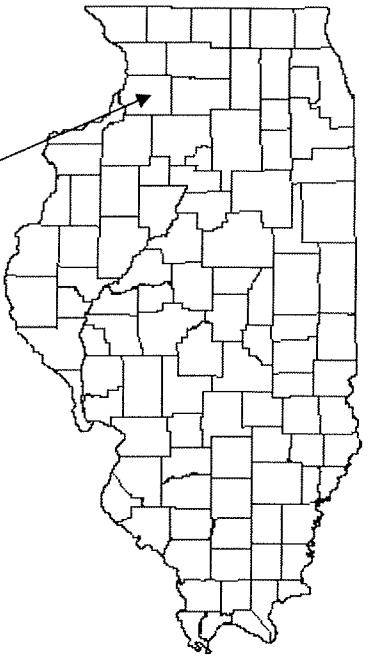
FLOOD INSURANCE STUDY

WHITESIDE COUNTY, ILLINOIS
AND INCORPORATED AREAS

COMMUNITY NAME	COMMUNITY NUMBER
ALBANY, VILLAGE OF	170688
*COLETA, VILLAGE OF	171370
DEER GROVE, VILLAGE OF	170948
ERIE, VILLAGE OF	170689
FULTON, CITY OF	170690
LYNDON, VILLAGE	170917
MORRISON, CITY OF	170691
PROPHETSTOWN, CITY OF	170692
ROCK FALLS, CITY OF	170694
STERLING, CITY OF	170693
*TAMPICO, VILLAGE OF	171371
WHITESIDE COUNTY (UNINCORPORATED AREAS)	170687

*NO SPECIAL FLOOD HAZARD AREAS IDENTIFIED



Federal Emergency Management Agency

FLOOD INSURANCE STUDY NUMBER

17195CV000B

Revised: February 17, 2017

NOTICE TO
FLOOD INSURANCE STUDY USERS

Communities participating in the National Flood Insurance Program have established repositories of flood hazard data for floodplain management and flood insurance purposes. This Flood Insurance Study (FIS) may not contain all data available within the Community Map Repository. It is advisable to contact the Community Map Repository for any additional data.

The Federal Emergency Management Agency (FEMA) may revise and republish part or all of this FIS report at any time. In addition, FEMA may revise part of this FIS by the Letter of Map Revision process, which does not involve republication or redistribution of the FIS. It is, therefore, the responsibility of the user to consult with community officials and to check the Community Map Repository to obtain the most current FIS components.

Selected Flood Insurance Rate Map panels for this community contain information that was previously shown separately on the corresponding Flood Boundary and Floodway Map panels (e.g., floodways, cross sections). In addition, former flood hazard zone designations have been changed as follows:

Old Zone(s)	New Zone
A1 through A30	AE
B	X (shaded)
C	X

Initial Countywide FIS Effective Date: February 18, 2011

Revised Countywide FIS Date: February 17, 2017 - Revision made to reflect the accreditation of formerly provisionally-accredited levees.

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WHITESIDE COUNTY, ILLINOIS AND INCORPORATED AREAS

1.0 INTRODUCTION

1.1 Purpose of Study

This Flood Insurance Study (FIS) revises and supersedes the FIS reports and/or Flood Insurance Rate Maps (FIRMs) and/or Flood Hazard Boundary Maps (FHBMs) in the geographic area of Whiteside County, Illinois, including: the Cities of Fulton, Morrison, Prophetstown, Rock Falls and Sterling; the villages of Albany, Coleta, Deer Grove, Erie, Lyndon, and Tampico, and the unincorporated areas of Whiteside County (hereinafter referred to collectively as Whiteside County) and aids in the administration of the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973. This study has developed flood-risk data for various areas of the county that will establish actuarial flood insurance rates and to assist the county in its efforts to promote sound floodplain management. Minimum floodplain management requirements for participation in the National Flood Insurance Program (NFIP) are set forth in the Code of Federal Regulations at 44 CFR, 60.3.

Note that the Villages of Coleta and Tampico have no special flood hazard areas (SFHAs) identified.

In some states or communities, floodplain management criteria or regulations may exist that are more restrictive or comprehensive than the minimum Federal requirements. In such cases, the more restrictive criteria take precedence and the State or other jurisdictional agency will be able to explain them.

The Digital Flood Insurance Rate Map (DFIRM) and FIS report for this countywide study have been produced in digital format. Flood hazard information was converted to meet the Federal Emergency Management Agency (FEMA) DFIRM database specifications and Geographic Information System (GIS) format requirements. The flood hazard information was created and is provided in a digital format so that it can be incorporated into a local GIS and be accessed more easily by the community.

1.2 Authority and Acknowledgments

The sources of authority for this FIS are the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973.

This FIS was prepared to include all jurisdictions within Whiteside County into a countywide format. Information on the authority and acknowledgements for each of the previously printed FISs and FIRMs for communities within Whiteside County was compiled, and is shown below.

Village of Albany:	The hydrologic and hydraulic analyses for the FIS report dated June 1, 1981 (Reference 1) for the Village of Albany were performed by the United States Army Corps of Engineers (USACE), Rock Island District, for the Federal Insurance Administration under Inter-Agency Agreement No. IAA-H-9-79, Project Order No. 1, Amendment No. 1. This study was completed in August 1980.
Village of Erie:	The hydrologic and portions of the hydraulic analyses for the FIS dated August 15, 1984 (Reference 2) for the Village of Erie were obtained from the USACE Rock Island District report, *Rock River Flood Plain Information, Mile 30.9 to Mile 56* (Reference 3). A revised hydraulic analysis was performed for the August 15, 1984 FIS by Greenhorne & O'Mara on behalf of the FEMA.
City of Fulton:	The hydrologic and hydraulic analyses for the FIS report dated November 17, 1981 (Reference 4) for the City of Fulton were performed by the USACE, Rock Island District, for FEMA, under Inter-Agency Agreement No. IAA-H-9079, Project Order No. 1, Amendment No.1. This study was completed in November 1980.
Village of Lyndon:	The hydrologic and hydraulic analyses for the FIS dated September 1, 1983 (Reference 5) for the Village of Lyndon were obtained for the USACE Rock Island District report, *Rock River Flood Plain Information, Mile 30.8 to Mile 56.0* (Reference 3).
City of Morrison:	The hydrologic and hydraulic analyses for the FIS dated September 30, 1988 (Reference 6) for the City of Morrison were performed by the United States Geological Survey (USGS), the study contractor for FEMA, under Inter-Agency Agreement No. EMW-85-E-1823, project Order No. 18. This study was completed in January 1987.
Whiteside County (Unincorporated Areas):	The hydrologic and portions of the hydraulic analyses for the FIS report dated February 19, 1986 (Reference 7) for Whiteside County, Unincorporated Areas, were obtained from the USACE Rock Island District reports, *Rock River Flood Plain Information, Mile 30.0 to Mile 56.0* (Reference 3), *Rock River Flood Plain Information, Mile 56.0 to Mile 78.0* (Reference 8), and *Upper Mississippi River Flood Profiles* (Reference 9). A revised hydraulic analysis of the Rock River from 30.9 to Mile 56.0 was performed for the February 19, 1986, FIS by Greenhorne & O'Mara on behalf of FEMA.

Table 1 – Initial and Final CCO Meetings Continued

COMMUNITY NAME	INITIAL MEETING	FINAL MEETING
Fulton, City of	November 1978	June 24, 1981
Lyndon, Village of	*	March 23, 1983
Morrison, City of	*	November 24, 1987
Whiteside County (Unincorporated Areas)	*	June 26, 1985

* Meeting was not held

Countywide FIS

The project team meeting was held on September 18, 2007 in Morrison, Illinois and was attended by representatives of Whiteside County, the cities of Fulton and Sterling, and IDNR. This meeting was intended to discuss various issues and concerns for the study area. A scoping meeting was held on October 18, 2007 in Morrison, Illinois and was attended by representatives of Whiteside County, the cities of Morrison and Rock Falls, and IDNR.

A preliminary FIRM and FIS were prepared by merging effective FIS text, tables, and profiles with new study data. A preliminary Summary of Map Actions (PSOMA) was also prepared for all affected communities. The PSOMA lists pertinent information regarding Letters of Map Change (LOMCs) that will be affected by the issuance of the FIRM (i.e., superseded, incorporated, and revalidated). Preliminary copies of the FIRM, FIS, and SOMA were distributed to community officials for public review and comment.

The results of the study were reviewed at the open house held on December 3, 2009 in Morrison, Illinois, and attended by representatives of Whiteside County, the cities of Fulton and Sterling, the Illinois State Water Survey, and IDNR. All problems raised at the meeting have been addressed in this study.

2.0 AREA STUDIED

2.1 Scope of Study

This FIS covers the geographic area of Whiteside County, Illinois, including the incorporated communities listed in Section 1.1.

The flooding information for the entire county, including both incorporated and unincorporated areas are shown. The vertical datum was converted from the National Geodetic Vertical Datum of 1929 (NGVD 29) to the North American Vertical Datum of 1988 (NAVD 88).

Typically, areas studied by detailed methods are selected with priority given to all known flood hazards and areas of projected development or proposed construction. Approximate

analyses are used to study those areas having low development potential or minimal flood hazards.

The streams, or portions of streams, listed in Table 2, "Areas Studied by Detailed Methods," have new or revised hydrologic and hydraulic analyses for this countywide FIS.

For this PMR, the Mississippi River accredited levee will now be shown on the effective FIRM as providing protection from the 1-percent-annual-chance flood.

Table 2 – Areas Studied by Detailed Methods

Flooding Source	Limits of Revised or New Detailed Study
Mississippi River	From the limit of flooding affecting community below the Whiteside/Rock Island County Boundary, 511.65 miles above the confluence with the Ohio River (approximately 6.45 miles below U.S. Highway 30), to the Whiteside/Carroll County Boundary, 524.75 miles above the confluence with the Ohio River (approximately 2.2 miles above Lock and Dam No. 13)

The streams, or portions of streams, listed in Table 3, "Limits of Detailed Study," were studied in detail and included in this report. The limits of detailed study are also indicated on the Flood Profiles (Exhibit 1) and on the FIRM (Exhibit 2).

Table 3 – Limits of Detailed Study

Flooding Source	Limits of Detailed Study
French Creek	From the confluence with Rock Creek to 16,850 feet above the confluence with Rock Creek (approximately 3,750 feet above Highway 30)
Mississippi River	From the limit of flooding affecting community below the Whiteside/Rock Island County Boundary, 511.65 miles above the confluence with the Ohio River (approximately 6.45 miles below U.S. Highway 30), to the Whiteside/Carroll County Boundary, 524.75 miles above the confluence with the Ohio River (approximately 2.2 miles above Lock and Dam No. 13)
Rock Creek	From the limit of detailed study (approximately 2,350 feet downstream of Prairie Center Road) to 22,700 feet above the limit of detailed study (approximately 4,750 feet above Crosby Road)

Table 3 – Limits of Detailed Study Continued

Flooding Source	Limits of Detailed Study
Rock River	From the Whiteside/Henry County Boundary, 28.9 miles above the confluence with the Mississippi River (approximately 2.0 miles above Hurd Road), to the Whiteside/Lee County Boundary, 77.05 miles above the confluence with the Mississippi River (approximately 3.75 miles above State Highway 40)

Previous maps and reports for Whiteside County are community-based. The maps and reports for adjacent communities may not reflect the same data. The conversion from community-based mapping to countywide mapping includes resolution and consolidation of data within the countywide FIS, as well as showing the full extent of the floodplains and floodways through mapped reaches on the countywide FIRM.

The conversion to countywide mapping may result in new or revised base flood elevations (BFEs) and floodway data for communities. The countywide FIRM may show detailed studies where previously approximate studies were shown, and/or may show flood hazard areas where previously no flood hazard areas were shown.

Also, special flood hazard areas were delineated for limited distances between study reaches using additional information from the model or interpolated for consistency.

Summary of Map Actions (SOMA)

FEMA issues determination LOMCs. No letters issued by FEMA resulted in map changes (Letter of Map Revision [LOMR] and/or Special Response [SR]) of sufficient scale to be incorporated in the FIS revision.

2.2 Community Description

Whiteside County is located in northwestern Illinois and lies approximately 120 miles west of Chicago. It is bordered by Carroll and Ogle Counties on the north, Lee and Ogle Counties on the east, Bureau and Henry Counties on the south, and by Rock Island County, and Clinton County, Iowa on the west. The Mississippi River forms approximately the northern half of the western boundary of Whiteside County.

In 2010, the population of Whiteside County was reported to be 58,498. Morrison, the county seat, had a population of 4,188 (Reference 14). Sterling, the largest city in the county, had a population of 15,370 (Reference 15).

Whiteside County has well-developed transportation facilities. U.S. Highways 84, 78, and 40 cross the county north and south, and Interstate Highway 88 and U.S. Highway 30 cross the county east and west. Railroads furnish freight service to Whiteside County. The Mississippi River and Lock and Dam No. 13 provide an excellent route for incoming and outgoing barge traffic. Barge terminals are located at Albany and Fulton (Reference 16).

There are several established industries in the county, with the largest employers being located in the Rock Falls and Sterling area (Reference 16). Farming has been a major enterprise in Whiteside County since the settlement of the area, and cropland now covers 68 percent of the county, encompassing approximately 698 square miles or 446,744 acres. The remainder of the county is grassland (21 percent), forest (4 percent), open water (3 percent), wetland (2 percent), and urban/built-up land (2 percent). Of the 102 Illinois counties, Whiteside County ranks sixteenth in open water acres (13,902) and seventeenth in lake and river acreage (9,604). The county ranks tenth in the state in shallow marsh/wet meadow acreage (2,863) (Reference 17).

The landscape of Whiteside County is largely the product of past continental glaciation and more recent stream erosion. The four major landforms of the county are the uplands, outwash plains, stream terraces, and floodplains. Elevation ranges from about 875 feet above sea level in the northeastern part of the county to about 575 feet above sea level near the base of the Mississippi River bluffs (Reference 16).

The uplands make up roughly the northern one-third to one-half of Whiteside County. They are divided by major stream channels and include the bluffs along the Mississippi River and Rock River floodplains. The southeastern part of the county south of the Rock River consists of a broad outwash plain. These formations were created when meltwater carried sandy and loamy material westward from the receding glacier to the east. Sand dunes are common in the outwash plain (Reference 16).

The stream terraces are most extensive in the central part of the county immediately north of the Rock River floodplain. The terraces are a remnant of an old floodplain. Downcutting and channelization along the new floodplain have left the stream terraces at an elevation that is no longer subject to flooding. The terraces are typically separated from the active floodplain by a short, steep slope called a terrace escarpment. The active floodplains in the county are along the Green, Mississippi, and Rock Rivers and their adjoining tributaries. These major streams have changed course in the past resulting in several abandoned channels in the area (Reference 16).

Whiteside County has a typical mid-western continental climate that is characterized by cold winters and hot summers. Migratory air masses provide both seasonal and daily variability in weather conditions (Reference 18). According to records from the weather station located in Morrison, Illinois (station 115833) the average annual temperature for Whiteside County is 48.5 degrees Fahrenheit (°F). The coldest average temperatures are in January and the warmest average temperatures are in July. The coldest temperature recorded was -30 °F on February 13, 1905. The warmest temperature recorded was 112 °F on July 14, 1936. The average annual total precipitation for Whiteside County at Morrison is 37.65 inches which includes an average annual snowfall total of 34.8 inches. The largest daily snowfall on record was 13.5 inches on January 3, 1971. The largest recorded daily rainfall total was 6.10 inches on October 10, 1954 (Reference 19).

2.3 Principal Flood Problems

The Mississippi River borders Whiteside County on the west. Low-lying areas of Albany and Fulton are subject to periodic flooding from the Mississippi River. Floods on the Mississippi generally occur in the spring, resulting from snowmelt or snowmelt in combination with rainfall.

The flood of record for Fulton, Illinois occurred on April 28, 1965 when a flood stage of 25.03 feet was reached. Throughout the Upper Mississippi River basin in the winter months of 1965, heavy snowfalls piled up as prolonged cold temperatures delayed the melt. These conditions followed by warmer temperatures and spring rains created the 1965 Mississippi River flood in the Upper Midwest. Dangerous ice jams along the upper Mississippi River took place during the 1965 flood (Reference 20).

For many communities along the upper Mississippi River, the 2001 flood brought the second highest water levels on record. Such was the case at Fulton, Illinois Lock and Dam No.13 when the next highest flood stage of 23.20 feet was reached on April 23, 2001. The 2001 Mississippi River flood was produced by similar circumstances to those that had triggered the 1965 flood. Over the winter of 2000- 2001, there was heavy snow in southern Wisconsin, northern Iowa, and southern Minnesota. A late, rapid snowmelt combined with heavy rain led to flood crests that exceeded the crests from the 1993 and 1997 floods at most gage stations north of Lock and Dam No. 14 at Le Claire, Iowa. Only the 1965 flood was worse (Reference 21).

The 1993 flood was the third highest flood of record for the Mississippi River at the Fulton, Illinois Lock and Dam No. 13. Throughout the state, the 1993 floodwaters exceeded failed levees and destroyed farmland, towns, and transportation routes. Eighteen Illinois communities were severely flooded, resulting in the displacement of at least 16,000 people, the loss of more than 10,000 jobs, and destruction of or damage to more than 6,000 homes and 17 public water supply entities. Midwest agriculture suffered the most damage of any industry, with flooding of approximately 873,000 acres of Illinois farmland (Reference 22). In Fulton, a record river stage of 22.17 feet was reached at the Lock and Dam No. 13 on July 8, 1993. Local intense rainfall led to closure of floodgates and pumping at the Johnson Creek Drainage and Levee District. Flooding of approximately 1,500 acres occurred at the Cattail Drainage District due to heavy interior rains. Also during the 1993 flood, it became necessary for the Village of Fulton to pump treated sewage over the levee because of difficulty in handling the interior rain storms (Reference 23).

Table 4, "Historical Flood Data" summarizes the river stages of record on the Mississippi River at Fulton, Illinois Lock and Dam No. 13. Information for the table was collected from River Stages in Illinois (Reference 23) and the National Weather Service's Advanced Hydrologic Prediction Service (Reference 24). Please note that the datum of the gage is MSL 1912 (Reference 25).

Table 4 – Historical Flood Data for Mississippi River at Fulton, Illinois Lock and Dam No. 13
USACE (Rock Island) Gage
Datum of gage is 568.70 feet above MSL 1912
Flood Stage: 16 feet

Date	River Stage (feet)
April 28,1965	25.03
April 23, 2001	23.20
July 8, 1993	22.17
April 26, 1969	21.38
April 27, 1952	21.23
April 26, 1951	21.00

Table 4 – Historical Flood Data for Mississippi River at Fulton, Illinois Lock and Dam No.13 Continued

May 8, 1975	20.35
March 25, 1973	19.95
April 15, 1967	19.86
October 6, 1986	19.66

The Rock River flows east to west across Whiteside County. Flooding problems on the Rock River generally occur between the months of January and April as the result of ice cover and snowmelt. Flood stages can rise rapidly and remain high for considerable lengths of time.

Table 5, "Historical Flood Data" summarizes the river stages of record on the Rock River at Como, Illinois. Information for the table was collected from USGS Water Resources Data – Illinois (Reference 26) and River Stages in Illinois (Reference 23).

Table 5 – Major Storms in Boothbay Harbor
Rock River at Como, Illinois – USGS Gage 05443500
Datum of gage is 606.83 feet above NGVD 1929
Flood Stage: 10 feet

Date	Peak Discharge (cfs)	River Stage (feet)
April 21, 1973	59,700	15.66
February 22, 1937	51,000	14.50
June 5, 2002	48,800	13.65
May 29, 1996	48,300	13.58
January 24, 1938	46,600	*
January 6, 1946	46,400	14.40
June 15, 2000	45,300	13.12
May 17, 1974	43,100	13.13
March 25, 1993	42,700	12.72
February 22, 1977	40,900	13.30

* Data not available

2.4 Flood Protection Measures

Levees exist in the study area that provide the county with some degree of protection against flooding. However, levees that do not protet against the 1-percent-annual-chance flood are not considered in the hydraulic analysis of the 1- percent-annual-chance floodplain.

On February 11, 2015, the City of Fulton received notification of levee accreditation for the Mississippi River, which states that the levee complies with minimum requirements outlined in Title 44 of the Code of Federal Regulations, Section 65.10 (44 CFR 65.10). The accredited levee is shown on the effective FIRM as providing protection from the 1-percent-annual-chance flood.

3.0 ENGINEERING METHODS

For the flooding sources studied by detailed methods in the county, standard hydrologic and hydraulic study methods were used to determine the flood hazard data required for this study. Flood events of a magnitude that are expected to be equaled or exceeded once on the average during any 10-, 50-, 100-, or 500-year period (recurrence interval) have been selected as having special significance for floodplain management and for flood insurance rates. These events, commonly termed the 10-, 50-, 100-, and 500-year floods, have a 10-, 2-, 1-, and 0.2-percent-annual-chance, respectively, of being equaled or exceeded during any year. Although the recurrence interval represents the long-term, average period between floods of a specific magnitude, rare floods could occur at short intervals or even within the same year. The risk of experiencing a rare flood increases when periods greater than 1 year are considered. For example, the risk of having a flood that equals or exceeds the 1-percent-annual-chance (100-year) flood in any 50-year period is approximately 40 percent (4 in 10); for any 90-year period, the risk increases to approximately 60 percent (6 in 10). The analyses reported herein reflect flooding potentials based on conditions existing in the community at the time of completion of this study. Maps and flood elevations will be amended periodically to reflect future changes.

3.1 Hydrologic Analyses

Hydrologic analyses were carried out to establish the peak discharge-frequency relationships for the flooding source studied in detail affecting the community.

Pre-countywide Analyses

For each jurisdiction within Whiteside County that has a previously printed FIS report, the hydrologic analyses described in those reports that have not been superseded have been compiled and are summarized below.

The 1-percent-annual-chance flood discharges for French Creek were estimated using Water Resources Investigations Report 77-117 (Reference 27).

The 1-percent-annual-chance flood discharge for Rock Creek was computed using a frequency analysis of annual peak discharges from 40 years of record, 1940 to 1971 and 1977 to 1984, at the USGS gaging station at Morrison.

Streamflow records are available for the Rock River at Joslin, Illinois. The Joslin gage, USGS No. 05446500, which has been in operation since October 1939 to the present, is located approximately 27 miles upstream from the mouth of the Rock River. A frequency curve was developed by the USACE using the techniques described in Guidelines for Determining Flood Flow Frequency by U.S. Water Resources Council, Bulletin No. 17 (Reference 28).

Countywide Analyses

Information on the methods used to determine peak discharge-frequency relationships for the streams studied as part of this countywide FIS is given below.

Mississippi River flood elevations were determined by the January 2004 UMRSFFS (Reference 10). The UMRSFFS was developed by five Corps of Engineer Districts (St. Paul, Rock Island, Omaha, Kansas City, St. Louis) and coordinated through

representatives from seven federal agencies and seven states. The study addresses flooding of the Illinois River from Lockport to the mouth, the Missouri River below the Gavins Point Dam to the mouth, and the Mississippi River from St. Paul to the confluence with the Ohio River. The St. Louis District conducted the study of the Mississippi River from the confluence with the Ohio to Lock and Dam 22 tailwater (river mile 301.2) and the Illinois River from the confluence with the Mississippi River to the La Grange Lock and Dam tailwater (river mile 80.2). The Rock Island District conducted the study of the Mississippi River from river mile 301.2 to 614.9 and the Illinois River from river mile 80.2 to Lockport, IL.

Technical aspects of the study include impacts of levees, land use change, and climate variation. Hydrology was accomplished based on 100 years of record from 1898 to 1998 using a log-Pearson Type III distribution for unregulated flows at gages on the Mississippi River. In situations where historic records were not adequate to develop discharge frequency relationships or to verify the results, hydrologic modeling was used to create synthetic flows based on rainfall.

A summary of the drainage area-peak discharge relationships for all the streams studied by detailed methods is shown in Table 6, "Summary of Discharges."

Table 6 – Summary of Discharges

		PEAK DISCHARGES (cfs)			
FLOODING SOURCE AND LOCATION	**DRAINAGE AREA (SQ. MILES)**	**10%-ANNUAL-CHANCE**	**2%-ANNUAL-CHANCE**	**1%-ANNUAL-CHANCE**	**0.2%-ANNUAL-CHANCE**
FRENCH CREEK					
At mouth	11.2	*	*	2,130	*
At Sawyer Road	9.5	*	*	1,900	*
MISSISSIPPI RIVER					
At Lock and Dam No. 14 (RM 493.3)	88,400	206,000	265,000	289,000	344,000
At Lock and Dam No. 13 (RM 522.5)	85,500	202,000	259,000	283,000	337,000
ROCK CREEK					
0.45 miles downstream of Prairie Center Road	164.0	*	*	5,440	*

* Data Not Available
Note: the discharges for the Joslin Gage are lower than those of the Cosmo Gage since the floodwaters are partially attenuated in the expansive floodprone lands between the locations.

Table 6 – Summary of Discharges Continued

FLOODING SOURCE AND LOCATION	DRAINAGE AREA (SQ. MILES)	PEAK DISCHARGES (cfs) 10%-ANNUAL-CHANCE	2%-ANNUAL-CHANCE	1%-ANNUAL-CHANCE	0.2%-ANNUAL-CHANCE
ROCK RIVER					
Joslin Gage (RM 26.9)	9,542	40,300	61,500	71,300	99,000
Cosmo Gage (RM 69.1)	8,755	46,300	71,500	83,500	114,000

Stillwater Elevations for the 10-, 2-, 1-, and 0.2-percent-annual-chance floods for each stream and waterbody studied by detailed methods are presented in Table 7, "Summary of Stillwater Elevations."

Table 7 – Summary of Stillwater Elevations

FLOODING SOURCE AND LOCATION	ELEVATION (feet NAVD88) 10%-ANNUAL-CHANCE	2%-ANNUAL-CHANCE	1%-ANNUAL-CHANCE	0.2%-ANNUAL-CHANCE
Interior Drainage Cattail Slough & Wares Lake	*	*	584.3	*
Interior Drainage Ponding Area – Kwanis Park	*	*	583.8	*
Interior Drainage Ponding Area – East of 4th Street	*	*	580.8	*

* Data Not Available

3.2 Hydraulic Analyses

Analyses of the hydraulic characteristics of flooding from the sources studied were carried out to provide estimates of the elevations of floods of the selected recurrence intervals. Users should be aware that flood elevations shown on the FIRM represent rounded whole-foot elevations and may not exactly reflect the elevations shown on the

Flood Profiles or in the Floodway Data tables in the FIS report. Flood elevations shown on the FIRM are primarily intended for flood insurance rating purposes. For construction and/or floodplain management purposes, users are encouraged to use the flood elevation data presented in this FIS in conjunction with the data shown on the FIRM.

Pre-countywide Analyses

For each jurisdiction within Whiteside County that has a previously printed FIS report, the hydraulic analyses described in those reports that have not been superseded have been compiled and are summarized below.

Analyses of the hydraulic characteristics of flooding from the sources studied were carried out to provide estimates of the elevations of the floods of the selected recurrence intervals.

The starting water-surface elevation for Rock Creek was estimated from the known flood depth at the gaging station. The starting water-surface elevation for French Creek was taken from the 1-percent-annual-chance flood profile for Rock Creek. Water-surface elevations for the 1-percent-annual-chance flood were computed using the WSPRO step-backwater computer program (Reference 29).

Water-surface elevation profiles for the Rock River were developed using the USACE HEC-2 step-backwater computer model (Reference 30). The backwater model was calibrated by comparing water-surface elevations to observed high- water marks for the April 1973 flood.

Countywide Analyses

Cross sections for the Mississippi River were developed using channel hydrographic surveys in conjunction with Scientific Assessment and Strategy Team (SAST) floodplain digital terrain data collected in 1995 and 1998. The floodplain digital terrain models were developed from 1998 aerial photography and photogrammetry and digital hydrographic surveys that date from 1997 or later; supplemented as necessary with USGS National Elevation Dataset (NED) 1/3 arc second coverage (Reference 13). For areas where no digital hydrographic surveys were available, such as in some side channels and chutes, depths were estimated from the most current printed surveys available (Reference 10).

The UMRSFFS (discussed in Section 3.1) is based on an unsteady flow model (UNET). Levee failure was assumed at the top of existing levee grade based on an upstream and a downstream point. The UNET model was calibrated by both stage and discharge at gaging locations primarily by adjusting roughness coefficients and estimated lateral inflows. Some special considerations and techniques were required to address especially complex flow reaches and levee failure impacts.

Backwater effects from the UMRSFFS have been considered for tributaries to the Mississippi River within the county.

Locations of selected cross sections used in the hydraulic analyses are shown on the Flood Profiles (Exhibit 1). For stream segments for which a floodway was computed (Section 4.2), selected cross section locations are also shown on the FIRM (Exhibit 2).

Channel and overbank roughness factors (Manning's "n") used in the hydraulic computations were chosen by engineering judgment and were based on field observations of the stream and floodplain areas. Roughness coefficients (Mannings "n") along the Rock River were modified to obtain a reasonable relationship between computed elevations and historical high water marks. The range of the Manning's "n" coefficients for each stream is shown in Table 8, "Roughness Coefficients (Manning's 'n' Values)."

Table 8 – Manning's "n" Values

STREAM	CHANNEL	OVERBANK	SLOUGH "n"
French Creek	0.025	0.060	N/A
Mississippi River			
Pool 14 (RM 493.40-522.50)	0.023 – 0.035	0.040 – 0.121	0.030 – 0.050
Pool 13 (RM 522.60-556.70)	0.020 – 0.033	0.030 – 0.200	0.023 – 0.085
Rock Creek	0.025	0.060	N/A
Rock River	0.030 – 0.050	0.055 – 0.100	N/A

N/A – Not applicable

The hydraulic analyses for this study were based on unobstructed flow. The flood elevations shown on the Flood Profiles (Exhibit 1) are thus considered valid only if hydraulic structures remain unobstructed, operate properly, and do not fail.

3.3 Vertical Datum

All FIS reports and FIRMs are referenced to a specific vertical datum. The vertical datum provides a starting point against which flood, ground, and structure elevations can be referenced and compared. Until recently, the standard vertical datum used for newly created or revised FIS reports and FIRMs was the NGVD29. With the completion of the NAVD88, many FIS reports and FIRMs are now prepared using NAVD88 as the referenced vertical datum.

For this countywide FIS, all flood elevations shown in the FIS report and on the FIRM are referenced to NAVD88. Structure and ground elevations in the community must, therefore, be referenced to NAVD88. It is important to note that adjacent communities may be referenced to NGVD29. This may result in differences in BFEs across corporate limits between the communities.

Flood elevations shown in this FIS report and on the FIRM are referenced to the NAVD88. These flood elevations must be compared to structure and ground elevations referenced to the same vertical datum. Some of the data used in this study were taken from the prior effective FIS reports and FIRMs and adjusted to NAVD88. The datum conversion factor from NGVD29 to NAVD88 in Whiteside County is **-0.161 feet**. The locations used to establish the conversion factor were USGS 7.5-minute topographic quadrangle corners that fell within the County, as well as those that were within 2.5 miles outside the County. The benchmarks are referenced to NAVD88. The quadrangles use to determine the conversion are shown in Figure 1, "USGS Quadrangle Corner Intersections".