State of Illinois
Department of Natural Resources

Fox River Flood Commission Report for Public Act 100-0730

Office of Water Resources





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A full digital copy of the report is available on the Illinois Department of Natural Resources, Fox River Flood Commission webpage. Cover: Photos used with permission from the following: top left, Kane County, Office of Emergency Management; top right, The Conservation Foundation; center left and right, City of Aurora; and bottom, McHenry County, Department of Planning and Development, Water Resources Division

December 2019

Public Act 100-0730

Public Act 100-0730 (Act) amended the Flood Control Act of 1945, creating the Fox River Flood Control Commission (Commission) "to study and develop an integrated flood management coalition of communities in the Fox River watershed". A copy of the Act is provided in Appendix A. The Act specifies participation by the counties of DuPage, Kane, Lake, McHenry, and Will and tasked the Illinois Department of Natural Resources (IDNR) to assist the Commission members in the administration of the Act and preparation of this final report. A survey and a report must be submitted to the General Assembly by December 31, 2019 addressing, at a minimum, the following:

- extent and character of the areas affected
- current shortfalls in existing flood control practices in the Fox River Watershed
- basic structure of an integrated floodplain management coalition of communities in the Fox River Watershed to jointly leverage community resources and collaborate on:
  - flood preparedness
  - flood protection
  - flood response
  - flood recovery
  - future flood damage reduction
  - necessary floodplain management education
- recommended strategy and schedule for implementing the coalition of communities in the Fox River Watershed
- explanation of how such a coalition could
  - advance future flood damage reduction measures in the watershed
  - improve flood preparedness, flood protection, flood response, and flood recovery
  - advocate necessary floodplain management education in the region
  - save taxpayer dollars
- a statement of special or local benefit that will accrue to communities participating in the coalition and a statement of general or statewide benefits, with recommendations as to what local cooperation, participation, and cost sharing shall be required, if any, on account of the special or local benefit

Executive Summary

The Fox River flows out of Wisconsin through northeastern Illinois, from the northern border of the state to the Illinois River at Ottawa. The watershed is divided into an Upper Fox River Watershed and Lower Fox River Watershed. The Upper Fox includes the Wisconsin portion of the watershed and the Illinois portion to just south of Elgin. The Lower Fox contains the remainder of the watershed down to the Illinois River. The Fox River watershed faces unprecedented growth and development due to expansion of the Chicago metropolitan area. This urbanization of the watershed together with increases in rainfall intensity due to climate change have resulted in increased flooding and concerns over long-term sustainability.

In response to record flooding along the Fox River in July 2017, State Senator Karen McConnaughay introduced Senate Bill 3134 on February 15, 2018 to create a Flood Control Commission for the Fox River Watershed. The amended bill, Public Act 100-0730, was signed by Governor Bruce Rauner on August 3, 2018. The Act tasked the Illinois Department of Natural Resources (IDNR) to assist the Commission members in the administration of the Act and preparation of this final report.

Five Commission meetings were held between February and December 2019. Members discussed the extent of flooding in the Fox River watershed, flood mitigation alternatives, and the long-term benefits of a coalition.

To document the extent of flooding, the Act required that a survey be conducted. IDNR, in conjunction with the Illinois State Water Survey (ISWS), developed a survey and an interactive map to gather data on flooding throughout the watershed. The survey was sent to all of the Illinois counties, townships and municipalities in the watershed. In addition to the survey, the extent of flooding was also evaluated by reviewing existing floodplain maps, stream gage records, inundation maps, and flood insurance claims data. ISWS also provided data collected as part of floodplain mapping efforts. Finally, an online map was used to collect details on local flooding throughout the watershed.

In addition to the collection of loss data and flood concern areas, the report identifies flood control shortfalls within the watershed. These shortfalls include:

- Lack of a comprehensive watershed planning effort within Illinois, as well as with the State of Wisconsin
- Limited education outreach on watershed characteristics and management, flood preparedness, and flood recovery
- Limited understanding of the watershed impact of local flood control facilities

- Limited public understanding of the function of the dams on the river, including Algonquin and Stratton, on flood management
- Limited river and rainfall gages
- Outdated floodplain studies and mapping
- Inconsistent floodplain, wetland, and stormwater regulations across the watershed, Illinois and Wisconsin
- No database of at-risk critical facilities
- Insufficient mitigation funding

Public Act 100-0730 tasked the commissioners to discuss the possible formation of a long-term Fox River Coalition. At the September 12, 2019 Commission meeting, commissioners voted to continue the coordination effort started by the Public Act and establish a Fox River Coalition (Coalition). The first meetings of the Coalition will establish goals and committees to address such issues as mapping, education outreach, mitigation priorities, and funding sources.

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Chapter 1 Introduction

1.1 Background

In response to record flooding along the Fox River in July 2017, State Senator Karen McConnaughay introduced Senate Bill 3134 on February 15, 2018 to create a Flood Control Commission (Commission) for the Fox River Watershed. The amended bill, Public Act 100-0730 (Act), included as Appendix A, was signed by Governor Bruce Rauner on August 3, 2018. The Act tasked the Illinois Department of Natural Resources (IDNR) to assist the Commission in the administration of the Act and preparation of this final report.

1.2 Commission Members

The Commission is comprised of 28 appointed members (Table 1.1). The state legislative leadership were each given five appointments and the five counties were each given two appointments, representing their respective stormwater committees and a municipality. The remaining two members are the Governor and the Director of the Illinois Emergency Management Agency (IEMA), or their designees. Department of Natural Resources, Office of Water Resources (IDNR/OWR) staff Loren Wobig, Rita Lee and Marilyn Sucoe served as co-chairs of the Commission for Department of Natural Resources Director, Colleen Callahan. As of December 2, 2019, five appointments remain vacant.

Table 1.1 Flood Control Commission Appointments

Commission Member	Office
Jeff Frost	Senate President
Corey Dixon	Senate President
John Laskowski	Senate President
Bob Trueblood	Senate President
Bill Liu	Senate President
Linda Pedersen	Senate Minority President
Craig Munson	Senate Minority President
Anthony Charlton	Senate Minority President
Peter Wallers	Senate Minority President
Vacant	Senate Minority President
Richard Keehner, Jr.	House Speaker
James Murphy	House Speaker
Brian Gift	House Speaker
Rahat Bari	House Speaker
Matthew Stafford	House Speaker
Joe Keller	House Minority Leader
Matthew Prochaska	House Minority Leader

Table 1.1 Flood Control Commission Appointments	
Commission Member	**Office**
Judy Martini	House Minority Leader
Carolyn Schofield	House Minority Leader
Vacant	House Minority Leader
Jim Zay, Stormwater Management Planning Committee	DuPage County Board Chair
Chris Kious, Stormwater Management Planning Comm.	Kane County Board Chair
Mike Warner, Stormwater Management Planning Comm.	Lake County Board Chair
Joanna Colletti, Stormwater Management Planning Comm.	McHenry County Board Chair
Vacant, Stormwater	Will County Board Executive
Janice Anderson, Naperville	DuPage County Board Executive
Matt Brolley, Mayor, Village of Montgomery	Kane County Board Executive
Donnie Schmidt, Mayor, Village of Fox Lake	Lake County Board Executive
Mark Kownick, Mayor, Village of Cary	McHenry County Board Executive
Vacant, Municipal representative	Will County Board Executive
Declan Binninger, IEMA Chief of State	Governor's office designee
Michael Borcky, IEMA Region 3 Coordinator	IEMA Director designee

1.3 Summary of Commission Meetings

Five Commission meetings were held between February and December 2019. The agendas and meeting minutes are provided in Appendix B. Due to the lack of a quorum, official Commission action began at the September 12, 2019 meeting.

An informational meeting was held on February 27, 2019, with 19 in attendance. The 15 appointed Commission members were invited along with stakeholders from state agencies, county and local governments, and groups interested in flood management. Commission Chair, Loren Wobig, IDNR Office of Water Resources (OWR)Director, outlined the expectations in the Public Act 100-0730. Mike Sutfin, City of Ottawa, discussed the formation and accomplishments of the Illinois River Flood Alliance under the guidance of Illinois State Senator Sue Rezin. Known flood damage areas and flood insurance claims data details were presented by Rita Lee and Paul Osman, IDNR/OWR Staff . The meeting closed with a discussion of the next steps. Mike Warner, Lake County Stormwater Management Commission, and an appointed member of the Commission, expressed concerns with the floodplain mapping along the Fox River as it had been developed in the 1980's. Mike Hughes, resident of Fox Lake, raised concerns with the lack of flood prevention outreach.

The next meeting was held on April 17, 2019. There were six Commission members in attendance and a total attendance of 22. A quorum was not reached. Loren Wobig, IDNR Director, gave a review of the first meeting and the Public Act. Sally McConkey, Illinois State

Water Survey (ISWS), presented information on the FEMA Discovery Process, an initial step in the FEMA floodplain mapping process. Discovery Reports for both the Upper and Lower Fox River watersheds were updated in 2015. The reports include a list of mitigations projects and flooding areas collected through the Discovery process.

Sally McConkey also discussed the FEMA Coordinated Needs Management Strategy (CNMS), which is used to evaluate Flood Insurance Studies and mapping. Rita Lee then discussed the development of the survey to collect data related to floodplain management and flooding problems in the watershed and an interactive map, to be used along with the survey, was demonstrated.

On June 19, 2019 the Commission meet at the Aurora City Hall to discuss the sources for data on the extent of flooding, current shortfalls in existing flood control practices and the basic structure and formation of an alliance. The meeting had 24 people in attendance, including ten Commission members of the 18 appointed to date. Loren Wobig welcomed everyone to the meeting and reviewed the Public Act for the new members. Steve Altman, IDNR staff, recapped the previous meetings and lead a discussion on the data sources to describe the extent of flooding. The survey results were pending due to the lack of participation to date.

Altman and Marilyn Sucoe, IDNR staff, continued the meeting with a discussion on the current shortfalls in existing practices. Shortfalls discussed included outdated floodplain maps, sandbagging and outdated rainfall data.

The September 12, 2019 meeting was attended by 25 Commissioners providing the necessary majority of a quorum and allowing for formal action. Total attendance was 43. The meeting began with a review of the Public Act, a discussion of the survey results and a list of the shortfalls previously discussed by the Commission.

The Commission then discussed the long-term structure and purpose of a coalition . The Commission agreed that the structure of the Coalition should include the counties in the watershed, adding the counties not originally included in the Commission membership. Also discussed was the inclusion of municipal representation and other stakeholders in long-term. This could be accomplished through an executive committee and technical or advisory committees to be determined by the Coalition in the future.

Issues raised to be addressed by the Coalition include:

- need for additional revenue sources to address flooding
- runoff coming across the state line
- coordination with the State of Wisconsin
- coordination with municipalities

- sediment management
- sharing of resources across the watershed
- balancing recreational needs with water quality and flooding concerns
- coordination of education on flood preparedness, grant writing education to bring mitigation funding to the watershed
- need for flood control along the tributaries
- development of a better rain gage and stream gage network to improve flood forecasting, flood control structure design and floodplain mapping

At the conclusion of this discussion, the Commission voted to form the Fox River Flood Coalition, a non-legislative, ad-hoc group with representation from each county in the watershed, the Fox Waterway Agency and an IDNR liaison. Joe Keller of the Fox Waterway Agency will act as the Coalition's executive secretary/administrator, organizing the meetings and Coalition mailings.

The final meeting of the Commission was held on December 17 to review this report for submittal to the General Assembly.

1.4 Understanding the Watershed

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 River continues in a general southerly direction until it joins the Illinois River at Ottawa, Illinois.

The Fox River drains a total of 2658 square miles: 938 square miles in Wisconsin, and 1720 square miles in Illinois. The Fox is typically described in two unique reaches: The Upper Fox River and the Lower Fox River. These two sections are broadly defined by the dividing point at the IDNR Stratton lock and dam in McHenry, Illinois.

The Upper Fox River watershed includes parts of Kenosha, Racine, Walworth, and Waukesha counties in Wisconsin, and McHenry, Lake, DuPage, DeKalb, and Cook counties in Illinois. The Lower Fox Watershed lies entirely in Illinois and covers significant parts of Kane, Kendall, LaSalle, and DeKalb counties. The watershed boundary also touches Cook, Lee, DuPage, Will, and Grundy counties, Illinois (Figure 1.1).

The Fox River and the watershed land area are used for agriculture, industry, recreation, residences, and urban development. In Illinois, the northern and eastern portions of the Fox Watershed are more developed, while the southern and western portions are more rural, primarily used for agriculture. The main stem of the Fox River is used for recreation and is a source of potable water for public water supply. The Fox River and its tributaries carry

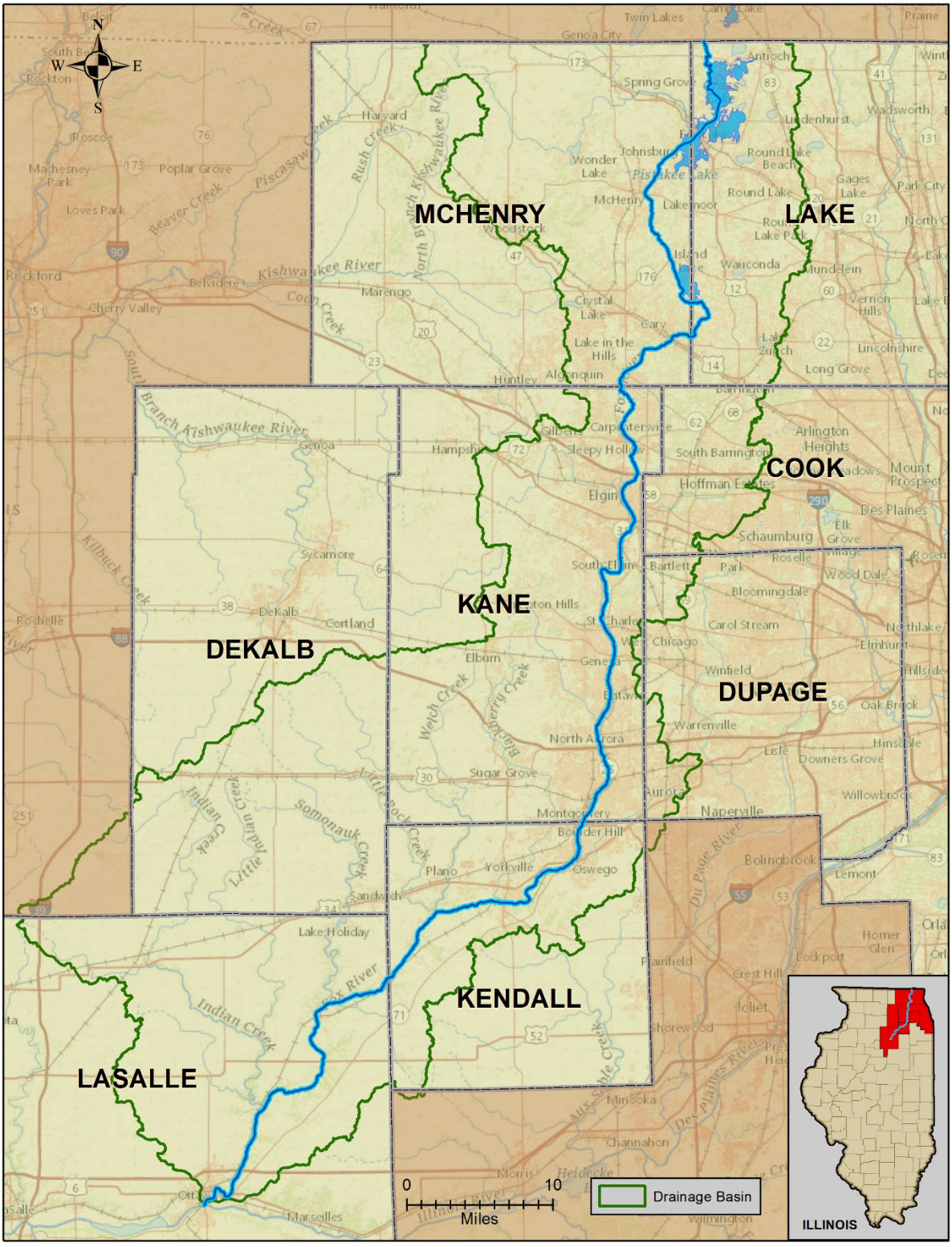

Figure 1.1 Fox River Flood Impacted Illinois Counties

stormwater runoff and receive permitted discharges from wastewater treatment plants and industry.

Within the Chicago metropolitan area, there is increasing population growth and pressure from development. By 2020, the population of the Fox River Watershed in Illinois is expected to increase dramatically (approximately 30 percent) from the 2000 totals, with much of the growth in McHenry and Kane Counties.

Flooding in the Fox Watershed is expected to worsen based on population growth, land use cover, and climate change impacts. Flooding around lakes, along the river and its tributaries, and in urban areas has been reported in a survey conducted by the Commission. As required by Public Act 110-0730, this report will document existing flood problems, shortfalls in flood control and provide recommendations for a strategy and schedule for implementing the coalition of communities in the Fox River Watershed.

1.5 Flood Coalition Concept

The concept for a flood coalition comes from work done in Illinois to form "Flood Alliances" along the Illinois River. After record flooding along the Illinois River in the spring of 2013, Illinois State Senator Sue Rezin asked community officials in her district what steps could be taken to reduce future flood losses.

Within Senator Rezin's district, one community, Ottawa, stuck out. Despite the area's most extensive floodplain, the City of Ottawa had minimal flood damage. Mitigation projects (buyouts) have eliminated residential structures in the floodplain and future flood damages by creating public parks and open space, as shown in before-and-after photos of the Ottawa "Flats"(Figure 1.2).

Working with the City of Ottawa and the IDNR Office of Water Resources, Senator Rezin formed a coalition of communities in her district to work together and develop watershed-wide strategies to reduce future damages. The coalition primarily includes the 38th Congressional District, which has over one hundred miles of the Illinois River and 40 miles of the lower Fox River inside its boundaries.

At the initial meeting, the Illinois River Flood Alliance established four primary goals:

1. Have someone in each community become trained in floodplain management and become a Certified Floodplain Manager (CFM).
2. Have each community join the NFIP's Community Rating System and pursue flood insurance discounts,

3. Have each community join the Illinois Association for Floodplain and Stormwater Management, and
4. Encourage each community to adopt and enforce higher regulatory standards within their floodplains.

Figure 1.2 Ottawa "Flats", Photos of flooding showing a flooded home before buyouts on the left and an open park shelter and playground equipment after buyouts on the right

Since its formation in 2013, five counties and 18 communities from the 38th District have participated in quarterly organizational meetings, which were also attended by state legislators. Communities have adopted higher regulatory standards, hosted a week-long FEMA floodplain management class, taken CFM exams, and are working to join CRS.

Without the political support and collaborative risk management by all stakeholders, the success of this regional coalition would be minimized. Participating communities now understand that their own actions have a direct impact on sister communities up and down stream. Collectively they can make a positive difference.

Chapter 2 Study Elements under the Public Act

2.1 Extent of Flooding and Character of the Watershed

To document the extent of flooding the Act required that a survey be conducted. IDNR, in conjunction with the Illinois State Water Survey (ISWS), developed a survey and an interactive map to gather data on flooding throughout the watershed. The survey was sent to all of the Illinois counties, townships and municipalities in the watershed. In addition to the survey, the extent of flooding can also be evaluated by reviewing existing floodplain maps, stream gage records and inundation maps, history of flood insurance claims, and data collected as part of future floodplain mapping efforts by the ISWS.

Survey Results

The survey was completed by 59 of the nearly 170 the jurisdictions contacted. The survey was also completed by one home owner's association and the Fox Waterway Agency. Those responding were asked to provide details on the flooding in their community, as well as their floodplain and stormwater management programs. Summaries of the data collected will provided throughout Chapter 2, as applicable.

The survey questions were grouped under seven categories: stormwater and floodplain regulations and enforcement, areas of flooding, critical facilities at risk, mitigation, current mitigation projects, historic flooding, and floodplain mapping needs.

Areas of Flooding

The survey asked four questions regarding areas of flooding:

1. Do you have structures *within the mapped floodplain* which routinely flood?
2. Do you have structures *outside of the mapped floodplain* which routinely flood?
3. Do you have critical infrastructure within the mapped floodplain which routinely flood?
4. Do you have critical infrastructure outside of the mapped floodplain which routinely flood?

Twenty-six of those responding reported routine flooding in the floodplain, but only 17 responded yes to flooding outside of the floodplain. The interactive map provided some additional details on these other areas of flooding. (Due to privacy concerns the actual survey responses are not provided in this report.)

Other areas of flooding including three general types:

- dense urban areas requiring storm sewer improvements, overflow routes or detention basins
- areas upstream of roadway culverts with reported roadway overtopping or requiring replacement
- combined sewer flooding due to inflow and infiltration or pump station capacity

Twelve surveys reported critical facilities located in the floodplain, but only four reported critical facility flooding routinely outside of the floodplain. Wastewater treatment plants, which are often located in the floodplain, were the most often listed facility. Additionally, two schools, one bridge, one village hall, and two police/fire station were listed. Additional discussion of critical facilities can be found in Chapter 2.

Roadway flooding and overtopping has been reported throughout the watershed. While not often considered a critical facility, roadways are critical to emergency response and present a hazard to the entire community. The National Weather Service (NWS) reported 57 flood related deaths in 2018 linked to driving. Often alternate routes can be found but critical time may be lost. Two areas of reported roadway flooding specified flooding depth of 2 feet or greater that isolated homes. Locations of roadway flooding and overtopping reported through the survey can be found at the end of this chapter.

Historic Flooding

Dates of historic flooding were provided by 27 respondents (Table 2.1). All but one, McHenry County, listed a single event historic event, assumed to be the communities record flood. Four flood events were listed by more than one community. Most events listed have occurred within the last twenty years.

Table 2.1 Historic Flooding

Date of Flood	Community
July 2017	Avon Township, Carpentersville, East Dundee, Fox Lake, Grant Township, Kane Co., Lake Co., Lake Villa, McHenry Co., Round Lake Beach, Round Lake Park
June 2013	Cary, Crystal Lake
April 2013	Fox Waterway Agency, Kendall Co., LaSalle Co., McHenry Co., Millbrook, Wauconda
May 2010	Sleepy Hollow
September 2008	Barrington
July 1996	Hampshire, Sugar Grove Township, Yorkville
April 1960	South Elgin
August 2007, June 2008, 2018, 2019	McHenry County

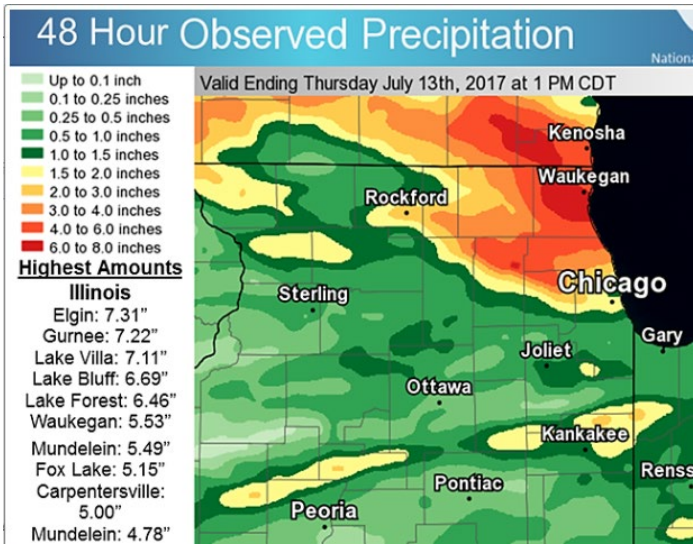

Figure 2.1, National Weather Service, July 12, 2017 Heavy Rain & Flash Flooding Impact Far Northeast Illinois; Prolonged River Flooding, November 25, 2019
https://www.weather.gov/lot/July12_flooding

The data shows that a watershed of this size rarely has one event that is the record or highest flood event throughout the watershed. For example, the recent historic flooding during July 2017 in the Upper Fox River basin, Lake and McHenry counties, was not noted south of Carpentersville. The South Elgin United States Geologic Survey (USGS) gage shows this event as the second highest crest. The next gage on the river in Montgomery shows five higher flood events. The 48-hour rainfall amounts across the watershed (Figure 2.1) explains this pattern of flooding in the Upper Fox in July 2017.

Similarly, flooding in July 1996 impacted portions of the Lower Fox, in particular Aurora, Montgomery, and Naperville. While the Upper Fox saw 2 to 4 inches of rain, Aurora, namely the Blackberry watershed, experienced the largest single-day rainfall in Illinois, 16.94 inches (Figure 2.2). This event is the highest recorded crest on the Fox River at the Montgomery gage.

Floodplain Mapping

The Federal Emergency Management Agency (FEMA), National Flood Insurance Program (NFIP) issues maps, known as Flood Insurance Rate Maps (FIRM), for flood insurance policy rating and the regulation of development. These maps reflect areas of increased flood risk, delineated as the 1% chance or base flood floodplain, and the 0.2% chance floodplain. These are often referred to as the 100-year and 500-year floodplains, respectively. A Flood

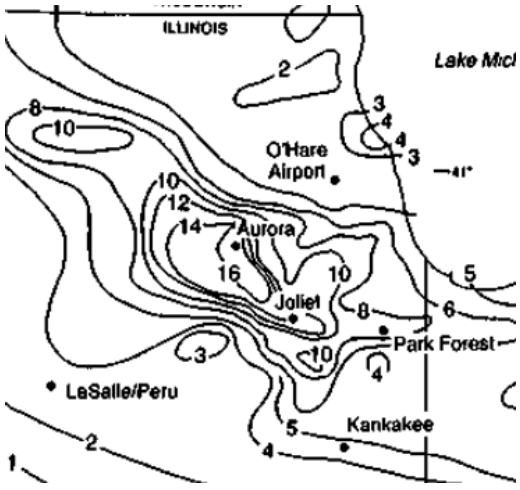

Figure 2.2 Total Storm Rainfall for July 17-18, 1996, ISWS, *The Record Rainstorm on July 17-18, 1996 in Northern Illinois*, May 1997.

Insurance Study (FIS) accompanies the maps and provides the details on the engineering methods used to determine the floodplain boundaries.

The floodplain maps for the Fox River watershed are shown on the FIRM maps issued for each county. These maps can be viewed at the National Flood Hazard Layer Viewer *(https://msc.fema.gov/nfhl)*. The FIS for each county may be viewed at the FEMA Map Service Center *(https://msc.fema.gov/portal/home)*.

The floodplain along the Fox River and many tributaries are defined with detailed Base Flood Elevations based on engineering studies (Figure 2.3). The studies along the Fox River were developed between 1976 and 1980.

Floodplains mapped in less developed areas of the watershed or along smaller tributaries are often unstudied. An approximate floodplain is shown as a Zone A with no defined Base Flood Elevations (Figure 2.4).

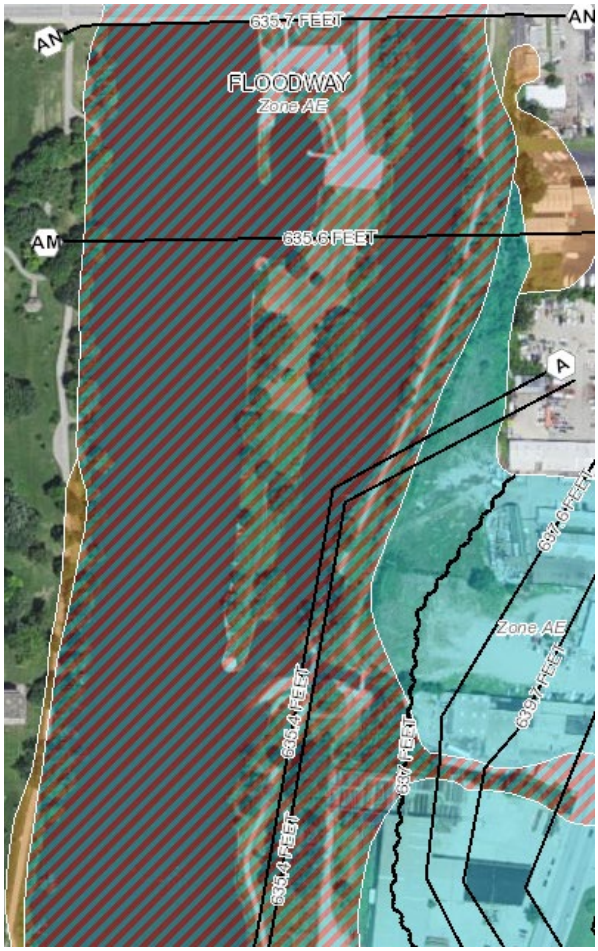

Figure 2.3 FIRM Downtown Aurora, IL

Figure 2.4 FIRM DeKalb County, IL

Stream Gage Records and Inundation Mapping

The history of the gage heights on the Fox River can be compared to the Base Flood Elevations, or 100-year flood elevations listed in the FIS. The highest gage heights or historical crests can also be compared to the 10% (10-year), 2% (50-year), 1% (100-year) and the 0.2% (500-year) floods. County and state Geographic Information Systems (GIS) can be used to relate the flood depths to topographic maps to create inundation maps. McHenry and Lake counties

developed inundation maps for recent flooding along the Fox River in 2017 and 2019 (Figures 2.5 and 2.6) to help with emergency response and post-flood activities.

The USGS operates 29 gages and the NWS operates two additional gages at the locations detailed in Table 2.2.

Table 2.2 Gages in Fox River Watershed	
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 – Observed stages
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 - Forecasts available
05549000	Boone Creek Near McHenry, IL
05549500	Fox River Near McHenry, IL
05549501	Fox River Stratton Lock and Dam (Tailwater) Near McHenry, IL– Observed stages
05549850	Flint Creek Near Fox River Grove, IL
05550000	Fox River at Algonquin, IL - – Observed stages
05550001	Fox River Algonquin Dam (Tailwater) at Algonquin, IL - Forecasts available
05550300	Tyler Creek at Elgin, IL
05550500	Poplar Creek at Elgin, IL
NWS Volunteer	Fox River above Elgin, IL – Observed stages
05551000	Fox River at South Elgin Dam, South Elgin, IL – Forecast available
05551540	Fox River at Montgomery, IL - Forecasts available
05551580	Fox River at Yorkville, IL – Observed Stages
05552500	Fox River at Dayton, IL - Forecasts available
Wisconsin	
05543830	Fox River at Waukesha, WI - Forecasts available
05544475	Fox River at Rochester, WI – Observed stages
USACE/NWS	Fox River at Burlington, WI - Forecasts available
05545750	Fox River near New Munster, WI - Forecasts available
05544200	Mukwonago River at Mukwonago, WI
05544300	Mukwonago River tributary near Mukwonago, WI
05545100	Sugar Creek at Elkhorn, WI
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)

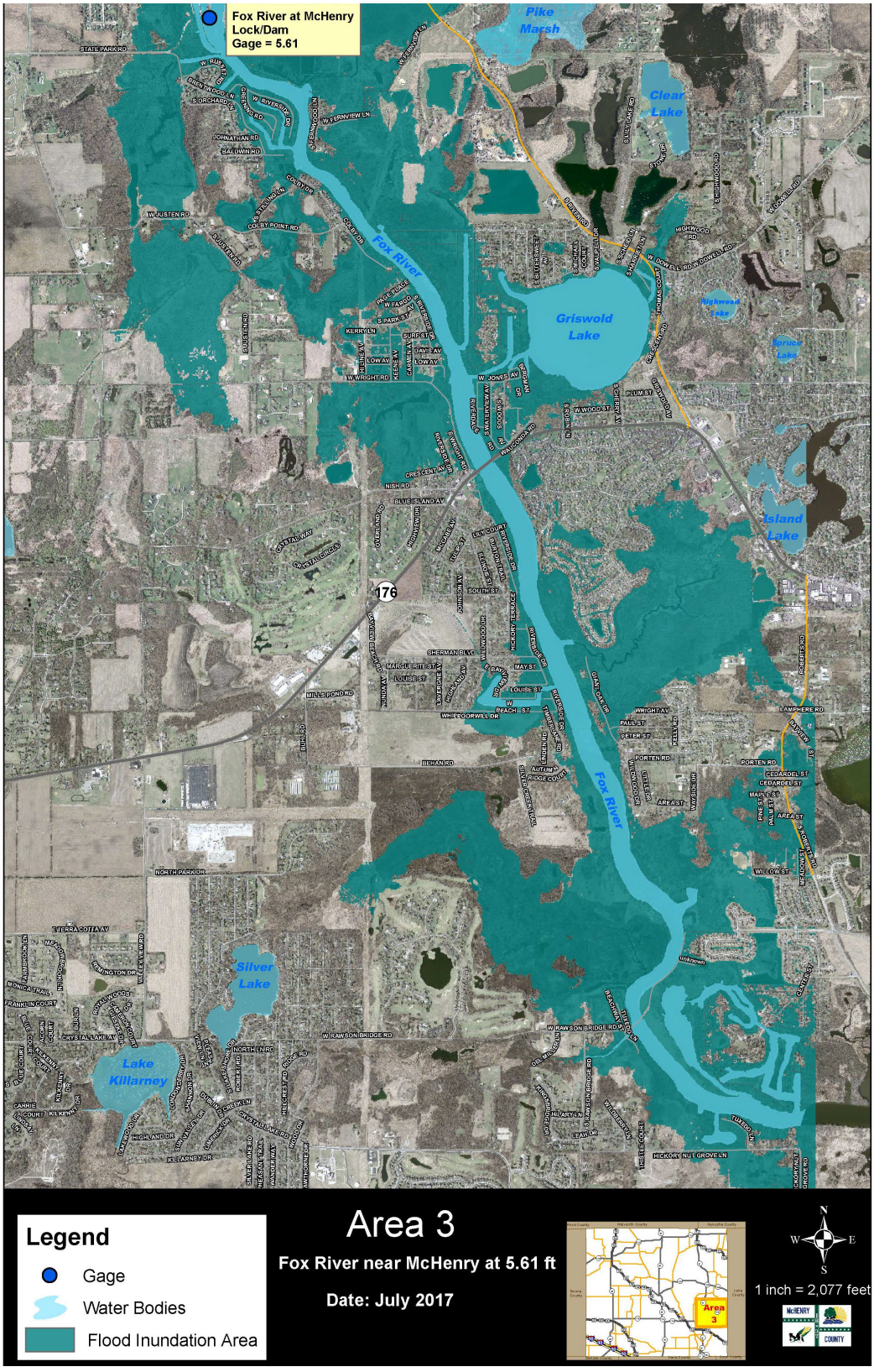

Figure 2.5 McHenry County, Fox River Inundation Map, July 2017.

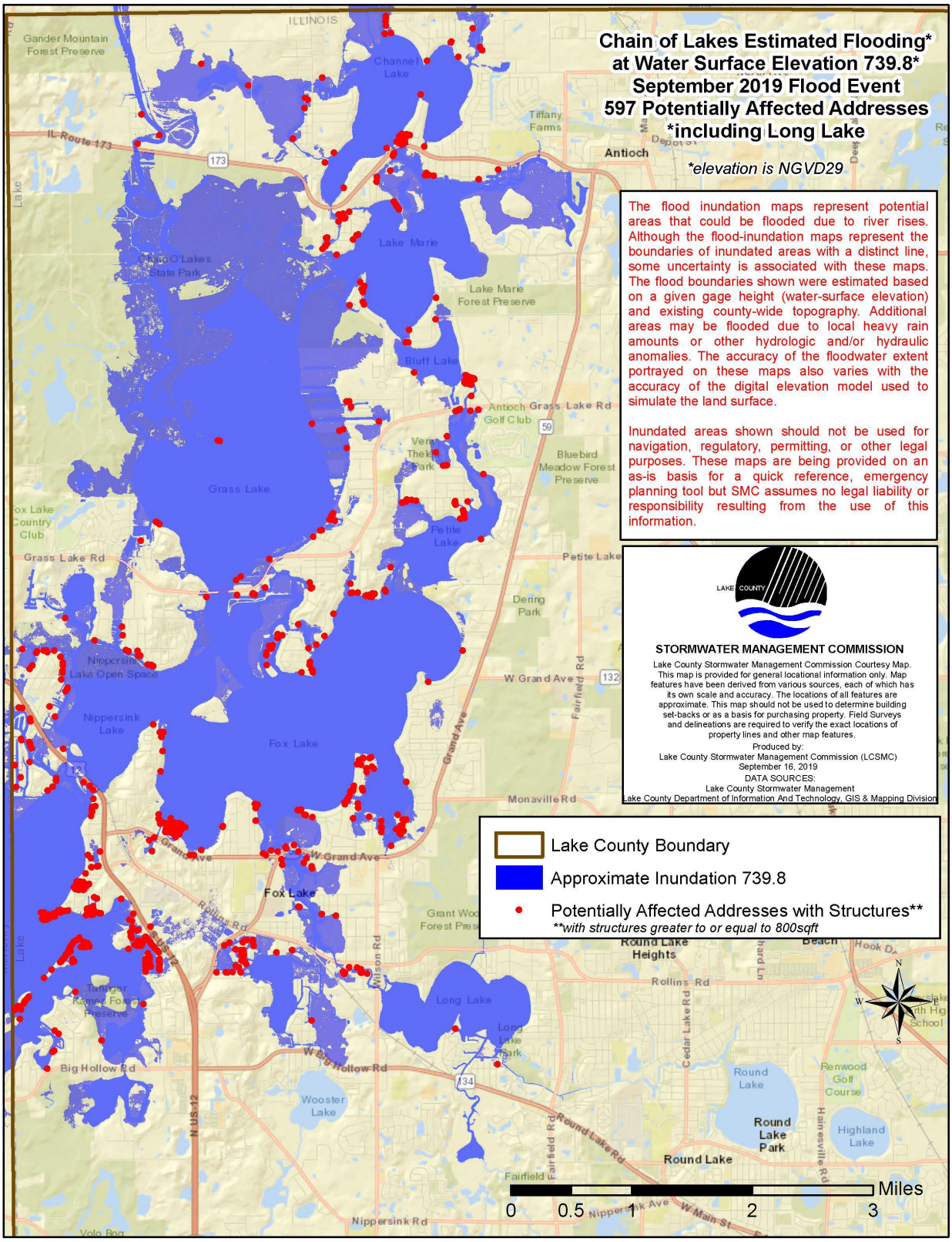

Figure 2.6 Lake County Inundation Map, Chain of Lakes, September 2019

Two gage locations were selected to compare the historic crests to the flood elevations listed in the FIS. The two gages chosen are the Fox Lake gage near Lake Villa and Montgomery gage on the Fox River. The Lake Villa site represents the Upper Fox, while Montgomery represents the Lower Fox. Using the FIS for Lake and Kane counties, the historical crest data was assigned the reoccurrence probability and interval.

Lake Villa

Flood elevations for the 10, 50, 100 and 500 - year annual chance floods for Fox Lake at the Lake Villa gage (Table 2.3) were found in Table 9 of the Lake County FIS (FEMA, 2013).

Table 2.3 Flood Insurance Study Fox Lake Elevations - Lake Villa	
Reoccurrence Probability & Interval (%, years)	**Gage Elevation (NAVD)**
10%, 10	**739.4**
2%, 50	**740.7**
1%, 100	**741.3**
0.2%, 500	**742.5**

The historic crest events for the Fox River at Lake Villa between 1960 and 2018 were obtained from the NWS data for the Lake Villa gage (Table 2.4). These elevations were compared to Table 2.3 and assigned the reoccurrence probability and interval.

The historical crest data revealed that the record event was a 63-year event, which falls well below the 100-year flood insurance base flood elevation. Over the 60-year period, there is a high number of events that are between the 10-year and 30-year events. One could conclude that the FIS may be underestimating the lower frequency events and needs to be revised.

Table 2.4 Historical Flood Data for Lake Villa					
No	**Gage Height (ft)**	**Date of Crest**	**Gage Elevation (NAVD)**	**Reoccurrence Probability**	**Reoccurrence Interval (years)**
1	8.18	4/6/1960	740.95	1.58%	63.2
2	**8.01**	**7/17/2017**	**740.78**	**1.87%**	**53.6**
3	7.88	4/22/2013	740.65	2.31%	43.3
4	7.64	4/2/1979	740.41	3.78%	26.4
5	7.5	5/4/1973	740.27	4.65%	21.5
6	7.5	10/3/1986	740.27	4.65%	21.5
7	7.15	6/18/2008	739.92	6.80%	14.7
8	6.99	3/11/1974	739.76	7.78%	12.8
9	6.95	8/27/2007	739.72	8.03%	12.5

Table 2.4 Historical Flood Data for Lake Villa					
No	Gage Height (ft)	Date of Crest	Gage Elevation (NAVD)	Reoccurrence Probability	Reoccurrence Interval (years)
10	6.72	9/26/1972	739.49	9.45%	10.6

Montgomery

The flood elevations for the 10, 50, 100 and 500 - year annual chance floods on the river at the Montgomery gage location (Table 2.5) were taken from flood profile sheet 47P of the Kane County FIS (FEMA, 2009) . The historic crest events for the Fox River at Montgomery from 1996 to 2019 were obtained from the NWS (Table 2.6). Gage discharge data is only available since 2002. The 1996 gage height is listed as a preliminary value and may have been developed using other discharge data for the watershed. The historic crests were compared to the FIS elevations to assign a probability of occurrence.

Table 2.5 Flood Insurance Study Elevations - Montgomery	
Reoccurrence Probability & Interval (%, years)	**Gage Elevation (NAVD)**
10%, 10	**619.9**
2%, 50	**620.8**
1%, 100	**621.4**
0.2%, 500	**623.8**

Table 2.6 Historical Flood Data for Montgomery					
No	Gage Height (ft)	Date of Crest	Gage Elevation	Reoccurrence Probability	Reoccurrence Interval (years)
1	16.5	7/18/1996	619.79	10.98%	< 10
2	15.14	4/18/2013	618.43	23.07%	< 10
3	15.12	9/14/2008	618.41	23.24%	< 10
4	14.77	8/24/2007	618.06	26.36%	< 10
5	14.37	6/15/2015	617.66	29.91%	< 10

Neither gage shows a flood height that has reached a 100-year event. At Montgomery, no event has exceeded the 10-year flood elevation. Further studies would be required on both Upper and Lower Fox to accurately assess the shortcomings of the previous hydrologic and hydraulic studies.

Flood Insurance Claim History

One way to quantify flood damage is to review claims paid under the NFIP. Figure 2.7 shows the claims paid by county in the Fox River watershed from 1976 to the beginning of 2019. The height of the bar for each county is based on the relative number of claims. The colors are

based on the total dollar amount of the payments. Payment details per county show the highest claims paid were in Lake County and the lowest were in DuPage (Table 2.7). Data for Grundy and Lee counties was not included in this analysis. There were no claims for Will County in the watershed.

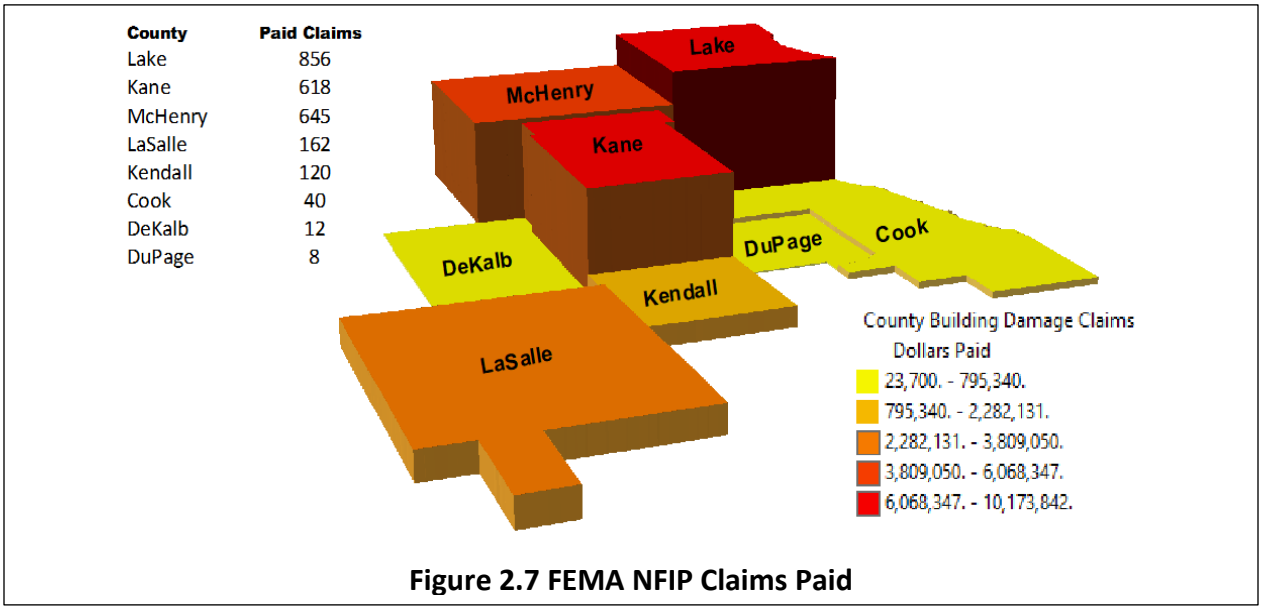

Figure 2.7 FEMA NFIP Claims Paid

Table 2.7 FEMA NFIP Damage Claims Paid in Fox River Watershed by County	
County	**Building Payments**
Lake	$10,173,842.28
Kane	$8,199,398.23
McHenry	$6,068,346.79
LaSalle	$3,809,049.96
Kendall	$2,282,130.72
Cook	$795,340.00
DeKalb	$225,734.50
DuPage	$23,700.18

A majority of the claims are concentrated along the main stem Fox River (Figure 2.8). A map of damage "hot spots" shows the areas with the highest concentration of claims along the river (Figure 2.9).

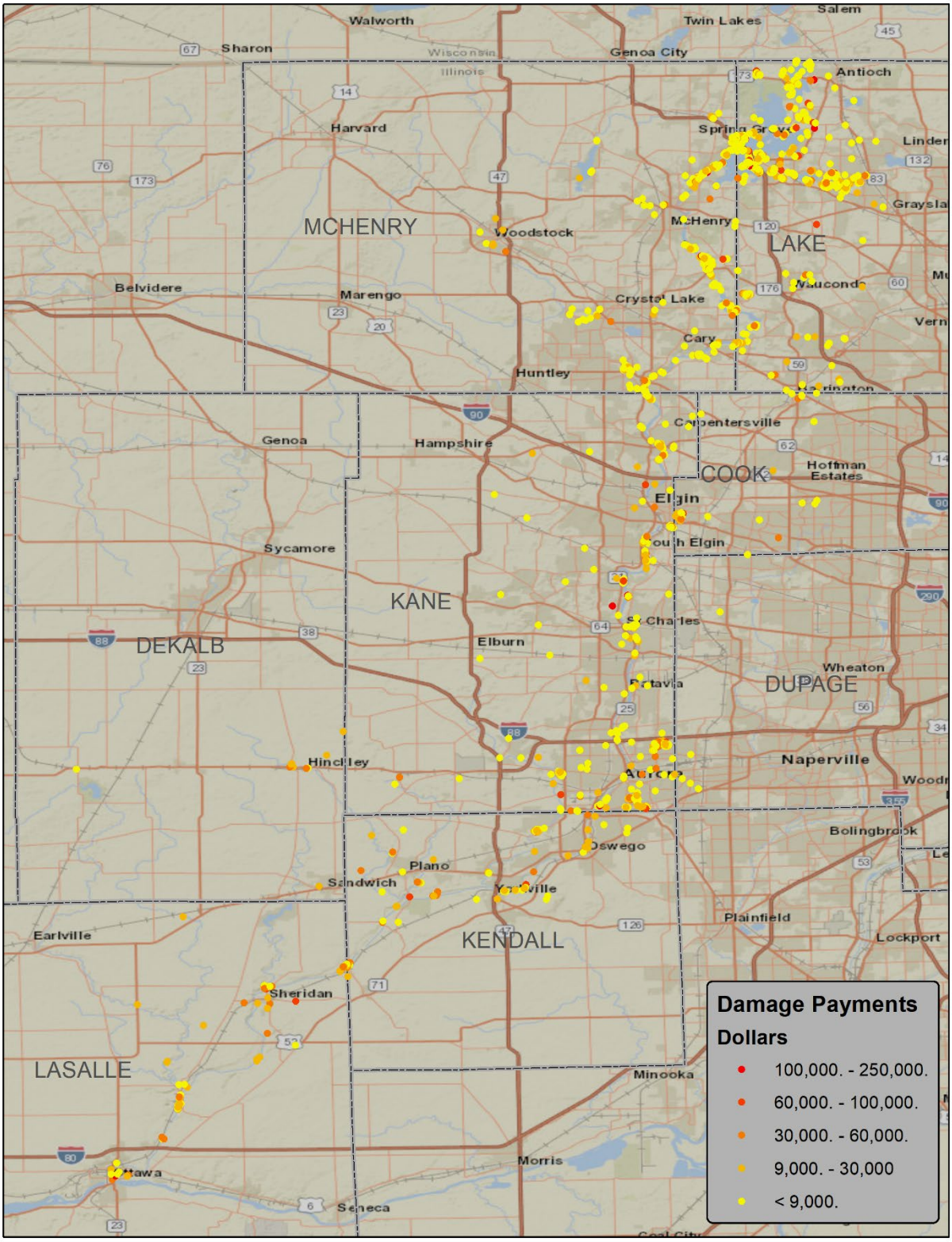

Figure 2.8 Location of FEMA Building Flood Damage Payments

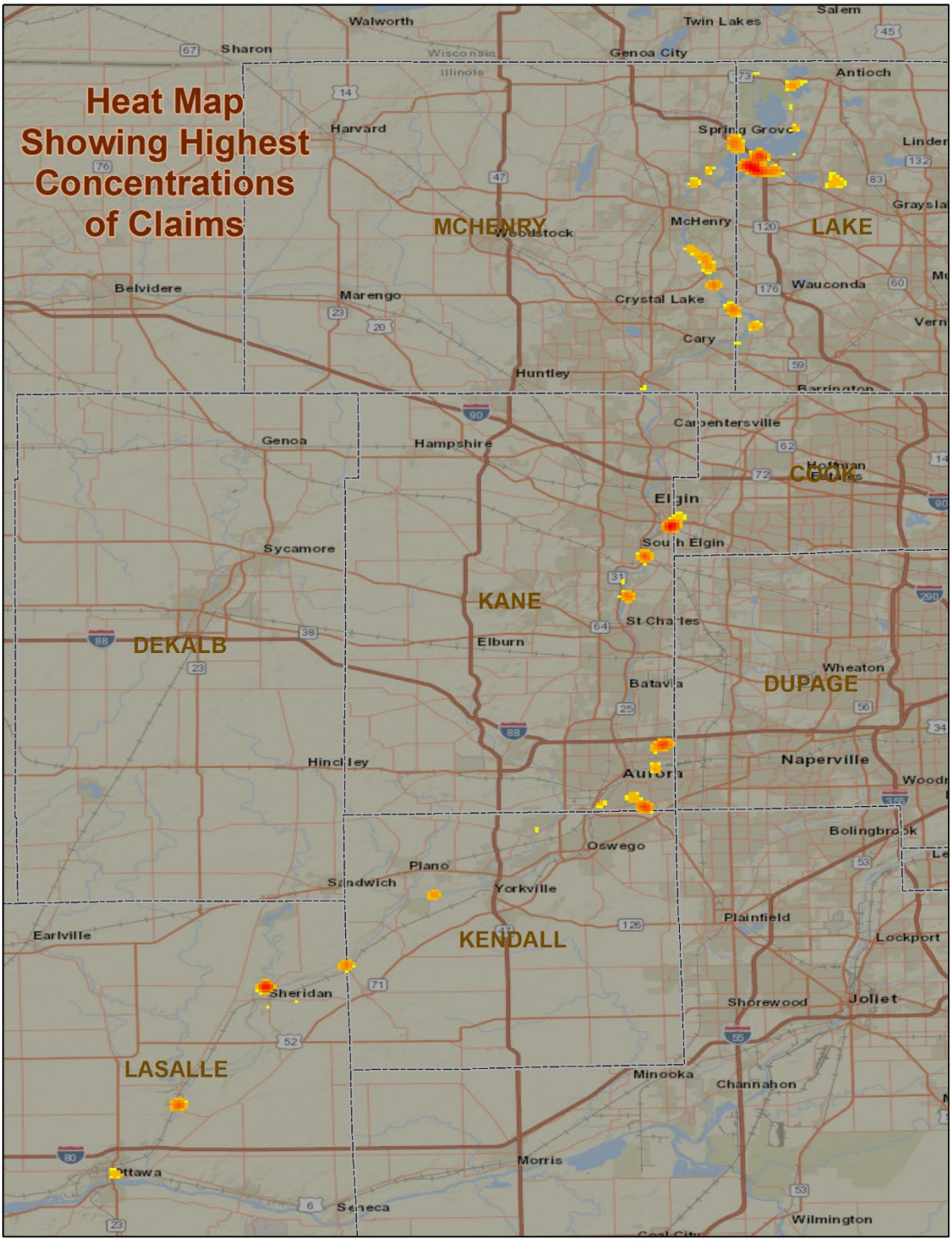

Figure 2.9 "HEAT" Map Showing Relative Concentration of Payments

Table 2.8 NFIP Damage Payment		
Jurisdiction	# Paid Claims	Total Damage Payments
UNINCORPORATED LAKE	434	$5,517,603.39
UNINCORP. MCHENRY	372	$3,832,663.85
FOX LAKE	252	$3,125,544.42
UNINCORPOR. LASALLE	114	$2,865,105.98
AURORA	190	$2,243,346.21
UNINCORP. KANE	133	$2,186,726.58
ELGIN	105	$1,735,952.20
UNINCORP. KENDALL	85	$1,677,550.96
MONTGOMERY	73	$1,420,463.75
ROUND LAKE BEACH	105	$923,790.30
MILLINGTON	33	$661,651.52
JOHNSBURG	39	$597,812.33
OTTAWA	26	$571,980.68
SOUTH ELGIN	44	$559,577.11
PORT BARRINGTON	34	$378,563.84
HOLIDAY HILLS	56	$338,547.82
ALGONQUIN	41	$334,086.36
BARRINGTON	10	$208,204.14
YORKVILLE	12	$184,175.61
ROUND LAKE HTS	12	$182,251.93
ST CHARLES	36	$174,727.70
WOODSTOCK	13	$155,432.81
HANOVER PARK	4	$143,975.00
ANTIOCH	2	$140,434.45
LAKE IN THE HILLS	27	$131,169.64
UNINCORP. DEKALB	6	$124,675.89
CRYSTAL LAKE	14	$97,614.76
EAST DUNDEE	16	$83,564.73
MCHENRY	8	$78,197.82
FOX RIVER GROVE	17	$77,878.21
HINCKLEY	3	$74,785.82
WAUCONDA	15	$74,389.79
SHERIDAN	4	$65,855.88
NORTH AURORA	14	$53,468.96
NORTH BARRINGTON	4	$48,660.33
OSWEGO	5	$44,957.58
GENEVA	5	$40,453.05
WEST DUNDEE	2	$38,042.14

BIG ROCK	1	$36,854.82
SUGAR GROVE	7	$28,881.49
BATAVIA	7	$27,632.09
SPRING GROVE	10	$26,326.46
DEER PARK	4	$26,319.15
PLANO	3	$19,902.47
SANDWICH	1	$19,240.34
GRAYSLAKE	2	$17,589.91
LAKEMOOR	6	$17,525.97
CARPENTERSVILLE	5	$16,706.86
ROUND LAKE	8	$16,417.70
HAWTHORN WOODS	1	$13,996.34
SOUTH BARRINGTON	1	$13,726.00
ROUND LAKE PARK	2	$12,641.89
GILBERTS	2	$9,787.70
HOFFMAN ESTATES	2	$9,176.00
UNINCORP. DUPAGE	3	$9,073.37
CARY	4	$7,981.49
LAKE VILLA	4	$7,770.40
SHABBONA	2	$7,032.45
ELBURN	1	$6,749.96
INVERNESS	1	$4,558.00
CAMPTON HILLS	2	$4,541.85
BARRINGTON HILLS	2	$4,287.84
SCHAUMBURG	1	$3,469.00
LAKE BARRINGTON	1	$3,288.60
STREAMWOOD	1	$2,256.00
ISLAND LAKE	3	$2,158.06
UNINCORPORATED COOK	1	$1,825.00
LAKE ZURICH	2	$1,657.92
LAKEWOOD	2	$1,174.76
LINDENHURST	1	$1,155.00
TROUT VALLEY	1	$948.00
BARTLETT	1	$745.00
WONDER LAKE	1	$261.23

Looking at the number of claims and the total claim amount per community (Table 2.8), some of the hardest-hit communities, with damages over a half a million dollars, include Fox Lake, Aurora, Elgin, South Elgin, Montgomery, Round Lake Beach, Millington, Johnsburg and Ottawa.

Flood insurance claims data is protected under the federal Privacy Act. Access to this data is restricted to both the general public and governments . The data provided identifies general areas and does not identify specific properties.

Character

The northern portion of the river in Illinois is extremely flat as it flows through the glacially-formed lakes region, called the Chain of Lakes. The regulatory floodplain area in the Upper Fox River watershed is extensive, as shown on the FIRM (Figure 2.10). Thousands of homes and businesses are located adjacent to the river and lakes in this region. Proximity to the water, provides access for recreation but also places these properties at a high risk for flooding.

Figure 2.10 Mapped floodplain typical of the Chain of Lakes

The Chain of Lakes is comprised of nine interconnected lakes. The lakes provide a natural storage area for the Fox River. Stratton Lock and Dam (formerly McHenry Dam), located six miles downstream of the lakes, provides for the annual passage of 17,000 boats and controls the water level in the Chain Lakes to provide a deeper summer recreational pool. At the normal summer pool level there is 10,400 acre-feet of storage. During the winter the pool level is lowered, providing 22,200 acre-feet of storage. The three largest lakes are Grass, Fox and Piskatee. In addition to Stratton Dam, there are three more dams across the Upper Fox.

In July 2017, this region experienced record flooding. Lake County Emergency Management reported over 3000 structures were damaged. A collection of photographs, taken by the Civil Air Patrol captured the flooding and are available at Lake County 2017 Flood Event Viewer (Fig. 2.11).

The Lower Fox River is characterized by a narrow river valley and floodplain. The slope of the river increases as the river cuts through limestone bedrock. The river flows through the commercial centers of numerous communities. There are nine dams from South Elgin to the confluence with the Illinois River.

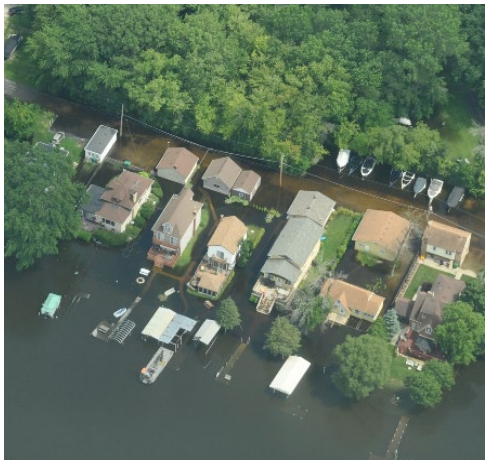

Figure 2.11 Lake County, 2017 Flood Event Viewer, Civil Air Patrol Drone Photographs, July 2017

The change in the gradient or slope of the river can be seen in a profile of the river bed from its beginning in Wisconsin down to the Illinois River (Figure 2.12). The river has an overall average slope of 2.5 ft./mi., dropping about 460 feet over 185 miles. The river does not have a uniform slope, between the state line and Algonquin, the river is extremely flat with an average slope of only 0.3 ft./mi. South of Algonquin to St. Charles the slope increases to about 2.0 ft./mi., between St. Charles and Yorkville the slope averages 4.5 ft./mi. and finally from Yorkville to Dayton the average is 2.7 ft./mi.

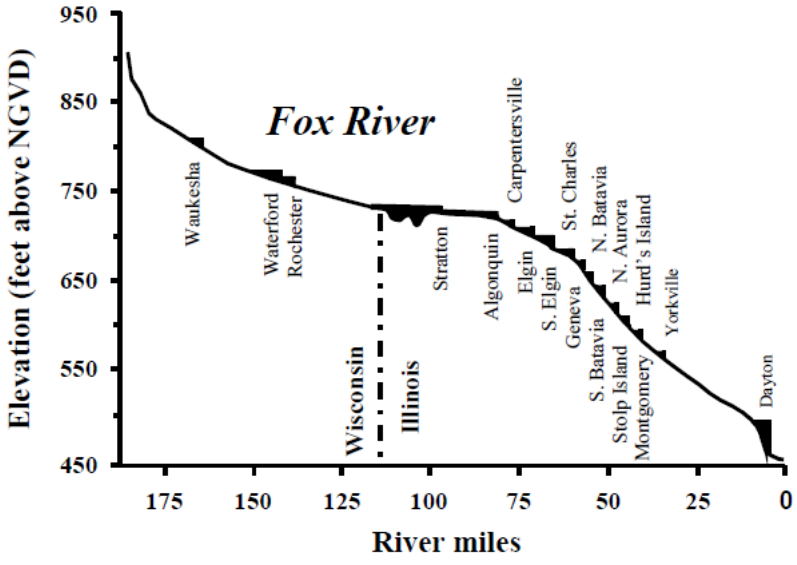

Figure 2.12 Fox River profile with dams, Fox River Fish Passage Feasibility Study, 2003

Fox River Dams

The 13 remaining dams on the Fox River in Illinois are listed in Table 2.9. Most of these dams were built during 1830-1850 to provide power for saw mills and flour mills, and ice during the winter. Over the years, these dams were improved and replaced, and they continued to provide power throughout the early part of the twentieth century (Illinois Rivers and Lakes Commission, 1915).

Table 2.9. Fox River Dams in Illinois

Name	Location (river mile)	Type/function	Removal Status
Stratton near McHenry	98.9	Navigation, pool control	Not Being Considered
Algonquin	82.6	Channel	Not Being Considered
Carpentersville	78.8	Channel	**Planning for Removal**
Elgin	71.9	Channel (old hydropower)	**Under Consideration**
South Elgin	68.2	Channel (old hydropower)	**Under Consideration**
St. Charles	60.6	Channel	**Under Consideration**
Geneva	58.7	Channel	**Under Consideration**
North Batavia	56.3	Channel	**Under Consideration**
North Aurora	52.6	Channel/reaeration	**Planning for Removal**
Aurora	48.9	Channel	**Under Consideration**
Montgomery	46.8	Channel/reaeration	**Under Consideration**
Yorkville	36.5	Channel (modified)	**Modified w/ bypass**
Dayton	5.1	Hydropower	Not Being Considered

For public safety and ecosystem benefits, IDNR is considering removal of or modifications to a majority of the dams on the river. Two dams have already been removed and were not listed, one near North Avenue in Aurora and another in Batavia. The dams in North Aurora and Carpentersville are in the planning stages of removal.

The Fox River system is heavily used for recreation. The dams in Illinois along the Fox River provide for that recreation by maintaining water levels needed for boating. These low-head dams however, are linked to numerous deaths. As of 2006, sixteen people had died by drowning at the dam near Yorkville. In 2006, the dam was renovated by IDNR to reduce public safety hazards at the dam, provide the opportunity for fish passage, and provide safe canoe and kayak boat passage through the dam. The dam is now also the site of the Marge Cline Whitewater Course.

Today, Stratton Dam (Figure 2.13), and Algonquin Dam provide for recreational boating on the river and the in Chain of Lakes. The McHenry County Dam Act (615 ILCS 100), 1923-24, assigns IDNR the duty of maintaining the Stratton "*dam at a suitable height to properly provide a sufficient depth of water north of the dam in the Fox River and the lakes adjacent thereto and*

connected therewith to enable said water to be navigable." In light of the McHenry County Dam Act, the primary objective of operating the Stratton Dam is to maintain a recreation pool in the Chain of Lakes. An operation manual, *Operation of Stratton and Algonquin Dams, Fox River February 2012* was developed in conjunction with the ISWS and outlines the competing operation objectives. This manual is available on the IDNR website at www.dnr.illinois.gov/WaterResources/Pages/StrattonLockandDam.aspx. The manual provides additional guidance for winter operations, ice jam conditions, low flow operations, and summer rain events. Dam improvements currently under construction will double the capacity of the

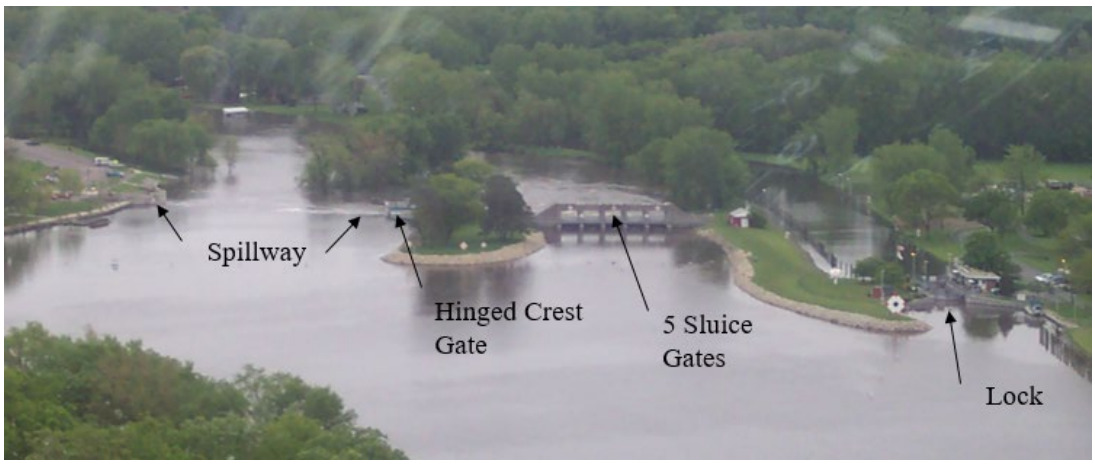

Figure 2.13 Stratton Dam, before improvements

lock, improving boat passage, and replace the five deteriorating sluice gates with three hinged crest gates.

It is possible that water levels may rise quickly in the Chain of Lakes because of high runoff events caused by rainfall and snow melt or other causes such as ice jams. Immediately downstream of the Fox Lake, water flows through a narrow channel around Johnsburg. This narrow river section is also extremely flat (Figure 2.12), which restricts the flow of water out of the Chain of Lakes, over five miles upstream of the gate structure at Stratton Dam. As a result, the gates cannot and do not directly control water levels in the Chain of Lakes during periods of high flow.

The Stratton gates are opened in the fall to draw down the lake levels over the winter to utilize the available storage in the Chain of Lakes and minimize seasonal spring flooding. Sophisticated models are used to make river flow forecasts and aid in determining gate settings and timing with limited effectiveness during smaller rainfall events and essentially no impact during large flood events. Acquisition of structures and properties along the river and lakes would be

required in order to expand flood storage above Algonquin and Stratton dams or increase flows below the dams. In the past, many residents in this area have not shown interest in buyouts.

Tributary Streams

There are three major tributaries to the Fox River in Illinois: Indian, Big Rock, and Nippersink creeks. Additionally, there are eight smaller tributaries with drainage area great than 40 square miles. These eleven tributaries and their drainage areas are listed in Table 2.10.

Table 2.10 Selected Tributaries to the Fox River Basin in Illinois

Stream Name	Counties	Drainage Area (sq. mi.)
Buck Creek	La Salle	41
Indian Creek	La Salle, De Kalb	264
Somonauk Creek	La Salle, De Kalb	88
Big Rock Creek	Kendall, Kane, De Kalb	194
Blackberry Creek	Kendall, Kane	73
Ferson Creek	Kane	54
Poplar Creek	Cook	44
Tyler Creek	Kane	40
Flint Creek	Lake	37
Nippersink Creek	McHenry	205
Squaw Creek	Lake	46

2.2 Current Shortfalls in Existing Flood Control Practices in the Fox River Watershed

Flood control is typically divided into structural and non-structural activities. Structural methods include large infrastructure, levees and regional detention facilities, as well as local stormwater management systems such as detention basins, storm sewers, and infiltration basins. Non-structural activities include flood fighting, floodplain mapping, stream maintenance, floodplain regulations, and comprehensive and land-use planning. This section will also discuss flood mitigation and floodplain mapping needs outlined in the survey.

Structural Flood Control

While there are no large or regional structural flood control facilities along the main stem of the Fox River, there are countless public and private stormwater detention basins throughout the watershed. Since the 1980's, stormwater management ordinances require many new developments to construct detention basins to reduce and detain stormwater runoff. This requirement is generally triggered by either development size, disturbed area, or new

impervious area. The detention basin can provide local flood relief but the cumulative effectiveness of these smaller basins on flood reduction in larger watershed is less understood.

The USGS looked at the effectiveness of stormwater detention basins in the Blackberry Creek watershed portion of the Fox River basin. In 1996 this watershed experienced the 17-inch

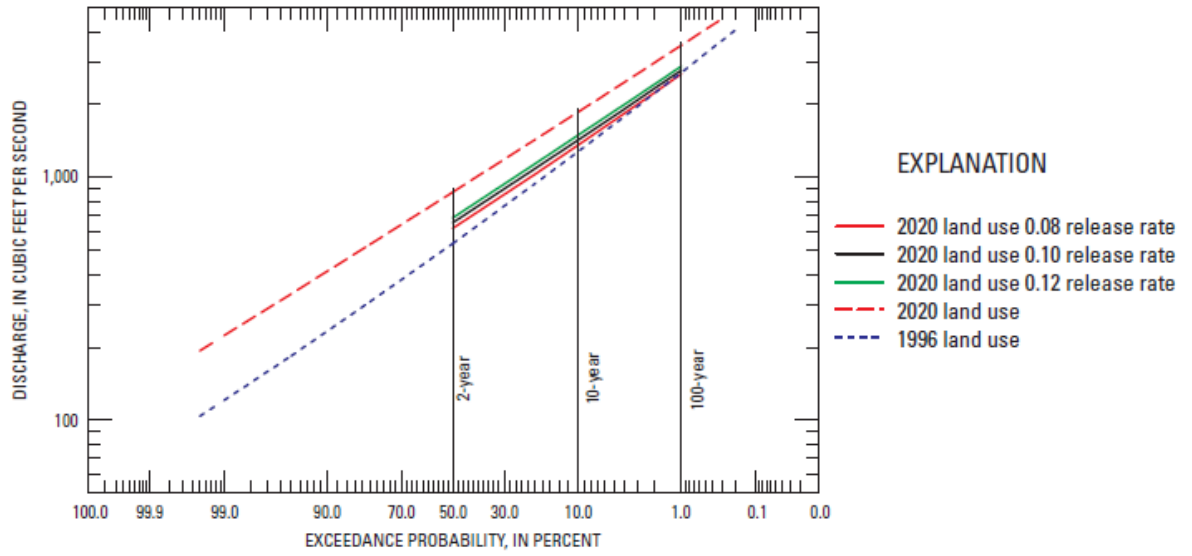

Figure 2.14 Comparison of flood frequencies and selected storm hydrographs simulated for 1996 and 2020 land uses and selected detention basin release rates on Blackberry Creek

rainfall previously discussed. The study looked at what impact detention basins would have on runoff based on growth between 1996 and 2020. The report, *Effect of Detention Basin Release Rates on Flood Flows—Application of a Model to the Blackberry Creek Watershed in Kane County, Illinois,* concluded that the stormwater detention did reduce runoff for both the 100-year and 2-year storms (Figure 2.14). However, the report also found that stormwater detention was less effective in areas where most of the development existed prior to 1996.

Another shortfall of this flood control method is failure of long-term maintenance. Inspections of private basins frequently reveal outlets that are clogged with vegetation, debris and sediment (Figure 2.15). In some cases, owners will modify or even disable outlet structures to stop or reduce the frequency of the basin filling with water.

Figure 2.15 Detention basin outlet structure requiring maintenance

Due to the gate control structures at Stratton Dam, the dam is often erroneously considered to be a flood control structure. The ISWS study of alternative operation scenarios showed that removal of Stratton dam would have the best benefit for flood reduction. However, a complete dam removal would only reduce the water surface elevations upstream of the dam less than 6 inches in only extremely large flood events and would have no benefits to the Fox River downstream of Stratton Dam. Removal of Stratton Dam would not eliminate flooding but would reduce or risk elimination of the recreational and boating opportunities and the natural resources throughout the Chain of Lakes and Fox River watershed during periods with less rain. The impacts would extend to the local economy.

Flood Fighting

Communities along the Fox River main stem commonly implement sandbagging practices to protect homes and businesses. Floodwalls made of plywood and plastic are also deployed. This type of flood protection requires sufficient time to prepare and construct the sandbag wall. Nunda Township in McHenry County supplies thousands of sand bags to the residents along the Fox River during flood events. In 2017, the township reported filling 100,000 sandbags requiring 1,170 volunteer hours to complete. It takes an average of 600 sandbags to cover a 100 foot section, 1 foot high. A video of the flooding In Nunda Township is available on the Road District's website, http://www.nundaroaddistrict.com/.

Figure 2.16 Home in McHenry County using sandbags, a floodwall and pumps to protect from shallow flooding.

Sandbagging and temporary floodwalls have limitations:

- Sandbags alone will not seal out water and must be combined with plastic sheeting.
- Sandbagging is labor-intensive and requires a sufficient lead time.
- Flooding can still occur between building and the sandbagged wall, requiring pumps and a source of power (Figure 2.16).
- A generator may be needed to power pumps, which poses a risk of electrocution.
- Sandbags offer protection only for lower depth floods, up to two feet.
- Sandbags deteriorate and may not remain effective for long-duration flood events.
- Extensive sandbagging, especially of large areas, can increase flood heights on neighboring properties and is currently illegal under the Illinois Administrative Code Title 17, Parts 3700 and 3708, unless specifically suspended by a Governor's disaster declaration through IEMA.

Floodplain Studies and Mapping

FEMA uses the Coordinated Needs Management Strategy (CNMS) to organize the evaluation of floodplain studies. A CNMS online map can be used to view the mapping validation status for all the streams in the Fox River watershed (https://www.fema.gov/coordinated-needs-management-strategy). Due to the size of the watershed, the 825 stream miles in the Upper Fox and 442 stream miles in the Lower Fox are shown separately (Figures 2.17 and 2.18). The mainstem and the tributaries fall into four main categories:

- Unverified - To Be Studied
- Unverified- Being Studied
- Assessed - To Be Studied
- Valid

A full description of how these categories are established can be found on the CNMS website, at the link provided above. In general, FEMA has established 17 factors including land use changes, new or removed bridges and culverts, and recent flooding to assign a validation status. A study that does not pass a validity check is deemed “Unverified” and therefore eligible to receive resources for restudy. As shown in the figures, over 90% of the Fox River mainstem is categorized as Unverified -To Be studied. A majority of the tributaries, especially in the Lower Fox River watershed are also listed as Unverified – To Be Studied. Three waterways in the watershed are currently being studied and remapped by ISWS under a contract with FEMA: Nippersink Creek in McHenry County will have new hydrologic and new hydraulic modeling upstream of Pistakee Lake; and Popular Creek in Cook County, Spring Creek in Cook County and McHenry county will have new hydrologic and hydraulic modeling.

The Fox River main stem hydrologic and hydraulic studies have not been updated since they were originally completed between 1976 and 1980. The Kane County FIS, dated June 2, 2015, states that hydrologic model for the Fox River was calibrated with the 1973 flood event. Therefore, the hydrologic model does not represent known changes in rainfall and land use, nor has it been calibrated to more recent storms. This applies to both the main river and a majority of the tributaries.

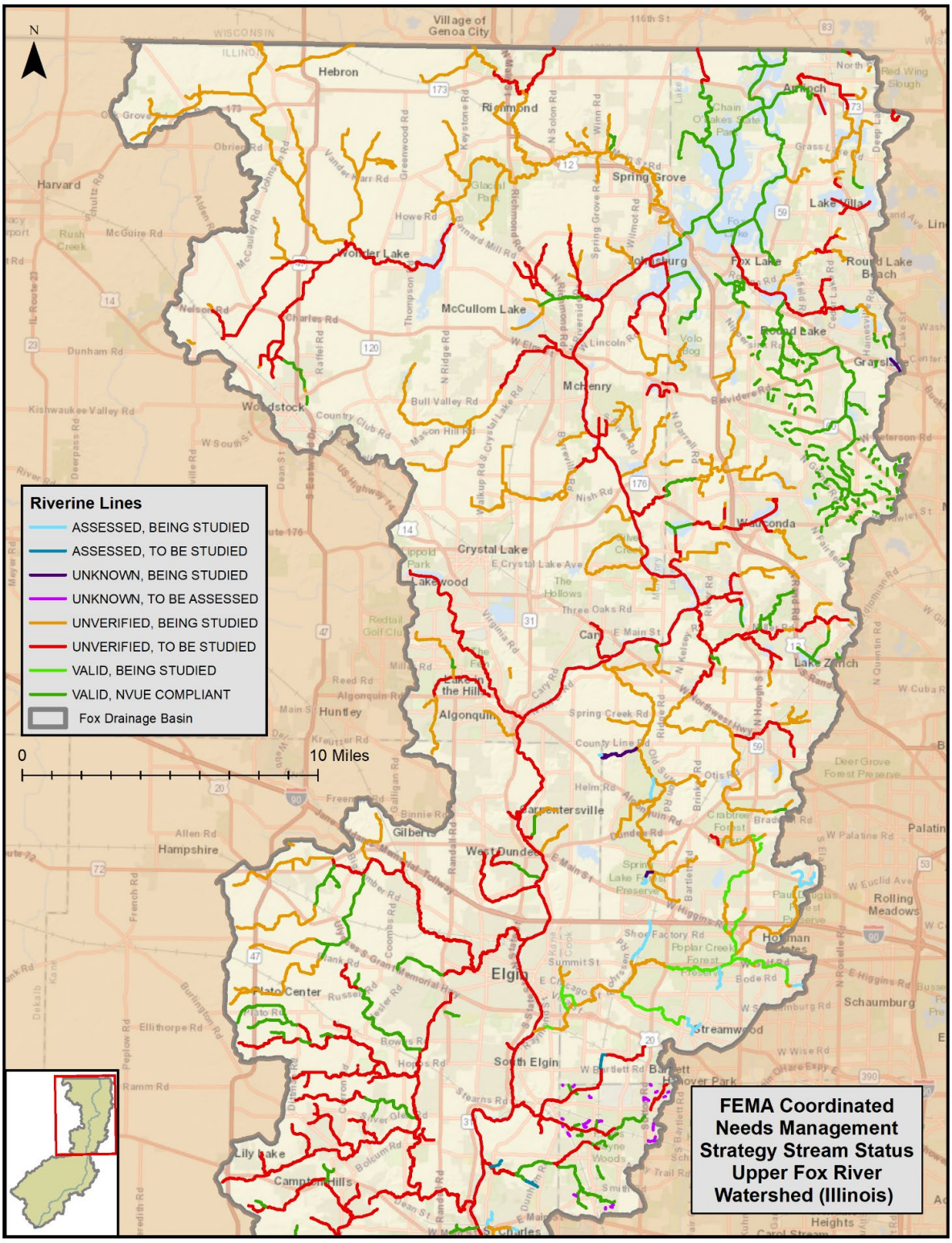

Figure 2.17 Upper Fox River Watershed, Inventory of Flood Hazard Studies and Maps

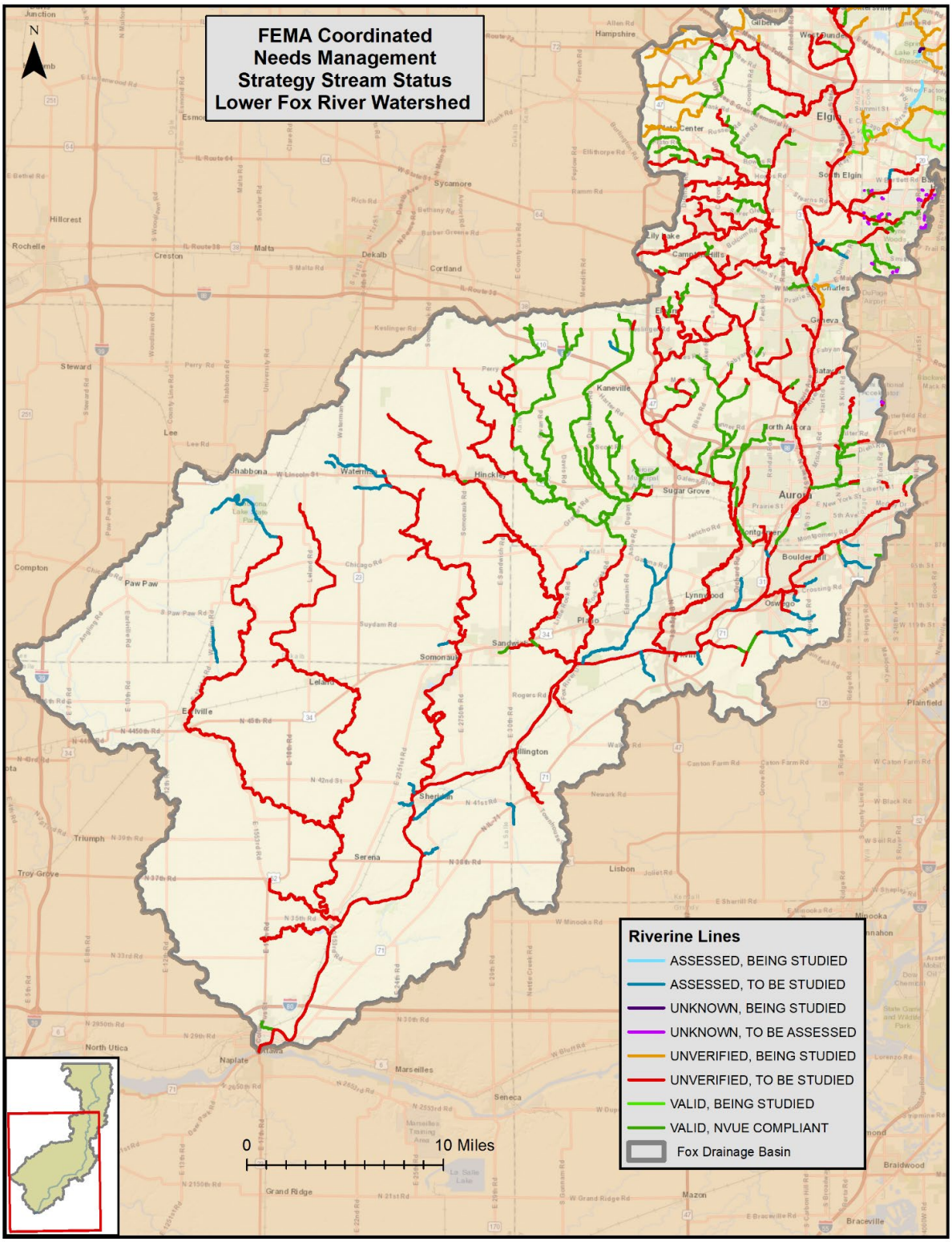

Figure 2.18 Lower Fox River Watershed, Inventory of Flood Hazard Studies and Maps

The ISWS recently issued a report documenting the changes in rainfall patterns in Illinois. The report, *Frequency Distributions of Heavy Precipitation in Illinois: Updated Bulletin 70*, (March 2019) indicates that "not only have the amounts of annual and seasonal precipitation increased, but so too have the number of extreme precipitation events" (Figure 2.19). The report further states that "the changing climate of heavy precipitation observed in Illinois and the Midwest presents a significant challenge for storm water management". . The rainfall total now predicted in Northeastern Illinois for a 100-year, 24-hour frequency event is 9.8 inches, an increase of 1.2 inches from the 7.58 inches calculated in the original *Bulletin 70* report published in 1989.

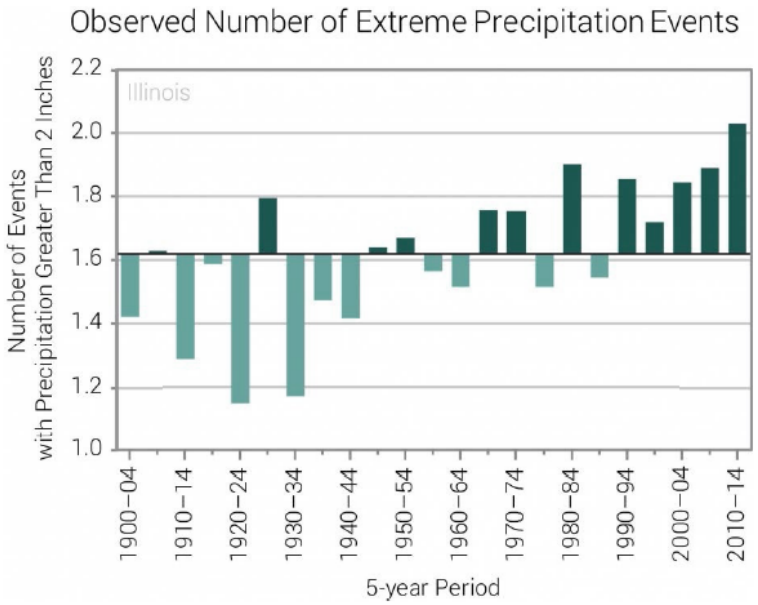

Figure 2.19 The observed annual number of days with precipitation greater than 2 inches for 1900–2014 on average over 5-year periods (*Illinois State Climate Summary*. NOAA Technical Report NESDIS 149-IL, 2017)

On an annual basis FEMA and the states review the mapping needs and prioritizes counties and watersheds for future funding. When a watershed has been identified a "Discovery" process begins where data and information is collected through outreach to local communities, state and federal agencies, community groups, and the general public. A Discovery Report is issued at the conclusion of this process.

The Fox River was identified by the state of Illinois FEMA as a priority watershed and the discovery process was conducted. The watershed was divided into an Upper and Lower watershed and two reports were issued and then updated in 2015. Both the Discovery Report, Upper Fox River Watershed (February 2015), and the Lower Fox River Watershed Discovery Report (January 2015) indicate that study and mapping needs exist even though the FIS and FIRMs were recently updated. The report also documented mitigation needs expressed through public outreach (Table 2.11).Topics of mitigation interest included levees, ice jams, roadway flooding, significant riverine erosion, at-risk essential facilities, stream flow constriction, and recent and/or future development.

> *"Despite better floodplain mapping, strong regulations, and proactive flood mitigation programs, flood damages due to climate change continues to increase in Illinois"*
>
> Building Resiliency to Climate Change: A Call to Action. Illinois State Water Survey Report. November 2018.

IDNR monitors inflow points at New Munster, WI and Nippersink Creek in Illinois to verify inflows to the Fox River system. A graph of the number of historic crests above flood stage during the past 25 years at New Munster, WI. shows a recent increase in flood events at this location in 2018 and 2019, as compared to 1994 through 2017 (Figure 2.20).

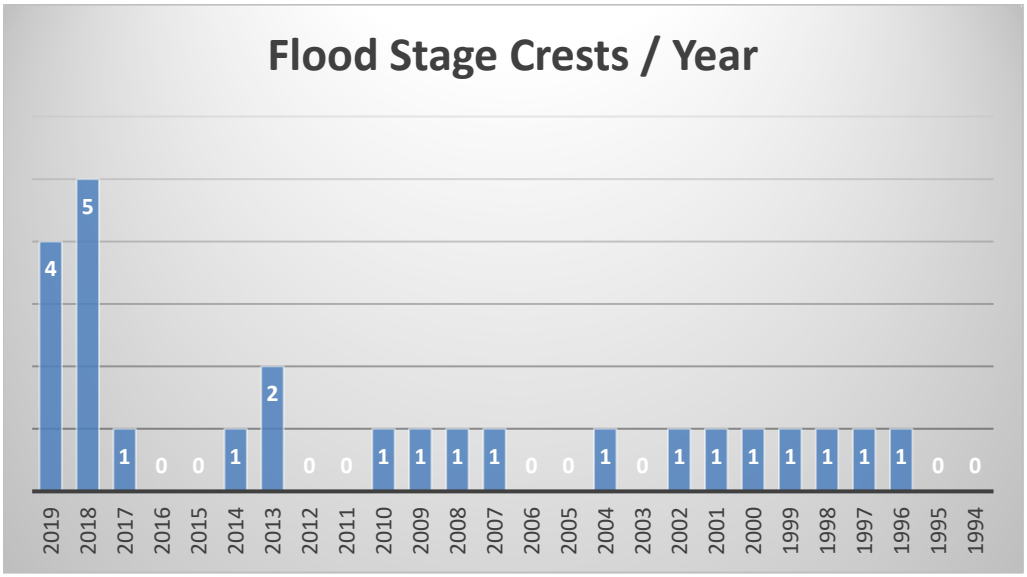

Figure 2.20 Number of Historic Crest above Flood Stage at New Munster, WI.

Table 2.11 Mitigation Projects (Discovery Report, Upper Fox River, updated 2/19/15)		
Community	**Flood Risk Issue**	**Mitigation Project**
Algonquin, Village of	Overtopped Road	Enlarge Box Culverts and Elevate Woods Creek Lane
Algonquin, Village of	Overtopped Road	Install larger culverts under Woods Creek Lane and raise the road.
Algonquin, Village of	Overtopped Road and Stream Erosion	Upsize culverts / realign and stabilize Dixie Creek
Algonquin, Village of	Village Property Flooding	Realign the storm sewer. Stabilize Souwanas Creek.
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.
Carpentersville, Village of	Inaccurate Floodplain	Zone A needing study and remapped
Carpentersville, Village of	Overtopped Roads and Properties	Replace storm sewers
Carpentersville, Village of	Flooding, Significant Riverine Erosion	Stream bank stabilization; Remapping; LOMR
Carpentersville, Village of	Overtopped Roads	Upsize storm sewers; new concrete box culvert
Carpentersville, Village of	Erosion	Stabilize banks and new box culvert
Carpentersville, Village of	Erosion / Runoff	Install storm sewer pipe and swale the rear yards to a drainage structure.
Carpentersville, Village of	Creek Flooding	Remove and replace restrictive culvert
Carpentersville, Village of	Inaccurate Zone A	Study Update; LOMR needed
Carpentersville, Village of	Inaccurate Floodplain	Remap the area using new study data
Carpentersville, Village of	Inaccurate Zone A	Study Update
Cary, Village of	Flooded Homes	Buyouts
Cary, Village of	Overtopped Road	Raise Spring Street
Cary, Village of	Roadway and Residential Flooding	Additional storage, runoff volume reductions needed. Buyouts in process for 4 properties.

Table 2.11 Mitigation Projects (Discovery Report, Upper Fox River, updated 2/19/15)		
Community	**Flood Risk Issue**	**Mitigation Project**
Crystal Lake, City of	Overtopped road	City of Crystal Lake raised North Shore Drive, added culverts beneath pavement, and expanded conveyance channel
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
Crystal Lake, City of	Stream Flow Constriction	Replace/repair culverts under Lake Avenue and Country Club Road
Crystal Lake, City of	Residential Flooding / Drainage Issues	Purchase homes. Provide stormwater storage.
Crystal Lake, City of	Residential Flooding	Drainage Improvements
Crystal Lake, City of	Lake Flooding	Culvert Enlargement
Crystal Lake, City of	Overtopped Roads	Upsizing storm sewer. Expansion of detention storage basin. Drainage improvements.
Crystal Lake, City of	Crystal Lake BFE	New study model.
Crystal Lake, City of	Localized flooding and standing water.	Installation of perforated storm sewer.
Crystal Lake, City of	Crystal Creek Residential Flooding	Culvert Enlargement; Construct storage areas.
East Dundee, Village of	Stormwater Management	Development of Regional Stormwater Management facility
East Dundee, Village of	Significant Riverine Erosion	Stream bank stabilization
Elgin, City of	Stream Flow Constrictions	Repair/replace culverts under St. Charles Street, Royal Boulevard, Laurel Street, and Villa Street
Elgin, City of	Streambank Erosion and Overtopped Road	Tyler Creek stream stabilization and culvert upsizing for Garden Crescent Drive

Table 2.11 Mitigation Projects (Discovery Report, Upper Fox River, updated 2/19/15)		
Community	**Flood Risk Issue**	**Mitigation Project**
Elgin, City of	Overtopped Road	Upsize Brookside Creek culvert. Improve drainage and flow of Otter Creek.
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.
Fox Lake, Village of	Road and Residential Flooding	Eagle Point Subdivision; Rte. 12 at Eagle Point Road. Buyouts. Raise homes and flood proof properties.
Fox Lake, Village of	Roadway Flooding	Raise roadways. Improve drainage. New storm relief sewers.
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.
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.
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
Fox River Grove, Village of	Sewer Backup	Rehabilitation of the sanitary sewer lift stations to alleviate the inundation.
Fox River Grove, Village of	Road Flooding	200 block South River Road / Replacement of existing culverts, regrading of existing ditches and excavation.
Hawthorn Woods, Village of	Inaccurate Floodplain	New study and floodplain remapped
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.

Table 2.11 Mitigation Projects (Discovery Report, Upper Fox River, updated 2/19/15)		
Community	**Flood Risk Issue**	**Mitigation Project**
Holiday Hills, Village of	Fox River Flooding	Retention Area for Floodwaters – Lake Griswold
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.
Island Lake, Village of	Areas needed to be mapped	Study and Floodplain Mapped
Island Lake, Village of	Inaccurate Floodplain	Map Update
Kane County	Ice Jams	Reestablish IDNR/OWR ice boom project to mitigate ice jams in critical locations
Kane County	Inaccurate Floodplain	Zone A needing study and remapped
Kane County	Zone A Floodplain Needing Additional Study	Study Request and Map Update
Lake County	Residential Flooding	Property acquisition residential area south shoreline of Slocum Lake, Lake County.
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
Lake County	Overtopped Road	Elevate Stratton Point Road and Squaw Road
Lake County	Stream Debris	Fiddle Creek Stream Maintenance Project
Lake County	Stream Restriction	Slocum Drainage District and Lake County SMC removing flow obstructions
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.
Lakemoor, Village of	Overtopped roads	Village installed 24” new storm sewer to replace 100 year-old 14” farm tile to correct flooding in the Sunnyside, Hollywood, Rosedale, and East Lake Area
Lakemoor, Village of	Overtopped road	Buyout of one home at the end of Sheridan Road

Table 2.11 Mitigation Projects (Discovery Report, Upper Fox River, updated 2/19/15)		
Community	**Flood Risk Issue**	**Mitigation Project**
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.
McHenry County	Overtopped road	River Road at Dowell RJ intersection improvement project with additional land and roundabout.
McHenry County	Gap in Floodplain Mapping	New study and floodplain remapped
McHenry County	Flooded Homes and Roads	Bone Creek Conservation Area Water Control Project
McHenry County	Lack of Designated SFHA Boundary	DFIRM 17111C0176J. Section missing from SFHA designation. New study and floodplain remapped.
McHenry County	Residential Flooding	Repetitive Loss Structures. Application for HMPG funds to acquire 9 structures and vacant properties.
McHenry County	Bridge Flooding / Damage	O'Brien Road Bridge rehabilitation, Branch of Nippersink Creek stream bank protection, scour protection.
McHenry, City of	Overtopped Roads	Dredging and culvert work to alleviate flooding on Anne Street and Dale Avenue. Funding needed to do more work.
McHenry, City of	Overtopped Road	Dredge Lakeland Park Drainage Ditch
Port Barrington, Village of	Inaccurate Floodplain	New study and floodplain remapped
Port Barrington, Village of	Residential Flooding	Buyout of residences on Eastwood Lane.
Sleepy Hollow, Village of	Overtopped Roads	Dredge and Enlarge Ditches at Locust and Hillcrest.
Sleepy Hollow, Village of	Overtopped Road	Elevate Winmoor, Willow, and Bull Frog Roads
Sleepy Hollow, Village of	Overtopped Road	Replace/repair culverts
South **E**lgin, Village of	Overtopped Road	Elevate Water Street

Table 2.11 Mitigation Projects (Discovery Report, Upper Fox River, updated 2/19/15)		
Community	**Flood Risk Issue**	**Mitigation Project**
Streamwood, Village of	Inaccurate Floodplain	New study and floodplain remapped
Wauconda, Village of	Overtopped Road	Replace/repair existing outfall culvert under roadway.
West Dundee, Village of	Street and Structure Flooding	Culvert enlargement at Sleepy Creek at Strom Road. Downstream channel maintenance
West Dundee, Village of	Structure Flooding	Buyout of apartment building at Lincoln and 6th Streets.
West Dundee, Village of	Street Flooding	A study is needed to determine how to eliminate street flooding at Edwards and Fox.
West Dundee, Village of	Stream Erosion / Sedimentation	Channel Maintenance at Huffman Park and Fairhill Basin

Table 2.11. Mitigation Projects (Lower Fox River Watershed Discovery Report, updated 1/28/15)		
Community	**Flood Risk Issue**	**Mitigation Project**
Aurora / Kane	Ice Jam	Ice jam occurrence at Illinois AU on Fox River
Aurora / Kane	Study Update	Need study update of Waubonsee Creek & tributaries for floodplain management purposes
Batavia /St. Charles /Montgomery / Kane County / Ottawa / Sheridan /LaSalle County / Sheridan	Study Update / Depth & Velocity Grids	Downtown Batavia redevelopment- accurate Fox River study & depth/velocity grids would be powerful tools to communicate to the community. Fox River needs a new study. Stream bank erosion issues.
Campton Hills / Kane	Study Need	Study for Mill Creek Tributary #2 (Zone A transitions to Zone AE) for floodplain management purposes
DeKalb County	Mapping Need	Depth Grids for Emergency Services Agencies
DeKalb County	Study Need	Zone A; LOMC cluster; Study needed for floodplain management purposes; Little Rock Creek
DeKalb County	Conservation Practices	CREP Easements and CRP Practices
DeKalb County	Overtopped Road	Mitigate overtopping and freezing of water on Pritchard Road
DeKalb County	Overtopped Road	Mitigate overtopping of Chicago Road at Govern Beveridge Road - Somonauk Creek
DeKalb County	Overtopped Road	Water overtops Perry Road at Battle Creek. Bridge. Being replaced in 2014.
Elburn / Kane	Restrictive Culvert	Culvert replacement needed from north side of Union Pacific Railroad to Welch Creek

Table 2.11. Mitigation Projects (Lower Fox River Watershed Discovery Report, updated 1/28/15)		
Community	**Flood Risk Issue**	**Mitigation Project**
Elburn / Kane	Development / Study Needs	Development near Pouley Run and Pouley Run North, tributaries of Blackberry Creek. Study Need.
Hinkley / DeKalb	Overtopped Road	Mitigate overtopping at Rumsnider & Duffy Road Intersection
Kane County	Repetitive Loss	Buyouts of three residences. Riverside Avenue, Elgin Township, Section 35. Camp Flint Drive, Dundee Township, Section 27.
Kane County	Ice Jam	Ice Jam near Dundee. Trial IDNR ice jam boom project.
Kane County	Overtopped Roads	Frequent flooding at Route 64 & 47
Kendall County	Culvert Restriction	Engineering data is needed to determine replacement size for a restrictive culvert that causes overtopping of Wolf Road.
Kendall County	Residential Flooding	Flooding in unincorporated Fox Lawn subdivision near Yorkville. Engineering study indicates that the culvert needs replaced.
LaSalle County	Overtopped Road	Mitigate overtopping of Route 23 at railroad crossing.
LaSalle County	Ice Jam	New bridge County Highway 18 may reduce ice jam issue. Study may not be accurate
LaSalle County	Ice Jam	Ayer's Landing / River Road Sulphur Springs; consistent flooding on the east side.
LaSalle County	Ice jam	Backwater created and LOMC cluster; Erosion; Limited access
Montgomery / Kane	Study Need	Flooding in Montgomery from Blackberry Creek. Study should continue through Fox metro to Fox River.
Montgomery / Kane	Stream Gage	Stream gage would be helpful for a flood warning system.
Montgomery / Kane / Kendall	Study Need	Fox River Tributary. No detailed flood study. Study needed in both Kane & Kendall County
Ottawa, LaSalle County	Repetitive Loss Properties	Flat's properties buyout
Ottawa, LaSalle County	Flood Wall	Engineering study needed for flood wall to protect the sewer treatment plant from flooding; IDNR permit;
Ottawa, LaSalle County	Buyout	Central School Buy-out
Ottawa, LaSalle County	Ice Jam	Major ice jam March 2014
Ottawa, LaSalle County	Stream Restriction	Surface debris build up upstream of the aqueduct and sand bars are created.
Ottawa, LaSalle County	Stream bank erosion	Stabilization project. No erosion from April 2013 flood.
Ottawa, LaSalle County	Levee	Levee needed to protect the High School. IDNR Permit. Funding needed.
Ottawa, LaSalle County	Flood Protection Project	Ottawa Regional Hospital Flood Protection & Mitigation Planning
Ottawa, LaSalle County	Street Elevation	Flow study complete. Vertical re-alignment with a series of box culverts or a bridge. Funding needed

Table 2.11. Mitigation Projects (Lower Fox River Watershed Discovery Report, updated 1/28/15)		
Community	**Flood Risk Issue**	**Mitigation Project**
Ottawa, LaSalle County	Flood Threat Recognition	The City of Ottawa can partner with ISWS and AHPS to produce inundation mapping for the City of Ottawa to be able to warn citizens of flood threats, prepare for action earlier and be better equipped to fight flood events.
Ottawa, LaSalle County	Dam Failure / Critical Facility	Catastrophic Inundation Study for Dayton Hydro Dam for mapping and evacuation purposes in case of damage to the infrastructure of the dam or dam failure.
Ottawa, Sheridan, LaSalle County	Flooding and Ice Jams	Flooding and ice jams are getting worse from below Sheridan to the mouth in Ottawa. Sand mining operations may be contributing fill. Possible conveyance problem. Study needed.
St. Charles / Kane	Study Update	Need update of flood study for Ferson Creek / Otter Creek for floodplain management purposes
St. Charles / Kane	Increased Volumes	Flood study needed to extend the City of St. Charles latest approved flood study (Tyler Rd to Kirk) farther east due to increased volumes.
St. Charles / Kane	Restudy	Flood study of 7th Avenue Creek performed by the City and approved by FEMA.
St. Charles / Kane County	Severe Erosion	Norton Creek, near cross section (B-B) Panel 258 tributary creek has severe erosion & needs to be studied for mitigation strategies.
St. Charles / Montgomery / Kane County / Ottawa / Sheridan / LaSalle County /	Study Update	Fox River study update needed due to consistent residential flooding in areas not mapped within the floodplain, LOMC clusters, severe erosion, and fill.
St. Charles, Kane	Study Update	Area needs a restudy to determine mitigation strategies. Severe flooding in 2007, 2008, 2010
Waterman / DeKalb	Overland Flow and Riverine Flooding	Mitigate residential flooding from fields and creek.
Yorkville / Kane	Study	City of Yorkville has modeled Rob Roy Creek
Yorkville / Kendall	Study Need	Un-named creek along Pavilion Road. Greater than 1 square mile drainage area - needs study.

Floodplain and Stormwater Regulations

Floodplain regulations are designed to reduce damages to development in the floodplain. This is accomplished by restricting new construction or requiring protections for the both the new development and adjacent properties. The NFIP requires floodplain regulations be adopted and enforced to be a member community. Illinois requires higher regulatory standards than the NFIP, and in northeastern Illinois there are additional higher standards. A comparison between the countywide regulations in the five counties specified in the Act and the state's model ordinance shows the range of flood protection standards (Table 2.12). The countywide

regulations in the five counties that are the minimum standards enforced in the county. Communities may choose to have higher standards.

In some cases, communities adopt higher standards. The three floodplain standards are:

- Flood protection elevation: the elevation that a new or substantially improved structure must be elevated to above the base flood elevation.
- Compensatory storage ratio: the amount of additional cut required if fill is placed in the floodplain.
- Cumulative tracking of improvements or repairs: to a building over a specified length of time, life of the building or from a specified date.

Kane, Lake, and McHenry counties all have chosen a higher flood protection elevation. Kane County has chosen to go even higher along the Fox River. If a community knows that a particular study underestimates flood elevations, they can specify a higher flood protection elevation for that particular waterway.

Compensatory storage mitigation requirements are consistent across the counties, except for Will County. Kane and McHenry counties allow for range, with a 1.5:1 ratio for projects with less detailed analysis down to 1:1 ratio for specific projects such as roadways.

The tracking of improvements and repairs to floodplain structures is an effective tool for mitigation, typically elevation or demolition of a building. When a floodplain home is repaired or improved, the costs for the work is compared to the market value of the home before the start of work. If the costs exceed 50% of the market value, the home must be mitigated. For floodplain homes that are frequently flooded by low depth flooding or homes that are being improved slowly over years, the building may never reach the 50% threshold. By accumulating the repairs and improvements the threshold may be reached. A longer the accumulation period is a more restrictive provision.

Stormwater regulations are adopted to both reduce stormwater runoff and to detain or slowly release runoff from a development. As already discussed, stormwater detention has been in use since the 1980s. All of the countywide ordinances and the state's model ordinance provide for the stormwater detention. A comparison of these standards is provided in Table 2.13.

More recently, stormwater ordinances have begun to require the infiltration of some portion of the runoff. This new requirement helps reduce runoff and helps capture pollutants carried in the initial runoff from a property. The comparison includes the volume of runoff that must be stored and infiltrated, and at what level of development it is required. Some communities that are experiencing redevelopment of existing neighborhoods with larger homes require this for small increases in impervious areas. DuPage County, for example, does not exempt single-

family homes and requires infiltration of runoff starting at 2,500 sq. ft. of added impervious area. Some communities in DuPage County have taken that threshold even lower to address redevelopment that increases impervious areas in established neighborhoods. Single family lots are required to install rain gardens or gravel trenches to provide for storage and infiltration for as little as 1,000 sq. ft. of new impervious areas.

County stormwater management programs are able to address stormwater program management issues at a larger scale than many small community programs, especially in a highly dense urban area. Many small communities benefit from a county's efficient use of resources to support and enforce stormwater regulation and avoid competitive easing of stormwater management standards for economic benefit. Counties may be better able to facilitate watershed-based analysis of stormwater management issues. Some counties have successfully implemented sources of funding that may not be viable for small communities.

Table 2.12 Comparison of Countywide and State Model Floodplain Regulations

County	Flood Protection Elevation above the Base Flood Elevation	Compensatory Storage Ratio Cut to Fill	Tracking Cumulative Substantial Damage and Improvements
DuPage	1 ft None Detached Garages and Accessory Structures	1.5:1	All work after September 24, 1991
Kane	3 ft Fox River 2 ft All other floodplains 0.5 ft Detached Garages and Accessory Structures 0.5 ft Adjacent to floodplain	Varies from 1.5:1 to 1:1	All work after January 1, 2010
Lake	2 ft 0.5 ft Attached Garages None Detached Garages and Accessory Structures	1.2:1	10 year
McHenry	2 ft 0.5 ft Attached garages and Small Accessory Structures	Varies from 1.5:1 to 1:1	5 year
Will	1 ft	1:1	No cumulative requirement
State Model Floodplain Ord.	1 ft None Detached Garages and Accessory Structures	1.25:1 recommended (None required outside of NE Illinois)	10 year recommended

Table 2.13 Comparison of Countywide Stormwater Regulations						
			Area of Development Thresholds			
County	Infiltration/ Stormwater Runoff Reduction/ Water Quality	Retention/ Detention Requirements	Residential	Multi-family	Non-Res	Open Space
Cook/ MWRD	First inch of runoff from impervious must be stored if impervious area is greater than or equal to 01.0 acres	Based on watershed specific rates, Popular Creek 0.25 cfs/acre	1 acre (Single-family home exempt)	0.5 acre	0.5 acre	0.5 acre
Du Page	1.25 inches from Net New Impervious Area over 2,500 sq. ft.	Pre-development peak discharges in a 2 yr, 24 hr and 100 yr event of critical duration up to a 24 hr duration	5,000 square feet, or 2,500 square feet of net new impervious			
Kane	1 inch of runoff from new impervious area starting at 25,000 sq. ft. unless known flooding or drainage issues	0.1 cfs/acre detention + 1.00" rainfall over impervious area of new development	2 or more homes on 3 or more acres	1 acre	1 acre	N/A
Lake	Required for 1 ac. of disturbance or more or 0.5 ac. or more of new impervious area. Volume varies based on % of impervious area	Probability of the post-development release rate exceeding 0.1 cfs/acre of shall be less than one percent (1%) per year	5,000 square feet of hydrologic disturbance; activities within a floodplain or create a wetland impact; drainage modifications with twenty (20) or more acres of tributary drainage area			
Mc Henry	Required for 1 ac. of disturbance (runoff volume reduction hierarchy). Increased imp. area requires water quality treatment.	2-yr, 24-hr and 100-yr, 24-hr release rates or existing conditions peak runoff rate or watershed-specific rate	5,000 square feet of hydrologic disturbance; disturbance of 50% or more of a parcel; activities within a flood hazard area or wetland or waters; 20,000 square feet additional impervious			

Table 2.13 Comparison of Countywide Stormwater Regulations						
			Area of Development Thresholds			
County	Infiltration/ Stormwater Runoff Reduction/ Water Quality	Retention/ Detention Requirements	Residential	Multi-family	Non-Res	Open Space
Will	None	100-year, 24 hour	1 acre	1 acre	1 acre	1 acre
State Model Stormwater Ord.	1 in of runoff from new impervious	2-, 10-, 25-, 50- and 100-year critical duration events.	5,000 square feet of impervious area or hydrologically disturbs 5,000 square feet or more			

Survey: Areas of Concern and At-Risk Facilities

In addition to the mitigation concerns collected by the ISWS through the Discovery process, communities were asked in the Commission survey and via the interactive map to identify their areas of flooding, top mitigation concerns, and any at-risk facilities. A summary is provided in Table 2.14.

Table 2.14 Fox River Commission Survey		
Village/Township	Areas of Flooding, Comments and Mitigation Priorities	At Risk Facility
Aurora	• Mastodon Lake and Little Doe Lake, acquisitions and infrastructure improvements • Borealis Terrace, acquisitions and infrastructure • Golfview Area, acquisitions and infrastructure • Turnstone Lake infrastructure improvements • Farnsworth and Marshall, acquisitions and infrastructure • East View Estates acquisitions • Sherwood Glen infrastructure improvements	
Avon Township, Lake County	• Round Lake Drain structures under Fairfield Rd. • Arrow Head Lake • Linden Ave at Third Lake • Harrison Ave.at Hart Rd.	• Water treatment plants at RLB • Murphy elementary
Barrington	• In-line detention and water quality enhancement on channel between Lake Louise and Baker Lake	
Barrington Hills	• Chapel Road roadway overtopping • Oak Knoll roadway overtopping • Donlea Road roadway overtopping • Mapping needed along Spring Creek and Flint Creek	
Campton Hills	• Denker Bridge (at Cross Creek)	

Table 2.14 Fox River Commission Survey		
Village/Township	**Areas of Flooding, Comments and Mitigation Priorities**	**At Risk Facility**
Carpentersville	• Four Winds Way Creek bank stabilization • Re-mapping Four Winds Way Ck. from the Fox River to IL. Rte. 31 • Carpenter Creek Bank Stabilization from the south end of Carpenter Park to Washington Street • Lake Marian Creek bank stabilization from Williams Road to the Fox River • Williams Road Culvert Replacement @ Lake Marian Creek	
Cary	• Areas of urban flooding documented in Village study, northwest of East Main St and Northwest Hwy. • Flooded intersection Krenz and School • Cary Creek undersized culvert under Northwest Hwy and railroad (Veteran's Park)	
Crystal Lake	• Acquisition of 4 to 5 homes near Pine and Oriole • Crystal Creek FIS needs to be updated to establish base flows at additional locations. • Daylight Crystal Creek through Lundahl School, • Storm sewers and overflow routes to reduce urban flooding north of country club.	• Lundahl Middle School
DeKalb County	• Roadway overtopping Sanderson and Burns Rd intersection, • Roadway overtopping at numerous locations along N 48th Rd west of Somonauk • Buck Creek overtops Pine Rd	
East Dundee	• River bank restoration/enhancement	• Sanitary sewers Inflow and infiltration
Elgin	• Buyouts along Bayview and Catherine • Buyouts along Poplar Creek floodplain north of Villa St. • Roadway flooding along Poplar Creek near Kirk and Kramer, small number of homes isolated • Buyouts along Poplar Creek floodplain north of Hammond Ave	• PW facility on Tyler Cr. • Judson University remove building in Floodway of Tyler Creek
Fox Lake	• Knollwood Subdivision • Wastewater Treatment Plant--Backwater into loading dock and building	• Sanitary sewers Inflow and infiltration • Pump station capacity

Table 2.14 Fox River Commission Survey		
Village/Township	**Areas of Flooding, Comments and Mitigation Priorities**	**At Risk Facility**
Fox River Springs HOA	• Dredging of the Fox River from the State line to Grass Lake or at least to the Route 173 Bridge.	
Fox Waterway Agency	• Provide annual bathymetric surveys in all lakes and rivers to track sediment deposits due to flooding events • Create flood storage areas • Stabilize banks to prevent damage IE bog's breaking free, Grass island • Bathymetric mapping to identify sediment movement and accumulation due to flooding is needed system wide.	
Grant Township, Lake County	• Stanton Point Rd at Fox Lake mitigation • Meyers Bay Region mitigation • Long Lake South shoreline mitigation	
Hanover Township, Cook County	• Ponding and roadway flooding at CN tracks south of Irving Park Rd, Kings Arthur Ct.	
Hoffman Estates	• Mapping of Zone A north of Palatine at Castaway (Poplar Creek Watershed currently being remapped) • Golf Road overtopping due to culvert at Poplar Creek at EJ & E tracks • Buyouts or mitigation for homes around Victoria Park	
Kane County	• Dundee, St Charles and Algonquin (unincorporated)	• WW Treatment plants in the county
North Aurora	• Areas lie outside the mapped floodplain primarily a result between the interaction of undeveloped agricultural areas abutting residential neighborhoods. • Study of A Zone near Randall Road to establish am AE Zone	
Lake Villa	• Floodplain study Upstream of West Loon lake to set BFE • Mitigation near Steven Sherwood Park • Roadway overtopping Monaville Rd	
Lake County	• Subdivision drainage improvements Northwest Hwy and Hart Rd • Acquisitions south of Slocum Lake and southern Fox River or structural floodproof measures. • Roadway overtopping along east side of Fox Lake in numerous locations shown outside of SFHA • Roadway overtopping Caine Rd • New floodplain mapping needed just east and south of Volo, area has numerous isolated Zone A	• Drain tile replacements - Abbey Glenn Subdivision and other areas across watershed.

Table 2.14 Fox River Commission Survey		
Village/Township	**Areas of Flooding, Comments and Mitigation Priorities**	**At Risk Facility**
	• Four corners basin • Drainage improvements/floodplain mitigation in Chicago Highlands area. • Mitigation residential area on river north of IL 173	
LaSalle County	• Buyouts or elevations is three repetitively flooded area near Sulphur Springs and Sheridan	
McHenry	• Lakeland Park Drainage -Extend floodplain mapping to west • New floodplain for tributary south of Boone Creek, runs parallel to IL Rte 31	• Lakeland Park • Ramble/Home Anne Street • Dale Avenue
McHenry County	• Mapping Needs Silver Lake, Lake Killarney, McCullom Lake and Nippersink Creek • Acquisition in three neighborhoods along the Fox River north of IL Route 176 • Acquisitions between Brentwood Lane and the river • Roadway overtopping W Fernview Lane, only access to about 35 homes • Overtopping of S River Rd – IDOT/McDOT • Mitigation Lagoon Dr • Severe erosion Spring Creek along Creek Rd. • Remapping along Fox to reflect topography at Haegers Bend • General roadway flooding throughout county • Overtopping of Rawson Bridge Rd • Erosion on Woods Creek at Dennis Ave. • Acquisitions in along Nippersink east of Fox Lake Rd	
Montgomery	• Complete acquisitions along Waubonsee Creek	
North Aurora	• Flooding of residential areas adjacent to undeveloped agricultural areas west of Hart Rd • Study of A Zone at Randall Rd. north of I-88 • Randall Rd overtopping by backwater from East Run	• Village Hall in floodplain.
Northville Town., LaSalle County	• Culverts, bridge replacement, backflow preventers	
Oswego	• Roadway overtopping by tributaries to Waubonsee Creek at Wolfs Crossing • Improvements to US 30 at the Lincoln Station subdivision to convey water to creek away from homes. • Flooding north of Wolfs Crossing and Douglas Rd	• Fox Metro Water Reclamation District pump station
Port Barrington	• Acquisition of repetitive flood prone properties	• Elevate flood-prone

Table 2.14 Fox River Commission Survey		
Village/Township	**Areas of Flooding, Comments and Mitigation Priorities**	**At Risk Facility**
	• Address low elevation of roadways in flood areas for homeowner and business access • Implement flood BMPs such as shoreline stabilization, rain gardens, bio-swales, parking lot retrofits to mitigate stormwater runoff and erosion	roads with possible flow-through culverts.
Round Lake Beach	• Developing a floodplain/stormwater management plan for known problem areas. • Acquisition of two floodprone structures • Storm sewer improvements	
Round Lake Park	• Acquisition of three homes along Greenwood Dr	• Upsizing stormwater pumping stations
Round Lake Hghts.	• Roadway overtopping Rollins Rd at Round Lk Drain	
St. Charles	• Mitigation is needed along 7th Avenue Creek at the Fox River; South Ave. and S. 10th Ave; and the area of S. 13th Ave. • Culvert replacements along 7th Avenue Creek at IL Rte 25, S. 10th Ave; S. 11th Ave., S. 13th Ave. and under RR • Intersection flooding 17th and Indiana • State St. Creek needs updated mapping • Route 64 floods at 7th Avenue Creek • Norton Creek better delineation upstream of Kirk Rd	• Currently moving Police Station out of the 500-year floodplain
Sandwich	• Sandhurst/Fieldcrest Flooding Relief/Storage road floods 3 feet deep • Wright Drive/Wright Court Intersection Flooding Relief/Storage - depth of 2 feet or higher, isolating homes around 30 homes • Main Street flooding • Reduction of infiltration and inflow into the sanitary sewer system.	• WW Treatment plant excess flow utilized frequently during storms • Stormwater management facilities (storm sewers and detention areas).
Sleepy Hollow	• Provide funding to mitigate at risk properties in the low-lying areas of Sleepy Hollow. • Dam repair/removal along Sleepy Creek. • Provide additional stormwater detention storage.	• Fire Station on Thorobred Lane
South Elgin	Acquisition in repetitive loss areas along Fox	

Table 2.14 Fox River Commission Survey		
Village/Township	**Areas of Flooding, Comments and Mitigation Priorities**	**At Risk Facility**
Wauconda	• Acquisition	• Pine Street/US 12 Pumping Station replacement • Monroe Street Pumping Station replacement
Yorkville	• Acquisition or floodproofing of Van Emmon Road Properties on Fox River Tributary • White Oak Way	

2.3 Flood Reduction Strategies

Floods are, by far, the most common natural disaster in the Fox River watershed. Along the Fox River, floods can occur as the result of rain, snow melt, and ice jams. Flooding on the main stem of the Fox River can happen slowly and flash flooding can be experienced, especially along the smaller tributary streams. With rainfall characteristics changing, i.e. more short-duration high-intensity rainfall events, there may be less time to build the temporary sandbag barriers that have provided the flood protection for many buildings in the floodplain.

Through the Coalition, communities would work together to create one voice and to leverage resources to address flooding on the Fox River. A majority of the six flood control strategies listed in the Public Act match elements addressed in the hazard mitigation plans prepared by each county. The Coalition should coordinate their efforts with the county emergency management agencies to avoid duplication of efforts. The Coalition can support and assist the counties in achieving many of the recommendations in their plans. The six flood reductions strategies noted in The Act are discussed in greater detail in this chapter.

Many of the activities discussed are eligible for credit under FEMA's Community Rating System (CRS) program. An overarching goal of the Coalition could be to increase the number of CRS participating communities in the watershed. The CRS program was established to reward communities that go above and beyond the minimum requirements of the NFIP. The reward is a reduction in NFIP flood insurance policy premiums in those communities that participate. At this time there are 13 communities in the watershed participating. They include Aurora, Bartlett, Carpentersville, Crystal Lake, DuPage County, Lake County, LaSalle County, Lake in the Hills, McHenry County, Montgomery, Ottawa, Saint Charles, and South Elgin. Two additional communities, Fox Lake and Port Barrington, are working towards their participation.

Flood Preparedness

Preparedness activities include actions taken by state, county, and local levels of governments and nonprofits, and also actions taken by individuals and families. The Coalition can foster partnerships among communities and state and Federal agencies and facilitate the coordination of planning, outreach and training for residents and responders. Any Coalition flood preparedness activities should be coordinated with the emergency management departments in each county.

The Coalition could be the lead organization to assess flood risk within the Fox Watershed and develop flood preparedness strategies such as:

- Identify the types of flood risk in the Fox River watershed, including riverine, isolated poorly-drained areas and areas of urban flooding.
- Identify and map all of the flood risk areas within the Fox River watershed.
- Work to improve the FEMA floodplain maps and public awareness of the maps.
- Develop a community warning system including reverse 9-1-1 or CodeRED or use of Emergency Alert System (EAS) and National Oceanic and Atmospheric Administration (NOAA) Weather Radios.
- Develop plans to notify citizens of flash flooding risks.
- Establish additional real-time gaging stations to provide early warning during heavy rain.
- Develop real-time inundation maps for the Fox River.
- Work with state agencies and the Silver Jackets program to fund a lowest floor survey to help prioritize mitigation.
- Learn and practice evacuation routes, shelter plans, and flash flood response.
- Provide outreach information on the purchase of flood insurance.
- Provide training on protecting individual property such as storing important documents in waterproof containers, moving valuables to higher levels, cleaning gutters, and installing sanitary sewer back-flow preventers.

The US Army Corps of Engineers has conducted flood fighting workshops for other flood groups and communities. The workshop includes hands-on training on how to sandbag properly. The workshop may also include vendors demonstrating various flood fighting products.

The US Army Corps of Engineers has also coordinated with IEMA to identify storage locations for flood fighting materials, so transportation times are minimized during flood events.

Flood Protection

Flood protection or mitigation are actions taken to protect a property from flooding. For this report, flood protection will not include flood safety measures taken to protect people from loss of life or physical injury. Flood protection can include temporary measures, long-term building retrofitting projects, and flood insurance.

Figure 2.21 2008 Elevation of home on Fox River in Sheridan

The 2018 Illinois Natural Hazard Mitigation Plan prioritizes acquisitions, demolition, and relocation when making funding decisions. The acquisition of substantially damaged properties and repetitive loss properties are list as the second and third priorities for mitigation. Small structural projects are listed as the fourth state priority. Specifically, storm water detention projects, reservoirs, floodwalls and channel improvements.

The hazard mitigation plans completed for each county in the watershed include some or all of the following property protection measures for buildings subjected to flooding. Each county hazard plan discusses these measures in greater detail. Each plan also identifies critical facilities, which when flooded pose a risk to the larger community. Links to each county hazard plan is available on the IEMA website at: https://www2.illinois.gov/iema/Mitigation/Pages/Planning.aspx.

Property protection measures include:

- Building Acquisition and Relocation
- Building Retrofits – Elevation (Figure 2.21), Floodproofing or Barriers
- Temporary Barriers
- Flood Insurance
- Regulations, Zoning and Comprehensive Planning

The survey conducted by the Commission asked communities to specify critical facilities at risk of flooding. The survey provided a limited view of the risks to these facilities, with only 12 reported in the floodplain. The county hazard mitigation plans provide a more complete analysis:

- Lake County specifies 19 critical facilities are subject to flooding and 170 roads and bridges are threatened by flooding.

- Kane county reports 58 bridges and only five critical facilities in the mapped floodplain.
- McHenry County has over 60 critical facilities in or within 100 feet the mapped floodplain, including numerous wastewater treatment plants, drinking water wells and police stations.
- Kendal County identifies three wastewater facilities in the Fox River watershed as the only critical facilities subject to flooding. The plan did not specify the number of roads or bridges impacted by flooding.

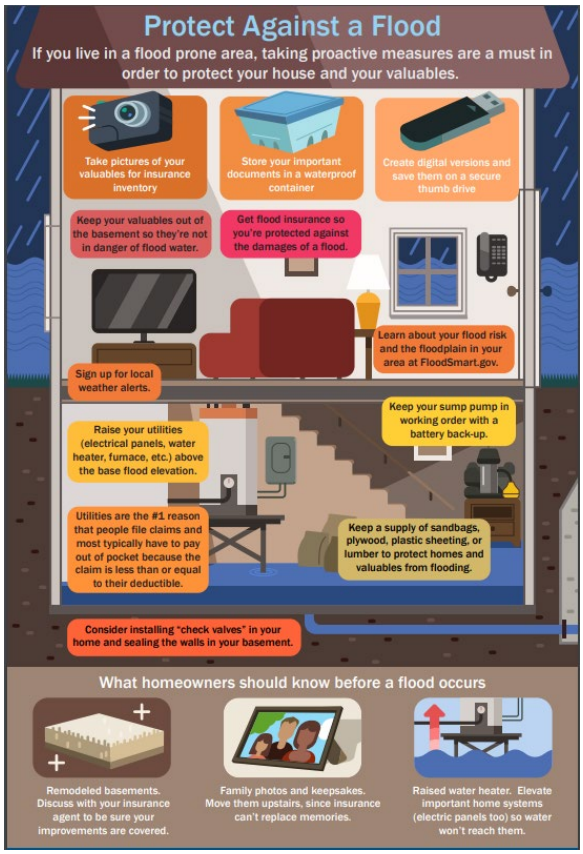

Figure 2.22 Flood Protection Poster , FEMA Flood Awareness Stakeholder Toolkit, https://www.fema.gov/media-library/assets/documents/108453

The Coalition can take the following actions to promote flood protection in the watershed:

- Participate in the hazard mitigation planning process for the counties in the watershed to encourage communities to identify structures requiring mitigation, including critical facilities and roadways to prepare for future funding opportunities.
- Provide public education materials to communities in the watershed, working with local county stormwater agencies where available. FEMA has a large number of outreach materials available(Figure 2.22), which may be ordered or linked to a community website. FEMA also has a number of online "tool kits" that include social media posts, posters, graphics, etc.

- Coordinate flood protection seminars for the public, such as flood fighting classes that show proper construction of a sandbag flood barrier, demonstrate use of dewatering pumps, explain elevating of utilizes and appliances, and discuss generator safety.
- Coordinate training of county and municipal staff in flood protection techniques to provide technical advice to property owners.
- Coordinate training for local realtors and insurance agents on floodplain mapping and insurance.

Figure 2.23 Ice jam flooding on the Fox River in 2010, Kane County Natural Hazard Mitigation Plan, 2015

- Coordinate grant-writing seminars for county and municipal staff to access funds for acquisitions.
- Promote use of higher regulatory floodplain standards for new construction and substantial improvement.
- Promote the use zoning codes and land use plans to wisely locate critical facilities, including nursing homes, police stations, fire stations, etc., outside of the floodplain.
- Promote use of rebates or other incentives by communities for building retrofitting.
- Coordinate the development of educational materials related to ice jam flooding (Figure 2.23) with county and municipal staff, USACE Cold Regions Research and Engineering Laboratory, and IDOT.

Flood Response

The purpose of emergency response is to ensure:

- Delegation of emergency authority
- Assignment of emergency responsibilities
- Documentation of emergency procedures and processes
- Coordination of emergency efforts internally and with external parties
- Safe continuation of essential operations, while crisis is being managed
- Proactive identification of all possible emergency events/scenarios and their corresponding mitigation actions

Emergency response should be well-planned and coordinated by all communities. An emergency response plan acts as a guide to taking actions during a flood emergency. Disaster response is

primarily the task of first-responders, such as police, fire, township highway and public works. IEMA and County emergency management agencies support these first responders by:

- Helping agencies follow their emergency plans
- Providing information to responders and residents
- Locating and coordinating resources for responders
- Documenting actions and costs of response work

What is unique to planning for flooding is that, by understanding the event, you can factor in warning times that do not exist in many other types of emergencies. This is the key to an effective flood emergency response plan. The primary tools used to identify flood risk are rainfall and stream gages used for forecasting. Inundation maps, like those prepared by McHenry and Lake counties (Figure 2.5 and 2.6), can be prepared to determine what structures are most at risk, where roads should be closed and if evacuations should be ordered.

The NWS provides forecasting for rainfall as well as flooding. Forecasting accuracy can be improved with additional rainfall and stream gauges. There are over 30 USGS stream gages located within the Fox River Watershed in Illinois and Wisconsin (Table 2.2).

The USGS also operates five instantaneous data rainfall gages, location shown in Table 2.15 in or near the Fox River watershed. The five gages are primarily located along the east side of the watershed towards the center. A map of the five locations (Figure 2.24) illustrates the lack of gages in the watershed.

Table 2.15 USGS Rain Gages

Rain Gage Number	Station Name and Location
Illinois	
422834088255800	Village of Hebron Public Works in Hebron, IL
420354088170500	Elgin Water Treatment Facility in Elgin, IL
415457088150600	DuPage County Airport near St Charles, IL
415131088143600	Fermi National Accelerator Lab near West Chicago, IL
414652088133800	Naperville Township Highway in Naperville, IL

The Coalition can take the following actions to promote flood protection in the watershed:

- Install additional stream gages in coordination with the USGS and US Army Corps of Engineers. Developing long-term maintenance cost-sharing agreements between counties and the applicable federal agency.
- Develop a flood warning plan which includes identifying the warning time of flooding, impacts at various stages, and pre-identified flood fighting steps.

- Coordinate with county emergency management to establish additional rain gages, ideally instantaneous read rain gages, at police and fire stations or other public facilities. These gages can be linked to the NWS's Community Collaborative Rain, Hail and Snow Network (CoCoRaHS).
- Study the overall impacts of flood fighting efforts such as sandbags and barriers. Determine the impacts of these flood fighting efforts on other occupants in the watershed. Develop a flood fighting plan to minimize impacts on others.
- Provide a framework for each community along the river to develop a flood warning plan. The CRS program can provide additional guidance on establishing a plan. Go to *https://crsresorces.org* and look at the Documentation Checklist under Activity 600.

Flood Recovery

The first step in long-term community recovery is the recognition by the community of the need to organize and manage the recovery process as opposed to letting repairs and rebuilding occur without a cohesive, planned approach. In most cases, FEMA and the State will not be able to provide full assistance to all communities. Therefore, communities must undertake the recovery planning process themselves. There are numerous online resources to help communities with their recovery planning. The Illinois River Alliance can assist the Coalition with the education and outreach materials.

DISASTER RECOVERY

The *ideal* disaster recovery process is one where the community proactively manages:

- Recovery and redevelopment decisions to balance competing interests so constituents are treated equitably and long-term community benefits are not sacrificed for short-term individual gains;
- Multiple financial resources to achieve broad-based community support for holistic recovery activities;
- Reconstruction and redevelopment opportunities to enhance economic and community vitality;
- Environmental and natural resource opportunities to enhance natural functions and maximize community benefits; and
- Exposure to risk to a level that is less than what it was before the disaster.

Source: *Holistic Disaster Recovery: Ideas for Building Local Sustainability after a Natural Disaster.*

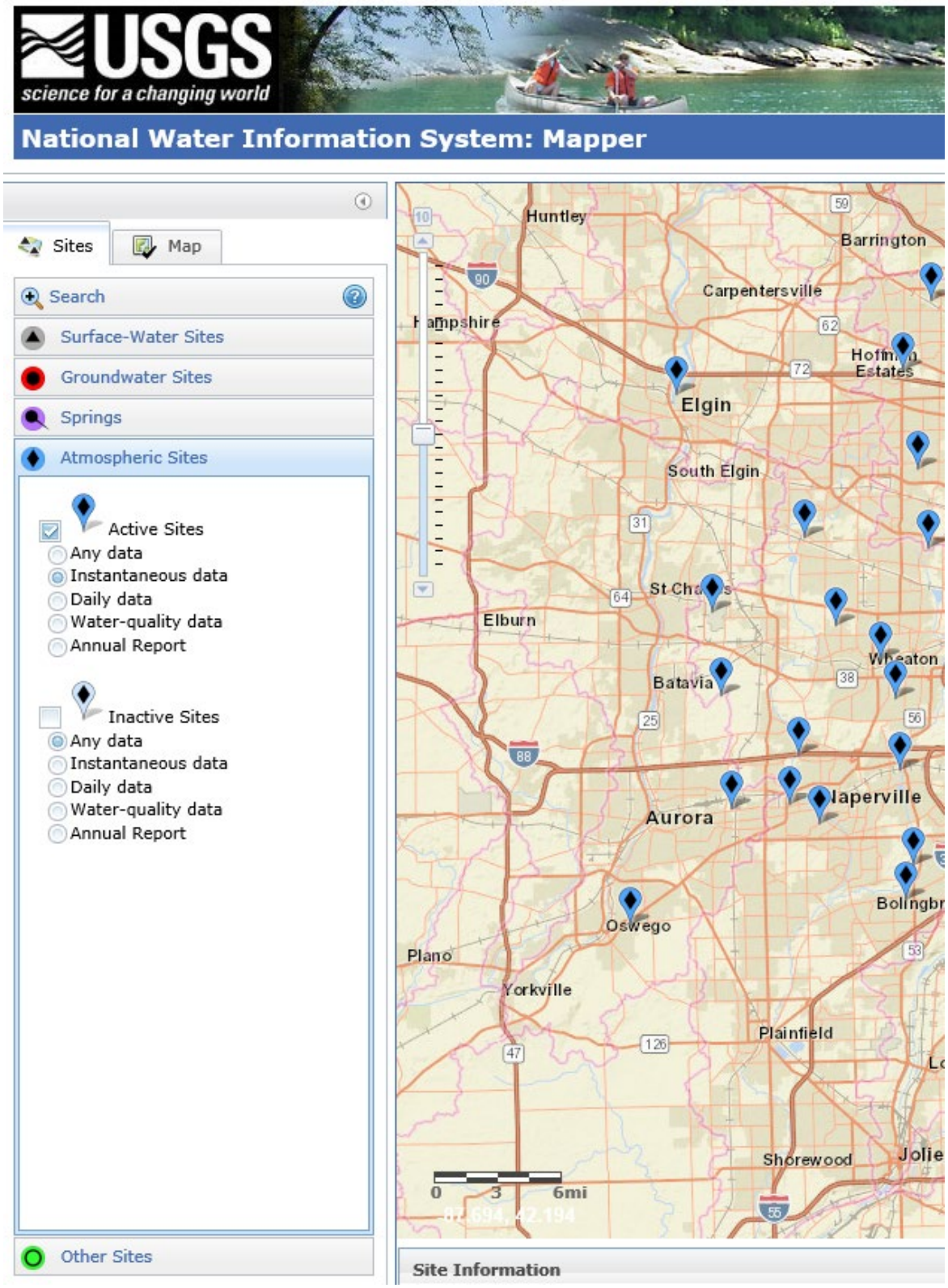

Figure 2.24 USGS Rainfall Gages in Northeastern Illinois

Long-term recovery refers to the need to re-establish a healthy, functioning community that will sustain itself over time. Examples of long-term community recovery actions include:

- Providing permanent disaster-resistant housing units to replace those destroyed,
- Initiating a low-interest loan programs for businesses (and thus encouraging other improvements that revitalize the economy),
- Completing damage assessments and enforcing strict compliance with floodplain development regulations as re-construction occurs,
- Initiating buy-outs of flood-prone properties and designating them community open space, and
- Widening or elevating bridges or roadways that improves both residents' access to employment areas and evacuation routes.

A long-term recovery plan benefits an affected community and improves the effectiveness of recover assistance from state and federal agencies. A long-term recovery program includes both a process and a product. Key benefits of a long-term recovery program include:

- Organization: the program provides a consistent approach to recovery and promotes cooperation and coordination among federal, state, and local officials.
- Focus: provides a clear path for recovery.
- Community-Driven: involves and engages the community in the process.
- Hazard Mitigation: provides an opportunity to incorporate hazard mitigation in the recovery effort to eliminate or decrease exposure to damage in future disasters.
- Community Healing: provides opportunities for residents to join together as a community to vent their concerns, meet with one another, and be involved in defining and creating their future.
- Look Beyond Tomorrow: takes the community and federal/state agencies beyond response and into the recovery process.
- Partnerships: fosters cooperation and coordination among federal, state, and local agencies and organizations, both public and private.
- New Participants: creates an opportunity to bring in new participants and new leaders from non-traditional sectors within the community.
- Empowerment: provides an opportunity for the community to take control of its future and facilitate its recovery.

A long-term recovery plan provides a road map to community recovery, where the journey is as important as the destination. A primary goal of the Coalition should be to ensure that communities within the watershed recovery wisely and plan for future flood loss reduction in the face of population growth and climate uncertainty within the watershed.

Future flood damage reduction

Some of the activities discussed under flood response and flood protection also play a role in future flood damage reduction.

The connection between land use planning and reducing future flood losses must be made if communities wish to become more resilient to future flooding. FEMA floodplain maps are a tool that illustrate the flood risk at the time the maps and analysis were completed. Comprehensive land use plans can identify future flood risk and identify safe growth areas. Planning and zoning can be used to protect floodplains and other environmentally sensitive areas. The Lake County plan, *Interconnections, Overview Summary-June 2005*, promotes the use of conservation development, "a system where half of the buildable land in a residential subdivision is plotted for housing, with up to one-fourth set apart for active recreation and the last quarter left as relatively undisturbed open space."

The coalition can take the following actions to help achieve future flood-damage reduction in the watershed:

- Develop maps for the more frequent flood events, such as the 10-year and 25-year, to prioritize mitigation efforts to those structures at the highest risk.
- Recommend higher regulatory standards to reduce stormwater runoff and increase flood resilience.
- Host meetings with local planners and public officials to encourage the integration of comprehensive land use plans and hazard mitigation plans, identifying future growth areas away from high-hazard locations and allowing for flexibility in the design of developments to reduce flood damage potential.
- Prepare a report on the history of ice jam flooding, detailing the location, extent, elevation, and frequency of historical ice jams with appropriate mapping products.
- Hold grant-writing seminars to increase local grant funding for buyouts and infrastructure projects.
- Coordinate efforts with Wisconsin Department of Natural Resources to look for opportunities to reduce flooding

Floodplain management education

Flood control structures, mitigation projects, and planning will never completely protect the Fox River watershed from all flooding. As conditions change and populations increase, people will remain at risk. Therefore, floodplain management education is a critical factor in flood loss reduction. Floodplain management education helps people learn what to do before, during and after a flood emergency.

Within the Fox River watershed there has been considerable action in community disaster education, especially when compared with other watersheds within Illinois. Historically, flood education programs have been poorly designed and delivered in a relatively ineffective "top-down" manner from federal or state agencies. With the advent of internet resources and social media, many communities within the watershed have taken a new approach to flood education by broadening the focus from increasing awareness and preparedness to building flood resilient communities at the local level. There has been relatively little research into the most effective local flood education programs and learning activities. However, some common themes have emerged after past disasters show that people learn best when there is:

- Strong participation by residents in the design, implementation and evaluation of community floodplain education programs.
- A focus on community resilience including learning about preparedness and building locally based capabilities.
- Linkages with other disaster mitigation and resilience-building plans and methods, such as emergency management plans.
- A priority to reduce flood risks and keep people safe, which encouraging community growth.

The CRS communities in the watershed, such as the Village of Carpentersville, can provide mentorship to other communities. The Floodplain Information page on the Village's website is an example for other communities (Figure 2.25). Links are provided to two USGS gages and additional information is provided including flood safety, flood insurance and property protection.

Within the Fox River Watershed, the newly-developed Coalition has a unique ability to develop and promote local watershed-based flood education programs. These education programs could include:

- Open houses at the Stratton Lock and Dam;
- Local officials training on floodplain management regulations;
- Retrofitting and sandbagging seminars;
- Flood insurance seminars for agents, lenders, and realtors; and
- Uniform and effective website development for the counties and communities in the watershed. Websites should include a variety of resources to assist individuals with flood preparedness and flood recovery.

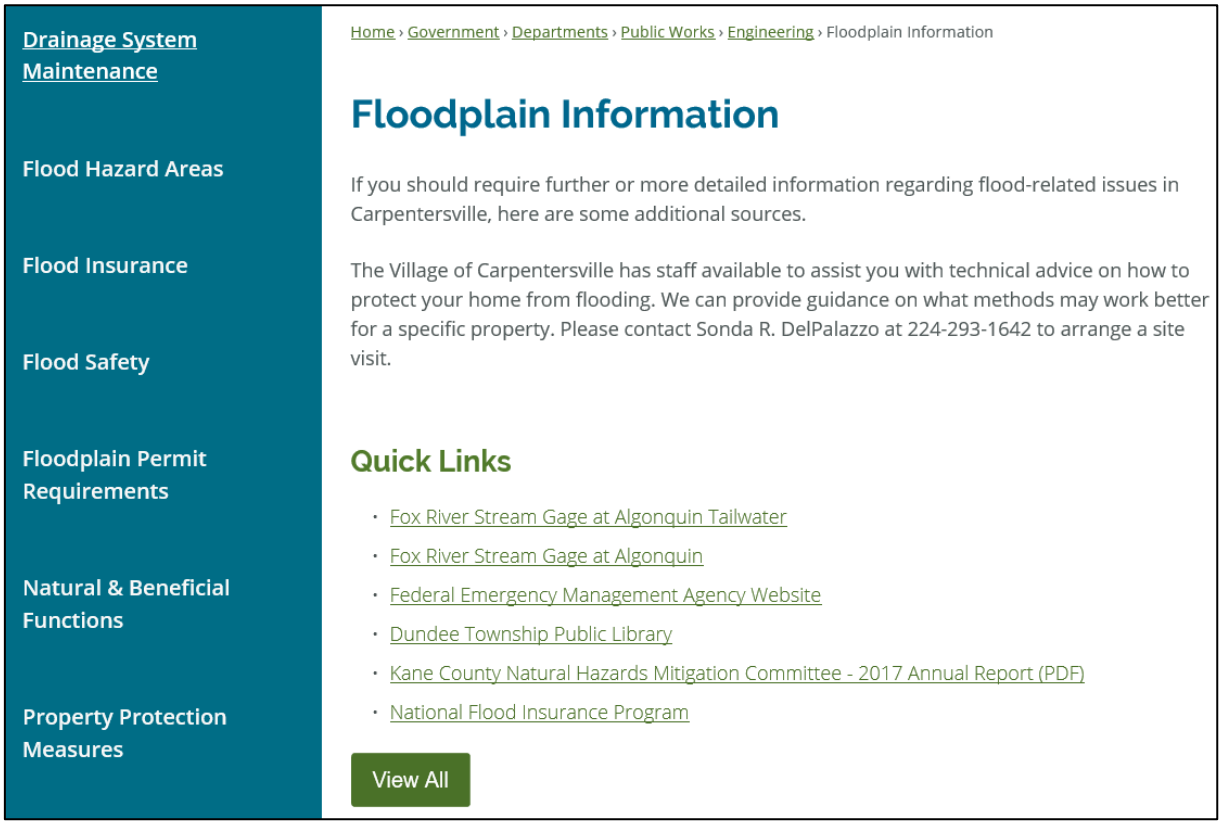

Figure 2.25 Village of Carpentersville Flood Information webpage

2.4 Basic Structure of a Coalition

A coalition, as defined in the *Cambridge English Dictionary*, is "a group of different organizations or people who agree to act together, usually temporarily, to achieve something". The Act requires the commission to outline a basic structure for a coalition of communities in the watershed to "jointly leverage community resources and collaborate on flood preparedness, flood protection, flood response, flood recovery; future flood damage reduction and necessary floodplain management education."

At the September 12, 2019 Commission meeting, an ad hoc or informal structure was chosen for the Coalition. Membership will initially consist of the Fox Waterway Agency and one representative from each of the eleven counties in the watershed that wish to participate. The Commission voted the Fox Waterway Agency to act as the administrator or lead agency to convene the group and distribute e-mails.

In Illinois, the Fox River watershed includes portions of the eleven counties (Table 2.16). The total area of the watershed in Illinois is about 1720 square miles. The area of the watershed in each county varies from 30 sq. mi. or less in DuPage, Grundy, Lee, and Will counties to 300 sq.

mi. or more in Kane, LaSalle, and McHenry counties. Counties with very little drainage area in the watershed, such as Grundy and Will; or predominately rural areas, such as Lee and Grundy, may choose not to participate in the Coalition.

Table 2.16 Area of Counties in the Watershed	
County	**Watershed Area (mi^2)**
Cook	76.7
DeKalb	243.7
DuPage	30.5
Grundy	0.7
Kane	385.5
Kendall	165.5
Lake	164.7
LaSalle	323.1
Lee	27.2
McHenry	301.3
Will	2.0

Over time, the Coalition will need to establish a structure to make progress on flood control and floodplain management. A structure will define the roles of the leadership and members, rules or by-laws, and voting procedures. The use of task forces and regularly scheduled meeting can help divide the work load and ensure that progress is made.

Coalition leadership can take different forms but typically a Steering Committee, Board of Directors, or an Executive Committee. Decision may be made by consensus, voting by all members, or voting by a board or executive committee. It is important that all members feel ownership in the process and decisions.

Membership may be expanded, or stakeholders can play a role in task groups or as advisory members. Membership or other stakeholders could include local and county stormwater and emergency management staff, state and federal agencies, local political leaders, recreational groups, environmental groups, business owners, and property owners.

2.5 Benefits of Forming a Coalition

Coalitions are useful for accomplishing a broad range of goals that reach beyond the capacity of any individual member organization. These goals range from information sharing to coordination of services, from community education to advocacy for major environmental or policy (regulatory) changes.

A coalition offer numerous advantages over working independently. Coalitions can:

- Conserve resources.
- Achieve more widespread reach within a community than any single organization could attain.
- Accomplish objectives beyond the scope of any single organization.
- Provide greater credibility than individual organizations.
- Provide a forum for sharing information.
- Provide a range of advice and perspectives to the lead agency.
- Foster personal satisfaction and help members to understand their jobs in a broader perspective.
- Foster cooperation between grassroots organizations, community members, and/or diverse sectors of a large organization.

The Illinois River Flood Alliance has achieved numerous benefits in developing a resiliency plan for the region. The communities are working on uniform flood damage prevention ordinances that fit their specific needs, restrictive zoning, and storm water regulations. As a direct result of the alliance, there are also now 24 new Certified Floodplain Managers in the 38th Senate district. The alliance members have developed a good relationship and friendship with federal agencies and leaders in flood prevention. The communities have jointly written grant applications that have resulted in over $10 million in mitigation grants from FEMA to upgrade and protect area water plants from flooding.

Direct benefits to the taxpayer

The Fox River Coalition could also see direct financial benefits as a result of their leadership and actions. Not all benefits will be as tangible as others, such as mentorship or implementing best practices learned through coalition participation as compared to reducing a flood insurance premium.

The following benefits are just some that could be realized through the Coalition:

- Reducing flood losses by having more flood-fighting experts throughout the watershed to assist residents with protecting their properties.
- Providing the ability to leverage grant applications and secure flood mitigation funding.
- Securing additional resources for new floodplain studies and mapping through advocacy to federal agencies.
- Increasing the number of CRS communities to help lower flood insurance premiums.
- Combining public education outreach efforts to better cost share.

- Developing intergovernmental agreements to cost-share resources such as equipment or personnel.
- Increasing the number of rain and river stage gages to improve flood forecasting.
- Sharing knowledge of best practices to reduce costs in other communities for floodplain management activities.
- Increasing understanding of floodplain management, including the number of Certified Floodplain Managers in the watershed, to increase compliance with floodplain regulations to reduce future damages.

2.6 Implementation Strategy and Schedule for a coalition

To build an effective coalition, the objectives, key policy or legislative goals, and community needs must be defined. Through the Commission meeting, discussions, and activities outlined in this report, it is clear that "flood control" is too broad of an objective to set initial goals. A preliminary set of goals and activities should be developed to achieve early success while the Coalition works on the long-term objectives and goals. The Coalition should continue to meet on a quarterly basis at a minimum or more frequently as needed.

Members of the Illinois River Alliance have met quarterly to set strategies, discuss best practices, education and outreach, and strategies for flooding. Specific activities conducted by the group include:

- Floodplain 101 and Elevation Certificate training conducted by IDNR
- Mitigation grant training conducted by the IEMA and Northcentral Illinois Council of Governments.
- "Flood Fighting School" held by the U.S. Army Corp of Engineers, LaSalle County Emergency Management, the City of Ottawa, and dozens of other community leaders. Participants learned about proper sandbag preparation, how to build earth levees, common failure modes, and what new materials and technology are available that can make fighting floods easier, requiring less man power.

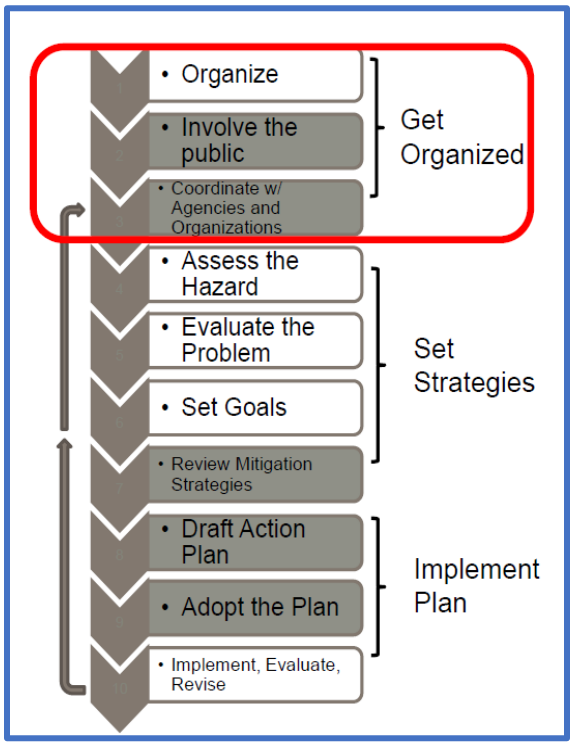

Figure 2.26 FEMA 10-Step Plan

The use of the FEMA 10-step planning process may be utilized to structure Coalition meetings. The steps include public involvement, evaluating the flooding, setting goals, and adopting a plan (Figure 2.26). This process is also followed by communities in FEMA's Community Rating System (CRS) when developing flood mitigation plans. Use of this program may allow for any CRS communities participating to receive credit for the plan.

Appendix A: Public Act 100-0730

SB3134 Enrolled LRB100 19802 LNS 35078 b

AN ACT concerning flood control.

Be it enacted by the People of the State of Illinois, represented in the General Assembly:

Section 5. The Flood Control Act of 1945 is amended by adding Section 8.5 as follows:

(615 ILCS 15/8.5 new)

Sec. 8.5. Flood Control Commission.

(a) The Flood Control Commission is created to study and develop an integrated floodplain management coalition of communities in the Fox River Watershed to serve as an example and catalyst to other watershed communities in the DuPage, Kane, Lake, McHenry, and Will County region to jointly leverage community resources and collaborate on flood preparedness, flood protection, flood response, flood recovery, future flood damage reduction, and necessary floodplain management education to mitigate future flooding events, prevent property damage and threats to public health, and save taxpayer money.

(b) The Commission shall be chaired by the Director of Natural Resources or his or her designee and consist of the following members:

(1) 5 members appointed by the President of the Senate;

(2) 5 members appointed by the Minority Leader of the Senate;

(3) 5 members appointed by the Speaker of the House of Representatives;

(4) 5 members appointed by the Minority Leader of the House of Representatives;

(5) one member appointed by the chairman of the county board with the advice and consent of the county board from the DuPage County Stormwater Management Planning Committee;

(6) one member appointed by the chairman of the county board with the advice and consent of the county board from the Kane County Stormwater Management Planning Committee;

(7) one member appointed by the chairman of the county board with the advice and consent of the county board from the Lake County Stormwater Management Planning Committee;

(8) one member appointed by the chairman of the county board with the advice and consent of the county board from the McHenry County Stormwater Management Planning Committee;

(9) one member appointed by the county executive of the county board with the advice and consent of the county board from the Will County Stormwater Management Planning Committee;

(10) one member appointed by the chairman of the county board with the advice and consent of the county board from a municipality in each of the following counties: (i) DuPage County; (ii) Kane County; (iii) Lake County; and

(iv) McHenry County;

(11) one member appointed by the county executive with the advice and consent of the county board from a municipality in Will County;

(12) the Governor or his or her designee; and

(13) the Director of the Illinois Emergency Management Agency or his or her designee.

(c) The Commission shall catalog current shortfalls in existing flood control practices in the Fox River Watershed. The Commission shall make suggestions for the improvement of such practices, including, but not limited to, the development of an example integrated floodplain management coalition of communities in the Fox River Watershed.

(d) The Commission shall conduct a survey and submit a report of the survey to the General Assembly by December 31, 2019. The report shall include, but is not limited to, the following information:

(1) the extent and character of the areas affected;

(2) current shortfalls in existing flood control practices in the Fox River Watershed;

(3) the basic structure of an integrated floodplain management coalition of communities in the Fox River Watershed to jointly leverage community resources and collaborate on flood preparedness, flood protection, flood response, flood recovery, future flood damage reduction, and necessary floodplain management education;

(4) a recommended strategy and schedule for implementing the coalition of communities in the Fox River Watershed;

(5) an explanation of how such a coalition could advance future flood damage reduction measures in the watershed; improve flood preparedness, flood protection, flood response, and flood recovery; and advocate necessary floodplain management education in the region;

(6) an explanation of how such a coalition could save taxpayer dollars; and

(7) a statement of special or local benefit that will accrue to communities participating in the coalition and a statement of general or statewide benefits, with recommendations as to what local cooperation, participation, and cost sharing shall be required, if any, on account of the special or local benefit.

The report to the General Assembly shall be filed with the Clerk of the House of Representatives and the Secretary of the Senate in electronic form only, in the manner that the Clerk and the Secretary shall direct.

(e) The Chicago Metropolitan Agency for Planning shall provide information to the Commission upon request.

(f) The Department of Natural Resources shall provide administrative support to the Commission.

(g) This Section is repealed on January 1, 2021.

Appendix B: Commission Agendas and Meeting Minutes

Fox River Flood Commission
Informational Meeting

February 27, 2019
10:30 am

Location: Illinois Department of Natural Resource
2050 West Stearns Road
Bartlett, IL 60103
Auditorium

Purpose: Inform Communities about the Fox River Flood Commission

1. Welcome – Loren Wobig, Director of IDNR Office of Water Resources
2. Introductions
3. Public Act 100-0730 Goals – Loren Wobig
4. Illinois River Flood Alliance – Mike Sutfin, City of Ottawa
5. Known Flood Damage Areas – Paul Osman and Rita Lee
6. Documentation of Flood Damages
7. Future Meetings
8. Adjournment

Meeting Name: Fox River Flood Commission—Informational Meeting

Date of Meeting: 2/27/2019

Time: 10:30 am

Location: Illinois Department of Natural Resources (IDNR) Region 2, Bartlett, Illinois

Purpose: Kickoff/Informational Meeting about the Fox River Flood Commission

Attendees: see attached list

Meeting Agenda: see attached

Meeting Minutes

- Welcome remarks by Loren Wobig, Director, IDNR Office of Water Resources
- Introductions
- Public Act 100-0730
  - Loren Wobig described the goals of the Public Act 100-0730
  - Act calls for the formation of a "Flood Control Commission"
  - Coalition of communities in the Fox River Watershed
  - Legislation identifies members of the commission—chaired by the IDNR Director
  - IDNR has to provide administrative support to the commission
  - Today's meeting is for informational purposes
  - Not recording or voting today
  - Need to understand critical flood issues and extent of areas impacted
  - Evaluate flood issues and develop goals and recommendations for commission
  - Submission of report by end of 2019
- Illinois River Flood Alliance, Mike Sutfin, Flood Plain Manager, City of Ottawa
  - Ottawa is a CRS Class 2 community
  - Ottawa had little flooding in 2013 after completing the requirements to join the CRS
  - 38Th Senate District had $150 million in flood damages from the 2013 flood
  - Senator Resin developed the Illinois Valley Flood Alliance to help the other communities manage their floodplain like Ottawa
    - Quarterly meetings were held to educate about floodplain management
    - Flood fighting response
    - Four goals of the Alliance:
      - Someone in the city must be a certified floodplain manager
      - Join the CRS
      - Adopt a higher regulatory standard
      - Join the IAFSM - state organization
    - Flood fighting plans
    - Coordination and coalition have many benefits
  - USACE has developed a template based on IDNR and Ottawa's methodology to develop a Flood Alliance
- Known Flood Damage Areas, Rita Lee, IDNR OWR
  - Identify the extent of flooding

- Fox River Watershed—long and narrow watershed
- Communities help identify known damage areas
- IEMA damage assessment
- Character of the flooding
    - Major flood—in the houses
    - Moderate – flooding of garages or outbuildings or approaching homes
    - Minor flood—flood of roadways and open areas

- Flood Insurance Claims, Paul Osman, IDNR OWR
    - Plot of flood insurance claims using GIS/Maps
    - Fox watershed—2300 claims, about $35 million in damages
    - 3 Areas with worst damages—Fox Lake, Aurora/Montgomery, Ottawa
    - Fox Lake – most of the damages on the Fox River and Chain of Lakes
        - Fox Lake has resolved their floodplain violations and reduced flood damages
    - Aurora/Montgomery – most of the damages are located on the tributary stream
    - Ottawa—one thing that made a big difference is buyouts after 2008
    - Buyouts are the ultimate flood damage reduction tool as the floodplain is left in open space
    - Flood assessment by IAFSM/RAFT team can help a community.
    - ICC coverage available through flood insurance to help elevate a building when it is substantially damaged.
- Next Steps
    - Rita Lee—First step is to identify and develop documentation of the extent and character of flooded areas
        - Identify flood prone areas
            - Take home today is to provide either a GIS file, address list, maps etc.
            - Identify what kind of flooding -yard flood, first floor, or urban flooding
        - Urban Flooding Storm is flooding away from a river such as street flooding or sewer backing up

    - Second step is to identify shortfall in the current flood control practices
        - Are we needing flood preparedness plan, flood warning system
        - Flood response and individual flood protection
        - Regulating floodplain developments
- Start brainstorming.
    - Mike Warner—underestimating floodplain as the Fox River FIS was developed in 1980's
    - Sally McConkey – new studies for the tributaries, mapping update, FEMA for more funding
    - Mike Hughes, Fox Lake resident, haven't heard about prevention
- Meeting Schedule, Loren Wobig
    - Four meetings April, June, August, and October
- Adjournment

Fox River Flood Commisssion
Informational Meeting
2/27/19 Meeting

Last	First	Organization	Email Address	Phone #
Ahmad	Munib	Office of Water Resources		
Altman	Steve	Office of Water Resources		
Anderson	Janice	City of Naperville		
Asseilmeier	Matt	Kendall County	[redacted]	630-553-4139
Brawley	Emy	The Conservation Fund	[redacted]	
Brolley	Matt	Village of Montgomery		
Bush	Sharon	Grand Victoria Foundation		
Colletti	Joanna	McHenry Co	[redacted]	815-334-4560
Davis	Sue	USACE- Chicago		
Duesing	Colin	Will County	[redacted]	815->>4.. 3350
Evasic	Kate	CMAP	[redacted]	312-386-8782
Gift	Brian	LaSalle County	[redacted]	
Haderlein	Lisa	Land Conservancy of McHenry Co		
Jereb	Gary	Office of Water Resources		
Keller	Joe	Fox Waterway Agency		
Lee	Rita	Office of Water Resources		
Lincoln	Scott	NWS Chicago	[redacted]	815-834-0600 x493
Linke	Rob	Kane Co Envir & Water Resource		
McConkey	Sally	ISWS	Sally McConkey [redacted]	
Osman	Paul	Office of Water Resources		
Palmieri	John	Office of Water Resources		
Pederson	Linda	Lake Co Board	[redacted]	

	Phipps	Drew	Fox River Ecosystem Partnership
	Pohlman	Rick	Office of Water Resources
√	Prochaska	Matthew	Kendall Co Board
√	Rudsell	Jarin	USACE - Rock Island
√	Schmidt	Donnie	Village of Fox Lake
	Schmidt	Joel	USACE - Chicago
	Skrukurd	Cindy	Fox River Study Group
√	Sucoe	Marilyn	Office of Water Resources
	Sutfin	Mike	Ottawa
√	Warner	Mike	Lake Co Stormwtr Mgmt Comm.
√	Winsauer	Liana	Office of Water Resources
√	Wobig	Loren	Office of Water Resources
√	Zay	Jim	DuPage Co Board-Strmwter Chair
√		"	" DIRECTOR
√			Fox River Ecosystem Partnership
√			Fox River Study Group
			Resident

Fox River Flood Commission
Meeting Agenda

April 17, 2019
10:00 am

Location: Illinois Department of Natural Resource
James Pate Philip State Park
2054 West Stearns Road
Bartlett, IL 60103
Auditorium

Purpose: Initiate of the Fox River Flood Commission

1. Welcome – Loren Wobig, Director of IDNR Office of Water Resources
2. Introductions
3. Review of Informational Meeting – Loren Wobig
4. Fox River FEMA Discovery Information – Sally McConkey
5. Flooding and Floodplain Management Survey and Map Websites – Rita Lee and Sally McConkey
6. New Floodplain Study Needs – Sally McConkey
7. Future Meetings
8. Adjournment

Meeting Name: Fox River Flood Commission Meeting

Date of Meeting: 4/17/2019

Time: 10:00 am

Location: Illinois Department of Natural Resources (IDNR) Region 2, Bartlett, Illinois

Purpose: Initial Meeting about the Fox River Flood Commission

Attendees: see attached list

Meeting Agenda: see attached

Meeting Minutes

- Welcome remarks by Loren Wobig, Director, IDNR Office of Water Resources
- Introductions
- Public Act 100-0730
  - Loren Wobig described the goals of the Public Act 100-0730
  - Act creates a "Flood Control Commission"
  - Created to study and develop integrated floodplain management coalition
  - Requires a report to the General Assembly by December 31, 2019
  - Legislation identifies members of the commission—chaired by the IDNR Director
  - IDNR has to provide administrative support to the commission
  - Report requirements:
    - Extend and Character of areas affected
    - Shortfalls in existing flood control practices
    - Flood Alliance for Fox River Communities
    - Strategy for implementation of Alliance
    - Floodplain Management Improvements
    - Taxpayer savings from Alliance
    - Community benefits from Alliance
  - Several Flood Alliances have been created in Illinois. Their formation can be used to suggest how this Alliance could be structured,
- Known Flood Damage Areas
  - Citizen contact for information of operations of Stratton and Algonquin Dams
  - Damage assessments completed post-flood to acquire Federal flood declaration
  - National Flood Insurance claims
- Floodplain Management Issues
  - Flood Insurance Maps for Fox River from the 1980s
  - Buyout of repetitive loss buildings
  - Elevation of homes to keep home from being damaged during a flood
  - Prepare flood response plans for local community
- Illinois River Valley Flood Alliance (IRVFA)
  - Initiated by Senator Resin following 2013 flood. Senator Resin saw that the City of Ottawa had little flood damages while other communities in her district suffered

extensive flood damages. Created to assist other communities in becoming more flood resilient.
    - Missions of IRVFA
    - Strategies of IRVFA
    - Implement Plan
    - Results of IRVFA
- FEMA Discovery – Illinois State Water Survey
    - Process to meet with communities and citizens to document available flood data
    - Upper Fox River completed in 2015 and Lower Fox River updated in 2015
    - Results and report are located on website: illinoisfloodmaps.org under Outreach tab
- FEMA Coordinated Needs Management Strategy (CNMS) - Illinois State Water Survey
    - Evaluation of Flood Insurance studies and mapping
    - Stream segments are categorized: validated, being studied, unverified, and assessed
    - Upper Fox River has 825 stream miles reviewed
    - Lower Fox River has 442 stream miles reviewed
    - Nippersink Creek has hydrologic model completed and 11 miles upstream of the confluence with Pistakee Lake will have new hydraulic modeling
    - Poplar Creek has new hydrologic model and 41 stream miles of new hydraulic modeling
    - Spring Creek has new hydrologic model and 18 stream miles of new hydraulic modeling
    - A limited flood assessment of Pistakee Lake shown current flood elevations were still valid.
- Survey preparation
    - OWR will have a survey on the Fox River Flood Commission website to request information on flooding and floodplain management needs.
    - 93 communities, townships, and counties will be sent emails to request participation on the survey.
    - The survey will link to web map application that Illinois State Water Survey developed.
    - Survey will request participants top 3 flood mitigation needs
    - Survey will be ready by June; hopefully in May
    - Develop a way to show which communities have completed survey
    - Preliminary survey data will be shared before next meeting
- Map Web Application
    - ISWS has developed a web application for communities to enter flood problems
    - Area is selected on a map, can be categorized for flood type, and a comment can be added.
    - Discovery and CMNS data can be shown in the application
    - National Flood Hazard Layer can be shown on the map
    - Help information is available on the map.
- Flood Damage Concerns
    - Disposal of contaminated sand bags after a flood
    - Removal of sand deposition after flood to restore floodplain storage
    - Need additional funding for buying out repetitive loss properties
- Floodplain Management Needs
    - Develop a factor to adjust base flood levels to account for increase in rainfall amounts.

    - Combined commission data with water quality from Fox River Study Group
    - Education of residents – i.e. use of other products to protect their buildings
- Fox River Flood Commission Website
    - Website has agenda, minutes, and presentations from previous meetings.
    - https://www.dnr.illinois.gov/WaterResources/Pages/Fox-River-Flood-Commission.aspx
- Next Meeting
    - Will be held in Aurora on June 19. Details will follow
    - Discuss data from the survey
    - Determine mission of the Alliance

- Adjournment

Fox River Flood Commisssion
Informational Meeting
2/27/19 Meeting

Last	First	Organization	Email Address	Phone #
Ahmad	Munib	Office of Water Resources		
Altman	Steve	Office of Water Resources		
Anderson	Janice	City of Naperville	[redacted]	
Asseilmeier	Matt	Kendall County	[redacted]	630-553-4139
Brawley	Emy	The Conservation Fund	[redacted]	
Brolley	Matt	Village of Montgomery		
Bush	Sharon	Grand Victoria Foundation		
Colletti	Joanna	McHenry Co	[redacted]	815-334-4560
Davis	Sue	USACE- Chicago		
Duesing	Colin	Will County	[redacted]	815->>4-3386
Evasic	Kate	CMAP	[redacted]	312-386-8782
Gift	Brian	LaSalle County	[redacted]	
Haderlein	Lisa	Land Conservancy of McHenry Co		
Jereb	Gary	Office of Water Resources		
Keller	Joe	Fox Waterway Agency		
Lee	Rita	Office of Water Resources		
Lincoln	Scott	NWS Chicago	[redacted]	815-834-0600 x493
Linke	Rob	Kane Co Envir & Water Resource		
McConkey	Sally	ISWS	[redacted]	
Osman	Paul	Office of Water Resources		
Palmieri	John	Office of Water Resources		
Pederson	Linda	Lake Co Board	[redacted]	

Phipps	Drew	Fox River Ecosystem Partnership
Pohlman	Rick	Office of Water Resources
Prochaska	Matthew	Kendall Co Board
Rudsell	Jarin	USACE - Rock Island
Schmidt	Donnie	Village of Fox Lake
Schmidt	Joel	USACE - Chicago
Skrukurd	Cindy	Fox River Study Group
Sucoe	Marilyn	Office of Water Resources
Sutfin	Mike	Ottawa
Warner	Mike	Lake Co Stormwtr Mgmt Comm.
Winsauer	Liana	Office of Water Resources
Wobig	Loren	Office of Water Resources
Zay	Jim	DuPage Co Board-Strmwter Chair
[redacted]	"	" DIRECTOR
[redacted]		Fox River Ecosystem Partnership
[redacted]		Fox River Study Group
[redacted]		Resident

Fox River Flood Control Commission
Meeting Agenda
June 19, 2019
10:00 a.m.

Location:

Aurora City Hall
44 E. Downer Place
Aurora, IL 60505
5th Floor Conference Room

I. Welcome – Loren Wobig, IDNR Office of Water Resources

II. Introductions

III. Meeting minutes approval, February and April 2019

IV. Public Act 100-0730. Recap of Goals and Directives

V. Extent and Character of the Affected Areas – Survey results and insurance data

VI. Current Shortfalls in Existing Flood Control Practices in the Fox River Watershed.

VII. Small Group Discussion and Consensus on Primary Shortfalls.

VIII. Discussion on Basic Structure and Formation of an Alliance

IX. Next Steps – Meeting date, Topics, Assignments and Scheduling

X. Adjournment

Meeting Name: Fox River Flood Commission Meeting

Date of Meeting: 6/19/2019

Time: 10:00 am

Location: City Hall, Aurora, Illinois

Purpose: Initial Meeting about the Fox River Flood Commission

Attendees: see attached list (quorum not reached)

Meeting Agenda: see attached

Meeting Minutes

The meeting began at 10:10 am

Welcome and Introductions -Chair Loren Wobig, Director IDNR Office of Water Resources and Commission Chair began with a welcome and introductions

(Due to a lack of quorum February and April meeting minutes could not be approved.)

Public Act 100-0730. Recap of Goals and Directives - Steve Altman, IDNR, completed a:

- quick review of Public Act 100-0730, the status of the appointments and what is required by the act
- discussion of the status of appointments 20 of the 33 appointments have been made, making it difficult to achieve quorum as we need 17 committee members in attendance to take a vote
- discussion of what the act requires in the report, explaining that today's meeting would address:
  - Extent and Character of the Affected Areas – Survey results and insurance data
  - Current Shortfalls in Existing Flood Control Practices in the Fox River Watershed.
  - Small Group Discussion and Consensus on Primary Shortfalls.
  - Discussion on Basic Structure and Formation of an Alliance

Extent and Character of the Affected Areas – Survey results and insurance data - Steve Altman lead the discussion on existing data sources showing the extent and character of the watershed. The following sources of data were discussed:

- watershed mapping
- Fox River survey findings
- comments on ISWS website combined with comments from FEMA Risk Map Discovery process
- FEMA Risk Map discovery reports and data
- flood insurance claims data including repetitive loss properties
- Letters of Map Change plot on floodplain maps to indicate poor mapping
- floodplain maps and study dates
- county hazard mitigation plans
- zoning maps
- open space maps
- local repetitive loss area analysis
- Comprehensive plans

Discussed survey results. Only 14 communities had completed the survey with less providing comments on the interactive maps. The results would be discussed at the next meeting after more communities respond. Steve was asked about the survey and sending the survey to others. Steve agreed that the survey can be distributed to anyone to provide us with as much information as possible.

Current Shortfalls in Existing Flood Control Practices - Steve Altman and Marilyn Sucoe lead a discussion on existing flood control practices.

Fox River Dams - Commissioner Pete Wallers asked about the operations of Stratton Dam. Chair Loren Wobig again explained that the dam was not designed as a flood control facility. The dam provides very little flood control Lake County, explained 90,000 ac-ft of water and that the dam is quickly overcome. Steve Altman recalled the misconceptions both up and downstream of the dam. Marilyn Sucoe, IDNR asked for clarification on the statutory requirements for operating the dam for recreation on the Chain. Loren explained that an operations plan has been developed and is available on the IDNR website. Pete Wallers expressed concern with the lack of understanding along the river by residents and official as to the purpose and capabilities of the dam. Wesley Catoor, IDNR explained that Stratton has about 9 inches of storage versus 15 feet available in downstate dams. Also explained that this year they were never able to maintain any winter storage due to high lake levels.

Mapping – The floodplain mapping is outdated, and the rainfall calculations used at the time of the study are now considered to be low. Scott Lincoln with the NWS explained that their rainfall analysis shows increased rainfall of 15 to 20% that produces 50 to 60% increases in runoff but with urbanization they are finding an 80% increase in measured water in the river.

Urbanization – A question was asked about how urbanization and detention impact flooding. General discussion concluded that you only store so much runoff. Loren Wobig mentioned that NIPC's research showed that the timing of releases from detention can actually worsen flooding.

Rain gages - The group discussed the overall need for more rainfall gages. The NWS owns very few gages. The NWS operates a few gages with volunteer observers, USGS gages have a majority of the gages in the Fox River Basin. Mike Warner, Lake County and Scott Lincoln mentioned the loss of the rain gages in the watershed. Specifically, Scott Lincoln explained that many USGS gage are no longer working (vegetation growth affecting the data, etc.) so they just turn them off. Tony Charlton mention that DuPage County is paying USGS for helping them with the gages. DuPage County networks with waste water treatment plants and municipalities and once a year they calibrate the gages. Mike Warner expressed hope that this commission could help communities' partner to pay for the gages. Loren Wobig discussed that the report can discuss the importance and need for funding for a rain gage network. Having a network of partners can help keep the funding.

Zoning, stormwater codes etc. Joanne Colletti, McHenry County asked questions: How can we determine if our codes working? Are we seeing post-FIRM flooding? Are our freeboards high enough? Paul Osman mentioned that Illinois has the fewest post-FIRM claims but we could narrow down for the Fox River, how many post-FIRM flood claims we have versus pre-FIRM.

Detention basins - Marilyn Sucoe discussed issues with maintaining small detention basins and the fact that restrictors are often pulled. Loren Wobig mentioned that the Chain of Lakes are the basins for the upper Fox watershed but the lakes are surrounded by homes.

Pete Wallers asked if increasing the use of Best Management Practices (BMPs) to increase infiltration. Kane County code rewrite is looking at increasing BMP usage. Is that needed in other counties?

Sandbagging – Steve Altman asked about sandbagging. Who is paying for sandbagging? If these homes flooded would they be better off as they could be acquired and be eligible for buyout funds.

Tony Charlton discussed the need for comprehensive planning. Comprehensive regional planning was then discussed. There was a concern regarding the ability to find places for regional basins. Marilyn Sucoe raised concerns that most community comprehensive plans don't even address floodplain. It was also mentioned that each community's plan doesn't coordinate with other community plans around them. The watershed needs a watershed wide plan. Carolyn Schofield mentioned that comp. planning could be used to help concentrate buyouts instead of having the buyouts scattered.

Education – Joanna Colletti raised concerns about educating residents about elevation and buyouts. as a need for the watershed. Need to educate residents, the floodplain residents along the river and the lakes don't want to elevate and they don't want to take a buyout. This plan could talk about ….

Buyouts – Discussed as being piece meal. Loren discussed that the plan could target areas for buyout.

Hazard Mitigation Plans – Discussed that the county plans could be better.

Cost of Flooding was discussed.-How are the costs spread out after a flood? Flood insurance covers cost only for property owners with flood insurance. Hard costs after a flood are easier to quantify but then there are soft costs like stress and lost productivity that are hard to quantify. Discussed that it can be hard to get a disaster declaration unless Cook County is hit. Lake County didn't get a disaster from their recent flooding. Joanna Colletti mentioned that most of the homeowners sandbag but they are just a sandbag away from flooding.

Joe Keller, Fox River Agency has been asking to get some of the property taxes to come back to the watershed to help with open space preservation and buyouts. Could this commission be used to help get the money needed to for example buy quarries in the future for flood storage. Loren Wobig explained that the plan could discuss long range funding options.

Flood insurance was discussed as needed to help people recover but we don't have enough policies.

Next Meeting

Consensus was that the next meeting will be scheduled for September and an online poll will be used to select the best date. Planned location will be Aurora City Hall.

Adjournment – 12:20 pm

Fox River Flood Commisssion - Sign In Sheet

	Name	Organization	Email address	Meeting Attendance 6/19/19
Commission Members				
Governor	~~Joe~~ Jim Keller	Fox Waterway Agency	[redacted]	[redacted]
Speaker	Richard Keehner, Jr.	Village of Villa Park, Manager		
Speaker	James Murphy			[redacted]
House Minority	Matthew Prochaska	Kendall Co Board		
House Minority	Judy Martini	Lake Co Board		
House Minority	Carolyn Schofield			
Senate Minority	Linda Pederson	Lake Co Board		
Senate Minority	Craig Munson	Resident		
Senate Minority	Peter Wallers	EEI		[redacted]
DuPage Co	Jim Zay	DuPage Co Board - Stormwater Chair		
DuPage Co	Janice Anderson	City of Naperville		
Kane Co	Matt Brolley	Village of Montgomery		
Kane Co	Chris Kious	Kane County Board		[redacted]
Lake Co	Donnie Schmidt	Village of Fox Lake		
Lake Co	Mike Warner	Lake Co Stormwater Mgmt Commisssion		[redacted]
McHenry	Joanna Colletti	McHenry Co		
McHenry	Mark Kownik	Village of Cary, Mayor		
Will	Randy Jessen	Village of Plainfield		[redacted]
Will	Mark Phipps	City of Aurora (Fox River Ecosystem Partnership)		
IEMA Director/ Designee				
Chair	Loren Wobig	Office of Water Resources		

Municipal/County Staff				
	Matt Asselmeier	Kendall County	[redacted]	[redacted]
	Anthony Charlton	DuPage Co Stormwater Director		
	Colin Duesing	Will County		
	Brian Gift	LaSalle County		
	Rob Linke	Kane Co Environmental & Water Resources		
	Anne Wilford	Kane Co Environmental & Water Resources		[redacted]
	Jodie Wollnik	Kane Co Environmental & Water Resources		
IDNR Staff				
	Munib Ahmad	IDNR/OWR		[redacted]
	Steve Altman	IDNR/OWR		
	Bill Boyd	IDNR/OWR		
	Gary Jereb	IDNR/OWR		
	Paul Osman	IDNR/OWR		[redacted]
	John Palmieri	IDNR/OWR		
	Ted Penesis	IDNR Communications		
Co-Chair	Marilyn Sucoe	IDNR/OWR		[redacted]
	Liana Winsaur	IDNR/OWR		

Stakeholders and General Public				
	Megan Andrews	Fox River Study Group	[redacted]	
	Emy Brawley	The Conservation Fund		
	Sharon Bush	Grand Victoria Foundation		
	Sue Davis	USACE- Chicago		[redacted]
	Kate Evasic	CMAP		
	Lisa Haderlein	Land Conservancy of McHenry Co		
	John Kunio	Resident		
	Scott Lincoln	NWS Chicago		[redacted]
	Dan Lobbes	The Conservation Foundation		
	Sally McConkey	ISWS		
	Jeff Mengler	Fox River Ecosystem partnership		
	Jarin Rudsell	USACE - Rock Island		
	Joel Schmidt	USACE - Chicago		
	Cindy Skrukurd	Fox River Study Group		
	Mike Sutfin	Ottawa resident		
	[redacted]	DNR (Outreach)	[redacted]	
	[redacted]	LWUI		

Fox River Flood Control Commission
Meeting Agenda
September 12, 2019
1:00 p.m.

Location:

Bartlett Nature Center
James Pate Philip State Park
2054 West Stearns Road
Bartlett, IL 60103
Auditorium

I. Welcome and Introductions – Loren Wobig, IDNR OWR

II. Meeting minutes approval, February, April and June 2019 - Loren Wobig, IDNR OWR

III. Public Act 100-0730. Recap of Goals and Directives for new Members - Loren Wobig, IDNR - OWR

IV. Survey Results and Map Comments – Sally McConkey, ISWS and Marilyn Sucoe, IDNR-OWR

V. Recap of Current Shortfalls in Existing Flood Control Practices - Marilyn Sucoe, IDNR-OWR

VI. Long term Structure for the Coalition - Loren Wobig, IDNR OWR

VII. Purpose of the Coalition – Steve Altman, IDNR-OWR

Discuss how the Coalition could:

a. advance flood damage reduction measures?

b. improve flood preparedness, protection and response?

c. advocate for floodplain management education?

d. save taxpayer dollars?

e. benefit participating communities and the state?

VIII. Future meeting dates: Draft and Final Report - Marilyn Sucoe, IDNR-OWR

IX. Adjournment

Fox River Flood Commisssion - Sign In Sheet

	Name	Organization	Email address	Meeting Attendance 9/12/19
Commission Members				
Governor	Vacant			
Speaker	Richard Keehner, Jr.	Village of Villa Park, Manager	[redacted]	
Speaker	James Murphy	Resident		
Speaker	Brian Gift	LaSalle County		
Speaker	Rahat Bari	City of Batavia		
Speaker	Matthew Stafford	City of Ottawa		
House Minority	Joe Keller	Fox Waterway Agency		
House Minority	Matthew Prochaska	Kendall Co Board		
House Minority	Judy Martini	Lake Co Board		
House Minority	Carolyn Schofield	CMAP - McHenry Co Board		
Senate Pres	Jeff Frost	City of Carpentersvill		
Senate Pres	Corey Dixon	City of Elgin		
Senate Pres	John Laskowski	North Aurora		
Senate Pres	Bob Trueblood	Exec Director Fox River Water Rec District		
Senate Pres	Bill Liu	Resident		
Senate Minority	Linda Pedersen	Lake Co Board		
Senate Minority	Craig Munson	Resident, Chain of Lakes region		
Senate Minority	Anthony Charlton	DuPage Co Stormwater Director		
Senate Minority	Peter Wallers	Northwest Water Planning Alliance		
DuPage Co	Jim Zay	DuPage Co Board - Stormwater Chair		
DuPage Co	Janice Anderson	City of Naperville		

Kane Co	Matt Brolley	Village of Montgomery	[redacted]	[redacted]
Kane Co	Chris Kious	Kane County Board		
Lake Co	Donnie Schmidt	Village of Fox Lake		
Lake Co	Mike Warner	Lake Co Stormwater Mgmt Commisssion		
McHenry	Joanna Colletti	McHenry Co		
McHenry	Mark Kownik	Village of Cary, Mayor		
Will	Randy Jessen	Village of Plainfield		
Will				
IEMA Director/ Designee	Michael Borcky	IEMA Region 3 Coordinator	[redacted]	[redacted]
Chair	Loren Wobig	Office of Water Resources		

[redacted]

CITY OF GENEVA

JCFRWC

West Dundee

Culle

Municipal/County Staff	[redacted]	South Elgin	[redacted]	[redacted]
	Matt Asselmeier	Kendall County	[redacted]	[redacted]
	Colin Duesing	Will County		
	Rob Linke	Kane Co Environmental & Water Resources		
	Anne Wilford	Kane Co Environmental & Water Resources		
	Jodie Wollnik	Kane Co Environmental & Water Resources		
IDNR Staff				
	Munib Ahmad	IDNR/OWR	[redacted]	
	Steve Altman	IDNR/OWR		
	Bill Boyd	IDNR/OWR		
	Gary Jereb	IDNR/OWR		
	Paul Osman	IDNR/OWR		
	John Palmieri	IDNR/OWR		
	Ted Penesis	IDNR Communications		
Co-Chair	Marilyn Sucoe	IDNR/OWR		
	Liana Winsaur	IDNR/OWR		
[redacted]		City of St. Charles	[redacted]	[redacted]

B-23

Stakeholders and General Public				
	Megan Andrews	Fox River Study Group	[redacted]	
	Emy Brawley	The Conservation Fund		
	Sharon Bush	Grand Victoria Foundation		
	Sue Davis	USACE- Chicago	[redacted]	
	Kate Evasic	CMAP		
	Lisa Haderlein	Land Conservancy of McHenry Co		
	John Kunio	Resident		
	Scott Lincoln	NWS Chicago		
	Dan Lobbes	The Conservation Foundation		
✓	Sally McConkey	ISWS		
	Jeff Mengler	Fox River Ecosystem partnership		
	Jarin Rudsell	USACE - Rock Island		
	Joel Schmidt	USACE - Chicago		
	Cindy Skrukurd	Fox River Study Group		
	Mike Sutfin	Ottawa resident		
	David Poweleit	Jelkes Creek	[redacted]	
✓	Gary Mechanic	Friends of the Fox, 815.370.0026		
	Gary Swick	Friends of the Fox, 815.370.0027		
	Mark Phipps	City of Aurora (Fox River Ecosystem Partnership)		
	Siobhan Greene	League of Women Voters		

[redacted] FRSG [redacted]

Meeting Name: Fox River Flood Commission Meeting

Date of Meeting: 12/17/2019

Time: 10:00 am

Location: Bartlett Nature Center, Bartlett, Illinois

Purpose: Fox River Flood Commission

Attendees: see attached list (quorum reached)

Meeting Agenda: see attached

Meeting Minutes

The meeting began at 10 am.

Loren Wobig, Director IDNR Office of Water Resources and Commission Chair began with a welcome and everyone in attendance introduced themselves.

Chair Wobig then asked for approval of the September minutes. Chris Kious made a motion to approve the minutes, Corey Dixon seconded the motion. The Commission voted unanimously to approve the minutes.

Chair Wobig then confirmed that we had achieved quorum and explained to the commission members present that two members had requested electronic attendance due to a health issue and business meeting conflict. A rule to allow for their attendance, included with the agenda packet was then reviewed. Judy Martini motioned to approve the Rule for Participation in Meetings by Telephone Conference Call or Other Electronic Means and Corey Dixon seconded the motion. The Commission voted unanimously to approve the rule. The two commissioner, James Murphy and Carolyn Schofield, were then called and attended the remainder of the meeting by phone.

Chair Wobig led a discussion of the draft Fox River Commission Flood Report for Public Act 100-0730. Minor corrections and wordsmithing occurred throughout the document. Significant changes made to report included:

- The executive summary was revised to better detail the flood control shortfalls including comprehensive planning within Illinois and jointly with Wisconsin, educational outreach efforts, river and rainfall gages, public understanding of Algonquin and Stratton dams and regulations in the watershed.
- Correction on various job titles in Section 1.
- Character - Duplicate text was removed from the beginning of the section.
- Character – A profile of the river will be added along with an explanation of the river grades from the Chain of Lakes to Algonquin Dam.
- Fox River Dams – A majority of this section was rewritten by the commission members at the meeting. A reference to the profile will be added as it relates to the flow out of the Chain of Lakes and through the dams.

- Structural Control – A paragraph was added describing the limited use of Stratton Dam for structural flood control.
- Flood fighting – A reference to state law prohibiting extensive sandbagging without a disaster declaration was added.
- Floodplain Mapping and Studies – A discussion of the revised rainfall data, updated Bulletin 70, was included.
- Corrections were made to the summaries of countywide floodplain and stormwater regulations for Kane and McHenry counties and the statewide model stormwater ordinance.

Joanna Colletti motioned to approve the report as edited and Mike Warner seconded the motion. The Commission voted unanimously to approve the report.

Chair Wobig discussed IDNR plans to participate with the future Fox River Coalition on an open house at Stratton Dam to help educate the public on dam operations.

Joe Keller and Mike Warner expressed their thanks to the IDNR staff for their work in organizing the Commission and writing the report. He also asked for clarification on his future role with the Coalition. It was decided that he would help by contacting those involved in the Commission and facilitating the initial meetings. The Coalition would then need to decide how they would organize going forward.

The meeting was adjourned at 11:45 pm.

Fox River Flood Commisssion - Sign In Sheet

	Name	Organization	Email address	Meeting Attendance 12/17/19
Commission Members				
Governor	~~Vacant~~ [redacted]	IEMA		[redacted]
Speaker	Richard Keehner, Jr.	Village of Villa Park, Manager	[redacted]	
Speaker	James Murphy	Resident		[redacted]
Speaker	Brian Gift	LaSalle County		
Speaker	Rahat Bari	City of Batavia		x [redacted]
Speaker	Matthew Stafford	City of Ottawa		
House Minority	Joe Keller	Fox Waterway Agency		x [redacted]
House Minority	Matthew Prochaska	Kendall Co Board		
House Minority	Judy Martini	Lake Co Board		x
House Minority	Carolyn Schofield	CMAP - McHenry Co Board		
Senate Pres	Jeff Frost	City of Carpentersville		x
Senate Pres	Corey Dixon	City of Elgin		x
Senate Pres	John Laskowski	North Aurora		x [redacted]
Senate Pres	Bob Trueblood	Exec Director Fox River Water Rec District		x
Senate Pres	Bill Liu	Resident		
Senate Minority	Linda Pedersen	Lake Co Board		x [redacted]
Senate Minority	Craig Munson	Resident, Chain of Lakes region		
Senate Minority	Anthony Charlton	DuPage Co Stormwater Director		x [redacted]
Senate Minority	Peter Wallers	Northwest Water Planning Alliance		x
DuPage Co	Jim Zay	DuPage Co Board - Stormwater Chair		
DuPage Co	Janice Anderson	City of Naperville		

Kane Co	Matt Brolley	Village of Montgomery	[redacted]	
Kane Co	Chris Kious	Kane County Board		
Lake Co	Donnie Schmidt	Village of Fox Lake		x
Lake Co	Mike Warner	Lake Co Stormwater Mgmt Commisssion		x
McHenry	Joanna Colletti	McHenry Co		x
McHenry	Mark Kownik [redacted]	Village of Cary, Mayor		x
Will				
Will				
IEMA Director/ Designee	Michael Borcky	IEMA Region 3 Coordinator	[redacted]	
Chair	Loren Wobig	Office of Water Resources		

Municipal/County Staff				
	Matt Asselmeier	Kendall County	[redacted]	
	Colin Duesing	Will County		
	Rob Linke	Kane Co Environmental & Water Resources		
	Anne Wilford	Kane Co Environmental & Water Resources		[redacted]
	Carolyn Campbell	McHenry Co. Conservation District		
	Jodie Wollnik	Kane Co Environmental & Water Resources		
IDNR Staff				
	Munib Ahmad	IDNR/OWR	[redacted]	[redacted]
	Steve Altman	IDNR/OWR		
	Bill Boyd	IDNR/OWR		
	Gary Jereb	IDNR/OWR		
	Paul Osman	IDNR/OWR		[redacted]
	John Palmieri	IDNR/OWR		
	Ted Penesis	IDNR Communications		
Co-Chair	Marilyn Sucoe	IDNR/OWR		
	Liana Winsaur	IDNR/OWR		

[redacted] FRIENDS OF THE FOX

GEOSYNTEC

Geosyntec [redacted]

Stakeholders and General Public				
	Megan Andrews	Fox River Study Group	[redacted]	
	Emy Brawley	The Conservation Fund		
	Sharon Bush	Grand Victoria Foundation		
	Sue Davis	USACE- Chicago	[redacted]	
	Kate Evasic	CMAP		[redacted]
	Lisa Haderlein	Land Conservancy of McHenry Co		
	John Kunio	Resident		
	Scott Lincoln	NWS Chicago		[redacted]
	Dan Lobbes	The Conservation Foundation		
	Sally McConkey	ISWS		
	Jeff Mengler	Fox River Ecosystem partnership		
	Jarin Rudsell	USACE - Rock Island		
	Joel Schmidt	USACE - Chicago		
	Cindy Skrukurd	Fox River Study Group		
	Mike Sutfin	Ottawa resident		
	David Poweleit	Jelkes Creek	[redacted]	
	Gary Mechanic	Friends of the Fox, 815.370.0026		
	Gary Swick	Friends of the Fox, 815.370.0027		
	Mark Phipps	City of Aurora (Fox River Ecosystem Partnership)		[redacted]
	Siobhan Greene	League of Women Voters		
	Carolyn Campbell	McHenry Co. Conservation District		

[redacted] Village of Port Barrington [redacted]