

Discovery Report

Upper Fox River Watershed, HUC # 07120006

Illinois Counties – Cook, Kane, Lake, and McHenry Counties

Wisconsin Counties – Kenosha, Racine, Walworth, and Waukesha Counties

09/12/2013

Updated 02/ 19/2015



FEMA

Project Area Community List

Illinois County	Illinois Community
Cook	Cook County
	Village of Inverness
	Village of South Barrington
	Village of Streamwood
Cook/Dupage	Village of Schaumburg
Cook/Kane	Village of Hoffman Estates
Cook/Kane/McHenry/Lake	Village of Barrington Hills
Cook/Lake	Village of Barrington
	Village of Deer Park
Dupage/Cook	Village of Hanover Park
Dupage/Cook/Kane	Village of Bartlett
Kane	Village of Carpentersville
	Village of Gilberts
	Kane County
	Village of Pingree Grove
	Village of Sleepy Hollow
	Village of South Elgin
	Village of West Dundee
Kane/Cook	Village of East Dundee
	City of Elgin
Lake	Village of Antioch
	Village of Grayslake
	Village of Hainesville
	Village of Hawthorn Woods
	Village of Lake Barrington
	Lake County
	Village of Lake Villa
	Village of Lake Zurich
	Village of Lindenhurst
	Village of Mundelein
	Village of North Barrington
	Village of Round Lake
	Village of Round Lake Beach
	Village of Round Lake Heights
	Village of Round Lake Park

Illinois County	Illinois Community
Lake	Village of Tower Lakes
	Village of Volo
	Village of Wauconda
Lake/McHenry	Village of Fox Lake
McHenry	Village of Bull Valley
	Village of Cary
	City of Crystal Lake
	Village of Greenwood
	City of Harvard
	Village of Hebron
	Village of Holiday Hills
	Village of Johnsburg
	Village of Lake in the Hills
	Village of Lakewood
	Village of McCullom Lake
	City of McHenry
	McHenry County
	Village of Oakwood Hills
	Village of Prairie Grove
	Village of Richmond
	Village of Ringwood
Village of Spring Grove	
Village of Trout Valley	
Village of Wonder Lake	
City of Woodstock	
McHenry/Kane	Village of Algonquin
McHenry/Lake	Village of Fox River Grove
	Village of Island Lake
	Village of Lakemoor
	Village of Port Barrington

Project Area Community List (continued)

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

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I. General Information

The Upper Fox Watershed, HUC 07120006 (Figure 1), is located in the southeastern part of Wisconsin and in the far northeastern section of Illinois. The watershed covers 1,543 square miles of which the Illinois and Wisconsin portions cover 617 square miles and 926 square miles, respectively. The Fox River, with a total watershed area of 2,658 square miles, originates in southeastern Wisconsin just west of Milwaukee and flows southward before entering Illinois in the northwest corner of Lake County. The Fox River then flows in a general southerly direction until it joins the Illinois River at Ottawa, Illinois (IEPA, 1996). The Upper Fox River watershed includes parts of Kenosha, Racine, Walworth, and Waukesha Counties in Wisconsin and Cook, Kane, Lake, and McHenry Counties in Illinois. Land use along the river consists of residential, commercial, and light industrial development, agriculture, and open space.

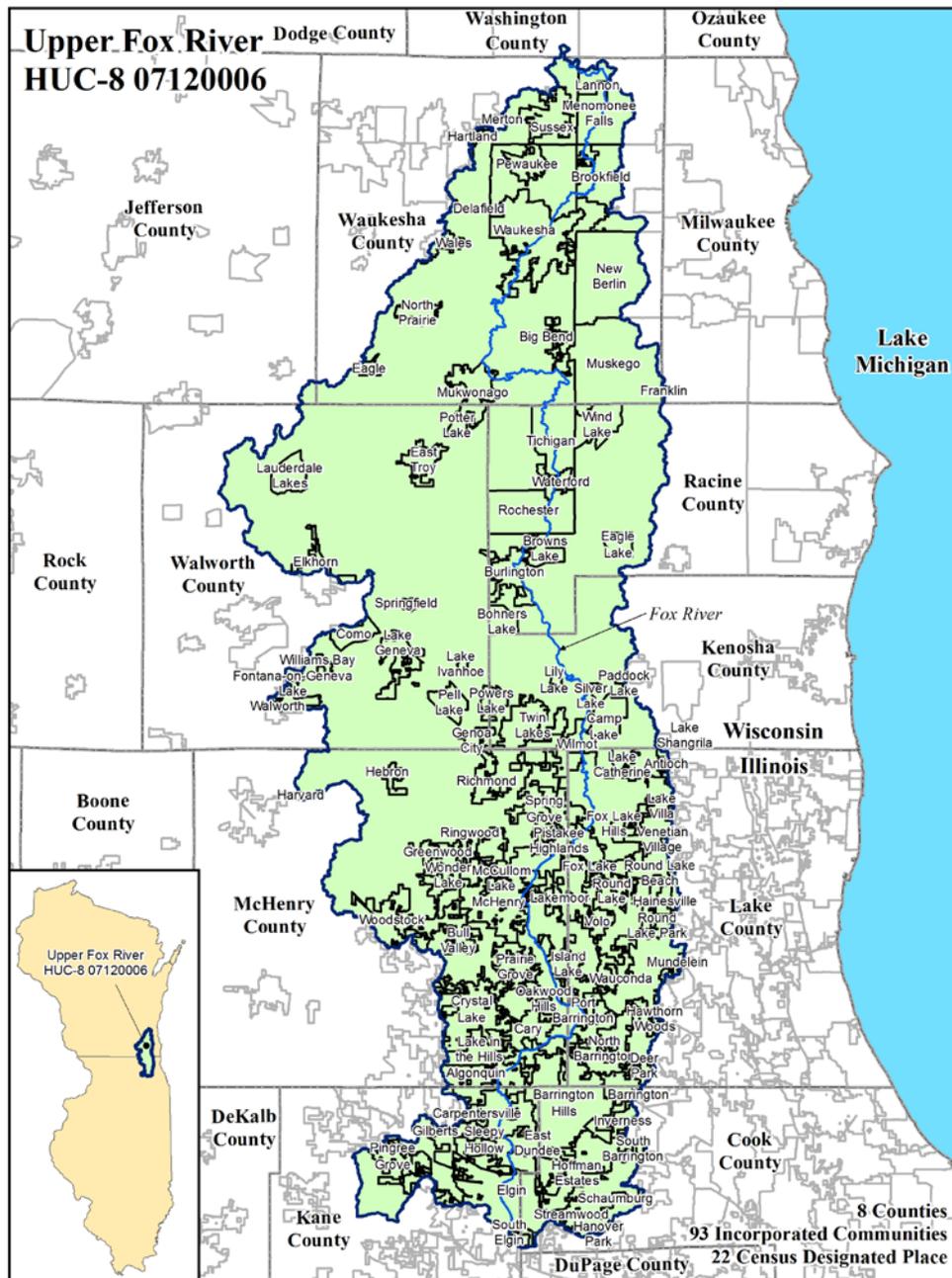


Figure 1. Upper Fox Watershed HUC 07120006

Table 1. NFIP Participation Status

Illinois County	Illinois Community	2010 Census Population	Participating
Cook	Cook County	5,194,675	Yes
	Inverness, Village of	7,399	Yes
	South Barrington, Village of	4,565	Yes
	Streamwood, Village of	39,858	Yes
Cook/Dupage	Schaumburg, Village of	74,227	Yes
Cook/Kane	Hoffman Estates, Village of	51,895	Yes
Cook/Kane/McHenry/Lake	Barrington Hills, Village of	4,209	Yes
Cook/Lake	Barrington, Village of	10,327	Yes
	Deer Park, Village of	3,200	Yes
Dupage/Cook	Hanover Park, Village of	37,973	Yes
Dupage/Cook/Kane	Bartlett, Village of	41,208	Yes
Kane	Carpentersville, Village of	37,691	Yes
	Gilberts, Village of	6,879	Yes
	Kane County	515,269	Yes
	Pingree Grove, Village of	4,532	Yes
	Sleepy Hollow, Village of	3,304	Yes
	South Elgin, Village of	21,985	Yes
	West Dundee, Village of	7,331	Yes
Kane/Cook	East Dundee, Village of	2,860	Yes
	Elgin, City of	108,188	Yes
Lake	Antioch, Village of	14,430	Yes
	Grayslake, Village of	20,957	Yes
	Hainesville, Village of	3,597	Yes
	Hawthorn Woods, Village of	7,663	Yes
	Lake Barrington, Village of	4,973	Yes
	Lake County	703,462	Yes
	Lake Villa, Village of	8,741	Yes
	Lake Zurich, Village of	19,631	Yes
	Lindenhurst, Village of	14,462	Yes
	Mundelein, Village of	31,064	Yes
	North Barrington, Village of	3,047	yes
	Round Lake, Village of	18,289	yes
	Round Lake Beach, Village of	28,175	Yes
	Round Lake Heights, Village of	2,676	Yes
Round Lake Park, Village of	7,505	Yes	

(CIS, 2014)

Table 1. NFIP Participation Status (continued)

Illinois County	Illinois Community	2010 Census Population	Participating
Lake	Tower Lakes, Village of	1,283	Yes
	Volo, Village of	2,929	Yes
	Wauconda, Village of	13,603	Yes
Lake/McHenry	Fox Lake, Village of	10,579	Yes
McHenry	Bull Valley, Village of	1,077	No
	Cary, Village of	18,271	Yes
	Crystal Lake, City of	40,743	Yes
	Greenwood, Village of	255	Yes
	Harvard, City of	9,447	Yes
	Hebron, Village of	1,216	Yes
	Holiday Hills, Village of	610	Yes
	Johnsburg, Village of	6,337	Yes
	Lake in the Hills, Village of	28,965	Yes
	Lakewood, Village of	3,811	Yes
	McCullom Lake, Village of	1,049	Yes
	McHenry, City of	26,992	Yes
	McHenry County	308,760	Yes
	Oakwood Hills, Village of	2,083	No
	Prairie Grove, Village of	1,904	Yes
	Richmond, Village of	1,874	Yes
	Ringwood, Village of	836	Yes
	Spring Grove, Village of	5,778	Yes
	Trout Valley, Village of	537	No
	Wonder Lake, Village of	4,026	Yes
Woodstock, City of	24,770	Yes	
McHenry/Kane	Algonquin, Village of	30,046	Yes
McHenry/Lake	Fox River Grove, Village of	4,854	Yes
	Island Lake, Village of	8,080	Yes
	Lakemoor, Village of	6,017	Yes
	Port Barrington, Village of	1,517	Yes

(CIS, 2014)

Table 1. NFIP Participation Status (continued)

Wisconsin County	Wisconsin Community	2012 Census Population	Participating
Kenosha	Kenosha County	166,426	Yes
	Paddock Lake, Village of	2,992	Yes
	Silver Lake, Village of	2,411	Yes
	Twin Lakes, Village of	5,989	Yes
Kenosha/Walworth	Genoa City, Village of	3,042	Yes
Racine	Racine County	195,408	Yes
	Rochester, Village of	3,682	Yes
	Waterford, Village of	5,368	Yes
Racine/Walworth	Burlington, City of	10,464	Yes
Walworth	Bloomfield, Village of	5,095	Yes
	East Troy, Village of	4,281	Yes
	Elkhorn, City of	10,084	No
	Fontana on Geneva Lake, Village of	1,672	Yes
	Lake Geneva, City of	7,651	Yes
	Walworth, Village of	2,816	Yes
	Walworth County	102,228	Yes
	Williams Bay, Village of	2,564	No
Walworth/Waukesha	Mukwonago, Village of	7,355	Yes
Waukesha	Big Bend, Village of	1,290	Yes
	Brookfield, City of	37,920	Yes
	Delafield, City of	7,085	Yes
	Eagle, Village of	1,950	No
	Hartland, Village of	9,110	Yes
	Lannon, Village of	1,107	Yes
	Menomonee Falls, Village of	35,626	Yes
	Merton, Village of	3,346	Yes
	Muskego, City of	24,135	Yes
	New Berlin, City of	39,584	Yes
	North Prairie, Village of	2,141	No
	Pewaukee, City of	13,195	Yes
	Pewaukee, Village of	8,166	Yes
	Sussex, Village of	10,518	Yes
	Wales, Village of	2,549	No
	Waukesha, City of	70,718	Yes
	Waukesha County	389,891	Yes

(CIS, 2014)

II. Watershed Stakeholder Coordination

Discovery

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 a detailed data collection to refine the Discovery maps, which were prepared by the Illinois State Water Survey (ISWS) and Wisconsin Department of Natural Resources (WDNR). WDNR and ISWS led the stakeholder coordination in Wisconsin and Illinois, respectively. Watershed coordination meetings were held with community, state, and federal officials to share information concerning the watershed and its stakeholders. Pre-Discovery materials are available in Appendix A.

Prior to the Discovery meetings, a contacts database was created by WDNR and ISWS using available websites and directories and making phone calls to the communities. These calls included an overview of the Risk MAP program and Discovery process. An invitation list for the Discovery meetings was compiled from the information gathered for the contacts database. Approximately four weeks prior to the meetings, WDNR and ISWS sent letters to invited stakeholders providing a background of the Risk MAP program and an invitation to attend a Discovery meeting. The contact information and invitations are available in Appendix B.

The Wisconsin Upper Fox Discovery meetings were hosted by WDNR on behalf of the Federal Emergency Management Agency (FEMA). The meetings were held at the following places, dates, and times.

Tuesday, November 13, 2012 / 9:00 AM – 11:00 AM
Southeastern Wisconsin Regional Planning Commission (SEWRPC)
W239 N1812 Rockwood Drive
Waukesha, WI 53188

Tuesday, November 13, 2012 / 2:30 PM – 4:30 PM
Village of Burlington Public Works Building
2200 S. Pine Street
Burlington, WI 53105

The Illinois Upper Fox Discovery meetings were hosted by ISWS on behalf of FEMA. The meetings were held at the following places, dates, and times.

Thursday, November 29, 2012 / 1:30 PM - 3:30 PM
McHenry Public Library
809 Front Street
McHenry, IL 60050

Friday, November 30, 2012 / 10:00 AM - 12:00 PM
Rakow Center, Dundee Township Park District
665 Barrington Avenue
Carpentersville, IL 60110

Each Discovery meeting lasted approximately two hours and consisted of introductory presentations followed by a break-out session in which stakeholders could review the Discovery map, ask questions, and provide comments and revisions.

Presentations were given describing Risk MAP program goals and objectives, hazard mitigation projects, FEMA's Community Rating System (CRS), the National Flood Insurance Program (NFIP), and the Discovery meeting goals and objectives. The meeting materials are available in Appendix C.

For the break-out session, Discovery maps were available for review at approximately six to eight stations, and each station was staffed by meeting personnel. After reviewing the maps and clarifying any questions, stakeholders completed comment forms that included their contact information and recommended revisions or general feedback about flood risk issues and mitigation efforts. The meeting summary, attendance, and comments are available in Appendix D. The Discovery Maps are available in Appendix E.

As part of the ongoing outreach process meeting, participants received a community communications assessment seeking their feedback on the best way to correspond with their community throughout the Upper Fox Watershed Risk MAP project. The assessment results and summary report are available in Appendix F.

Action Discovery

For the Upper Fox Action Discovery phase the Illinois State Water Survey (ISWS) and Wisconsin Department of Natural Resources (WDNR) independently led the stakeholder coordination in Illinois and Wisconsin, respectively. The Wisconsin Action Discovery data included in this report was provided to the ISWS by the WDNR. The WNDR Action Discovery data is available in Appendix L.

Illinois

The Action Discovery phase provided a continuation of past Discovery efforts that focused upon more intensive coordination with communities possessing a higher mitigation action potential. The Upper Fox Action Discovery Project emphasized reducing flood risk through mitigation actions that would ultimately result in safer communities. Prior to the start of the project the Illinois State Water Survey (ISWS) conducted a project team

conference call with FEMA and appropriate state and federal officials to gather relevant information concerning the watershed communities.

Upper Fox Action Discovery Tier 1 and Tier 2 communities were selected based upon the FEMA Community Action Potential Index (CAPI) scores, comment data collected during the Discovery phase, a draft AoMI dataset, the county Hazard Mitigation Plans, and input from FEMA and Illinois state agencies. Once the Tier 1 and Tier 2 watershed communities were designated, contact information was updated and four weeks prior to the meeting invitations were sent to selected communities. Prior to the Action Discovery meeting outreach began with a one-on-one meeting with the Tier 1 communities during which time unique local flood-related issues, plans, existing resources and tools, and mitigation priorities were discussed. Action Discovery CAPI tier rankings, contact information and meeting invitations are available in Appendix H.

The Upper Fox Action Discovery meeting was held at the following place, date, and time.

Wednesday, October 1, 2014, 1:30 – 3:30 PM

Algonquin Village Hall
Village Board Room
2200 Harnish Drive
Algonquin, IL 60102

The Action Discovery meeting was approximately two hours in length and consisted of introductory presentations followed by a break-out session in which stakeholders reviewed and Discovery comments and Action Discovery maps, and provided information for needed community mitigation action projects.

Presentations were given describing FEMA's Risk MAP program goals, Community Rating System (CRS), Mitigation Action Tracker and mitigation ideas for local flood risk issues, and the Action Discovery meeting goals and objectives. The meeting handouts and presentations are available in Appendix I.

For the break-out session, Action Discovery maps labeled with Discovery comment numbers were available for review at approximately six stations, and each station was staffed by ISWS personnel. After reviewing the maps and clarifying any questions, stakeholders updated Discovery meeting comments and completed Mitigation Action Forms that included their contact information and recommended mitigation projects for local flood risk areas. The mitigation projects were entered into FEMA's Mitigation Action Tracker. The meeting summary, attendance, updated comments, and Mitigation Action Forms are available in Appendix J. The Action Discovery maps are available in Appendix K.

Wisconsin

The Wisconsin Department of Natural Resources (WDNR) teamed with the Wisconsin Emergency Management Agency (WEM) to host the Wisconsin Action Discovery meetings as they had done previously for the Discovery meetings. The teamwork between the WDNR and WEM is a great example of stakeholder coordination which helps streamline and focus the discussions with the affected communities by uniting over the common ground about mitigation potential. The meetings were held at the following places, dates, and times.

Tuesday, February 11, 2014, 1:00 PM (One-on-One Meeting)
Brookfield City Hall
2000 North Calhoun Road
Brookfield, Wisconsin

Tuesday, February 11, 2014, 3:00 PM (Small Group Meeting)
Menomonee Falls Village Hall
W156 N8480 Pilgrim Road
Menomonee Falls, Wisconsin

Tuesday, February 18, 2014, 1:00 PM (One-on-One Meeting)
New Berlin City Hall
3805 South Casper Drive
New Berlin, Wisconsin

Tuesday, February 18, 2014, 3:00 PM (Small Group Meeting)
New Berlin Public Library
15105 Library Lane
New Berlin, Wisconsin

The Upper Fox watershed within Wisconsin has two Tier I communities, the Cities of Brookfield and New Berlin, which were each met with by the WDNR and WEM one-on-one. An additional seven Tier II communities also participated in two group discussions as well. Those Tier II communities are the City of Muskego, Village of Menomonee Falls and the counties of Kenosha, Waukesha, Racine, Washington and Walworth. Communities in this watershed are very proactive about mitigating flood risk and work closely with the WDNR and other area stakeholders such as Southeast Wisconsin Regional Planning Commission (SEWRPC) to address flooding issues.

It should be noted that several communities were confused as to why they were again being asked for Discovery related information, particularly given the fact the WDNR received data development funding in FY13, resulting in survey work already completed during the 2014 summer. The WDNR reiterated that the goal of the Action Discovery meetings was to assure there was a good understanding of how Risk MAP can be applied

to help communities mitigate flood risk. Therefore, the primary feedback the WDNR received from the communities were examples of how they currently mitigate flooding and that they would like the WDNR to keep their initial Discovery comments in mind. Several communities wanted an updated timeline of when the new maps would become effective as they are anxious for updated study information.

III. Data

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 is provided in Table 2. Table 2 data can be used for flood risk products and provide additional information to benefit the project.

Table 2. Data Collection for Upper Fox Watershed

Data Types	Description	Source	Deliverable
Illinois			
Areas of Mitigation Success	Any flood mitigation strategies, tactics, and/or projects that have been demonstrated to reduce losses associated with flooding events	Community Comments gathered during Discovery process.	Discovery Map; Geodatabase
Community Boundaries	Location of community boundaries	U.S. Census 2010	Discovery Map; Geodatabase
Coordinated Needs Management Strategy (CNMS) Streams	Engineering study needs as defined by Phase 3 CNMS data. Streams categorized by study validity	Region V Coordinated Needs Management Strategy Inventory	Discovery Map; Geodatabase
County Boundaries	Location of county boundaries	U.S. Census 2010	Discovery Map; Geodatabase
Dams	Location of dams	USACE National Inventory of Dams 1999 taken from the HAZUS Dams Database	Discovery Map; Geodatabase
EPA 303(d) Streams	Streams included in the EPA 303(d) list of impaired streams	U.S. EPA Office of Water	Discovery Map; Geodatabase
Federal Land	Location of Federally owned or administered lands	National Atlas of the United States	Discovery Map; Geodatabase
FEMA Average Annualized Loss	FEMA's Level 1 Hazus Average Annualized Loss Analysis	FEMA	Discovery Map; Geodatabase
FEMA Public Assistance Grant Program	Location of public assistance grant projects	FEMA Region 5	Discovery Map; Geodatabase

Table 2. Data Collection for Upper Fox Watershed (continued)

Data Types	Description	Source	Deliverable
Illinois			
HUC 8, 10, & 12 Watersheds	Watershed Boundary (HUC8)	USGS National Hydrography Dataset	Discovery Map; Geodatabase
Key Emergency Routes Overtopped	Location of roads and bridges overtopped by flooding	Local Mitigation Plans for Kane and McHenry Counties	Discovery Map; Geodatabase
Letters of Map Change	Locations of letters of map change	FEMA Mapping Information Platform Database	Discovery Map; Geodatabase
Other	Information that does not fit into other classifications	Community Comments gathered during Discovery process	Discovery Map; Geodatabase
Other Flood Risk Areas	Locations of flooding identified by the IDNR Office of Water Resources	IDNR Office of Water Resources	Discovery Map; Geodatabase
Roads	Location of interstates and major highways	Illinois Department of Transportation, 2010	Discovery Map; Geodatabase
Significant Land Use Change	Recent significant land use changes.	Community Comments gathered during Discovery process.	Discovery Map; Geodatabase
Special Flood Hazard Areas	Location of special flood hazard areas	FEMA Flood Insurance Rate Maps, DRAFT FEMA Flood Insurance Rate Maps	Discovery Map; Geodatabase
State Boundaries	Location of state boundaries	U.S. Census 2010	Discovery Map; Geodatabase
Stream Flow Constrictions	Locations of Ice Jams and other stream flow constrictions.	U.S. Army Corps. of Engineers - Ice Jam Database, IDNR Office of Water Resources, Community Comments gathered during Discovery process	Discovery Map; Geodatabase
Stream Gages	Locations of stream gages operated by multiple agencies	United States Geological Survey (USGS)	Discovery Map; Geodatabase
Streams of Concern	Streams categorized by level of concern determined by Illinois State Water Survey (ISWS) in-house process.	Region V Coordinated Needs Management Strategy Inventory \ ISWS	Discovery Map; Geodatabase

Table 2. Data Collection for Upper Fox Watershed (continued)

Data Types	Description	Source	Deliverable
Illinois			
Wetlands	Location and type of wetlands and deep water habitats	U.S. Fish and Wildlife Service National Wetlands Inventory	Geodatabase
Wisconsin			
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-scale ratio and rectified photographic base maps	Wisconsin DNR	Discovery Map; Geodatabase

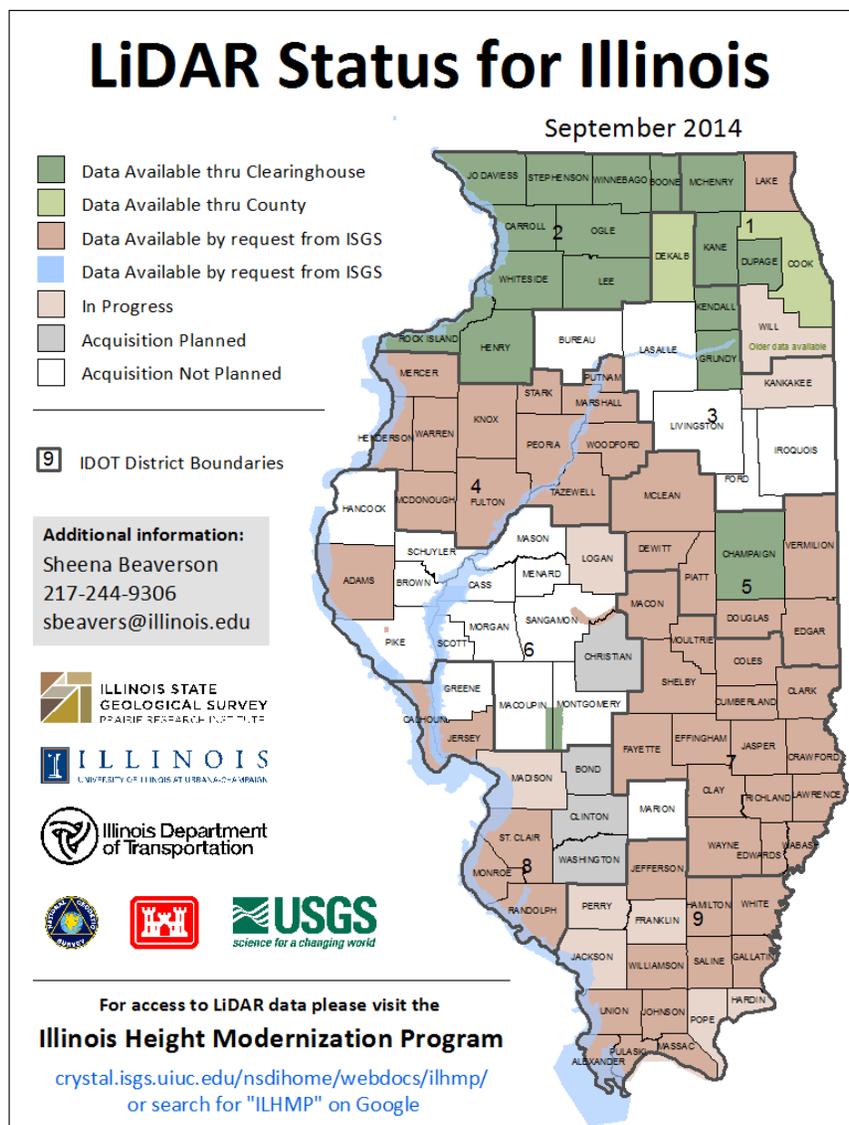
i. Data that can be used for Flood Risk Products

Topographic and Imagery Data

Illinois

As part of the Illinois Height Modernization effort, the Illinois Department of Transportation (IDOT) is leading LiDAR data acquisition for Illinois counties scheduled by IDOT district. Figure 2 displays the LiDAR status for Illinois counties (ISGS, 2014).

Figure 2. LiDAR Status for Illinois



Wisconsin

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

USGS Gages

The Illinois State Water Survey (ISWS) and Wisconsin Department of Natural Resources (WDNR) project teams identified USGS stream gages in the watershed. The locations of the gages are shown on the Discovery map and listed in Table 3.

Table 3. USGS Stream Gages

Gage Number	Station Name and Location
Illinois	
05547000	Channel Lake Near Antioch, IL
05547350	Grass Lake Outlet At Lotus Woods, IL
05547500	Fox Lake Near Lake Villa, IL
05547755	Squaw Creek At Round Lake, IL
05548000	Nippersink Lake At Fox Lake, IL
05548105	Nippersink Creek Above Wonder Lake, IL
05548110	Nippersink Creek Below Wonder Lake, IL
05548280	Nippersink Creek Near Spring Grove, IL
05548500	Fox River At Johnsburg, IL
05549000	Boone Creek Near McHenry, IL
05549500	Fox River Near McHenry, IL
05549501	Fox River (Tailwater) Near McHenry, IL
05549850	Flint Creek Near Fox River Grove, IL
05550000	Fox River At Algonquin, IL
05550001	Fox River (Tailwater) At Algonquin, IL
05550300	Tyler Creek At Elgin, IL
05550500	Poplar Creek At Elgin, IL
Wisconsin	
05543830	Fox River at Waukesha, WI
05544200	Mukwonago River at Mukwonago, WI
05544300	Mukwonago River tributary near Mukwonago, WI
05545100	Sugar Creek at Elkhorn, WI

Table 3. USGS Stream Gages (continued)

Gage Number	Station Name and Location
Wisconsin	
05545200	White River tributary near Burlington, WI
05545300	White River near Burlington, WI
05548170	North Branch Nippersink Creek near Genoa City, WI (Discontinued 10/01/2013)
05545750	Fox River near New Munster, WI

ii. **Other Data and Information**

Mitigation Plans/Status, Mitigation Projects

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

Table 4. MHMPs: Status and Availability

County	MHMP	Hazus	Issue Date	Expiration Date	Available for Review
Illinois					
Cook	Y	Y	09/10/2014	09/10/2015	Y
Kane	Y	N	02/03/2010	02/03/2015	Y
Lake	Y	N	07/26/2012	07/26/2017	Y
McHenry	Y	N	01/07/2011	01/07/2016	Y
Wisconsin					
Kenosha	Y	Y	06/30/2011	06/30/2016	Y
Racine	Y	Y	12/06/2010	12/06/2015	Y
Walworth	Updated Draft Plan for 2014-2018 in Progress	Y	07/07/2009	07/07/2014	Y
Waukesha	Y	Y	03/15/2011	03/15/2016	Y

(IEMA 11/13/2014) (WDNR 11/3/2014)

CNMS and NFIP Mapping Study Needs

Illinois

The Illinois State Water Survey (ISWS) applied geospatial technologies to coordinate the management of mapping needs. The Coordinated Needs Management Strategy (CNMS) contains data for stream reaches to support existing and proposed flood mapping activities. An update and analyses of the CNMS data for the Upper Fox watershed are complete. Analyzed studies have been identified in Illinois as valid, unverified, assessed, or unknown.

A methodology was determined to rank streams based on several criteria to provide a basis for prioritizing mapping needs in the watershed. There are a number of flooding issues in the Upper Fox River HUC8 watershed. ISWS identified streams of concern by performing a spatial analysis of the data to determine where there are combinations of potentially unverified engineering data, high risk, and community concerns. Three sources of information were used for this initial screening task. The CNMS Phase III data are organized in a geospatial database of stream reaches attributed with an assessment of the engineering analyses as valid, unverified, assessed, or unknown. The FEMA National Flood Risk Analysis HUC Risk Data spatial data were used to provide a relative risk ranking. The FEMA National Flood Risk Analysis HUC Risk Data are formed in a Census Block Group GIS layer that contains aggregated flood claims data along with 10 weighted parameters used to compute relative national risk (1 to 10 with 1 being highest risk) by Census Block Group. Study requests contained in the CNMS as well as local mapping concerns collected at the Discovery meeting were used to identify 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 for which comments collected indicate that the Special Flood Hazard Area (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. Table 5 displays the streams of concern categorization used in Illinois. The entire list of categorized stream segments, including stream names, floodplain zones, stream lengths, and categories of concern, are provided in Appendix G. The stream segment categories are stored in the Discovery geodatabase as well as a GIS feature class derived from the CNMS. The feature class name is Streams of Concern.

Table 5. Streams of Concern Categorization - Illinois

Level of Concern	CNMS Status	Study Request	FEMA Risk Decile
<i>High</i>	Unverified	Yes/No	1-5
	Unknown & Assessed	Yes	1-5
<i>Medium</i>	Unverified	Yes/No	6-10
	Unknown & Assessed	Yes	6-10
	Valid	Yes	1-10
<i>Low</i>	Valid	No	n/a
	Unknown & Assessed	No	n/a

Wisconsin

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 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 identifying those streams for which 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 five-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 for which 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 for which a community request was made to study the reach in detail.

Community Rating System (CRS)

The National Flood Insurance Program's (NFIP) Community Rating System (CRS) is a voluntary incentive program that recognizes and encourages community floodplain management activities that exceed the minimum NFIP requirements. As a result, flood

insurance premium rates are discounted to reflect the reduced flood risk resulting from the community actions meeting the three goals of the CRS. The three goals are to reduce flood damage to insurable property, strengthen and support the insurance aspects of the NFIP, and encourage a comprehensive approach to floodplain management.

Eight communities and three counties in the Upper Fox watershed participate in the CRS (Table 6, FEMA, 2014).

Table 6. CRS Communities

Community/County	Rating	Premium Discount
Illinois		
Bartlett/ DuPage, Cook, Kane	7	15%
Carpentersville/Kane	6	20%
Crystal Lake/McHenry	6	20%
Hoffman Estates/Cook, Kane	7	15%
Lake County	6	20%
Lake in the Hills/McHenry	6	20%
McHenry County	8	10%
South Elgin/Kane	5	25%
Woodstock/Woodstock	7	15%
Wisconsin		
Kenosha County	5	25%
New Berlin/Waukesha	7	15%

(CIS, 2014)

Levees

No levees exist in the Illinois or Wisconsin Upper Fox watershed study area.

Floodplain Management/Community Assistance Visits (CAVs)

Community Assistance Contacts (CACs) and Community Assistance Visits (CAVs) are two key methods FEMA uses to identify community floodplain management program deficiencies and violations and to provide technical assistance to resolve these issues. As the state coordinating agency for the National Flood Insurance Program, the Illinois Department of Natural Resources, Office of Water Resources (IDNR/OWR) and the WDNR, conduct CACs and 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 an 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.

A CAC can be conducted by a telephone call to the community or a brief visit. The CAC provides a means to establish or re-establish contact with an NFIP community for the purpose of determining any existing problems or issues and to offer assistance if necessary. Table 7 lists the communities in the watershed and the date of their latest CAV or CAC. (CIS, 2014)

Table 7. Recent CAV/CACs

Community	CAV	CAC
Illinois		
Algonquin, Village of	09/28/11	06/19/96
Antioch, Village of	04/30/02	N/A
Barrington, Village of	02/07/96	N/A
Barrington Hills, Village of	10/21/97	08/28/96
Bartlett, Village of	07/20/00	08/27/97
Bull Valley, Village of	N/A	N/A
Carpentersville, Village of	04/20/05	09/05/97
Cary, Village of	02/14/12	07/28/95
Cook County	08/04/11	N/A
Crystal Lake, City of	08/11/09	09/12/96
Deer Park, Village of	03/20/08	09/22/97
East Dundee, Village of	12/05/02	10/27/99
Elgin, City of	05/26/11	10/27/99
Fox Lake, Village of	06/30/10	N/A
Fox River Grove, Village of	03/27/02	09/23/98
Gilberts, Village of	12/17/03	12/17/97
Grayslake, Village of	02/25/05	N/A
Greenwood, Village of	N/A	06/04/99
Hainesville, Village of	11/27/06	09/29/98
Hanover Park, Village of	09/18/12	08/29/97
Harvard, City of	01/29/04	10/27/99
Hawthorn Woods, Village of	04/11/06	N/A
Hebron, Village of	N/A	N/A
Hoffman Estates, Village of	07/31/2013	09/12/97
Holiday Hills, Village of	N/A	09/09/96
Inverness, Village of	N/A	09/10/97
Island Lake, Village of	04/20/04	09/19/97

Table 7. Recent CAV/CACs

Community	CAV	CAC
Illinois		
Johnsburg, Village of	02/08/12	09/15/99
Kane County	01/17/2013	N/A
Lake Barrington, Village of	09/17/04	09/07/99
Lake County	10/01/11	08/01/06
Lake in the Hills, Village of	05/30/06	09/01/92
Lake Villa, Village of	02/01/08	N/A
Lake Zurich, Village of	02/25/05	09/03/96
Lakemoor, Village of	06/28/06	03/22/94
Lakewood, Village of	04/15/04	N/A
Lindenhurst, Village of	04/24/06	09/26/96
McCullom Lake, Village of	01/20/05	03/22/94
McHenry County	04/15/10	N/A
McHenry, City of	08/15/02	09/20/96
Mundelein, Village of	05/02/04	09/24/96
North Barrington, Village of	05/02/05	08/19/10
Oakwood Hills, Village of	N/A	N/A
Pingree Grove, Village of	N/A	N/A
Port Barrington, Village of	03/05/07	09/24/98
Prairie Grove, Village of	04/24/07	N/A
Richmond, Village of	01/20/05	08/02/95
Ringwood, Village of	N/A	N/A
Round Lake, Village of	04/16/02	09/26/96
Round Lake Beach, Village of	06/20/02	N/A
Round Lake Heights, Village of	07/13/04	09/20/96
Round Lake Park, Village of	09/11/01	09/23/97
Schaumburg, Village of	N/A	09/27/99
Sleepy Hollow, Village of	11/01/05	12/10/97
South Barrington, Village of	03/30/98	N/A
South Elgin, Village of	03/30/98	N/A
Spring Grove, Village of	12/12/02	09/30/96
Streamwood, Village of	04/28/93	07/21/99
Tower Lakes, Village of	N/A	09/20/99

Table 7. Recent CAV/CACs (continued)

Community	CAV	CAC
Trout Valley, Village of	N/A	N/A
Volo, Village of	N/A	09/15/99
Wauconda, Village of	05/30/02	09/24/96
West Dundee, Village of	07/25/01	09/02/97
Wonder Lake, Village of	06/08/05	09/24/98
Woodstock, City of	09/01/09	08/28/96
Wisconsin		
Big Bend, Village of	N/A	09/11/95
Brookfield, City of	05/24/11	N/A
Burlington, City of	10/24/2013	09/29/06
Delafield, City of	N/A	08/19/94
East Troy, City of	N/A	09/12/95
Genoa City, Village of	04/08/10	N/A
Hartland, Village of	N/A	09/11/95
Kenosha County	09/30/09	09/20/2005
Lake Geneva, City of	06/26/1991	N/A
Lannon, Village of	N/A	06/23/09
Menomonee Falls, Village of	3/11/1998	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
New Berlin, City of	09/29/2004	N/A
Pewaukee, Village of	06/28/90	12/27/93
Racine County	07/10/90	09/23/93
Rochester, Village of	02/02/1995	N/A
Silver Lake, Village of	09/13/06	08/03/10
Twin Lakes, Village of	N/A	09/28/1993
Walworth County	11/30/1999	07/09/93
Waterford, Village of	N/A	05/15/2012
Waukesha, City of	09/12/2006	N/A

(CIS, 2014)

Regulatory Mapping

As part of FEMA’s Map Modernization program, ISWS and WDNR have recently updated several countywide Flood Insurance Rate Maps (FIRMs) throughout Illinois and 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 8 lists the Digital Flood Insurance Rate Map (DFIRM) status for counties in the Upper Fox watershed.

Table 8. Digital Flood Insurance Rate Map Status

County	Status	Effective Date
Illinois		
Cook County	Effective	08/19/2008
Kane County	Effective	08/03/2009
Lake County	Effective	09/18/2013
McHenry County	Effective	11/16/2006
Wisconsin		
Kenosha County	Effective	06/19/2012
Racine County	Effective	05/02/2012
Walworth County	Effective	10/02/2009
Waukesha County	Effective	11/19/2008

(FEMA MSC, 11/19/2014)

IV. Risk MAP Needs and Recommendations

The Illinois and Wisconsin project teams presented the Discovery map and discussed the results of the data collection and analysis with the watershed stakeholders in detail during the Discovery meetings. This section addresses the areas of concern and interest within the Upper Fox watershed that could be addressed with Risk MAP projects.

i. Floodplain Studies

DFIRMs have been produced for many counties in the Upper Fox HUC 8 watershed, yet study and mapping needs still exist. Using the CNMS and input from community stakeholders, ISWS and WDNR have 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 9. Maps showing Illinois and Wisconsin waterways that have been identified as streams of concern are displayed in Figures 3 and 4, respectively.

The goal of the floodplain mapping program is to have a high quality, model-based floodplain mapped for all streams that drain greater than 1 square mile. While the mapping needs listed in the following table are the highest priority stream reaches for modeling, there are other mapping needs that also should be included in any project proposed for this basin. These needs are fully documented in CNMS. Appendix G lists the additional mapping needs required to meet this goal.

Wisconsin Action Discovery Update

As a result of the April 2013 Wisconsin Upper Fox Discovery Report submittal, Data Development funding was received in FY13 and survey work has been completed up to the Wisconsin-Illinois state line for the Wisconsin portion of the Upper Fox watershed. The Wisconsin Department of Natural Resources (WDNR) is currently in the process of developing hydraulic and hydrologic models and will create work maps during 2015. (WDNR, 11/3/2014)

Table 9. Mapping Needs

Flooding Source	Study Length (Miles)	Study Type
Illinois		
Antioch Lake Drain	0.77	AE
Bangs Lake Drain	4.51	AE
Boone Creek	7.52	A
Carpenter Creek	1.79	A
Carpenter Creek	0.38	AE
Dutch Creek	2.31	AE
Dutch Creek-North Branch	3.13	AE
Eagle Creek	1.32	AE
Eagle Creek	2.48	A
East Branch Of Eagle Creek	0.26	AE
Flint Creek Tributary	2.98	AE
Fox River	20.35	AE
Fox River	5.34	AE
Fox River	12.19	AE
Jelkes Creek	2.70	AE
Jelkes Creek	1.32	AE
Kimball Avenue Tributary	0.28	AE
Nippersink Creek	19.45	AE
Nippersink Creek	0.83	AE

Flooding Source	Study Length (Miles)	Study Type
Illinois		
North Flint Creek	5.05	AE
Pistakee Lake	6.76	AE
Poplar Creek	1.86	AE
Poplar Creek	0.49	AE
Round Lake	0.46	AE
Round Lake Drain	0.69	AE
Round Lake Drain	1.83	AE
Round Lake Drain Tributary	1.59	AE
Sandy Creek	1.54	AE
Silver Creek Tributary No. 1	1.11	AE
Sleepy Creek	1.33	AE
Slocum Lake	1.25	AE
Slocum Lake Drain	2.00	AE
Squaw Creek	5.13	AE
Squaw Creek	1.62	AE
Squaw Creek	3.06	AE
Squaw Creek	1.58	AE
Willow Road Creek	0.42	AE
Woods Creek Tributary	2.00	A
Cary Creek	1.32	AE
Cary Creek	0.53	AE
Cotton Creek	2.06	AE
Cross Lake Tributary	0.15	AE
Crystal Creek	7.53	AE
Crystal Lake	1.24	AE
Dutch Creek- West Fork Of North Fork Of Branch To Northwest	0.74	AE
Dutch Creek-Branch To Northwest	2.35	AE
Dutch Creek-North Fork Of Branch To Northwest	1.59	AE
Eagle Creek	0.28	A
East Fork North Spring Creek	0.68	AE
Elizabeth Lake Drain	1.61	AE
Elizabeth Lake Drain	0.75	AE
Flint Creek	4.87	A
Flint Creek	0.40	AE
Flint Creek Tributary	0.38	AE
Four Winds Way Creek	0.77	AE
Honey Lake Drain	2.06	AE
Lake Barrington Drain	0.75	AE
Lake Villa Creek	1.45	AE

Flooding Source	Study Length (Miles)	Study Type
Illinois		
Lakeland-Park Drainage Ditch	0.79	AE
Lily Lake	1.33	AE
Lily Lake	0.13	AE
Lily Lake Drain	1.09	A
Lily Lake Drain	1.76	A
Lord's Park Tributary	1.01	AE
Mutton Creek	1.59	AE
North Branch Eagle Creek	0.07	AE
North Branch Nippersink Creek (Lower Reach)	4.98	AE
North Branch Nippersink Creek (Upper Reach)	1.74	AE
North Flint Creek	0.84	AE
North Shore Drain	0.39	AE
Pingree Creek	2.77	AE
Poplar Creek	0.24	AE
Poplar Creek	0.70	AE
Poplar Creek South Branch	3.16	AE
Sequoit Creek	2.99	AE
Shallow Ponding East Of Lily Lake	0.50	AE
Shallow Ponding East Of Lily Lake	0.16	AE
Signal Hill Tributary	0.45	AE
Silver Creek	6.75	AE
Silver Creek Tributary No. 1	0.18	AE
Silver Creek Tributary No. 2	0.56	AE
Silver Lake Drain	0.45	AE
Slough Creek	6.03	AE
South Branch Of Lake Villa Creek	0.43	AE
South Branch Slough Creek	0.19	AE
Spring Creek	7.07	A
Squaw Creek	3.31	A
Timber Lake Drain	0.96	AE
Tower Lake Creek	1.77	AE
Tyler Creek	13.61	AE
Tyler Creek Unnamed Tributary	4.04	A
Tyler Creek Unnamed Tributary	1.72	AE
Wonder Lake	2.53	AE
Woods Creek	2.88	AE

Flooding Source	Study Length (Miles)	Study Type
Wisconsin		
Benedict Lake / Tombeau Lake	0.46	AE
Eagle Creek	2.25	A
East Branch Nippersink Creek	3.15	AE
East Channel Fox River	0.57	AE
Fox River	81.77	AE
Fox River Tributary 2	6.65	None
Geneva Lake Tributary	1.74	A
Jewel Creek	0.68	AE
Little Muskego Lake	1.26	AE
Mill Brook	5.29	A
Mukwonago River Tributary	2.65	None
Muskego Canal	2.77	AE
Muskego Lake	3.98	AE
New Munster Creek	4.95	A
Pebble Brook	8.25	AE
Pebble Brook Tributary	1.14	AE
Pewaukee River	1.25	AE
Pewaukee Trib 11.1	1.77	A
Powers Lake Tributary	1.62	AE
Quietwood Creek	2.19	AE
Spring Brook	6.18	A
Sugar Creek Tributary	0.48	A
Sugar Creek Tributary Surcharge Route	0.41	AE
Tributary to Ore Creek	3.44	A
Tributary to White River	2.27	A
Willow Springs Creek	5.27	AE

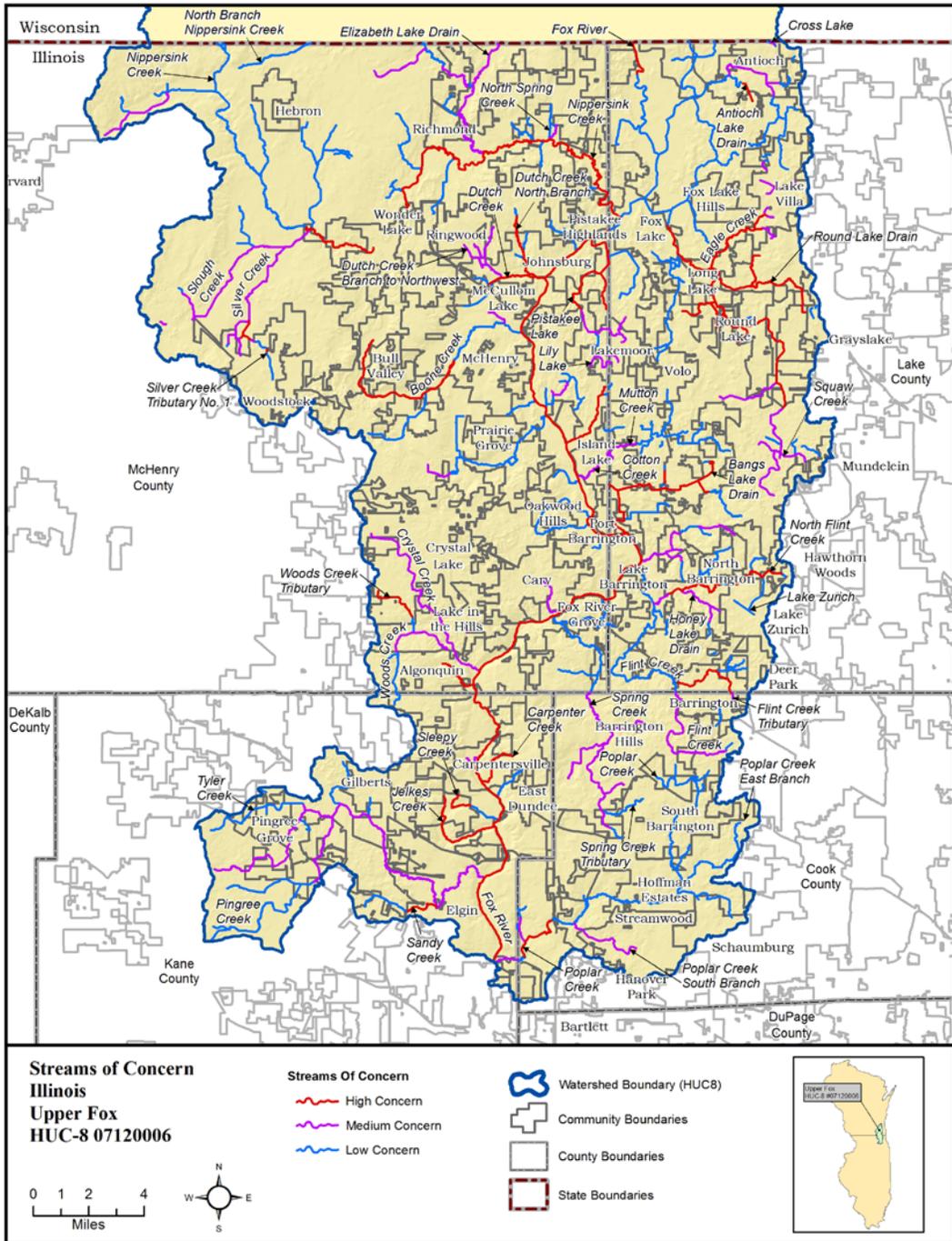


Figure 3. Illinois Streams of Concern

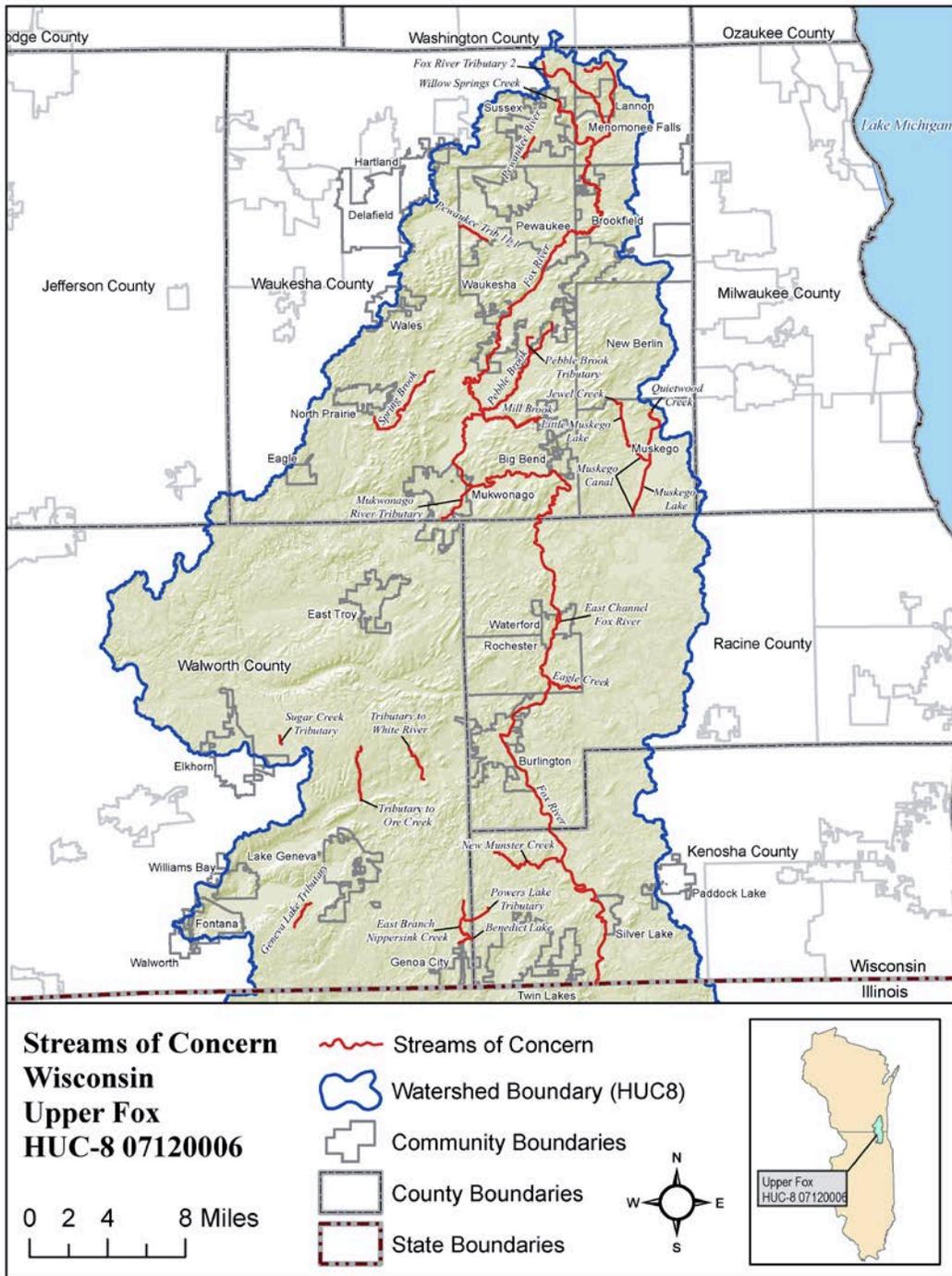


Figure 4. Wisconsin Streams of Concern

ii. Mitigation Projects

In the Discovery and Action Discovery meetings, community stakeholders identified several possible 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, stream flow constriction, and recent and/or future development. Table 10 lists the mitigation projects identified during the Discovery and Action Discovery meetings and follow up communications. Comment forms and Mitigation Action Forms (MAF) were used to submit mitigation projects.

Table 10. Mitigation Projects

Community	Flood Risk Issue	Project	Status	Comment
Illinois				
Algonquin, Village of	Overtopped Road	Enlarge Box Culverts and Elevate Woods Creek Lane	Identified	13
Algonquin, Village of	Overtopped Road	Install larger culverts under Woods Creek Lane and raise the road.	Identified	MAF Alg1
Algonquin, Village of	Overtopped Road and Stream Erosion	Upsize culverts / realign and stabilize Dixie Creek	Identified	MAF Alg2
Algonquin, Village of	Village Property Flooding	Realign the storm sewer. Stabilize Souwanas Creek.	Identified	MAF Alg3
Barrington, Village of	Stream Flow Constriction	Village of Barrington / IDOT Phase I for underpass / overpass of U.S. Rte. 14 at CN/EJE railroad tracks.	In Progress	76
Carpentersville, Village of	Inaccurate Floodplain	Zone A needing study and remapped	Identified	97
Carpentersville, Village of	Overtopped Roads and Properties	Replace storm sewers	Identified	2,15, 21_Carp
Carpentersville, Village of	Flooding, Significant Riverine Erosion	Stream bank stabilization; Remapping; LOMR	In Progress	94
Carpentersville, Village of	Overtopped Roads	Upsize storm sewers; new concrete box culvert	Identified	MAF 2,16, 25, 27-Carp
Carpentersville, Village of	Erosion	Stabilize banks and new box culvert	Identified	MAF 19, 26-Carp
Carpentersville, Village of	Erosion / Runoff	Install storm sewer pipe and swale the rear yards to a drainage structure.	Identified	MAF 22, 23, 24-Carp
Carpentersville, Village of	Creek Flooding	Remove and replace restrictive culvert	Identified	MAF95 -Carp
Carpentersville, Village of	Inaccurate Zone A	Study Update; LOMR needed	In Progress	MAF 97-Carp
Carpentersville, Village of	Inaccurate Floodplain	Remap the area using new study data	Identified	95

Community	Flood Risk Issue	Project	Status	Comment
Illinois				
Carpentersville, Village of	Inaccurate Zone A	Study Update	In Progress	97
Cary, Village of	Flooded Homes	Buyouts	Identified	N/A
Cary, Village of	Overtopped Road	Raise Spring Street	Identified	108
Cary, Village of	Roadway and Residential Flooding	Additional storage, runoff volume reductions needed. Buyouts in process for 4 properties.	In progress	MAF39
Crystal Lake, City of	Overtopped road	City of Crystal Lake raised North Shore Drive, added culverts beneath pavement, and expanded conveyance channel	Completed (10/2012)	8
Crystal Lake, City of	Flooding Issue / Standing Water	Area under study for future mitigation effort to address flooding issue. Reroute stormwater to a new drainage facility	Identified	102, MAF 102-CL
Crystal Lake, City of	Stream Flow Constriction	Replace/repair culverts under Lake Avenue and Country Club Road	Identified	104
Crystal Lake, City of	Residential Flooding / Drainage Issues	Purchase homes. Provide stormwater storage.	Identified	MAF 1C
Crystal Lake, City of	Residential Flooding	Drainage Improvements	Identified	MAF 3-CL
Crystal Lake, City of	Lake Flooding	Culvert Enlargement	Identified	MAF 4-CL
Crystal Lake, City of	Overtopped Roads	Upsizing storm sewer. Expansion of detention storage basin. Drainage improvements.	Identified	MAF 5, 6, 7, 8, 9, 10-CL
Crystal Lake, City of	Crystal Lake BFE	New study model.	Identified	MAF 101-CL
Crystal Lake, City of	Localized flooding and standing water.	Installation of perforated storm sewer.	Identified	MAF 1A-CL
Crystal Lake, City of	Crystal Creek Residential Flooding	Culvert Enlargement; Construct storage areas.	Identified	MAF 4B, 4C-CL
East Dundee, Village of	Stormwater Management	Development of Regional Stormwater Management facility	Completed	83b
East Dundee, Village of	Significant Riverine Erosion	Stream bank stabilization	Identified	83c
Elgin, City of	Stream Flow Constrictions	Repair/replace culverts under St. Charles Street, Royal Boulevard, Laurel Street, and Villa Street	Identified	Elgin 1, 2,3,4

Community	Flood Risk Issue	Project	Status	Comment
Illinois				
Elgin, City of	Streambank Erosion and Overtopped Road	Tyler Creek stream stabilization and culvert upsizing for Garden Crescent Drive	Identified	MAF 25
Elgin, City of	Overtopped Road	Upsize Brookside Creek culvert. Improve drainage and flow of Otter Creek.	Identified	MAF 33
Fox Lake, Village of	Roadway Flooding, Rear Yard, Repetitive Losses	Raise Route 12 and Route 59 intersection just south of Rollins Road. Install storm relief sewers. Possible buyouts in Knollwood Subdivision.	Identified	MAF 2
Fox Lake, Village of	Road and Residential Flooding	Eagle Point Subdivision; Rte. 12 at Eagle Point Road. Buyouts. Raise homes and flood proof properties.	Identified	MAF 27
Fox Lake, Village of	Roadway Flooding	Raise roadways. Improve drainage. New storm relief sewers.	Identified	MAF 36
Fox River Grove, Village of	Road Flooding	Garner Road / Doyle Road / Replacement of existing culverts, regrading of existing ditches and excavation to alleviate the flooding.	Identified	MAF1 FRG; MAF2 FRG
Fox River Grove, Village of	Road Flooding	Welch's Subdivision / South Illinois Route 22, east of US Route 14 / Replacement of the existing culvert and extensive re-grading of existing ditches.		MAF3 FRG
Fox River Grove, Village of	Road Flooding	Hillcrest Avenue / Excavate the adjacent parkway to create detention, raise the roadway and re-grade the existing ditches	Identified	MAF4 FRG
Fox River Grove, Village of	Sewer Backup	Rehabilitation of the sanitary sewer lift stations to alleviate the inundation.	Identified	MAF5 FRG
Fox River Grove, Village of	Road Flooding	213 South River Road / Replacement of existing culverts, regrading of existing ditches and excavation.	Identified	MAF6 FRG
Hawthorn Woods, Village of	Inaccurate Floodplain	New study and floodplain remapped	Identified	75

Community	Flood Risk Issue	Project	Status	Comment
Illinois				
Holiday Hills, Village of	Overtopped Road / At-Risk Essential Facility	The channels, homes, and water supply facility flood due to reverse flow of the Fox River. Mitigated by controlling the lock at Stratton Dam.	Ongoing	34
Holiday Hills, Village of	Fox River Flooding	Retention Area for Floodwaters – Lake Griswold	Identified	MAF 16
Illinois Department of Natural Resources	Fox River Flooding	To help identify the flood risk, a new hydraulic model, HEC-RAS, should be developed for the Fox River.	Identified	MAF IDNR
Island Lake, Village of	Areas needed to be mapped	Study and Floodplain Mapped	Identified	32
Island Lake, Village of	Inaccurate Floodplain	Map Update	Identified	32
Kane County	Ice Jams	Reestablish IDNR/OWR ice boom project to mitigate ice jams in critical locations	Identified	18
Kane County	Inaccurate Floodplain	Zone A needing study and remapped	Identified	120
Kane County	Zone A Floodplain Needing Additional Study	Study Request and Map Update	Identified	120
Lake County	Residential Flooding	Property acquisition residential area south shoreline of Slocum Lake, Lake County.	Identified	MAF 8
Lake County	Flood Risk	Install a stream gage on the Fox River south of WS border and another near Cary, IL to improve flood warnings	Identified	15a, 15b
Lake County	Overtopped Road	Elevate Stratton Point Road and Squaw Road	Identified	6a, 6b
Lake County	Stream Debris	Fiddle Creek Stream Maintenance Project	In Progress	90, 115
Lake County	Stream Restriction	Slocum Drainage District and Lake County SMC removing flow obstructions	In Progress	115
Lake in the Hills, Village of	Flood Risk	Install stream gages at spillway of Dam 1 and downstream of Dam 4 to improve flood warnings.	Identified	5

Community	Flood Risk Issue	Project	Status	Comment
Illinois				
Lakemoor, Village of	Overtopped roads	Village installed 24" new storm sewer duct to replace an 100 year-old 14" farm tile to correct flooding in the Sunnyside, Hollywood, Rosedale, and East Lake Area	Completed	10
Lakemoor, Village of	Overtopped road	Buyout of one home at the end of Sheridan Road	Identified	103
McHenry County	Overtopped road	Additional buyouts are needed on the T-channel on Pistakee Lake where the loss of access prevents the residents from entering their homes.	Identified	20
McHenry County	Overtopped road	River Road at Dowell RJ intersection improvement project with additional land and roundabout.	In Progress	7
McHenry County	Gap in Floodplain Mapping	New study and floodplain remapped	Identified	112
McHenry County	Flooded Homes and Roads	Bone Creek Conservation Area Water Control Project	In Progress	N/A
McHenry County	Lack of Designated SFHA Boundary	DFIRM 17111C0176J. Section missing from SFHA designation. New study and floodplain remapped.	Identified	MAF Mc1, Mc3, Mc4
McHenry County	Residential Flooding	Repetitive Loss Structures. Application for HMPG funds to acquire 9 structures and vacant properties.	Identified	MAF Mc2
McHenry County	Bridge Flooding / Damage	O'Brien Road Bridge rehabilitation, Branch of Nippersink Creek stream bank protection, scour protection.	Identified	MAF 31
McHenry, City of	Overtopped Roads	Dredging and culvert work to alleviate flooding on Anne Street and Dale Avenue. Funding needed to do more work.	In Progress	3b, 3c
McHenry, City of	Overtopped Road	Dredge Lakeland Park Drainage Ditch	Identified	3C
Port Barrington, Village of	Inaccurate Floodplain	New study and floodplain remapped	Identified	22
Port Barrington, Village of	Residential Flooding	Buyout of residences at 228, 230, and 232 Eastwood Lane.	Identified	MAF PB

Community	Flood Risk Issue	Project	Status	Comment
Illinois				
Sleepy Hollow, Village of	Overtopped Roads	Dredge and Enlarge Ditches at Locust and Hillcrest.	Identified	81a
Sleepy Hollow, Village of	Overtopped Road	Elevate Winmoor, Willow, and Bull Frog Roads	Identified	81b
Sleepy Hollow, Village of	Overtopped Road	Replace/repair culverts	Identified	118
South Elgin, Village of	Overtopped Road	Elevate Water Street	Identified	124
Streamwood, Village of	Inaccurate Floodplain	New study and floodplain remapped	Identified	119
Wauconda, Village of	Overtopped Road	Replace/repair existing outfall culvert under roadway.	Identified	41
West Dundee, Village of	Street and Structure Flooding	Culvert enlargement at Sleepy Creek at Strom Road. Downstream channel maintenance	Identified	MAF 13a
West Dundee, Village of	Structure Flooding	Buyout of apartment building at Lincoln and 6 th Streets.	Identified	MAF 13b
West Dundee, Village of	Street Flooding	A study is needed to determine how to eliminate street flooding at Edwards and Fox.	Identified	MAF 13c
West Dundee, Village of	Stream Erosion / Sedimentation	Channel Maintenance at Huffman Park and Fairhill Basin	Identified	MAF 13d
Wisconsin				
Brookfield, City of; New Berlin, City of	Approximate Study or No Study on a Stream Where Development is Occurring or Likely To Be	2004 Unnamed Tribe studied by Ruckert-Mielke. Community needs to submit study for a LOMR. Possibly the same Zone A study the City of New Berlin mentions as a potential leverage by Willow Drive.	Incomplete	Action Discovery
Brookfield, City of	Buyout; Areas of Mitigation Success	Adelaide and Oak Hill acquisition and demo done (2nd in HMP)	Completed	Action Discovery
Brookfield, City of	Buyout; Areas of Mitigation Success	Imperial Estates floods (3rd in HMP)	Completed	Action Discovery
Brookfield, City of	Overtopped Road During Flood Events	Baker Road/CTH Y; North Ave/CTY M - Fox River cuts through	In Progress	Action Discovery
Brookfield, City of	Overtopped Road During Flood Events	Elmbrook Memorial Hospital affected when CTH M overtops road, closed road for several days	In Progress	Action Discovery
Brookfield, City of	Potential Storage Area	Sunny Slope and Greenfield - flat - may help New Berlin	Incomplete	Action Discovery
Kenosha County	Dam	Rebuilt dam at Center Lake > changes outlet elevation.	Incomplete	Action Discovery

Community	Flood Risk Issue	Project	Status	Comment
Wisconsin				
Kenosha County	Effective Study No Longer Reflects Existing Conditions	Center Lake - a lot of flooding. Goes along with original Discovery Comment to use LIDAR requesting a detailed study on this lake. Originally given 4th priority.	Incomplete	Action Discovery
Kenosha County	Effective Study No Longer Reflects Existing Conditions	Rock Lake - a lot of flooding. Goes along with original Discovery Comment requesting a detailed study on this lake. Originally given 3rd priority.	Potential In Progress	Action Discovery
Kenosha County	Effective Study No Longer Reflects Existing Conditions	Cross Lake - a lot of flooding	Potential In Progress	Action Discovery
Kenosha County	Effective Study No Longer Reflects Existing Conditions	Camp Lake - a lot of flooding. Goes along with original Discovery Comment to use LIDAR requesting a detailed study on this lake. Originally given 4th priority.	Incomplete	Action Discovery
Kenosha County	Effective Study No Longer Reflects Existing Conditions	Trevor Creek - a lot of flooding	In Progress	Action Discovery
Kenosha County	Effective Study No Longer Reflects Existing Conditions	Powers Lake - new detailed floodplain.	In Progress	Action Discovery
Kenosha County	Effective Study No Longer Reflects Existing Conditions	New Munster being restudied.	In Progress	Action Discovery
Kenosha County	Areas of Mitigation Success	Lots of mitigation.	Completed	Action Discovery
Lannon, Village of	Overtopped Road	Areas of flooding overtopping street mitigated by floodplain widening by removing retaining wall.	Completed	50F&W
Lannon, Village of	Overtopped Road	Lannon Creek drains a major part of the village.	Identified	50-1
Lannon, Village of	Overtopped Road	Flooding at Good Hope Road	Identified	50-2
Menomonee Falls, Village of	Overtopped Road During Flood Events	Willow Creek studied/being studied-replaced structures but road still floods and affects home access	In Progress	Action Discovery
Menomonee Falls, Village of	Potential Storage Area; Areas of Mitigation Success	Potential Detention pond/wetland scrape at Chrisman & Maple off UF; bought properties	In Progress	Action Discovery

Community	Flood Risk Issue	Project	Status	Comment
Wisconsin				
Menomonee Falls, Village of	Areas of Mitigation Success	Areo Park Airport (abandoned) - Village bought that land - unnamed tributary of Fox River.	Completed	Action Discovery
Muskego, City of	Effective Study No Longer Reflects Existing Conditions	Muskego Canal - DNR grant - locally adopted floodplain good, FEMA maps poor - surveyed for this study	In Progress	Action Discovery
Muskego, City of	Effective Study No Longer Reflects Existing Conditions	Quietwood Creek - repetitive loss property in HMP - being surveyed for this study	In Progress	Action Discovery
Muskego, City of	Dam	Muskego Dam has IOM plan > helps with modeling	In Progress	Action Discovery
New Berlin, City of	Undersized Culverts; Roads Overtopping	Beloit Road - A zone needed.	Incomplete	Action Discovery
New Berlin, City of	Undersized Culverts; Roads Overtopping	Beres Road - overtopping roads ingress/egress of subdivision	Incomplete	Action Discovery
New Berlin, City of	Effective Study No Longer Reflects Existing Conditions	Poplar Creek - Industrial Park - controversy - not mapped accurately. Stream centerline should go north of Observatory	Incomplete	Action Discovery
New Berlin, City of	Area in Need of Mitigation Action To Reduce Flooding	Victor Road - create high flow ditch? So Poplar Creek doesn't cross road twice in short area.	Incomplete	Action Discovery
New Berlin, City of	Undersized Culverts; Roads Overtopping	Calhoun - road flooding and damage all along	Incomplete	Action Discovery
Racine County	Areas of Mitigation Success	Updating HMP in next 2 years	In Progress	Action Discovery
Waukesha, Village of	Stream Flow Constriction	Replace/repair culverts	Identified	48-6
Waukesha, Village of	Overtopped Road	Saratoga Dam - overstreet - Corrina Blvd and Barstow Buckley - Near Madison/Broadway/Clinton intersection	Identified	31-A
Waukesha, Village of	Overtopped Road	Marshall at Prairie Ave and Bethesda Park at Dunbar	Identified	31-B
Waukesha, Village of	Significant Riverine Erosion	Stream bank stabilization along Fox River from Moreland to West Ave.	Identified	32-G
Waukesha, Village of	Stream Flow Constriction	RR bridge (not used) behind 300 Sentry Drive collects logs and river debris	Identified	34-G
Waukesha, Village of	Overtopped Road	Fox River Pkwy South of Sunset	Identified	31-C

(WDNR, 11/3/2014) (ISWS, 11/19/2014)

Community Mitigation Projects

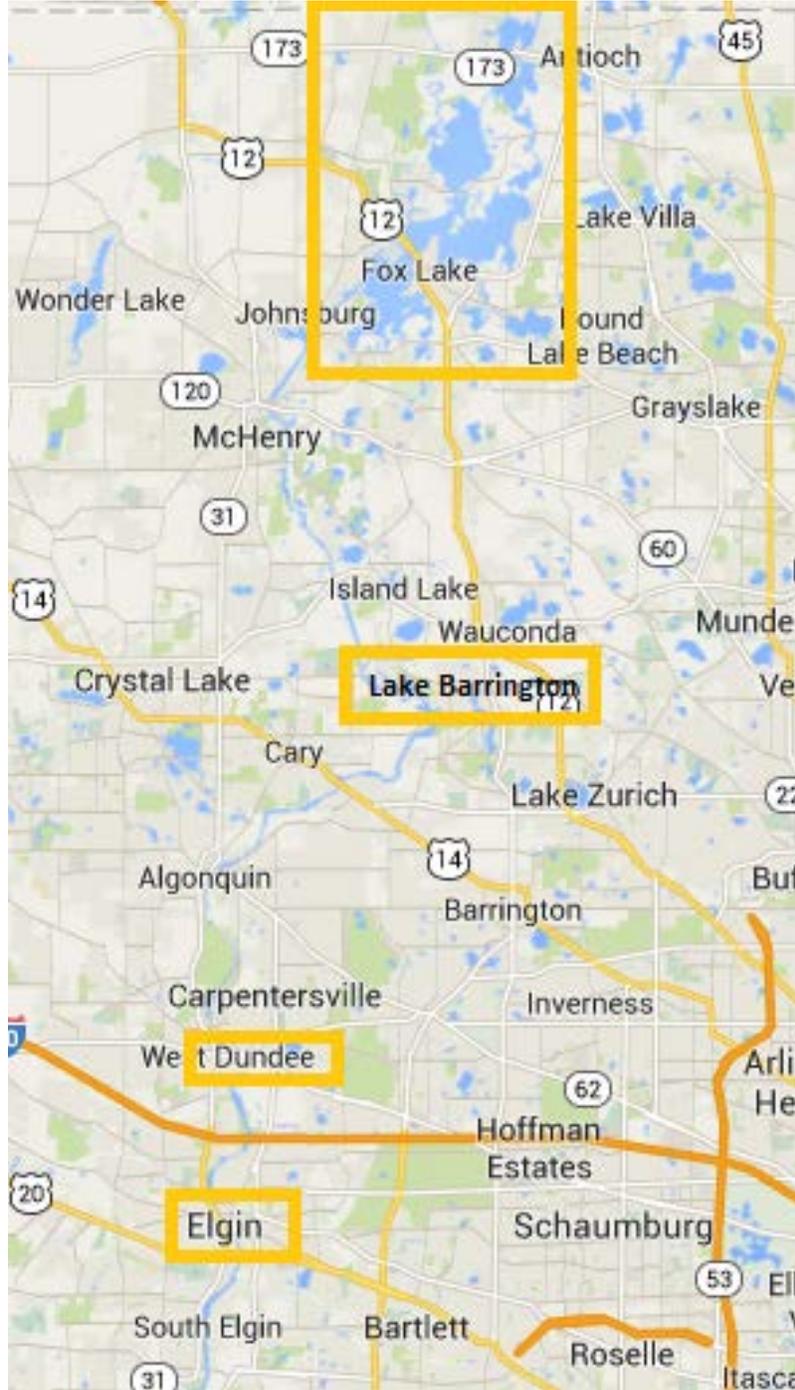
Following the Discovery meetings, comments were reviewed and additional community outreach was conducted to help identify high priority community mitigation projects within the Upper Fox River watershed area. The high priority mitigation projects are described in the following narratives.

Fox River Ice Jams – East Dundee, Elgin, Lake Barrington, Lake County, Kane County

Ice jams and associated flooding at various times were reported at numerous locations along the Upper Fox River, with nine separate comments submitted at the Discovery and Action Discovery Meetings. The Village of East Dundee, the City of Elgin, Kane County, Lake County, and the Village of Lake Barrington reported ice jams and damage caused by frequent ice jam flooding and locations experiencing limited access during ice jam events.

Specific reaches identified were the Upper Fox River from Elgin, IL to East Dundee, IL (including Kane County and Richardson Subdivision), the Fox River throughout Lake County (including Lake Barrington and the Chain-of-Lakes), and Matton Creek in Lake County.

A comprehensive report on historical ice jam flooding could assist floodplain managers, communities, and FEMA in mitigating risks due to ice jams. A report detailing the location, extent, elevation, and frequency of historical ice jams with appropriate mapping products can be used as educational materials to help individuals and communities understand their flood risk and take mitigating actions. The report could also be used as a tool for floodplain administrators looking to enforce floodplain ordinances in known flood-prone areas outside of the Special Flood Hazard Area and to FEMA as a tool at a key decision point when considering whether ice jam analysis should be included in a future restudy of the Fox River (the USACE is planning to restudy the Fox River from the state line to the confluence with the Illinois River as per Rita Lee, Engineering Studies Section Chief). Information is available from communities, the USACE, the Cold Regions Research and Engineering Laboratory (CRREL), and IDOT.

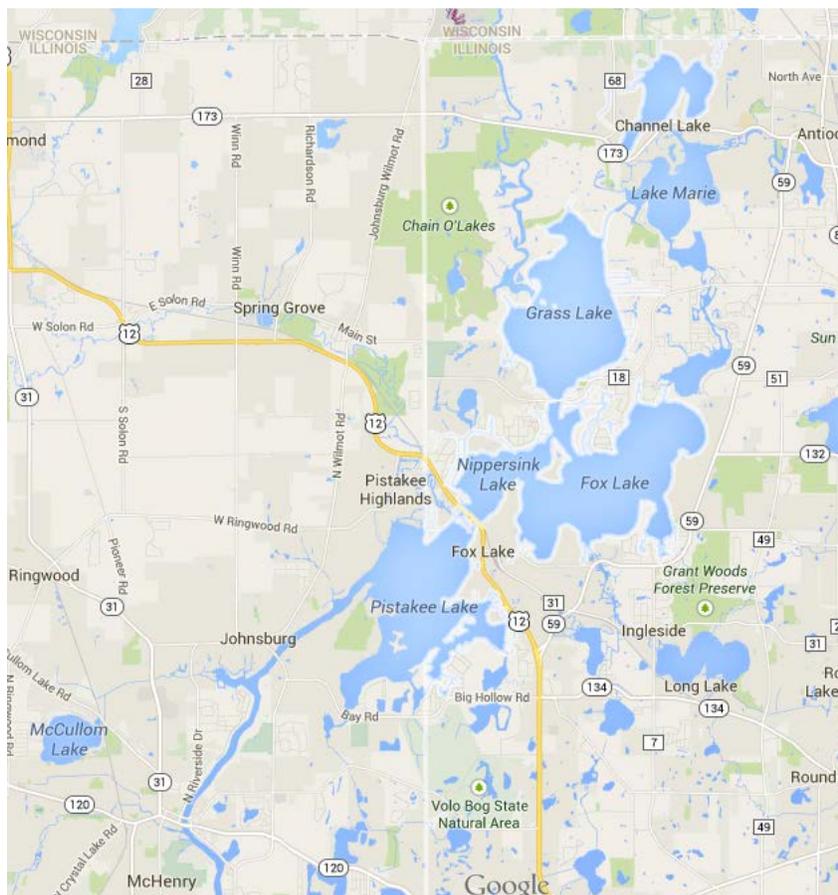


Communities Reporting Ice Jam Flooding on the Upper Fox River during Discovery

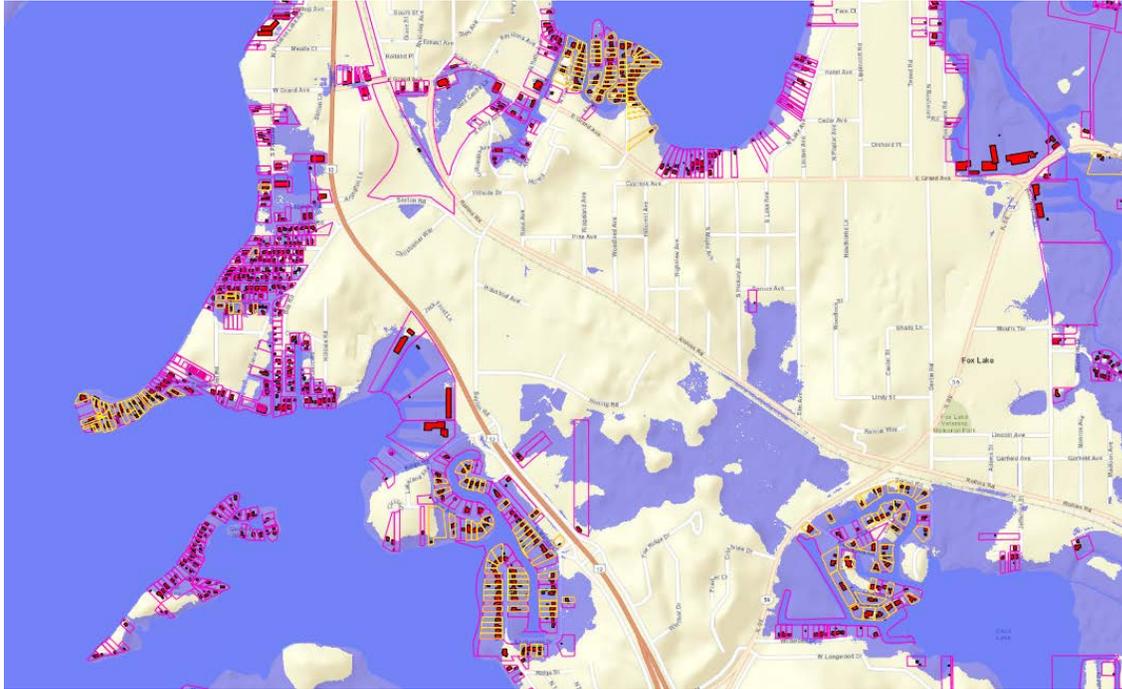
Pistakee Lake-Eagle Point Subdivision, Fox Lake-Grand Ave Area, Duck Lake-Knollwood Subdivision, Village of Fox Lake and Pistakee Lake-T-Channel, Unincorporated Lake County

The Chain O’Lakes on the Fox River (including Pistakee Lake, Nippersink Lake, Fox Lake, and others) in Lake and McHenry Counties are prone to flooding, most recently in June, 2008 and April, 2013. Floodwaters from the lake inundate shoreline neighborhoods, overtop roads, and strand both residences and emergency vehicles for days at a time.

During the April, 2013 flood event the water surface elevation on the Chain O’Lakes crested at 741ft and caused damage to 400 homes in the Village of Fox Lake and damaged up to 600 more homes in the surrounding area (<http://www.foxlake.org/index.aspx?nid=219>).



Chain O'Lakes - Lake and McHenry Counties



Estimated Flood Damage, Village of Fox Lake Area, April 2013 Flood Map Provided by Lake County



April 2013 Flood, Village of Fox Lake Picture provided by Village of Fox Lake

Eagle Point Subdivision, located on a peninsula on the east side of Pistakee Lake in the Village of Fox Lake, experiences frequent street and basement flooding. During the April, 2013 flood many homes had basement and first floor flooding and the subdivision was closed for 3 days. Numerous repetitive loss properties are located within the subdivision.

The residential area in the Village of Fox Lake near Grand Ave and Holly Ave also saw significant flooding April, 2013. This area is located on the southwest shore of Fox Lake. Parts of Grand Ave., Holly Ave., and Keystone Ave. were closed for 2 days. Many properties are repetitive loss properties.

Knollwood Subdivision, located on Duck Lake, is frequently flooded and suffered a major flood April, 2013. Duck Lake is hydraulically connected to Fox Lake and floods with the Chain O'Lakes accordingly. Many homes had basement and first floor flooding. A number of homes are repetitive loss properties.

The T-channel located in unincorporated Lake County on the east side of Pistakee Lake is one of the first areas on the Chain of Lakes which floods. Past mitigation has elevated several homes. However, additional mitigation is needed in the form of buyout or home elevations.

Mitigation actions to reduce future flood damages suggested by the Village of Fox Lake and Lake County include buyouts of repetitive loss properties, elevating flood prone properties, and basement waterproofing.



Eagle Point Subdivision, Village of Fox Lake



Grand Avenue Area, Village of Fox Lake



Knollwood Subdivision - Village of Fox Lake



T-channel on Pistakee Lake - Unincorporated Lake County

Slocum Lake - Unincorporated Lake County

The low lying residential area on the south side of Slocum Lake includes a number of repetitive loss single family homes. The area is subject to backwater flooding from the Fox River. Property acquisition, buyouts are the mitigation actions suggested by Lake County for 30 homes with a total estimated cost of \$3 million.

West Dundee, IL - Kane County

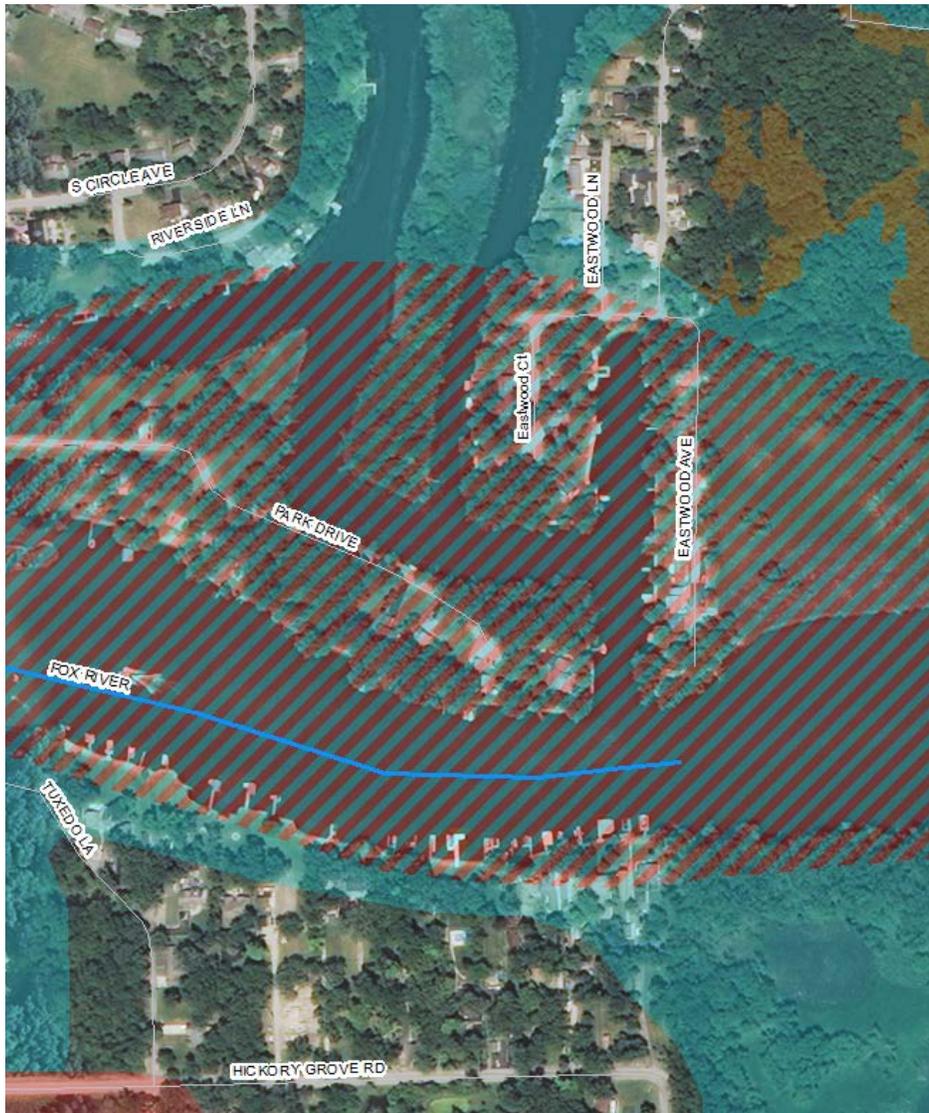
The Village of West Dundee reported repetitive loss properties (apartment buildings) at the corner of 6th Street and Lincoln Ave on the bank of the Fox River. Buyouts were suggested to mitigate future flood damage.



6th Street and Lincoln Ave- West Dundee, IL

Port Barrington, IL- Lake/McHenry County

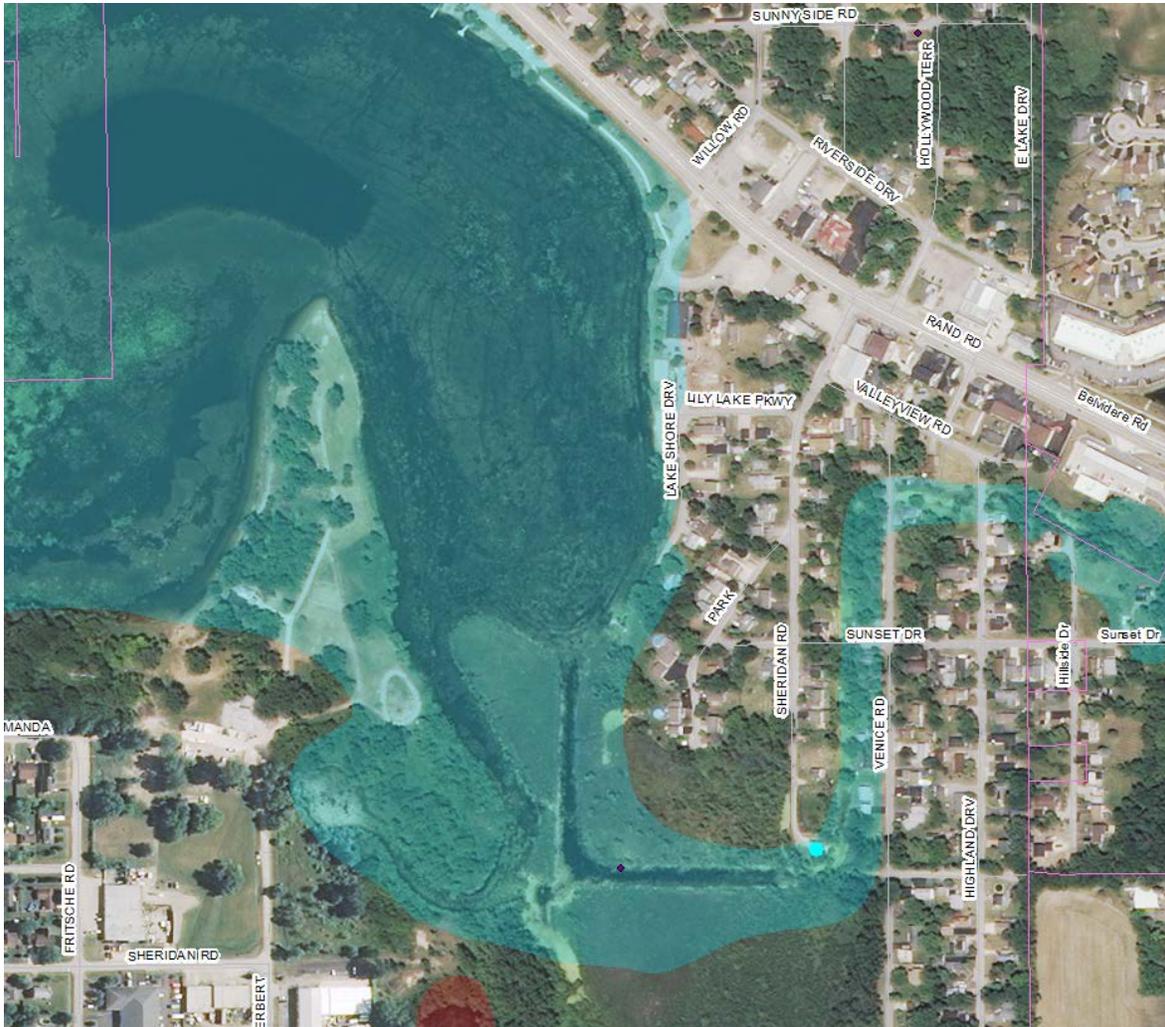
The Village of Port Barrington reported repetitive loss residential structures at 228, 230, and 232 Eastwood Lane (south end of Eastwood Lane on Fox River) in Port Barrington, IL. Buyouts recommended by Village engineer to mitigate future flood damage.



Eastwood Lane- Port Barrington, IL

Lakemoor, IL - McHenry County

The Village of Lakemoor reported a repetitive loss residual structure 390 Sheridan Road (south end of Sheridan Road) in Lakemoor, IL. A buyout is recommended by the Village to mitigate future flood damage.

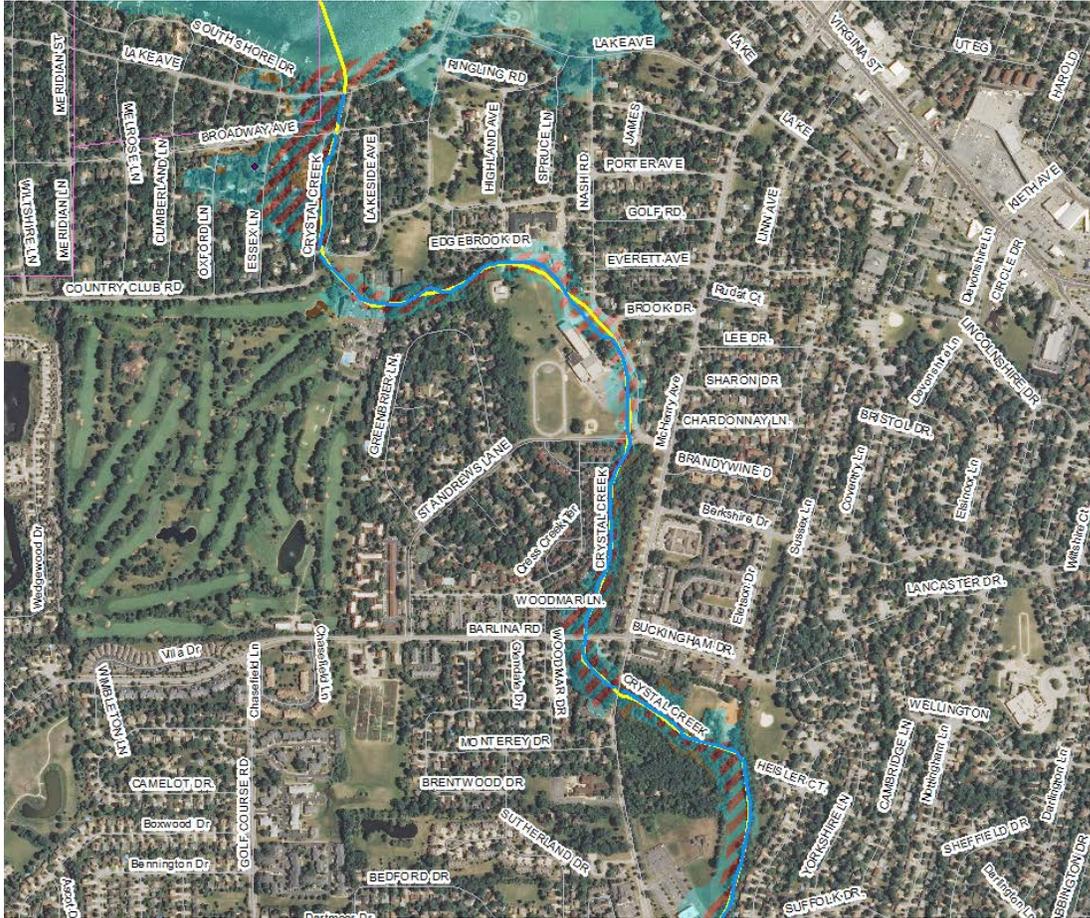


and inundation time for the depressional areas and this action would help about 50 residents. The cost estimated by the City of Crystal Lake is \$300,000.

On the north side (East End Avenue, Greenfield Road and Crystal Beach Avenue) approximately 125 residents are affected by flooding as well as three residential roadways. The three roadways are overtopped, basements flood, and standing water is present for many days, sometimes weeks, causing concern for both mold and the West Nile virus. Standing water is present throughout the area. The groundwater in this area is very high and no specific drainage routes are identified for stormwater. Proposed improvements would include rerouting stormwater to a new drainage facility and providing a specified overland storm water flow path. These improvements would also provide designated areas for stormwater to be stored until it can be infiltrated into the ground. The estimated cost by the City of Crystal Lake is \$4 million.

On the northeast side of Crystal Lake (South of IL 176, east of Lippold Park, west of US 14, north of Cove Pond) approximately 50 residents and businesses are affected by flooding due to high groundwater in the area and an inadequate major and minor drainage system. Proposed improvements include a new perforated storm sewer to improve the existing drainage within the area by lowering the shallow groundwater elevations and restoring the natural infiltration and storage capacity of the soil and depressional areas. The cost estimated by the City of Crystal Lake is \$250,000.

Also on the northeast side of the lake (South of Crystal Lake Avenue, east of Route 14, west of Oriole Trail, north of Carpenter St) 11 homes and 3 businesses are affected by frequent rear yard flooding and approximately 50 homes are affected periodically. Water also overtops Oriole Trail. Proposed improvements include the purchase of 3-5 homes in the area to remove the residential structures from this flood-prone area. The area where the buyouts occur will be used for storm water routing and storage during rain events. The area where the homes previously existed will be regraded to provide designated areas for the stormwater storage during rain events. The cost estimated by the City of Crystal Lake is \$1 million.



Crystal Creek - City of Crystal Lake

The City of Crystal Lake has also proposed work along Crystal Creek to lower the BFE of Crystal Lake and reduce the flooding problems around the Lake noted above. Specifically, the City would like to increase the culvert size under Lake Avenue to lower and stabilize the Crystal Lake BFE for an estimated cost of \$150,000.

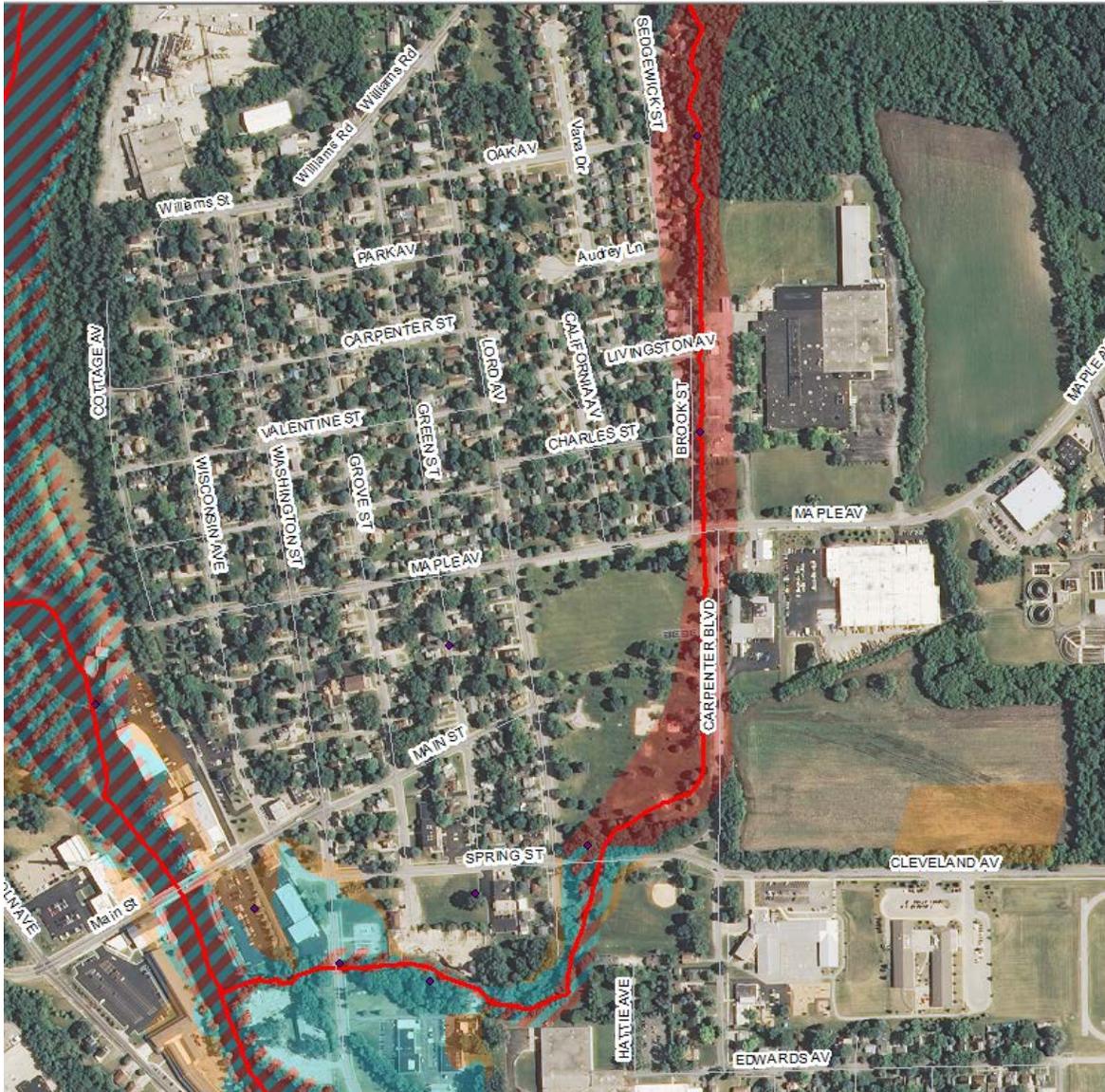
Increasing the culvert size under Country Club Road would lower the 100-year floodplain along the creek and remove properties between Country Club Road and Crystal Lake from the floodplain and floodway. This action could remove approximately 260 properties from the floodplain and over 40 properties from the floodway. The estimated cost is \$150,000.

Finally, a large number of residential properties along the creek between the Crystal Lake and St Andrews Lane flood during large rain events. The parking lot of the Crystal Lake Country Club and the middle school flood during large flow events as well. The City would like to construct storm water storage areas along the reach shown above to mitigate current flooding and also account for the increase in peak discharge downstream due to the proposed enlarged culverts under Lake Avenue and Country Club Road. The estimated cost for these improvements is \$675,000.

Carpentersville, IL - Kane County

Carpenter Creek is a Zone A study upstream of Spring Street. Numerous parcels are located within the Zone A floodplain along Carpenter Creek from Maple Ave to approximately 2000ft upstream of Maple Ave. The reach includes severely eroded streambanks. The eroded streambanks put infrastructure at risk. Water quality is also impacted since the eroded stream banks contribute to the transported sediment laden pollutants to the Fox River, which is on IEPA 303(d) list for impaired waters. The Village funded a study of the Zone A reach to establish a base flood elevation and to determine ways to reduce BFEs along the reach as well as improve water quality by stabilizing the stream banks. As a result of the restudy, it was also determined that the ZONE AE floodplain downstream of Spring Street is mapped incorrectly thereby inaccurately showing the flood risks.

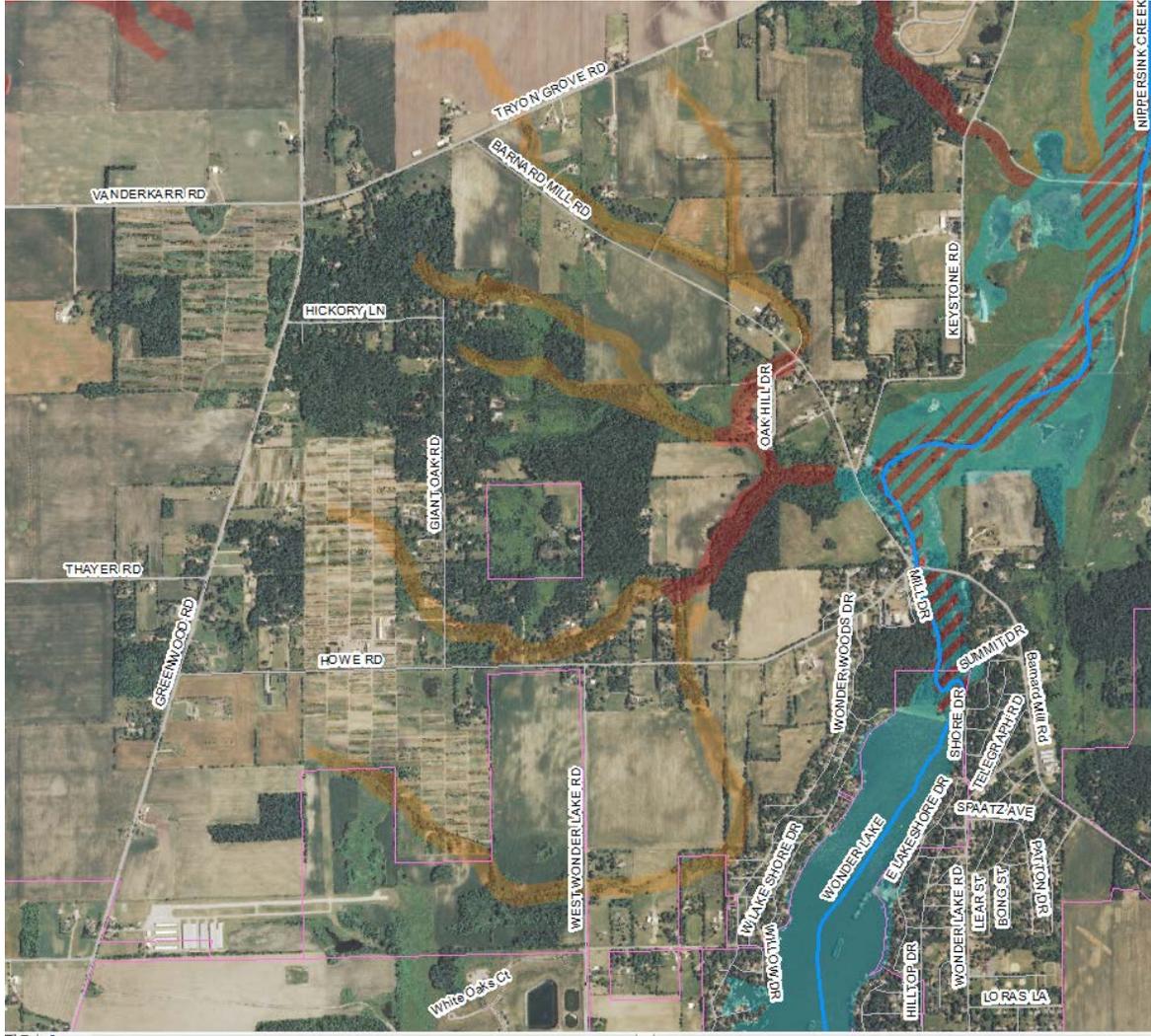
The Village of Carpentersville has already funded and replaced the restrictive culvert under Maple Avenue. The Village is also developing final engineering plans for improving channel conveyance and to stabilize the eroded stream banks. A Letter of Map Revision (LOMR) will need to be completed along Carpenter Creek to map more accurate flood risk. The Village also applied for and received Section 319(h) funding for the water quality improvements. The Village will also use general funds for its local match. Additional improvements are needed along the creek between Spring Street and Fox River, including the replacement of the restrictive culvert under Washington Avenue. Total estimated cost for these mitigation actions is \$2.7 million and approximately \$1.1 million is funded through Section 319(h) and Village funds. Additional funding is needed for improving channel conveyance between Spring Street and Fox River, the Washington Avenue culvert replacement, and for a LOMR application.



Carpenter Creek - Carpentersville, IL

Unincorporated McHenry County

There are significant discrepancies in topographic datasets in this area and throughout McHenry County. The current County GIS 2-ft contours dataset (from LiDAR) differs from the effective mapped Zone A boundaries and/or the BFEs for Zone AE's by 2 to 10 feet in many areas. The area north of Wonder Lake (Unnamed Tributary to Nippersink Creek) shows discrepancies of 6-10 feet between the current LiDAR based contours and the effective mapping. New hydrologic and hydraulic studies and floodplain mapping are requested for many of these areas.



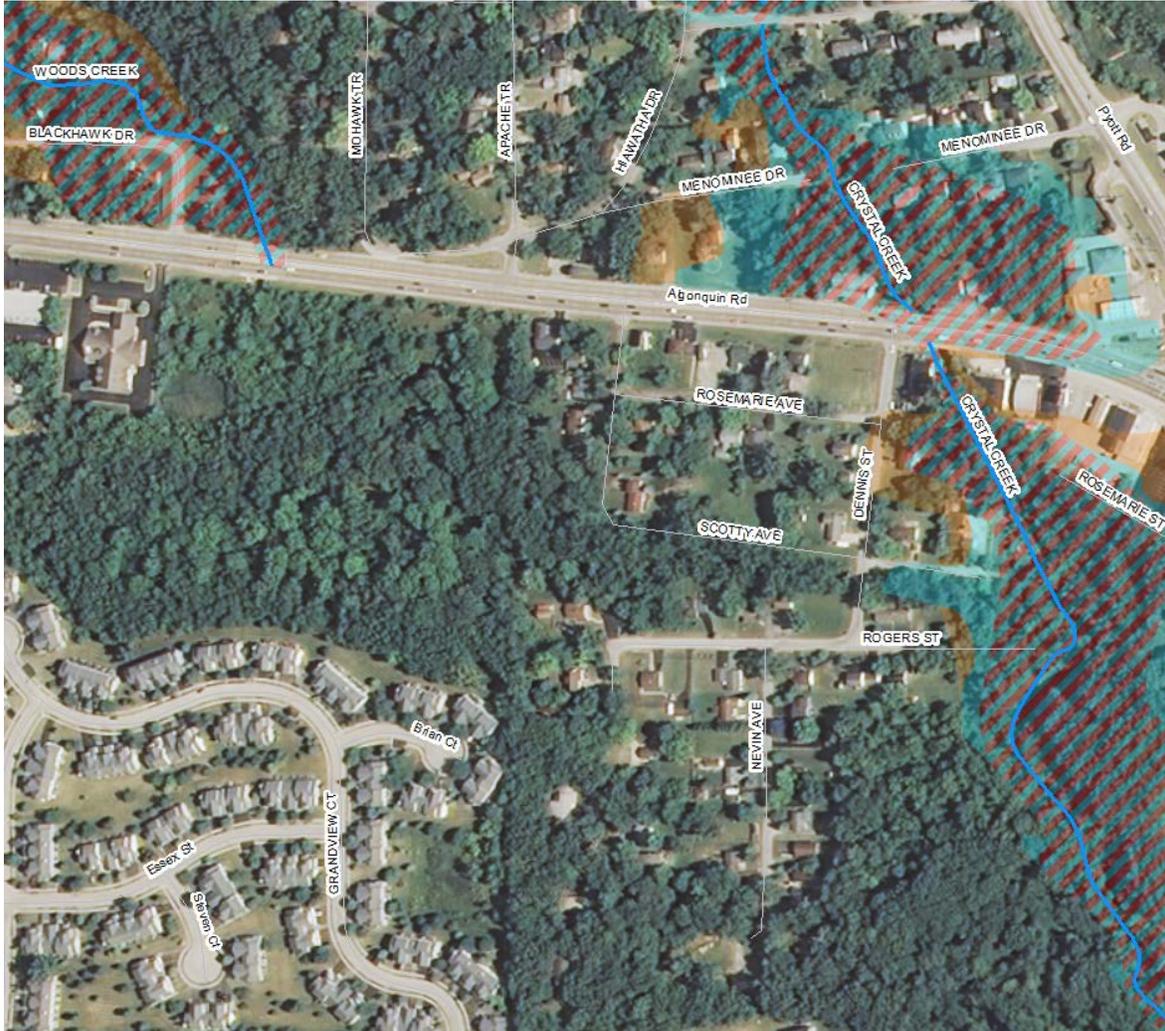
**Unnamed Tributary to Nippersink Creek - North of Wonder Lake
Unincorporated McHenry County**

In addition to the topographic discrepancies, many areas in McHenry County have experienced significant development and road construction/modification. New H&H studies are needed due to development (hydrology) and topography discrepancies and modified/new structures (hydraulics) for floodplain mapping. Boone Creek and Unnamed Tributary to Boone Creek near the City of McHenry are streams of concern with regard to these issues.



South Branch Slough Creek - Unincorporated McHenry County

The other section missing a SFHA designation is Woods Creek just upstream of the confluence with Crystal Creek. This section is riverine between Woods Creek Zone AE and connects downstream to Crystal Creek Zone AE. Numerous permit applications have been submitted in this area for existing developed areas, signaling a need for a new study in this area. New hydrologic and hydraulic study and floodplain remapping is requested.



Woods Creek – Village of Algonquin and Unincorporated McHenry County

Upper Fox Watershed in Lake County: Antioch, Fox Lake, Lake Villa (partial), Unincorporated , Lake County All Natural Hazards Mitigation Plan (email)

The Lake County Stormwater Management Commission and Lake County Emergency Management Agency developed flood inundation maps representing approximate potential areas that could be flooded due to river rises. The flood boundaries were estimated based on a given gage height (water-surface elevation) and existing county-wide topography. Additional areas may be flooded due to local heavy rain amounts or other hydrologic and/or hydraulic anomalies. The accuracy of the floodwater extent portrayed on these maps also varies with the accuracy of the digital elevation model used to simulate the land surface. Inundated areas shown should not be used for navigation, regulatory, permitting, or other legal purposes. These maps are being used on an as-is basis for a quick reference,

emergency planning tool only before and during flood watches and warnings on the Chain O'Lakes and Fox River in Lake County.

The Lake County Planning, Building and Development (PBD) Department and the Lake County Stormwater Management Commission surveyed high flood risk areas in unincorporated Fox River Watershed (Lake County). The Lake County Emergency Management Agency (LCEMA) also participated in the project by identifying several of the high risk areas to be surveyed. Site-specific elevation data collected for over 500 structures of which more than half were in the Upper Fox River watershed. The surveys will make it easier to quickly and accurately assess potential damage and provide expedited planning and coordination of resources for affected communities and property owners. The project also included establishment of 30 new survey benchmarks, which will be used by SMC, PBD and partner agencies to check flood levels and will be made available on the Lake County on-line GIS mapping application for the public to reference.



Site-Specific Elevation Data and Survey Benchmarks

V. Appendices

Appendix A: Pre-Discovery Meeting Contacts & Materials

Appendix B: Stakeholder Contact Information & Meeting Invitations

Appendix C: Discovery Meeting Attendance & Handouts

Appendix D: Discovery Meeting Summary & Comments

Appendix E: Discovery Maps

Appendix F: Discovery Meeting Participant Feedback

Appendix G: Comprehensive List of Study Needs

Appendix H: Action Discovery CAPI Tier Rankings, Contact Information & Meeting Invitations

Appendix I: Action Discovery Meeting Handouts & Presentations

Appendix J: Action Discovery Meeting Summary, Attendance, Updated Comments & Mitigation Action Forms

Appendix K: Action Discovery Maps

Appendix L: Wisconsin Action Discovery Update Data

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(Appendix L)