaw River Basin 1987. State of Illinois Illinois Environmental Protection Agency Division of Water Pollution Control Planning Section. Springfield, IL.

Short, M. B., T. G. Kelly, J. E. Hefley, and W. H. Ettinger. 1996. An Intensive Survey of the Mackinaw River Basin 1994. State of Illinois Environmental Protection Agency Division of Water Pollution Control Planning Section. Springfield, IL.

United States Department of Agriculture. 1996. Illinois Agricultural Statistics. Bull. 96-1.

Woodford County, Illinois: Erosion, Sediment, and Storm Water Control Ordinance. 1996.

Woodford County Soil and Water Conservation District. 1996. 1996 BSWC Transect Survey Data. United States Department of Agriculture Natural Resource Conservation Service. Eureka, IL.