

Discovery Report

Lake Erie Cattaraugus Watershed, HUC 04120102

Allegany, Cattaraugus, Erie and Wyoming Counties, New York*

**These counties span more than one watershed; please see the following page for a list of communities fully or partially located in the watershed. This report covers only the Cattaraugus Watershed in the State of New York.*

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FEMA

Federal Emergency Management Agency
Department of Homeland Security
26 Federal Plaza
New York, NY

Project Area Community List

This list includes all communities located fully or partially within the Cattaraugus Watershed. While all communities may be under consideration for a revised Federal Emergency Management Agency (FEMA) Flood Insurance Study (FIS) and/or Flood Insurance Rate Map (FIRM), it is important to note that not all communities will receive new/updated FEMA FISs or FIRMs as a result of this study.

Allegany County

*Centerville, Town of***

*Rushford, Town of***

Cattaraugus County

Ashford, Town of*

Cattaraugus, Village of

*Dayton, Town of***

Delevan, Village of

East Otto, Town of

*Ellicottville, Town of***

Farmersville, Town of*

Freedom, Town of*

Gowanda, Village of***

Machias, Town of*

Mansfield, Town of*

New Albion, Town of*

Otto, Town of

Perrysburg, Town of*

Perrysburg, Village of

Cattaraugus County (Continued)

Persia, Town of*

Yorkshire, Town of

Chautauqua County

Hanover, Town of*

Erie County

Brant, Town of*

Collins, Town of*

Concord, Town of*

Gowanda, Village of***

North Collins, Town of*

Sardinia, Town of*

Springville, Village of

Wyoming County

Arcade, Town of*

Arcade, Village of

*Eagle, Town of***

Java, Town of*

*Wethersfield, Town of***

**Partially within the Cattaraugus Watershed*

***Partially within the Cattaraugus Watershed, but not included in this Discovery Report due to inclusion within other Discovery processes, lack of flooding sources, and/or due to unpopulated area or development.*

****Dual-county community (Erie and Cattaraugus) considered part of Erie County for NFIP purposes and this Discovery process.*

Study Date

The information and data presented in this report is static and was current as October 2014, the date of initial submission.

For the Cattaraugus Watershed, the Discovery process began in the spring of 2014. Data collection, as detailed in Section V, was completed in August 2014. The in-person meetings were held on June 10th and 11th 2014. Additional details on meetings and stakeholder involvement can be found in Section IV of this report. Data collected in this report was available prior to August 2014. As applicable, dates of data creation are noted throughout the report.

Executive Summary

The Federal Emergency Management Agency (FEMA) Risk Mapping, Assessment, and Planning (Risk MAP) program helps communities identify, evaluate, and reduce their flood risk. FEMA, in coordination with the New York State Department of Environmental Conservation (NYSDEC), has completed Discovery, the first step in the Risk MAP process, for three Lake Erie watersheds. This report describes the Discovery process and results for the Cattaraugus Watershed.

Discovery is a process that helps communities identify risks and sustainable development methods and provides participants with an in-depth understanding of their watershed. The process involves conducting an assessment of existing flood hazard mapping needs throughout a watershed, and researching available information that may be of use to update Flood Insurance Rate Maps (FIRMs). In partnership with state and local officials, FEMA uses recommendations identified through the Discovery process to refine existing Risk MAP and FIRM products, as needed.

The basic structure of the Discovery Report follows a standard template to allow comparison between watersheds. This Discovery Report also summarizes FEMA's ongoing Great Lakes Coastal Flood Study (GLCFS). The GLCFS is a comprehensive study of coastal flood hazards for the shoreline along the Great Lakes Basin. The study is being performed by FEMA in cooperation with the U.S. Army Corps of Engineers (USACE), the Association of State Floodplain Managers, and other partners.

The Discovery process for the Lake Erie watersheds involved extensive basin-wide data collection and outreach efforts with stakeholders in each project area. The stakeholder group included representatives from FEMA, other federal agencies, state agencies, county and local governments, as well as watershed-based groups. A full list of stakeholders invited to participate in the Discovery process is available in Appendix H: *Pre-Discovery Mailing List and Invitation Letter*. Discovery stakeholder coordination in this watershed was achieved by several methods, including individual phone calls with local stakeholders, as well as pre-Discovery webinars. The pre-Discovery webinars held in August and September 2013 provided information about the Discovery process and discussed the flood mapping, mitigation, and planning needs of communities within the Cattaraugus Watershed. A record of meeting participants can be found in Appendix I: *Pre-Discovery Stakeholder Meetings* and a summary of the information collected can be found in Appendix J: *Kickoff Meeting Notes*.

Watershed stakeholders were encouraged to attend Discovery meetings to become engaged in the process. Discovery meetings were held in the morning on June 10, 2014 in Blasdell, New York for Erie County, in the afternoon on June 10, 2014 in Dunkirk, New York for Chautauqua County, and on June 11, 2014 in Springville, New York for Cattaraugus and Wyoming counties and the Seneca Nation of Indians. All relevant flood-related information was reviewed during these meetings. The meetings also allowed participants to discuss the watershed's future, and learn about the importance of mitigation planning and community outreach.

As a result of the Cattaraugus Discovery process, FEMA and NYSDEC, with the assistance of watershed stakeholders, identified needs (Table 24: *Summary of Community Floodplain Mapping Requests*) relating to specific flooding sources within the watershed. By obtaining a better understanding of existing local risk and mitigation actions already underway, FEMA was able to begin working with communities to identify new ways to take action to reduce flood risk and strengthen existing actions. During this project, multiple stakeholders noted a need for additional floodplain management and hazard mitigation training. Table 23 summarizes the training needs that were noted during Discovery. There is a general lack of understanding about the Community Rating System (CRS) program, its benefits, and how to join, which indicates a need for further outreach and training on this topic within the watershed, given its potential benefits.

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- Attachment 2: *Floodplain Construction Requirements in New York State*, NYSDEC Information Sheet
- Attachment 3: *Levee Certification vs. Accreditation*, FEMA Fact Sheet
- Attachment 4: *LOMA-LOMR-F*, FEMA Fact Sheet
- Attachment 5: *Joining the CRS Program*, FEMA Fact Sheet
- Attachment 6: *Coordinated Needs Management Strategy (CNMS)*, FEMA Fact Sheet

Appendices

- Appendix A: *Acronyms and Abbreviations*
- Appendix B: *Glossary of Terms*
- Appendix C: *Other Stakeholders in the Cattaraugus Watershed*
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I. Lake Erie Watershed Discovery Project Overview

The Federal Emergency Management Agency (FEMA) Risk Mapping, Assessment, and Planning, or Risk MAP, program helps communities identify, assess, and reduce their flood risk. Through Risk MAP, FEMA provides information to enhance local hazard mitigation plans, improve community outreach, and increase local resilience to floods.

Discovery is the first phase of the Risk MAP process. Prior to Discovery, a watershed is selected based on risk, need, available topographic data, and other factors. The data that FEMA has readily available is gathered and prepared at the national and regional level. For a complete picture of a community's flood risk, FEMA relies heavily on information and data provided by the community itself.

Throughout the Risk MAP process, FEMA engages and partners with states, local communities, and stakeholders to communicate risk. One of the goals of Risk MAP is to build awareness and understanding of risk to empower communities to take action to reduce that risk.

During the Lake Erie Watershed Discovery project, FEMA, NYSDEC, and partners:

- Gathered information about local flood risk and flood hazards;
- Reviewed mitigation plans to understand local mitigation capabilities, hazard risk assessments, and current or future mitigation activities;
- Supported communities within the watershed to develop a vision for the watershed's future;
- Collected information from communities about their flooding history, effective Flood Insurance Rate Map (FIRM) usability, development plans, daily operations, and stormwater and floodplain management activities;
- Used all information gathered to determine which areas of the watershed might require revised mapping, risk assessment, or mitigation planning assistance through a Risk MAP project; and
- Developed a Discovery Map and report that summarize and display the Discovery findings.

For definitions of terms and acronyms used throughout this Discovery report, refer to Appendix A: *Acronyms and Abbreviations* and Appendix B: *Glossary of Terms*.

Figure 1 provides an overview of the watersheds that have been included within the Lake Erie Discovery project. Three individual watershed Discovery reports have been concurrently developed and include six counties, one tribal community, and 81 individual communities. The Cattaraugus Watershed is shown in gold in Figure 1.

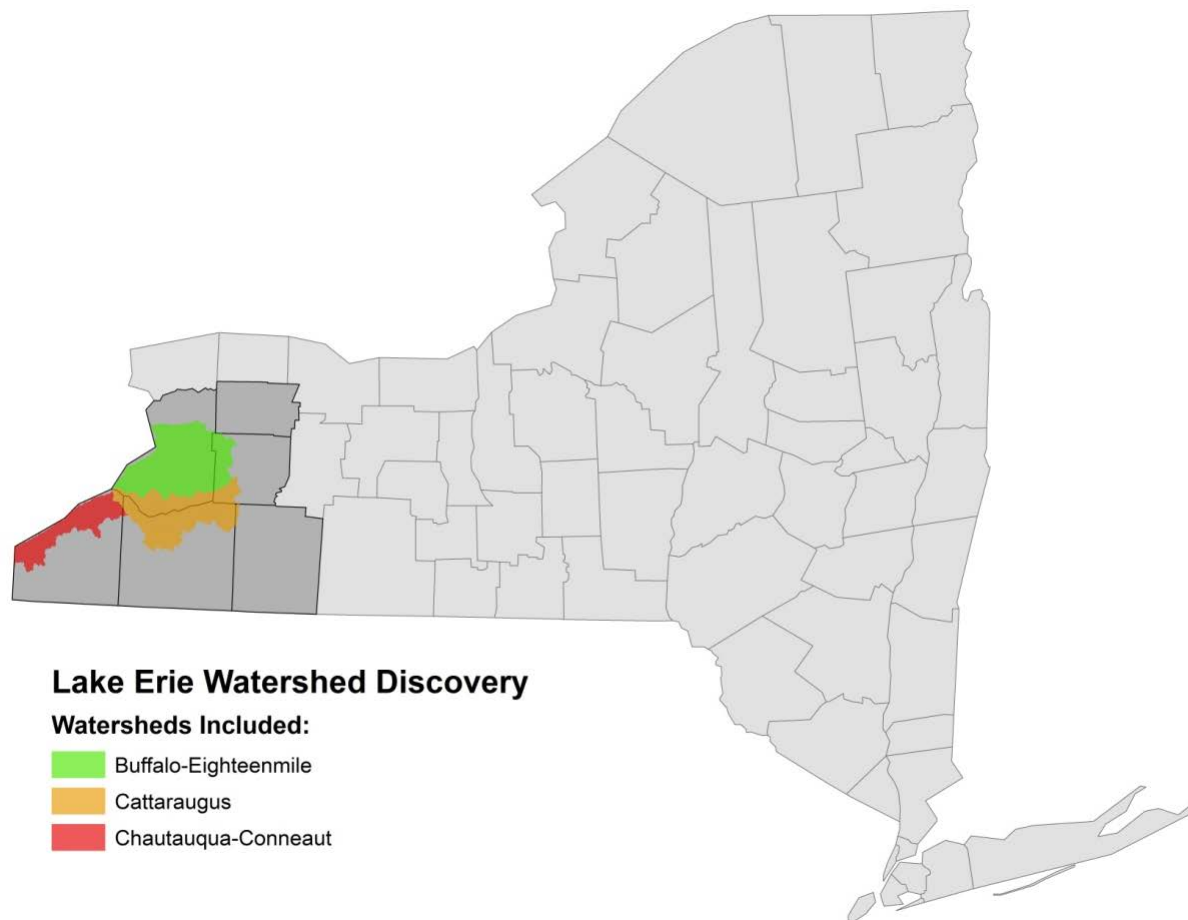


Figure 1: Lake Erie Watershed Discovery

Prior to the beginning of this Discovery project, FEMA had initiated a coastal analysis re-study for Lake Erie as part of a system-wide Great Lakes flood study. Additional details about that study are provided in the section below.

Great Lakes Coastal Flood Study

The current, effective FIRMs for the communities surrounding the Great Lakes are outdated in terms of age and the methodologies used in the coastal analysis used to produce them. There have been major changes to the National Flood Insurance Program (NFIP) policies and updates to the FEMA guidelines and standards used to complete coastal flood studies since the effective date of many of the area's Flood Insurance Studies (FISs).

FEMA shows VE zones on FIRMs to designate areas that are at greater risk from high velocity wave action and/or wave runup/overtopping. In such areas, significant damage to structures along the coastline can occur. These zones have been mapped nationwide in coastal regions bordering the Atlantic Ocean, Pacific Ocean and Gulf of Mexico, however to date, VE Zones have not been mapped along the Great Lakes shorelines. Because the types of major storm events that impact the Great Lakes region are different when compared to those that impact other U.S.

shorelines, an independent body was convened to evaluate whether VE Zones are appropriate in the Great Lakes. This study was completed in early 2015 and did conclude that VE Zones are appropriate along the Great Lakes shorelines.

FEMA initiated the Great Lakes Coastal Flood Study (GLCFS) to evaluate the surge and wave hazards, as well as evaluate the mapping needs. The goal of the GLCFS is to update the coastal flood hazard information for Great Lakes coastal communities and help elevate risk awareness and stimulate mitigation actions in the region. The GLCFS is funded through the FEMA Risk MAP program. FEMA, the Association of State Floodplain Managers (ASFPM), state partners and FEMA contractors will collaborate in updating the coastal methodology and flood maps, as needed.

The Great Lakes is a hydraulic system best studied as an integrated system where related information is included in each separate lake study. As a result, the study will include a system-wide solution that provides a comprehensive analysis of past storm events. As part of the study, a revised coastal flood hazard analysis including a comprehensive storm surge study and overland wave analysis will be completed and coastal hazard work maps will be produced. The results of the study, along with the needs of the communities as identified during the Discovery process, will determine whether updated FIRMs will be produced as part of the GLCFS.

Stakeholder Coordination

To begin the Discovery process, [NYSDEC](#)'s Floodplain Management Section along with Risk Assessment, Mapping, and Planning Partners [a joint venture between Dewberry, URS (now AECOM) and ESP] (RAMPP) compiled an extensive list of contact information for community officials within the watershed.

In an effort to gather as much feedback from as many public officials and jurisdictions as possible, local officials from individual communities and the counties were invited to online WebEx™-based discussions. The purpose of these WebEx™ sessions was to introduce the planning team, request feedback from the municipalities, counties, and regional groups within the project area, determine what additional local floodplain and hazard risk data were available, and determine who to include in the Discovery process. To further expand on this discussion, participants were asked to complete and return community data worksheets to supplement the discussion.

This initial contact was followed by in-person Discovery meetings held in the morning on June 10, 2014 in Blasdell, New York for Erie County, in the afternoon on June 10, 2014 in Dunkirk, New York for Chautauqua County, and on June 11, 2014 in Springville, New York for Cattaraugus and Wyoming counties and the Seneca Nation of Indians. All relevant flood-related information was reviewed during these meetings. The meetings also allowed participants to discuss the watershed's future, and learn about the importance of mitigation planning and community outreach. Detailed information about the Discovery meetings is provided in Section IV of this report.

Other Stakeholders

In addition to municipal officials, planning and emergency agencies, and local residents, there are others stakeholders with an interest in floodplain mapping and management. Major landowners, large employers, academic institutions, environmental, and sporting organizations

all have a role to play. These entities have valuable information to provide when developing both pre-mapping data and final mapping products.

An attempt to identify all relevant stakeholders in the watershed was made. The resulting list is shown in Appendix C: *Other Stakeholders in the Cattaraugus Watershed*.

Communication

Throughout this Discovery process, community representatives and local stakeholders expressed the desire to be kept informed about the results of Discovery, the GLCFS, and opportunities for public input throughout the study process. As a result of communication during the Discovery process, several new stakeholders were identified and added to the master contact database for this study.

II. Cattaraugus Watershed Overview

Geography

The Cattaraugus Watershed is located entirely within the southwest corner of New York State and has a land area of 553.4 square miles. As shown in Figure 2: *Cattaraugus Watershed Communities*, portions of Allegany, Cattaraugus, Chautauqua, Erie and Wyoming Counties lie within the watershed. It should be noted that although portions of Allegany County are included in the Cattaraugus Watershed, it is not included in this Discovery Report due to inclusion within other Discovery processes, lack of flooding sources, and/or due to unpopulated area or development.

Urban areas make up 1.8 percent of the watershed and include the villages of Arcade, Gowanda, and Springville, and Town of Arcade. Agriculture is spread out evenly across the watershed. Approximately 544 farms are located in the watershed and most of the operations are small to medium sized. Farm operations are almost evenly split into thirds with horses, milk cows and beef cows being the top three types of livestock raised. Dry hay and haylage are the predominant crops, followed by corn for grain or silage.

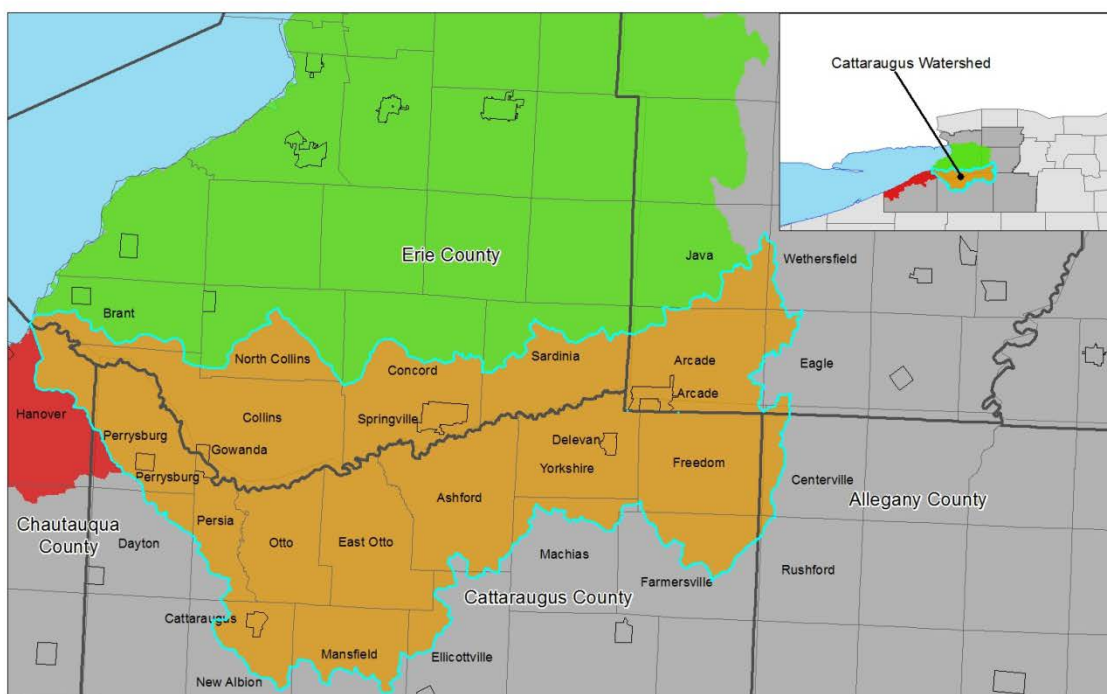


Figure 2: Cattaraugus Watershed Communities

Property Ownership

Land ownership in the watershed is diverse. Cattaraugus County is in the southwestern part of New York State, immediately north of the Pennsylvania border. The northern border of the county is formed by Cattaraugus Creek. According to the U.S. Census Bureau, the county has a total area of 1,308 square miles. According to the U.S. Department of Agriculture (USDA) 2007 Census of Agriculture, there are approximately 1,122 farms throughout Cattaraugus County consisting of 183,439 acres of farmland.

Chautauque County, in the southwestern corner of New York State, along the New York-Pennsylvania border, is the westernmost of New York's counties. Chautauque Lake is located in the center of the county, and Lake Erie is its northern border. According to the U.S. Census Bureau, the county has a total area of 1,060 square miles. According to the USDA 2007 Census of Agriculture, there are approximately 1,658 farms throughout Chautauque County consisting of 235,858 acres of farmland.

Erie County is in the western portion of New York State, bordering on the lake of the same name. It is the most populous county in New York State outside of the New York City metropolitan area. The County also lies on the international border between the United States and Canada, bordering the Province of Ontario. According to the U.S. Census Bureau, the county has a total area of 1,042 square miles. According to the USDA 2007 Census of Agriculture, there are approximately 1,215 farms throughout Erie County consisting of 149,356 acres of farmland.

Wyoming County is in the western part of New York State, east of Buffalo and slightly west and south of Rochester. The county is in the Holland Purchase Region. According to the U.S. Census Bureau, the county has a total area of 593 square miles. According to the USDA 2007

Census of Agriculture, there are approximately 761 farms throughout Wyoming County consisting of 218,028 acres of farmland.

The Cattaraugus Reservation is within the watershed and is held and governed as a sovereign territory of the Seneca Nation of Indians. The reservation is primarily located in Erie County. Smaller parts of the reservation are found in Cattaraugus County and Chautauqua County. According to the U.S. Census Bureau, the Indian reservation has a total area of 34.5 square miles (89.1 km²), of which 33.7 square miles (87.3 km²) is land and 0.6 square miles (1.9 km²) is water. Based on 2013 American Community Survey 2014 estimates, 840 housing units are located within the reservation, housing a population of 1,845.

More information on property ownership can be found on each county's Real Property webpage, as noted in Table 1.

Table 1: Links to County Real Property Webpages

County Name	Hyperlink to Real Property Webpage
Cattaraugus	http://www.cattco.org/real-property-and-gis
Chautauqua	http://chautauqua.ny.us/349/Real-Property-Tax
Erie	http://www2.erie.gov/ecrpts/index.php?q=real-property-parcel-search
Wyoming	http://www.wyomingco.net/real/main.html

Demographics

The Cattaraugus Watershed covers parts of 31 cities, towns, and villages. Chautauqua County is part of the Jamestown-Dunkirk-Fredonia Metropolitan Statistical Area. Cattaraugus County is part of the Olean Metropolitan Statistical Area. Erie County is part of the Buffalo-Cheektowaga-Niagara Falls Metropolitan Statistical Area. The distribution of population by county in the watershed can be seen in Table 2: *Approximate 2010 Population in the Cattaraugus Watershed*.

During the in-person Discovery meetings, several communities noted current and future development pressures near flooding sources, which have been included in Table 24: *Summary of Community Floodplain Mapping Requests*.

Table 2: Approximate 2010 Population in the Cattaraugus Watershed

County	Total County Population (2010 data)	Percent of County Population in Cattaraugus Watershed	2010 Estimated Population in the Cattaraugus Watershed (Based on % in watershed * Total Population)	Square Miles in Cattaraugus Watershed
Cattaraugus	80,317	20.91%	16,796	324.37
Chautauqua	134,905	0.95%	1,279	11.17
Erie	919,040	1.8%	16,540	158.32
Wyoming	42,155	10.33%	4,353	59.55
TOTAL	1,176,417	3.31%	38,968	553.41

Land Use

A comprehensive plan is a land-use document providing framework and policy direction for land-use decisions. Comprehensive plans usually include chapters detailing policy direction affecting land use, transportation, housing, capital facilities, utilities, and rural areas. Comprehensive plans identify where and how growth needs will be met. For the sake of floodplain management and hazard mitigation, a comprehensive land-use plan can be a powerful tool to guide the community to increased resilience.

While many of the communities in the watershed do not have comprehensive land use plans, links to those counties that have developed plans have been compiled in Table 3: *Links to County Land Use*.

Table 3: Links to County Land Use

County Name	Hyperlink to Land Use Webpage
Cattaraugus	http://www.cattco.org/planning
Chautauqua	http://www.planningchautauqua.com/index.html
Erie	http://www2.erie.gov/environment/
Wyoming	http://www.wyomingco.net/econ/main.html

Table 4: *U.S. Census 2010 and USDA Census of Agriculture 2007* summarizes the total population and land area based on the 2010 U.S. Census, and the number of farms and acres of farmland based on the USDA 2007 Census of Agriculture.

Table 4: U.S. Census 2010 and USDA Census of Agriculture 2007

County	Population	Land Area (Square Miles)	Farm Land (Acres)
Cattaraugus	80,317	1,308	183,439
Chautauqua	134,905	1,060	235,858
Erie	919,040	1,042	149,356
Wyoming	42,155	593	218,028

As was noted during the in-person Discovery meetings, growth in the watershed remains subdued for most communities. Construction of new homes and commercial properties continues at a slow pace and largely is in the form of the incremental conversion of summer cottages to year-round residences, and piecemeal, limited-scale housing developments. Despite the slow growth, continued vigilance must be maintained so that as development occurs, sound building practices are in place to protect lives and property within the watershed. Community specific information provided during these meetings has been summarized in Table 23: *Summary of Community Floodplain Mapping and Training Needs* and Table 24: *Summary of Community Floodplain Mapping Requests*.

NFIP Floodplain Development Criteria

The FIRM, which participating communities must officially adopt as part of their floodplain management ordinance, identifies the Special Flood Hazard Areas (SFHAs) in the community. The SFHA represent the areas that will be inundated by a flood event having a 1-percent annual chance of being equaled or exceeded in any given year. The 1 percent-annual-chance flood is also referred to as the base flood or 100-year flood.

Development may take place within the SFHA provided that the development complies with local floodplain management ordinances, which must meet the minimum federal requirements. Communities participating in the NFIP must adopt legally enforceable floodplain management measures that are compliant with 44 CFR §60.3 of the NFIP regulations. Requirements in 44 CFR §60.3 are based on the level of mapping that FEMA has provided to the community, that is, whether FEMA has designated SFHAs, BFEs, a regulatory floodway, and/or coastal high hazards on the community's FIRM. The regulatory floodway is the area identified on a FIRM that represents the portion of the floodplain that carries the majority of the flood flow and often is associated with high velocity flows and debris impact.

When issuing building permits for upgrades to homes located in the Special Flood Hazard Area (SFHA), it is important that local building and code officers understand the NFIP and state building requirements including the "substantial improvement" clause. "Substantial improvement" means any reconstruction, rehabilitation, addition, or other improvement of a structure, the cost of which equals or exceeds 50 percent of the market value of the structure before the "start of construction". Comprehensive guidance on building or rebuilding in a SFHA can be found in FEMA's *Substantial Improvement/Substantial Damage Desk Reference*. A summary of this publication and a link to where the publication can be found online is provided as Attachment 1 of this report.

The prevalence of smaller developments (often as limited as two building sites) planned across the watershed may be a challenge to effective floodplain management, as these micro-developments can easily slip through regulatory cracks. Local officials need to be aware that minimum New York State building codes and NFIP building standards must be met for construction in the SFHA. The NFIP also has additional regulations for projects within the approximate A Zone involving 50 lots or 5 acres, whichever is smaller (44 CFR §60.3(b)(3)). Information on the NFIP's building requirements in the SFHA can be found in the NYSDEC's report *Floodplain Construction Requirements in New York State*. A copy of this brochure can be found [online](#) or as Attachment 2 in the digital version of this report.

Municipal Separate Storm Sewer Systems (MS4s)

As noted on NYSDEC's website, Federal Stormwater Phase II regulations require permits for stormwater discharges from Municipal Separate Storm Sewer Systems (MS4s) in urban areas, and for construction activities that disturb one or more acres of land. To implement the law, NYSDEC has developed two general permits, one for MS4s in urbanized areas and one for construction activities. The permits are part of the State Pollutant Discharge Elimination System (SPDES). Operators of regulated MS4s and operators of construction activities must obtain permit coverage under either an individual SPDES permit or one of the general permits prior to commencement of construction.

Guidance for local officials on complying with state and federal stormwater management requirements, Minimum Measures 4 and 5 can be found on [NYSDEC's website](#). Detailed maps that depict where the regulated MS4 boundaries lie can be found on the [NYSDEC's website](#).

There have been no MS4 permits issued in the Cattaraugus Watershed as of August 2014.

III. Summary of Data Analysis

A large collection of tabular and spatial data was compiled for all communities from federal, state, and local sources. Community specific information was collected through pre-Discovery interactive mapping webinars with stakeholders and during the in-person Discovery meetings. This section is divided into three parts: data that can be used to develop Risk MAP flood risk products, flood risk and mapping data, and other information that helped the study team to better understand the study area.

Table 5: *Data Collected for the Cattaraugus Watershed*, lists the data products and the respective sources.

Table 5: Data Collected for the Cattaraugus Watershed

Data Types	Source
Average Annualized Loss (AAL) Data	Census 2010 and Hazus
Boundaries: Community	FEMA, NYSDEC
Boundaries: County and State	FEMA, NYSDEC
Boundaries: Watersheds	USGS, NYSDEC
Census Blocks	U.S. Census Bureau
Coastal Barrier Resource System (CBRS)	U.S. Fish and Wildlife Service

Table 5: Data Collected for the Cattaraugus Watershed

Data Types	Source
Contacts	Local websites, State/FEMA updates, NYSDEC
Community Assistance Visits	Community Information System
Community Rating System	FEMA's "Community Rating System Communities and Their Classes"
Coordinated Needs Management Strategy	FEMA
Critical Facilities vulnerable to Flooding	Local Mitigation Plans
Dams and/or Levees	USACE, NYSDEC
Declared Disasters	FEMA's "Disaster Declarations Summary"
Demographics, Industry	U.S. Census Bureau, Hazard Mitigation Plans
Effective Floodplains: Modernized SFHAs	FEMA's Mapping Service Center and Mapping Information Platform
Coastal Gage Data	USGS, NOAA CO-OPS
Hazard Mitigation Plans and Status	NYSDEC

Data that can be used for Flood Risk Products

During the Discovery process, a database of available flood hazard and flood risk assessment data was created. This database is an inventory of available data and helps identify flood hazard data gaps. State, county, and other government Geographic Information System (GIS) websites are a good place to start the data search, however local knowledge of flooding and mitigation projects is critical to accurately determine flood risks and mapping needs. Therefore, locally and regionally developed data were used where available.

Average Annualized Loss Data (AAL)

The AAL data provides a general understanding of the dollar losses associated with a certain flood event frequency within a county or community and are used to obtain a relative comparison of flood risk. This data is determined by using FEMA's Multi-Hazard Risk Assessment and Loss Estimation Program, otherwise known as Hazus-MH. The current Hazus-MH analysis is based on approximate flood boundaries and national datasets.

The Hazus Flood Model analyzes both riverine and coastal flood hazards. Flood hazard is defined by a relationship between depth of flooding and the annual chance of inundation to that depth. Probabilistic events are modeled by looking at the damage caused by an event that is likely to occur over a given period of time, known as a return period or recurrence interval (10, 25, 50, 100, and 500-year). Annualized losses are the summation of losses over all return periods multiplied by the probability of occurrence. Loss estimation for this Hazus module is based on specific input data. The first type of data includes square footage of buildings for specified building types. The second type of data includes information on the local economy that is used in estimating losses.

The countywide results for the Cattaraugus Watershed were obtained from the report called FEMA Hazus AAL Usability Analysis and are shown in Table 6: *2010 Hazus-MH AAL Data*. AAL data summarized at the census block level are shown on Discovery Maps. AAL data is also available in Appendix D: *FEMA Hazus-MH Average Annualized Loss (AAL)*.

Total losses for the communities included in the Cattaraugus Watershed are estimated at over \$44.9 billion for AAL. Cattaraugus Creek represents the majority of losses. The Town of Hanover, northern portion of the Town of Perrysburg, Town of Arcade, and Town of Yorkshire have the highest AAL losses along the Cattaraugus Creek. Mansfield Creek in the Town of Otto, and Elton Creek in the Town of Yorkshire and the Village of Delevan also have significant AAL estimates.

Table 6: 2010 Hazus-MH AAL Data

County	Community	Building Loss	Contents Loss	Total Loss*
Cattaraugus	Ashford, Town of	\$584,000	\$460,000	\$1,058,000
	Cattaraugus, Village of	\$287,000	\$193,000	\$486,000
	Delevan, Village of	\$1,369,000	\$1,518,000	\$3,001,000
	East Otto, Town of	\$733,000	\$695,000	\$1,467,000
	Farmersville, Town of	\$172,000	\$249,000	\$443,000
	Freedom, Town of	\$1,108,000	\$659,000	\$1,783,000
	Machias, Town of	\$207,000	\$148,000	\$366,000
	Mansfield, Town of	\$80,000	\$169,000	\$255,000
	New Albion, Town of	\$360,000	\$233,000	\$599,000
	Otto, Town of	\$589,000	\$676,000	\$1,308,000
	Perrysburg, Town of	\$744,000	\$799,000	\$1,656,000
	Perrysburg, Village of			
	Persia, Town of	\$3,492,000	\$5,441,000	\$9,350,000
	Yorkshire, Town of	\$4,074,000	\$5,984,000	\$10,793,000
Chautauqua	Hanover, Town of	\$3,152,000	\$3,485,000	\$6,803,000
Erie	Brant, Town of	\$403,000	\$304,000	\$715,000
	Collins, Town of	\$1,991,000	\$2,011,000	\$4,131,000
	Concord, Town of	\$502,000	\$404,000	\$919,000
	**Gowanda, Village of	\$3,335,000	\$5,364,000	\$9,114,000
	North Collins, Town of	No Loss Estimate Calculated		
	Sardinia, Town of	\$1,504,000	\$1,031,000	\$2,559,000
	Springville, Village of	No Loss Estimate Calculated		
Wyoming	Arcade, Town of	\$3,427,000	\$6,405,000	\$10,322,000
	Arcade, Village of	\$3,215,000	\$6,142,000	\$9,839,000
	Java, Town of	No Loss Estimate Calculated		
Total:		\$31,328,000	\$42,370,000	\$76,967,000

Source: FEMA HAZUS AAL Usability Analysis 2010

* Total Loss includes business disruption losses where applicable

**Dual-county community (Erie and Cattaraugus) considered part of Erie County for NFIP purposes and this Discovery process.

Gage Data

Stream Gages

According to the USGS, most USGS stream gages operate by measuring the elevation of the water in the river or stream and then converting the water elevation (called “stage”) to a stream flow (“discharge”) by using a curve that relates the elevation to a set of actual discharge measurements. This is done because current technology cannot accurately measure the direct flow of water. For more information on stream gages, please see the [USGS website](#).

There is one known currently active gage and four inactive gages in the watershed as shown in Figure 3: *Cattaraugus Watershed Stream Gages*. Table 7: *USGS Gages in the Cattaraugus Watershed* shows the gage identification number, location, drainage area, status, and county for all USGS gages identified in the Cattaraugus Watershed. Historical stream flow information from the USGS gages listed in Table 7 will be employed for use in hydrological analysis where applicable.

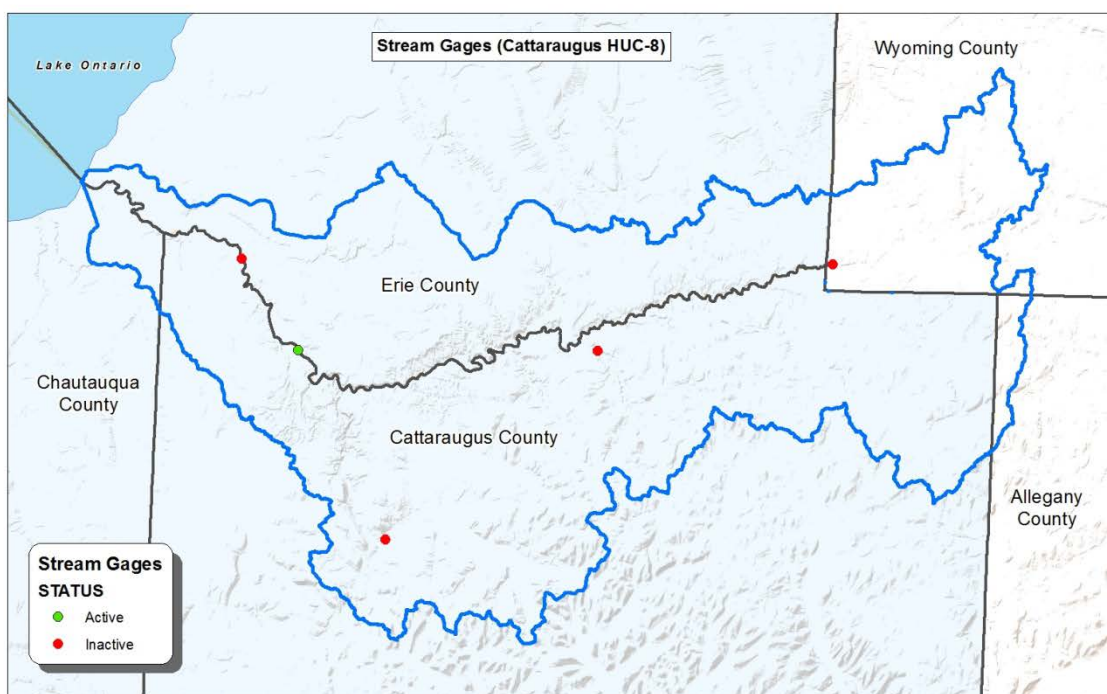


Figure 3: Cattaraugus Watershed Stream Gages

Table 7: USGS Gages in the Cattaraugus Watershed

Gage ID	Gage Location	Drainage Area (sq. miles)	Gage Status	County
04213492	South Branch Cattaraugus Creek near Cattaraugus NY	70.4	Inactive	Cattaraugus
04213500	Cattaraugus Creek at Gowanda NY	436	Active	Erie
04213450	Buttermilk Creek near Springville NY	30	Inactive	Cattaraugus
04214000	Cattaraugus Creek at Versailles NY	466	Inactive	Cattaraugus
04213410	Cattaraugus Creek near Arcade NY	79	Inactive	Wyoming

Rain Gages

The National Oceanic and Atmospheric Administration’s (NOAA) [Cooperative Observer Program](#) is a weather and climate observing network of more than 8,700 volunteers who take observations nationwide on farms, in urban and suburban areas, National Parks, seashores, and mountaintops. Within the five counties of the Cattaraugus Watershed, one location is currently active. When appropriate, FEMA will utilize the NOAA information from these gages in developing meteorological models for the watershed that will employ rainfall runoff models and calibration.

Additional information on rainfall in New York can be found in NOAA [Technical Paper No. 49](#) and in the Technical Memorandum [NWS HYDRO-35](#), both on NOAA’s website. Additional technical manuals and web-based tools including regional extreme rainfall maps and graphics are also available on the NRCS’. [Extreme Precipitation in New York and New England website](#).

Water Level Observations Network

The NOAA National Ocean Service is responsible for recording and disseminating water level data. The [National Data Buoy Center \(NDBC\)](#) is part of the NOAA National Weather Service (NWS). NDBC designs, develops, operates and maintains a United States network of data collecting buoys and coastal stations. NOAA Stations provides hourly data, including wind speed, direction, and gust; atmospheric pressure; and air temperature. No stations within the Great Lakes provide tidal information, as the tidal range is minimal. No NOAA gages are located within the Cattaraugus Watershed.

Levees and Dams

Levees

A levee or floodwall is defined in 44 CFR §59.1 as “a man-made structure, usually an earthen embankment, designed and constructed in accordance with sound engineering practices to contain, control, or divert the flow of water so as to provide protection from temporary flooding”. Levee certification and/or accreditation information can be found in Attachment 3: *Levee Certification vs. Accreditation*.

A review of current and preliminary FIRMs as of August 2014 finds that there are no identified levees in the study area.

Dams

According to the [NYSDEC's Dam Safety Section](#)'s dam inventory, the Cattaraugus Watershed contains 109 dam structures. The NYSDEC uses a classification scale of A-D and 0 (zero) to assign hazard potential to each of the dam structures contained within the inventory. The NYSDEC classifications of dams within the State of New York are as follows:

Class A-Low Hazard Potential: Resulting damages from a dam failure would likely be minimal and not interfere with any critical infrastructure; personal injury and substantial economic loss is unlikely to occur.

Class B-Intermediate Hazard Potential: A dam failure may result in damage to isolated homes, roads and railways; critical facilities may experience disruption; personal injury or substantial economic loss is likely, but loss of human life is not expected.

Class C-High Hazard Potential: Dam failure may result in widespread or serious damage to homes; damage to roads, railroads, commercial buildings and critical infrastructure is expected; loss of human life and substantial economic loss is expected.

Class D-Negligible or No Hazard Potential: Dam has been breached, removed or otherwise has failed or no longer materially impounds waters, or the dam was planned, but never constructed at this location. Class D dams are considered to be defunct dams posing negligible or no hazard.

Class 0-Unclassified Hazard Potential: Hazard code has not yet been assigned.

The locations of dams in the watershed are shown in Figure 4: *Dams in Cattaraugus Watershed*.

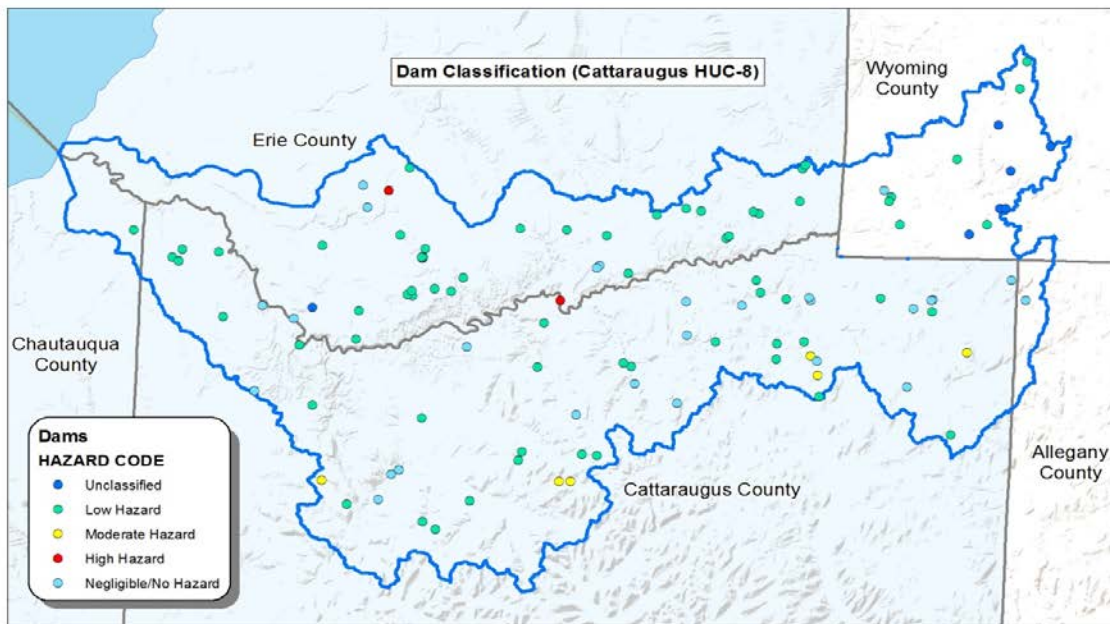


Figure 4: Dams in Cattaraugus Watershed.

Table 8: *Dams in the Cattaraugus Watershed* shows the classification of dams located in the Cattaraugus Watershed. According to NYSDEC’s Dam Safety Section’s dam files, many of the Class B and C dams have reports and studies available. There are 20 Class D dams within the study area and are considered to have no hazard potential. Detailed information is available in Appendix E: *Dams and Floodplain Structures*. Information includes inspection and certification dates, site plans, analysis (Hydrologic and Hydraulic), as-built drawings, Emergency Action Plans, applications and permits for maintenance, and correspondence related to each dam.

Table 8: Dams in the Cattaraugus Watershed

County	Class A	Class B	Class C	Class D	Class 0	Total
Cattaraugus	31	6	0	20	0	57
Chautauqua	1	0	0	1	0	2
Erie	29	0	2	5	0	36
Wyoming	7	0	0	1	5	13
Total	68	6	2	27	5	108

Streamlines/Hydrograph

Streamlines, when available, were obtained from the effective FIRM databases issued for the communities. Streamlines are paths made over a period of time that are in line with the direction of velocity and flow of water. By definition, a hydrograph is a plot of the rate of flow (discharge) versus time past a specific point in a river or channel. Discharge is the volume of water flowing past a location per unit time (usually in cubic feet per second (cfs)). These components are important to understand the location and severity of floods, forecasting floods, and enabling communities to plan, mitigate and prevent loss of life and property. For more information, visit the [NOAA website](#).

Topography

Topography is the description of surface features including elevation information. Topographic information can be generated in the form of Light Detection and Ranging (LiDAR) data. LiDAR is a state of the art method for collecting accurate topographic information using an instrument that measures distance to an object by emitting pulses of light via a laser. LiDAR elevation data are available for Erie County and the Great Lakes shoreline within Chautauqua County. More information on LiDAR data coverage for the State of New York is available at the GIS.NY.Gov website.

Sources of available LiDAR are the 2011 USACE Joint Airborne LiDAR Bathymetry Technical Center of Expertise (JALBTCX) and 2008 FEMA New York LiDAR. The 2011 USACE topographic dataset has a 2-meter point spacing with a 0.75-meter root-mean-square-error horizontal accuracy and a 20-centimeter root-mean-square-error vertical accuracy, and the 2008 FEMA LiDAR dataset has a 1.4-meter point spacing with a 1-meter root-mean-square-error horizontal accuracy and an 18.5-centimeter root-mean-square-error vertical accuracy.

Bathymetry

Bathymetry is the underwater equivalent to topography. The data used to make bathymetric maps today typically comes from an echo sounder (sonar) mounted beneath or over the side of a boat, "pinging" a beam of sound downward at the seafloor, or from remote sensing systems. The bathymetry is combined into a seamless Digital Elevation Model (DEM)/terrain and is used to determine the offshore component for the overland wave analysis/coastal hazard analysis and is also a necessary component to study storm surge.

Bathymetric data were compiled from multiple sources to provide complete coverage of the study area. The data sources used to create the bathymetric portion of the terrain are 2011 USACE JALBTCX, 2007 USACE JALBTCX, 1999 U.S. Geological Survey (USGS) National Elevation Dataset (NED) 1/3 arc-second ArcGrid, 1940 and 1980 National Oceanic and Atmospheric Administration (NOAA) National Ocean Service (NOS) Hydrographic Survey Data.

Shoreline Change Information

The study area has approximately 1 mile of shoreline along Lake Erie contained within Erie County. Portions of the shoreline may be vulnerable to coastal erosion through natural actions (runoff of surface water or groundwater seepage) and human intervention. Erosion is the loss of land near the coastline from exposure to water movement from wave action, currents, tides, wind driven water, ice, or other storm impacts. The coastline of Lake Erie is at risk to coastal erosion from natural and human activities and is regulated. These areas are currently mapped as coastal erosion hazard areas (CEHAs) and require a CEHA permit (Article 34 Part 505) for any regulated activity.

Coastal Barrier Resources System

The Coastal Barrier Resources Act (CBRA) of 1982 and (subsequent amendments) established the John H. Chafee Coastal Barrier Resources System (CBRS). The CBRS consists of undeveloped coastal barriers located along the Atlantic, Gulf of Mexico, Great Lakes, U.S. Virgin Islands, and Puerto Rico coasts. CBRS areas are generally depositional geologic features that are subject to wave, tidal, and wind energies; protect landward aquatic habitats from direct wave attack; and contain associated aquatic habitats, including adjacent wetlands, marshes, estuaries, inlets, and near shore waters. The law encourages the conservation of vulnerable, biologically rich coastal barriers by restricting federal expenditures that encourage development, such as federal flood insurance. CBRS areas are identified and depicted on a series of official maps entitled "John H. Chafee Coastal Barrier Resources System." These maps are controlling and form the basis of CBRS boundaries shown on FEMA FIRMs. The CBRS maps are maintained by the Department of the Interior through the U.S. Fish and Wildlife Service. Aside from three minor exceptions, only Congress has the authority to add or delete land from the CBRS and create new units. These exceptions include: (1) voluntary additions to the CBRS by property owners; (2) additions of excess federal property to the CBRS; and (3) the CBRA 5-year review requirement that solely considers changes that have occurred to System units by natural forces such as erosion and accretion. <http://www.fws.gov/cbra/index.html>

The CBRS contain two types of units, System units (e.g., NY-11) and Otherwise Protected Areas (OPAs). OPAs are denoted with a "P" at the end of the unit number (e.g., NY-11P). An

interactive CBRS Mapper is available to the public to help property owners, and the local, state and federal stakeholders to determine sites affected by CBRA at [CBRS Mapper](#).

There are no CBRS or OPA areas located within the Cattaraugus Watershed.

Coastal Zone Protection Structures

The USACE Enterprise Coastal Inventory Database houses information on over 900 coastal structures as well as associated inlet data across the United States. The coastal structures protect harbors and shore-based infrastructure, provide shoreline stability control, and protect coastal communities, roadways, and bridges. Coastal structures include seawalls, groins, bulkheads, revetments, dikes, levees, breakwaters, jetties, and piers. Due to the variability of long-term lake water levels from year to year, coastal structures designed and constructed during one particular lake level may not afford the same level of risk protection when lake levels either increase or decrease. Coastal structures should be evaluated for a range of lake water levels.

A coastal breakwater is located in the Cattaraugus Watershed at Cattaraugus Creek Harbor on the southern shore of Lake Erie in the Towns of Hanover and Brant.

Watershed Boundaries

As described by the USGS, the “United States is divided and sub-divided into successively smaller hydrologic units which are classified into four levels: regions, sub-regions, accounting units, and cataloging units. The hydrologic units are arranged within each other, from the smallest (cataloging units) to the largest (regions). Each hydrologic unit is identified by a unique hydrologic unit code (HUC) consisting of two to eight digits based on the four levels of classification in the hydrologic unit system.”

The Cattaraugus Watershed is a HUC-8 watershed. Figure 5 shows the boundaries of the Cattaraugus Watershed. The first two digits of the HUC are the code for the Regional Boundary (e.g., 04, for the Great Lakes Region). The next two digits of the HUC are the code for the Subregional boundary (e.g., 0412, Eastern Lake Erie). The next two digits are the code for the Accounting Unit (e.g., 041401, Cattaraugus Basin, New York). The next two digits of the HUC are the Cataloging Unit (e.g., 04120102, Cattaraugus). Table 9: *Cattaraugus Watershed* shows the HUC-8 code and the name for the watershed

Table 9: Cattaraugus Watershed

HUC 8 Code	Name
04120102	Cattaraugus

Regulatory Mapping

The Cattaraugus Watershed covers portions of five counties in New York, Allegany, Cattaraugus, Chautauqua, Erie and Wyoming, four of which have been included in this Watershed project. Although portions of Allegany County are included in the Cattaraugus Watershed, it is not included in this Discovery Report due to inclusion within other Discovery processes, lack of flooding sources, and/or due to unpopulated area or development. The mapping in place is largely made up of older community-based FIRMs.

The effective countywide FIS/FIRM dates for each of the participating communities is shown in Table 10: *FIS/FIRM Effective Dates*.

Table 10: FIS/FIRM Effective Dates (as of August 2014)

County	Coastal	Community	FIS/FIRM Effective Date	Notes
Cattaraugus	No	Ashford, Town of	5/25/1984	Community-based FISs ranging in date from 1982-1991.
		Cattaraugus, Village	4/20/1984	
		Delevan, Village	1/20/1984	
		East Otto, Town of	4/20/1984	
		Farmersville, Town of	7/23/1982	
		Freedom, Town of	8/19/1991	
		Machias, Town of	8/20/1982	
		Mansfield, Town of	5/25/1984	
		New Albion, Town of	12/3/1982	
		Otto, Town of	4/20/1984	
		Perrysburg, Town of	4/20/1984	
		Perrysburg, Village of	N/A**	
		Persia, Town of	4/20/1984	
		Yorkshire, Town of	5/25/1984	
Chautauqua	Yes	Hanover, Town of	12/18/1984	Community-based FIS
Erie	Yes	Brant, Town of	1/6/1984	Partial countywide Effective 9/26/2008. Community-based FISs range in date from 1984-2006.
	No	Collins, Town of	9/26/2008	
		Concord, Town of	9/4/1986	
		*Gowanda, Village of	9/26/2008	
		North Collins, Town of	N/A**	None
		Sardinia, Town of	1/16/2003	Partial countywide Effective 9/26/2008. Community-based FISs range in date from 1984-2006.
		Springville, Village of	7/17/1986	

Table 10: FIS/FIRM Effective Dates (as of August 2014)

County	Coastal	Community	FIS/FIRM Effective Date	Notes
Wyoming	No	Arcade, Town of	3/3/1992	Community-based FISs
		Arcade, Village of	3/3/1992	
		Java, Town of	12/23/1983	

* Dual-county community (Erie and Cattaraugus) considered part of Erie County for NFIP purposes and this Discovery process.

** No published FIS or FIRM for community.

Letters of Map Change (LOMC)

Due to limitations in the scale or topographic detail of the source maps used to prepare a FIRM, on occasion, small areas of elevated land may be included in an SFHA. When a property owner feels that this has occurred, they may request a LOMC for their property or structure.

A LOMC is the general term for a suite of methods FEMA uses to make an official flood hazard determination for a structure or property. The Letter of Map Amendment (LOMA), for properties on natural high ground and the Letter of Map Revision based on Fill (LOMR-F), for properties elevated by the placement of fill, are the most common ways used by property owners to amend the effective FIRM. These methods do not physically change the FIRM for a community; rather they amend, *by letter*, the FIRM and do not result in the publication of a revised FIRM panel. By comparison, a Letter of Map Revision (LOMR) is commonly used by community officials to request FIRM revisions stemming from completed development, flood-control projects, or other larger-scale changes. LOMRs physically revise a portion of a FIRM panel or panels and/or the Flood Insurance Study (FIS) report.

Table 11: *LOMCs in the Project Area* and Figure 6: *Location of LOMCs in the Cattaraugus Watershed* highlight the areas within the Cattaraugus Watershed that have LOMCs. There are 63 LOMAs/LOMR-F and no LOMRs located in the communities within Cattaraugus Watershed. Cattaraugus County has twelve of the LOMCs. Chautauqua County has five LOMAs/LOMR-Fs. Erie County has a total of nineteen LOMAs/LOMR-Fs, six of which are in the Town of Sardinia. Wyoming County has 26 LOMAs/LOMR-Fs, 22 of which are in the Village of Arcade.

More information on the LOMA and LOMR-F processes can be found on [FEMA's LOMC website](#) or by reviewing Attachment 4 - *LOMA-LOMR-F Fact Sheet*, included with the digital copy of this Discovery Report.

During the Discovery Meetings, the Village of Springville noted a cluster of LOMAs along Spring Brook from North Street to South Buffalo Street. Additional study of this area was requested.

Table 11: LOMCs in Project Area (as of October 2014)

County	Community	Number of LOMA/ LOMR-Fs*	Number of LOMRs	Effective Date
Cattaraugus	Ashford, Town of	3	0	5/25/1984
	Cattaraugus, Village of	0	0	4/20/1984
	Delevan, Village of	0	0	1/20/1984
	East Otto, Town	1	0	4/20/1984
	Farmersville, Town of	3	0	7/23/1982
	Freedom, Town of	0	0	8/19/1991
	Machias, Town of	1	0	8/20/1982
	Mansfield, Town of	0	0	5/25/1984
	New Albion, Town of	1	0	12/3/1982
	Otto, Town of	0	0	4/20/1984
	Perrysburg, Town of	1	0	4/20/1984
	Perrysburg, Village of***	0	0	N/A
	Persia, Town of	0	0	4/20/1984
	Yorkshire, Town of	0	0	5/25/1984
Chautauqua	Hanover, Town of	4	0	12/18/1984
Erie	Brant, Town of	1	0	1/6/1984
	Collins, Town of	1	0	9/26/2008
	Concord, Town of	3	0	9/4/1986
	Gowanda, Village of**	3	0	9/26/2008
	North Collins, Town of***	0	0	N/A
	Sardinia, Town of	6	0	1/16/2003
	Springville, Village of	5	0	7/17/1986
Wyoming	Arcade, Town of	3	0	3/3/1992
	Arcade, Village of	21	0	3/3/1992
	Java, Town of	1	0	12/23/1983

N/A – Information not available

* May contain LOMA/LOMR-Fs in the community that are outside the study area for this Discovery process.

** Dual-county community (Erie and Cattaraugus) considered part of Erie County for NFIP purposes and this Discovery process.

*** This community does not participate in the NFIP.

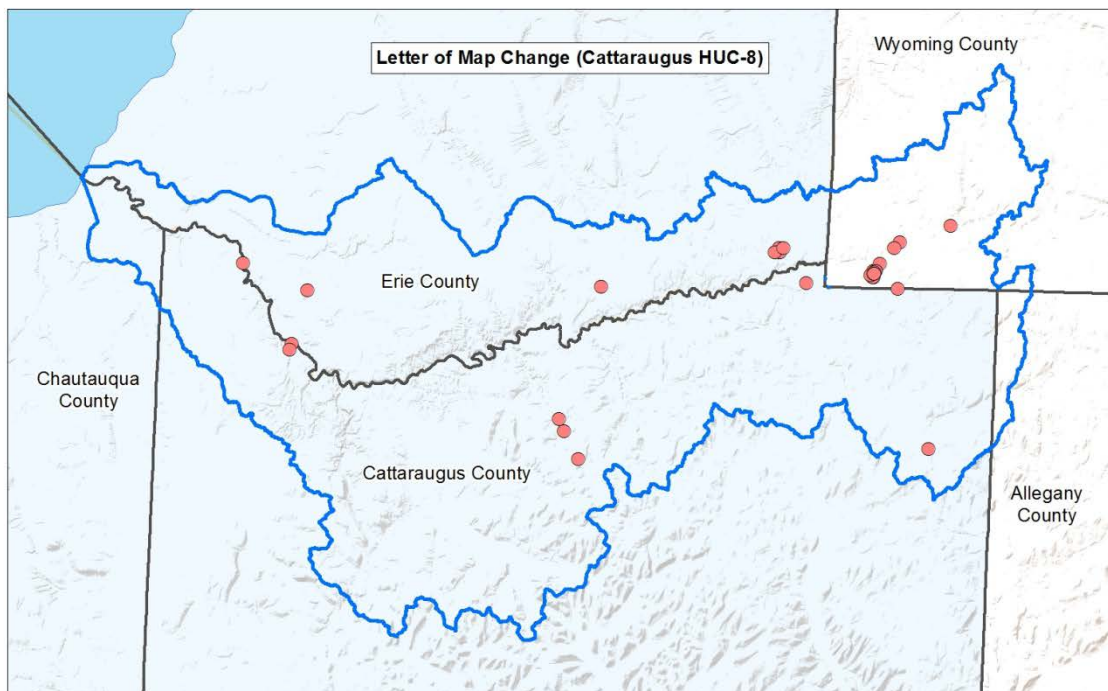


Figure 6: Location of LOMCs in the Cattaraugus Watershed

Historical Flooding

Throughout the recorded history of the Cattaraugus Watershed, flooding has been a constant threat. The Allegheny Mountains lie partially in the Cattaraugus Watershed, and their heights often act as a sponge, squeezing out copious amounts of rain and snow from storm systems flowing up from the middle of the United States. Floods in the early summer months are often associated with tropical storms moving north along the Atlantic coast. During the winter, flooding is a threat when ice jams impede the free flow of streams.

Flooding usually occurs in the late winter and early spring, when the ground is still frozen and snowmelt adds to heavy rainfall to produce increased runoff. Table 12: *FIS Historical Flooding Areas* summarizes the historical flooding noted in each community's FIS report. It should be noted that some of the events noted and areas of concern relate to areas outside of the Cattaraugus Watershed.

Table 12: FIS Historical Flooding Areas

County	Community	Event Date	Areas of Concern*
Cattaraugus	Ashford, Town of	-	N/A
	Cattaraugus, Village of	-	N/A
	Delevan, Village of	-	N/A
	East Otto, Town of	-	N/A

Table 12: FIS Historical Flooding Areas

County	Community	Event Date	Areas of Concern*
Cattaraugus (Cont'd)	Farmersville, Town of	-	N/A
	Freedom, Town of	Various	Clear Creek has experienced several documented flooding events (1902, 1971, 1972, 1984, and 1986). A bridge was destroyed in the 1986 flood.
	Machias, Town of	-	N/A
	Mansfield, Town of	-	N/A
	New Albion, Town of	-	N/A
	Otto, Town of	-	N/A
	Perrysburg, Town of	-	N/A
	Perrysburg, Village of***	-	N/A
	Persia, Town of	-	N/A
	Yorkshire, Town of	-	N/A
Chautauqua	Hanover, Town of	Various	<p>Flooding primarily occurs along Lake Erie, caused by wave run-up during periods of high water levels usually in late winter or early spring.</p> <p>Many major floods on Cattaraugus Creek are produced by sand bars that form across the mouth of the creek. During the late winter and early spring, lake storms force ice to shore, increasing the barrier effect of the sand bars.</p> <p>Significant flooding events during the period of Gowanda gage record include: March 1942, June 1944, April 1947, February 1953, October 1955, March 1956, January 1957, January 1959, February 1961, March 1963, March 1972, June 1972, and February 1976.</p> <p>Silver Creek causes frequent flood problems. In Smith Mills and an area north of Balltown, the creek overtops banks and causes localized flooding.</p> <p>An undersized culvert opening causes flooding upstream of the structure along Halfway Brook in an area south of the U.S. Route 20 and N.Y. Route 5.</p>
Erie	Brant, Town of	-	N/A
	Collins, Town of	Various	Clear Creek flows in meandering, shifting channels with steep profiles, and between high (upper basin) and low (lower basin) banks. The flood problems may occur along U.S. Highway 62, where the stream crosses it three times.

Table 12: FIS Historical Flooding Areas

County	Community	Event Date	Areas of Concern*
Erie (Cont'd)	Concord, Town of	Various	Large floods have occurred on Spring Brook caused by a combination of rainfall and runoff.
	Gowanda, Village of**	Various	Large magnitude floods have occurred in this downstream reach of Cattaraugus Creek in 1861, 1894, 1902, 1904, 1913, 1918, 1937, 1942, 1956, 1967, and 1972. Both tributaries of Cattaraugus Creek, Thatcher Brook and Grannis Creek, create major flood problems in their lower reaches.
	North Collins, Town of***	-	N/A
	Sardinia, Town of	Various	Flooding primarily occurs during winter and spring months as a result of spring rains and/or snowmelt.
	Springville, Village of	Various	Large floods have occurred on the Spring Brook as a result of rainfall and runoff.
Wyoming	Arcade, Town of	Various	The principal areas of flooding are located along Cattaraugus Creek and Clear Creek and the floodplain especially in the vicinity of their confluence. The greatest recorded flood occurred on July 6, 1902. In recent years major floods have occurred in late spring or early summer due to excessive rainfall. Other significant flood events occurred in 1908, 1942, 1956, 1957, 1967, 1971, 1972, 1984, and 1986.
	Arcade, Village of	Various	Low-lying areas in the Village of Arcade are subject to periodic flooding caused by the overflow of Cattaraugus and Clear Creek at their confluence. Water Street and Main Street bridges on the respective creeks are subject to frequent clogging by trees and debris.
	Java, Town of	-	N/A

N/A – Information not available

* Some of the identified areas of concerns relate to areas outside the Watershed.

** Dual-county community (Erie and Cattaraugus) considered part of Erie County for NFIP purposes and this Discovery process.

*** This community does not participate in the NFIP.

Historical flooding events were also included in several of the community Hazard Mitigation Plans (HMPs). Descriptions of significant events from these plans are summarized below and/or in Table 13: *Hazard Mitigation Plan Significant Flood Events*.

Many spring and fall rainfall events have resulted in significant damage to property and infrastructure within the Cattaraugus Watershed. The counties within the watershed have experienced several flood-related events resulting in millions of dollars in damages.

The August 2013 Cattaraugus County HMP notes that a total of 43 flood events have been recorded in the County, 31 of which were recorded as flash floods. Flash flooding in Cattaraugus County typically occurs every year and tends to be exacerbated by beaver dams, which cause debris jams leading to washouts and infrastructure damage. In the past decade, nine major flood events (i.e., greater than \$100,000 in damages) totaling nearly \$52 million in damages have occurred in Cattaraugus County. On average, the County experiences three major flood events per year, each causing damages estimated at \$3 million. The County has experienced multiple federally-declared storm events due to flooding in January 1996, June 1998, May through August 2001, and August 2009.

Chautauqua County's HMP, updated in September 2015, notes that since 1996, there have been 45 recorded flood events with losses in the county. This corresponds to about 2.5 floods with losses per year. Of all these floods, only eight have cost more than \$100,000, with the most costly event occurring in the Village of Brocton in 2013, totaling \$500,000 in damages. Most floods in the County stem from heavy winter or early spring rainfall, usually augmented by melting snow. Occasionally, intense rainfall associated with cyclonic disturbances produces flooding. Low-lying areas along Chautauqua Lake are poorly drained, and during intense rainfalls severe flooding conditions have been experienced. Flooding and erosion of the Lake Erie shoreline has been caused by high wind and wave action coupled with high water levels on the lake, a frequent occurrence in recent years. Chautauqua County has experienced many historic severe storms. Since 1996, the estimated losses from these storms has totaled more than \$6 million.

Erie County's HMP, updated in February 2015, notes that since 1994, there have been 82 flood events that have affected Erie County. More than \$24 million in property damage was attributed to these events, including damages occurring outside the county boundaries. Thirty of these events and approximately \$16.6 million in damages are attributed to events since 2005 and \$15 million alone is from the single event on August 9, 2009 in the Village of Gowanda and surrounding areas.

In the Wyoming County HMP, in draft form as of May 2014, it is noted that seven flood incidents have been recorded since the previous effective 2008 HMP, totaling \$258,000 in damages. A total of 44 flood incidents have occurred between 1900 and 2012; the resulting damage is estimated at approximately \$14 million. These incidents, which are considered by the County as separate from minor seasonal floods, tend to cause power outages, potable water shortages, school and business closings, and property damage.

Historical flooding events were also included in several of the community Hazard Mitigation Plans (HMPs). Significant events from these plans are summarized in Table 13: *Hazard Mitigation Plan Significant Flood Events*.

Table 13: Hazard Mitigation Plan Significant Flood Events

County	Community Name	Flood Events of Significance
Cattaraugus	Ashford, Town of	June 1998: Cattaraugus Creek crested 2 feet above flood stage and caused extensive damage.
	Cattaraugus, Village of	None Listed
	Delevan, Village of	None Listed
	East Otto, Town of	None Listed
	Farmersville, Town of	None Listed
	Freedom, Town of	None Listed
	Machias, Town of	None Listed
	Mansfield, Town of	None Listed
	New Albion, Town of	None Listed
	Otto, Town of	None Listed
	Perrysburg, Town of	August 2009: Severe flash flooding occurred as the result of heavy rainfall, which caused major washouts and severe damage to critical facilities.
	Perrysburg, Village of	August 2009: Extensive flash flooding caused severe damage to critical facilities.
	Persia, Town of	August 2009: Extensive flash flooding caused severe damage to critical facilities.
	Yorkshire, Town of	June 1998: Cattaraugus Creek crested 2 feet above flood stage and caused extensive damage.
Chautauqua	Hanover, Town of	A majority of claims and losses are from the mouth of Cattaraugus Creek. Claims in the town total 607 and cover \$4 million in payments.
Erie	Brant, Town of	Historical flooding in Erie County is not detailed at the community level in the HMP.
	Collins, Town of	
	Concord, Town of	
	*Gowanda, Village of	June 1998: Cattaraugus Creek crested 2 feet above flood stage and caused \$1.4m in damages to the Village. August 2009: Extensive flash flooding from heavy rainfall caused one fatality, evacuations, road washouts, damage to residences, and severe damage to critical facilities such as the Tri-County Hospital. (Source: Cattaraugus County HMP)
	North Collins, Town of	None Listed
	Sardinia, Town of	Historical flooding in Erie County is not detailed at the community level in the HMP.
	Springville, Village of	

Table 13: Hazard Mitigation Plan Significant Flood Events

County	Community Name	Flood Events of Significance
Wyoming	Arcade, Town of Arcade, Village of	<p>The July 1902 flood is the greatest recorded and was described as a “torrent of water, six feet deep, pouring down from Clear Creek.”</p> <p>June 21 and 23, 1989: 4.6 inches of rain fell in the basin resulting in major, costly, damage to buildings, roads, and crops.</p> <p>June and July 1998: Severe thunderstorms caused heavy rain on already saturated ground leading to general flooding.</p>
	Java, Town of	<p>September 2000: Strong afternoon thunderstorms dropped 3-4 inches of rain in small portion of western Wyoming.</p> <p>May 2011: Three inches of rain fell in a few hours resulting in localized flash flooding that closed numerous roads and flooded basements.</p>

* Dual-county community (Erie and Cattaraugus) considered part of Erie County for NFIP purposes and this Discovery process.

Declared Disasters

Like much of the eastern United States, one of the most frequent, wide-spread, and damaging natural disasters affecting the watershed is flooding from rainfall events; especially tropical systems tracking inland from the Atlantic Seaboard. With full records beginning in the 1950s, the watershed has repeatedly been subject to flooding from tropical storms, hurricanes, and other non-cyclonic events.

The President is authorized by the Robert T. Stafford Disaster Relief and Emergency Assistance Act to declare a disaster for any emergency situation or natural event when states and local municipalities need federal assistance. Once the President declares that a major disaster or emergency exists, an array of federal programs to assist in the response and recovery effort are activated. The determination of which programs are activated following a particular event is based on the needs found during damage assessments and any subsequent information that may be discovered.

The major flood-related disaster declarations for the study area are listed in Table 14: *Disaster Declarations*. Since 1967 there have been 13 federally declared disasters where flooding was a factor within the study area. FEMA’s disaster declarations and emergency declarations history can be viewed at FEMA’s website at <http://www.fema.gov/disasters>.

Table 14: Disaster Declarations (as of January 2015)

Date	Title of Event	Number of Counties Declared within Study Area
10/1/1967	New York Severe Storms, Flooding	1
6/1/1972	New York Tropical Storm Agnes	3
3/1/1976	New York Ice Storm, Severe Storms, Flooding	4
3/1/1985	New York Snow Melt, Ice Jams	1
1/1/1996	New York Severe Storms/Flooding	2
June & July 1998	New York Severe Storms and Flooding	3
May to August 2001	New York Severe Storms	2
July & August 2003	New York Severe Storms, Tornadoes, and Flooding	2
May & June 2004	New York Severe Storms and Flooding	4
4/1/2005	New York Severe Storms and Flooding	1
10/12/2006	New York Severe Storms and Flooding	1
8/1/2009	New York Severe Storms and Flooding	3
November 17-26, 2014	Severe Winter Storm, Snowstorm, and Flooding	4

During the Discovery Meetings, several community officials noted flood events that caused significant flooding in their communities. The communities included:

- Town of Arcade – 2009
- Town of East Otto
- Town of Mansfield
- Town of New Albion
- Town of Otto - 2009 flooding. Merrick Road was flooded and replaced.
- Town of Yorkshire
- Town of Hanover - 2009
- Village of Springville
- Town of Arcade

The events provided by the communities did not include specific dates of events and/or damages.

High Water Marks

A limited amount of verified High Water Mark (HWM) data was available from the USGS or USACE prior to the Discovery meeting. USGS collected HWMs along Grannis Creek, Thatcher Brook, Cattaraugus Creek, and Walnut Creek during the August 2009 flood events.

During the pre-Discovery and Discovery meetings, communities identified the following verifiable HWMs:

- Town of East Otto – Cattaraugus Creek and Zoar Valley
- Town of Freedom – Clear Creek at Sparks Road and Route 98
- Town of Persia
- Town of Hanover – Railroad Bridge over Cattaraugus Creek
- Town of Arcade
- Village of Arcade – Clear Creek

Limited details were provided for these HWMs.

Ice Jams

As explained by the NWS Office, “ice jams cause localized flooding and can quickly cause serious problems in the area. Rapid rises behind the jams can lead to temporary lakes and flooding of homes and roads along rivers. A sudden release of a jam can lead to flash flooding below with the addition of large pieces of ice in the wall of water which will damage or destroy most things in its path.”

There are two types of ice jams: Freeze up and Break up. Freeze up jams usually occur in early to mid-winter during extremely cold weather. Break up jams usually occur in mid to late winter with thaws. The NWS (found [online](#) or in References section of this report) notes the conditions of both below:

Freeze Up Jam Criteria:

“Three consecutive days with daily average temperatures of less than 0°F. Early to midwinter formation, fairly steady discharge, frazil and broken border ice, unlikely to release suddenly, smooth to moderate surface roughness.”

Break Up Jam Criteria:

“Ice around 1 foot thick or more (presumed) and Daily Average Temperature forecast to be greater than 42°F or more. Direct sunlight plays a large role as open water areas absorb sunlight. A break up jam can occur at any time after ice cover formation, but generally takes place in mid to late winter. Break up jams are highly unstable with sudden failures.”

Rainfall or snowmelt with a thaw will enhance the potential for Break up jams as rising water helps to lift and break up the ice. A very short thaw with little or no rain or snowmelt may not be enough to break up thick ice.

Flooding caused by ice jams is not calculated nor shown on FEMA’s FIRMs. Furthermore, the NWS’s statement on ice jams also explains that river forecasts found on its website do not take into account the effect of ice on river levels. Documented ice jam areas within the Cattaraugus Watershed include Buttermilk Creek in the Village of Springville, Cattaraugus Creek in the Village of Gowanda, and Clear Creek in the Town of Collins. Details of regarding these ice jams locations can be found at <http://icejams.crrel.usace.army.mil/>.

The following measures will help communities prepare for and address ice jam conditions as they occur.

Ice Jam Preparedness

1. Monitoring areas to identify problem areas early
2. Alert system for evacuation
3. Identification of evacuation routes if ice jam overtops roads
4. Mitigation
 - a. Ice weakening/thinning/removal
 - b. Equipment placement
 - c. Supplies
 - Sandbags
 - Jersey barriers
5. Permanent Measures
 - a. Freeze up Jam Control
 - Displace jam location
 - Control production and transport of frazil ice
 - b. Break up Jam Control
 - Control timing of breakup
 - Displace jam location

During the Discovery Meetings and on the community data worksheets, several communities noted areas of historic and repeated ice jams. Ice jam locations were noted for the following communities:

- Town of Persia – Thatcher Brook
- Town of Hanover – Cattaraugus Creek, Sunset Bay, Irvin, Hanford
- Town of Concord – Cattaraugus Creek

Coordinated Needs Management Strategy (CNMS) and NFIP Mapping Needs

The Lake Erie Discovery process did identify unmet needs. During many discussions with community officials, the need or desire for updated digital FIRMs was raised. Many of the communities do not have digital maps and the information depicted on the maps is not current (e.g., location of flooding and roads). As presented in Table 23: *Summary of Community Floodplain Mapping and Training Needs* and Table 24: *Summary of Community Floodplain Mapping Requests*, all municipalities within the Watershed have noted their current flood maps are not accurate.

CNMS is a FEMA initiative to update the way FEMA organizes, stores, and analyzes flood hazard mapping needs information for communities. CNMS defines an approach and structure for the identification and management of flood hazard mapping needs that supports data-driven planning and the flood map update investment process in a geospatial (or GIS) environment. The goal is to identify areas where existing flood maps are not up to FEMA's mapping standards.

There are three classifications within the CNMS: “Valid,” “Unverified,” and “Unknown”. New and updated studies (those with new hydrologic and hydraulic models) performed during the Map Modernization program were automatically determined to be “Valid” and the remaining studies went through a 17 element validation process with seven critical and 10 secondary elements. Validation elements apply physical, climatological, and environmental factors to stream studies to determine validity. A stream study has to pass all of the critical elements and at least seven secondary elements in order to be classified as “Valid.” The remainder of the streams are classified as “Unverified.”

The following seven Critical Elements or “checks” must be answered satisfactorily in order for a stream reach to be determined “Valid”:

1. Change in the gage record: Has a major flood event caused a sizable change in gage record since effective analysis?
2. Change in discharge: Do the updated and effective peak discharges differ significantly based on confidence limit criteria in *FEMA's Guidelines and Specifications* (G&S)?
3. Model methodology: Is the model methodology no longer appropriate based on FEMA's G&S?
4. Hydraulic change: Has a major flood-control structure (dam/levee/floodwall/other change) been added or removed from the reach?
5. Channel reconfiguration: Is the current channel reconfiguration outside the effective SFHA? (i.e., has the stream moved?)
6. Other hydraulic changes: Have more than five hydraulic structures (bridge/culvert) been added or removed that impact Base Flood Elevations (BFEs) on the reach?
7. Channel area change: Has there been significant channel fill or scour?

If one or more of the above noted elements are true, then the flood hazard information for the reach is “Unverified.” Not all elements may be applicable for all flooding sources.

In addition to the seven Critical Elements, if four or more of the following Secondary Elements are true, then the flood hazard information must be recorded as “Unverified.”

1. Regression Equation: Has a rural regression equation been used in a now urbanized area?
2. Repetitive Loss: Are there repetitive losses outside the SFHA?
3. Impervious Area: Has there been an increase in impervious area in the sub-basin of equal to or greater than 50 percent of previous area (i.e., 10 percent to 15 percent, 20 percent to 30 percent, etc.)?
4. Hydraulic Structure: Have more than one, but less than five, hydraulic structures (bridge/culvert) been added or removed that impact BFEs on the reach?
5. Channel Improvements: Have there been channel improvements or shoreline changes?
6. Topography Data: Is better topography and/or bathymetry available?
7. Vegetation or Land Use: What changes to vegetation or land use have occurred in the area?
8. Coastal Dune: Failure to identify primary frontal dune in coastal areas?
9. High Water Mark: Have significant storms occurred with recorded HWMs?
10. Regression Equation: Are new regression equations available?

CNMS is a living database that is continuously updated whenever new or revised studies become available. Valid stream reaches will be reassessed every 5 years and Unverified streams will be

prioritized for potential funding. Watershed Discovery meetings will provide input for CNMS community requests and help prioritize studies in the watershed. Table 15: *Current Status of CNMS* shows the status of the counties in this project area prior to the Discovery process.

A CNMS Factsheet is included in the digital version of this Discovery Report as Attachment 6 - *Coordinated Needs Management Strategy*. More information about CNMS can also be found on [FEMA's CNMS webpage](#) or by viewing an informative CNMS PowerPoint® presentation of the process created by the [Illinois State Water Survey](#).

Table 15: Current Status of CNMS

County	FIPS*	Stream Mileage within Cattaraugus Watershed			
		Valid	Unverified	Unknown	Total
Cattaraugus	36009	48.33	0	92.24	140.57
Chautauqua	36013	0	0	14.90	14.90
Erie	36029	19.41	0	58.20	77.61
Wyoming	36121	0	0	31.64	31.64

*FIPS = Federal Information Processing System

All needs identified as a result of this Discovery process have been included in both CNMS and this Discovery Report.

Other Data and Information

The following section contains a summary of other information that helped the study team to better understand the study area, local flood risks, and potential mitigation needs within the watershed as part of this Discovery project.

Flood Insurance Policies

A community's agreement to adopt and enforce floodplain management ordinances as part of the NFIP, particularly with respect to new development, is an important element in making federally-backed flood insurance available to home and business owners. For this Discovery project, data on NFIP flood insurance policies in the watershed communities were gathered.

As of May 8, 2014, in the Cattaraugus Watershed 457 policies were in-force accounting for \$55.1 million in insurance coverage and \$365,857 in written premiums. The number of policies, total coverage, and total premium cost are listed in Table 16: *Flood Insurance Policy Data*.

The Town of Hanover has 238 insurance policies with \$28.9 million in insurance coverage. The Town has had 1,388 insurance claims accounting for more than \$5.8 million in insurance claims. The Village of Gowanda has 104 insurance policies with more than \$11.8 million in coverage.

Table 16: Flood Insurance Policy Data (as of May 2014)

County	Community	Number of Policies by Zone*		Total Coverage	NFIP Total Premium	Total Claims Since 1978	Total Paid Since 1978
		A Zone	Total Policies				
Cattaraugus	Ashford, Town of	4	9	\$606,800	\$4,387	14	\$ 37,851
	Cattaraugus, Village of	-	-	-	-	21	\$ 33,395
	Delevan, Village of	0	1	\$175,000	\$334	0	\$ 0
	East Otto, Town of	5	5	\$522,700	\$5,709	25	\$305,873
	Farmersville, Town of	6	6	\$165,600	\$3,809	2	\$16,410
	Freedom, Town of	6	10	\$1,458,300	\$7,444	3	\$47,879
	Machias, Town of	0	1	\$80,000	\$631	0	\$ 0
	Mansfield, Town of	0	0	\$0	\$ 0	2	\$5,074
	New Albion, Town of	0	0	\$0	\$ 0	4	\$13,989
	Otto, Town of	1	1	\$65,000	\$616	0	\$ 0
	Perrysburg, Town of	0	1	\$28,000	\$174	3	\$2,234
	***Perrysburg, Village of	-	-	-	-	-	-
	Persia, Town of	0	1	\$280,000	\$427	0	\$ 0
	Yorkshire, Town of	0	2	\$280,000	\$622	3	\$12,839
Chautauqua	Hanover, Town of	197	238	\$28,862,500	\$158,801	1,388	\$5,828,962
Erie	Brant, Town of	1	1	\$33,300	\$437	101	\$307,628
	Collins, Town of	3	4	\$658,900	\$3,542	5	\$74,715
	Concord, Town of	2	6	\$785,000	\$2,978	8	\$58,398
	**Gowanda, Village of	82	104	\$11,897,900	\$109,347	112	\$2,263,616
	***North Collins, Town of	-	-	-	-	-	-
	Sardinia, Town of	5	5	\$815,600	\$9,131	6	\$108,049
	Springville, Village of	3	7	\$1,474,100	\$8,731	17	\$320,645
Wyoming	Arcade, Town of	3	6	\$714,400	\$3,893	5	\$7,377
	Arcade, Village of	38	46	\$5,841,500	\$42,793	26	\$500,465
	Java, Town of	2	3	\$399,000	\$2,051	1	\$8,228
Total:		358	457	\$55,143,600	\$365,857	1,746	\$9,953,627

* V Zones are not identified on the current effective flood mapping for the Cattaraugus Watershed

** Dual-county community (Erie and Cattaraugus) considered part of Erie County for NFIP purposes and this Discovery process.

*** This community does not participate in the NFIP

Repetitive Loss/Severe Repetitive Loss Properties

A Repetitive Loss (RL) is a property that has received two or more claim payments of more than \$1,000 from the NFIP within any rolling 10-year period. In the Cattaraugus Watershed, there were 633 RLs within the study area as of May 2014, accounting for \$4.75 million in claims paid.

The Town of Hanover has 603 RL properties, the most within the watershed. The Village of Arcade has the largest average claims paid, with \$30,777 distributed over 10 losses.

Of the six communities in this watershed that have RLs, four communities (Towns of East Otto, Mansfield, Persia and the Village of Arcade) noted during the Discovery meetings that they were aware of the RLs in their communities.

The data are shown in Table 17: *Repetitive Losses in Study Area*.

A Severe Repetitive Loss (SRL) property is defined as a residential property that is covered under an NFIP flood insurance policy and (a) has at least four NFIP claim payments (including building and contents) over \$5,000 each, and the cumulative amount of such claims payments exceeds \$20,000; and (b) for which at least two separate claims payments (building payments only) have been made with the cumulative amount of the building portion of such claims exceeding the market value of the building. For both (a) and (b) above, at least two of the referenced claims must have occurred within any ten-year period, and must be greater than 10 days apart.

Table 17: Repetitive Losses in Study Area (as of May 2014)

County	Community	Number of Variances	Number of RLs	Number of BCX Claims	Total Claims Paid
Cattaraugus	Ashford, Town of	-	-	-	-
	Cattaraugus, Village of	-	-	-	-
	Delevan, Village of	-	-	-	-
	East Otto, Town of	0	9	0	\$213,367
	Farmersville, Town of	0	2	2	\$12,839
	Freedom, Town of	-	-	-	-
	Machias, Town of	-	-	-	-
	Mansfield, Town of	-	-	-	-
	New Albion, Town of	-	-	-	-
	Otto, Town of	-	-	-	-
	Perrysburg, Town of	-	-	-	-
	**Perrysburg, Village of	-	-	-	-
	Persia, Town of	-	-	-	-
	Yorkshire, Town of	-	-	-	-
Chautauqua	Hanover, Town of	8	603	33	\$4,150,984
Erie	Brant, Town of	-	-	-	-
	Collins, Town of	-	-	-	-
	Concord, Town of	0	4	0	\$53,058
	*Gowanda, Village of	1	-	-	-
	**North Collins, Town of	-	-	-	-
	Sardinia, Town of	-	-	-	-
	Springville, Village of	0	5	5	\$21,134
Wyoming	Arcade, Town of	-	-	-	-
	Arcade, Village of	0	10	4	\$307,769
	Java, Town of	-	-	-	-
Total:		9	633	44	\$4,759,151

* Dual-county community (Erie and Cattaraugus) considered part of Erie County for NFIP purposes and this Discovery process

**This community does not participate in the NFIP

Structures that flood frequently strain the NFIP Fund. In fact, RL properties are the biggest draw on the fund. FEMA had paid almost \$3.5 billion in claims for RL properties as of 2005 and that number continues to grow. RL properties not only increase the NFIP's annual losses and the need for borrowing funds from Congress, they also drain funds needed to prepare for future catastrophic events.

Clusters of RL and previous NFIP assistance, including claims and other financial support such as Flood Mitigation Assistance and Hazard Mitigation Assistance grants, are used to identify "hot spot" areas within communities. This information can be used to identify areas of mitigation interest and updated mapping needs and products for individual communities.

Community Rating System (CRS)

The CRS is a voluntary incentive program that provides flood insurance premium discounts to NFIP-participating communities that take extra measures to manage floodplains above the minimum requirements. The more measures a community takes to minimize or eliminate exposure to floods, the more CRS points are awarded and the higher the discount on flood insurance premiums.

As of August 2014, no communities within the study area were participating in the CRS. For more information on CRS, please see Attachment 5 - *Joining the CRS Program*, or visit [FEMA's CRS website](#).

Community Assistance Visits (CAVs) and Community Assistance Contacts (CACs)

FEMA uses a number of tools to determine a community's compliance with the minimum regulations of the NFIP. Among them are Community Assistance Visits (CAVs) and Community Assistance Contacts (CACs). These tools help assess a community's implementation of its floodplain management regulations and identify any deficiencies and/or violations.

CACs

The CAC is a telephone call or brief visit by a FEMA staff member (or staff of a state agency on behalf of FEMA) verifying the community's designated floodplain manager and their contact information.

CACs in the watershed have been sporadic during the last 20 years. CACs are a tool employed by FEMA and its state partners to periodically contact a community to see if they are having any difficulties in administering the local floodplain management ordinance or program. The CAC can be used as a way to screen for potential community floodplain management issues that would require a CAV. CACs are also a means of encouraging Code Enforcement Officers to attend annual floodplain management workshops. CACs can serve as a means to support local officials when they need help effectively administering the NFIP in their community.

CAVs

Statewide Community Assistance Visits (CAVs) are part of the evaluation and review process used by FEMA and NYSDEC Floodplain Management staff to ensure that each community adequately enforces local floodplain management regulations to remain in compliance with NFIP requirements. Generally, a CAV consists of a FEMA staff member or staff of a state agency on behalf of FEMA touring the floodplain, inspecting community permit files, and meeting with local appointed and elected officials. During a CAV, observations and investigations will focus on identifying issues in various areas, such as community floodplain management regulations/ordinances, community administration and enforcement procedures, engineering or other issues related to FIRMs, and other problems in community floodplain management. .

Any administrative problems or potential violations identified during a CAV will be documented in the CAV findings report. The community will be notified and given the opportunity to correct administrative procedures and remedy any violations to the maximum extent possible within established deadlines.

CAVs are also a way to provide technical assistance to communities. FEMA or the state will work with the community to help bring the program into compliance with NFIP requirements. In extreme cases where the community does not take action to bring itself into compliance, FEMA may initiate an enforcement action against the community. A program deficiency is a defect in a community's floodplain management regulations or administrative procedures that impacts effective implementation of floodplain management regulations of the standard in 44 CFR §60.3, §60.4, or §60.6. "Open" CAVs can be indicative of unresolved violations.

CAVs and CACs performed within the project area are identified in Table 18: *CAVs and CACs Performed within the Project Area*. Due to the sensitivity of the information collected, CAV findings are not captured in this report. However, most communities within the Cattaraugus Watershed were found to have sound floodplain management practices in place. Of the communities in the Watershed, two were found to have serious engineering problems during the CAV requiring remedial actions.

Table 18: CAVs and CACs Performed within the Project Area

County	Community	CAC Date	CAV Date
Cattaraugus	Ashford, Town of	06/19/2003	12/23/1992
	Cattaraugus, Village of	-	-
	Delevan, Village of	-	-
	East Otto, Town of	01/27/2011	04/04/1996
	Farmersville, Town of	05/12/2009	-
	Freedom, Town of		09/03/2010
	Machias, Town of	06/23/1992	06/16/1999
	Mansfield, Town of	01/26/2007	-
	New Albion, Town of	03/15/2013	-
	Otto, Town of	02/27/2007	-
	Perrysburg, Town of	-	-
	**Perrysburg, Village of	-	-
	Persia, Town of	-	-

Table 18: CAVs and CACs Performed within the Project Area

County	Community	CAC Date	CAV Date
Cattaraugus (Cont'd)	Yorkshire, Town of	-	05/24/2011
Chautauqua	Hanover, Town of	05/23/2012	01/14/2009
Erie	Brant, Town of		11/15/1995
	Collins, Town of	06/26/1997	-
	Concord, Town of	01/14/2011	-
	*Gowanda, Village of	11/02/2009	04/23/2008
	**North Collins, Town of	-	-
	Sardinia, Town of	03/25/1994	11/14/2002
	Springville, Village of		12/15/2009
Wyoming	Arcade, Town of		11/21/2001
	Arcade, Village of	01/14/2005	04/10/2012
	Java, Town of	02/08/2007	-

*Dual-county community (Erie and Cattaraugus) considered part of Erie County for NFIP purposes and this Discovery process.

**This community does not participate in the NFIP

Ordinances

The project area's local jurisdictions have a patchwork of regulations regarding development within known SFHAs, ranging from ordinances with minimum NFIP requirements to strong, proactive ordinances that not only regulate and protect new and improved development in existing SFHAs, but seek to mitigate the growth of SFHAs caused by increased runoff from developed areas and the degradation of natural flood control areas, such as wetlands and forests. The NFIP uses six different ordinance levels (60.3 land-use classification levels).

The following summarizes the three different ordinance levels based on 44 CFR §60.3 that apply to New York State local law for communities participating in the NFIP.

1. The "A" type should be used when 1-percent-annual-chance floodplains have not yet been identified.
2. The "D" type should be used when 1-percent-annual-chance floodplains without BFEs have been identified; 1-percent-annual-chance floodplains with BFEs, but without floodways have been identified; and 1-percent-annual-chance floodplains with BFEs and a floodway have been identified. If the community also has coastal flooding, but does not have coastal high-hazard areas (V Zones), it is a "D" type.
3. The "E" type should be used when coastal high-hazard areas (V Zones) have been identified.

Table 19: *Program Status and Ordinance Level* lists the NFIP program status and ordinance level for each community in the Cattaraugus Watershed.

Table 19: Program Status and Ordinance Level (as of August 2014)

County	Community	Program Status	Ordinance Level
Cattaraugus	Ashford, Town of	Regular	D
	Cattaraugus, Village of	Regular	D
	Delevan, Village of	Regular	D
	East Otto, Town	Regular	D
	Farmersville, Town of	Regular	D
	Freedom, Town of	Regular	D
	Machias, Town of	Regular	D
	Mansfield, Town of	Regular	D
	New Albion, Town of	Regular	D
	Otto, Town of	Regular	D
	Perrysburg, Town of	Regular	D
	Perrysburg, Village of	Not Participating	-
	Persia, Town of	Regular	D
	Yorkshire, Town of	Regular	D
Chautauqua	Hanover, Town of	Regular	D
Erie	Brant, Town of	Regular	D
	Collins, Town of	Regular	D
	Concord, Town of	Regular	D
	*Gowanda, Village of	Regular	D
	North Collins, Town of	Not Participating	-
	Sardinia, Town of	Regular	D
	Springville, Village of	Regular	D
Wyoming	Arcade, Town of	Regular	D
	Arcade, Village of	Regular	D
	Java, Town of	Regular	D

*Dual-county community (Erie and Cattaraugus) considered part of Erie County for NFIP purposes and this Discovery process.

The NFIP-participating communities within the project area have floodplain management regulations in place and have a mechanism for updating their ordinances. Local ordinances are available in Appendix F: *Community Ordinances*.

Hazard Mitigation Plans (HMPs)

A local HMP is a long-term strategic/guidance document used by an entity to reduce future risk to life, property and the economy in a community. HMPs are often completed at the county or regional level. At the local level, each municipal government also adopts the HMP as an individual plan or regional plan. The purpose of the HMP is to:

- Identify vulnerabilities to natural hazards and provide for potential projects to reduce those vulnerabilities in the future;
- Ensure safety and protect life and property by reducing the potential for future damages and economic losses that result from natural hazards;

- Help communities qualify for additional grant funding, in both the pre-disaster and post-disaster environment;
- Speed recovery and redevelopment following future disaster events;
- Demonstrate a firm local commitment to hazard mitigation principles; and
- Comply with both state and federal legislative requirements for local HMPs.

The county and municipal HMPs outline mitigation actions to address vulnerabilities, which officials believe are attainable and can be implemented. Some of these activities include:

- Reduce the number of critical facilities in hazard prone areas;
- Reduce the future development of facilities in flood inundation zones;
- Map out all critical facilities in SFHAs;
- Develop regulations that require zero-increase in runoff;
- Elevate structures located in flood prone areas;
- Require flood resistant building construction methods; and
- Develop a comprehensive plan to relocate critical facilities to safer areas.

Status of Approved Mitigation Plans

Each municipal HMP was reviewed for initiatives, critical facilities, and mitigation actions. As of September 2014, 23 communities within the study area had approved HMPs; 8 of the HMPs were under revision.

The status of the approved HMPs is shown in Table 20: *Approved Hazard Mitigation Plans*.

Table 20: Approved Hazard Mitigation Plans (as of September 2014)

County	Community	Approval Date	Plan Expiration
Cattaraugus	Ashford, Town of	1/21/2014	1/21/2019
	Cattaraugus, Village of		
	Delevan, Village of		
	East Otto, Town of		
	Farmersville, Town of		
	Freedom, Town of		
	Machias, Town of		
	Mansfield, Town of		
	New Albion, Town of		
	Otto, Town of		
	Perrysburg, Town of		
	Perrysburg, Village of		
	Persia, Town of		
	Yorkshire, Town of		
Chautauqua	Hanover, Town of	Plan updated in 2015; no record of adoption as of November 2016	To Be Determined

Table 20: Approved Hazard Mitigation Plans (as of September 2014)

County	Community	Approval Date	Plan Expiration
Erie	Brant, Town of	Plan updated in 2015; no record of adoption as of November 2016	To Be Determined
	Collins, Town of		
	Concord, Town of		
	*Gowanda, Village of		
	North Collins, Town of		
	Sardinia, Town of		
Wyoming	Springville, Village of		
	Arcade, Town of	3/19/2014	5/19/2019
	Arcade, Village of		
	Java, Town of	5/19/2014 (Approvable Pending Adoption)	

* Dual-county community (Erie and Cattaraugus) considered part of Erie County for NFIP purposes and this Discovery process.

Critical Facilities and Infrastructure

Critical facilities are those entities that are essential to the community's health and welfare. Critical facilities included in the HMPs vary based on how the locality defines a critical facility/infrastructure and the types of data available. Critical facilities often include 911 and emergency services facilities, airports, colleges and universities, schools, fire departments, police departments, sewage treatment plants, hospitals and nursing homes.

Table 21: *Critical Facilities and Infrastructure* summarizes the critical facilities that were noted in the HMPs as being at risk from flood-related events. Updates to these plans will need to include the critical structure vulnerability.

Table 21: Critical Facilities and Infrastructure

County Name	Community Name	Facilities Located within SFHA
Cattaraugus	Ashford, Town of	None Listed
	Cattaraugus, Village of	(3) – 1 Cemetery, 1 Railroad, 1 School
	Delevan, Village of	(5) – 1 Railroad, 1 Government Building, 1 Highway Garage, 1 Police/Fire Station, 1 School
	East Otto, Town of	(1) – 1 Educational Facility
	Farmersville, Town of	(4) – 1 Cemetery, 3 Railroads
	Freedom, Town of	(6) – 2 Railroads, 1 Manufacturing, 3 Mines/Quarries
	*Gowanda, Village of	(15) – 1 Community Services, 1 Electric & Gas, 2 Government Buildings, 1 Home for Aged, 1 Library, 1 Manufacturing, 1 Railroad, 1 Professional Association, 5 Religious, 1 Telephone

Table 21: Critical Facilities and Infrastructure

County Name	Community Name	Facilities Located within SFHA
Cattaraugus (Cont'd)	Machias, Town of	(12) – 6 Railroads, 1 Highway Garage, 5 Mines/Quarries
	Mansfield, Town of	(1) – 1 Railroad
	New Albion, Town of	(3) – 1 Cemetery, 1 Landfill/Dump, 1 Recreational Facility
	Otto, Town of	(2) – 1 Police/Fire, 1 Religious
	Perrysburg, Town of	(7) – 1 Gas Regulation, 1 Hospital, 2 Indian Reservations, 1 Other Health Building, 1 Recreational Facility, 1 School
	Perrysburg, Village of	None Listed
	Persia, Town of	(1) – 1 Landfill/Dump
	Yorkshire, Town of	(3) – 1 Railroad, 1 Gas Well, 1 Religious
Chautauqua	Hanover, Town of	None Listed
Erie	Brant, Town of	Critical facilities listing unavailable in draft 2015 plan update.
	Collins, Town of	
	Concord, Town of	
	*Gowanda, Village of	
	North Collins, Town of	
	Sardinia, Town of	
	Springville, Village of	
Wyoming	Arcade, Town of	20 Critical Facilities, 4 of which are categorized as Essential Facilities
	Arcade, Village of	None Listed
	Java, Town of	7 Critical Facilities, 4 of which are categorized as Essential Facilities

* Dual-county community that participates in both the Erie and Cattaraugus Counties HMP's.

Mitigation Projects

FEMA administers three programs that provide funding for eligible mitigation projects that reduce disaster loss and protect life and property from future disaster damage. The three programs are the Hazard Mitigation Grant Program (HMGP), the Flood Mitigation Assistance (FMA) Program, and the Pre-Disaster Mitigation (PDM) Program.

- [HMGP](#) assists in implementing long-term hazard mitigation measures following a Presidential major disaster declaration;
- [PDM](#) provides funds for hazard mitigation planning and projects on an annual basis; and
- [FMA](#) provides funds for projects to reduce or eliminate risk of flood damage to buildings that are insured under the NFIP on an annual basis.

HMGP funding is generally 15 percent of the total amount of federal assistance provided to a state, territory, or federally-recognized tribe following a major disaster declaration. PDM and FMA funding depends on the amount Congress appropriates each year for those programs.

Appendix G lists FEMA funded hazard mitigation projects that have occurred in the project area.

The community HMPs identified mitigation projects/actions/strategies to reduce long-term vulnerability to hazards. Each county listed several mitigation projects related to reducing flood vulnerability.

The Cattaraugus County HMP includes countywide mitigation projects related to improving public awareness about flood hazards, protecting infrastructure and improving repeatedly-damaged infrastructure, ensuring maintenance of drainage ways and waterways, and identifying and acquiring RL properties. Mitigation actions specific to individual communities are identified as follows:

Table 22: Hazard Mitigation Plan Actions

County Name	Community Name	Mitigation Actions
Cattaraugus	Ashford, Town of	Replace repetitively damaged/undersized culverts at various locations
	Cattaraugus, Village of	N/A
	Delevan, Village of	<ul style="list-style-type: none"> Replace repetitively damaged/undersized culverts at various locations Study flooding on Delevan Avenue
	East Otto, Town of	N/A
	Farmersville, Town of	Improve drainage at various locations
	Freedom, Town of	
	*Gowanda, Village of	N/A
	Machias, Town of	N/A
	Mansfield, Town of	Replace repetitively damaged/undersized culverts at various locations
	New Albion, Town of	<ul style="list-style-type: none"> Replace repetitively damaged/undersized culverts at various locations Identify stream stabilization projects Remove debris from waterways
	Otto, Town of	<ul style="list-style-type: none"> Replace repetitively damaged/undersized culverts at various locations Identify stream stabilization projects
	Perrysburg, Town of	<ul style="list-style-type: none"> Replace repetitively damaged/undersized culverts at various locations Continue to support the ongoing Flood Risk Management Feasibility Study Continue ongoing Thatcher Brook Task Force Identify stream stabilization projects
	Perrysburg, Village of	<ul style="list-style-type: none"> Replace repetitively damaged/undersized culverts at various locations Continue to support the ongoing Flood Risk Management Feasibility Study Continue ongoing Thatcher Brook Task Force

Table 22: Hazard Mitigation Plan Actions

County Name	Community Name	Mitigation Actions
Cattaraugus (Cont'd)	Persia, Town of	<ul style="list-style-type: none"> Replace repetitively damaged/undersized culverts at various locations Continue to support the ongoing Flood Risk Management Feasibility Study
	Yorkshire, Town of	Replace repetitively damaged/undersized culverts at various locations
Chautauqua	Hanover, Town of	Update the 2001 study for emergency access to Sunset and Hanford Bay.
Erie	Brant, Town of	Countywide mitigation actions only.
	Collins, Town of	
	Concord, Town of	
	*Gowanda, Village of	
	North Collins, Town of	
	Sardinia, Town of	
	Springville, Village of	
Wyoming	Arcade, Town of	Stabilize stream banks along East Arcade Road
	Arcade, Village of	N/A
	Java, Town of	Develop a flood/drainage mitigation program

N/A – Information not available

* Dual-county community that participates in both the Erie and Cattaraugus Counties HMP's.

Within the past 10 years, the Village of Gowanda has acquired property for flood mitigation and Cattaraugus County has completed a culvert project.

Erie County's mitigation projects are countywide and include bank stabilization, stream maintenance, and sedimentation studies; public education campaigns about stormwater and flood management; and a property acquisition program for structures in the floodplain.

The Wyoming County HMP proposes many countywide mitigation actions that include the identification of sites for temporary housing and relocation of houses following flood disasters; public education/outreach initiatives related to flooding; establishment of a flood warning system along Tonawanda Creek; stabilization of stream banks and channels; participation in CRS; development of erosion control and drainage programs; and acquisition of RL properties/relocation of RL property owners.

During the Discovery meetings and on the community data worksheets, several communities provided information on completed mitigation activities that have resulted in reduced flood losses. These projects include:

- Town of Yorkshire: completed demolition and bank wrapping on Cattaraugus Creek in 2001;
- Town of Ashford: completed storm drain improvements on Hamlet Street;

- Town of Persia: had a study ongoing with the USACE (reference current as of data collection in 2014. Flooding sources not noted);
- Town of Hanover: completed bridge replacements over Cattaraugus Creek along NY-5 and US 20;
- Town of Sardinia: has completed elevations, relocations, and demolitions; and
- Town and Village of Arcade: have completed elevations, relocations, and demolitions on Clear Creek and Cattaraugus Creek.

IV. Discovery Meetings

A series of conference calls with virtual meeting capabilities was held on May 19-20, 2014, and was followed up with three in-person Discovery meetings held June 10-12, 2014, throughout the Lake Erie Watershed.

Webinars

RAMPP conducted the pre-Discovery WebEx™ sessions with public officials on May 19-20, 2014. These sessions introduced the planning team, requested feedback from the municipalities, counties, and regional groups within the project area, determined what additional local floodplain and hazard risk data were available, and who to include in the process.

Invitees to the WebEx™ sessions included community officials engaged in the administration, planning, emergency management, and public works duties of local jurisdictions. A list of the community leaders invited to the sessions is available in Appendix H: *Pre-Discovery Mailing List and Invitation Letter*. A sample invitation letter is also shown. A record of the participants of these meetings can be found in Appendix I: *Pre-Discovery Stakeholder Meetings*. While not expressly excluded, the public does not generally attend these meetings.

The second half of the session was interactive, with community maps shown on the meeting screen and participants discussing floodplain mapping needs within their communities. Floodplain mapping needs and areas of concern included areas that experience flooding, locations of bridge/culvert replacements, and areas where FEMA maps are inaccurate or do not exist, etc. To further expand on this discussion, participants were asked to complete and return community data worksheets to supplement the interactive discussion. Representatives from Cattaraugus, Chautauqua, Erie, and Wyoming counties, the Seneca Nation of Indians, USACE, USGS, the Nature Conservancy, and Regional Planning Commissions attended.

The meeting notes are shown in Appendix J: *Kickoff Meeting Notes*. These notes contain comments from those interviewed by RAMPP and other staff to determine each attending community's flood mapping priorities.

In-Person Meetings

In-Person Discovery meetings were held with affected communities and other selected stakeholders to:

- Review new or previously submitted information provided by communities, state and regional agencies, and local stakeholders relevant to the Discovery process
- Identify flood risk concerns in the Chautauqua-Conneaut Watershed
- Discuss each community's floodplain management activities and mitigation planning projects
- Gather additional feedback for FEMA to consider when developing Risk MAP products, including new FIRMs where needed.

Table 22: *Community Meeting Information* includes meeting dates and locations for the in-person Discovery meetings held that affect the Cattaraugus Watershed.

Table 23: Community Meeting Information

Date and Time	Counties	Meeting Location
Tuesday, June 10, 2014 9:30 AM to 12:00 PM	Erie	Woodlawn Beach State Park S-3580 Lakeshore Road Blasdell, NY 14219
Tuesday, June 10, 2014 2:30 PM to 5:00 PM	Chautauqua	JCC North County Training Facility 10785 Bennett Road Dunkirk, NY 14048
Wednesday, June 11, 2014 9:30 AM to 12:00 PM	Cattaraugus, Wyoming, and the Seneca Nation of Indians	Town of Concord Court 86 Franklin Street Springville, NY 14141

Representatives of FEMA, various state agencies, county officials, and several non-governmental organizations attended these sessions in addition to local community officials. County and community represented at the in-person meetings included:

Town of Ashford
Town of Concord
Town of Eagle
Town of Hanover
Town of Mansfield
Town of Otto
Town of Sardinia

Town of Springville
Town of Yorkshire
Village of Delevan
Seneca Nation of Indians
Cattaraugus County
Erie County
Wyoming County

At the start of the meetings a PowerPoint® presentation was delivered. The second half of the meeting was interactive and included breakout sessions during which community officials and stakeholders met with representatives from FEMA, NYSDEC, and RAMPP to discuss the following:

- What are areas of recent or planned development or high growth or other significant land changes?
- What other flood risks are present?
- What other mitigation plans and projects are in the affected area(s)?
- What are your community's concerns?
- How can we (both FEMA and you) communicate risk within your community and increase resilience from floods?

Appendices K through N include the Discovery meeting preparation and meeting materials:

- Meeting Agenda/Minutes (Appendix K: *Discovery Meeting Agenda*);
- Meeting Sign-In sheets (Appendix L: *Discovery Meeting Sign-In Sheets*);
- Meeting Presentation (Appendix M: *Discovery Presentation*); and
- Discovery Meeting Worksheets (Appendix N: *Discovery Meeting Data Worksheets*).

The results of the Discovery meeting breakout sessions with watershed stakeholders are provided in Section V: Discovery Process Outcomes.

V. Discovery Process Outcomes

Table 23: *Summary of the State of Community Floodplain Mapping and Training Needs* and Table 24: *Summary of Community Floodplain Mapping Requests* capture the discussion of needs that took place during the Discovery process. These tables include highlights from data collected from communities that participated in the planning, provided information on the community data worksheets, and noted specific needs related to their effective FIRMs. Twelve of the 24 communities within the Cattaraugus Watershed provided needs that have also been captured in CNMS.

The main types of needs identified by participants related to the existing FIRMs included:

- Specific unstudied streams in areas of growth and development;
- Old, difficult-to-read maps, due to scale (e.g., several communities have flat fold 11x17 maps and most of the watershed's FIRMs are not yet digital); and,
- Need to establish BFEs on large bodies of water that are currently mapped as approximate flood zones.

Appendix N includes the completed Risk MAP questionnaire/Discovery meeting worksheets and stream matrices used to capture community input and needs during the Discovery process.

During the Discovery process, stakeholders also noted a need for additional training related to Risk MAP products, floodplain management, and hazard mitigation topics. Table 23: *Summary of Community Floodplain Mapping and Training Needs* summarizes these training needs as indicated by specific communities.

Please note that in Table 24 some of the data included in community needs comes from meetings that the NYSDEC held with communities in the watershed that occurred in March of 2005. It should be further noted that some of the data collected during the Discovery process relates to flood hazard outside the Cattaraugus Watershed. Where applicable, a footnote has been added to identify the watershed name that corresponds with the comment and/or need. All needs and priorities should be looked at as products of the times that the meetings were held and are subject to update or change.

Recommendations for Future Action

The following summarizes the key findings of this Discovery process:

1. There is a lack of existing digital FIRM data in the majority of the watershed; the age and non-digital format of this information can make local floodplain management and mitigation efforts difficult.
2. There are a number of existing flood studies prepared by New York State Department of Transportation (NYSDOT) and the USACE, which should be acquired and incorporated into FISs.
3. There is a need for Risk MAP products, floodplain management, and hazard mitigation training.
4. There is a general lack of understanding about the CRS program, its benefits, and how to join, which indicates a need for further outreach and training on this topic within the watershed, given its potential benefits.
5. While development has been largely subdued, there is a prevalence of smaller developments planned across the watershed. Continued vigilance must be maintained so that as development occurs, good building practices continue within the watershed.

Table 24: Summary of Community Floodplain Mapping and Training Needs

County	Community	Effective Date	Submitted Data Worksheet and Mapping Needs	Current FIRMs Format (Paper or Digital)	Needs Captured in CNMS Database	Current Maps Accurate	Request for Training	Attended WebEx™	Attended In-Person Meeting
Cattaraugus	Ashford, Town of	05/25/1984	Yes	Paper	Yes	-	Yes	No	Yes
	Cattaraugus, Village of	04/20/1984	No	Paper	No data collected due to lack of participation.				
	Delevan, Village of	01/20/1984	Yes	Paper	Yes	-	Yes	No	Yes
	East Otto, Town of	04/20/1984	Yes	Paper	Yes	Yes	Yes	No	No
	Farmersville, Town of	07/23/1982	Yes	Paper	No	-	Yes	Yes	No
	Freedom, Town of	08/19/1991	Yes	Paper	No	-	Yes	No	No
	Machias, Town of	08/20/1982	No	Paper	No data collected due to lack of participation.				
	Mansfield, Town of	05/25/1984	Yes	Paper	Yes	-	Yes	No	Yes
	New Albion, Town of	12/03/1982	No	Paper	No data collected due to lack of participation.				
	Otto, Town of	04/20/1984	Yes	Paper	Yes	-	Yes	No	Yes
	Perrysburg, Town of	04/20/1984	Yes	Paper	Yes	-	Yes	No	No
	**Perrysburg, Village of	Unmapped	No	N/A	No data collected due to lack of participation.				
	Persia, Town of	04/20/1984	Yes	Paper	Yes	Yes	Yes	No	No
	Yorkshire, Town of	05/25/1984	Yes	Paper	Yes	-	Yes	No	Yes
Chautauqua	Hanover, Town of	12/18/1984	Yes	Paper	Yes	-	Yes	Yes	Yes
Erie	Brant, Town of	01/06/1984	No	Paper	No data collected due to lack of participation.				

Table 24: Summary of Community Floodplain Mapping and Training Needs

County	Community	Effective Date	Submitted Data Worksheet and Mapping Needs	Current FIRMs Format (Paper or Digital)	Needs Captured in CNMS Database	Current Maps Accurate	Request for Training	Attended WebEx™	Attended In-Person Meeting
Erie (Cont'd)	Collins, Town of	09/26/2008	No	Paper	No data collected due to lack of participation.				
	Concord, Town of	09/04/1986	Yes	Paper	Yes	-	Yes	No	Yes
	*Gowanda, Village of	09/26/2008	No	Digital	No data collected due to lack of participation.				
	**North Collins, Town of	Unmapped	No	N/A	No data collected due to lack of participation.				
	Sardinia, Town of	01/16/2003	Yes	Digital	Yes	Yes	Yes	No	Yes
	Springville, Village of	07/17/1986	Yes	Paper	Yes	Yes	Yes	No	Yes
Wyoming	Arcade, Town of	03/03/1992	Yes	Paper	Yes	-	Yes	No	No
	Arcade, Village of	03/03/1992	Yes	Paper	Yes	-	No	No	No
	Java, Town of	12/23/1983	No	Paper	No data collected due to lack of participation.				

* Dual-county community (Erie and Cattaraugus) considered part of Erie County for NFIP purposes and this Discovery process.

** This community does not participate in the NFIP.

Table 25: Summary of Community Floodplain Mapping Requests¹

County	Community	Summary of Needs/ Map Update Justification
Cattaraugus	Ashford, Town of	Bridges over Buttermilk Creek need study and possibly repair/retrofit due to flooding in 2009. Piped streams and storm drains need to be studied and county maps checked for accuracy around the Hamlet of West Valley. Studies of Connoisarauley and Buttermilk Creeks are a priority, as is a study of properties within the Hamlet of West Valley floodplain.
	Cattaraugus, Village of	No specific comment due to lack of participation.
	Delevan, Village of	Elton Creek has erosion problems along its bank. This should be studied and restored if possible. Priorities for study include Elton Creek and an unnamed stream from the corporate limits to Delevan Ave. A grant project involving Cattaraugus Creek is underway.
	East Otto, Town of	Cattaraugus Creek and a smaller creek along East Flats Rd. both require study. Excessive runoff along Snake Run Rd. should be looked into.
	Farmersville, Town of	No specific comments.
	Freedom, Town of	No specific comments.
	Machias, Town of	No specific comment due to lack of participation.
	Mansfield, Town of	Priorities for study include Mansfield Creek from the corporate limits to Maple Road, Little Valley Creek, and an unnamed tributary to Little Valley Creek from its confluence with Little Valley Creek to Toad Hollow Road. ²
	New Albion, Town of	No specific comment due to lack of participation.
	Otto, Town of	All existing studies are Zone A and should be restudied to represent either a limited detail or a detailed study. There is a pipeline under Cattaraugus Creek that experienced significant flooding in 2009. Bridges and culverts were replaced after the 2009 flood. The following should also be studied: Cattaraugus Creek - AE from corporate limits; the South Branch of Cattaraugus Creek - AE from its confluence with Cattaraugus Creek to the corporate limits; Waterman Brook – Limited Detailed from its confluence with Cattaraugus Creek to north of Traffic Street; and the entirety of the Mansfield Creek.

¹ Information gathered at meetings with communities, held by the New York State Department of Environmental Conservation (NYSDEC) in 2005, is included in this table.

² Little Valley Creek and the unnamed tributary to Little Valley Creek are located outside the Cattaraugus Watershed in the Upper Allegheny Watershed.

Table 25: Summary of Community Floodplain Mapping Requests¹

County	Community	Summary of Needs/ Map Update Justification
Cattaraugus (Cont'd)	Perrysburg, Town of	No specific comments.
	Perrysburg, Village of	No specific comment due to lack of participation.
	Persia, Town of	Thatcher Brook requires study.
	Yorkshire, Town of	After the 2009 flooding, new weirs were put in for Cattaraugus Creek from the corporate limits downstream of Elton Creek. Weirs were also put in for the Lime Lake Outlet, a culvert for the Cattaraugus Tributary, and a bank establishment for Town Line. These may warrant restudy based on the structural modifications.
Chautauqua	Hanover, Town of	<p>Possible bridge replacement on the Cattaraugus Creek at NY 5, US 20, and King Road should be investigated/studied. There is a USACE project at the mouth of Cattaraugus Creek. The USACE may have studied the breakwater. This study should be obtained and taken into account.</p> <p>Piping under Hopper Road and piping between the upper and lower reservoirs should all be studied. A breakwall was built for boats that tends to exacerbate flooding as it causes ice jams and sedimentation, compounding flooding. All of this should be looked into, some plans to dredge have been discussed.</p> <p>Residential development is underway in Sunset Bay and Hanford Bay. A subdivision has been proposed in these areas. All are in the floodplain, they should be studied and assurances made they are built to code or amended to code.</p> <p>Cattaraugus Creek should have a detailed restudy at all points where it intersects the community.</p> <p>Small tributaries that empty into Lake near Sunset Bay, Hanford Bay, and Irving require study.</p> <p>A levee along Buffalo Road, formerly known as Dike Road should be studied. Ownership of the levee is unknown. The community thought possibly the structures were owned by the USACE. The ice dam at the mouth of the levee causes the largest damages in the community. In lieu of, or perhaps in addition to its study, information should be obtained from the owner of the levee.</p>

Table 25: Summary of Community Floodplain Mapping Requests¹

County	Community	Summary of Needs/ Map Update Justification
Chautauqua (Cont'd)	Hanover, Town of (Cont'd)	<p>Rose Brook, also known as Tributary C1 to Cattaraugus Creek should be restudied from the confluence with Cattaraugus Creek to the I-90 Crossing. There is significant development potential at the Thruway interchange, as well as the site of a potential casino, all of which should be built to meet NFIP requirements.</p> <p>The approximate study for Tupper Creek needs to be extended through the Village of Forestville. The remainder of the creek is a good candidate for redelineation.³</p> <p>Silver Creek is a good candidate for redelineation from the confluence with Smith Mills Reservoir to 2.5 miles upstream. There is no development near the reservoir.⁴</p> <p>Walnut Creek is a good candidate for redelineation from the western corporate limits to the Village of Forestville Corporate limits.⁵</p> <p>The Lake Erie Shoreline is a good candidate for redelineation for its entire length within the community.</p>
Erie	Brant, Town of	No specific comment due to lack of participation.
	Collins, Town of	No specific comment due to lack of participation.
	Concord, Town of	<p>Based upon meetings that the NYSDEC held in 2005: Eighteenmile Creek from the corporate limits to approximately 1.2 miles south of Springville Boston Road should have a detailed study performed.⁶ A home and a bridge were lost to flooding along this stretch of stream. During flood events local eateries and Springville Boston Road also flood.</p> <p>Cattaraugus Creek from east of Mill Street to west of Scoby Hill should have an approximate study performed. Creek changes course and there are areas of significant flooding, homes in the area don't typically experience significant problems, however.</p>
	*Gowanda, Village of	No specific comment due to lack of participation.

³ Tupper Creek and the Village of Forestville are located in the outside the Cattaraugus Watershed in the Chautauqua-Conneaut Watershed.

⁴ Silver Creek is located outside the Cattaraugus Watershed in the Chautauqua-Conneaut Watershed.

⁵ Walnut Creek is located outside the Cattaraugus Watershed in the Chautauqua-Conneaut Watershed.

⁶ Eighteenmile Creek is outside the Cattaraugus Watershed in Buffalo-Eighteenmile Watershed.

*Dual-county community (Erie and Cattaraugus) considered part of Erie County for NFIP purposes and this Discovery process.

Table 25: Summary of Community Floodplain Mapping Requests¹

County	Community	Summary of Needs/ Map Update Justification
Erie (Cont'd)	North Collins, Town of	No specific comment due to lack of participation.
	Sardinia, Town of	The old quarry bordered by Route 16 and East Schutt Road in the South East corner of the Town was recently purchased and is slated for industrial/retail development, it represents 230 acres of land. This should be studied and ensured that it is developed to code.
	Springville, Village of	<p>South Buffalo Street bank stabilization needs to be performed along Spring Brook in the area next to the sewage treatment plant.</p> <p>The banks of Spring Brook from North Street to South Buffalo Street should be recovered and studied.</p> <p>Based upon meetings that the NYSDEC held in 2005: Spring Brook requires a detailed study from the corporate limits to South Buffalo Street. In the 1997 flooding there were areas along the creek that were under water that were outside of the currently mapped floodplain, including two homes that were lost.</p>
Wyoming	Arcade, Town of	Clear Creek and Cattaraugus Creek have many trouble spots with bank erosion issues that should be studied.
	Arcade, Village of	Cattaraugus Creek requires study.
	Java, Town of	No specific comment due to lack of participation.

VI. Risk MAP Projects and Needs

FEMA's Risk MAP program allows communities to make informed mitigation decisions by providing products and technologies that communicate and visualize risks. Risk MAP also equips communities with the information and tools they need to develop mitigation programs and actions.

Coastal Studies

As discussed in the Overview section of this report, Coastal flood hazard analyses and mapping will be performed for some communities along the shoreline of Lake Erie as a part of the GLCFS. This study will produce revised flood hazard analysis and work maps. Currently there is no scope of work for FIRM production.

Below is a summary of data that will be collected and analysis that will be performed:

1. Creation of Bathymetric and Topographic Map Data Inventory

Topographic data for the coastal areas to be studied will be used for coastal analysis, floodplain boundary delineation, and/or testing of floodplain boundary standard compliance. The topographic data used will be based on the data collected as part of this Discovery process, and will depend on the date and accuracy of existing topographic data. Only topographic data that are of better quality than that of the existing study and effective FISs will be used. New topographic and bathymetric LiDAR, orthoimagery, and [hyperspectral imagery](#) will be used for the coastal study areas and will replace the existing datasets.

2. Base Map Acquisition

Base map data for all counties, including data collected during this Discovery process as an initial inventory will be collected and organized. The necessary permissions from the map sources will be obtained to allow FEMA to use and distribute hard-copy and digital map products using the digital base map. Base map data must comply with FEMA's Guidelines and Standards (G&S).

3. Coastal Flood Hazard Analysis

Response-based computational approaches outlined in FEMA G&S Appendix D.3, dated May 2012 (FEMA, 2012), will be used to perform coastal flood hazard analysis for the Lake Erie shoreline and areas subject to coastal flooding or more recent requirements depending on the date of contract and requirements current at the time. Coastal flood hazard analyses include some but not all of the following components:

- Wave setup;
- Erosion;
- Wave runup;
- Wave overtopping;
- Overland wave propagation; and
- Primary frontal dune identification (where applicable).

A transect-based approach for assessing coastal flood risks along Lake Erie will be used.

The 1.5-foot breaking wave height will be selected from the Wave Height Analysis for Flood Insurance Studies' results and used to define the landward limits of the Limit of Moderate Wave Action (LiMWA) as described in FEMA Procedure Memorandum No. 50, updated in 2012.

Coastal flood hazards will be mapped as outlined in FEMA's G&S Appendix D.3, dated May 2012 (FEMA, 2012). Flood hazard mapping will extend to the landward limit of coastal flooding as a result of wave run up or storm surge, whichever is higher.

Coastal flood maps (or work maps) will be produced for the study area. The work maps will include the 1- and 0.2- percent-annual-chance SFHA, Coastal High Hazard Area (Zone VE), BFEs, and LiMWA. Communities will be provided with an opportunity to review the work maps after the coastal modeling is complete and before FEMA moves forward with updated coastal flood maps.

Mitigation Projects

During the Discovery process, FEMA, NYSDEC, and RAMPP met with the communities and discussed their recent and current mitigation projects. Based on the results of the Lake Erie coastal study, the communities can determine if their existing projects and programs are adequate or if they would benefit from additional mitigation measures.

Technical assistance is available through Risk MAP to help communities identify, select, and implement activities to support mitigation planning and risk reduction. Activities could include (but are not limited to):

- Advising in the creation of initial HMPs;
- Advising in the update of existing HMPs;
- Training to improve a community's capabilities for reducing risk;
- Assisting in incorporating flood risk datasets and products into potential and effective community legislation, guidance, regulations, procedures, etc.;
- Assisting with creating, acquiring, and incorporating GIS data into potential and effective maps, planning mechanisms, emergency management procedures, etc.; and
- Facilitating the identification of data gaps and interpreting technical data to identify risk reduction deficiencies that should be corrected.

Regulatory Considerations

Coastal Special Flood Hazard Areas

The Lake Erie Coastal Flood Study analysis may result in new SFHAs, or areas that will be inundated by a flood event having a 1-percent annual chance of being equaled or exceeded in any given year. The 1-percent-annual-chance flood is also referred to as the base flood or 100-year flood. SFHAs labeled as Zone AE have been studied by detailed methods and show BFEs. SFHAs labeled as Zone VE are along coasts and are subject to additional hazards from storm-induced velocity wave action. BFEs derived from detailed hydraulic analyses are shown within these zones.

The NFIP shows coastal flood hazards in two different zones on its FIRMs:

- Zone VE, where the delineated flood hazard includes wave heights equal to or greater than 3 feet; and
- Zone AE, where the delineated flood hazard includes wave heights less than 3 feet.

These zones were discussed in greater detail during the Discovery meetings. .

Building Requirements in VE Zones

The zone designation and the BFE are critical factors in determining which requirements apply to a building and, as a result, how the structure must be built. The NFIP minimum requirements for buildings constructed in Zone VE (Coastal High Hazard Areas) are as follows:

1. The building must be elevated on pile, post, pier, or column foundations.
2. The building must be adequately anchored to the foundation.
3. The building must have the bottom of the lowest horizontal structural member at or above the BFE, with NYSDEC requiring a minimum of 2 feet above the BFE.
4. The building design and method of construction must be certified by a design professional.
5. The area below the BFE must be free of obstructions.
6. Enclosures must be made of lightweight wood lattice, insect screening, or breakaway walls.

Communities participating in the NFIP that have mapped VE Zones must adopt floodplain management regulations that meet or exceed the minimum NFIP and New York State requirements described above.

LiMWA

Post-storm field investigations and laboratory tests have confirmed that waves heights as low as 1.5 feet can cause significant damage to structures that are constructed without consideration of coastal hazards. Additional flood hazards associated with coastal waves include floating debris, high velocity flow, erosion, and scour, which can cause damage to Zone AE-type construction in these coastal areas.

To help community officials and property owners recognize this increased potential for damage due to wave action in the AE Zone, FEMA issued Procedure Memorandum 50 in December 2008, as modified by Operating Guidance No. 13-13 Oct. 30, 2013, which provides guidance on identifying and mapping the 1.5-foot breaking wave height line, referred to as the LiMWA. The LiMWA alerts property owners on the lakeward side of this line that although their property is in a Zone AE area, it may also be affected by breaking waves of 1.5 feet to just below 3.0 feet. Consequently, it is important to be aware of the area between this waterward limit and the Zone VE boundary, as the area may face a high risk—though not as high as Zone VE. Figure 7 depicts the LiMWA zone location.

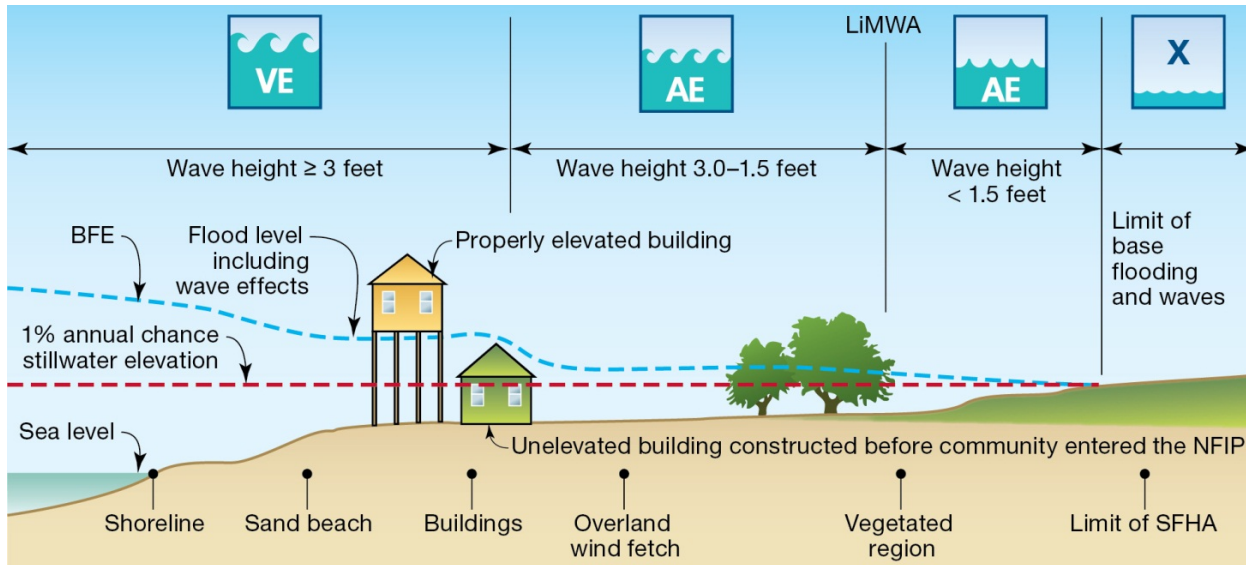


Figure 7: Limit of Moderate Wave Action

A new line layer will be added to the FIRM Database to accommodate the LiMWA features. The new layer will also be depicted on updated FIRM panels. The LiMWA will be identified in the FIRM legend as “Limit of Moderate Wave Action,” and a note will be included in the “Notes to Users” section on the map panel to explain the LiMWA boundary.

Figure 8 is an example FIRM showing the delineated LiMWA. The area in Map A shows the delineation of the LiMWA in an area where the predominant coastal flood hazard is overland wave propagation. Map B shows the delineation of the LiMWA in a region where the major coastal flood hazard is breaking waves and wave runoff. The triangles along the LiMWA line points toward the source of the breaking waves.

While FEMA does not impose floodplain management requirements based on the LiMWA, the LiMWA is provided to help communicate the higher risk that exists in that area. Because the 1.5-foot breaking wave in the LiMWA zone can potentially cause foundation failure, communities must adopt building construction standards similar to those in Zone VE in those areas. For communities that do adopt Zone VE building standards in the area defined by the LiMWA, additional CRS credits are available. Additional information on CRS can be found [online](#).

Mapping the LiMWA provides community officials and other stakeholders with additional important flood risk details to consider when buying/developing, mitigating, or enforcing floodplain management regulations in coastal flood hazard areas. When a LiMWA has been mapped, specific building codes may apply lakeward of the line.

Residents and business owners living or working in the LiMWA zone should be aware of the potential wave action along with floating debris, erosion, and scour that could cause significant damage to their property. They are encouraged to build safer and higher than the minimum local requirements in order to reduce the risk to life and property.

While the risk of damage is higher between the LiMWA line and the Zone VE line than it is in other parts of the coastal AE Zone, the NFIP flood insurance rates currently do not differ from other AE Zone rates.

The federal mandatory purchase requirement does apply in these zones, and property owners are encouraged to carry coverage equivalent to the replacement cost of their building and to include contents coverage.

For additional background information on the LiMWA, please refer to FEMA [Procedure Memorandum No. 50](#) and [Operating Guidance No. 13-13](#).

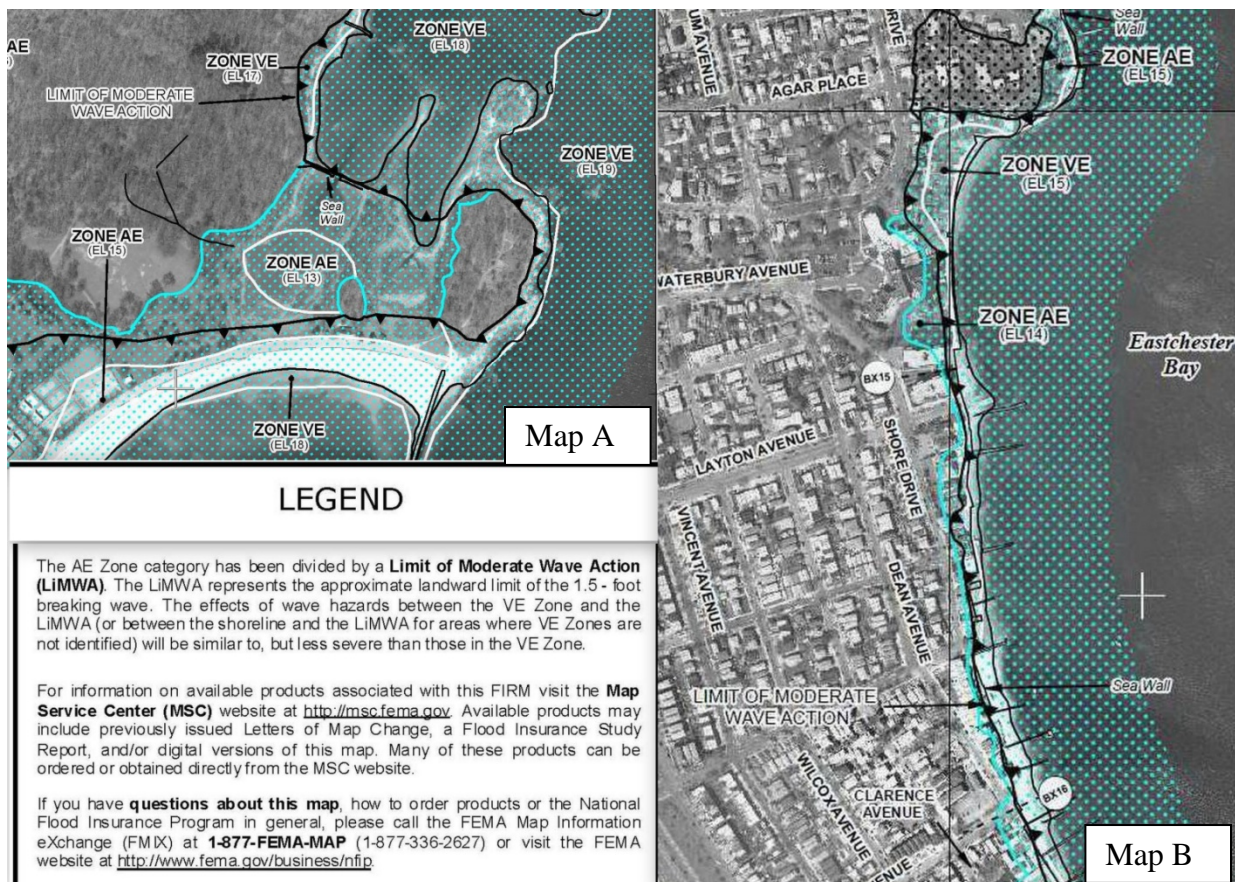


Figure 8: Example FIRM Showing LiMWA

VII. Conclusion

None of the communities within the Cattaraugus Watershed, with the exception of the Village of Gowanda and Town of Sardinia which are a part of a partial countywide digital study for Erie County, have digital floodplain products. These communities have expressed concern with current mapping accuracy, paper products, and lack of information to make accurate floodplain management determinations. As noted in the Demographics Section of this Report, the watershed's slow, but steady population growth offers local jurisdictions the opportunity for thoughtful floodplain mitigation and management. The quality of the available flood data and lack of digital products makes floodplain management and mitigation problematic. Continued vigilance must be maintained so that as the economy improves, good building practices continue for communities within the watershed.

Stream extents that have consistently been discussed as priority needs (as shown in Table 24: *Summary of Community Floodplain Mapping Requests*) and warrant updated studies include Cattaraugus Creek, South Branch Cattaraugus Creek, Buttermilk Creek, Prospect Creek, Elton Creek, Mansfield Creek, Little Valley Creek, Waterman Brook, Spring Creek, and Lake Erie.

In general, a particular emphasis on joining the NFIP's CRS program would benefit these and all watershed communities. There seems to be a great deal of misinformation and lack of communication as to what the CRS is; if a community is eligible for membership; and what level of effort is required to make the CRS beneficial for a community. Local communities may wish to consider pooling resources/efforts or work on a countywide-basis to ease the effort of complying with the requirements of joining the CRS program.

In addition, the prevalence of smaller developments (often as limited as two building sites) planned across the watershed may be a challenge to effective floodplain management, as these micro-developments can easily slip through regulatory cracks. Local officials need to be aware that the NFIP minimum building standards apply to all construction in the SFHA as well as the current NYS Building Code. The NFIP also has additional regulations for projects within the approximate A Zone involving 50 lots or 5 acres, whichever is smaller (44 CFR §60.3(b)(3)). Information on the NFIP's building requirements in the SFHA can be found in the NYSDEC's Floodplain Construction Requirements in New York State.

VIII. Deliverables

Communications (Supporting materials available in Appendices C, and H-M)

Contacts

Stakeholders

Notifications/Invitations

A. *Discovery Meeting Notification via emails (WebEx™) and paper copies (in-person meetings)*

B. *Meeting notes distributed via email and through RAMPP website*

Information Exchange (Supporting materials available in Appendix N)

Community Data Worksheets

Discovery Meeting (Supporting materials available in Appendices K-N)

Agenda

Presentation

Sign-In Sheet

Discovery Meeting Map

Meeting Minutes

Evaluations

Discovery Deliverables

Report

Project Area Map

Final Discovery Maps

Tabular Data, including Data Sources and Mapping Needs

Geodatabase

CNMS Database Updates

Due to file size, the Discovery meeting maps and CNMS database have not been included in the Discovery report. Maps and data are available through NYSDEC for review upon request.

IX. References

Federal Emergency Management Agency, www.fema.gov

FEMA, Map Service Center. <https://msc.fema.gov/portal>.

Federal Emergency Management Agency, HAZUS flood loss estimation.
<http://www.fema.gov/HAZUS>.

FEMA, Disasters, <http://www.fema.gov/disasters>.

FloodSmart, the official site of the National Flood Insurance Program (NFIP):
www.floodsmart.gov

National Committee on Levee Safety: <http://www.leveesafety.org/>.

National Weather Service Ice Jam Information:
<http://www.weather.gov/media/aly/Hydrology/IceJamInfo.pdf>

New York State Department of Environmental Conservation: <http://www.dec.ny.gov/>

NFIP Reform: www.fema.gov/bw12

Risk Assessment, Mapping and Planning Partners: www.RAMPP-team.com/ny.htm

U.S. Census Bureau, 2010, State and County Quick Facts, <http://quickfacts.census.gov/>,
accessed November 2014.

U.S. Fish and Wildlife, Coastal Barrier Resources System: <https://www.fws.gov/ecological-services/habitat-conservation/coastal.html>

USGS National Water Information System: <http://nwis.waterdata.usgs.gov/ny/nwis/peak>

U.S. Department of Agriculture, New York Rapid Watershed Assessment Profile:
<http://www.nrcs.usda.gov/wps/portal/nrcs/main/ny/technical/dma/rwa/>

USDA 2007 Census of Agriculture:
<http://www.agcensus.usda.gov/Publications/2007/index.php>