

Discovery Report

Upper Fox Watershed, HUC 07120006

Village of Bloomfield, Village of Big Bend, City of Brookfield, City of Burlington, City of Delafield, Village of Eagle, Village of East Troy, City of Elkhorn, Village of Fontana, City of Franklin, Village of Genoa City, Village of Hartland, City of Lake Geneva, Village of Lannon, Village of Menomonee Falls, Village of Merton, Village of Mukwonago, City of Muskego, City of New Berlin, Village of North Prairie, Village of Paddock Lake, City of Pewaukee, Village of Pewaukee, Village of Richfield, Village of Rochester, Village of Silver Lake, Village of Sussex, Village of Twin Lakes, Village of Wales, Village of Walworth, Village of Waterford, City of Waukesha, Village of Williams Bay, Kenosha County, Racine County, Walworth County, Waukesha County, WI



FEMA

Project Area Community List

County	Name
Kenosha	Kenosha County
	Paddock Lake (Village)
	Silver Lake (Village)
	Twin Lakes (Village)
Kenosha/Walworth	Genoa City (Village)
Racine	Racine County
	Rochester (Village)
	Waterford (Village)
Racine/Walworth	Burlington (City)
Walworth	Bloomfield (Village)
	East Troy (Village)
	Elkhorn (City)
	Fontana (Village)
	Lake Geneva (City)
	Walworth (Village)
	Walworth County
	Williams Bay (Village)
Walworth/Waukesha	Mukwonago (Village)
Waukesha	Big Bend (Village)
	Brookfield (City)
	Delafield (City)
	Eagle (Village)
	Hartland (Village)
	Lannon (Village)
	Menomonee Falls (Village)
	Merton (Village)
	Muskego (City)
	New Berlin (City)
	North Prairie (Village)
	Pewaukee (City)
	Pewaukee (Village)
	Sussex (Village)
	Wales (Village)
	Waukesha (City)
Waukesha County	

Table of Contents

I.	General Information	1
II.	Watershed Stakeholder Coordination.....	5
III.	Data Analysis	7
i.	Data that can be used for Flood Risk Products.....	8
ii.	Other Data and Information.....	9
IV.	Risk MAP Needs and Recommendations	13
i.	Floodplain Studies	13
ii.	Mitigation Projects	14

List of Figures

Figure 1.	Upper Fox Watershed.....	2
Figure 2.	Upper Fox Watershed Communities Population 2010.....	10
Figure 3.	Wisconsin Streams of Concern	14

List of Tables

Table 1.	NFIP Participation Status.....	3
Table 2.	Data Collection for Upper Fox Watershed	7
Table 3.	LiDAR Status for Upper Fox.....	8
Table 4.	USGS Stream Gages.....	8
Table 5.	HMPs: Status and Availability	9
Table 6.	Recent CAV/CACs	11
Table 7.	Map Modernization Activity	12
Table 8.	Mapping Needs, Wisconsin	13
Table 9.	Mitigation Projects.....	15

I. General Information

The Fox River originates in southeastern Wisconsin just west of Milwaukee and flows southward before entering Illinois in the northwest corner of Lake County. The Fox then flows in a general southerly direction until it joins the Illinois River at Ottawa, Illinois (IEPA, 1996).

The Fox River Basin covers over 2,658 sq. mi. total, draining over 938 sq. mi. in southeastern Wisconsin and 1,720 sq. mi. in northeastern Illinois (Bekele and Knapp, 2009). Major streams which comprise the Upper Fox River Watershed within the portion in Wisconsin include the Fox River, Brandy Brook, Deer Creek, Honey Creek, Pebble Creek, Pewaukee River, Poplar Creek, Sussex Creek, Sugar Creek, and the White River. The Upper Fox River HUC8 unit is designated 07120006. The Upper Fox River watershed includes parts of Kenosha, Racine, Walworth, and Waukesha Counties in Wisconsin.

Figure 1. Upper Fox Watershed

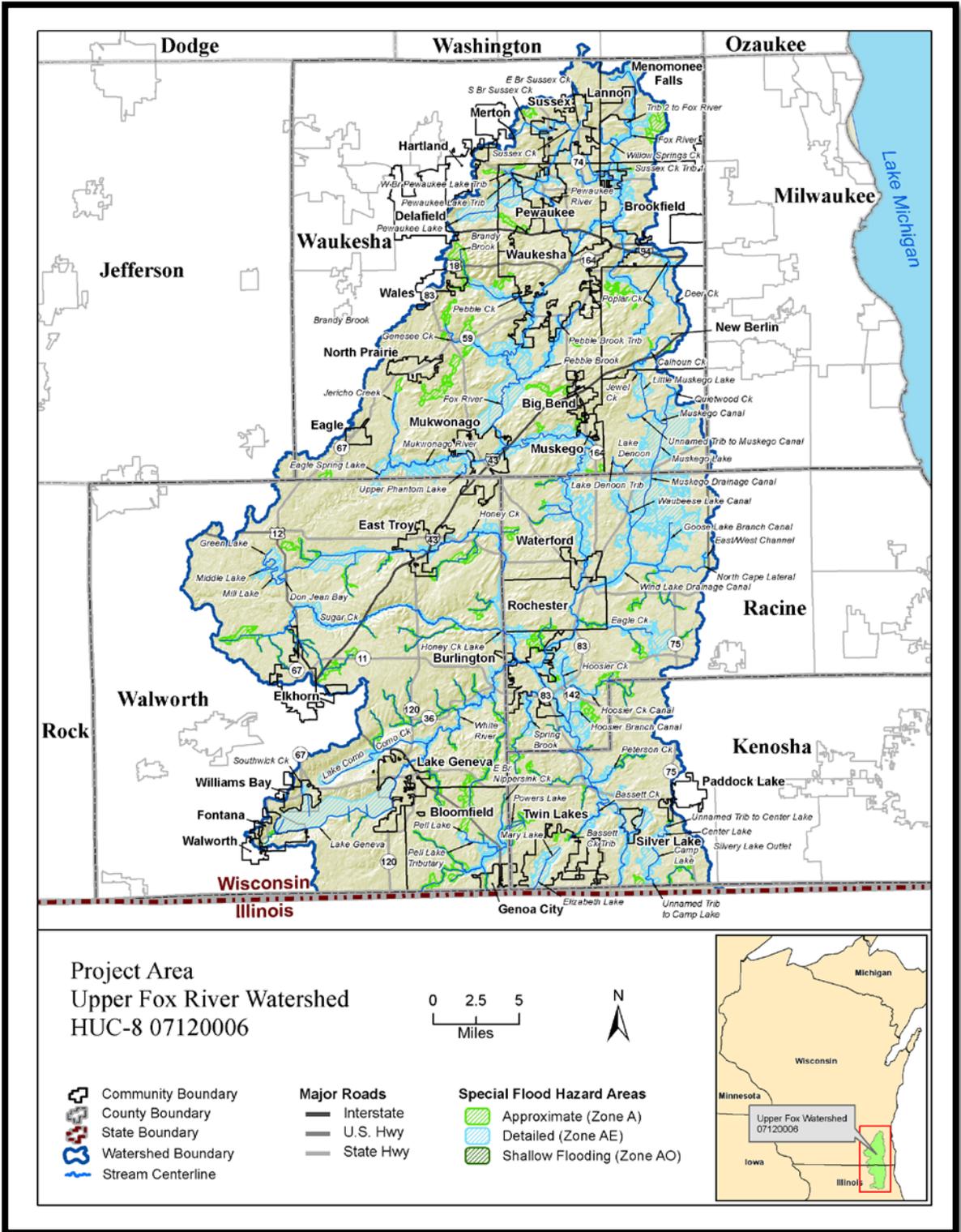


Table 1. NFIP Participation Status

County	Name	Population (2010)	NFIP Participation
Kenosha	Kenosha County	166,426	Y
	Paddock Lake (Village)	2,992	Applied
	Silver Lake (Village)	2,411	Y
	Twin Lakes (Village)	5,989	Y
Kenosha/Walworth	Genoa City (Village)	3,042	Y - on probation
Racine	Racine County	195,408	Y
	Rochester (Village)	3,682	Y
	Waterford (Village)	5,368	Y
Racine/Walworth	Burlington (City)	10,464	Y
Walworth	Bloomfield (Village)	5,095	Y
	East Troy (Village)	4,281	Y
	Elkhorn (City)	10,084	N
	Fontana (Village)	1,672	Y
	Lake Geneva (City)	7,651	Y
	Walworth (Village)	2,816	Y
	Walworth County	102,228	Y
	Williams Bay (Village)	2,564	N
Walworth/Waukesha	Mukwonago (Village)	7,355	Y
Waukesha	Big Bend (Village)	1,290	Y
	Brookfield (City)	37,920	Y
	Delafield (City)	7,085	Y
	Eagle (Village)	1,950	N
	Hartland (Village)	9,110	Y
	Lannon (Village)	1,107	Y
	Menomonee Falls (Village)	35,626	Y
	Merton (Village)	3,346	Y
	Muskego (City)	24,135	Y
	New Berlin (City)	39,584	Y
	North Prairie (Village)	2,141	N
	Pewaukee (City)	13,195	Applied
	Pewaukee (Village)	8,166	Y
	Sussex (Village)	10,518	Y

Wales (Village)	2,549	N
Waukesha (City)	70,718	Y
Waukesha County	389,891	Y

II. Watershed Stakeholder Coordination

The Discovery phase included an investigation of existing terrain, flood hazard data, and flood risk data; broad data mining for development of an initial Discovery map, and detailed data collection to refine the Discovery map which was prepared by the Wisconsin Department of Natural Resources (WDNR). Watershed coordination meetings with community, state, and federal officials are scheduled for November 13, 2012, to share information concerning the watershed and its stakeholders.

Prior to the Discovery Meeting, a contacts database was created using available websites, the Wisconsin League of Municipalities Directory and making phone calls to the communities. This contact database became the basis for the Discovery meeting invitation list. Approximately four weeks prior to the meetings, WDNR mailed letters to all invited stakeholders providing a background of the Risk MAP program and an invitation to attend; a brief follow-up email was sent to all invitees (where email was available).

The Discovery Meetings will be hosted by the WDNR. The meetings are scheduled for the following places, dates, and times.

Tuesday, November 13, 2012, 9:00 – 11:00 AM

Southeastern Wisconsin Regional Planning Commission (SEWRPC)

W239 N1812 Rockwood Drive

Waukesha, WI 53188

(attendees are asked to please park behind the building or in the surface lot across Rockwood Drive)

Tuesday, November 13, 2012, 2:30 – 4:30 PM

Village of Burlington Public Works Building

2200 S. Pine Street

Burlington, WI 53105

The Discovery meeting will last approximately two hours in length and will consist of introductory presentations followed by a break-out session in which stakeholders can review the Discovery map, ask questions, and provide comments and revisions.

The goals of the meeting are to:

- Provide an overview of the project;
- Discuss the project scope, including which individual streams will be studied;
- Collect community feedback on the project and finalize the scope of work:
 - The areas of growth for which more detailed flood study data are needed;
 - Areas of growth;

- Areas where mitigation projects would benefit from updated/upgraded flood study data; and
- Streams for which the effective study/mapping does not reflect existing conditions.
- Discuss ways in which flood risk could be reduced in the watershed;
- Gather available technical data to support hydrologic and hydraulic studies; and
- Discuss the project timeline.

The meeting will include the following agenda:

- Map Mod to Risk Map transition
- Risk MAP goals and products
- Hazard Mitigation update from SHMO
- CRS update from NFIP Coordinator
- Project scope of work details and break out session goals
- Discovery map explanation
- Break-out sessions by county

Presentations will be given describing Risk MAP program goals and objectives, hazard mitigation projects, the Federal Emergency Management Agency (FEMA)'s Community Rating System (CRS), and the Discovery meeting goals and objectives.

For the break-out session, Discovery maps will be available for review with WDNR personnel at hand to answer questions. After reviewing the maps and clarifying any questions, stakeholders are invited to complete comment forms that include their contact information and any recommended revisions or general feedback.

Meeting participants will be provided with a survey questionnaire seeking their feedback on what method of communication is preferred as the project moves forward.

III. Data Analysis

A list of the data collected, the deliverable or product in which the data are included, the source of the data, and any pertinent comments are provided in Table 2. Following Table 2, the information received is categorized by data that can be used for flood risk products and additional data that benefited the project.

Table 2. Data Collection for the Upper Fox Watershed

Data Types	Description	Source	Deliverable
Average Annualized Loss	FEMA's Level 1 HAZUS Average Annualized Loss Analysis	FEMA	Discovery Map; Geodatabase
Community Boundaries	Location of municipal boundaries	Wisconsin Department of Transportation	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	WDNR Inventory	Discovery Map; Geodatabase
Streams and Rivers	Stream centerlines based on USGS topo quads	USGS Topographic Maps	Discovery Map; Geodatabase
HUC 8 Watershed	Watershed boundary	USGS Watershed Boundary Dataset	Discovery Map; Geodatabase
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 National Flood Hazard Layer	Discovery Map; Geodatabase
Major Roads	Location of interstates and major highways	Wisconsin Department of Transportation	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 Hydrography Dataset	Discovery Map; Geodatabase
Watershed Boundaries	Hydrologic Unit Code-8, watershed boundaries	USGS National Hydrography Dataset	Discovery Map; Geodatabase
Wetland	Wetland delineations digitized from 1:24,000-	Wisconsin DNR	Discovery Map; Geodatabase

	scale ratio and rectified photographic base maps		
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i. Data that can be used for Flood Risk Products

Topographic Data

Kenosha, Racine and Waukesha counties have acquired countywide LiDAR through a Community Development Block Grant that became available as a result of the extensive flooding in 2008 across southern Wisconsin. Kenosha County’s LiDAR has only been processed for a limited area and a request for funds to complete the processing has been submitted to FEMA. At this time it is unknown whether or not the data will be processed for the remainder of the county or just for the area affected by the Upper Fox River watershed.

Walworth County currently has no plans to acquire LiDAR. The topographic data that will be used for this project consists of photogrammetric data developed between 1999-2005.

Table 3. LiDAR Status for Counties within the Upper Fox Watershed

County	Date Acquired
Kenosha	2011 – Partially processed
Racine	2011
Walworth	No LIDAR
Waukesha	2012

USGS Gages

The project team identified USGS stream gages in the watershed. The locations of the gages are shown on the Discovery map and listed in Table 3.

Table 4. USGS Stream Gages

Gage Number	Station Name and Location
5543830	Fox River at Waukesha, Wis.
5544200	Mukwonago River at Mukwonago, WI
5544300	Mukwonago River tributary near Mukwonago, Wis.
5545100	Sugar Creek at Elkhorn, Wis.
5545200	White River tributary near Burlington, Wis.
5545300	White River near Burlington, Wis.
5548150	North Branch Nippersink Creek near Genoa City, Wis.
5545750	Fox River near New Munster, WI

ii. Other Data and Information

Mitigation Plans/Status, Mitigation Projects

Hazard Mitigation Plans (HMPs) are prepared for unincorporated and incorporated communities to help communities reduce long-term risk to life and property from natural hazards. The plans include comprehensive mitigation strategies intended to promote flood-resilient communities. The project team reviewed the mitigation strategies in available HMPs to determine which, if any, were relevant for the Discovery process. Table 4 lists the HMPs, their status, and their availability for review.

Table 5. HMPs: Status and Availability

County	HMP	Hazus	Issue Date	Expiration Date	Available for Review
Kenosha	Y	Y	06/30/2011	06/30/2016	Y
Racine	Y	Y	12/06/2010	12/06/2015	Y
Walworth	Y	Y	07/07/2009	07/07/2014	Y
Waukesha	Y	Y	03/15/2011	03/15/2016	Y

CNMS and NFIP Mapping Study Needs

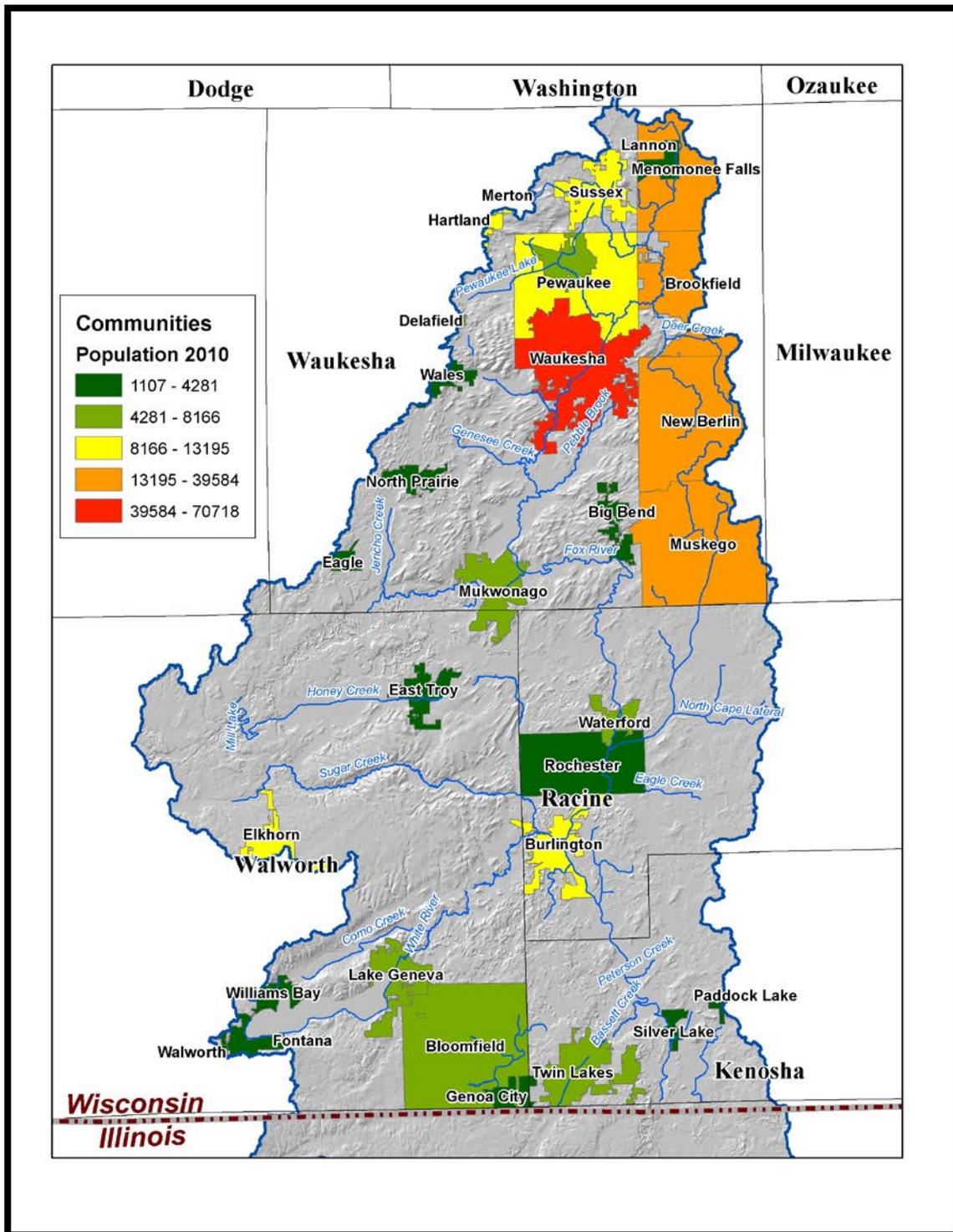
There are 220 stream miles with Special Flood Hazard Areas (SFHA) shown on FEMA DFIRMs in the Upper Fox Watershed. The number of stream miles with mapped SFHAs was tallied from the Coordinated Needs Management System (CNMS) database. The CNMS Phase III data are a geospatial database of stream reaches attributed with an assessment of the engineering analyses as valid, unverified or unknown.

Other information collected through community contact will be considered in conjunction with the level of concern in preparing a proposed scope of work. An outcome of the Discovery process is to identify those streams where the communities' flood risk management efforts will most benefit from updated engineering analyses. The final list of streams for study will include both local community identified areas of known flooding issues and WDNR determined areas of concern. The WDNR developed a 5-level ranking method to prioritize streams of concern for inclusion in the final list:

1. Streams currently mapped as Zone AE where the study has been deemed "Invalid" (CNMS).
2. Gaps between detailed studies that are either currently mapped as Zone A or not mapped at all.
3. Streams currently mapped as Zone A where a community request was made to study the reach in detail.
4. Streams currently mapped as Zone A that will be engineered, but remain mapped as Zone A.
5. Streams that are not currently mapped where a community request was made to study the reach in detail.

Demographics

Figure 2. Upper Fox Watershed Communities Population 2010



Community Rating System (CRS)

The community of New Berlin (City) is participating in the CRS program. At the Discovery meeting communities will be informed of the CRS program and its benefits to the community as well as its citizens.

Levees

No levees exist in the study area.

Floodplain Management/Community Assistance Visits (CAVs)

As the state coordinating agency for the National Flood Insurance Program, the Wisconsin Department of Natural Resources conducts Community Assistance Visits (CAVs) as part of their floodplain management programs. A CAV typically consists of a tour of the floodplain to assess any recent construction activities, a review of the local permitting process, and evaluation of the local floodplain ordinance. A meeting with the local floodplain official is held to discuss the NFIP, the local permitting process, any recent flood events, training opportunities, and any program deficiencies. Table 6 lists the communities in the watershed and the date of their latest CAV or Community Assistance Call (CAC).

Table 3. Recent CAV/CACs

Community	CAV	CAC
Wisconsin		
BIG BEND, VILLAGE OF	N/A	09/11/95
BROOKFIELD, CITY OF	05/24/11	N/A
BURLINGTON, CITY OF	03/31/92	09/29/06
DELAFIELD, CITY OF	N/A	08/19/94
EAST TROY, VILLAGE OF	N/A	09/12/95
GENOA CITY, VILLAGE OF	04/08/10	04/15/92
HARTLAND, VILLAGE OF	N/A	09/11/95
KENOSHA COUNTY	09/30/09	N/A
LANNON, VILLAGE OF	N/A	06/23/09
MENOMONEE FALLS, VILLAGE OF	N/A	12/27/93
MERTON, VILLAGE OF	04/18/12	N/A
MUKWONAGO, VILLAGE OF	N/A	12/27/93
MUSKEGO, CITY OF	09/09/09	N/A
PEWAUKEE, VILLAGE OF	06/28/90	12/27/93
RACINE COUNTY	07/10/90	09/23/93
SILVER LAKE, VILLAGE OF	09/13/06	08/03/10
WALWORTH COUNTY	06/18/91	07/09/93

Regulatory Mapping

As part of FEMA’s Map Modernization program, WDNR has recently updated several of the countywide FIRMs throughout the state of Wisconsin. Many of these maps are effective or in the final stages of map adoption. While these maps are in a digital format, they do not necessarily reflect newer hydrologic or hydraulic study information and therefore may not be the most accurate representation of flood risk within the watershed. Table 10 lists the Map Modernization activity in the Upper Fox watershed

Table 4. Digital Flood Insurance Rate Map Status

County	Status	Effective Date
Kenosha	Effective	06/19/2012
Racine	Effective	05/02/2012
Walworth	Effective	10/02/2009
Waukesha	Effective	11/19/2008

IV. Risk MAP Needs and Recommendations

The project team will present the Discovery map and discuss the results of the data collection and analysis with the watershed stakeholders in detail during the Discovery meetings. This section addresses the currently identified areas of concern and interest within the Upper Fox watershed that could be addressed with Risk MAP projects. After completion of the Discovery process this section will be updated to reflect the results and final conclusions.

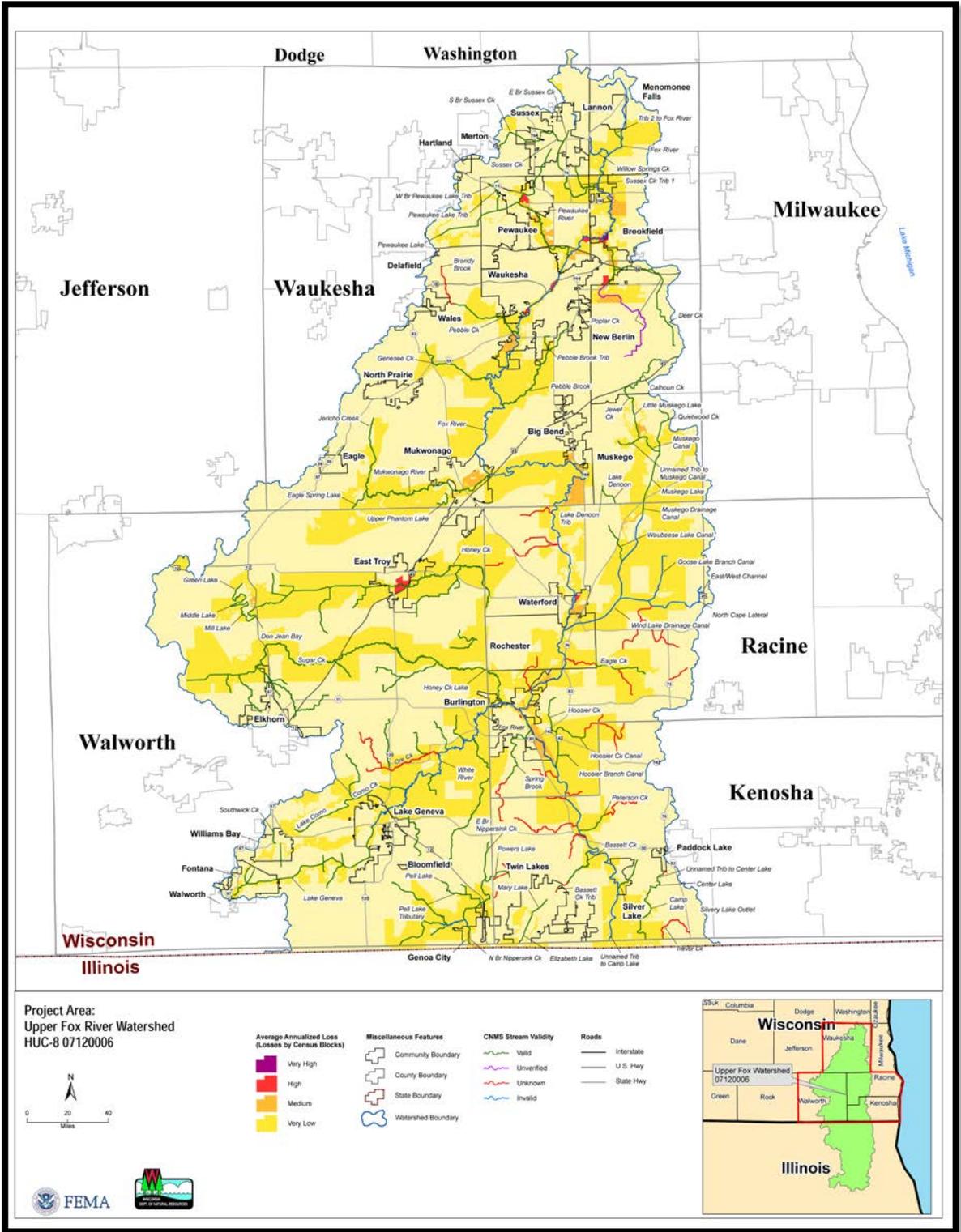
i. Floodplain Studies

While DFIRMs have been produced for many of the counties in the watershed, there are still study and mapping needs. Using CNMS, the WDNR has identified several areas where new or updated studies rank highest in terms of need and risk relative to other locations in the Upper Fox HUC8 watershed. The proposed new study areas and types (detailed or approximate) are listed in Table 8.

Table 5. Mapping Needs, Wisconsin

Flooding Source	Study Length (Miles)	Study Type (Current)
Bassett Creek	0.3	A
Bassett Creek Tributary	0.1	A
Eagle Creek	2.2	A
East Branch Nippersink Creek	0.4	A
East Channel Fox River	0.5	AE
East/West Channel	0.3	AE
Fox River	81.7	AE
Goose Lake Branch Canal	4.6	AE
New Munster Creek	3.5	A
North Branch Nippersink Creek	2.5	AE
North Cape Lateral	4.4	AE
Ore Creek	9.5	A
Palmer Creek	2.3	A
Peterson Creek	3.5	A
Poplar Creek	7.5	AE
Spring Brook	3.4	A
Trevor Creek	2.5	A
Unnamed Tributaries	35.9	A
White River	18.7	AE
Willow Springs Creek	3.3	AE
Wind Lake Drainage Canal	8.9	AE

Figure 3. Wisconsin Streams of Concern



ii. Mitigation Projects

In the Discovery meetings, community stakeholders will be asked to identify several locations in which mitigation projects could reduce the impacts of flooding. Topics of mitigation interest included levees, roads that frequently flood, significant riverine erosion, at-risk essential facilities, streamflow constriction, and recent and/or future development. After completion of the Discovery process this section will be updated to reflect the comments provided by the stakeholders.

Table 6. Mitigation Projects

Community	Subject(s)	Project	Status	Comment Number
Example	Overtopped road	Repair or replace culverts on Route XX	Incomplete	3A