Discovery Report

Indian Watershed

HUC 04150303

Jefferson, Lewis, and St. Lawrence Counties, New York*

These counties span multiple watersheds. Please see the following page for a complete list of communities fully or partially located in the Indian Watershed.

Report Number 01
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Federal Emergency Management Agency
Department of Homeland Security
26 Federal Plaza
New York, NY

Project Area Community List

This list includes communities targeted by the New York State Department of Environmental Conservation (NYSDEC) that are located fully or partially within the Indian Watershed. While all communities may be under consideration for a revised Federal Emergency Management Agency (FEMA) Flood Insurance Study (FIS) and Flood Insurance Rate Map (FIRM), not all communities will receive new/updated FEMA FISs or FIRMs as a result of this Discovery project.

Jefferson County

Antwerp, Town of*
Antwerp, Village of*
Philadelphia, Town of*
Philadelphia, Village of*
Theresa, Town of*
Theresa, Village of*
Wilna, Town of*

Lewis County

Diana, Town of*
Croghan, Town of*

St. Lawrence County

De Peyster, Town of*
Hammond, Town of*
Hammond, Village of*
Macomb, Town of*
Morristown, Town of*
Oswegatchie, Town of*
Rossie, Town of*

* Partially within the Indian Watershed

Study Date

The information and data presented in this report are static and are current as of January 2020. Previously, in-person Discovery Meetings were held on September 18th and 19th, 2019. Outreach to communities to complete the Risk MAP Discovery Project Stakeholder Survey was continued through December 2019. Additional details on meetings and stakeholder involvement can be found in Sections IV and V of this report. As applicable, dates of data creation are noted throughout the report.

I. Contents

FIGURES

APPENDICES

Acronyms and Abbreviations

AAL	Average Annualized Loss
BFE	Base Flood Elevation
BLE	Base Level Engineering
CAC	Community Assistance Contact
CAV	Community Assistance Visit
CFR	Code of Federal Regulations
CID	Community Identification Number
CIS	Community Information System
CNMS	Coordinated Needs Management Strategy
CRS	Community Rating System
DEM	Digital Elevation Model
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Map
FIS	Flood Insurance Study
FIPS	Federal Information Processing Standard
FMA	Flood Mitigation Assistance
GIS	Geographic Information System
Hazus-MH	Multi-Hazard Risk Assessment and Loss Estimation Software Program
HAZNY	Hazards- New York
HIRA-NY	Hazard Identification and Risk Assessment New York
HMA	Hazard Mitigation Assistance
HMGP	Hazard Mitigation Grant Program
HMP	Hazard Mitigation Plan
HWM	High Water Mark
HUC	Hydrologic Unit Code
LiDAR	Light Detection and Ranging

LOMA	Letter of Map Amendment
LOMC	Letter of Map Change
LOMR	Letter of Map Revision
LOMR-F	Letter of Map Revision based on Fill
MS4	Municipal Separate Storm Sewer System
NFIP	National Flood Insurance Program
NIBS	National Institute of Building Sciences
NOAA	National Oceanic and Atmospheric Administration
NRCS	Natural Resources Conservation Service
NWS	National Weather Service
NYSDEC	New York State Department of Environmental Conservation
NYSDHSES	New York State Division of Homeland Security and Emergency Services
PDM	Pre-Disaster Mitigation
Risk MAP	Risk Mapping, Assessment, and Planning
RL	Repetitive Loss
SFHA	Special Flood Hazard Area
SPDES	State Pollutant Discharge Elimination System
SRL	Severe Repetitive Loss
SWCD	Soil and Water Conservation District
USACE	United States Army Corps of Engineers
USDA	United States Department of Agriculture
USGS	United States Geological Survey

Glossary of Terms

1-Percent-Annual-Chance Flood: The flood having a 1-percent chance of being equaled or exceeded in any given year. This is the regulatory standard also referred to as the "100-year flood" or "base flood". The base flood is the national standard used by the National Flood Insurance Program (NFIP) and all Federal agencies for the purposes of requiring the purchase of flood insurance and regulating new development. Base Flood Elevations (BFEs) are typically shown on Flood Insurance Rate Maps (FIRMs). (Federal Emergency Management Agency (FEMA))

0.2-Percent-Annual-Chance Flood: A flood that has a 0.2-percent chance of being equaled or exceeded in any given year. This is also referred to as the "500-year flood". (FEMA)

Approximate Study: Areas subject to inundation by the 1-percent-annual-chance flood event generally determined using approximate methodologies. Because detailed hydraulic analyses have not been performed, no BFEs or flood depths are shown. Mandatory flood insurance purchase requirements and floodplain management standards apply. An approximate study is represented on a FIRM as Zone A. (FEMA)

Average Annualized Loss (AAL): AAL is the estimated long-term value of losses to the general building stock averaged on an annual basis for a specific hazard type. Annualized loss considers all future losses for a specific hazard type resulting from possible hazard events with different magnitudes and return periods averaged on a "per year" basis. Like other loss estimates, AAL is an estimate based on available data and models. Therefore, the actual loss in any given year can be substantially higher or lower than the estimated annualized loss. (FEMA)

Base Flood Elevation (BFE): The computed elevation to which floodwater is anticipated to rise during the base flood. BFEs are shown on FIRMs and on the Flood Profiles in the FIS report. The BFE is a regulatory requirement for the elevation or flood proofing of structures. The relationship between the BFE and a structure's elevation determines the flood insurance premium. (FEMA)

Base Level Engineering (BLE): A watershed-wide engineering modeling method that uses high-resolution ground topography, automated model building techniques, and manual model review. BLE allows an engineer to perform large-scale modeling at a fraction of the effort. BLE provides modeling needed to assess unknown and unverified flood hazard areas. (FEMA)

Coordinated Needs Management Strategy (CNMS): A FEMA Geographic Information System (GIS) tool that identifies and tracks the lifecycle of mapping requests and needs for the flood hazard mapping program. (FEMA)

Dam: An artificial barrier that can impound water, wastewater, or any liquid-borne material, for the purpose of storage or control of water. (FERC)

Declared Disaster: Local and State governments share the responsibility for protecting their citizens and for helping them recover after a disaster strikes. In some cases, disasters are beyond the capabilities of local, State, and tribal government. In 1988, the Stafford Act was enacted to

support local, State, and tribal governments and their citizens when disasters overwhelm and exhaust their resources. This law, as amended, established the process for requesting and obtaining a Presidential Emergency or Disaster Declaration, defined the type and scope of assistance available from the Federal Government, and set the conditions for obtaining assistance. Steps for a Disaster Declaration include: (1) Local government responds, supplemented by neighboring communities and volunteer agencies. (2) If the local government is overwhelmed, the State responds, (3) Damage assessments are completed to determine total losses and recovery needs, (4) Disaster Declaration is requested by the governor of the state or by a tribal Chief Executive Officer (CEO), (5) Based on damage assessments, FEMA evaluates the request, and then (6) the President approves or denies the request. (FEMA)

Detailed Study: A flood hazard mapping study done using hydrologic and hydraulic methods that produce BFEs, floodways, and other pertinent flood data. Detailed study areas are shown on the FIRM as Zones AE, AH, AO, AR, A99, A1-A30, and in coastal areas Zones V, VE, and V1-30. (FEMA)

Digital Elevation Model (DEM): regularly spaced elevation values referenced horizontally either to a Universal Transverse Mercator (UTM) projection or to a geographic coordinate system. (USGS)

Flood Insurance Rate Map (FIRM): The official map of a community on which FEMA has delineated both the special hazard areas and the risk premium zones applicable to the community. (FEMA)

Flood Insurance Study (FIS): A compilation and presentation of flood risk data for specific watercourses, lakes, and coastal flood hazard areas within a community. When a flood study is completed for the NFIP, the information and maps are assembled into an FIS. The FIS report contains detailed flood elevation data depicted in flood profiles and tables. (FEMA)

Flood Mitigation Assistance (FMA): The FMA program provides funds for projects to reduce or eliminate risk of flood damage to buildings that are insured under the NFIP on an annual basis. There are three types of FMA grants available and include (1) planning grants, (2) project grants, and (3) management cost grants. (FEMA)

Multi-Hazard Risk Assessment and Loss Estimation Program (Hazus-MH): Hazus-MH is a nationally applicable standardized methodology that estimates potential losses from earthquakes, hurricane winds, floods, and tsunamis. FEMA developed Hazus-MH under contract with the National Institute of Building Sciences (NIBS). Hazus-MH uses state-of-the-art GIS software to map and display hazard data and the results of damage and economic loss estimates for buildings and infrastructure. It also allows users to estimate the impacts of earthquakes, hurricane winds and floods on populations. (FEMA)

Hazard Mitigation Assistance (HMA): FEMA's HMA grant programs provide funding for eligible mitigation activities that reduce disaster losses and protect life and property from future

disaster damages including the Hazard Mitigation Grant Program (HMGP), Pre-Disaster Mitigation (PDM), and Flood Mitigation Assistance (FMA). (FEMA)

Hazard Mitigation Grant Program (HMGP): The HMGP provides grants to States or Tribes and local governments (as sub-grantees) to implement long-term hazard mitigation measures after a major disaster declaration. Each State or Tribe (if applicable) administers the HMGP in its jurisdiction. The purpose of the HMGP is to reduce the loss of life and property due to natural disasters and to enable mitigation measures to be implemented during the immediate recovery from a disaster. The HMGP is authorized under Section 404 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act. Individual homeowners and businesses may not apply directly to the program; however, an eligible applicant or sub-applicant may apply on their behalf. (FEMA)

HUC (Hydrologic Unit Code): The United States Geological Survey (USGS) divides and sub-divides the area of the United States into successively smaller hydrologic units which are classified into four levels: regions, sub-regions, accounting units, and cataloging units. The hydrologic units are arranged or nested within each other, from the largest geographic area (regions) to the smallest geographic area (cataloging units). 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. (USGS)

Hydraulics: The science that deals with fluids in motion, is used to determine how a quantity of water will flow through a channel or floodplain. For purposes of floodplain analysis, hydraulics is the study of floodwaters moving through the stream and the floodplain. (FEMA)

Hydrology: The science that encompasses the occurrence, distribution, movement, and properties of the waters of the earth and their relationship to the environment within each phase of the hydrologic cycle. The water cycle or hydrologic cycle, is a continuous process by which water is purified by evaporation and transported from the earth's surface (including the oceans) to the atmosphere and back to the land and oceans. (USGS)

Light Detection and Ranging (LiDAR**):** is a remote sensing method that uses light in the form of a pulsed laser to measure ranges (variable distances) to the Earth. These light pulses—combined with other data recorded by the airborne system— generate precise, three-dimensional information about the shape of the Earth and its surface characteristics. LIDAR systems allow scientists and mapping professionals to examine both natural and manmade environments with accuracy, precision, and flexibility. (NOAA)

Letter of Map Amendment (LOMA): A LOMA is an official amendment, by letter, to an effective NFIP map. A LOMA establishes a structure and/or property's location in relation to the Special Flood Hazard Area (SFHA). LOMAs are usually issued because a structure and/or property has been inadvertently identified as being in the floodplain, but is on natural high ground above the BFE or outside of the mapped floodplain as shown on the FIRM. Because a LOMA officially amends the effective NFIP map, it is a public record that the community must maintain.

Any LOMA should be noted on the community's master flood map and filed by FIRM panel number in an accessible location. (FEMA)

Letter of Map Change (LOMC): A general term used to refer to the several types of revisions and amendments to FEMA maps that can be accomplished by letter. They include LOMAs, Letters of Map Revision (LOMRs), and Letters of Map Revision based on Fill (LOMR-Fs). (FEMA)

Letter of Map Revision (LOMR): FEMA's modification to an effective FIRM. LOMRs are generally based on the implementation of physical measures that affect the hydrologic or hydraulic characteristics of a flooding source and thus result in the modification of the existing regulatory floodway, the effective BFEs, and/or the SFHA. The LOMR officially revises the FIRM and associated tables/Flood Profiles as applicable in the FIS report. (FEMA)

Letter of Map Revision Based on Fill (LOMR-F): A LOMR-F is FEMA's modification of the SFHA shown on the FIRM based on the placement of fill outside the existing regulatory floodway. (FEMA)

Levee/Floodwall: A man-made structure designed to contain or control the flow of water. Levees and floodwalls are constructed from earth, compacted soil, or artificial materials, such as concrete or steel. To protect against erosion and scouring, earthen levees can be covered with grass and gravel or hard surfaces like stone, asphalt, or concrete. (FEMA)

Map Modernization: A multi-year Presidential initiative funded by Congress from fiscal year (FY) 2003 to FY 2008 that improved and updated the nation's flood maps and provided 92 percent of the nation's population with digital FIRMs. (FEMA)

Mitigation: Any cost-effective action taken to eliminate or reduce the long-term risk to life and property from natural and technological hazards, including, but not limited to, flooding. Flood mitigation measures include: elevation, flood proofing, relocation, demolition, or any combination thereof. (FEMA)

Pre-Disaster Mitigation (PDM): The PDM grant program provides funds for hazard mitigation planning and projects on an annual basis. The PDM program was put in place to reduce overall risk to people and structures, while at the same time reducing reliance on Federal funding if an actual disaster were to occur. (FEMA)

Repetitive Loss (RL) property: A RL property is any insurable building for which two or more claims of more than $1,000 were paid by the NFIP within any rolling ten-year period since 1978. A RL property may or may not be currently insured by the NFIP. (FEMA)

Risk Mapping, Assessment, and Planning (Risk MAP) program: The FEMA program that provides communities with flood risk information and tools to support mitigation planning and risk reduction actions. (FEMA)

Severe Repetitive Loss (SRL) property: A SRL property is a single family property (consisting of one to four residences) covered by flood insurance underwritten by the NFIP that has incurred flood-related damage for which four or more separate claim payments have been paid with the amount of each claim payment exceeding $5,000 and with the cumulative amount of such claim payments exceeding $20,000; or for which at least two separate claim payments have been made with the cumulative amount of such claims exceeding the market value of the property. (FEMA)

Special Flood Hazard Area (SFHA): SFHAs are high-risk areas subject to inundation by the base (1-percent-annual-chance) flood; they are also referred to as 1-percent-annual-chance floodplains, base floodplains, or 100-year floodplains. (FEMA)

Stakeholder: An individual or group that has an interest in a decision or proposed action. A stakeholder may have none, one, or more of the following roles: has authority or decision-making power over some aspect of the project, is affected by the outcome of the project, will be a part of implementing the project, and/or can stop or delay the project (through litigation or other means). A project may have multiple stakeholders, and these stakeholders often have conflicting interests and want competing outcomes. (FEMA)

Watershed: A watershed is a basin-like landform defined by highpoints and ridgelines that descend into lower elevations and stream valleys. A watershed carries water from the land after rain falls and snow melts. Drop by drop, water is channeled into soils, aquifers, creeks, and streams, making its way to larger rivers and eventually the sea. (Watershed Atlas)

Water Year: The 12-month period beginning on October 1st for any given year and ending on September 30th of the following year. The water year is designated by the calendar year in which it ends, and which includes 9 of the 12 months. Thus, the year ending September 30, 2019, is called the "2019" water year. (USGS)

Executive Summary

The Federal Emergency Management Agency (FEMA) Discovery Report provides users with a comprehensive understanding of historical flood risk, existing flood-related data, and local needs concerning FEMA Flood Insurance Studies (FISs) and Flood Insurance Rate Maps (FIRMs) and current flood mitigation activities within the North Country Watersheds in upstate New York.

FEMA, in coordination with the New York State Department of Environmental Conservation (NYSDEC), completed the Discovery process for eight sub-basins within the larger North Country Watersheds. These eight watershed sub-basins are: Chateaugay-English, Grass, Indian, Oswegatchie, Raquette, Salmon, St. Regis, and Upper St. Lawrence. The Discovery process involves significant watershed-wide data collection and outreach efforts with local stakeholders using several methods, including individual telephone calls, flyers, e-mails, webinars, and in-person meetings. During the outreach process, emphasis is placed on opportunities for stakeholders to provide their comments and concerns and provide input for future mapping projects. Conversations during the meetings focused on the types of existing data sources that could be used as part of a Risk MAP project, community mapping needs, locations of development pressure, and mitigation assistance requirements.

In addition to collecting information about mapping needs and existing data sources, the Discovery project also identified mitigation activities within the watershed. County-based Hazard Mitigation Plans (HMPs) were reviewed to better understand existing flood risks within communities in the watershed. These HMPs are developed as part of the local planning process and are prepared at the county level. Stakeholders provided additional information about ongoing mitigation activities in the watersheds, and several communities requested specific training focused on hazard mitigation planning and future projects. Data collected from the stakeholders, information on flood hazard mitigation projects, and actions identified during the Discovery process can be found in *Section IV: Summary of Watershed-Wide Data* in this report.

A recommended scope of work for the North Country Watersheds Discovery project was developed using community mapping needs and information about existing data collected during the stakeholder engagement process. The Indian Watershed consists of three counties and 16 communities.

Communities in the Indian Watershed have a mix of older community-based, paper FIRMs issued between 1982 and 1993. Communities in Jefferson, Lewis, and St. Lawrence Counties would benefit from a modernized FIRM in a digital format. Many community officials find the existing maps difficult to work with and the floodplains shown are inaccurate or absent. These communities would also benefit from the development of Base Flood Elevations (BFEs) and updated flood hazard mapping. The new / revised detailed studies along key streams and lake segments, combined with updated approximate studies supported by Base Level Engineering (BLE) in a new digital format, should be sufficient to assist with enforcement and support safe

development. Beyond upgrading existing detailed and approximate mapping for Jefferson, Lewis, and St. Lawrence Counties to a digital format, the resulting scope of work also included 4 high priority stream / lake study requests with a total detailed stream study mileage of 27.9 miles. More specific information on stream study requests and other community needs collected through the Discovery process can be found in Section VII of this report. A copy of the recommended scope of work can be found in *Appendix R: Recommended Scope of Work Memorandum*.

II. Discovery Overview

The FEMA Risk MAP program helps communities identify, assess, and reduce their flood risk. Through Risk MAP, FEMA provides information to enhance county HMPs, improve community outreach, and increase local resilience to floods.

The North Country Watersheds Discovery project is an interactive process that gathers existing data useful in updating FIS reports, and results in a watershed-wide assessment of existing flood hazard mapping needs, and ultimately, recommendations for the development of updated Risk MAP products, such as revised FIRMs.

Discovery occurs after FEMA's planning and budgeting cycle, when watersheds of interest have been selected for further examination in coordination with Federal and State-level stakeholders. Watersheds are 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 and augmented by community-supplied flood risk information and data collected during the Discovery process. Community participation is necessary to ensure that FEMA has the most up-to-date understanding of a community's flood risk.

The Discovery process does not necessarily mean that a new Risk MAP project will take place – instead, it is the process through which FEMA and NYSDEC learn about local flooding issues and prioritize the need for new studies or other support that may be provided under the Risk MAP program. Additional support may include the development of new training and outreach programs or aiding selected communities to advance mitigation actions or join the Community Rating System (CRS).

During Discovery, FEMA, NYSDEC, and partners:

- Gather information about local flood risk and flood hazards
- Review county HMPs to understand local mitigation capabilities, hazard risk assessments, and current or future mitigation activities
- Support communities within the watersheds to develop a vision for the watershed's future
- Collect information from communities about their flooding history, effective FIRM usability, development plans, daily operations, and stormwater and floodplain management activities
- Use all information gathered to identify and prioritize areas of the watersheds that require updated flood hazard mapping, risk assessment, or mitigation planning assistance through a Risk MAP project, and
- Develop a Discovery Report and Maps that summarize and display the Discovery findings

III. Indian Watershed Overview

Watershed Characteristics and Geography

As described by the U.S. Geological Survey (USGS), watersheds in the United States are "divided and sub-divided into successively smaller hydrologic units classified into six levels. The hydrologic units are arranged within each other, from the smallest (sub-watersheds) to the largest

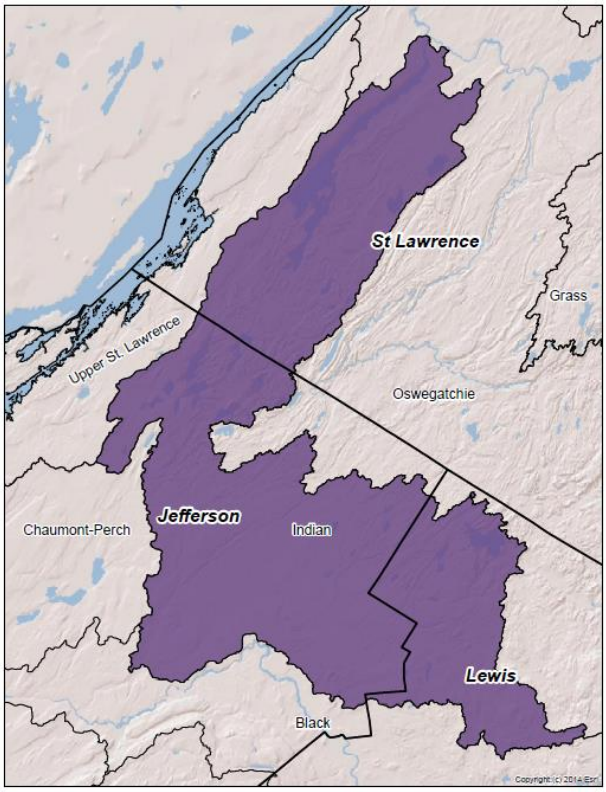

Figure 1: Indian Watershed

(regions). Each hydrologic unit is identified by a unique hydrologic unit code (HUC) consisting of two to twelve digits based on the six levels of classification in the hydrologic unit system."[1]

The Indian Watershed lies in portions of Jefferson, Lewis, and St. Lawrence Counties.[2] The watershed covers approximately 562 square miles of land area in upstate New York. Forests dominate the landscape of the region, as characterized by deciduous, evergreen, and mixed forests, and accounts for about half of the land coverage in the Indian Watershed.[3]

[1] *Hydrologic Unit Maps, U.S. Geological Survey. usgs.gov.* http://water.usgs.gov/GIS/huc.html
[2] St. Lawrence River Watershed Overview
[3] Rapid Watershed Assessment Profiles

Demographics

Population

According to the 2010 U.S. Census Bureau data, the Indian Watershed includes a population of 35,616. Communities in the watershed are generally small, with many towns having a centrally located village. The largest community in the watershed is the Town of Wilna with a population of 6,427.[4] The distribution of population in the watershed is shown in *Table 1: Approximate 2010 Population in the Indian Watershed*

Table 1: Approximate 2010 Population in the Indian Watershed

County	Total County Population (2010 data)	Percent of County in the Indian Watershed	2010 Estimated Population in the Indian Watershed	Square Miles in the Indian Watershed
Jefferson	116,234	23%	26,733	291
Lewis	27,087	8%	2,167	109
St. Lawrence	111,940	6%	6,716	163
Total	255,261	-----	**35,616**	563

Source: U.S. Census 2010, New York Rapid Watershed Assessment Profiles

Government/Representatives

The NYS Municipal Home Rule law grants significant authority to local government, including lawmaking and administrative powers. *Table 2: County Government Organization* outlines each county's administrative and legislative officials. Jefferson, Lewis, and St. Lawrence Counties have adopted specific County Charters, which divide executive and legislative duties between the County Executive/Manager/Administrator and the County Legislature.

Table 2: County Government Organizations

County	Chief Administrative Official	Legislative Body
Jefferson	County Administrator	Board of Legislators (15 members)[5]
Lewis	County Manager	Board of Legislators (10 districts, 12 members)[6]
St. Lawrence	County Administrator	Board of Legislators (15 members)[7]

[4] https://www.census.gov/quickfacts/wilnatownjeffersoncountynewyork
[5] *https://co.jefferson.ny.us/departments/Legislature/county-legislators*
[6] *http://greenegovernment.com/greene-government/county-legislature*
[7] *https://www.stlawco.org/Departments/BoardofLegislators/FindMyLegislator/LegislatorList*

Project Area Description

Land Area coverage in the Indian watershed is diverse. St. Lawrence County accounts for 52% of the land area, followed by Jefferson County with 29%, and Lewis County with 19%. There are approximately 330 farms within the watershed.[8] Farm operations in the region are dominated by milk cows, grains, oilseeds, beans, peas, apples, and maple syrup production. The predominant crops are grass seed, hops, and grass silage[9].

More information on property ownership can be found on each county's Real Property webpage as noted in *Table 3.* Land characteristics in the watershed are dominated by mixed forest, grassland, and wetland. Aside from mixed forests and grassland, open water and farmland are common.

Table 3: Links to Real Property Webpages

County	Hyperlink to Real Property Webpage
Jefferson	*https://co.jefferson.ny.us/departments/RealProperty*
Lewis	*https://www.lewiscounty.org/departments/real-property/real-property*
St. Lawrence	*https://www.stlawco.org/Departments/RealProperty/*

Jefferson County

Jefferson County is located in the north-central part of New York. The county is bordered to the east by Lewis County, the north by Canada and St. Lawrence County, the west by Canada (Lake Ontario), and the south by Oswego County. Jefferson County covers 1,857 square miles[10] (land and water) and has a population of 116,229 with an average density of 91.6 people per square mile. The county seat is the City of Watertown. In Jefferson County, 36.7% of the county is being used for agriculture and 23% for residential areas.[11]

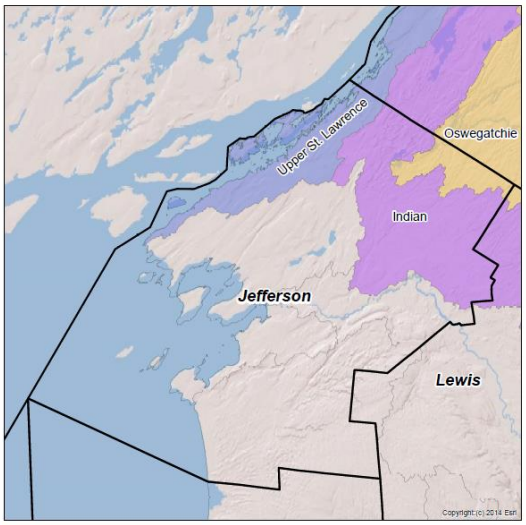

Figure 2: Jefferson County

[8] Rapid Watershed Assessment Profiles
[9] *A Profile of Agriculture in New York State, 2019*
[10] *https://www.census.gov/quickfacts/jeffersoncountynewyork*
[11] Jefferson County Hazard Mitigation Plan, page 196

Lewis County

Lewis County is a rural county located in the north-central part of New York. The county is bordered to the east by Herkimer County, the north by St. Lawrence County, the west by Jefferson and Oswego Counties, and the south by Oneida County. Lewis County has a land area of 1,274 square miles, is the fourth least populous county in the state, with a population of 27,087 and an average density of 21.3 people per square mile.[12] The county seat is the Village of Lowville and the eastern part of the county is in the Adirondack Park. Over half of the county is comprised of forests and conservation areas and approximately 19% of the county is used for agriculture.[13]

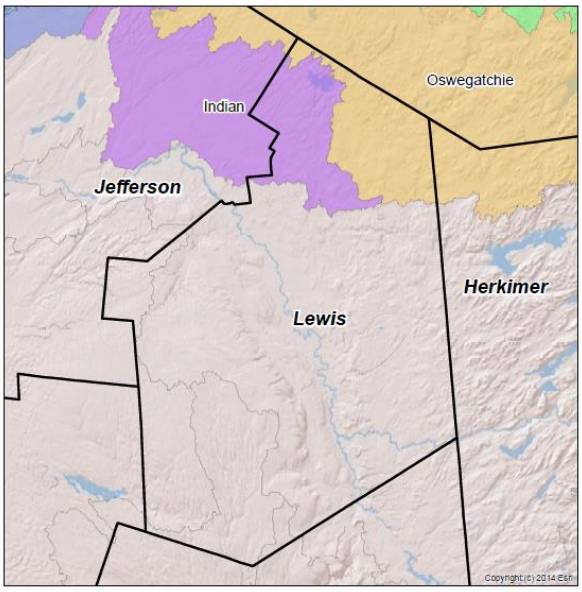

Figure 3: Lewis County

St. Lawrence County

St. Lawrence County is located in the northern part of New York and is the largest county by area in New York State. The county is bordered to the east by Franklin County, the north by Canada (the St. Lawrence River runs along the northern border), the west by Canada and Jefferson County, and the south by Jefferson, Lewis, Herkimer, and Hamilton Counties. St. Lawrence County covers 2,680 square miles (land and water) in upstate New York. The county seat is the Village of Canton. St. Lawrence County has a population of 111,944 with an average density of 41.8 people per square mile.[14] Evergreen and deciduous forests dominate the southern half of the County, with agricultural land much more prominent in the northern and western portions of the County.[15]

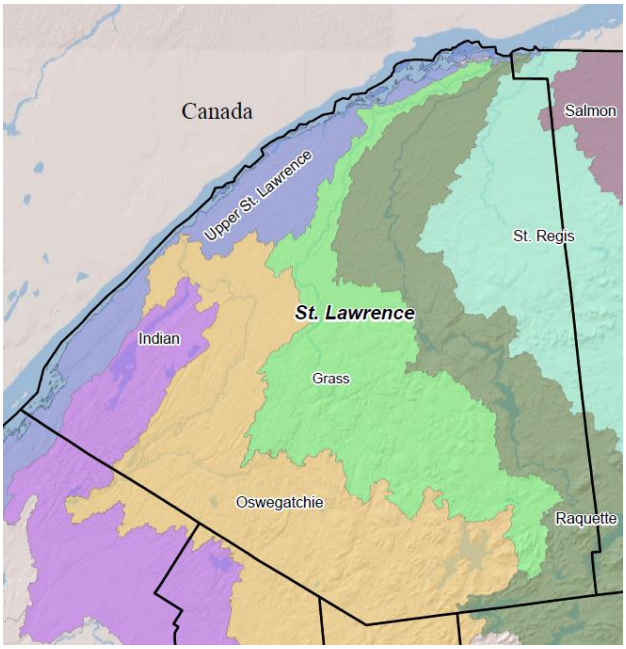

Figure 4: St. Lawrence County

[12] *https://www.census.gov/quickfacts/lewiscountynewyork*
[13] Lewis County Hazard Mitigation Plan, page 177
[14] *https://www.census.gov/quickfacts/stlawrencecountynewyork*
[15] St. Lawrence County Hazard Mitigation Plan, page 16

Land Use

A comprehensive plan is a land use document that provides 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 floodplain management and hazard mitigation, a land-use management plan can be a powerful tool to guide the community on how to achieve increased resilience. If a community has a comprehensive plan, it needs to comply with both the local flood damage prevention ordinance and local HMP.

The 2001 National Land Cover Database divides land cover in the United States into 16 classes. New York contains 15 of these classes. In the Indian Watershed, forest accounts for 49% of the land cover, followed by grassland (18.7%), wetland (16.1%), open water (5.6%), shrub/scrub (3.7%), developed land/low intensity (3.5%), cultivated crops (2.8%), developed land/medium-high intensity (0.5%), and barren land (0.1%).[16]

Table 4: U.S. Census 2010 and USDA Census of Agriculture 2017 summarizes the total population and land area from the 2010 U.S. Census and the number of farms and acres of farmland from the USDA 2017 Census of Agriculture.

Table 4: U.S. Census 2010 and USDA Census of Agriculture 2017

County	Land Area (Square Miles)	Farm Land (Acres)	Farm Land (Acres) Within Watershed	Total Farms Within Watershed
Jefferson	1,269	247,456	60,336	204
Lewis	1,275	182,457	13,380	49
St. Lawrence	2,680	342,595	20,835	80

Sources: U.S. Census Bureau 2010 and USDA Census of Agriculture 2017

Media

There is one media market that serves the Indian Watershed. The Watertown market serves Jefferson, Lewis, and St. Lawrence Counties. The largest newspaper in circulation is the *Watertown Daily Times*.

Jefferson County newspapers and media include: [17]

- *Carthage Tribune*
- *Jefferson County Journal*

[16] NRCS Rapid Watershed Assessment Profiles
[17] *https://co.jefferson.ny.us/departments/CountyAdministratorsOffice/media*

- *Thousand Island Sun*
- *Watertown Daily Times*

Lewis County newspapers and media include:

- *Watertown Daily Times*

St. Lawrence County newspapers and media include: [18]

- *North Country This Week*
- *Northern New York Newspapers*
- *Fourth Coast Entertainment*
- *Watertown Daily Times*

Historic Flooding Problems

Overview

Flooding has been a constant threat in the North Country. Floods in the early summer months and extending through the fall months are often associated with tropical systems moving north along the Atlantic coast. During the winter, flooding is a threat when ice jams impede the free flow of rivers in the watershed. 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. Historic flooding problems associated with each county in the watershed are summarized below.

County HMPs include vulnerability assessments for hazards, based on models including Hazards New York (HAZNY) and Hazard Identification and Risk Assessment New York (HIRA-NY). HAZNY is an automated interactive risk assessment tool that enables the quantitative assessment of risks. HIRA-NY evaluates five factors related to the hazard analysis process to rank hazards. Both models assign rankings of 44-160 (low), 161-240 (moderately low), 241-320 (moderately high) and 321-400 (high). Specific scores are noted for each county when available. [19]

Jefferson County

Jefferson County experiences multiple types of flooding, including riverine flooding, shallow flooding resulting from urban drainage issues, and ice jams. A portion of the county is situated on Lake Ontario of the Great Lakes, but due to minimal tides the lake does not flood the surrounding communities. According to the NOAA Storm Events Database, there have been 13 flood events in the county between 2000 and 2019.[20] Approximately 9.6% of Jefferson County lies within high or moderate flood risk zones.[21] These zones are shown on the NFIP flood hazard maps as Zones A, AE, and X (shaded) within the county. The most significant flooding in the county occurred in January 1996 when rapid snowmelt of 2-3 feet of snow combined with heavy rain produced severe flooding on area creeks and the Black River, resulting in property damage of $1 million dollars. While the western portion of the county borders Lake Ontario, generally the lake does not flood

[18] *https://business.visitstlc.com/list/category/newspapers-50*
[19] *http://www.dhses.ny.gov/recovery/mitigation/documents/2014-shmp/Section-3-9-Flood.pdf*
[20] Storm Events Database, Jefferson County
[21] Jefferson County Hazard Mitigation Plan, page 3a-44

the surrounding communities due to minimal tides on the lake.[22] However, there were devastating floods and significant erosion along the Lake Ontario and St. Lawrence River shorelines in 2017; Governor Andrew Cuomo has made $100 million available to help residents, businesses and municipalities recover and build back stronger.[23] As of January 2020, the average paid NFIP loss per claim in the county was approximately $8,351, with an average coverage of approximately $435,929 per policy.

Lewis County

Lewis County experiences multiple types of flooding, including riverine flooding, shallow flooding resulting from urban drainage issues, and occasional ice jams. The largest lake area in the county is Lake Bonaparte in the northern end of the county. Flooding is a moderate to high risk natural hazard in Lewis County. According to the NOAA Storm Events Database, there have been 23 flood events in the county from 2000 to 2019.[24] While only 6% of the county area lies within a high flood risk zone, the area impacted contains about 21% of the improved property in the county. High risk zones are shown on the NFIP flood hazard maps as Zones A and AE within the county. As of January 2020, the average paid NFIP loss per claim in the county was approximately $25,660, with an average coverage of approximately $196,300 per policy.

St. Lawrence County

St. Lawrence County experiences multiple types of flooding associated with rivers, lakes, and streams. Most flood hazards are the result of excess water from snowmelt, rainfall, or where storm surges overflow stream embankments. The severity of floods are the result of intensity of rainfall, duration of rain events, and the topography of the county. In the county's 2015 HMP, floods have a ranking of 278 on the HIRA-NY model, a ranking considered as moderately high. According to the NOAA Storm Events Database, there have been 19 flood events in the county from 2000 to 2019.[25] Comparatively speaking, St. Lawrence County has fewer documented floods than many other counties in the State.[26] There has been one Presidential Disaster Declaration (DR-1095) for a January 1996 severe storm that resulted in road closures, property damage of $160 million, and 10 fatalities. This event was the result of precipitation from an intense storm in combination with unseasonably warm temperatures, that also resulted in rapid snowmelt. A major flood event in St. Lawrence County was in May 2011 when the Raquette River over-topped its banks resulting in flooding for the Towns of Colton and Norfolk.[27] As of January 2020, the average paid NFIP loss per claim in the county was approximately $10,702, with an average coverage of more than $166,921 per policy.

Significant flood events from the HMPs are summarized in *Table 5: Hazard Mitigation Plan Significant Flood Events*. See Hazard Mitigation Planning and Activities for additional information on HMPs.

[22] Ibid, page 3a-43
[23] Lake Ontario Flooding
[24] Storm Events Database, Lewis County
[25] Storm Events Database, St. Lawrence County
[26] St. Lawrence Hazard Mitigation Plan, page 10
[27] Ibid, page 53

Table 5: Hazard Mitigation Plan Significant Flood Events in the Indian Watershed

County	Community	Flood Events of Significance
Jefferson	Countywide, Towns of Antwerp and Ellisburg	January 1996: Snowmelt and heavy rainfall produced flooding on area creeks and the Black River. Damages to roads and bridges were estimated at around $1.35 million.
	Countywide	April 2005: Deep low pressure brought 2-3 inches of rainfall. Combined with snowmelt, produced significant flooding along Black River at Watertown causing reported damages of $600,000.
Lewis	Countywide	December 1984: Heavy rains combined with snowmelt led to damage exceeding $5 million.
St. Lawrence	Town of Lisbon and Waddington (North Corners)	April 2014: Snowmelt from late season snowpack along with heavy rains produced widespread flooding amounting to $4.1 million dollars in property damage[28]
	Countywide	January 1996: Snowmelt, ice jams, and heavy rainfall excessive produced flooding on area creeks. The county received Public Assistance because of the flooding declaration.

Sources: State Hazard Mitigation Plans, Storm Events Database

Disaster Declarations

Like much of the eastern United States, one of the most frequent, widespread, 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, most recently Hurricane Irene (2011). Heavy snowmelt is also a major contributor to flooding in the North Country region.

Often in the aftermath of a major flooding event, the Federal Government will make funding available for homeowners, businesses, and local communities to aid in disaster relief and recovery. The major flood-related disaster declarations for the study area are listed below in Table 6: Disaster Declarations**.** Since 1972, there have been 17 flood-related declared disasters within the study area. FEMA's disaster and emergency declarations history can be viewed at FEMA's website.[29]

Table 6: Disaster Declarations

Incident Period	Title of Event	Counties Declared Within Study Area
March 1973	DR 367: High Winds, Wave Action and Flooding	Jefferson
March 1985	DR 733: Flooding	Lewis
March 1990	DR 898: Severe Winter Storm	Jefferson, Lewis, St. Lawrence

[28] *https://www.ncdc.noaa.gov/stormevents/eventdetails.jsp?id=507378*
[29] *https://www.fema.gov/disasters*

Table 6: Disaster Declarations

Incident Period	Title of Event	Counties Declared Within Study Area
January 1996	DR 1095: Severe Storms and Flooding	Clinton, Franklin, Jefferson, Lewis, St. Lawrence
November 1996	DR 1148: Severe Storms, High Winds, Rain, and Flooding	Clinton, Franklin, Lewis
January 1998	DR 1196: Severe Storms and Flooding	Clinton, Franklin, Jefferson, Lewis, St. Lawrence
May 2000	DR 1335: Severe Storms and Flooding	Lewis
April 2011	DR 1993: Severe Storms, Flooding, Tornadoes, and Straight-Line Winds	Clinton, Franklin, Hamilton, Lewis
May 2014	DR 4180: Severe Storms and Flooding	Lewis
November 2014	DR 4204: Severe Winter Storm, Snowstorm, and Flooding	Jefferson, Lewis, St. Lawrence
May 2017	DR 4348: Flooding	Jefferson, St. Lawrence

Source: FEMA[30]

Ice Jams

As explained by the National Weather Service (NWS), "ice jams cause localized flooding and can quickly cause serious problems. 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".[31]

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 notes the conditions of both jams below:[32]

Freeze Up Jam Criteria:

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

Break Up Jam Criteria:

Ice around one foot thick or more (presumed) and daily average temperature forecast to be greater than 42°F or higher. Direct sunlight plays a large role as open water areas absorb sunlight. A breakup 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.

The daily average temperature is determined by the following equation:

(Tmax (maximum temperature) + Tmin (minimum temperature))/2.

[30] https://www.fema.gov/disasters/state-tribal-government/0/NY
[31] http://www.weather.gov/media/aly/Hydrology/IceJamInfo.pdf
[32] http://www.weather.gov/media/aly/Hydrology/IceJamInfo.pdf

Rainfall or snowmelt combined 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 explains that river forecasts presented on its website do not consider the effects of ice jams on river levels. According to the NYSDEC, from March 1948 through September 2018, New York has had 1,712 ice jam events statewide. An ice jam event is defined as an accumulation of ice at a given location in a river which restricts the flow of water.[33] For a complete list with fuller descriptions of the circumstances of ice jamming at different locations, refer to the U.S. Army Corps of Engineers (USACE) website: https://icejam.sec.usace.army.mil/ords/f?p=101:7:::NO:::.

Jefferson County

Although there are only three recorded ice jam instances in Jefferson County, they are common. The lack of recording is due to the localized nature of ice jam hazards.[34] Ice jams are the principal cause of flooding in the Village of Philadelphia.[35]

Lewis County

Lewis County has recorded 31 ice jams for a period spanning from 1925 to 1999, although none of these recorded ice jams lie within the Indian Watershed project area. Nearly all these ice jams were on Deer River, Independence River, and East Branch Fish Creek. Ice jams are a moderately low risk hazard in Lewis County and were placed 13th out of 15 hazards considered in the Lewis County HAZNY study.[36]

St. Lawrence County

Ice jams in the county's 2015 HMP have a ranking of 272 on the HIRA-NY model, a ranking considered as moderately high, and the frequency of ice jams is considered a common occurrence in the county where any waterway is susceptible to ice jam events. The USACE has maintained records of ice jams in the county going back to 1910, where records document 100 such events. The St. Regis River at Brasher Falls and the Grass River in Pyrites each have experienced 22 recorded ice jam events, over the period 1911 to 1997. In addition, the Deer, Little Salmon, Oswegatchie, and Raquette Rivers are prone to ice jams in the county.[37]

Dams

According to the NYSDEC Dam Safety Section's dam inventory, the Indian Watershed has 36 dam structures. The NYSDEC uses a dam downstream hazard classification scale of Class A, B, or C to assign hazard potential to each of the dam structures listed in the inventory. These dam class levels build on each other, with higher levels adding to the consequences of the lower levels. Two other dam classifications, Class D and Class 0, are noted below as well.

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[33] Ice Jam Flooding
[34] Jefferson Mitigation Plan, page 3a-63
[35] Ibid, page 2-14
[36] Lewis County Hazard Mitigation Plan, page 2-11
[37] St. Lawrence County Hazard Mitigation Plan, page 10, B-13

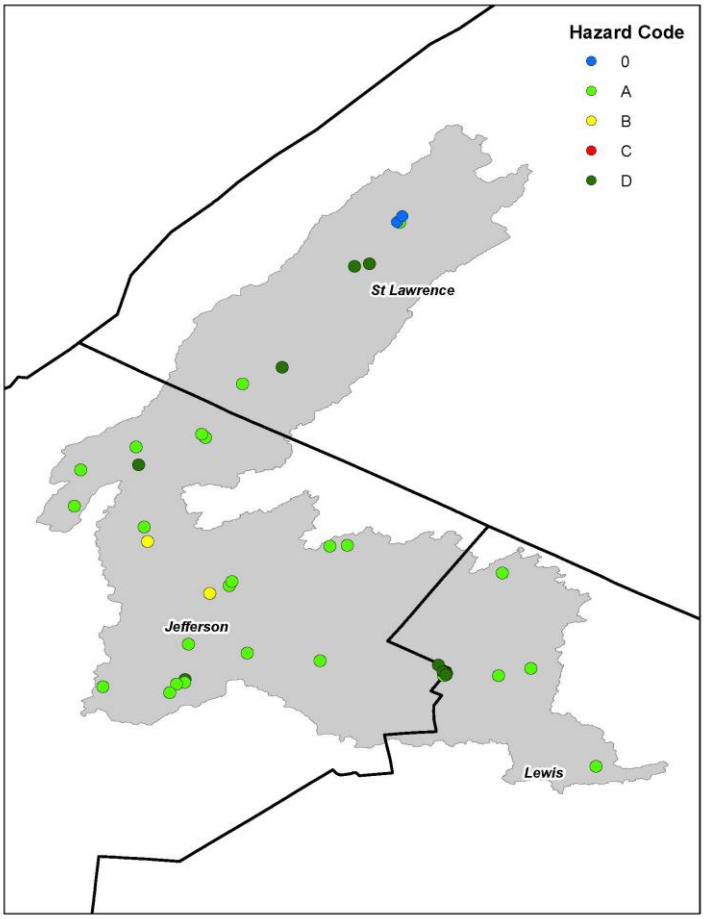

Figure 5: Indian Watershed Dams

NYSDEC classifies dams in the State using the following criteria:

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

Class B - Intermediate Hazard dam: 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; loss of human life is not expected.

Class C - High Hazard dam: 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 are expected.

Class D - Negligible or No Hazard dam: 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 dam: Hazard code has not yet been assigned.

The 36 dam structures classified by the NYSDEC Dam Safety Section are noted below in *Table 7: Dams in the Indian Watershed*.

Table 7: Dams in the Indian Watershed

County	Class A	Class B	Class C	Class D	Class 0	Total
Jefferson	16	2	0	6	0	**24**
Lewis	5	0	0	0	0	**5**
St. Lawrence	2	0	0	3	2	**7**
Total	**23**	**2**	**0**	**9**	**2**	**36**

Source: NYSDEC

Recent Media Coverage of Natural Hazards

In late August 2011, Hurricane Irene made its way to the North Country having reached hurricane status after striking Puerto Rico in the Caribbean. The storm itself was one of the costliest storms in the state's history. A summary of more recent media coverage of natural hazards in the Indian Watershed counties is provided below.

Jefferson County

Lake Ontario flooding in May 2019 prompted a State of Emergency declaration by Governor Andrew M. Cuomo.[38] The severe winter storm of November 2014, with significant snowfall and resultant power outages, prompted a State of Emergency declaration by Governor Cuomo.[39]

Lewis County

The Halloween storm of 2019 produced flooding that resulted in numerous roads being flooded over a period of days along the Black River in Lowville. [40] The severe winter storm of November 2014, with significant snowfall and resultant power outages, prompted a State of Emergency declaration by Governor Cuomo.[41] In July 2014, a tornado touched down near Lowville and the resulting impact damaged 12 structures. The tornado was reported along a path measuring 10 miles in length and 300 yards wide, but not always touching the ground. Wind speeds for the EF1 tornado were between 95-100 mph. [42]

St. Lawrence County

Lake Ontario flooding in May 2019 prompted a State of Emergency declaration by Governor Andrew Cuomo.[43] The severe winter storm of November 2014, with significant snowfall and resultant power outages, prompted a State of Emergency declaration by Governor Cuomo.[44]

[38] *NNY360*, November 4, 2019
[39] New York State, Governor News, November 18, 2014
[40] *North Country Public Radio*, November 4, 2019
[41] New York State, Governor News, November 18, 2014
[42] *NYY Business*, July 10, 2014
[43] New York State, Governor News, May 20, 2019
[44] New York State, Governor News, November 18, 2014

IV. Summary of Watershed-Wide Data

National Flood Insurance Program (NFIP) Data

Effective Regulatory Flood Insurance Rate Maps (FIRMs)

As noted in earlier sections of this report, the Indian Watershed includes three counties and 16 communities in New York State. The FEMA flood hazard map inventory consists of FIRMS of varying ages. Jefferson, Lewis, and St. Lawrence Counties currently have community-based FIRMs, with effective publication dates ranging from 1982 to 1993. Additionally, three communities currently have no published FIRMs and one community (Village of Hammond) does not participate in the NFIP. As a result, the economic consequences of Sections 201(d) and 202 of the Flood Disaster Protection Act of 1973 (Public Law 93-234)[45] may apply to the village. Federal flood insurance is not available in communities that do not participate in the NFIP; instead, flood insurance may be purchased through a private insurance carrier.

The effective FIRM dates for each community are shown in *Table 8: FIRM Effective Dates*.

Table 8: FIRM Effective Dates

County	Community	FIRM Effective Date
Jefferson	Antwerp, Town of	04/15/1986
	Antwerp, Village of	No SFHA Mapped
	Philadelphia, Town of	06/05/1989
	Philadelphia, Village of	09/15/1993
	Theresa, Town of	10/15/1985
	Theresa, Village of	10/15/1985
	Wilna, Town of	01/16/1992
Lewis	Croghan, Town of	05/15/1985
	Diana, Town of	09/24/1984
St. Lawrence	De Peyster, Town of	07/23/1982
	Hammond, Town of	No SFHA Mapped
	Hammond, Village of	Not participating in the NFIP
	Macomb, Town of	No SFHA Mapped
	Morristown, Town of	08/06/1982
	Oswegatchie, Town of	05/01/1985
	Rossie, Town of	07/30/1982

Letters of Map Change (LOMCs)

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 inadvertently included in a Special Flood Hazard

[45] https://www.gpo.gov/fdsys/pkg/STATUTE-87/pdf/STATUTE-87-Pg975.pdf

Area (SFHA). When a property owner believes the FIRM does not accurately represent flood risk for their structure and/or property, they may request a Letter of Map Change (LOMC) for their property or structure.

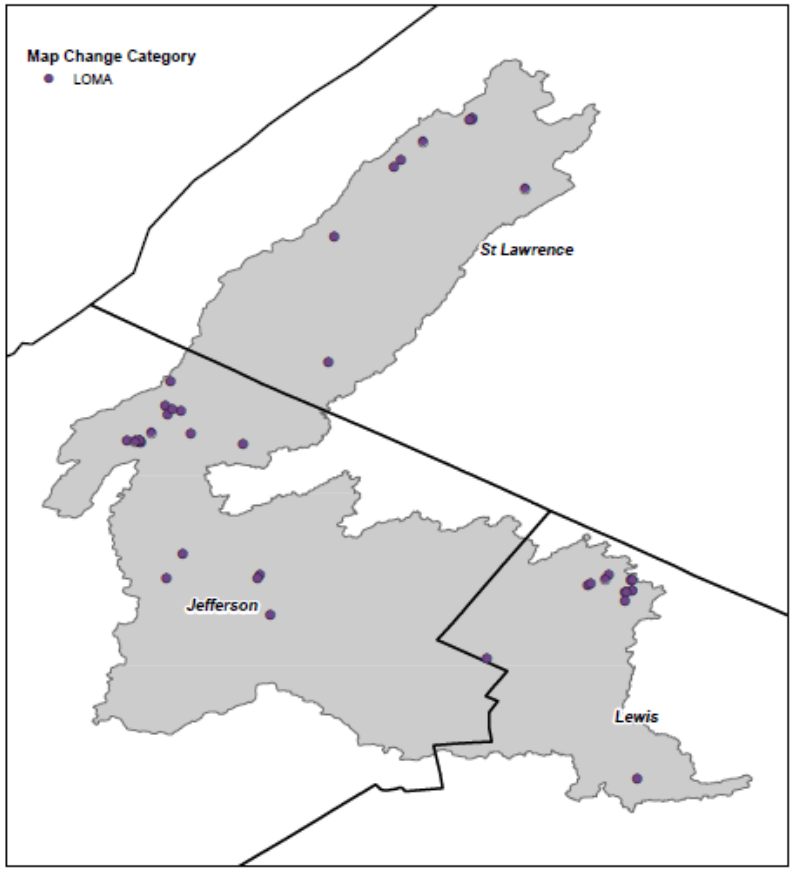

Figure 6: LOMCs in the Indian Watershed

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) process, for properties on natural high ground, and the Letter of Map Revision based on Fill (LOMR-F) process, for properties elevated by the placement of fill, are the most common methods used to amend the FIRM. These methods do not physically change the FIRM for a community; rather they amend, by letter action, the FIRM without incurring the cost of publishing a revised FIRM panel. By comparison, a Letter of Map Revision (LOMR) is commonly used by community officials to request FIRM changes stemming from completed development (e.g. the construction of a bridge in a flood hazard area), flood-control projects (e.g., the construction of a levee), or other larger-scale changes in the floodplain (e.g., the paving of a stream channel). Please note, no LOMRs have been issued in the Indian Watershed project area.

Table 9: LOMCs in the Indian Watershed displays the number of LOMCs issued, as of August 2019, for communities in the Indian Watershed.

More information on the LOMA and LOMR-F processes can be found on FEMA's LOMC website.

Table 9: LOMCs in the Indian Watershed

County	Community	Number of LOMA/ LOMR-Fs
Jefferson	Antwerp, Town of	0
	Antwerp, Village of	0
	Philadelphia, Town of	1
	Philadelphia, Village of	2
	Theresa, Town of	7
	Theresa, Village of	0
	Wilna, Town of	0
Lewis	Croghan, Town of	3
	Diana, Town of	16
St. Lawrence	De Peyster, Town of	3
	Hammond, Town of	0
	Hammond, Village of	0
	Macomb, Town of	0
	Morristown, Town of	32
	Oswegatchie, Town of	22
	Rossie, Town of	1

Source: FEMA

Base Level Engineering (BLE)

Base Level Engineering (BLE) is a FEMA initiative to create flood hazard data that may be used to assess stream inventories and prioritize watersheds or stream segments for further study. It can also be used to initiate discussions with communities that revolve around flood risk information, identification, abatement, and mitigation strategies. BLE does not produce effective FIRMs, but it can be used as best available information for communities to develop Base Flood Elevations (BFEs) in areas where a BFE has not been established.

BLE is a watershed-wide engineering modeling method that uses high-resolution ground topography, automated model building techniques, and manual model review. A significant portion of FEMA's national flood hazard inventory is currently considered non-model backed or based on outdated techniques with no supporting data. BLE provides the modeling needed to assess these unknown and unverified flood hazard areas.

BLE is a time efficient and cost-effective method of assessing flood hazard information. Engineers can gather data and create a model that can be shared with the public at a much faster rate than the previous FEMA studies. The high-quality elevation data provides the foundation for more technically credible flood risk identification and can be further refined for more detailed analysis. Leveraging this high-quality topo data and using improved technologies has significantly improved the accuracy and quality of these flood studies. For the Indian Watershed project area, Digital Elevation Model (DEM) datasets from New York State's GIS Clearinghouse website provided the topographical data required for the hydraulic analyses and floodplain mapping. 1-

foot seamless DEMs were created using Light Detection and Ranging (LiDAR) data developed in 2014, 2016, and 2017.

The hydrologic analyses was performed for approximately 2,027 stream miles within Franklin and St. Lawrence Counties. Peak discharges were computed for the required seven frequencies, the 10%- , 4%- , 2%- , 1%- , 1%-plus, 1%-minus and 0.2%- annual chance floods. Regression analyses was the primary method for the development of peak discharges. StreamStats [46] was used to obtain regression points for all flow locations. This application provides access to spatial analytical tools that are useful for water-resources planning and management, and for engineering and design purposes. StreamStats also provides an easy, user-friendly interface and utilizes Regional Regression Equations, published by USGS. [47]

There are no USGS gages located within the project area. To determine whether these gages are appropriate for use, the following parameters were defined:

- ✓ Currently active gages:
  - 15 years or more
  - Use regulated period only when the gage is impacted by a reservoir built during the period of record; Q estimate is not weighted with regression; transfer is according to a power
- ✓ Currently inactive gages:
  - 20 years or more
  - Record terminates less than 15 years from now
  - Watershed is similar to the condition when record was collected
  - For regulated gages, only use after regulation (homogeneous record); Q estimate is not weighted
- ✓ PeakFQ Analysis

There are currently no gages within the Indian Watershed

USGS Bulletin 17C was used to determine the 10%- , 4%- , 2%- , 1%- , 1%-plus, 1%-minus and 0.2%- annual chance flood recurrence intervals using PeakFQ Version 7.2. A comparison was also made against values developed using USGS Bulletin 17B.

Similarly, the hydraulic analyses were performed for approximately 2,027 stream miles within Franklin and St. Lawrence Counties. Flood elevation profiles were developed for the required seven frequencies, the 10%- , 4%- , 2%- , 1%- , 1%-plus, 1%-minus and 0.2%- annual chance floods. Note, no floodway analyses or levee analyses were developed for this project. The hydraulic analyses were developed using the USACE's HEC-RAS model. A one-dimensional (1D) steady-state hydraulic simulation was selected for the flooding sources. Letters distributed to

[46] *https://www.usgs.gov/mission-areas/water-resources/science/streamstats-streamflow-statistics-and-spatial-analysis-tools?qt-science_center_objects=0#qt-science_center_objects*

[47] *https://water.usgs.gov/osw/programs/nss/pubs.html#ny*

Franklin and St. Lawrence Counties communities explaining this process are in *Appendix E: Base Level Engineering Letters* of this report

The in-person Discovery meetings, held in September 2019, provided an opportunity to present the BLE data to communities within the project area and collect their feedback on both the usefulness as well as the accuracy of the associated mapping. More information about BLE can be found on FEMA's BLE webpage at: https://www.fema.gov/media-library/assets/documents/160060. *Table 10: Current Status of BLE* shows the status of the stream mileage classifications within the Indian Watershed.

Table 10: BLE Mileage in the Indian Watershed

HUC8 Watershed Name	HUC8 Number	Stream Mileage Classifications Within the Indian Watershed	
		Scoped Stream Miles	Studied Stream Miles [1]
Indian	04150303	46.0	43.0

[1] *Mileage excludes stream lines that are within a lake with an identified stillwater/normal pool elevation or stream lines that are part of braided channels (the main channel is maintained in the model, but not the secondary channels)*

Coordinated Needs Management Strategy (CNMS) and NFIP Mapping Needs

Coordinated Needs Management Strategy (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 do not accurately represent FEMA's mapping standards.

There are three classifications within the CNMS: "Valid," "Unverified," and "Unknown." New and updated studies (i.e., those with new hydrologic and hydraulic models) developed during FEMA's Map Modernization program were automatically determined to be "Valid" and the remaining studies went through a 17-element validation process with seven critical and ten secondary elements. Validation elements apply physical, climatological, and environmental factors to stream studies to determine validity. A stream study must pass all 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 addressed satisfactorily in order for a stream reach to be determined "Valid":

- Change in the Gage Record: Has a major flood event caused a major change in the gage record since the effective analysis?
- Change in Discharge: Do the updated and effective peak discharges differ significantly based on the confidence limit criteria in FEMA's Guidelines and Specifications (G&S)
- Model Methodology: Is the model methodology no longer appropriate based on FEMA's G&S?
- Hydraulic Change: Has a major flood-control structure (dam/ levee/ floodwall/ other change) been added or removed from the reach?

- Channel Reconfiguration: Is the channel reconfiguration outside the effective SFHA? (i.e. has the stream moved or been relocated?)
- Other Hydraulic Changes: Have more than five hydraulic structures (bridges/culverts) been added or removed that impact BFEs on the reach?
- 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 "Invalid." Not all elements may be applicable for all flooding sources. In addition to the above seven Critical Elements, if four or more of the following Secondary Elements are true then the flood hazard information must be recorded as "Invalid."

- Regression Equation: Has a rural regression equation been used in a now urbanized area?
- Repetitive Loss: Are there repetitive losses outside the mapped SFHA?
- Impervious Area: Has there been an increase in impervious area in the sub-basin of equal to or greater than 50 percent?
- Hydraulic Structure: Have more than one, but less than five, hydraulic structures (bridges/culverts) been added or removed that impact BFEs on the reach?
- Channel Improvements: Have there been channel improvements or shoreline changes?
- Topography Data: Is better topography and/or bathymetry data available?
- Vegetation or Land Use: Have significant changes to vegetation or land use occurred in the area?
- Coastal Dune: Is there a failure to identify primary frontal dune in coastal areas?
- High Water Mark (HWM): Have significant storms occurred with recorded HWMs?
- Regression Equation: Are new regression equations available?

CNMS is a living database that is continuously updated whenever new or revised studies become available. As part of that update, valid stream reaches will be reassessed every five years and invalid streams will be prioritized for potential funding. The in-person Discovery meetings provide an opportunity for the gathering and prioritization of CNMS community requests. *Table 11: Current Status of CNMS* shows the status of the portions of each county in this project area within the Indian Watershed prior to the in-person Discovery meetings held in September 2019.

Table 11: CNMS Mileage in the Indian Watershed

County	FIPS	Stream Mileage Classifications Within the Indian Watershed			
		"Valid"	"Unverified"	"Unknown"	Total
Jefferson	36045	11	97	0	**108**
Lewis	36049	0	48	5	**53**
St. Lawrence	36089	0	45	0	**45**
Total	**--**	**11**	**190**	**5**	**206**

Source: FEMA

The CNMS Map Viewer tool provides a single location to view riverine stream line segments, coastal line segments, unmapped line segments, and mapping request information. This tool is updated on a quarterly basis (the current display is September 2019), and can be accessed at:

http://fema.maps.arcgis.com/apps/webappviewer/index.html?id=34a65cf7044441c081b557e2877585a1. More information about CNMS can be found on FEMA's CNMS webpage at: https://www.fema.gov/coordinated-needs-management-strategy.

Flood Insurance Policies and Claims

A community's agreement to adopt and enforce floodplain management ordinances as a participant in the NFIP, particularly with respect to new or substantially improved construction, is an important risk reduction element in making federally backed flood insurance available to home and business owners.

As part of this Discovery project, NFIP flood insurance policy data for the communities was collected. As of January 2020, 84 policies were in force for communities affected by the Indian Watershed, accounting for $13,983,900 in insurance coverage. The number of policies and total coverage cost are listed in *Table 12: Flood Insurance Policies and Claims Data*.

Jefferson County flood insurance policies and coverage in the Indian Watershed, with 19% of the policies (16) and 21.8% of the total amount of insurance coverage ($3,051,500).

Lewis County flood insurance policies and coverage in the Indian Watershed, with 25% of the policies (21) and 29.9% of the total amount of insurance coverage ($4,178,600).

St. Lawrence County represents the county with the largest number of flood insurance policies and coverage in place across the Indian Watershed, with 56% of the policies (47) and 48.3% of the total amount of insurance coverage ($6,753,800).

Table 12: Flood Insurance Policies and Claims Data (as of January 2020)

County	Community	Number of Policies	Total Amount of Coverage	Number of Claims	Total Claims Paid
Jefferson	Antwerp, Town of	2	$124,000	5	$33,328
	Antwerp, Village of	1	$350,000	0	0
	Philadelphia, Town of	0	0	0	0
	Philadelphia, Village of	7	$1,079,200	0	0
	Theresa, Town of	1	$350,000	0	0
	Theresa, Village of	0	0	1	$2,000
	Wilna, Town of	5	$1,148,300	12	$114,990
Lewis	Croghan, Town of	13	$2,977,900	1	$3,442
	Diana, Town of	8	$1,200,700	4	$124,859
St. Lawrence	De Peyster, Town of	0	0	0	0
	Hammond, Town of	0	0	1	$1,173
	Hammond, Village of	0	0	0	0
	Macomb, Town of	0	0	0	0
	Morristown, Town of	27	$3,894,800	2	$2,691
	Oswegatchie, Town of	18	$2,621,000	8	$82,533
	Rossie, Town of	2	$238,000	2	$52,353

Table 12: Flood Insurance Policies and Claims Data (as of January 2020)

County	Community	Number of Policies	Total Amount of Coverage	Number of Claims	Total Claims Paid
Total Amount of Coverage	**--**	**84**	**$13,983,900.00**	**36**	**$417,369.00**

Source: FEMA

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 ten-year period. In the Indian Watershed, there was one repetitive loss property, which accounted for $14,649.38 in claims paid, as of August 2019. The data are shown in *Table 13: 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), at least two of the referenced claims must have occurred within any ten-year period and must be greater than ten days apart. Within the Indian River project area, there is one SRL property in the Town of Antwerp (Jefferson County) impacted by the Oswegatchie River.

Table 13: Repetitive Losses/Severe Repetitive Losses in Study Area

County	Community	Number of Repetitive Loss Properties	Number of Losses Paid	Total Claims Paid
Jefferson	Antwerp, Town of	1	3	$14,649.38

Source: FEMA

Structures that flood frequently strain the National Flood Insurance Fund (NFIF). In fact, RL properties are the biggest draw on the fund. From 1978 to 2015, FEMA has paid approximately $9 billion in claims for RL properties. RL properties not only increase the NFIP's annual losses and the need for borrowing funds from Congress, but also drain funds needed to prepare for future catastrophic events.

Clusters of RL properties and previous NFIP assistance 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 Assistance Visits (CAVs)

Statewide Community Assistance Visits (CAVs) are part of the evaluation and review process used by FEMA, NYSDEC Floodplain Management staff, and local officials to ensure that each community adequately enforces local floodplain management regulations to remain in compliance with NFIP requirements. Generally, a CAV consists of a tour of the floodplain, an inspection of

community permit files, and meetings with local appointed and elected officials. During a CAV, observations and investigations 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 related to 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. If administrative problems or potential violations are identified, the community will be notified and given the opportunity to correct those administrative procedures and remedy the violations to the maximum extent possible within established deadlines. 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 act 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 standards in Code of Federal Regulations (CFR), Title 44, Sections 60.3, 60.4, or 60.6. "Open" CAVs can be indicative of unresolved violations.

Community Assistance Contacts (CACs)

Community Assistance Contacts (CACs) are a tool employed by New York State and FEMA to periodically contact a community to determine whether they are having any difficulties in administering the local floodplain management ordinance or program. A CAC is an additional way of determining if a CAV should be scheduled. CACs are also a means of encouraging Code Enforcement Officers to attend annual floodplain management workshops. CACs can serve to support local officials when they need help to effectively administer the NFIP in their community.

Table 14: CAVs and CACs Performed within the Project Area lists the most recent CAVs and CACs performed for communities located within the Indian Watershed.

Table 14: CAVs and CACs Performed within the Project Area

County	Community	Most Recent CAV Date	Most Recent CAC Date
Jefferson	Antwerp, Town of	09/10/1990	10/08/2015
	Antwerp, Village of	N/A	N/A
	Philadelphia, Town of	07/28/1993	N/A
	Philadelphia, Village of	10/05/2015	N/A
	Theresa, Town of	08/27/1990	01/09/2017
	Theresa, Village of	N/A	N/A
	Wilna, Town of	N/A	06/21/2011
Lewis	Croghan, Town of	07/14/2017	12/22/2006
	Diana, Town of	N/A	05/09/1994

Table 14: CAVs and CACs Performed within the Project Area

County	Community	Most Recent CAV Date	Most Recent CAC Date
St. Lawrence	De Peyster, Town of	05/16/1994	10/28/2015
	Hammond, Town of	N/A	N/A
	Hammond, Village of	N/A	N/A
	Macomb, Town of	N/A	10/28/2015
	Morristown, Town of	11/06/2014	N/A
	Oswegatchie, Town of	03/28/2012	10/28/2015
	Rossie, Town of	N/A	N/A

Source: FEMA N/A - Date not available

Ordinances

The project area's local jurisdictions have a patchwork of regulations regarding development within known SFHAs. The regulations range from ordinances with minimum NFIP requirements to strong, pro-active 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.

While the NFIP uses six different ordinance levels (60.3 land-use classification levels), New York State uses their own system that includes three ordinance levels, as described below.

1. "A" type: used when 1-percent-annual-chance floodplains have not yet been identified. Communities participating in the NFIP without any FIRMs would adopt an "A" type ordinance.

2. "D" type: 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), the community would adopt is a "D" type ordinance.

3. "E" type: used when coastal high-hazard areas (V Zones) have been identified.

The NFIP-participating communities within the watershed have floodplain management regulations in place and have a mechanism for updating their ordinances. *Table 15: Program Status and Ordinance Level* lists the program status and ordinance level for each community in the Indian Watershed Discovery project area.

Table 15: Program Status and Ordinance Level (as of January 2020)

County	Community	Program Status	Ordinance Level	Ordinance Effective Date
Jefferson	Antwerp, Town of	Regular	D	N/A
	Antwerp, Village of	Regular	A	N/A
	Philadelphia, Town of	Regular	D	N/A
	Philadelphia, Village of	Regular	D	N/A
	Theresa, Town of	Regular	D	N/A
	Theresa, Village of	Regular	D	N/A
	Wilna, Town of	Regular	D	N/A
Lewis	Croghan, Town of	Regular	D	N/A
	Diana, Town of	Regular	D	N/A
St. Lawrence	De Peyster, Town of	Regular	D	N/A
	Hammond, Town of	Regular	A	N/A
	Hammond, Village of	Not Participating	A	N/A
	Macomb, Town of	Regular	A	N/A
	Morristown, Town of	Regular	D	N/A
	Oswegatchie, Town of	Regular	D	N/A
	Rossie, Town of	Regular	D	N/A

Source: FEMA, NYS

Community Rating System (CRS)

CRS is a voluntary incentive program that provides flood insurance premium discounts to NFIP-participating communities that take extra measures to manage floodplains beyond the minimum NFIP requirements. A point system is used to determine a community's CRS rating class; 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 a result, flood insurance premium rates are discounted from 5 to 45 percent for properties located within the SFHA. The reduced flood risk resulting from a community's actions are reflected in these three CRS goals:

1. Reduce flood damage to insurable property;
2. Strengthen and support the insurance aspects of the NFIP; and
3. Encourage a comprehensive approach to floodplain management.

Currently there are no communities within the Indian Watershed that participate in CRS. For more information on CRS, please visit FEMA's CRS website.

Learning more about the CRS program would be of benefit to all watershed communities to ensure they are fully aware of what CRS is, if a community is eligible to apply, and what level of effort is required to make CRS participation beneficial for a community. Local communities may wish to consider pooling resources and efforts or work on a countywide basis to offset the level of effort to comply with the requirements of joining the CRS program.

Other Data Useful for Flood Risk Assessment and Mitigation

Topographic Data

Topographic data is commonly captured using Light Detection and Ranging (LiDAR), a state-of-the-art method for collecting accurate topographic elevation information. LiDAR uses an instrument that measure distance to a reflecting object by emitting timed pulses of laser light and measuring the time between emission and reception of reflected pulses. More information on LiDAR is available on NOAA's website. LiDAR elevation data was flown across the Indian Watershed in 2014, 2016, and 2017. Information about the coverage of LiDAR data in NYS is available at the NYSGIS Clearinghouse.

Dams

Please refer to the *Historic Flooding Problems* subsection of this report for information about dams in the Indian Watershed project area.

Levees

A levee or floodwall is defined in 44 CFR, Section 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".

A review of current effective FIRMs and the USACE's National Levee Database (https://levees.sec.usace.army.mil/#/) indicates there are no identified levees in the study area.

Stream Gages and Flows

According to the U.S. Geological Survey (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.

The USGS standard is to measure river stage to 0.01 inches. This is accomplished with the use of floats inside a stilling well, and pressure transducers that measure how much pressure is required to push a gas bubble through a tube (related to the depth of water), or with radar. Figure 7: Typical Modern USGS Stream Gage illustrates the design of a river gaging station.

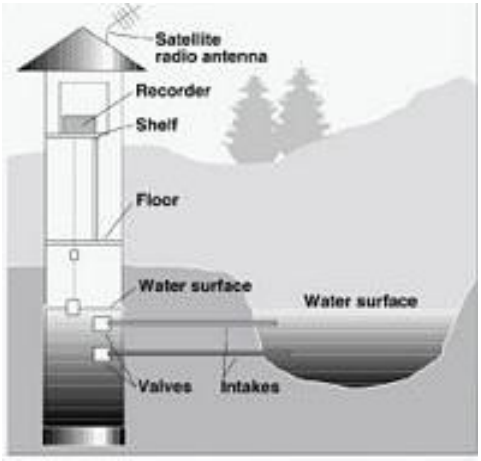

Figure 7: Typical Modern USGS Stream Gage

At most USGS stream gages, the stage is measured every 15 minutes and the data is stored in an electronic data recorder. At set intervals, usually between every one to four hours, the data is transmitted to the USGS using satellite, telephone, or radio. At the USGS offices, the curves relating stage to stream flow are applied to determine stream flow estimates and both the stage and stream flow data are then displayed on the USGS website. For more information on how stream gages work, please see the USGS's factsheet on stream gaging.

There are no current and past gages in the watershed. Additional information on gages in the watershed may be found by visiting the USGS's website.

Rain Gages

The National Oceanic and Atmospheric Administration's (NOAA) Cooperative Observer Program is a weather and climate observing network of more than 11,000 volunteers who take observations nationwide on farms, in urban and suburban areas, National Parks, seashores, and mountaintops. When appropriate, FEMA utilizes the NOAA information from these gages in developing meteorological models for the watersheds that employ rainfall runoff models and calibration.

Additional information on rainfall in New York can be found in NOAA's Technical Paper No. 49 and in the Technical Memorandum NWS HYDRO-35; both can be found on NOAA's website. It should be noted that data has been updated through a joint collaboration between the Natural Resources Conservation Service (NRCS) and the Northeast Regional Climate Center (NRCC) and is available on the Extreme Precipitation in New York and New England webpage.

Municipal Separate Storm Sewer Systems (MS4s)

As noted on the NYSDEC's website, Federal Stormwater Phase II regulations require permits for stormwater discharges from 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 the NYSDEC's website. Detailed maps that depict where the regulated MS4 boundaries lie can be also found on the NYSDEC's website.

Transportation

Transportation is the movement of people and goods from location to location. These features include roads, rail, and air. Planning for these features allows for utilization and function within communities and interaction with other communities. These features are critical for community planning related to risk assessments for evacuation routes and potential flooding issues that could occur. Transportation features used for this Discovery project were obtained from the New York State GIS Clearinghouse.

Jurisdictional Boundaries

Jurisdictional boundaries used for this Discovery project, including boundaries for cities, towns, villages, and counties, were also obtained from the New York State GIS Clearinghouse.

Hazard Mitigation Planning and Activities

Summary of 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. The purpose of the HMP is to:

- Identify vulnerabilities to natural hazards and provide for potential projects to reduce those vulnerabilities in the future;
- Protect life, safety, and property by reducing the potential for future damages and economic losses that result from natural hazards;
- 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 New York State Division of Homeland Security and Emergency Services (NYSDHES) reviews the local HMPs prior to FEMA review and approval. These plans identify potential hazards and threats that face each community. Subsequent to approval and adoption of the HMPs, communities are eligible to receive grants for future mitigation projects through the Hazard Mitigation Grant Program. There are numerous advantages to mitigation. For example, the creation of a mitigation plan helps local officials identify potential future hazards. Once the threats are identified, the communities can identify mitigation activities, projects, and strategies to eliminate or minimize the impact a potential hazard would cause. Preventative measures are also cost effective; preventing the impact of a hazard will cost less than cleaning up after a disaster occurs. Mitigation can prevent the loss of lives as well as property damage. These plans focus on the exposure of critical facilities and community-owned assets to potential hazards and address ways to reduce the vulnerability to these threats. Some of these actions, projects, and strategies may take little time to employ while others may take years to implement.

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. Each municipality that adopts the HMP must develop specific mitigation actions to address vulnerabilities. Each municipal HMP was reviewed for initiatives, critical facilities, and mitigation actions. The status of each countywide HMP is shown in *Table 17: Status of Hazard Mitigation Plans*.

Table 16: Status of Hazard Mitigation Plans (as of August 2019)

County	Community	Approval Date	Plan Expiration
Jefferson	Countywide	1/4/2011	1/4/2016
Lewis	Countywide	3/18/2011	3/18/2016
St. Lawrence	Countywide	10/9/2015	10/9/2020

Source: FEMA

Critical Facilities and Other Important Properties in the SFHA

Critical facilities are those entities 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. Typically, critical facilities are defined as community assets whose presence is vital to that jurisdiction's continued ability to operate. 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.

None of the HMPs referenced above identified facilities located within the SFHA.

Hazard Mitigation Grants

FEMA provides funding for various types of mitigation projects. These funds are granted through several mechanisms including the Pre-Disaster Mitigation Grant Program (PDM), Hazard Mitigation Grant Program (HMGP), and Flood Mitigation Assistance (FMA).

The PDM program provides funds for hazard mitigation planning and the implementation of mitigation projects prior to a disaster event to states, territories, and Tribal governments (and through them, local communities). Funding these plans and projects reduces overall risks to residents and structures, while also reducing reliance on funding from actual disaster declarations. PDM grants are awarded on a competitive basis and without reference to state allocations, quotas, or other formula-based allocation of funds.

Like PDM, the HMGP provides grants to states (who may then award funding to local governments), to implement long-term hazard mitigation measures after a major disaster declaration. The purpose of the HMGP is to reduce the loss of life and property due to natural disasters and to enable mitigation measures to be implemented statewide during the immediate recovery from a disaster.

Lastly, the 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 through three types of grants:

- Planning Grants to prepare flood mitigation plans;
- Project Grants to implement measures to reduce flood losses, such as elevation, acquisition or relocation of NFIP-insured structures; and
- Management Cost Grants so that the grantee may administer the FMA program and activities.

FMA grants are only available to state (and state-equivalent) and Tribal governments; however, local governments may be named as sub-applicants.

Mitigation Projects Completed or Underway

The county HMPs identified mitigation projects, actions, and strategies to reduce long-term vulnerability to hazards. Each county listed several mitigation projects related to reducing flood risk. The general mitigation planning approach used is based on the FEMA Publication *"Developing the Mitigation Plan: Identifying Mitigation Actions and Implementing Strategies."* The FEMA document contains four steps used to support mitigation planning:

- Develop mitigation goals and objectives
- Identify and prioritize mitigation actions
- Prepare an implementation strategy
- Document the mitigation planning process

Jefferson County

Jefferson County's HMP mitigation strategies include:[48]

- Participate in the Community Rating System
- Limit development and uses in regulatory floodways
- Develop specific mitigation solutions for flood-prone roadways and intersections
- Identify and document repetitively flooded properties
- Develop a countywide gaging and warning system

Lewis County

Lewis County's HMP mitigation strategies include:[49]

- Participate in the Community Rating System
- Revise and update flood hazard data across the county
- Limit development and uses in regulatory floodways
- Develop specific mitigation solutions for flood-prone structures
- Develop a countywide gaging and warning system
- Develop and enforce open space preservation programs

St. Lawrence County

St. Lawrence County's mitigation strategies include:[50]

- Create digital FIRMs
- Stabilize stream banks to reduce erosion along St. Regis River
- Develop dam failure analyses
- Develop specific mitigation solutions for flood-prone roadways and intersections
- Improve storm water management
- Develop localized flood risk reduction projects
- Replace and rehabilitate local bridges and culverts

[48] Jefferson County Hazard Mitigation Plan, pages 6-4 and 6-5
[49] Lewis County Hazard Mitigation Plan, pages 294-296
[50] St. Lawrence County Hazard Mitigation Plan, pages 105-113

V. Discovery Outreach and Engagement Strategy

The following Discovery outreach information is based on the comprehensive North Country Watersheds project, which includes eight watershed sub-basins in Northern New York: Chateaugay-English, Grass, Indian, Oswegatchie, Raquette, Salmon, St. Regis, and Upper St. Lawrence.

Prior Engagement Efforts

Prior outreach and engagement efforts related to flood risk (separate from this Discovery project) have been performed by NYSDEC and FEMA for certain communities within the North Country Watersheds. These projects and activities are summarized in *Table 18: Prior Engagement Efforts in the North Country Project Area*.

Table 17: Prior Engagement Efforts in the North Country Project Area

County	Date	Project Outreach and Engagement Efforts
Franklin	11/06/1975	Initial CCO* Meeting, Village of Malone
	12/21/1976	Final CCO Meeting, Village of Malone
Jefferson	10/26/2010	Initial CCO Meeting, Jefferson County (countywide)
	12/13/2012	Final CCO Meeting, Jefferson County (countywide)
	02/22/1991	Final CCO Meeting, Town of Wilna
	05/13/1992	Final CCO Meeting, Village of Philadelphia
St. Lawrence	04/04/1978	Initial CCO Meetings - Village of Massena, Town of Morristown, City of Ogdensburg
	11/29/1979	Final CCO Meetings - Village of Massena and City of Ogdensburg
	11/20/1980	Final CCO Meeting, Village of Potsdam
	04/21/1993	Final CCO Meeting, Village of Canton

*CCO - Consultation Coordination Officer Meeting is held by FEMA to present preliminary Flood Insurance Rate Maps and Flood Insurance Study reports to community officials

Stakeholder Identification

As part of this Discovery process for the North Country Watersheds, the NYSDEC Floodplain Management Section compiled an extensive list of contact information for community officials, tribal, state, and local governments, and other stakeholders within the watersheds. In an effort to gather as much local feedback as possible, over 250 watershed stakeholders including local officials from individual communities and counties, representatives from Federal and State agencies, non-governmental organizations, and other local groups were invited to participate in the Discovery process.

Key Stakeholder Groups and Influencers

In addition to municipal officials, planning and emergency agencies, and residents, there are other stakeholders with an interest in floodplain mapping and management. Other Federal and State agencies, major landowners, large employers, academic institutions, and environmental organizations all have a role to play, and sometimes valuable information to provide, when

developing both pre-mapping data and final mapping products. Examples of such organizations in the North Country Watersheds include:

- United States Army Corps of Engineers (USACE), Buffalo District
- New York State Department of Transportation
- New York State Water Institute
- New York State GIS Program Office
- Cornell Cooperative Extensions: Franklin, Hamilton, Jefferson, Lewis, and St. Lawrence
- St. Lawrence University

Pre-Discovery Meeting Engagement and Information Exchange

Exchanging information with key stakeholders is a critical part of the North Country Watersheds Discovery project. There were two primary goals of the initial outreach and engagement activities associated with this project: 1) to communicate the purpose of the Discovery project and the role of local stakeholder input in the process and 2) to obtain key information upfront related to existing flood risk in the watersheds, flood hazard mapping needs, mitigation activities, and other existing information useful in updating the FIRMs. The list of key stakeholders is provided in *Appendix A: Pre-Discovery Meeting Mailing List and Correspondence* of this report.

Pre-Discovery Meeting Webinars

The project team hosted three Pre-Discovery Meeting webinars on July 30 and 31, and August 1, 2019, via WebEx/conference call for the North Country Watersheds project. The purpose of the sessions was to introduce the planning team, explain the Discovery process and how it can benefit the communities in the watersheds, and how stakeholders can participate in the process. The sessions were also used to obtain input on best locations for in-person Discovery meetings, who should be included in the process, and ideas for encouraging participation in the meetings. The webinar presentation is provided in *Appendix B: Pre-Discovery Meeting (Webinar) Presentation* of this report. A summary of the Pre-Discovery Meeting webinars is provided in *Appendix C: Pre-Discovery Meeting (Webinar) Summary* of this report.

Correspondence/Survey Form

Upon completion of the Pre-Discovery Meeting webinars, a Risk MAP Discovery Project Stakeholder Survey form in PDF format was sent via e-mail to all stakeholders invited to the webinars or in hard copy form if no e-mail address was available. The survey was also made available online via *Survey Monkey*. Stakeholders were asked to submit the completed survey prior to upcoming in-person Discovery meetings for the Discovery team to evaluate, gather, and develop preliminary materials ahead of the meetings.

The Stakeholder Survey form requested information from stakeholders on:

- Flood mapping needs, FIRM inaccuracies, and historical flood problems
- High water marks within the community
- Community planning, ongoing projects, and recent residential, commercial, or industrial development
- Flood mitigation activities
- Training needs
- NFIP and floodplain management information

- GIS data: base map, engineering, and risk assessment data
- Other community officials or groups to include in the Discovery project

The Stakeholder Survey form is provided in *Appendix D: Stakeholder Survey* of this report.

VI. Discovery Meetings

The following information on Discovery meetings is based on the comprehensive North Country Watersheds project, which includes eight watershed sub-basins in Northern New York: Chateaugay-English, Grass, Indian, Oswegatchie, Raquette, Salmon, St. Regis, and Upper St. Lawrence.

The purpose of the in-person Discovery meetings is to review any information previously provided by communities, State and regional agencies, and local stakeholders; discuss each community's floodplain mapping needs and floodplain management activities, mitigation plans and projects, and flood risk concerns; and gather additional feedback for FEMA to consider when developing Risk MAP products, including the development of new FIRMs where needed.

Appendices to this report include the in-person Discovery meeting presentation and meeting materials:

- Discovery Meeting Mailing List and Correspondence (see *Appendix G*)
- Discovery Meeting Sign-In Sheets (see *Appendix H*)
- Discovery Meeting Agenda (see *Appendix I*)
- Discovery Meeting Presentation (see *Appendix J*)
- Discovery Meeting Summary Memorandum (see *Appendix K*)

Invitees to the in-person Discovery meetings included not only those stakeholders initially identified to participate in the Pre-Discovery Meeting webinars, but also other stakeholders identified by participants during the Pre-Discovery Meeting webinars and in the completed Stakeholder Survey forms received prior to the meetings. Invitations were sent by e-mail and hard copy. In addition, telephone calls to communities who had not RSVP'd for the in-person Discovery meetings were made in the weeks prior to the meetings to encourage attendance.

A series of four in-person Discovery meetings for the North Country Watersheds were held on the dates and times listed below in *Table 19: North Country Watersheds Discovery Meetings*.

Table 18: North Country Watersheds Discovery Meetings

Date	Time	Location
09/18/2019	9:00 AM to 11:45 AM	Gouverneur Community Center 4673 State Highway 58 Gouverneur, NY 13642
09/18/2019	2:15 PM to 5:00 PM	Town of Potsdam Town Hall Conference Room 16 Elm Street Potsdam, NY 13676
09/19/2019	9:00 AM to 11:45 AM	Town of Massena Town Hall Board Room 60 Main Street Massena, NY 13662
09/19/2019	2:15 PM to 5:00 PM	Franklin County Emergency Services Building Meeting Room 55 Bare Hill Road Malone, NY 12953

Community officials and other stakeholders who attended the in-person Discovery meetings were interviewed by project team members on a variety of flood and mitigation-related topics. The identification of mapping, training and mitigation needs in the watersheds was of particular importance to this project. This information was captured by the project team on copies of the Stakeholder Survey form and on scoping/flood hazard maps or effective FIRMs for each community. The forms allowed stakeholders to provide detailed descriptions for points or areas of concern, while the maps allowed stakeholders to highlight areas of flood hazard concern, locations of past, ongoing, or desired mitigation projects, and areas with mapping needs.

Post-Meeting Follow Up Activities

Additional outreach to communities in the North Country Watershed was performed after the in-person meetings. Follow up letters were sent to communities that had not participated in the Discovery process to date (i.e., did not submit a Stakeholder Survey form or attend one of the in-person Discovery meetings) that again requested their input in the process (see *Appendix M: Community Acknowledgment Letters*). For communities, counties, and Tribal nations that did participate in the Discovery process, letters summarizing identified mapping needs were sent to the relevant community official(s) to ensure their needs were correctly recorded and summarized. These letters requested community officials review the identified needs and either return a signed copy of the letter to NYSDEC if the needs were summarized correctly or contact NYSDEC if changes were needed. Copies of the follow-up letters are provided in *Appendix M: Community Acknowledgment Letters.*

VII. Discovery Findings

Summary of Stakeholder Comments and Needs

Following the in-person Discovery meetings, the information gathered during the face-to-face consultations with community officials and other watershed stakeholders was combined with information provided by stakeholders through the Stakeholder Survey forms completed in hard copy or online outside of the meetings. A summary of identified needs (flood mapping, mitigation, and training) provided by stakeholders during the Discovery process are provided in the sections below. Detailed summaries of the data provided by stakeholders during the project are available in *Appendix K: Discovery Meeting Summary Memorandum* and *Appendix R: Recommended Scope of Work Memorandum* of this report.

Flood Mapping Needs

Communities in the Indian Watershed have FIRMs that were developed between 1988 and 1998. Further, there are a small number of communities with no published FIRMs or FEMA-identified flood hazards. All communities in the Discovery project area would benefit from new or revised digital FIRMs. Many community officials find the existing maps to be outdated, have floodplain inaccuracies, and difficult to use.

Table 20: Summary of Identified Mapping Needs summarizes the mapping needs identified by communities and other stakeholders during the Discovery project. The Discovery maps display each community and the identified mapping needs where applicable.

Table 19: Summary of Identified Mapping Needs

County / Tribe / Organization	Community	Identified Mapping Needs
Jefferson	Antwerp, Town of	None identified.
	Antwerp, Village of	No input received from community.
	Philadelphia, Town of	None identified.
	Philadelphia, Village of	1. Indian River needs a detailed study, there are general flood hazard inaccuracies along the river: a: near the village office and lift stations/waste water management b: area east of Sand Street and north of the railroad 2. Indian River and Black Creek flooding is generally seasonal, with snow melt and spring rain.
	Theresa, Town of	No input received from community.
	Theresa, Village of	No input received from community.
	Wilna, Town of	1. Indian River needs a detailed study; the floodplains are overstated and include areas elevated 50' above the river (specifically, Fort Drum land). 2. Townwide springtime ice jam flooding. 3. Brookfield Renewable Power Company may have dam inundation data.
Lewis	Croghan, Town of	No input received from community.
	Diana, Town of	No input received from community.

Table 19: Summary of Identified Mapping Needs

County / Tribe / Organization	Community	Identified Mapping Needs
St. Lawrence	De Peyster, Town of	No input received from community.
	Hammond, Town of	No input received from community.
	Hammond, Village of	No input received from community.
	Macomb, Town of	No input received from community.
	Morristown, Town of	1. Black Lake has SFHA inaccuracies and needs a detailed study. 2. Past / repetitive flooding at Black Lake and St. Lawrence River occurred in 2015, 2017, and 2019.
	Oswegatchie, Town of	1. Updated/revised FIRMs. 2. Black Lake has past flooding and needs a detailed study. 3. Oswegatchie River needs a detailed study; Eel Weir Road (State Route 4) bridge was replaced 10 years ago and has ice jam issues.
	Rossie, Town of	No input received from community.
St. Lawrence	St. Lawrence County	1. St. Lawrence River needs a detailed study. The river experienced flooding in 2017 and 2019; water level is controlled by regulated dams. 2. Updated/revised FIRMs a priority for Town and Village of Hammond, Town of Lisbon, and Town of Lewisville 3. Updated/revised/reinstated FIRMs a priority for communities that had their maps rescinded. 4. Mitigation notably under Resiliency and Economic Development Initiative (REDI) for Town of Waddington.
	----	1. Raquette River has SFHA inaccuracies and needs a detailed study. 2. St. Regis River needs a detailed study. It has SFHA inaccuracies mostly due to flooding that occurred in 2017 and 2019; water level is controlled by regulated dams. 3. Updated/revised FIRMs a priority for Town and Village of Hammond, Town of Lisbon, and Town of Lewisville. 4. Updated/revised/reinstated FIRMs a priority for communities that had their maps rescinded. 5. Mitigation notably under Resiliency and Economic Development Initiative (REDI) for Town of Waddington.

Mitigation and Risk Reduction Project Needs

Communities and other stakeholders provided their input on mitigation and risk reduction project needs as part of the Discovery project. The most common needs identified included the replacement/resizing of culverts and bridges, dam maintenance/remediation, and stream maintenance, sedimentation, and erosion issues along flooding sources that exacerbate flooding and ice jam problems. *Table 21: Summary of Mitigation and Risk Reduction Project Needs* provides a summary of such needs identified by communities and stakeholders during this Discovery project as applicable.

Table 20: Summary of Mitigation and Risk Reduction Project Needs

County / Tribe / Organization	Community	Mitigation/Risk Reduction Project Need
Jefferson	Antwerp, Town of	None identified.
	Antwerp, Village of	No input received from community.
	Philadelphia, Town of	None identified.
	Philadelphia, Village of	1. Need mitigation assistance at Garden Road and Sands Street due to Indian River flooding. 2. CRS information requested.
	Theresa, Town of	No input received from community.
	Theresa, Village of	No input received from community.
	Wilna, Town of	1. CRS information may be helpful.
St. Lawrence	Croghan, Town of	No input received from community.
	Diana, Town of	No input received from community.
	De Peyster, Town of	No input received from community.
	Hammond, Town of	No input received from community.
	Hammond, Village of	No input received from community.
	Macomb, Town of	No input received from community.
	Morristown, Town of	1. CRS information requested.
	Oswegatchie, Town of	1. Digital FIRMs with updated SFHAs.
	Rossie, Town of	No input received from community.
	St. Lawrence County	1. Digital FIRMs with updated SFHAs; reinstate rescinded FIRMs. 2. Flood risk assessment needed for St. Lawrence River. 3. Resiliency data (Sea Grant funding). 4. Code Enforcement Officer and Highway Superintendent trainings. 5. CRS information requested.
Development Authority of North Country	----	1. Code enforcement officer training. 2. The Towns of Parishville and Colton would be good candidates for CRS. 3. The Village of Potsdam and the City of Ogdensburg may be interested in more information about the CRS program. 4. Flood risk assessment needed for St. Lawrence River. 5. Resiliency data (Sea Grant funding).

Training, Outreach, and Planning Support Needs

As illustrated in the following table, Floodplain Management Administration was the most commonly requested training topic by community officials, with Building Code Requirements and Hazard Mitigation and Grant Programs following closely behind. Effective Public Outreach was the least requested topic of the four listed in the table. Several communities also requested Code Enforcement Officer training and information on the CRS program and other topics. *Table 22: Summary of Training Needs* captures the training, outreach, and planning support needs identified by communities and stakeholders during this Discovery project.

Table 21: Summary of Training Needs

County / Tribe / Organization	Community	Floodplain Management Admn.	Building Code Reqts.	Hazard Mitigation and Grant Programs	Effective Public Outreach	Other
Jefferson	Antwerp, Town	-	-	-	-	-
	Antwerp, Village	-	-	-	-	-
	Philadelphia, Town	-	-	-	-	-
	Philadelphia, Village	**x**	**x**	**x**	**x**	1. Mitigation specific to Kent Lane Park, Garden Road, and Sands Street
	Theresa, Town	-	-	-	-	-
	Theresa, Village	-	-	-	-	-
	Wilna, Town	**x**	-	**x**	-	-
Lewis	Croghan, Town	-	-	**x**	-	-
	Diana, Town	-	-	-	-	-
St. Lawrence	De Peyster, Town	-	-	-	-	-
	Hammond, Town	-	-	-	-	-
	Hammond, Village	-	-	-	-	-
	Macomb, Town	-	-	-	-	-
	Morristown, Town	**x**	**x**	**x**	-	-
	Oswegatchie, Town	-	-	-	-	-
	Rossie, Town	-	-	-	-	-
	St. Lawrence County	**x**	**x**	-	-	1. Code Enforcement Officer and Highway Superintendent training
Development Authority of North Country	----	**x**	**x**	**x**	-	1. Code Enforcement Officer and Highway Superintendent training

Recommendations for Future Risk MAP Project Scope

Based on the stakeholder input and other data collected during this Discovery project, a recommended scope of work was developed for consideration for a future Risk MAP project that may be implemented by FEMA if available funding permits. The Indian Watershed includes three counties and 16 communities. Stakeholder participation in the Discovery process included attending the pre-Discovery webinars, completing the questionnaire, attending in-person Discovery meetings, or responding to correspondences. In the Indian Watershed, counties have not been modernized to digital countywide FIS/FIRM products. New detailed and approximate studies, along with digital countywide maps, would assist communities in enforcing floodplain management regulations and managing development. The following table displays priority rankings based on community interest expressed during the Discovery process, the presence of existing flood hazards or mitigation needs, the proximity of structures to flooding sources, areas of recent development, and the status of the water course in the CNMS database.

Detailed studies were recommended for all or portions of the following flooding sources:

Table 22: Detailed Study Requests

Ranking	Community	Flooding Source	HUC8 Number	Mileage of Study Request	Description of Request and Risk to Address
1	Morristown, Town of	Black Lake	04150303	15.00	SFHA inaccuracies and past/repetitive flooding
2	Wilna, Town of	Indian River	04150303	10.70	Detailed study for overstated SFHAs and include areas elevated 50' above the river
3	Philadelphia, Village of	Indian River	04150303	1.50	Detailed study to address general SFHA inaccuracies (near the village office and lift stations, wastewater treatment plant, and Sand Street / railroad area)
4	Pitcairn, Town of	Portaferry Lake	04150302	0.70	Detailed analysis needed due to development

Total Detailed Study Request Mileage: 27.90 miles

Approximate studies were not recommended for any flooding sources in the Indian Watershed.

The highest priority in the scope of work is the development of digital FIRMs for Jefferson, Lewis, and St. Lawrence Counties. These counties currently use older maps, dating from 1978 to 1998, and would benefit greatly from digital countywide FIRMs. The current map inventory is out of date and lacks the details necessary for communities to effectively administer and enforce the NFIP requirements. In addition, several communities currently have no published FIRMs. Revised studies for key stream segments and new approximate A-zone studies in a digital format would

assist both the communities and the counties in enforcing the floodplain regulations and manage development. Along with updated maps, communities would also benefit from Base Level Engineering (BLE) products that can be used to assist communities in understanding local flood risk and develop mitigation strategies.

Ice jams and snowmelt are major flooding sources noted by local officials in the Indian Watershed. New York State has the second highest count of recorded ice jams in the country. The Villages of Philadelphia and Wilna mentioned flooding issues from spring snowmelt and frequent ice jams.

The complete recommended scope of work for all watersheds within the North Country Watershed Discovery project area is provided in *Appendix R: Recommended Scope of Work Memorandum*.