

Discovery Report

Lower Rock Watershed, HUC 07090005, in Winnebago County, Illinois

*City of Loves Park, City of Rockford, City of South Beloit, Rock Valley College,
Village of Machesney Park, Village of Rockton, Village of Roscoe, Village of
Winnebago, and Winnebago County, Illinois*

01/05/2012



FEMA

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I. General Information

i. Watershed Description

The Rock River originates in the Horicon Marsh in Dodge County, Wisconsin (WI), flows south and enters into Illinois (IL) near Beloit, WI. It flows south through Winnebago County, IL then flows southwest to where it joins the Mississippi River just below Rock Island, IL. (IEPA, 1996). Two of the three largest tributaries to the Rock River, the Pecatonica River (drainage area 2643 sq. mi.) and the Kishwaukee River (drainage area 1247 sq. mi.), join the Rock River in Winnebago County, IL. The third largest tributary, the Green River (drainage area 1121 sq. mi.) joins the Rock River in Rock Island County, IL. Each of the watersheds of these three rivers has been assigned a Hydrologic Unit Code (HUC) 8 designation. The main stem of the Rock River has two HUC8 units 07090005 (Lower Rock) and 07090001 (Upper Rock). The Rock River drains 10,915 sq. mi. in southeastern Wisconsin and northwestern Illinois; about 5317 sq. mi. are in IL (Knapp and Russell, 2004). The Upper Rock River basin is primarily located in Wisconsin while the Lower Rock is located entirely within Illinois. The length of the Rock River in Illinois is about 163 miles.

The Lower Rock River watershed includes parts of Boone, Carroll, Henry, Lee, Mercer, Ogle, Rock Island, Stephenson, Whiteside, and Winnebago Counties in Illinois. The communities that lie entirely and partly within the Lower Rock watershed are listed with their populations from the US Census Bureau 2010 census (U.S. Census Bureau, 2010) in Table 1. Winnebago County has a total population in 2010 of 295,266 persons. In Winnebago County there are four communities with populations greater than 10,000.

Table 1. Communities in the Lower Rock River HUC 8 watershed

<u>County</u>	<u>Name</u>	<u>Population 2010</u>
Boone	Caledonia village	197
Carroll	Chadwick village	551
Carroll	Lanark city	1457
Carroll	Milledgeville village	1032
Henry	Cleveland village	188
Henry	Colona city	5099
Lee	Ashton village	972
Lee	Dixon city	15733
Lee	Franklin Grove village	1021
Lee	Harmon village	120
Lee	Lee village	337
Lee	Nelson village	170
Lee	Steward village	256

Mercer	Sherrard village	640
Ogle	Adeline village	85
Ogle	Byron city	3753
Ogle	Creston village	662
Ogle	Davis Junction village	2373
Ogle	Forreston village	1446
Ogle	Grand Detour CDP	429
Ogle	Hillcrest village	1326
Ogle	Leaf River village	443
Ogle	Lost Nation CDP	708
Ogle	Mount Morris village	2998
Ogle	Oregon city	3721
Ogle	Polo city	2355
Ogle	Rochelle city	9574
Ogle	Stillman Valley village	1120
Rock Island	Carbon Cliff village	2134
Rock Island	Coyne Center CDP	827
Rock Island	East Moline city	21302
Rock Island	Hillsdale village	523
Rock Island	Milan village	5099
Rock Island	Moline city	43483
Rock Island	Oak Grove village	396
Rock Island	Port Byron village	1647
Rock Island	Rapids City village	959
Rock Island	Rock Island city	39018
Rock Island	Silvis city	7479
Rock Island\Henry	Coal Valley village	3743
Rock Island\Mercer	Reynolds village	539
Stephenson	German Valley village	463
Whiteside	Coleta village	164
Whiteside	Como CDP	567
Whiteside	Erie village	1602
Whiteside	Lyndon village	648
Whiteside	Morrison city	4188
Whiteside	Prophetstown city	2080
Whiteside	Rock Falls city	9266
Whiteside	Sterling city	15370
Whiteside	Tampico village	790
Winnebago	Loves Park city	23996
Winnebago	Machesney Park village	23499
Winnebago	Rockford city	152871

Winnebago	Rockton village	7685
Winnebago	Roscoe village	10785
Winnebago	South Beloit city	7892
Winnebago	Winnebago village	3101

ii. Project Description

The extent of this Discovery project includes only that portion of the Lower Rock watershed within Winnebago County, located in northern Illinois. In addition to the Pecatonica and Kishwaukee Rivers, notable tributaries to the Rock River within the study area include Spring Creek, Keith Creek, and Kent Creek.

This Risk MAP project complements work undertaken during the FFY2009 Transition Year which includes updates to the hydrology and hydraulics of the Rock River in Rock Island, Whiteside, Henry, Lee, and Ogle Counties. The study of the Rock River was initiated on the basis of findings from the meetings in these counties during Map Modernization FY2005-2009 (see Table 2) and the inconsistencies in flood elevations for the Rock River reported in the Special Problems Reports prepared by the Illinois State Water Survey (SPR dated April 7, 2008).

In 2010 FEMA funded Discovery, updated hydrology and hydraulics for the Rock River, and updated hydrology and hydraulics for a limited number of tributaries for the Lower Rock Watershed within Winnebago County, IL. The US Army Corps of Engineers, Rock Island District (USACE-RI) and the Illinois State Water Survey (ISWS) are partnering to perform the study of the mainstem of the Rock River. The USACE-RI has been contracted to conduct surveying of tributaries to the Rock River in Winnebago County to support the hydrologic and hydraulic analyses of these tributaries by the ISWS. The tributaries for which new hydrologic and hydraulic studies will be performed have been determined through the Discovery process.

Table 2. Meeting Report Index

County	Meeting Date	Meeting Type/Topic
Henry	01/16/2008	Project Team Meeting
Henry	02/27/2008	Scoping Meeting
Henry	05/25/2010	Open House
Lee	09/13/2006	Project Team Meeting
Lee	10/11/2006	Scoping Meeting

Lee	03/24/2009	Open House
Ogle	09/13/2006	Project Team Meeting
Ogle	10/12/2006	Scoping Meeting
Ogle	09/23/2009	Open House Meeting
Rock Island	3/22/2005	Scoping Meeting
Rock Island	2/17/2005	Project Team Meeting
Rock Island	2/23/2009	Open House Meeting
Whiteside	9/18/2007 10/18/2007	Project Team Meeting
Whiteside	10/18/2007	Scoping Meeting
Whiteside	12/3/2009	Open House Meeting

II. Watershed Stakeholder Coordination

The Winnebago County/Lower Rock Watershed Stakeholder Coordination phase of Discovery was initiated with a conference call to the Winnebago County Floodplain Administrator during which time FEMA’s Risk MAP program and the Discovery process were reviewed and discussed. A project team meeting was held with key Winnebago County officials approximately one month prior to the Discovery meeting. During the meeting an overview of the Risk MAP program and the Discovery process was provided by Illinois State Water Survey (ISWS) staff. Information concerning the Rock River and its tributaries as well as current Winnebago County projects and mitigation efforts was exchanged between ISWS staff and community officials. (See *AppendixA_WinnebagoProject_Management_Team_and_MeetingSummary.docx* Table A1 Project Team Meeting Invitation List)

Following this initial contact, a contacts database was updated using available websites and making phone calls to the communities. These calls included an overview of Risk Map and Discovery. An invitation list for the Discovery meeting was compiled from the information gathered during the phone conversations. (See *AppendixB_WinnebagoCo_Community_Contact_List.xlsx*)

Approximately four weeks prior to the Winnebago/Lower Rock Watershed Discovery Meeting both hard copy and email invitations were sent. An example of the invitation is provided in *AppendixC_Winnebago_DiscoveryMeeting_invite.pdf*.

III. Data Analysis

i. Data for FEMA Flood Risk Products

Spatial data are stored in a geospatial database and can be displayed or queried. The database

Discovery\4_Post_Discovery\Geospatial_Data_Summary\Discovery_07090005_Lower Rock.gdb contains spatial data sets collected and displayed on the Discovery maps prepared through the Discovery process.

Prior to the Discovery meetings, available data for the Lower Rock watershed was identified and, where possible, displayed on the draft Discovery map. Table 3 lists the spatial data displayed on the draft Discovery map and the data source. This information was distributed at the Discovery meetings. Community representatives were provided data forms and asked to list any spatial data held by the community that might be used in future studies. Additional data acquired after the Discovery meeting were added to create the final Discovery map.

High resolution topographic data are available for all counties within the Lower Rock Watershed. The LiDAR acquisition dates are shown in Table 4 below.

Through the Discovery process information was provided by communities and Discovery meeting attendees on areas of flooding, roads that overtop during flood events, mitigation projects, and other issues related to flooding. The corresponding locations were marked on the draft Discovery maps or copies of the DFIRMs. Feature classes were created from the community-supplied comments.

On the basis of the information gathered at the Discovery meetings, recurring flooding issues were found to be associated with areas of development within the watershed, suggesting a need for new or updated stream studies. Ice jams were noted as a cause of flooding, and buyout projects were given as the prevalent form of flood mitigation. Where a spatial reference could be determined, comments are recorded in the feature classes “CommunityComments” and “StudyRequests” in the *Discovery_07090005_LowerRock.gdb*.

Table 3. Data Collection for Lower Rock Watershed

Data Types	Description	Source	Deliverable
Community Boundaries	Location of community boundaries	Winnebago County GIS	Discovery Map; Geodatabase
Community Comments	Points based on comments made at Discovery Meetings	Discovery	Discovery Map; Geodatabase
Coordinated Needs Management Strategy (CNMS)	Engineering study needs as defined by Phase 3 CNMS data	Region V CNMS inventory	Discovery Map; Geodatabase
County Boundaries	Location of county boundaries	USGS Topographic Maps	Discovery Map; Geodatabase
Dams	Location of dams	Hazus 2.0 Database, U.S. Army Corps of Engineers - National Inventory of Dams	Discovery Map; Geodatabase
EPA 303(d) Streams	Streams included in the EPA 303(d) list of impaired streams	U.S. EPA Office of Water	Geodatabase
FEMA Risk Ranking	Risk Ranking based on FEMA's 10 risk factors and population density (shown by Census Block Groups)	FEMA Risk MAP (Mapping, Assessment, and Planning)	Discovery Map; Geodatabase

Data Types	Description	Source	Deliverable
Ice Jams	Location of ice jams	U.S. Army Corps of Engineers - Ice Jam Database	Discovery Map; Geodatabase
Letters of Map Change	Locations of letters of map change	FEMA Mapping Information Platform Database	Discovery Map; Geodatabase
Levees	Location of levees considered for accreditation status by FEMA	FEMA Midterm Levee Inventory	Discovery Map; Geodatabase
Major Roads	Location of interstates and major highways	Illinois Department of Transportation	Discovery Map; Geodatabase
New Studies	Location of new studies	Illinois State Water Survey	Discovery Map; Geodatabase
Public Assistance (PA)	Locations of PA disbursements	FEMA Region 5	Discovery Map; Geodatabase
Special Flood Hazard Areas	Location of FEMA flood hazard areas	FEMA Digital Flood Insurance Rate Maps	Discovery Map; Geodatabase
Stream Gages	Location of stream gages operated by multiple agencies	USGS, National Weather Service - Advanced Hydrologic Prediction Service	Discovery Map; Geodatabase
Study Requests	Study requests taken from CNMS and local officials at Discovery meetings.	Discovery, Region V CNMS inventory	Discovery Map; Geodatabase
Watershed Boundaries	Hydrologic Unit Code-8, 10, and 12 watershed boundaries	USGS National Hydrography Dataset	Discovery Map; Geodatabase
Wetlands	Location and type of wetlands and deep water habitats	U.S. Fish and Wildlife Service National Wetlands Inventory	Geodatabase

Table 4. LiDAR Acquisition Dates

County	Date Acquired
*Boone	2007
*Bureau	--
Carroll	2009
*DeKalb	2009
Henry	2009
Lee	2009
*Mercer	Planned, 2011
Ogle	2009
Rock Island	2009
Stephenson	2009
Whiteside	2009

ii. Other Data and Information

Mitigation Plans/Status, Mitigation Projects

Winnebago County has a Multi-Hazard Mitigation Plan prepared by Fuller, Mossbarger, Scott and May Engineers, Inc. in cooperation with Unincorporated Winnebago County and all incorporated communities within the county. The plan became effective December 21, 2007 and will need to be updated in 2012.

There have been many successful mitigation projects in Winnebago County within the Lower Rock Watershed, as well as many ongoing mitigation projects. Wetlands and forest preserves have been established to preserve the beneficial function of floodplains. The Pecatonica Wetlands were constructed by the Winnebago County Forest Preserve District between 2001 and 2003 in order to alleviate recurring flooding in adjacent and downstream areas. In 2010, the Crooked River Forest Preserve was created by the Winnebago County Forest Preserve District, an area of over 220 acres north of the Pecatonica River. While these two wetland areas are not directly within the Lower Rock watershed, both will help alleviate flooding on the Rock River by restricting/containing water in the Pecatonica River floodplain, a major tributary to the Rock River in Winnebago County.

Another mitigation success reported at the Discovery meeting includes the purchase and removal of several homes affected by recurring flooding by the Rock River Water Restoration District. Machesney Park has a very successful mitigation program and has secured approximately \$4 million dollars planned to facilitate over 100 buyouts.

Community Rating System (CRS)

No communities within Winnebago County participate in the CRS program. At the Discovery meeting communities were informed of the CRS program and its benefits to the community as well as its citizens. Communities seemed interested in the CRS program and its benefits.

Regulatory Flood Study and Mapping

Countywide Digital Flood Insurance Rate Maps (DFIRMs) are available for Winnebago County. The most recent FIS is dated 2006 although most of the engineering studies were performed decades earlier. Since 2006 there has only been one Letter of Map Revision (LOMR) issued within the county amending the maps.

iii. Integration of Data

There are 421.5 stream miles with Special Flood Hazard Areas (SFHA) shown on FEMA DFIRMs in the Lower Rock Watershed within Winnebago County. There are 2.8 miles of stream that were identified by Discovery meeting attendees to have engineering study needs but do not have SFHAs mapped on current DFIRMs. The number of stream miles with mapped SFHAs was tallied from the Coordinated Needs Management System (CNMS) database. The National Hydrography Dataset was used to calculate those stream miles with community requests outside of a mapped SFHA.

There are a number of flooding issues in the Lower Rock Watershed affecting Winnebago County. An outcome of the Discovery process is to identify those streams where the communities' flood risk management efforts will most benefit from update engineering analyses. One method of identifying streams of concern is to perform a spatial analysis of the data to determine where there are combinations of potentially invalid or unverified engineering data, high risk, and community concerns. Three sources of information were used for this initial screening task. The Coordinated Needs Management Strategy (CNMS) Phase III data are a geospatial database of stream reaches attributed with an assessment of the engineering analyses as valid, unverified, or unknown. The FEMA National Flood Risk Analysis HUC Risk Data spatial data were used to provide relative risk ranking. The Census Block Group GIS layer contains aggregated flood claims data along with ten weighted parameters used to compute relative national risk (1 to 10 with 1 being highest risk) by Census Block Group. (This database must be requested from FEMA.) The Discovery comments feature classes which include local community identified areas of known flooding issues.

A subset of stream segments was created by combining those stream segments identified as having engineering analyses that may no longer be valid (CNMS unverified) and any stream segment where comments collected indicate that the SFHA mapping is inaccurate or inadequate. This subset of stream segments was then intersected with the HUC Risk Data and separated into two categories: high concern for those segments which flow through Census Block Groups with Risk Rankings between 1 and 5; medium concern for those segments which flow through Census Block Groups with Risk Rankings between 6 and 10. Stream segments outside the combined set were categorized as low concern. The results of this assessment are summarized in *AppendixD-Streams_of_Concern.xls*.

Streams identified as having a "high" level of concern from the analysis were the first to be considered for further study. Other information collected through community contact was considered in conjunction with the level of concern in preparing a proposed scope of work.

IV. Discovery Meeting

The Winnebago County/Lower Rock Watershed Discovery Meeting was held on January 25, 2011 at 1:00 PM at the RMAP Conference Room, 313 North Main Street, Rockford, Illinois. The following staff members were in attendance at the Discovery meeting.

Illinois State Water Survey (ISWS): Sally McConkey, Kingsley Allan, Amanda Flegel, Glenn Heistand, Aaron Thomas, Lisa Graff, Crystal Williams, Pat Hubbartt

FEMA Region V: Suzanne Vermeer

U of I Extension Office: Carrie McKillip, Kyle Cecil

Illinois Emergency Management Agency (IEMA): Jared Owens

Attendance Details

The Lower Rock Discovery meeting had a total of 55 attendees. See **Discovery\3_Discovery_Meeting\WinnebagoDiscoveryMeeting_Attendance.xlsx**.

Discovery Meeting Agenda Summary

The Lower Rock Watershed Discovery Meeting began with introductions of all ISWS and U of I staff, FEMA and State representatives and self-introductions by community attendees. Meeting handouts and a participant evaluation form to be completed by attendees were reviewed. Presentations were made by ISWS, IEMA, and FEMA, and the presenters remained throughout the meeting to answer questions and address interests and concerns of the watershed attendees.

The meeting included the following presentations:

- Risk MAP Program Goals and Objectives - Suzanne Vermeer (FEMA Region V)
- Hazard Mitigation – Jared Owen, (IEMA)
- FEMA Community Rating System – Pat Hubbartt (ISWS)
- Meeting Goals/Discovery Map/Break Out Sessions - Sally McConkey (ISWS)

The goals of the meeting were to identify:

- Streams for which the effective study/mapping does not reflect existing conditions,
- Streams for which new or updated studies are needed,
- The areas of growth for which more detailed flood study data are needed,
- Available technical data to support hydrologic and hydraulic studies,
- Areas of growth where more detailed flood study data are needed,

- Areas where mitigation projects would benefit from updated/upgraded flood study data,
- Ways in which flood risk could be reduced in the watershed.

Following a description of the Discovery Map and the correlating Comment Form, group break-out sessions were organized by the existing table seating arrangement of 6-8 attendees. Each table had a Discovery Map and Comment Forms for reviewing and noting areas of concern. A staff facilitator using predesigned questions provided guidance and additional information. DFIRMs with more detailed images were available upon request.

Attendees were asked to mark the areas on the Discovery Maps or DFIRMs that would denote the following:

- Inaccurate floodplain boundaries
- Stream reaches for which the effective study does not show existing conditions
- Areas of development or new development in planning that impact the watershed
- Areas of frequent flooding that result in road closures or overtopped roads
- Locations of new bridges, culverts, channel realignment
- Streams for which more detailed study data are needed
- Locations of observed ice jams
- Flood mitigation projects completed or planned
- Technical data or studies that your community needs to help with mitigation projects

At the end of the meeting the next steps for the project following the Discovery meeting were discussed. The next steps included the following:

- Discovery map updated
- Discovery report completed
- Discovery map and report posted on the web site, www.illinoisfloodmaps.org
- FEMA Region V provided with data and other information for prioritization of projects
- Hydrologic and hydraulic studies conducted
- Technical meeting held to review preliminary results
- Preliminary DFIRMs presented at Open Houses for public review

Information Collected, Discovery Meeting Follow-Up

Eighty-seven comments concerning the Lower Rock watershed were provided by the attendees at the Discovery meeting. (See *AppenixE_Winnebago_Comment_Forms.xlsx*) The comments were reviewed and follow-up was carried out with the communities

when clarification was necessary. A proposed scope of work was developed and reviewed at the Lower Rock Discovery Technical Follow-Up Meeting held on September 27, 2011 at 1:30 PM at the Rockford City Hall, 425 East State Street, Rockford, Illinois 61104.

V. Bibliography

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<http://www.iema.illinois.gov/iema/planning/MitigationPlanning.asp> (access January 2, 2012)

VI. Appendices

Appendix A – Winnebago County Discovery Project Team Meeting Report, Attendance List, Contact Information

Appendix B – Discovery Meeting Invitation, Contact List, Attendance List

Appendix C – Discovery Meeting Invitations

Appendix D – Streams of Concern

Appendix E – Winnebago Comment Forms