Yates County, New York

Hazard Mitigation Plan

Volume I—Basic Plan

September 2025

TETRA TECH

2025 Yates County Hazard Mitigation Plan

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EXECUTIVE SUMMARY

HAZARD MITIGATION OVERVIEW

Hazard mitigation is the use of long-term and short-term policies, programs, projects, and other activities to minimize the loss of life, injury, and property damage that can result from a disaster. Communities, residents, and businesses across the United States have been faced with continually increasing costs associated with natural and human-caused hazards. Hazard mitigation is the first step in reducing risk and is the most effective way to reduce costs associated with hazards.

Yates County has developed a hazard mitigation plan (HMP) to reduce risks from disasters to the people, property, economy, and environment within the County's planning area. Yates County and 13 participating local jurisdictions (the Planning Partners) prepared this plan as an update to the 2020 Yates County HMP. The updated 2025 HMP (also referred to as "the plan") includes countywide analysis and assessment of hazards, risk, and capabilities.

The plan complies with federal and state hazard mitigation planning requirements to establish the Planning Partners' eligibility for funding under Federal Emergency Management Agency (FEMA) grant programs. FEMA has issued guidelines for the development of multi-jurisdictional hazard mitigation plans. The federal Disaster Mitigation Act of 2000 requires state and local entities to implement pre-disaster mitigation planning and develop HMPs. The New York State Division of Homeland Security and Emergency Services (NYS DHSES) supports plan development for jurisdictions in New York.

THE PLANNING PROCESS

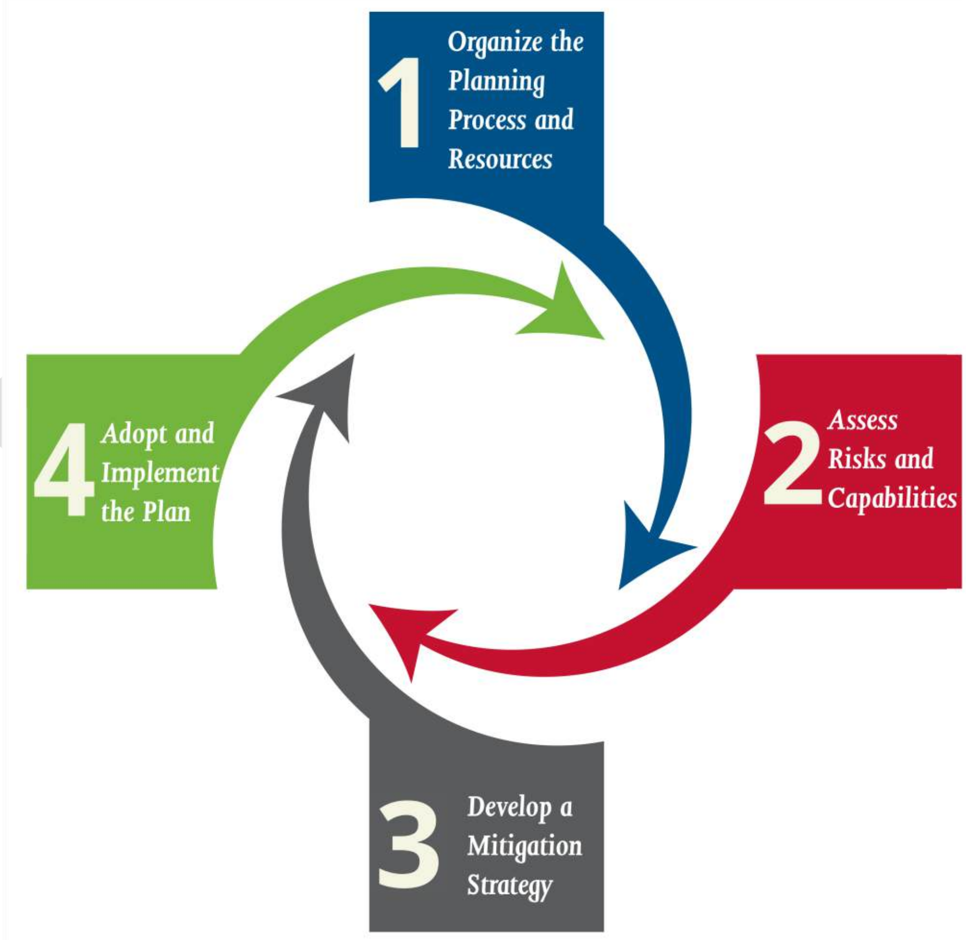
This HMP Update documents the process and outcomes of the mitigation efforts of Yates County and its jurisdictions. The hazard mitigation plan followed the four-phase planning process recommended by FEMA (see Figure ES-1).

To support the planning process, Yates County and the participating jurisdictions accomplished the following:

- Developed a Steering Committee consisting of key stakeholders and a countywide Planning Partnership, inclusive of the Steering Committee members, with participating jurisdictions and regional stakeholders
- Reviewed the 2020 Yates County Hazard Mitigation Plan

- Identified and reviewed hazards of greatest concern to the County (hazards of concern) to be included in the update
- Profiled hazards of concern
- Estimated the inventory at risk and potential losses associated with these hazards
- Reviewed and updated the mitigation goals and objectives
- Reviewed mitigation strategy and actions outlined in the 2020 HMP to indicate progress
- Developed new mitigation actions to reduce the vulnerability of assets from hazards of concern
- Involved a wide range of stakeholders and the public in the plan update process
- Developed mitigation plan maintenance procedures to be executed after obtaining approval of the plan from NYS DHSES and FEMA

Figure ES-1. FEMA's Four-Phased Planning Process



Source: FEMA 2021

INVOLVEMENT BY STAKEHOLDERS AND THE PUBLIC

The Planning Partners kept stakeholders and the general public informed throughout the planning process and provided opportunities for public comment and input. In addition, numerous agencies and stakeholders participated as core or support members of the Steering Committee or Planning Partnership, providing input and expertise throughout the planning process.

Participating Jurisdictions Involved in the Mitigation Planning Effort

The following are the local governments in Yates County that participated as Planning Partners in this HMP update:

- Yates County
- Town of Barrington
- Town of Benton
- Village of Dresden
- Village of Dundee
- Town of Italy
- Town of Jerusalem
- Town of Middlesex
- Town of Milo
- Village of Penn Yan
- Town of Potter
- Village of Rushville
- Town of Starkey
- Town of Torrey

The participating jurisdictions provided significant input into the preparation of the plan, in particular the preparation of jurisdiction-specific annexes included in Volume II. The Village of Rushville did not participate in this 2025 plan update.

Multiple Agency Support for Hazard Mitigation

Primary responsibility for the development and implementation of mitigation strategies and policies lies with local governments. However, local governments are not alone; various partners and resources at the regional, state, and federal levels are available to assist communities in the development and implementation of mitigation strategies. In New York, NYS DHSES is the lead agency providing hazard mitigation planning assistance to local jurisdictions. In addition, FEMA provides grants, tools, guidance, and training to support mitigation planning.

In updating the HMP, the participating jurisdictions fully coordinated with and solicited participation from county and local governments, relevant organizations and groups, state and federal agencies, and the general public. This coordination ensured that stakeholders had established communication channels and relationships to support mitigation planning and mitigation actions included in the plan.

Additional input and support for this planning effort was obtained from a wide range of agencies as well as through public involvement. Under the project management of the Yates County Office of Emergency Services (OES), the Yates County Hazard Mitigation Steering Committee provided oversight for the preparation of this plan. The Steering Committee includes representatives from the following:

- Yates County Office of Emergency Services
- Yates County Planning and Development Department
- Yates County Building and Grounds Department
- Yates County Community Services Department
- Yates County Social Services Department
- Yates County Information and Technology
- Yates County Probation Department
- Yates County Public Health Department
- Yates County Soil and Water District
- Town of Barrington
- Town of Benton
- Town of Potter
- Town of Starkey
- Town of Milo
- Town of Torrey
- Keuka College
- The Living Well Mission
- New York State Electric and Gas
- New York State Division of Homeland Security and Emergency Services

RISK ASSESSMENT FOR LOCAL HAZARDS OF CONCERN

The Planning Partners evaluated each jurisdiction's risk and vulnerability due to each of the hazards of concern, based on past events, past and predicted future losses, and the expected probability of future occurrence. From these evaluations, hazards were ranked as high, medium, or low risk to each jurisdiction. The hazard rankings were used to focus and prioritize individual jurisdictional mitigation strategies. Summary overall hazard rankings for all of Yates County are presented in Table ES-1.

Table ES-1. Countywide Ranking for Yates County Hazards of Concern

Hazard of Concern	Hazard Ranking
Dam Failure	Low
Disease Outbreak	Medium
Drought	Medium
Extreme Temperature	Medium
Flood	Medium
Harmful Algal Blooms	Medium
Hazardous Materials	Medium
Landslide	Low
Severe Storm	High
Severe Winter Storm	High
Transportation Accidents	Low
Utility Failure	Medium

CAPABILITY ASSESSMENT AND PLAN INTEGRATION INTO OTHER LOCAL MECHANISMS

Effective mitigation is achieved when hazard awareness and risk management approaches and strategies become an integral part of public activities and decision-making. Within the County, there are many existing plans and programs that support hazard risk management. It is critical that this HMP integrate, complement, and reference those plans and programs to the extent practical in order for it to be a comprehensive resource for hazard mitigation.

The HMP includes a capability assessment to review relevant local mechanisms for each participating jurisdiction. This assessment identifies where each jurisdiction is currently able to implement hazard mitigation measures and where each would benefit from improved capabilities for such measures. The capability assessment also provides a summary and description of the existing plans, programs, and regulatory mechanisms at all levels of government (federal, state, county and local) that support hazard mitigation in the County. In the jurisdictional annexes, each participating jurisdiction identifies how it has integrated hazard risk management into its existing planning, regulatory and operational/administrative framework, and how it intends to continue to promote this integration.

MITIGATION STRATEGY

Hazard Mitigation Plan Goals and Objectives

It is a federal requirement for hazard mitigation plans to include a description of mitigation goals to reduce or avoid long-term vulnerabilities to the identified hazards of concern.

The Yates County HMP planning process included a review and update of the prior mitigation goals and objectives to guide the selection of mitigation actions addressing all hazards of concern. Mitigation goals were updated based on a risk assessment, discussions, research, and input plan participants and stakeholders. The goal development process considered the goals expressed in the New York State Hazard Mitigation Plan, as well as other relevant county and local planning documents.

2025 Yates County HMP Goals

Goal 1: Reduce the likelihood and impacts of hazards on life, property, and the environment.

Goal 2: Protect life, property, critical infrastructure and community lifelines, the environment, and the economy from hazard impacts.

Goal 3: Educate the public, officials, and other stakeholders about the hazards they face and what can be done to mitigate hazard impacts.

Goal 4: Reduce the risk of natural hazards for socially vulnerable populations and underserved communities.

Goal 5: Address long-term vulnerabilities from high hazard dams.

Implementation of the 2020 Plan

The status of the mitigation projects identified in the 2020 HMP was reviewed for this HMP. Numerous projects and programs have been implemented that have reduced hazard vulnerability to assets in the planning area. Uncompleted projects have been revaluated, modified as necessary, and incorporated into this plan. The Planning Partners' annexes describe these mitigation activities in more detail, and plan maintenance procedures have been developed to encourage thorough integration with local decisions and processes and regular review of implementation progress.

2025 Mitigation Strategy

Jurisdictional actions included in the mitigation strategy had a strong focus on education and outreach for the general population and socially vulnerable populations; training and education of municipal officials, including the Floodplain Administrators; ensuring continuity of operations for critical facilities through the installation of emergency backup generators; the reduction of flood risk through the increase in capacity of stormwater infrastructure, including culverts, drainage systems, and catch basins; and working to identify safety measures and procedures of dams within the various jurisdictions.

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Part 1: The Planning Process and Planning Area

1. INTRODUCTION

Yates County has developed a hazard mitigation plan (HMP) to reduce risks from disasters to the people, property, economy, and environment within the County. Developed by the County and 13 participating local jurisdictions (the Planning Partners), this HMP updates the 2020 Yates County HMP. The updated 2025 HMP (also referred to as "the plan") includes countywide analysis and assessment of hazards, risk, and capabilities.

1.1 OVERVIEW TO HAZARD MITIGATION PLANNING

1.1.1 What is Hazard Mitigation?

Hazard mitigation is any sustained action taken to reduce or eliminate the long-term risk and effects that can result from hazards. The Federal Emergency Management Agency (FEMA) defines a hazard mitigation plan as the documentation of a state or local government's evaluation of natural hazards and strategies to mitigate them.

Effective mitigation planning helps people, organizations, and government agencies to better prepare for disasters and respond when disasters occur. It also allows local governments to remain eligible for FEMA grant funding for mitigation projects—actions that will reduce the impact of future disaster events. The following are long-term benefits of mitigation planning and implementation:

FEMA estimates that for every dollar spent on damage prevention (mitigation), twice that amount is saved by not having to perform post-disaster repairs.

- An increased understanding of hazards faced by local communities
- A more sustainable and disaster-resistant community
- Financial savings through partnerships that support planning and mitigation efforts
- Focused use of limited resources on hazards that have the biggest impact on the community
- Reduced long-term impacts on human health and structures
- Reduced costs associated with response and recovery efforts, including repairs

1.1.2 Regulatory Framework

In the early 1990s, a new federal policy regarding disasters began to evolve. Rather than simply reacting whenever disasters strike, the federal government began encouraging communities to assess their vulnerability to various hazards before disaster strikes, and then take actions to reduce or eliminate potential risks. The policy is based on the understanding that a disaster-resistant community can rebound from a natural disaster with less loss of property or human injury, at much lower cost and, consequently, more quickly.

The federal Disaster Mitigation Act of 2000 (DMA 2000) encouraged states, tribes, and local governments to take a new and revitalized approach to mitigation planning. DMA 2000 defined new requirements to replace the mitigation planning provisions of the Robert T. Stafford Disaster Relief and Emergency Assistance Act. Under the new requirements, communities seeking certain hazard-related federal funding must have a plan that identifies potential risks from natural hazards to the health, safety, and well-being of their residents, along with actions the community can take to mitigate those hazards before disaster strikes.

The HMP process enables local and state governments to better articulate accurate needs for mitigation, resulting in faster allocation of funding and more effective risk reduction projects. HMPs expire after five years, and communities must update them to maintain eligibility for hazard mitigation assistance from the federal government.

Regulations to implement DMA 2000 are included in Title 44 of the Code of Federal Regulations, Section 201 (44 CFR 201). One goal of the federal regulations is to facilitate cooperation between state and local authorities. In New York, responsibility for administering the FEMA Hazard Mitigation Program is delegated to the New York State Division of Homeland Security and Emergency Services (NYS DHSES). Table 1-1 summarizes the requirements outlined by 44 CFR 201 and where each is addressed in this hazard mitigation plan.

1.1.3 Specialized Terms and Concepts

Like any technical field, hazard mitigation has developed over the years its own set of terms and concepts with particular meanings within the hazard mitigation practice. A full list of acronyms and definitions is provided at the end of this volume. The following is a quick reference for specialized terms whose use is especially prominent in this HMP:

- Adaptive capacity—the ability of a human or natural system to adjust to climate change by moderating potential damage or coping with the consequences (EPA 2023)
- Asset—anything that is important to the character and function of a community (e.g., people, structures, community lifelines, the economy, and natural, historic, and cultural resources) (FEMA 2023)
- Capability assessment—an evaluation of which authorities, policies, programs, funding and resources a community has to accomplish hazard mitigation (FEMA 2023)

Table 1-1. FEMA Local Mitigation Plan Review Crosswalk

Plan Criteria	Primary Location in Plan
Prerequisites	
Adoption by the Local Governing Body: §201.6(c)(5)	Chapter 2; Appendix A
Compliance with NYS DHSES Hazard Mitigation Planning Standards	Appendix I
Planning Process	
Documentation of the Planning Process: §201.6(b) and §201.6(c)(1)	Chapter 2
Risk Assessment	
Identifying Hazards: §201.6(c)(2)(i)	Chapter 5
Profiling Hazards: §201.6(c)(2)(i)	Chapters 6 – 17
Assessing Vulnerability: Overview: §201.6(c)(2)(ii)	Chapter 3; Chapters 6 – 17
Assessing Vulnerability: Identifying Structures: §201.6(c)(2)(ii)(A)	Chapter 3; Chapters 6 – 17
Assessing Vulnerability: Estimating Potential Losses: §201.6(c)(2)(ii)(B)	Chapter 3; Chapters 6 – 17
Assessing Vulnerability: Analyzing Development Trends: §201.6(c)(2)(ii)(C)	Chapter 3; Chapters 6 – 17; Volume II Annexes
Mitigation Strategy	
Local Hazard Mitigation Goals: §201.6(c)(3)(i)	Chapter 20; Volume II Annexes
Identification and Analysis of Mitigation Actions: §201.6(c)(3)(ii)	Chapter 20; Volume II Annexes
Implementation of Mitigation Actions: §201.6(c)(3)(iii)	Chapter 20; Volume II Annexes
Multi-Jurisdictional Mitigation Actions: §201.6(c)(3)(iv)	Chapter 20; Volume II Annexes
Plan Maintenance Process	
Monitoring, Evaluating, and Updating the Plan: §201.6(c)(4)(i)	Chapter 21
Incorporation into Existing Planning Mechanisms: §201.6(c)(4)(ii)	Chapter 21; Volume II Annexes
Continued Public Involvement: §201.6(c)(4)(iii)	Chapter 21

- Cascading hazard—a primary event, such as heavy rainfall, seismic activity, or rapid snowmelt, followed by a chain of consequences that may range from modest (lesser than the original event) to substantial (National Academies of Sciences, Engineering, and Medicine 2022)
- Community lifeline—one of the most fundamental services in a community that, when stabilized, enable all other aspects of society to function (FEMA 2023)
- Extent—the range of anticipated intensities of the identified hazards within a community, most commonly expressed using various scientific scales (FEMA 2022)
- Hazard profile—a description of a hazard's location, extent, previous occurrences and probability of future events within a community (FEMA 2023)

- Hazard ranking—the process of identifying the hazards that pose the greatest risk to a community, based on how likely the hazard is to occur, the potential consequences if the hazard does occur, and other relevant local factors
- Impact—the consequences or effects of a hazard on a community's assets identified in the vulnerability assessment. (FEMA 2023)
- Integration—the inclusion of hazard mitigation principles, vulnerability information and mitigation actions into other existing community planning to leverage activities that have co-benefits, reduce risk and increase resilience (FEMA 2022)
- Mitigation action—a project, plan, or activity to reduce the current and future vulnerabilities identified in the risk assessment (FEMA 2023)
- Mitigation strategy—the long-term blueprint for reducing the potential hazard-related losses identified in the risk assessment; the strategy consists of mitigation goals, mitigation actions, and a plan for implementing the actions (FEMA 2023)
- Natural hazard—a source of harm or difficulty created by a meteorological, environmental or geological event (FEMA 2023)
- Plan maintenance—monitoring and updating a hazard mitigation plan as warranted by changing conditions, availability of new information, and progress on the proposed mitigation actions (FEMA 2023)
- Planning process—the procedures used to develop a hazard mitigation plan with broad acceptance across the community
- Risk—the potential for damage or loss when natural hazards interact with people or assets (FEMA 2023)
- Risk assessment—a data-driven analysis to find where a local jurisdiction is at greatest risk from hazards (FEMA 2023)
- Social vulnerability—the potential for loss within an individual or social group, as affected by traits that influence the individual's or group's resilience, which is their ability to prepare, respond, cope or recover from an event (FEMA 2023)
- Stakeholder—individuals or groups that a mitigation action or policy affects, including businesses, private organizations, and residents (FEMA 2023)
- Vulnerability—a description of which assets within locations identified to be hazard-prone are at risk from the effects of the hazard (FEMA 2023)

1.2 HISTORY OF HAZARD MITIGATION IN YATES COUNTY

Yates County has been included in 20 FEMA disaster declarations (major disaster, fire management, or emergency) since 1954. The County adopted its first hazard mitigation plan in 2011, with the second edition in 2017, and third in 2020. The 2020 plan identified the following as the greatest hazards of concern in Yates County:

- Drought
- Epidemic
- Extreme temperatures
- Flood
- Harmful algal blooms
- Hazardous materials
- Landslide
- Severe storm
- Severe winter storm
- Transportation accidents
- Utility failure

1.2.1 Key Changes in the Current Update

The following are the most significant changes made between the previous County HMP (2020) and the current (2025) update

- The 2020 Yates County HMP did not identify dam failure as a stand-alone hazard of concern and placed it in the flood hazard of concern. Members of the Steering Committee and Planning Partnership for the current updated determined that dam failure should be included as a stand-alone hazard of concern.
- The Steering Committee re-evaluated the name of the epidemic hazard of concern and re-named it disease outbreak for the current HMP update.
- The 2020 Yates County HMP had the capabilities located in the mitigation strategies chapter. In the current HMP update, capabilities can be found in a separate chapter (Chapter 19).

1.3 PLAN ORGANIZATION

The HMP provides a detailed review and analysis of each hazard of concern, resources, and relevant statistical information for the Planning Partners. It is organized into two volumes: Volume I includes all information that applies to the entire planning area (Yates County); and Volume II includes specific information for each participating jurisdiction.

Volume I is a resource for ongoing mitigation analysis. It includes a description of the County and its jurisdictions as well as information on mitigation planning and how the risk assessment and capability assessment were performed. Volume I includes the following chapters:

- Part 1: The Planning Process and Planning Area
    - Chapter 1: Introduction
    - Chapter 2: Planning Process: Description of the plan methodology and development process, committee and stakeholder roles and activities, and how the plan will be incorporated into existing programs. Information regarding the adoption of the plan by Yates County and each participating jurisdiction
    - Chapter 3: County Profile: Overview of Yates County, including: general information and physical conditions; economy; land use patterns and trends; population and demographics; general building stock inventory; and community lifelines
- Part 2: Risk Assessment
    - Chapter 4: Methodology: Description of the methodology used to assess hazard risk and the status of local data
    - Chapter 5: Hazards of Concern Identification: Documentation of the process of identifying the hazards of concern for profiling and evaluation in this HMP
    - Chapter 6-17: Profiles of each hazard and findings of the risk assessment for each hazard
    - Chapter 18: Hazards Ranking: Description of the hazard ranking process and results
- Part 3: Capability Assessment
    - Chapter 19: Capability Assessment: Description of existing plans, programs, and regulatory mechanisms at all levels of government (federal, state, county, local) that support hazard mitigation in Yates County
- Part 4: Mitigation Strategy
    - Chapter 20: Mitigation Strategy: Description of the mitigation goals and objectives identified for this update and the process by which mitigation strategies were developed or updated

- Part 5: Plan Maintenance
    - Chapter 21: Plan Maintenance Procedures: Description of a system to continue to monitor, evaluate, maintain, and update the plan

Volume II consists of annexes for each participating jurisdiction. Each annex summarizes the jurisdiction's legal, regulatory, and fiscal capabilities; evaluates vulnerabilities to hazards; describes the status of past mitigation actions and HMP integration into local planning processes; and provides a specific mitigation strategy. The annexes provide each jurisdiction with an expedient resource for implementing mitigation projects and maximizing future grant opportunities.

Appendices include the following:

- Appendix A (Adoption Resolution): Documentation of the Planning Partners' plan approvals
- Appendix B (Meeting Documentation): Agendas, attendance sheets, minutes, and other documentation of planning meetings held during development of the plan
- Appendix C (Public and Stakeholder Outreach): Documentation of the public and stakeholder outreach effort, including webpages, informational materials, public and stakeholder meetings and presentations, surveys, and other methods used to receive and incorporate public and stakeholder comment and input to the plan update process
- Appendix D (Participation Matrix)
- Appendix E (Action Worksheet Template and Instructions)
- Appendix F (Plan Maintenance Tools): Examples of plan review templates available to support annual plan review and example FEMA Guidance Worksheets (FEMA 386-4)
- Appendix G (Critical Facility Inventory)
- Appendix H (Risk Assessment Supplementary Data): Details regarding hazard events since those documented in the 2020 plan
- Appendix I (Mitigation Strategy Supplementary Data): Summary of activities and resources provided to plan participants to support the update of the mitigation strategy
- Appendix J (NYS DHSES Planning Standards): State standards and guidelines for hazard mitigation planning
- Appendix K (Linkage Procedures)
- Appendix L (Dam Supplement): Information on high hazard dams in Yates County; due to the sensitive nature of this information, details are redacted for the public document.

2. PLANNING PROCESS

This chapter describes the planning process used to update the Yates County HMP, including how it was prepared, who was involved in the process, and how the public was involved. The planning approach aimed to achieve the following results:

- The plan will be multi-jurisdictional, with the intention of including all municipalities in the county. Yates County invited all municipal governments in the county to join in the planning process. All 13 towns (T) and villages (V) participated with the county in the plan update:
  - County of Yates
  - Barrington (T)
  - Benton (T)
  - Dresden (V)
  - Dundee (V)
  - Italy (T)
  - Jerusalem (T)
  - Middlesex (T)
  - Milo (T)
  - Penn Yan (V)
  - Potter (T)
  - Rushville (V)
  - Starkey (T)
  - Torrey (T)
- The format of the plan is such that communities can readily join in the regulatory five-year plan update process, as identified in Chapter 21.
- The plan considers all natural hazards facing the area, as required by 44 CFR 201.
- The plan was developed following the process outlined by federal regulations and prevailing FEMA and NYS DHSES guidance. In addition, the plan meets criteria for the National Flood Insurance Program (NFIP) Community Rating System (CRS), and the Flood Mitigation Assistance (FMA) programs.

Yates County applied for and was awarded a multi-jurisdictional planning grant under the Hazard Mitigation Grant Program (HMGP) (E HMPG-4480-0007), which supported the development of this HMP. Grant administration was the responsibility of the Yates County Office of Emergency Services.

2.1 GENERAL MITIGATION PLANNING APPROACH

The approach used to update the Yates County HMP was based on FEMA and State of New York regulations and guidance, including the following:

- Mitigation Planning How-to Series (FEMA 386-1 through 4, 2002)
- How-To Guide for Using Hazus for Risk Assessment (FEMA Document No. 433, February 2004)
- Local Mitigation Plan Review Guide (FEMA October 1, 2011)
- Mitigation Ideas: A Resource for Reducing Risk to Natural Hazards (FEMA January 2013)
- Integrating Hazard Mitigation into Local Planning (FEMA March 1, 2013)

- Plan Integration: Linking Local Planning Efforts (FEMA July 2015)
- Local Mitigation Planning Policy Guide (FEMA April 19, 2022)
- Local Mitigation Planning Handbook (FEMA May 2023)
- DMA 2000 (Public Law 106-390 (October 30, 2000)
- 44 CFR 201 and 206 (Feb. 26, 2002, Oct. 1, 2002, Oct. 28, 2003, and Sept. 13, 2004, Interim Final Rules)
- Hazard Mitigation Planning Standard (NYS DHSES 2022)
- Hazard Mitigation Plan (NYS DHSES 2023)

2.2 ORGANIZATION OF PLANNING PROCESS

2.2.1 Planning Process Participants

The jurisdictions in Yates County have differing levels of capabilities and resources available to apply to the plan update process, as well as differing levels of vulnerability to and impacts from the natural hazards being considered in this plan. It was Yates County's intent to encourage participation by all jurisdictions, and to accommodate their specific needs and limitations while still meeting the intent and purpose of the plan update. Such accommodations included establishing a Steering Committee, engaging a contract consultant to assume certain elements of the plan update process on behalf of the jurisdictions, and providing alternative mechanisms for planning participation.

Project Management and Planning Consultant

Project management was the responsibility of the Yates County Office of Emergency Services. A contract was executed in May 2023 between Yates County and Tetra Tech, the contract planning consultant. Tetra Tech was tasked with the following:

- Assisting with the organization of a Steering Committee and a Planning Partnership
- Assisting with the development and implementation of a public and stakeholder outreach program
- Data collection
- Facilitation and attendance at meetings (Steering Committee, municipal, stakeholder, public and other)
- Review and update of the hazards of concern, and hazard profiling and risk assessment
- Assistance with the review and update of mitigation planning goals and objectives

- Assistance with the review of past mitigation strategy progress
- Assistance with the screening of mitigation actions and the identification of appropriate actions
- Assistance with the prioritization of mitigation actions
- Authoring of the draft and final plan documents

Planning Partnership

In August 2023, the County notified all municipalities in the County of the pending planning process and invited them to formally participate. Jurisdictions were asked to formally notify the County of their intent to participate and to identify planning points of contact to facilitate their participation and represent the interests of their communities.

All participating jurisdictions, including the County, are recognized as Planning Partners. Each Planning Partner identified members to participate in a Planning Partnership, along with representatives from the State of New York and other regional stakeholders. Table 2-1 list the Planning Partnership members who represented each agency.

Table 2-1. Yates County Hazard Mitigation Planning Partnership Members

Organization	Name	Title/Position
Yates County Office of Emergency Services	Brian Winslow	Director
Yates County Office of Emergency Services	Diane DiFabio	Deputy Director
Yates County Office of Emergency Services	Ryan Bailey	EMS Coordinator
Yates County Planning Department	Jeff Ayers	County Planner
Yates County Soil and Water Conservation District	Colby Peterson	Director
Yates County Building and Grounds	Joe Reed	Supervisor
Yates County Social Services Department	Amy Miller	Commissioner
Yates County Information and Technology	Tim Groth	Director
Yates County Personnel Office	Kerry Brennan	Personnel Officer
Yates County Probation Department	Alyssa Palmer	Director
Yates County Public Health Department	Douglas Sinclair	Director
Yates County Community Services Department	George Roets	Director
Town of Barrington	Steven Wheeler	Highway Superintendent
Town of Barrington	Bryan Yarrington	Town Supervisor
Town of Barrington	Jesse Jayne	Code Enforcement Officer
Town of Barrington	Joy L. C. Perry	Town Clerk
Town of Benton	Jayson Hoover	Highway Superintendent

Organization	Name	Title/Position
Town of Benton	John Prendergast	Supervisor
Town of Benton	Richard Harper	Deputy Supervisor
Town of Benton	Thomas Fulkrod	Zoning Officer
Town of Benton	Jeremy Delyser	Engineer
Town of Benton	Bobbi Wolfe	Town Clerk/Tax Collector, RMC
Town of Italy	Richard Craig	Town Supervisor
Town of Italy	Andy Best	Highway Superintendent
Town of Italy	Steve Faulker	Former Highway Superintendent
Town of Italy	Chris Whipple	Code Enforcement Officer
Town of Italy	Debbie Craig	Town Clerk
Town of Jerusalem	Tony Hurd	Highway Superintendent
Town of Jerusalem	Jamie Sisson	Supervisor
Town of Jerusalem	Bill Gerhardt	Former Code Enforcement Officer
Town of Jerusalem	James McKinley	Code Enforcement Officer
Town of Jerusalem	Sheila McMichael	Town Clerk
Town of Jerusalem		Planning Board Chair
Town of Jerusalem	Daryl Jones	Deputy Supervisor
Town of Jerusalem	Ginny Fenton	Water/Sewer Department
Town of Jerusalem	Terry Kwiecinski	Assessor
Town of Middlesex	David C. Adams	Supervisor
Town of Middlesex	Dawn M. Kane	Code Enforcement Officer
Town of Middlesex	Alan Williams	Water Superintendent
Town of Middlesex	Joshua Burnett	Highway Superintendent
Town of Middlesex	Lynnette F. Miller	Town Clerk
Town of Milo	Anthony Validzic	Code Enforcement Officer
Town of Milo	Leslie Church	Supervisor
Town of Milo	Patricia Christensen	Town Clerk
Town of Milo	Eric Wiles	Town Engineer
Town of Milo	Lance Yonge	Highway Superintendent
Town of Milo	Kasey Christensen	Sewer and Water Superintendent
Town of Potter	Art Parsons	Highway Superintendent
Town of Potter	Paul Moberg	Town Councilperson
Town of Potter	Larry Lewis	Town Supervisor
Town of Potter	Ed Moberg	Zoning Board
Town of Potter	Brian Bootes	Deputy Supervisor
Town of Potter	Tim Pagel	Code Enforcement
Town of Potter	Deborah Adams	Town Clerk
Town of Potter	Chris Mumby	Town Councilperson
Town of Starkey	Ralph Warren	Highway Superintendent

Organization	Name	Title/Position
Town of Starkey	Brian Shriver	Code Enforcement
Town of Starkey	Geroge E. Lawson	Supervisor
Town of Starkey	Candace J. Iszard	Town Clerk
Town of Torrey	Grant Downs	Town Councilman
Town of Torrey	Bruce Henderson	Town Councilman
Town of Torrey	Tim Chambers	Highway Superintendent
Town of Torrey	Josh Wood	Deputy Highway Superintendent
Town of Torrey	Dwight James	Town Code and Zoning Officer
Town of Torrey	Jeremey Henries	Dresden Fire Chief
Town of Torrey	Peter Martini	Town Supervisor
Town of Torrey	Betty Daggett	Town Clerk
Town of Torrey	Colby Petersen	Deputy Supervisor
Village of Dresden	Colleen Riviello	Clerk-Treasurer—Administration
Village of Dresden	William Hall	Mayor – Board of Trustees
Village of Dresden	Tim Steed	Engineer – Hunt Engineers
Village of Dresden	Brian Ellis	DPW Superintendent
Village of Dresden	Thomas Fulkrod	Code Enforcement Officer
Village of Dresden	Kathy Whitney	Deputy Clerk Admin
Village of Dundee	Steven Dean	Superintendent of Public Works
Village of Dundee	Frederick Cratsley, Jr.	Mayor
Village of Dundee	Alec Miller	Fire Chief
Village of Dundee	Thomas Grady	Code Enforcement Officer
Village of Dundee	Christine Sutherland	Clerk/Treasurer
Village of Penn Yan	Melissa Gerhardt	Director of Public Works
Village of Penn Yan	Brett McMichael	Deputy Director of Public Works
Village of Penn Yan	James Marshall	Code Enforcement Officer
Village of Penn Yan	Robert Elliott	Village Engineer
Village of Penn Yan	Chris Brand	Streets Supervisor
Village of Penn Yan	Danny Condella	Mayor
Village of Penn Yan	Holly Easling	Clerk/Treasurer
Village of Penn Yan Police Dept.	Justin Hamm	Lieutenant
Village of Rushville	Art Rilands	Public Works Supervisor
Village of Rushville	Dave LeClair	Mayor
Village of Rushville	Tim Pagel	Code Enforcement
Village of Rushville	Greg Hoteling	Village Engineer
Village of Rushville	Jim Adams	Fire Chief
Village of Rushville	Jeannie Kesel	Clerk
Village of Rushville	Neal Curtis	Temporary Public Works Supervisor
NYS DHSES	Kevin Clapp	Hazard Mitigation

Organization	Name	Title/Position
NYS DHSES	Dyan Maybee	Region 5 Coordinator
NYS DHSES	Scott Feuerstein	Planning Manager
NYS DHSES	Roland Paperman	Former Hazard Mitigation
NYS DHSES	Michael Tarasoff	Hazard Mitigation
New York Department of Transportation, Region 6	Timothy Alimossy	Regional Emergency Manager
New York State Department of Health	Albert Cheverie	Preparedness Representative
New York State Electric and Gas	Lori Miller	Supervisor
UR Finger Lakes Health	Josh Colton	Head of Security
Keuka College	Alan Storey	Associate Vice President for Facilities
Keuka College	Amy Cotner	Associate Vice President for Student Life and Dean of Students, Title IX Coordinator
Keuka College	Jim Cunningham	Director of Campus Safety
The Living Well Mission	Sandi Perl	Executive Director
Ontario County Emergency Management	Debra Trickey	-EMS Coordinator
Ontario County Planning Department	Linda Phillips	Senior Planner
Penn Yan Central Schools	Jonathan MacKerchar	Athletic Director
Penn Yan Police Department	Justin Hamm	Lieutenant
Cornell Cooperative Extension Yates County	Sandi Bastedo	Executive Director
Cornell Cooperative Extension Yates County	Caroline Boutard-Hunt	Agricultural Educator

Planning Partnership members were charged with the following:

- Representing their jurisdiction throughout the planning process
- Ensuring participation of all departments and functions within their jurisdiction that have a stake in mitigation (e.g., planning, engineering, code enforcement, police and emergency services, public works)
- Assisting in gathering information for inclusion in the HMP update, including the use of previously developed reports and data
- Supporting and promoting the public involvement process
- Reporting on progress of mitigation actions identified in prior or existing HMPs
- Identifying, developing, and prioritizing mitigation actions
- Reporting on the progress of integrating prior or existing HMPs into other planning processes and municipal operations
- Supporting and developing a jurisdictional annex
- Reviewing, amending, and approving all chapters of the plan update
- Adopting, implementing, and maintaining the plan update

Appendix D (Participation Matrix) identifies how each individual who represented the jurisdictions during this planning effort contributed to the planning process.

For each jurisdiction that fully participated in the HMP, a completed annex is included in Volume II. In the annexes, the jurisdictions identify their points of contact for the HMP, evaluate their risk from the hazards of concern, identify their capabilities to effect mitigation in their community, identify and prioritize a suite of actions to mitigate their hazard risk, and adopt the updated plan via resolution.

All 13 municipalities in the County actively participate in the National Flood Insurance Program and have a designated NFIP floodplain administrator. All floodplain administrators have been informed of the planning process, reviewed the plan documents, and provided direct input to the plan update. Local floodplain administrators are identified as part of each jurisdiction's hazard mitigation planning team, as presented in the jurisdictional annexes in Volume II, as well as in Appendix D (Participation Matrix).

After completion of the plan, implementation and ongoing maintenance will become a function of the Planning Partnership as described in Chapter 21 (Plan Maintenance). The Planning Partnership will be responsible for reviewing the draft plan and soliciting public comment as part of an annual review and as part of the five-year mitigation plan updates.

Steering Committee

Yates County developed a Steering Committee to provide guidance and direction to the HMP update effort, and to ensure that the resulting document will be embraced by local government leaders as well as all who live and work within the planning area. Steering Committee members were charged with the following:

- Providing oversight of the planning process on behalf of the Planning Partnership
- Attending and participating in Steering Committee meetings
- Reviewing and updating the hazards of concern
- Developing a public and stakeholder outreach program
- Ensuring that the data and information used in the plan update process is the best available
- Reviewing and updating the hazard mitigation goals
- Identifying and screening mitigation strategies and activities
- Reviewing and commenting on plan documents prior to submission to NYS DHSES and FEMA

The Steering Committee provided guidance, leadership, and oversight of the planning process and acted as the point of contact for all participating jurisdictions and various interest groups in the planning area. Table 2-2 lists the members of the Steering Committee.

Table 2-2. Yates County Hazard Mitigation Steering Committee Members

Affiliation	Name	Title
Yates County Office of Emergency Services	Brian Winslow	Director
Yates County Office of Emergency Services	Diane DiFabio	Deputy Director
Yates County Office of Emergency Services	Ryan Bailey	EMS Coordinator
Yates County Planning Department	Jeff Ayers	County Planner
Yates County Soil and Water Conservation District	Colby Peterson	Director
Yates County Building and Grounds	Joe Reed	Supervisor
Yates County Social Services Department	Amy Miller	Commissioner
Yates County Information and Technology	Tim Groth	Director
Yates County Probation Department	Alyssa Palmer	Director
Yates County Public Health Department	Douglas Sinclair	Director
Yates County Community Services Department	George Roets	Director
Town of Barrington	Steven Wheeler	Highway Superintendent
Town of Benton	Jayson Hoover	Highway Superintendent
Town of Milo	Anthony Validzic	Code Enforcement Officer
Town of Potter	Art Parsons	Highway Superintendent
Town of Potter	Paul Moberg	Town Councilman
Town of Starkey	Ralph Warren	Highway Superintendent
Town of Torrey	Grant Downs	Town Councilman
Town of Torrey	Brice Henderson	Town Councilman
NYS DHSES	Kevin Clapp	Hazard Mitigation
NYS DHSES	Dyan Maybee	R-5 Coordinator
NYS DHSES	Roland Paperman	Former Hazard Mitigation
New York State Electric and Gas	Lori Miller	Supervisor
UR Finger Lakes Health	Josh Colton	Head of Securit
Keuka College	Alan Storey	Associate Vice President for Facilities
Keuka College	Amy Cotner	Associate Vice President for Student Life and Dean of Students, Title IX Coordinator
The Living Well Mission	Sandi Perl	Executive Director

2.2.2 Planning Activities

Members of the Planning Partnership, as well as other key stakeholders, met and communicated as needed to share information. This included workshops to identify hazards, assess risks, update inventories of critical facilities, and assist in updating mitigation goals and strategies. All members of the Planning Partnership had the opportunity to review the draft plan, supported interaction with other stakeholders, and assisted with public involvement efforts. These activities provided continuity through the process to ensure that natural hazard vulnerability information and appropriate mitigation strategies were incorporated.

Table 2-3 summarizes meetings and other planning activities conducted during the development of the plan. It also identifies which federal planning requirements each activity satisfies. Documentation of meetings (agendas, sign-in sheets, minutes, etc.) may be found in Appendix C (Public and Stakeholder Outreach). Table 2-3 identifies only formal meetings and milestone events. There was a great deal of other communication between Planning Partnership members and the consultant through individual local meetings, phone, and email.

Table 2-3. Summary of Mitigation Planning Activities / Efforts

Date	Federal Requirement	Description of Activity	Participants
August 22, 2023	1b, 2, 3a, 3b, 3c, 4a, 5c	Steering Committee Kickoff Meeting: Review project schedule; review municipal participation, discuss Planning Partnership kickoff meeting and local data collection; review and discuss sources and availability of County and regional data; discuss public and stakeholder outreach efforts.	See Appendix D
August 22, 2023	1b, 2, 3a, 3b, 3c, 4a	Planning Partnership Kickoff Meeting: Complete overview of planning process, plan participant expectations, review of hazards and hazards of concern identification, discussion of data needs and data collection process explaining all provided worksheets, discussion of public and stakeholder outreach efforts	County and municipal representatives and stakeholders. See Appendix D
October 2023	2	Public project website developed: https://www.yatescountynyhmp.com/	Planning Team, Contract Planner
February 8, 2024	2, 3a, 3b, 4a	Steering Committee Meeting: Project schedule and status review, review and finalize hazards of concern, review and finalize goals and objectives, public and stakeholder outreach, next steps	See Appendix D
February 22, 2024	2, 3c, 3d, 3e, 4a, 4b	Planning Partnership Meeting: Project report and status review, public and stakeholder outreach, risk assessment overview, schedule, next steps	County and municipal representatives and stakeholders. See Appendix D

Date	Federal Requirement	Description of Activity	Participants
May 30, 2024	2, 3c, 3d, 3e, 4a, 4b	Planning Partnership Meeting: Project report and status review, public and stakeholder outreach, mitigation strategy overview; mitigation action development, next steps	County and municipal representatives and stakeholders. See Appendix D
June 2024	2	Online Public Hazard Preparedness and Mitigation Survey developed and deployed	Planning Team, Contract Planner
June 2024	2	Online Stakeholder Hazard Mitigation Surveys developed and deployed	Planning Team, Contract Planner
June 2024	2	Online Neighboring Community Mitigation Survey developed and deployed	Planning Team, Contract Planner
November 21, 2024	2, 3c, 3d, 3e, 4a, 4b, 5a, 5b	Steering Committee Meeting: Plan Maintenance, Draft Plan Review	Steering Committee, Contract Planner, See Appendix D
November 23, 2024	1b, 2, 3c, 3d, 3e, 4a, 4b	Planning Partnership Meeting: Draft Plan Review	County and municipal representatives and stakeholders. See Appendix D
November 23, 2024	2	Draft plan posted to public project website	Public and Stakeholders
December 23, 2024	1b, 2	Public and stakeholder comments on draft plan received and incorporated into final plan.	Public and Stakeholders
December 23, 2024	All requirements	Final plan submitted to NYS DHSES and FEMA Region 2	NYS DHSES, FEMA Region 2
Upon plan approval by FEMA	1a	Plan adoption by resolution by the governing bodies of all participating municipalities	All plan participants

Numbers in column 2 identify specific federal planning requirements, as follows:
1a – Prerequisite – Adoption by the Local Governing Body
1b – Public Participation
2 – Planning Process – Documentation of the Planning Process
3a – Risk Assessment – Identifying Hazards
3b – Risk Assessment – Profiling Hazard Events
3c – Risk Assessment – Assessing Vulnerability: Identifying Assets
3d – Risk Assessment – Assessing Vulnerability: Estimating Potential Losses
3e – Risk Assessment – Assessing Vulnerability: Analyzing Development Trends
4a – Mitigation Strategy – Local Hazard Mitigation Goals
4b – Mitigation Strategy – Identification and Analysis of Mitigation Measures
4c – Mitigation Strategy – Implementation of Mitigation Measures
5a – Plan Maintenance Procedures – Monitoring, Evaluating, and Updating the Plan
5b – Plan Maintenance Procedures – Implementation through Existing Programs
5c – Plan Maintenance Procedures – Continued Public Involvement

2.3 STAKEHOLDER OUTREACH AND INVOLVEMENT

The Yates County HMP update was written using the best available information obtained from a wide variety of sources. Throughout the HMP update process, a concerted effort was made to gather information from municipal and regional agencies and staff as well as stakeholders, federal and state agencies, and the residents of the County. The Steering Committee solicited information from local agencies and individuals with specific knowledge of natural hazards and past historical events. The Steering Committee and Planning Partnership took into consideration planning and zoning codes, ordinances, and recent land use planning decisions.

This section details the outreach to, and involvement of, the many agencies, departments, organizations, non-profits, districts, authorities, and other entities that have a stake in managing hazard risk and mitigation—commonly referred to as stakeholders.

Diligent efforts were made to ensure broad regional and local representation in this planning process. A comprehensive list of stakeholders was developed with the support of the Steering Committee and Planning Partnership. Stakeholder outreach was performed early and throughout the planning process, including mass media notification efforts. Identified stakeholders were invited to attend the Planning Partnership risk assessment meeting, and key stakeholders were requested to participate on the Steering Committee and/or Planning Partnership. Information and input provided by these stakeholders has been included throughout this plan.

The following sections list the stakeholders who were invited to participate in the development of this plan and describe how they contributed to the plan. This summary information demonstrates the scope and breadth of the stakeholder outreach efforts during the planning process. Beyond those described here, many stakeholders were aware of and/or contributed to this plan through formal and informal outreach efforts by the Planning Partners involved in the plan update.

2.3.1 Federal and State Agencies

The federal and state agencies listed in Table 2-4 were contacted during the planning process. The table describes how each participated.

2.3.2 County and Regional Agencies

The county and regional agencies listed in Table 2-5 were invited to participate during the planning process. The table describes how each participated.

Table 2-4. Participation of Federal and State Agencies

Agency	Participation
FEMA Region 2	Provided planning guidance; provided summary and detailed NFIP data for planning area; presented preliminary regulatory flood products to municipalities and the public; attended meetings; participated in a Mitigation Strategy Workshop; conducted plan review.
• National Centers for Environmental Information • National Hurricane Center • National Oceanic and Atmospheric Administration • National Weather Service • Storm Prediction Center • U.S. Army Corps of Engineers • U.S. Census Bureau • U.S. Geological Survey	Information regarding hazard identification and the risk assessment for this HMP update was requested and received or incorporated by reference.
NYS DHSES: Headquarters and Region II	Administered planning grant and facilitated FEMA review; provided planning guidance; attended meetings; participated in the Mitigation Strategy Workshop, provided review of draft and final plan.
New York State Department of Environmental Conservation (NYSDEC)	Provided data and information on various hazards. Provided dates of most recent Community Assistance Visits and Community Assistance Contacts for municipalities enrolled in the NFIP.

Table 2-5. County and Regional Agencies

Agency	Participation
• UR Finger Lakes Health • Keuka College • The Living Well Mission • Yates County Building and Grounds Department • Yates County Community Service Department • Yates County Information and Technology • Yates County Office of Emergency Services • Yates County Planning Department • Yates County Probation Department • Yates County Public Health Department • Yates County Soil and Water Conservation District • Yates County Social Services Department	Served on steering committee, attended meetings, completed hazard of concern exercise and goals and objectives exercise and reviewed draft plan.
• New York State Electric and Gas • Town of Barrington • Town of Benton • Town of Milo • Town of Potter • Town of Starkey • Town of Torrey	Served on steering committee, attended meetings, provided input and reviewed draft plan.
• Yates County Highway Department	Served on the steering committee, provided input, and reviewed draft plan.
• Town of Italy • Town of Jerusalem • Town of Middlesex • Village of Dresden • Village of Dundee • Village of Penn Yan • Village of Rushville	Provided input and reviewed draft plan.

Agency	Participation
• Mosaic Health • New York State Department of Transportation • Ontario County Emergency Management Office • Ontario County Planning Department • Schuyler County Emergency Services Office • Seneca County Planning Department	Invited to take the stakeholder survey and review the draft plan.

2.3.3 Stakeholders by Community Lifeline Category

FEMA defines community lifelines as fundamental services in a community that, when stabilized, enable all other aspects of society. Following a disaster event, intervention is required to stabilize community lifelines. All participating jurisdictions were asked to invite their internal agencies associated with community lifeline categories to complete a stakeholder survey. Many jurisdictions also directly involved representatives of these agencies in the planning process, as identified in Table 2-1. This section describes outreach to and participation by other stakeholders in the planning process associated with FEMA's eight designated community lifeline categories. More detailed information about community lifelines in the planning area is provided in Section 3.9.

Safety and Security

Law Enforcement

Many municipalities directly involved police and other law enforcement representatives in the planning process. The following law enforcement agencies were invited to complete a stakeholder survey and review the draft plan:

- Penn Yan Police Department
- Yates County Sheriff's Office
- New York State Police

Fire Districts and Fire Departments

Many jurisdictions directly involved representatives of their fire department, hazardous materials response team, or rescue team in the planning process. The following fire districts or departments, hazardous materials response teams, or rescue teams were invited to complete a stakeholder survey and review the draft plan:

- Dresden Fire Department
- Branchport Keuka Park Fire Department
- Middlesex Hose Company
- Dundee Fire Department

- Penn Yan Fire Department
- Bellona Fire Company
- Benton Fire Department
- Himrod Fire Department
- Potter Fire Department
- Rushville Fire Department

Ambulance/Emergency Medical Services

The following ambulance and emergency medical service providers in the County were invited to complete a stakeholder survey and review the draft plan:

- Penn Yan Area Volunteer Ambulance Corps
- Middlesex Valley Volunteer Ambulance Inc.
- Yates County Emergency Medical Services

Dams

In order to address high hazard potential dams, outreach was conducted with dam owners and dam safety agencies. The following information was requested:

- Information, data, or resources regarding the risk of dam failure as a result of deficiencies or exposure to hazards such as flooding, landslides, and severe weather
- Concerns with dam safety due to changing climate conditions
- Concerns with emergency action plan deficiencies, including warning time, evacuation needs, etc.
- Completed or in progress repairs/improvements to dams
- Potential new mitigation actions that should be considered for inclusion in the HMP mitigation strategy

Food, Hydration, Shelter

Jurisdictions were asked to invite their emergency management related agencies to provide information on shelters and sheltering procedures. The following stakeholders that provide food, hydration, shelter, and agricultural activities in the County were invited to complete a stakeholder survey and review the draft plan:

- Yates Baptist Church
- American Red Cross

Health and Medical

Hospitals and Health-Care Facilities

The following hospitals and health-care facilities were invited to complete a stakeholder survey and review the draft plan:

- Soldiers and Sailors Memorial Hospital
- Finger Lakes Medical Associates

Energy

In addition to municipal utilities, the following electrical, natural gas, and fuel companies were invited to complete a stakeholder survey and review the draft plan:

- Dailey Electric
- Greenidge Generation LLC
- Mertec Plumbing Heating Electric
- New York State Electric and Gas Corporation

Penn Yan Municipal Utilities Board

Communications

Each jurisdiction was asked to provide information on emergency communication and warning systems. The following communications companies were invited to complete a stakeholder survey and review the draft plan:

- Yates County Enhanced 911 Dispatch Center

Transportation

The following transportation companies and organizations were invited to complete a stakeholder survey and review the draft plan:

- Yates Highway Department
- Yates Transit Service
- Keuka Taxi LLC
- Dragonfly Transportation

2.3.4 Additional Stakeholder Groups

School Districts and Other Academic Institutions

The following school districts, colleges, and academic organizations were invited to complete a stakeholder survey and review the draft plan:

- Dundee Central School
- Penn Yan School District
- Keuka College

Groups Supporting Socially Vulnerable Populations and Underserved Communities

The following groups and agencies that support and work with socially vulnerable populations and underserved communities were invited to complete a stakeholder survey and review the draft plan:

- Yates County Community Services Department
- UR Finger LakesHealth
- Keuka College Health Center
- Keuka College
- Mozaic

2.3.5 Adjacent Jurisdictions:

The following adjoining county and jurisdictional representatives were contacted to inform them about the availability of the project website, draft plan documents, and surveys and to invite them to provide input to the planning process:

- Ontario County
  - Town of Canandaigua
  - Town of Geneva
  - Town of Gorham
  - Town of Naples
  - Town of Seneca
  - Town of South Bristol
- Seneca County
  - Town of Lodi

    - Town of Ovid
    - Town of Romulus
- Schuyler County
    - Town of Reading
    - Town of Tyrone
- Steuben County
    - Town of Prattsburgh
    - Town of Pulteney
    - Town of Wayne

2.3.6 Stakeholder and Neighboring Community Survey Summaries

This section summarizes the results and feedback received by those who completed the stakeholder and neighboring community surveys. Feedback was reviewed by the Steering Committee and integrated where appropriate in the plan.

Stakeholder Survey

The stakeholder survey was designed to identify general needs for hazard mitigation and resiliency within Yates County from the perspective of stakeholders, as well as to identify specific projects that may be included in the mitigation plan. It was distributed to identified stakeholders, including county and municipal departments and agencies.

Who Responded

As of July 26, 2024, nine stakeholders completed the survey. Following are key results about who the survey respondents are and what they do:

- Respondents represent the following sectors: academic/research, emergency services, health and human services, hospitals/medical services, transportation and public works.
- 77. 8 percent of respondents represent groups that serve Yates County as a whole.
- 33.3 percent of respondents represent groups that serve the Town of Jerusalem.
- Respondents manage the following types of facilities:
    - Buildings
    - Bridges
    - Stormwater infrastructure
    - Roads
    - Traffic signals
    - Roadway weather information systems
    - Transitional apartments

- Water/sewer plants
- Landfills
- Drop-in centers
- Out-patient facilities

- 33.3 percent of respondents do not manage any facilities.
- 66.7 percent of respondents work with socially vulnerable populations:
  - Facilitate the DRIVE program
  - Assist with transportation to appointments
  - Over sliding scale rates for the uninsured and underinsured
  - Provide translation services
  - Provide food, housing, and transportation
  - Provide access to immunizations and testing

Risk Overview

Following are key results about the survey respondents' experience with hazards and risk:

- 22.2 percent of respondents indicated that buildings, facilities, or structures their organization is involved with have been impacted by a hazard, specifically as follows:
  - Wind damage to buildings and utilities
  - Snow/ice storms
  - COVID pandemic disruption of treatment centers, schools, and community access to services
- The majority of respondents are unsure whether their facilities are susceptible to impacts from hazards.
- Three respondents identified a facility as a critical facility or community lifeline.
- Respondents identified the following hazards and impacts as their greatest vulnerabilities:
  - Power and utility disruption
  - High winds
  - Flooding and flash flooding
  - Winter storms
  - Wildfires
  - Structure fires
  - Spillage from vehicle accidents
  - Dam failure
- Respondents identified the following as challenges or barriers to reducing vulnerability in Yates County:
  - Influence of climate change on current hazards

- Projections on how climate change will worsen hazards
- Outdated equipment
- Insufficient resources available to meet current needs for the behavioral health population—including children, families and adults of all ages
- Insufficient manpower and heavy equipment
- Yates County's rural character and limited funding available for mitigation actions

Socially Vulnerable and Underserved Communities

Following are key results about the survey respondents' work with socially vulnerable and underserved communities:

- 33.3 percent of respondents are aware of the location and number of socially vulnerable populations in their community/operating area.
- 50 percent of respondents provide assistance to socially vulnerable or underserved populations in Yates County.
- Of those who provide services to socially vulnerable populations, 62.5 percent offer services during times of disaster, including the following:
  - Personal services (50 percent)
  - Funding/financial (50 percent)
  - Human rights (16.7 percent)
  - Regulatory oversight (33.3 percent)
  - Other (83.3 percent):
    - Assisting college students
    - Medical care
    - Housing assistance
    - Insurance assistance
    - Behavioral health services
- Respondents indicated the following barriers and community characteristics in Yates County that may create additional vulnerabilities to hazards:
  - Transportation
  - Broadband access
  - Economic disadvantages
  - Physical health (chronic diseases)
  - Limited physical mobility
  - Age (older adults and children)

- Rural communities
- Stigma regarding mental illness and substance abuse
- Behavioral health populations

Capabilities and Mitigation Strategies

Following are key results about the survey respondents' capabilities and mitigation strategies:

- 50 percent of respondents are part of an emergency operations plan or continuity of operations plan.
- 12.5 percent of respondents are part of a continuity of government plan or business continuity plan.
- Respondents maintain the following capabilities that could assist in addressing hazards:
  - Public works
  - Engineering
  - Road maintenance
  - Heavy equipment
  - Manpower.
- 57.1 percent of respondents are unsure whether they are involved in conducting studies or developing programs that would further support Yates County's hazard mitigation program. One respondent is involved in such work.
- Two respondents have a list of projects or programs they would like complete in order to reduce vulnerability to damages and losses, including the following:
  - Increasing infrastructure resilience in extreme weather
  - Protecting particular locations against rockfalls, landslides, etc.
  - Replacing pipe culverts and increasing flow capacity

Neighboring Community Survey

The neighboring community survey was sent to the county and municipal governments that border Yates County because the effects of hazard events that impact Yates County would be similar to that of these neighbors. As of July 26, 2024, three counties submitted the survey (Ontario, Schuyler, and Seneca County).

Emergency Operations and Continuity of Operations Planning

Schuyler County indicated it has a shared service or mutual aid agreement in place with Yates County. Ontario County noted that it shares an Animal Response Trailer with Yates County. Ontario

County is working on a joint Community Organizations Active in Disaster (COAD) and is part of a regional hazmat team with Seneca and Wayne County.

Schuyler County indicated that Yates County is involved in its comprehensive emergency operations planning, but not its continuity of operations planning. Yates County has been involved in emergency operations in Ontario County, and Ontario County has assisted Yates County during emergencies. Ontario County indicated that its 9-1-1 center regularly communicates with Yates County's 9-1-1 center to request primarily fire and EMS resources. Furthermore, communication and resources are provided through law enforcement and each county's directors.

Information Sharing

Ontario and Schuyler Counties have access to contact information for Yates County and share information primarily through email and phone calls. Ontario County noted that the Canandaigua Lake Watershed Manager serves both counties and that it shares risk and vulnerability assessment information regarding mitigation during planning and implementation phases of projects. Ontario County listed the following situations or hazards of concern to both it and Yates County:

- Flooding in the Town of Naples can affect both counties
- Failure of Ontario County's communication tower in the Town of Italy, which can cause some radio issues
- Flooding from Seneca Lake or Canandaigua Lake (or a contamination concern)
- Flint Creek from the Town of Potter flowing through Ontario County
- Hazardous material incidents could occur along the County borders
- 9-1-1 center failures could create communication problems
- Rushville public water and sewer treatment plants and distribution network
- Regional road network

Projects, Grants, Education, and Outreach

Schuyler County has open communication with the Yates County Office of Emergency Services in times of need. Ontario County maintains a great working relationship with Yates County. Ontario County has collaborated with Yates County on watershed projects and planning initiatives and on grant applications pertaining to hazardous materials and animal response. Both counties utilize the Canandaigua Lake Watershed Council and Canandaigua Lake Association to carry out education and outreach regarding hazards.

Evacuation and Sheltering

Ontario County will collaborate with Yates County as needed on the establishment of shelters and has worked with Yates County to distribute supplies such as water during boil-water advisories. Schuyler County worked with Yates County on traffic movement plans during the recent solar eclipse. Schuyler County and Yates County consult with one another before making evacuation decisions that would impact one another and ensure evacuation routes are maintained to the same level of protection across both jurisdictions.

None of the respondents indicated whether there is any availability for shared spaces that would be suitable for temporary housing.

2.4 PUBLIC OUTREACH

2.4.1 Outreach Strategy

The Steering and Planning Partnership made the following efforts toward public participation in the development of the HMP update:

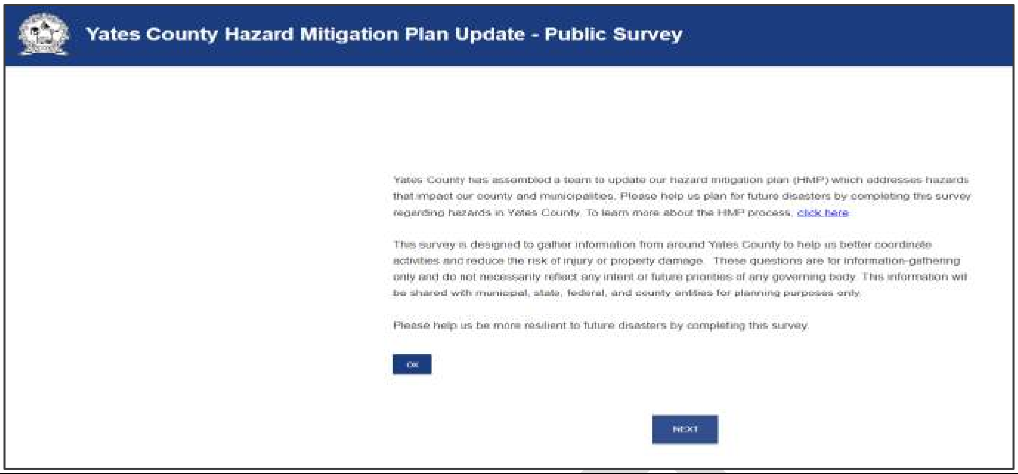
- The public was informed of the hazard mitigation planning effort commencement at the kickoff meeting and through social media postings.
- An on-line natural hazard preparedness public survey was developed to gauge household preparedness in impact Yates County and to assess public level of knowledge about ways to reduce risk and loss associated with hazards.
- A public website (https://www.yatescountynyhmp.com/) is being maintained to facilitate communication between the Steering Committee, the Planning Partnership, the public and stakeholders. The website contains a project overview, County and local contact information, access to the public survey and the stakeholder surveys, and chapters of the HMP for public review and comment.
- All participating jurisdictions have been encouraged to distribute press releases on the HMP, including links to the project website and public and stakeholder surveys.
- A printed version of the HMP will be maintained at the Yates County Office of Emergency Services and Yates County Department of Planning.
- Public information meetings on the HMP update process were held on August 22, 2023.
- The draft plan was posted to the public website as of __[DATE]__ for public review and comment. All public comments were directed to the Yates County Office of Emergency Services for collection and review by the Steering Committee. All public comments received

were forwarded to the appropriate jurisdiction and/or agency and incorporated into the final plan as appropriate.

- Once submitted to NYS DHSES/FEMA, the final plan will be available for public review and comment in the same manner and format as the draft plan, as well as in hard-copy format as identified in Section 21.2.

Examples of virtual outreach via websites is provided in Figure 2-1.

Figure 2-1. Yates County HMP Webpage and Local On-Line Outreach



2.4.2 Public Survey Summary

The public survey was developed to assess the public's level of knowledge about ways to reduce risk and loss associated with hazards. It asked quantifiable questions about public perception of risk, knowledge of mitigation, and support of community programs. The County advertised the survey on the HMP website and social media accounts.

The questionnaire was posted on the County website in November 2023 and was available through July 2024 for public input. All participating jurisdictions were requested to advertise the availability of the survey via local homepage links and other public announcement methods (Facebook, X (Twitter), email blasts, etc.).

As of July 26, 2024, the survey received 72 responses. A summary of survey results is provided below, with full results provided in Appendix C. Jurisdiction-specific responses can be found in Volume II.

Demographically, survey respondents were from 11 municipalities in Yates County, and 58 percent have lived in the County for 20 years or more. The greatest numbers of respondents live in the Village of Penn Yan, the Town of Milo, or the town of Jerusalem. The most common age of respondents was over the age of 60 (45.1 percent).

The following hazards were the most commonly included in survey respondents' lists of the top five most frequently occurring natural hazards in Yates County in the past five years (see Figure 2-2):

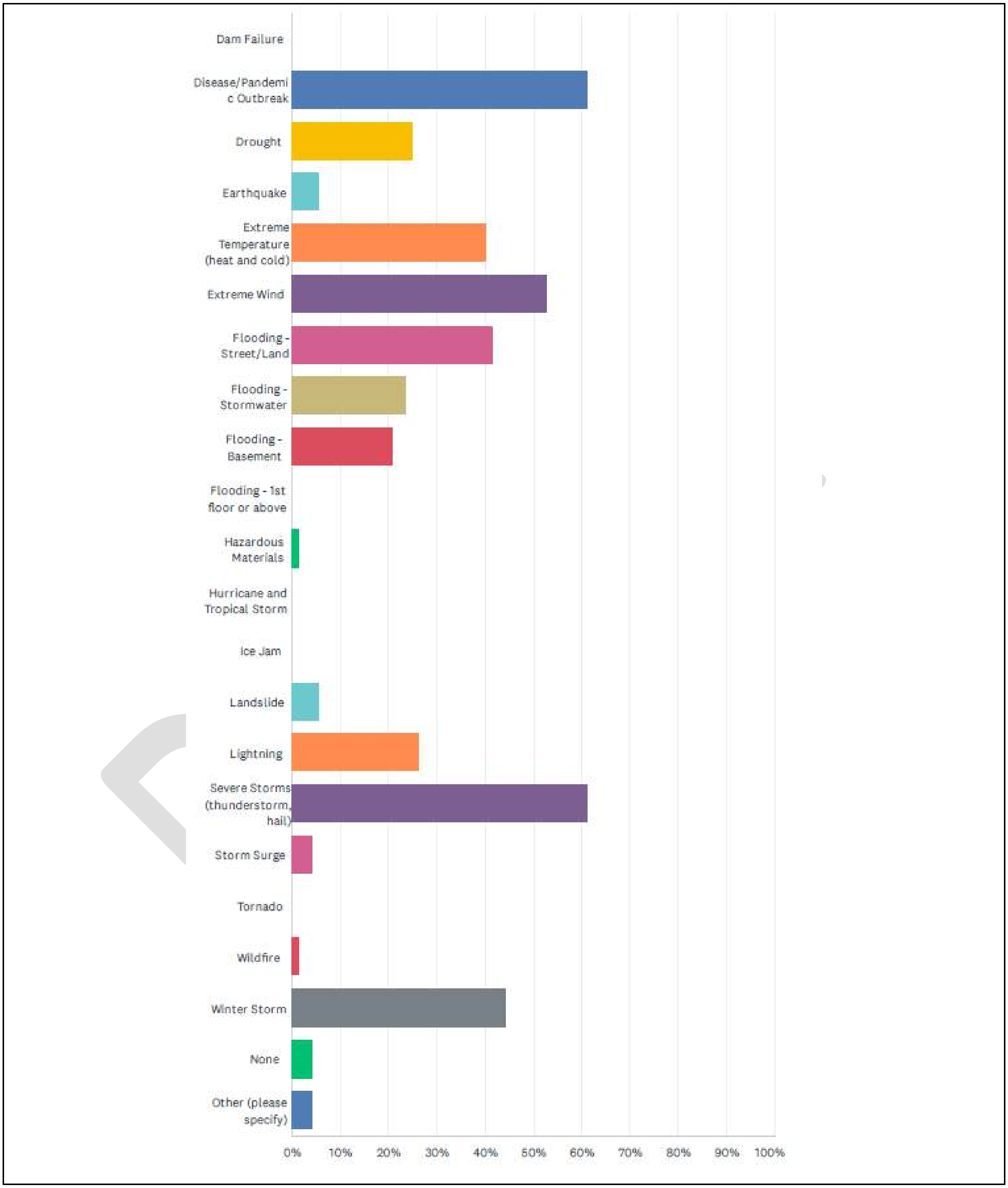
- Severe storms (thunderstorms, lightning, hail) (61.1 percent)
- Disease/pandemic outbreak (61.1 percent)
- Extreme wind (52.7 percent)
- Winter storm (heavy snow, blizzard, sleet, ice storm) (44.4 percent)

The highest hazards of concern (respondents reporting somewhat concerned, very concerned, or extremely concerned) include extreme wind, flood, and severe storms.

Respondents identified the following as desired measures for reducing the damage due to natural hazards (percent of respondents saying they favor each measure):

- Enforce the disclosure of natural hazard risks during real estate transactions (53.5 percent)
- Improve disaster preparedness of local schools (37.5 percent)
- Develop local inventory of at-risk buildings and infrastructure (30.3 percent)
- Adopt policies that prohibit development in areas subject to natural hazards (30.3 percent)
- Protect historical and cultural assets (25 percent)
- Implement steps to safeguard the local economy following a disaster (25 percent)

Figure 2-2. Most Frequently Experienced Natural Hazard Events in Yates County



Most residents receive information concerning natural hazards through the internet (66.6 percent), social media (66.6 percent), or mass notification systems (65.3 percent).

Respondents indicated the following activities they have performed to mitigate hazard impacts on their homes:

- 95 percent have installed smoke detectors
- 71 percent have talked with other household members about what to do in case of a natural disaster or emergency
- 64 percent have developed an emergency plan for the household to decide what will be done in the event of a disaster or emergency.
- 56 percent have become trained in first aid and/or CPR
- 50 percent have attended meetings or received information on natural disasters or emergency preparedness
- 40 percent have prepared a disaster supply kit

Respondents were asked about flood insurance and their property's location within the floodplain:

- 13.4 percent indicated that their property is in a designated floodplain
- 2.9 percent indicated their home is in a designated floodplain and covered by flood insurance

2.5 INCORPORATION OF EXISTING PLANS, STUDIES, REPORTS AND TECHNICAL INFORMATION

This HMP uses the best available information to support hazard profiling, risk assessment, review and evaluation of mitigation capabilities, and the development and prioritization of County and local mitigation strategies that are consistent with local and regional planning and regulatory mechanisms. The County and participating jurisdictions provided jurisdiction-specific planning and regulatory documents that were reviewed to identify the following:

- Existing jurisdictional capabilities
- Needs and opportunities to develop or enhance capabilities, which may be identified in the County or local mitigation strategies
- Mitigation-related goals or objectives
- Proposed, in-progress, or potential mitigation actions to be incorporated into the updated County and local mitigation strategies

The following regulations, codes, ordinances, and plans were reviewed:

- Comprehensive/master plans
- Building codes
- Zoning and subdivision ordinances
- Flood insurance studies
- Flood insurance rate maps
- NFIP flood damage prevention ordinances
- Site plan requirements
- Local waterfront revitalization plans
- Stormwater management plans
- Emergency management and response plans
- Land use and open space plans
- Capital plans
- Climate smart community program
- Community rating system
- New York State standard multi-hazard mitigation plan, 2023

Plans, reports, and other technical information were identified and accessed online through independent research by the planning consultant or provided directly by the County, participating jurisdictions, and stakeholders involved in the planning effort. Detailed sources of technical data and information used are listed in the references at the end of this volume. The asset inventory data used for the risk assessment is presented in the Chapter 3. Details of the source of this data, along with technical information on how the data was used to develop the risk assessment, are presented in Chapter 4, as well as in the hazard profiles in Chapters 6 through 17.

The County and participating jurisdictions reviewed relevant plans contributing to their capabilities to integrate effective mitigation efforts into their daily activities. This review is reflected in the capability assessment table in each of the municipal annexes in Volume II. These tables list plan types, names, and dates, as well as a summary of how each plan supports mitigation and resilience.

2.6 INTEGRATION WITH EXISTING PLANNING MECHANISMS AND PROGRAMS

Effective mitigation is achieved when hazard awareness and risk management approaches become an integral part of public activities and decision-making. It is critical that this HMP coordinate with and complement existing plans and programs that support hazard mitigation in the County.

The capability assessment presented in Chapter 20 provides a summary and description of the existing plans, programs, and regulatory mechanisms at all levels of government (federal, state, county and local) that support hazard mitigation in the County. In the jurisdictional annexes in Volume II, each participating jurisdiction identifies how it has already integrated hazard mitigation into its planning, regulatory and administrative framework ("integration capabilities") and how it intends to further promote this integration ("integration actions").

2.7 PLAN ADOPTION

Adoption of the HMP by the governing bodies of each participating jurisdiction, via a municipal resolution, demonstrates the commitment of the Planning Partners to fulfill the mitigation goals and strategies outlined in the plan. Adoption legitimizes the HMP and authorizes responsible agencies to execute their responsibilities.

> Formal adoption of the HMP by the governing bodies of participating jurisdictions achieves the following:
>
> - It lends authority to the plan to serve as a guiding document for government officials.
> - It gives legal status to the plan in the event it is challenged in court.
> - It certifies to program and grant administrators that the plan's recommendations have been properly considered and approved by the jurisdictions' governing authority and citizens.
> - It helps to ensure the continuity of mitigation programs and policies over time because elected officials, staff, and other community decision-makers can refer to the official document when making decisions about the community's future.
>
> *Source: FEMA. 2003. How to Series: Bringing the Plan to Life (FEMA 386-4).*

The County and all participating jurisdictions will proceed with formal adoption proceedings when FEMA completes review of the plan and provides conditional approval (known as approval pending adoption).

The resolutions issued by each jurisdiction to support adoption of the plan are included in Appendix A. Each jurisdiction will submit a copy of the formal adoption resolution to the Yates County Office of Emergency Services. Yates County will forward the executed resolutions to NYS DHSES, after which they will be forwarded to FEMA for the record. FEMA will transmit acknowledgement of verification of formal plan adoption and the official approval of the plan to the Yates County HMP Coordinator.

2.8 CONTINUED PUBLIC INVOLVEMENT

The Planning Partners are committed to the continued involvement of the public in the hazard mitigation process. This Plan update will be posted on-line (currently at https://www.yatescountynyhmp.com/), and jurisdictions will be encouraged to maintain links to the plan website. The County will make hard copies of the Plan available for review at public locations listed on the plan website. Each jurisdiction's governing body will be responsible for receiving, tracking, and filing public comments regarding this plan.

In coming years, after the Planning Partnership completes an annual evaluation of how the HMP is being implemented, a notice will be posted on the website with information on any updates and where the most current plan can be found. The public will have an opportunity to comment on the plan as a part of the annual evaluation process and the next five-year mitigation plan update. Meetings may be held as deemed necessary by the Planning Partnership to provide the public an opportunity to express concerns, opinions, and ideas about the plan.

The HMP Coordinator will be responsible for coordinating the plan evaluation, soliciting feedback, collecting and reviewing comments, and ensuring their incorporation in the five-year plan update as appropriate. Members of the Planning Partnership will assist the HMP Coordinator. Diane Caves, Deputy Director of the Yates County Office of Emergency Services, has been identified as the ongoing County HMP Coordinator (see Chapter 21), and is responsible for receiving, tracking, and filing public comments regarding this Plan Update. Contact information is:

Mailing Address:	Yates County Office of Emergency Services 227 Main Street Penn Yan, NY 14527
Contact Name:	Diane DiFabio , Deputy Director
Email Address:	dcaves@yatescounty.org
Telephone:	(315)-536-3000

Further details regarding continued public involvement are provided in Chapter 21.

3. COUNTY PROFILE

This chapter presents general information about Yates County to provide an understanding of the assets at risk and the concerns related to hazards analyzed in this plan.

3.1 LOCATION

Yates County is one of the smallest counties in New York State, but it is noted for its strong sense of community, rural pride, small-town friendliness, and independent character. The community's diversity enhances the county's agritourism focus, from cattle and cash-crop farming to the growing vineyard and winery industry.

The County is located in the Finger Lakes Region of New York State and includes three of the Finger Lakes (see Figure 3-1). Seneca Lake forms its eastern border and Canandaigua and Kekua Lakes form the majority of the western border. The County is 338 square miles in area and is bordered to the north by Ontario and Seneca Counties, to the east by Seneca Lake and Seneca and Schuyler Counties, to the south by Steuben and Schuyler Counties, and to the west by Canandaigua Lake and Ontario and Steuben Counties. Keuka Lake is centrally located within the County (Yates County n.d.).

3.2 EARLY HISTORY

Yates County is one of many counties created from the area that Oliver Phelps and Nathaniel Gorham purchased from the Seneca Nation in 1788. At that time, settlers were beginning to filter in from New England and from the Susquehanna Valley, which was part of the first great western migration after the American Revolution. Within a few years most of the farms in the region were taken up and political development of towns began. The first official and permanent settlement within the boundaries of what is now Yates County was initiated in the summer of 1788 by followers of Jemima Wilkinson, the first American-born woman to start a religious movement. About 60 families came to an area west of Seneca Lake and formed what was by 1790 the largest settlement in western New York. They referred to their settlement as the New Jerusalem (Yates County n.d.).

In 1790, when the first federal census was taken, western New York had a population of about 1,200. Yates County included parts of three census enumeration districts: Canandaigua, Jerusalem and Erwin. By the time the county was split off from Ontario County in 1823, its population was nearly 20,000. In 1826, two additional towns were annexed from Steuben County, and the modern boundaries were established (Yates County n.d.). Figure 3-2 shows historical sites in Yates County.

Figure 3-1. Yates County

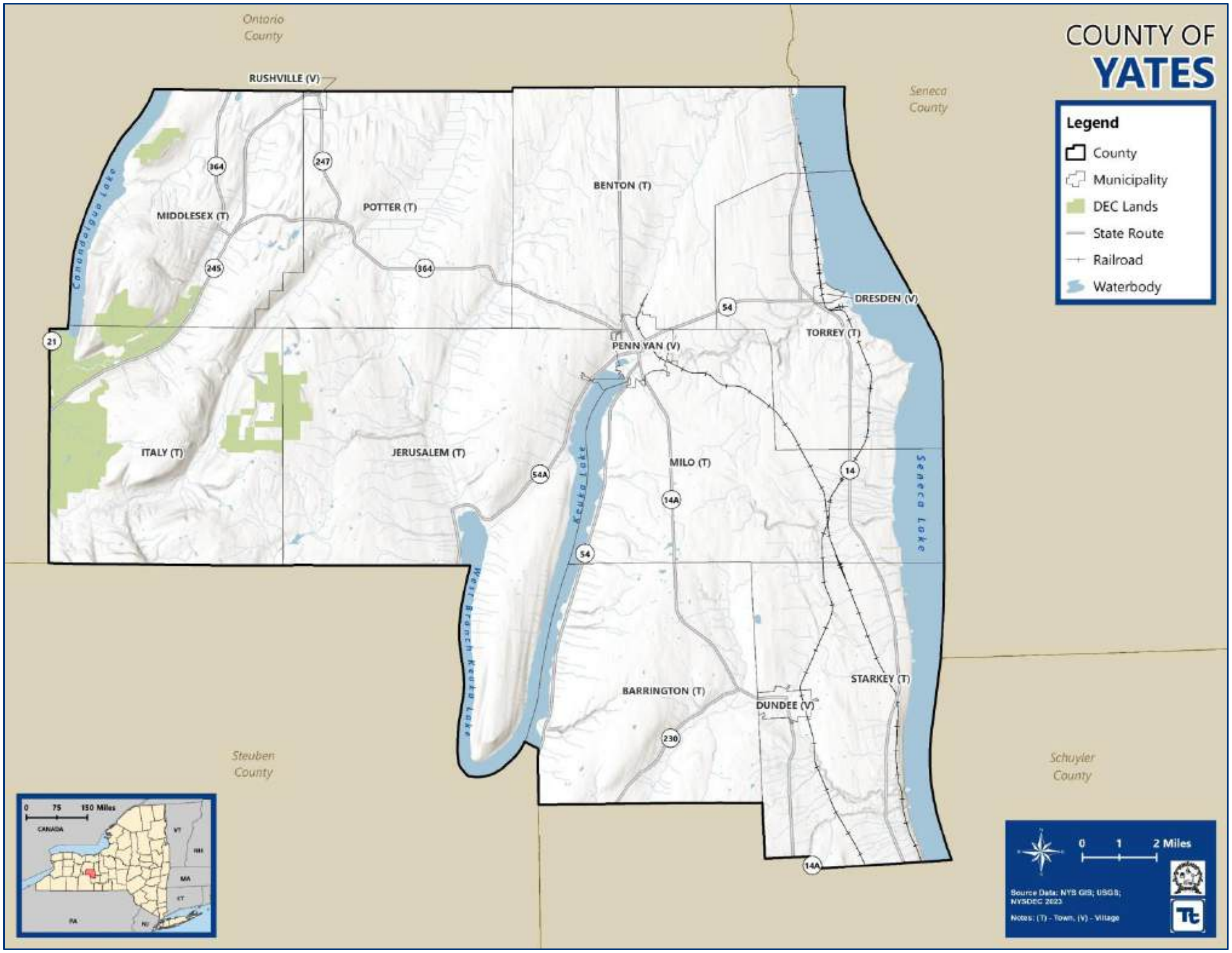
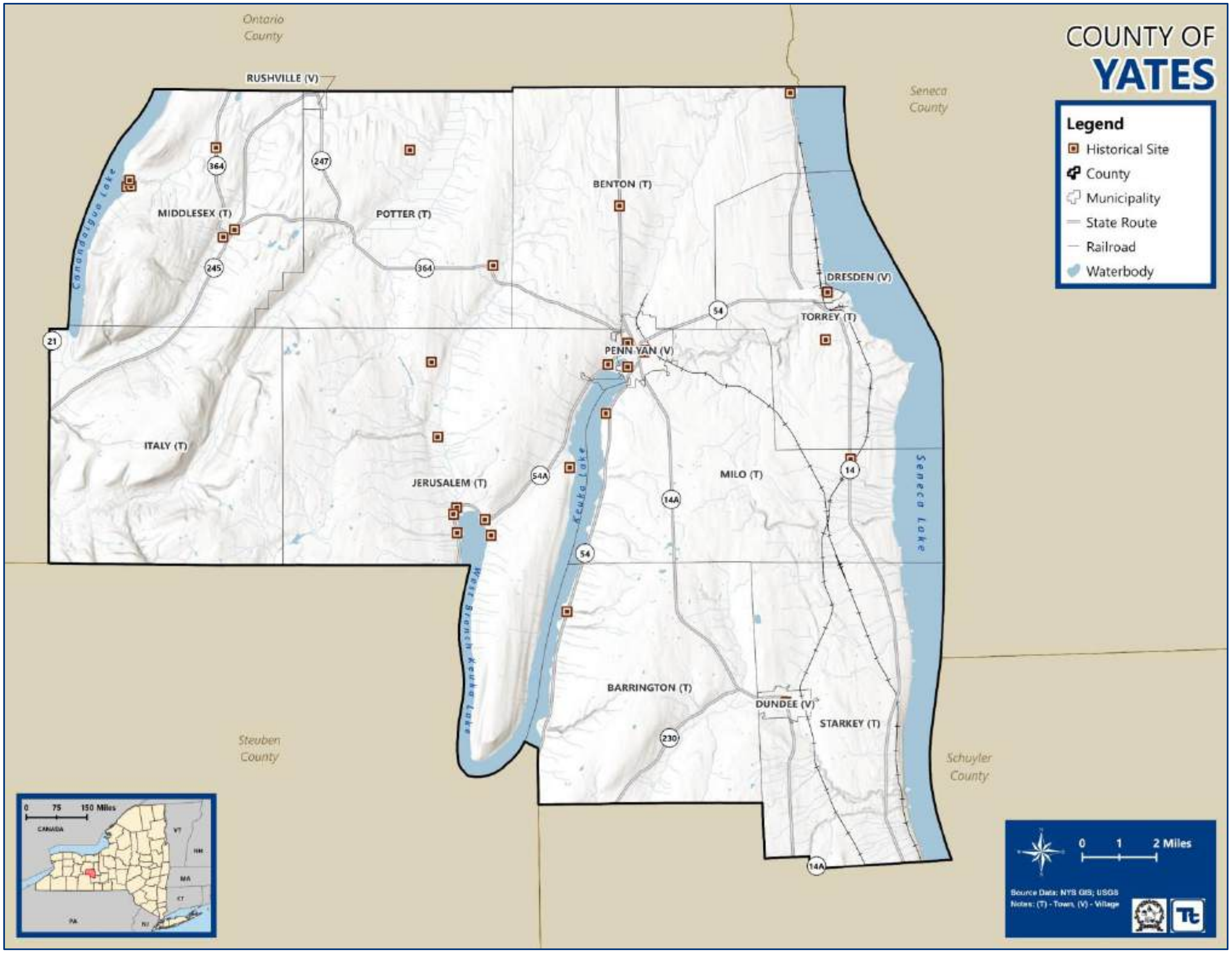


Figure 3-2. Historical Sites in Yates County



3.3 JURISDICTIONS WITHIN THE COUNTY

Yates County is made up of nine towns and four incorporated villages (see Figure 3-1):

- Town of Barrington
- Town of Benton
- Town of Italy
- Town of Jerusalem
- Town of Middlesex
- Town of Milo
- Town of Potter
- Town of Starkey
- Town of Torrey
- Village of Dresden
- Village of Dundee
- Village of Penn Yan
- Village of Rushville

3.4 MAJOR PAST HAZARD EVENTS

Federal disaster declarations are issued for hazard events that cause more damage than state and local governments can handle without assistance from the federal government. A federal disaster declaration puts federal recovery programs into motion to help disaster victims, businesses, and public entities. Some of the programs are matched by state programs. Review of federal disaster declarations helps establish the probability of occurrence for each hazard, which helps to identify targets for risk reduction. Table 3-1 shows federal disaster declarations that included Yates County through August 2023 (records date back to 1954). Federal disaster declaration numbers are designated with DR for major disasters and EM for emergency declarations.

The Secretary of the U.S. Department of Agriculture (USDA) is authorized to designate counties as disaster areas to make emergency loans to producers suffering losses in those counties and in contiguous counties. The process includes fast track disaster designations for severe drought when, during the growing season, any portion of a county meets the (severe drought intensity value for eight consecutive weeks or a higher drought intensity value for any length of time as reported in the U.S. Drought Monitor. For all other natural disaster occurrences the county must have a 30 percent production loss of at least one crop or a determination must be made by surveying producers that other lending institutions will not be able to provide emergency financing (USDA n.d.). USDA disaster declarations in Yates County are described in each of the hazard profile chapters in this HMP.

Table 3-1. History of Hazard Events in Yates County, New York

Disaster Number	Event Date	Declaration Date	Incident Type	Title
DR-338-NY	June 23, 1972	June 23, 1972	Flood	Tropical Storm Agnes
DR-487-NY	October 2, 1975	October 2, 1975	Flood	Storms, Rains, Landslides and Flooding
DR-725-NY	September 25, 1984	September 25, 1984	Flood	Severe Storms and Flooding
DR-898-NY	March 3 – 4, 1990	March 21, 1991	Snowstorm	Severe Winter Storm
EM-3107-NY	March 13 – 17, 1993	March 17, 1993	Snowstorm	Severe Blizzard
DR-1095-NY	January 19 – 30, 1996	January 24, 1996	Flood	Severe Storms and Flooding
DR-1335-NY	May 3 – August 12, 2000	July 21, 2000	Severe Storm	Severe Storms and Flooding
EM-3155-NY	May 22 – November 1, 2000	October 11, 2000	Other	West Nile Virus
DR-1391-NY	September 11, 2001	September 11, 2001	Fire	Fires and Explosion
DR-1467-NY	April 3 – 5, 2003	May 12, 2003	Severe Ice Storm	Ice Storm
EM-3186-NY	August 14 – 16, 2003	August 23, 2003	Other	Power Outage
DR-1486-NY	July 21 – August 13, 2003	August 29, 2003	Severe Storm	Severe Storms, Flooding, and Tornadoes
DR-1534-NY	May 13 – June 17, 2004	August 3, 2004	Severe Storm	Severe Storms and Flooding
EM-3262-NY	August 29 – October 1, 2005	September 30, 2005	Hurricane	Hurricane Katrina Evacuation
DR-1993-NY	April 26 – May 8, 2011	June 10, 2011	Flood	Severe Storms, Flooding, Tornadoes, and Straight-Line Winds
EM-3351-NY	October 27 – November 8, 2012	October 28, 2012	Hurricane	Hurricane Sandy
DR-4180-NY	May 13 – 22, 2014	July 8, 2014	Severe Storm	Severe Storms and Flooding
EM-3434-NY	January 20 – May 11, 2023	March 13, 2020	Biological	COVID-19
DR-4480-NY	January 20 – May 11, 2023	March 20, 2020	Biological	COVID-19
DR-4625-NY	August 18 – 19, 2021	October 8, 2021	Hurricane	Remnants of Tropical Storm Fred

Source: FEMA 2023

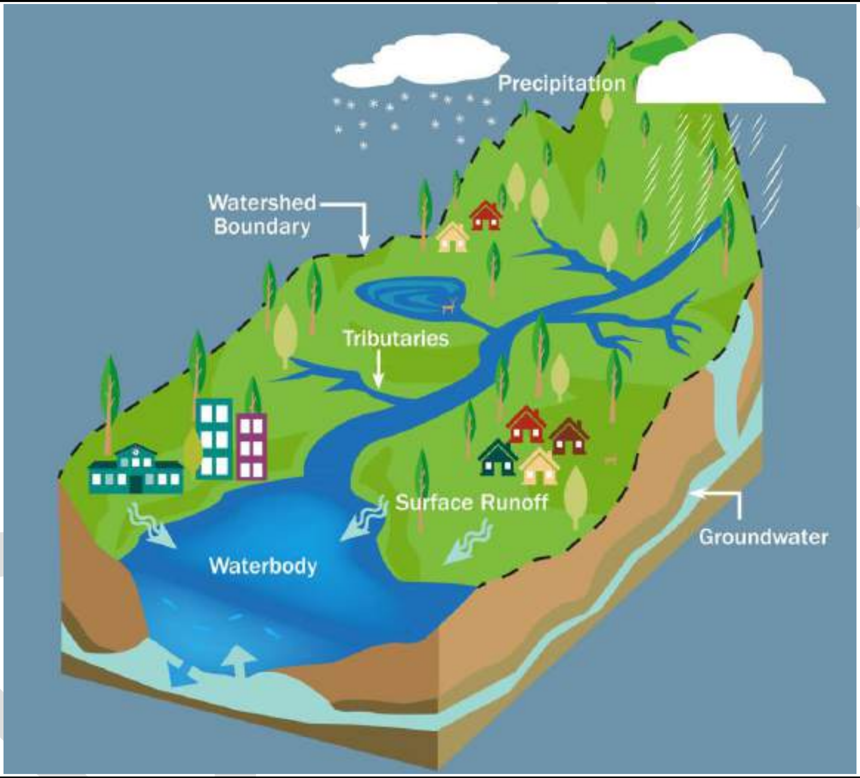
3.5 PHYSICAL SETTING

3.5.1 Water Resources

Numerous ponds, lakes, creeks, and rivers make up the waterscape of Yates County. The major waterways within the county are Canandaigua Lake, Seneca Lake, and Keuka Lake. Seneca Lake forms the eastern border of the county.

A watershed is the area of land that drains into a body of water such as a river, lake, stream, or bay. It is separated from other systems by high points in the area such as hills or slopes. It includes not only the waterway itself but also the entire land area that drains to it. For example, the watershed of a lake would include not only the streams entering the lake but also the land area that drains into those streams and eventually the lake. Drainage basins generally refer to large watersheds that encompass the watersheds of many smaller rivers and streams (USGS 2019). Figure 3-3 depicts the hydrologic system of a typical watershed.

Figure 3-3. Watershed



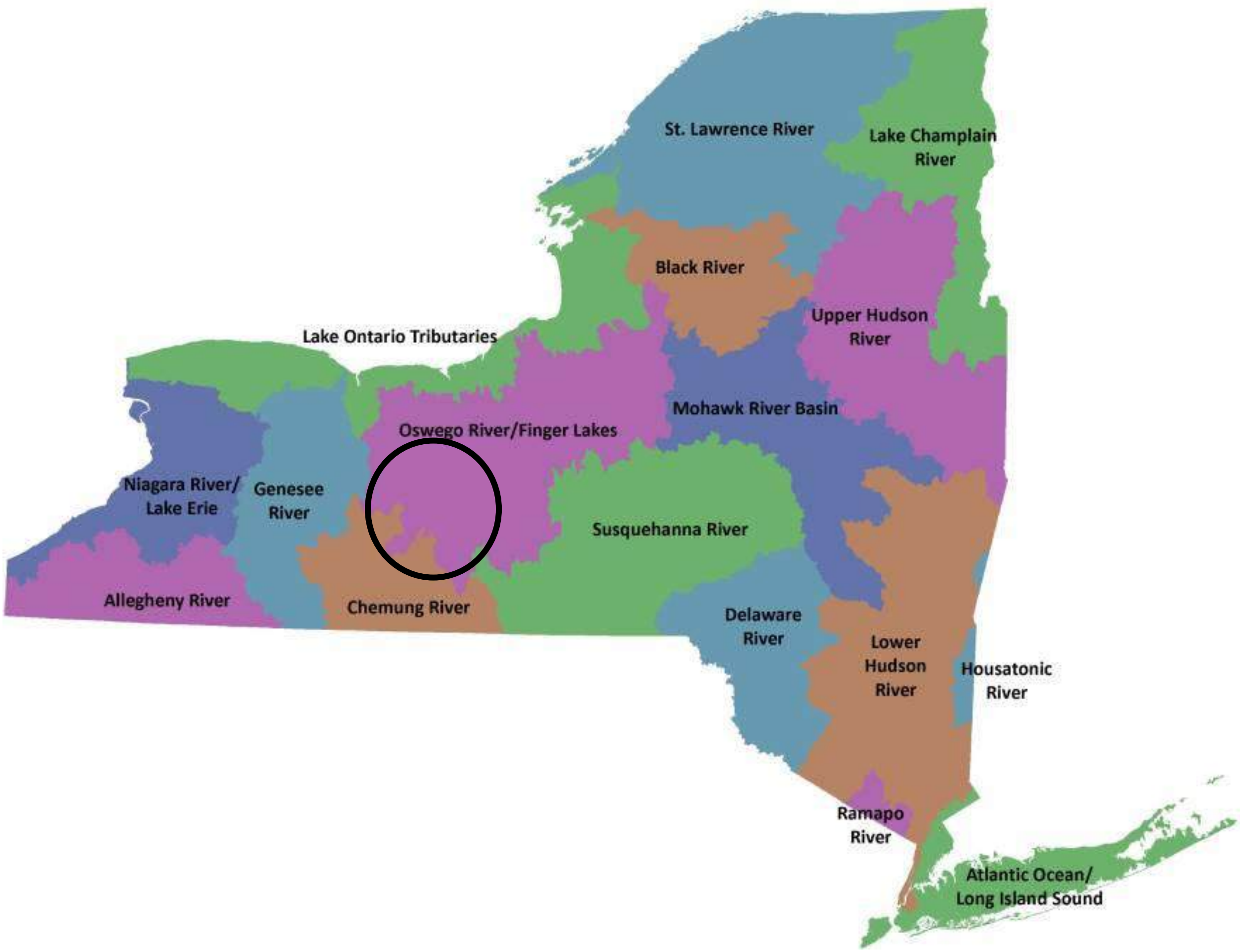
Source: (NOAA 2022)

Watersheds come in all shapes and sizes and can cross municipal and county boundaries. New York State's waters (lakes, rivers, and streams) fall within one of 17 drainage basins. Yates County lies within the Oswego/Finger Lakes (Seneca) and Chemung drainage basins (NYSDEC n.d.). Figure 3-4 shows the drainage basins and watersheds of New York State, and Yates County's location.

The Chemung River drainage basin is approximately 2,600 square miles and straddles the border between New York State and Pennsylvania (Figure 3-4). The waters of the Chemung River flow across the western portion of the Southern Tier of New York State before joining the Susquehanna River and eventually emptying into Chesapeake Bay. This drainage basin has approximately 1,740 square miles of land in New York State and 4,086 miles of rivers and streams. Major tributaries Chemung River are the Cohocton River and Tioga/Canisteo Rivers. The 23 significant freshwater lakes, ponds, and reservoirs in the county include Lamoka Lake/Mill Pond, Waneta Lake, and Almond Lake (NYSDEC n.d.).

The Oswego River/Finger Lakes Drainage Basin (or Seneca drainage basin) (Figure 3-4) is one of the largest drainage basins in New York State and includes the drainages of the Oswego, Oneida, Seneca, and Clyde Rivers. Its headwaters originate in the southwestern Adirondack Mountains in the east and along the northern edge of the Appalachian Plateau, and flow across the central lowlands before emptying into Lake Ontario.

Figure 3-4. New York State Watershed Map



Note: The Black Circle indicates the approximate location of Yates County.

Source: (NYSDEC n.d.)

The watershed includes most of the New York Finger Lakes. Lakes make up about 6 percent of the total surface area of the watershed. There are 8,896 miles of freshwater rivers and streams. Major tributaries to this drainage basin include the Oneida River, Clyde River, Cayuga Lake tributary, and Seneca Lake tributary. There are 76 significant freshwater lakes, ponds and reservoirs in the Oswego River/Finger Lakes Drainage Basin, which include Oneida Lake, Cayuga Lake, Seneca Lake, Keuka Lake, and Canandaigua Lake (NYSDEC n.d.).

3.5.2 Topography

Yates County's topography varies from steep hills and valleys in the western part of the county to relatively flat land in the north to gently rolling hills and valleys in the south, east, and central county. Elevations range from 445 feet above sea level at the Seneca Lake shoreline to over 2,140 feet in the Town of Italy (Yates County n.d.).

3.5.3 Geology

The diverse mix of fertile soil types in the Finger Lakes region make it ideal for agriculture, supporting a wide variety of crops. Yates County is well-known for its vineyards and wineries, which benefit from the unique soil composition and climate conditions conducive to grape cultivation (Yates County 2023).

The USDA classifies 67 percent of the soils in Yates County as "farmland of statewide importance" (130,321 acres), "prime farmland" (20,243 acres), or "prime farmland if drained" (10,882 acres). Soil health is crucial for agricultural production in these farmlands, and agricultural operations in turn impact soil health. Prime soils and soils of statewide significance are finite resources that must be responsibly managed to ensure continued productivity and maintain desirable characteristics (Yates County 2023).

There are 21 soil associations in Yates County, with five identified as excellent or good for crops: (Yates County 2023):

- Carlisle muck—Carlisle muck soils are organic soils, typically found in low-lying, poorly drained areas such as swamps or marshes. They have a high organic matter content and can be highly fertile when properly drained and managed. This soil type is suitable for crops that can tolerate wetter conditions, as well as for hay production and pastureland.
- Honeoye-Lima—The Honeoye-Lima soil association consists of two related soil series. Honeoye soils are well-drained and formed on glacial till, consisting of a mix of clay, silt, sand, gravel, and boulders deposited by glaciers. Lima soils are also well-drained and formed on glacial till. Both soil types are found in upland areas and are excellent for growing crops like corn, wheat, and soybeans due to their good drainage and fertility.
- Palmyra-Ontario—The Palmyra-Ontario soil association includes two related soil series. Palmyra soils are moderately well-drained, formed in glacial till, and found in upland areas.

Ontario soils are also moderately well-drained, formed in glacial till, and found in upland areas. Both soil types have good drainage and fertility, making them suitable for growing a variety of crops.

- Cayuga-Ovid—The Cayuga-Ovid soil association consists of two related soil series. Cayuga soils are well-drained and formed in glacial till, while Ovid soils are somewhat poorly drained and formed in glacial till. Both soil types have high lime content and are suitable for growing a range of crops, including fruits, vegetables, and field crops.
- Howard—Howard soils are moderately well-drained and formed on glacial till. They are typically found in upland areas and are suitable for growing various crops, including grains, hay, and pastures. The well-drained nature of Howard soils and their fertility make them suitable for agricultural use.

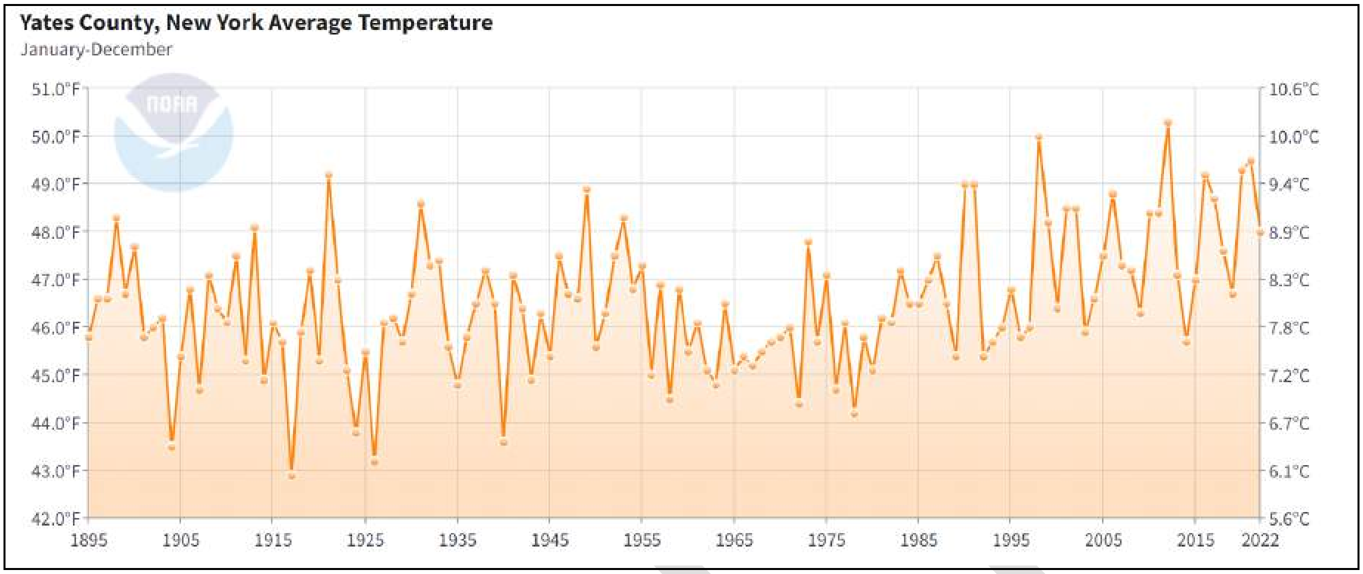
These soil associations share similar characteristics, such as being well-drained, high in lime, and found in areas with slopes generally no greater than 15 percent. Many of these soil associations are located in the northeast and eastern sections of Yates County, coinciding with areas containing the largest proportions of agricultural parcels (Yates County 2023).

3.5.4 Climate

Historical Conditions

The climate of Yates County is typical of central New York State, with warm summers and cold winters of moderate to heavy snowfall. The average yearly temperature for Yates County is 47°F, with an average summer high of 80°F and an average winter low of 17°F. On average, Yates County receives an average of 57.8 inches of rainfall per year (Yates County 2023). Figure 3-5 displays the average temperature of Yates County between 1895 and 2022.

Figure 3-5. Average Temperature in Yates County



Source: (NOAA 2023a)

Projections for Climate Change

According to the New York State Climate Impacts Assessment, annual average temperatures are projected to increase across New York State by 2.5°F to 4.4°F by the 2030s, 3.8°F to 6.7°F by the 2050s, 5.1°F to 10.9°F by the 2080s, and 5.6°F to 15.3°F by 2100, relative to the 1981–2010 base period. The ranges represent climate change for varying levels of potential future emissions of greenhouse gases (low through high). The warming is projected to be the greatest in the northern regions of the state and projections suggest that each season will experience a comparable amount of warming in the future relative to the baseline period (Stevens & Lamie 2024).

Annual average precipitation is projected to decrease in the low-emissions estimate but increase in the middle- and high-emissions estimates across all regions of New York. Precipitation is projected to decrease by 2 percent or increase by up to 11 percent by the 2030s, decrease by 2 percent or increase by up to 14 percent by the 2050s, increase by 1 to 22 percent by the 2080s, and decrease by 4 percent or increase by 30 percent by 2100 (Stevens & Lamie 2024).

In the Central/Finger Lakes region that includes Yates County, temperatures are estimated to increase by 3.5 ºF to 7.4 ºF by the 2050s, 5 ºF to 12.3 ºF by the 2080s, and 5.6 ºF to 14.3 ºF by 2100, relative to the 1981-2010 base period. Precipitation totals are estimated to increase by zero to 11 percent by the 2050s, increase by 2 to 17 percent by the 2080s, and decrease by 3 percent or increase by up to 22 percent by 2100, relative to the 1981-2010 base period (Stevens & Lamie 2024).

3.5.5 Land Cover

Yates County is home to forested pines and sloping, open spaces with broad vistas across the lakes. According to the U.S. Geological Survey (USGS), the land cover over the greatest area in Yates County is agriculture, covering 41.2 percent of all land in the county. The next largest areas are forest with 36.7 percent, water with 10.1 percent, and urban area with 7.3 percent. Table 3-2 summarizes land cover in the County. Figure 3-6 shows the land cover distribution.

Table 3-2. Yates County Land Cover Classification Table

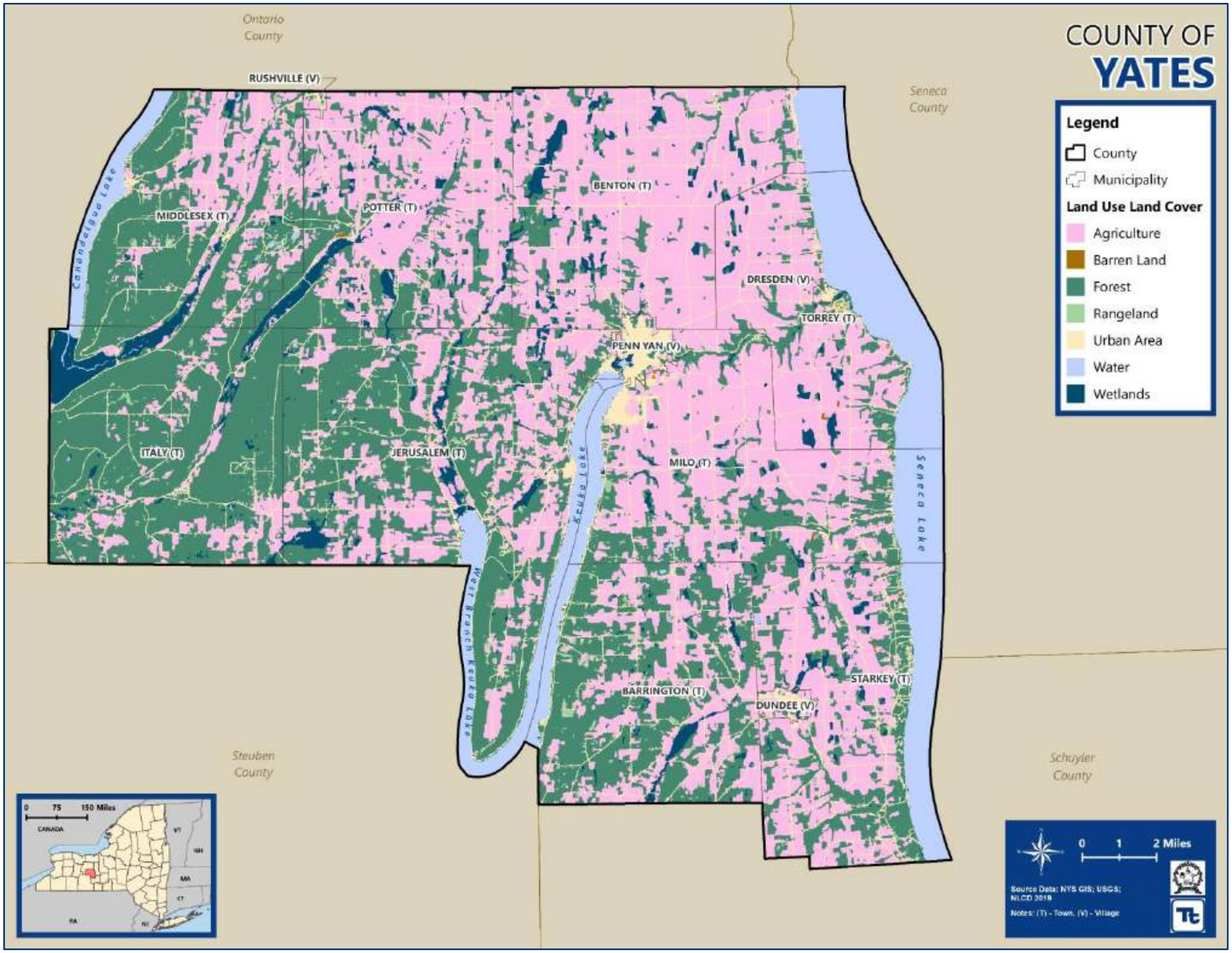
Land Use Category	Acreage	Percent of County
Agriculture	99,130	41.2%
Barren Land	109	0.0%
Forest	88,279	36.7%
Rangeland	2,634	1.1%
Urban Area	17,509	7.3%
Water	24,362	10.1%
Wetland	8,487	3.5%
Yates County (Total)	**240,510**	**100.0%**

Source: (MRLC 2021)

3.5.6 Land Use Trends

Federal regulations for hazard mitigation planning require communities to consider land use trends, which can impact the need for, and priority of, mitigation options over time. Land use trends can also significantly affect vulnerability to various hazards and the potential impacts from hazard events. In New York State, land use regulatory authority is vested in towns, villages, and cities, although many development issues transcend local political boundaries.

Figure 3-6. Land Cover for Yates County



Permits

From 2016 through 2020, Yates County issued 404 residential building permits, 14 industrial permits, 25 commercial permits, and two community service permits. The Town of Milo issued the most residential permits in Yates County, with 112 permits, and the most industrial permits, with five. The Town of Jerusalem issued 84 residential permits and the most commercial permits, at six. The Village of Penn Yan issued 63 residential permits. Each of these municipalities is near Keuka Lake in the central part of the county (Genesee/Finger Lakes Regional Planning Council 2021).

Individual development projects are detailed in the jurisdictional annexes in Volume II of this HMP. The county uses best-available data to avoid any potential hazard overlay.

Agriculture

Yates County is host to a large agricultural base, including dairy and crop farms, grape vineyards, and apple orchards (USDA 2017). Recently, local entrepreneurs have founded a number of microbreweries and a distillery. The USDA's 2022 Census of Agriculture showed a 3 percent decrease from 2017 in the number of farms in Yates County, but a 2 percent increase in total farmed area and a 6 percent increase in average farm size. The market value of products sold increased by 33 percent from 2017 to 2022, and total farm-related income grew by 71 percent (USDA 2017).

There are 35 wineries in Yates County and the county is second in grape growing in New York State. Yates County has over 1,700 acres of vineyards and has some of the most highly regarded winery operations in the United States (Finger Lakes Economic Development Center n.d.).

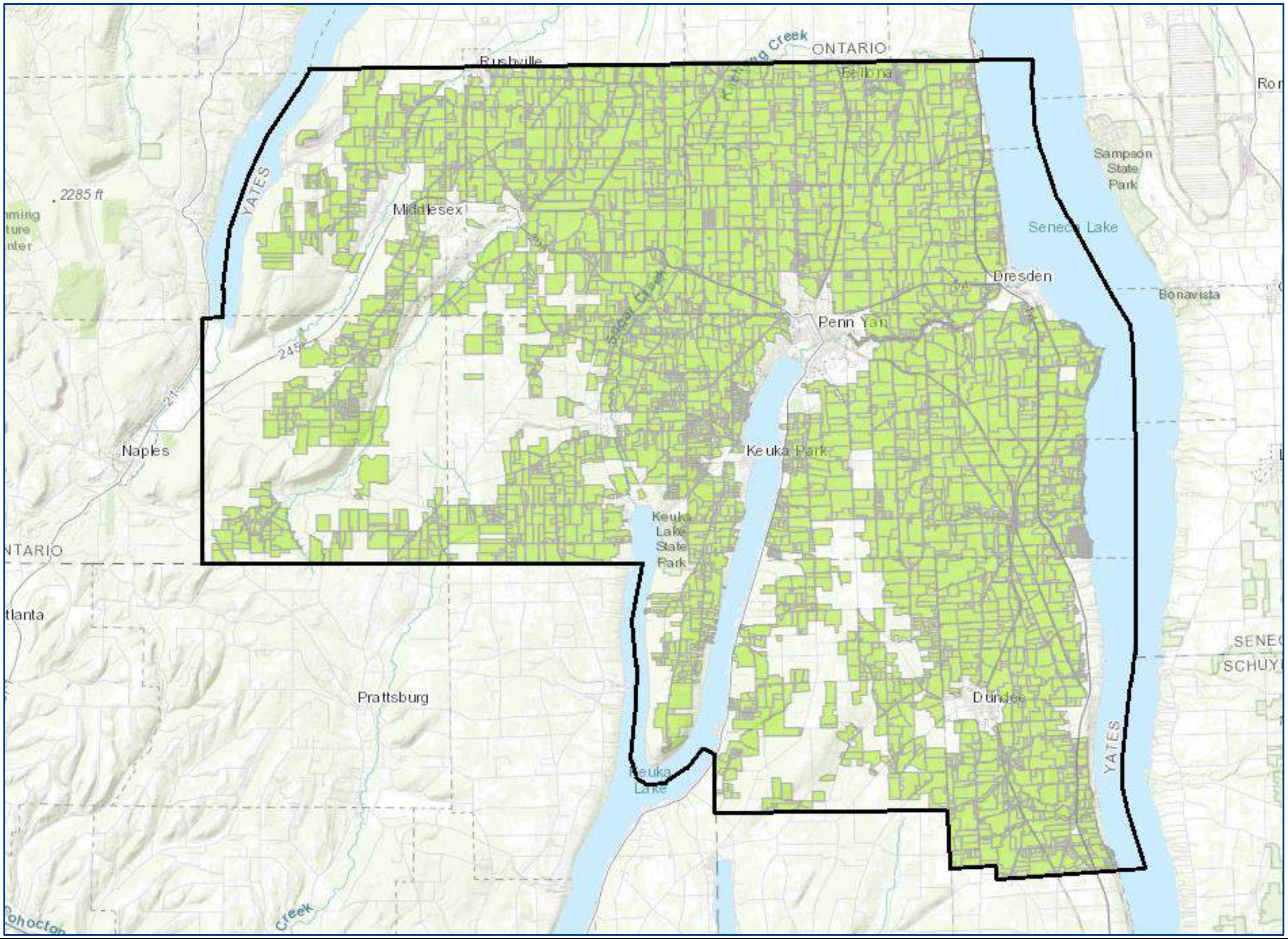
Yates County is also growing more organic products than any other county in New York State. Over 40 organic farms and businesses grow hay, grain, milk, berries, vegetables, and other products for sale to buyers inside and outside of the region (Finger Lakes Economic Development Center n.d.).

The New York State Agriculture and Markets Law provides counties with the opportunity to create agricultural districts for the purpose of protecting and promoting the agriculture industry. Once created, the law requires that each district be reviewed every 8, 10, or 12 years to see if it is still achieving its intended purpose (NYS Agriculture and Markets 2020). Yates County has one agricultural district, which is reviewed every 8 years. District #1 includes agricultural areas in all the towns and villages of Yates County, as shown in Figure 3-7.

Future Growth and Development

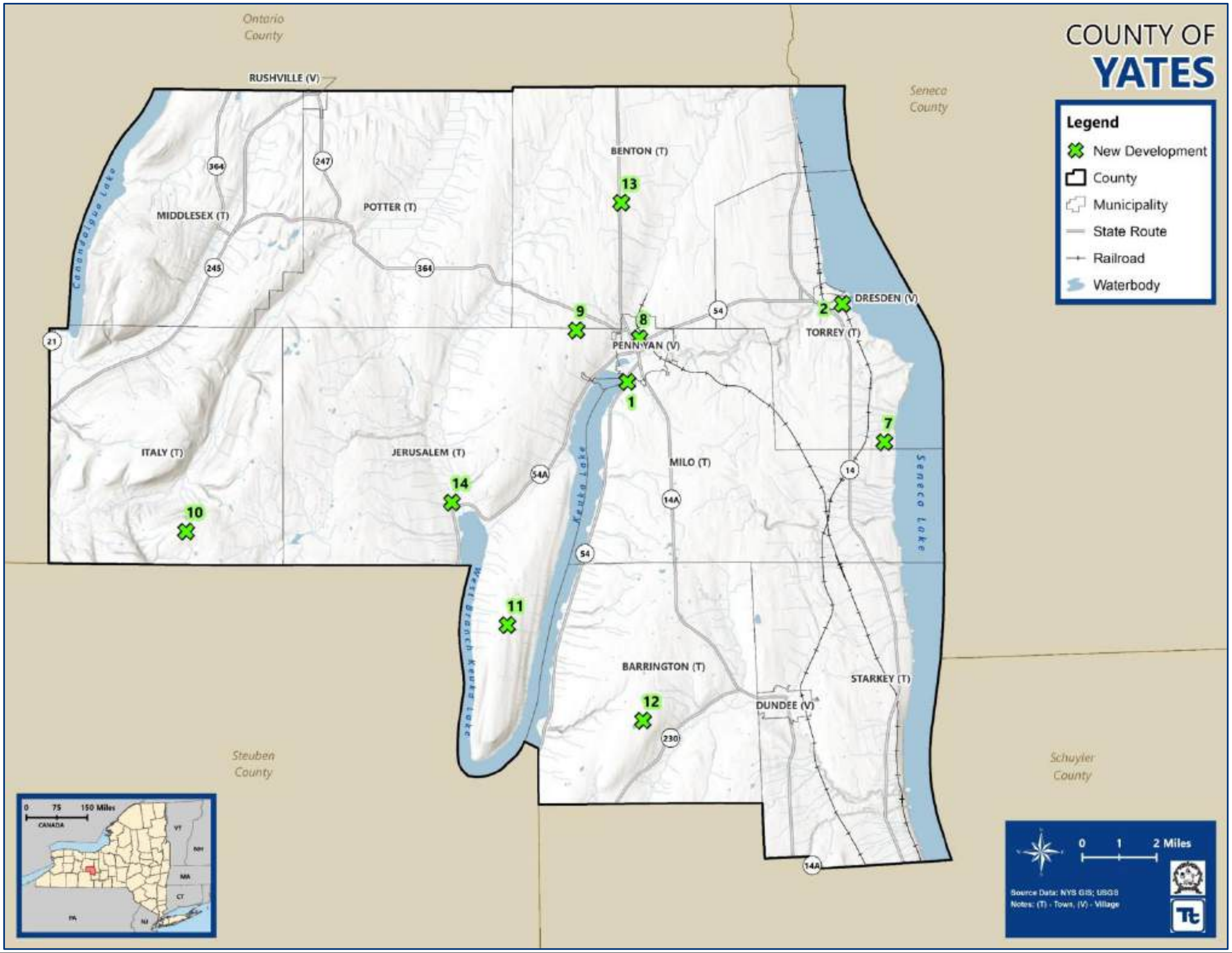
Figure 3-8 shows new development that has occurred in Yates County in the last 5 years. Details specific to each participating municipality are provided in the jurisdictional annexes in Volume II, along with locations of development relative to mapped hazard areas.

Figure 3-7. Agricultural Districts in Yates County



Source: Yates County n.d.

Figure 3-8. New Development in Yates County



3.6 POPULATION AND DEMOGRAPHICS

3.6.1 Population

Population characteristics provide a foundation for deciphering the impacts of natural hazards in the county. Current data from the 2020 U.S. Decennial Census Bureau indicates a county population of 24,773, which is a 2.3 percent decrease in population since 2010. Table 3-3 shows the 2020 Decennial Census for Yates County and its jurisdictions. The Decennial Census is the official population count taken every 10 years. Figure 3-9 shows the distribution of population density (persons per square mile).

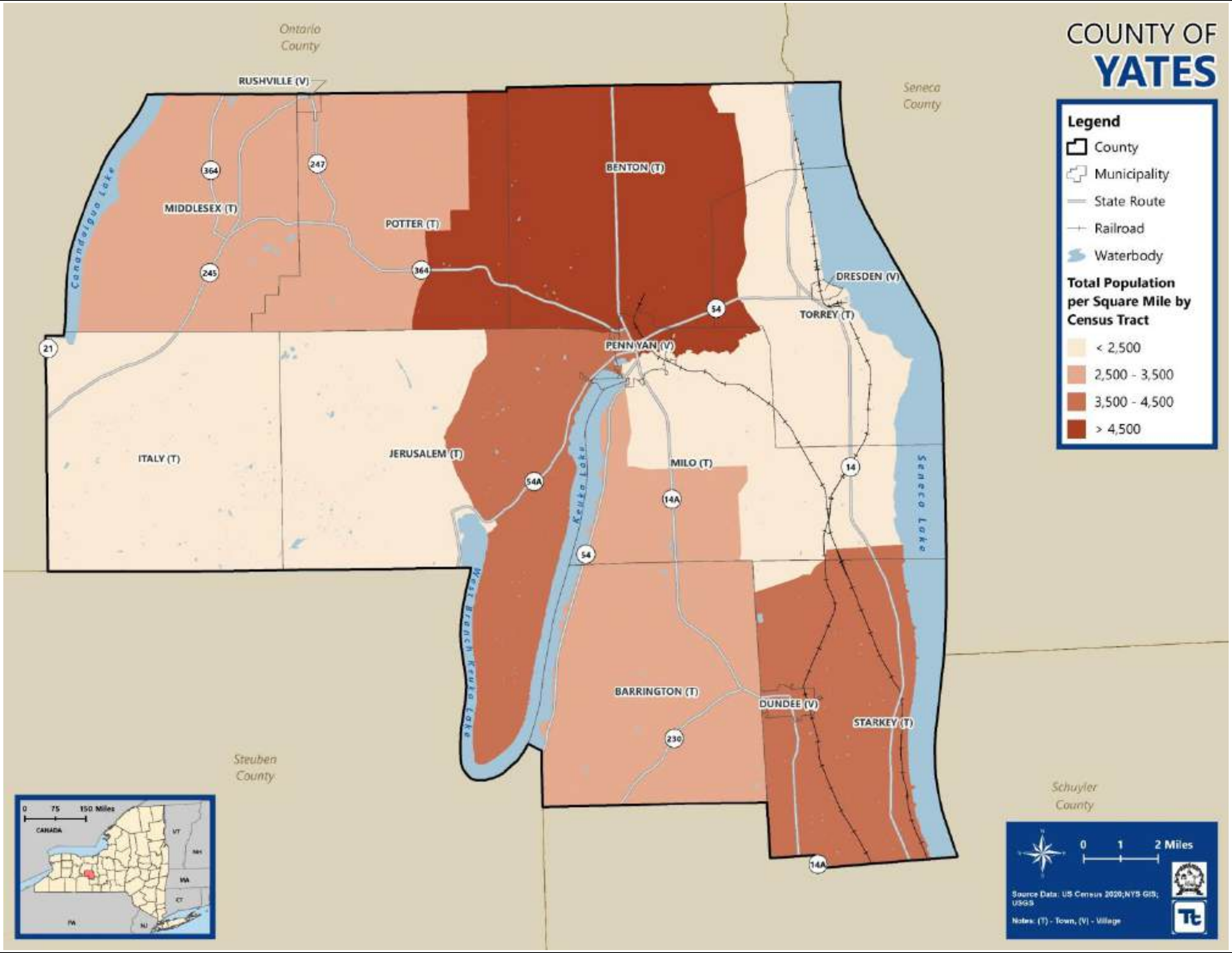
Table 3-3. Yates 2020 Decennial Population Statistics

	Total Population	% of County Total
Barrington (T)	1,541	6.2%
Benton (T) [a]	2,580	10.4%
Dresden (V)	293	1.2%
Dundee (V)	1,690	6.8%
Italy (T)	1,099	4.4%
Jerusalem (T) [a]	4,253	17.2%
Middlesex (T)	1,377	5.6%
Milo (T) [a]	2,303	9.3%
Penn Yan (V)	5,056	20.4%
Potter (T) [a]	1,207	4.9%
Rushville (V)	651	2.6%
Starkey (T) [a]	1,717	6.9%
Torrey (T) [a]	1,006	4.1%
Yates County (Total)	24,773	100.0%

Source: U.S. Census Bureau 2020 Decennial Census

a. In this table, the population of villages has been subtracted from the population of the towns in which the villages are located. Dresden is 100% within Torrey; Dundee is 100% within Starkey; Rushville is 100% within Potter; Penn Yan is 8% within Benton, 89% within Milo, and 3% within Jerusalem.

Figure 3-9. Distribution of General Population for Yates County



Analyses in this HMP use different sources for population estimates:

- Modeling of the impacts of natural hazards on the overall population (displaced households and number of persons seeking shelter) was estimated using FEMA's Hazus model. Hazus population information represents the 2020 U.S. Decennial Census data, which indicates a county population of 25,348.
- Population exposure results for the overall population were estimated based on the 2020 U.S. Decennial Census.
- Exposure results for socially vulnerable populations were estimated based on the 2021 American Community Survey (ACS) 5-Year Estimates from the U.S. Census Bureau. ACS estimates do not represent the official U.S. population count, but they allow consideration of annual changes. The 5-year estimates are the most accurate ACS estimates, with the largest sample size, which allows for greater accuracy at smaller geographic areas.

3.6.2 Population Trends

Population trend information was evaluated to estimate future shifts that could significantly change the character of the area. Population trends can provide a basis for making decisions on the type of mitigation approaches to consider and the locations in which these approaches should be applied. This information can also be used to support planning decisions regarding future development in vulnerable areas.

Yates County's population increased every decade from 1960 through 2010. The largest growth was 8.2 percent between 1970 and 1980. The smallest increase was 3 percent between 2000 and 2010. From 2010 to 2020, the county's population dropped 2.3 percent. The population decline from 2010 to 2020 was not uniform throughout the County; some areas experienced an increase over that period. Projections indicate a minor decrease by 2030 and a slight increase by 2040 (Cornell University 2018).

Table 3-4. Historical and Projected Population Change in Yates County

Historical Yates County Population							Projected Yates County Population	
1960	1970	1980	1990	2000	2010	2020	2030	2040
18,614	19,831	21,459	22,810	24,621	25,348	24,773	24,706	24,857

Source: Cornell University 2018; Yates County HMP 2020

3.6.3 Socially Vulnerable Populations

Federal guidance requires that HMPs consider socially vulnerable populations. These populations can be more susceptible to hazard events based on several factors, including their physical and financial ability to react or respond during a hazard and the location and construction quality of their housing. Populations with a higher level of vulnerability can be more seriously affected during an emergency or disaster. They have unique needs that need to be considered by public officials to help ensure the safety of demographics with a higher level of risk. Identifying concentrations of vulnerable populations can assist communities in targeting preparedness, response, and mitigation actions. The vulnerable populations for this HMP include the following:

- Persons 65 years of age or older
- Persons 5 years of age or younger
- Non-English speakers.
- Persons with physical or mental disability
- Persons living below the poverty threshold (households with two adults and two children with an annual household income below $25,926 per year)

Table 3-5 lists the ACS 2021 Five-Year Estimate vulnerable population statistics in Yates County by jurisdiction.

Social Vulnerability Index

> Social vulnerability refers to a community's capacity to prepare for and respond to the stress of hazardous events.

The Centers for Disease Control and Prevention (CDC) defines a Social Vulnerability Index (SVI) to assess vulnerable populations. The SVI uses U.S. Census data to determine the social vulnerability of every county and every census tract. It ranks each county or tract on 16 social factors, including poverty, lack of vehicle access, and crowded housing, and groups them into four related themes. (Agency for Toxic Substances and Disease Registry 2022). These factors may weaken a community's ability to prevent human suffering and financial loss in a disaster. Figure 3-10 illustrates the overall social vulnerability distribution in Yates County by census tract. Figure 3-11 displays the social vulnerability Index by census tract by theme. Figure 3-12 displays the SVI at the county level for Yates County, which is identified as "relatively moderate."

Table 3-5. Yates County Population Statistics

	Total Population (Decennial 2020)		American Community Survey 5-Year Population Estimates (2021)									
			Population Over 65		Population Under 5		Non-Speaking Population[b]		Population with Disability		Population Below Poverty Level	
	Number	% of County Total	Number	% of Jurisdiction Total	Number	% of Jurisdiction Total	Number	% of Jurisdiction Total	Number	% of Jurisdiction Total	Number	% of Jurisdiction Total
Barrington (T)	1,541	6.2%	376	24.4%	119	7.7%	35	2.3%	105	6.8%	117	7.6%
Benton (T) [a]	2,580	10.4%	557	21.6%	206	8.0%	89	3.4%	168	6.5%	188	7.3%
Dresden (V)	293	1.2%	54	18.4%	29	9.9%	2	0.7%	33	11.3%	63	21.5%
Dundee (V)	1,690	6.8%	226	13.4%	151	8.9%	0	0.0%	320	18.9%	467	27.6%
Italy (T)	1,099	4.4%	185	16.8%	49	4.5%	5	0.5%	198	18.0%	87	7.9%
Jerusalem (T) [a]	4,253	17.2%	737	17.3%	306	7.2%	57	1.3%	416	9.8%	382	9.0%
Middlesex (T)	1,377	5.6%	295	21.4%	43	3.1%	5	0.4%	172	12.5%	140	10.2%
Milo (T) [a]	2,303	9.3%	613	26.6%	207	9.0%	12	0.5%	289	12.5%	498	21.6%
Penn Yan (V)	5,056	20.4%	1,367	27.0%	172	3.4%	16	0.3%	789	15.6%	776	15.3%
Potter (T) [a]	1,207	4.9%	146	12.1%	116	9.6%	84	7.0%	12	1.0%	65	5.4%
Rushville (V)	651	2.6%	111	17.1%	17	2.6%	0	0.0%	88	13.5%	30	4.6%
Starkey (T) [a]	1,717	6.9%	286	16.7%	1	0.1%	0	0.0%	130	7.6%	155	9.0%
Torrey (T) [a]	1,006	4.1%	207	20.6%	80	8.0%	41	4.1%	170	16.9%	141	14.0%
Yates County (Total)	**24,773**	**100.0%**	**5,160**	**20.8%**	**1,496**	**6.0%**	**346**	**1.4%**	**2,890**	**11.7%**	**3,109**	**12.5%**

Source: U.S. Census Bureau 2017-2021 American Community Survey

a. In this table, the population of villages has been subtracted from the population of the towns in which the villages are located. Dresden is 100% within Torrey; Dundee is 100% within Starkey; Rushville is 100% within Potter; Penn Yan is 8% within Benton, 89% within Milo, and 3% within Jerusalem.

b. Non-English-speaking populations calculated from ACS household data based on average household population of 2.74.

Figure 3-10. Overall Social Vulnerability Index in Yates County by Census Tract

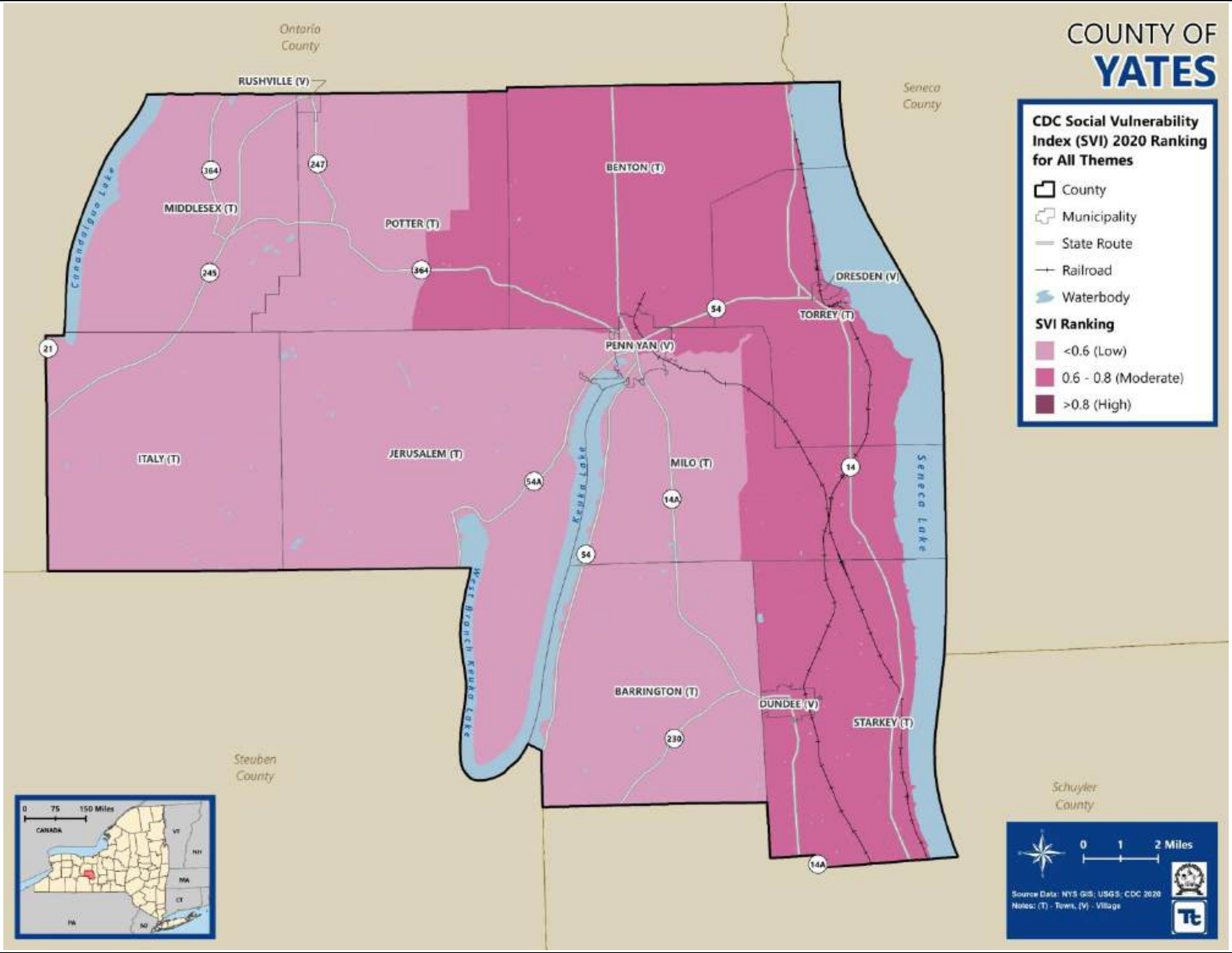


Figure 3-11. Distribution of Social Vulnerability by Theme

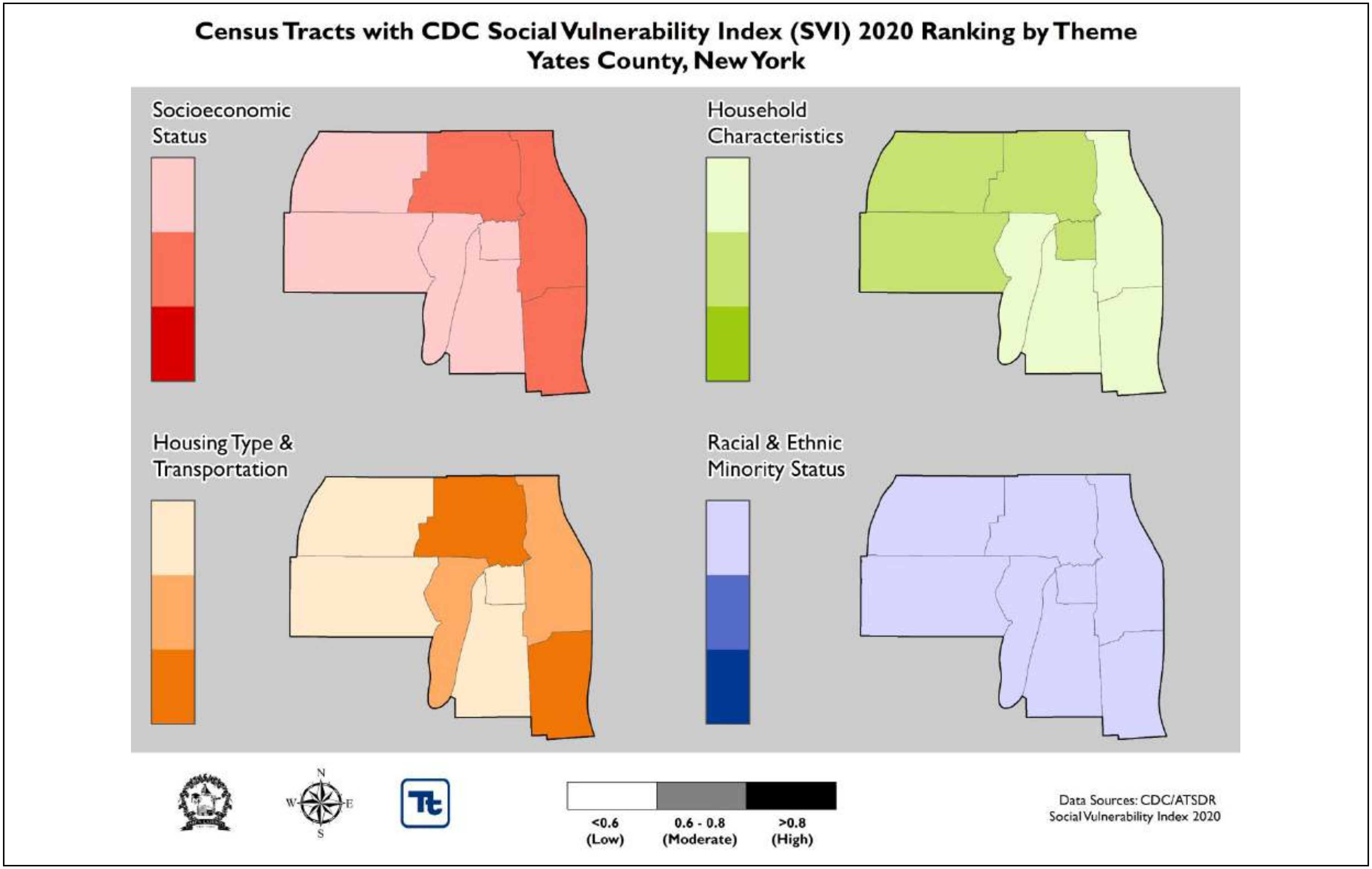
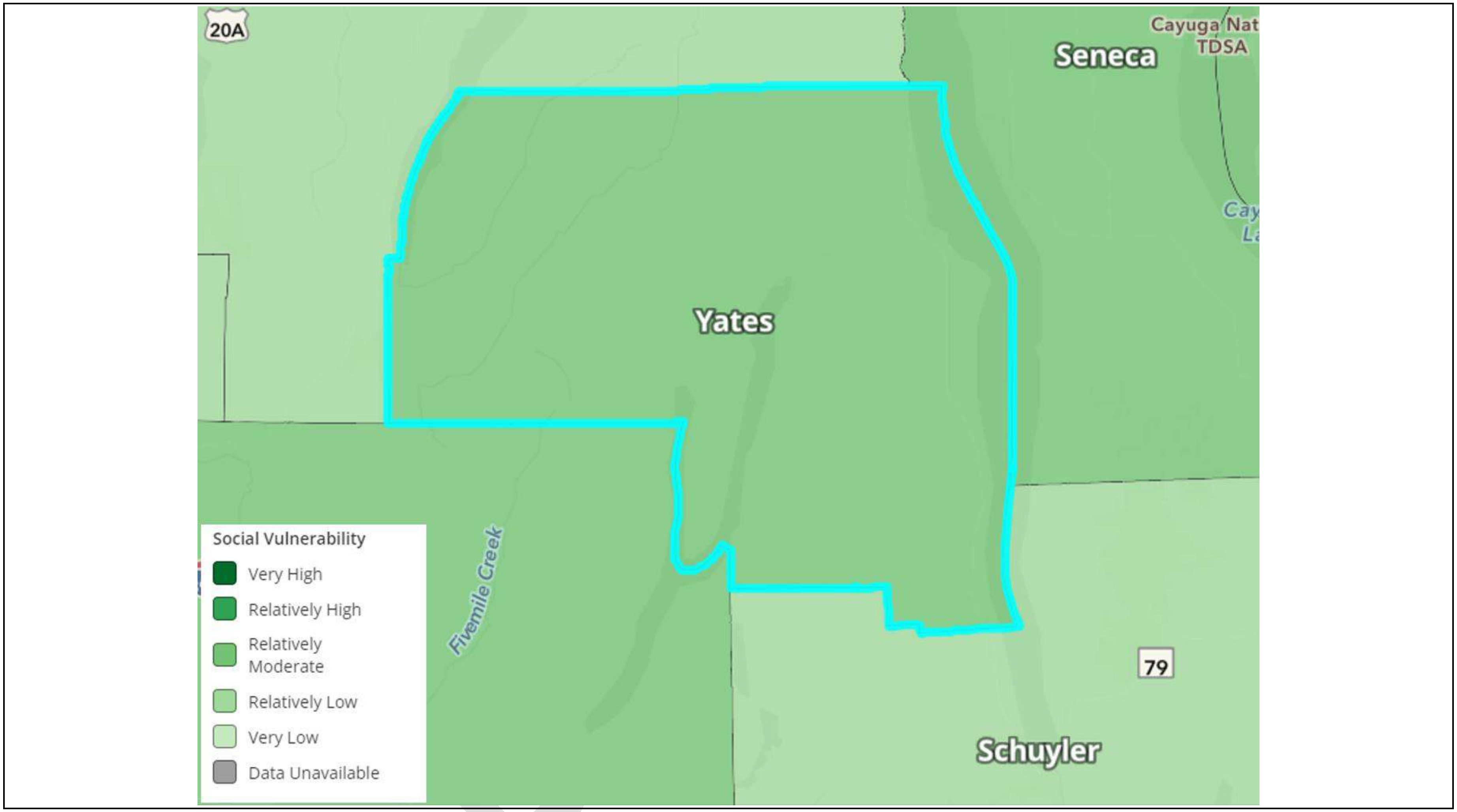


Figure 3-12. County-Level Social Vulnerability Index for Yates County and Surrounding Counties



Source: FEMA n.d.

Age

Older adults are more vulnerable than other age groups before and after disasters. Factors include a greater prevalence of chronic conditions, multi-morbidity, cognitive impairment, medication concerns, greater dependence on assistive devices (i.e., walkers, glasses), support requirements from caregivers and others, and likelihood of social isolation. Children are considered vulnerable to hazard events because they are dependent on others to safely access resources during emergencies and may experience increased health risks from hazard exposure (American Red Cross 2020).

According to the 2021 ACS, 20.8 percent (5,160 persons) of the County's population is 65 and older and 6 percent (1,496 persons) is under the age of 5 (U.S. Census Bureau 2023).

Language

Individuals who are not fluent or do not have a working proficiency in English are vulnerable because they can have difficulty understanding information being conveyed to them. Cultural differences also can add complexity to how information is being conveyed to populations with limited proficiency of English (CDC 2021). According to the 2021 ACS, 1.4 percent of the County's population over the age of five primarily speaks a language other than English at home.

Physically or Mentally Disability

A disability is a condition of the body or mind that makes it more difficult to do certain activities and interact with the world (CDC 2020). Cognitive impairments can increase the level of difficulty that individuals face during an emergency and reduce an individual's capacity to receive, process, and respond to emergency information or warnings. Individuals with a physical or sensory disability can face issues of mobility, sight, hearing, or reliance on specialized medical equipment. According to the 2021 ACS, 2,890 persons or 11.7 percent of residents in Yates County are living with a disability.

Income

Economically disadvantaged populations are vulnerable because they may not have funds to evacuate during a hazard event. The U.S. Census Bureau identifies households with two adults and two children with an annual household income below $25,926 per year as low income (Census 2021). The 2021 ACS indicates that 12.5 percent (3,109 persons) of County residents are below the poverty level (U.S. Census Bureau 2023). Yates County faces a lower average household income than the state average, but its poverty rate is lower than the state average of 15 percent.

While the poverty threshold is typically used as a standard for identifying low-income populations, the Steering Committee noted that households may be above the poverty threshold but still struggle financially, making them socially vulnerable to hazard events. The County also used data available from United for ALICE. ALICE stands for Asset Limited, Income Constrained, Employed. This dataset identifies households with income above the federal poverty threshold but below the basic cost of living. This represents the growing number of families who are unable to afford the basics of housing, childcare, food, transportation, health care, and technology (United For ALICE 2024). Costs associated with hazard events could exceed the financial capacity of these households, making them highly vulnerable to hazard events. In 2022, 35 percent of the 8,882 households in Yates County were ALICE households (compared to the state average of 31 percent). See Table 3-6 for ALICE data by jurisdiction.

Table 3-6. Yates County ALICE Data

	Total Households	% Below ALICE Threshold
Barrington (T)	596	33%
Benton (T)	927	44%
Dresden (V)	—	—
Dundee (V)	—	—
Italy (T)	419	58%
Jerusalem (T)	1,362	37%
Middlesex (T)	488	45%
Milo (T)	2,938	54%
Penn Yan (V)	—	—
Potter (T)	568	36%
Rushville (V)	—	—
Starkey (T)	1,160	55%
Torrey (T)	424	34%
Yates County (Total)	**8,882**	**35%**

Source: United For ALICE 2024

Note: No data available for the Villages of Dresden, Dundee, Penn Yan, and Rushville.

3.7 ECONOMY

3.7.1 Major Institutions

Yates County's economy largely focuses on agriculture, manufacturing, health care, and tourism. Yates County is unique in the number of lakes it fronts, the number of wineries it possesses, its extensive organic industry and the diversity of farm products it grows. Yates County has among the fastest growing manufacturing sectors in the Northeast, growing nearly 30 percent since 2000.

Major manufacturers in the County include Abtex Corporation, Birkett Mills, Coach and Equipment Manufacturer, Ferro, KanPak, LLC, Penn Yan Aero, and Silgan PlasticsY Yates County is at the center of the Finger Lakes Region, which sees more than 20 million visitors spend over $2.2 billion on an annual basis (FLDEC n.d.). The County is home to one higher education institution, the Keuka College in the hamlet of Keuka Park.

3.7.2 Employment

According to the 2021 ACS, 57.0 percent (11,283) of the county's population is in the labor force. In 2021, education services and health care and social assistance was the largest sector in Yates County, employing 26.2 percent of the County's workforce. The second-largest sector was manufacturing, followed by retail trade (U.S. Census Bureau 2021).

The 2017 Census County Business Patterns Survey data identified 417 business establishments employing 4,620 people in Yates County. The health care and social assistance industry had the greatest number of establishments in the County at that time, with 904. This was followed by the manufacturing industry, with 893 establishments, and the retail trade industry, with 699 establishments (U.S. Census Bureau 2017).

3.7.3 Income

The average household income in the County, according to the 2022 ACS 5-year estimates, was $62,637, which is below the state ($79,463) and national ($74,755) averages. Table 3-7 shows the median household income in Yates County between 2018 and 2022, as calculated by the U.S. Census Bureau.

Table 3-7. Yates County Median Household Income, 2018-2022

Year	Yates County Median Household Income	New York Median Household Income	National Median Household Income
2018	$51,089	$67,648	$61,937
2019	$60,612	$72,038	$65,712
2020	$57,057	$73,354	$67,340
2021	$63,619	$74,230	$69,717
2022	$62,637	$79,463	$74,755

Source: U.S. Census 2023

3.8 GENERAL BUILDING STOCK

For this HMP update, a customized general building stock inventory was created using building footprint and parcel data from the County, supplemented with other County-provided data and 2022 RSMeans replacement cost values for structures and contents. Contents are valued at

50 percent of the structure value for residential structures and 100 percent of the structure value for non-residential facilities. This inventory was incorporated into Hazus. Key numbers from the inventory include the following:

- The updated building inventory contains 22,096 buildings with a total building replacement cost value (structure and contents) of $14.03 billion.
- The Town of Jerusalem has the greatest number of structures, at 4,305.
- The Village of Dresden has the fewest structures, with 189.
- Residential housing accounts for 50.7 percent of the buildings in the inventory (11,203 buildings) and 28.6 percent of the building stock replacement value (approximately $4.02 billion).

The 2021 ACS identifies 11,203 residential units in Yates County. The Census Bureau defines a residential unit as any house, apartment, mobile home, group of rooms, or single room that is intended for occupancy as separate living quarters. Commercial buildings make up 41 percent of the total building replacement cost value. Replacement cost values of residential, commercial, and industrial properties in Yates County are shown in Figure 3-13 through Figure 3-15, respectively.

3.9 CRITICAL FACILITIES AND COMMUNITY LIFELINES

Critical facilities are those that are essential to the health and welfare of the population. These facilities are especially important after any hazard event. Critical facilities are those that maintain essential and emergency functions and are typically defined to include police and fire stations, schools, and emergency operations centers.

Critical facilities include infrastructure such as roads and bridges that provide access to those in need and utilities that provide water, electricity, and communication services. Also included are facilities that use or store hazardous materials (FEMA 1997). The complete inventory is provided in Appendix F.

Figure 3-13. Replacement Cost Value of Residential Properties in Yates County

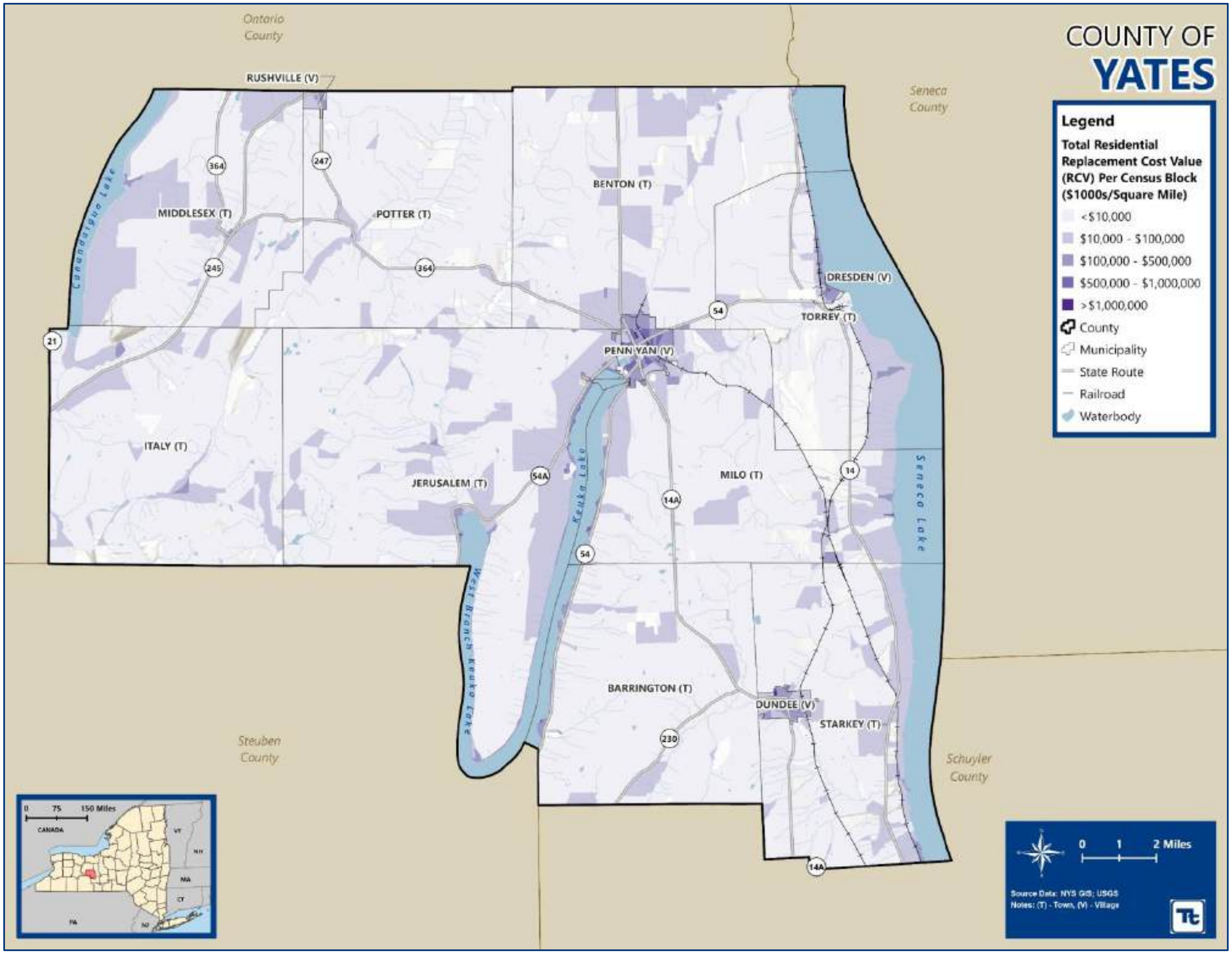


Figure 3-14. Replacement Cost Value of Commercial Properties in Yates County

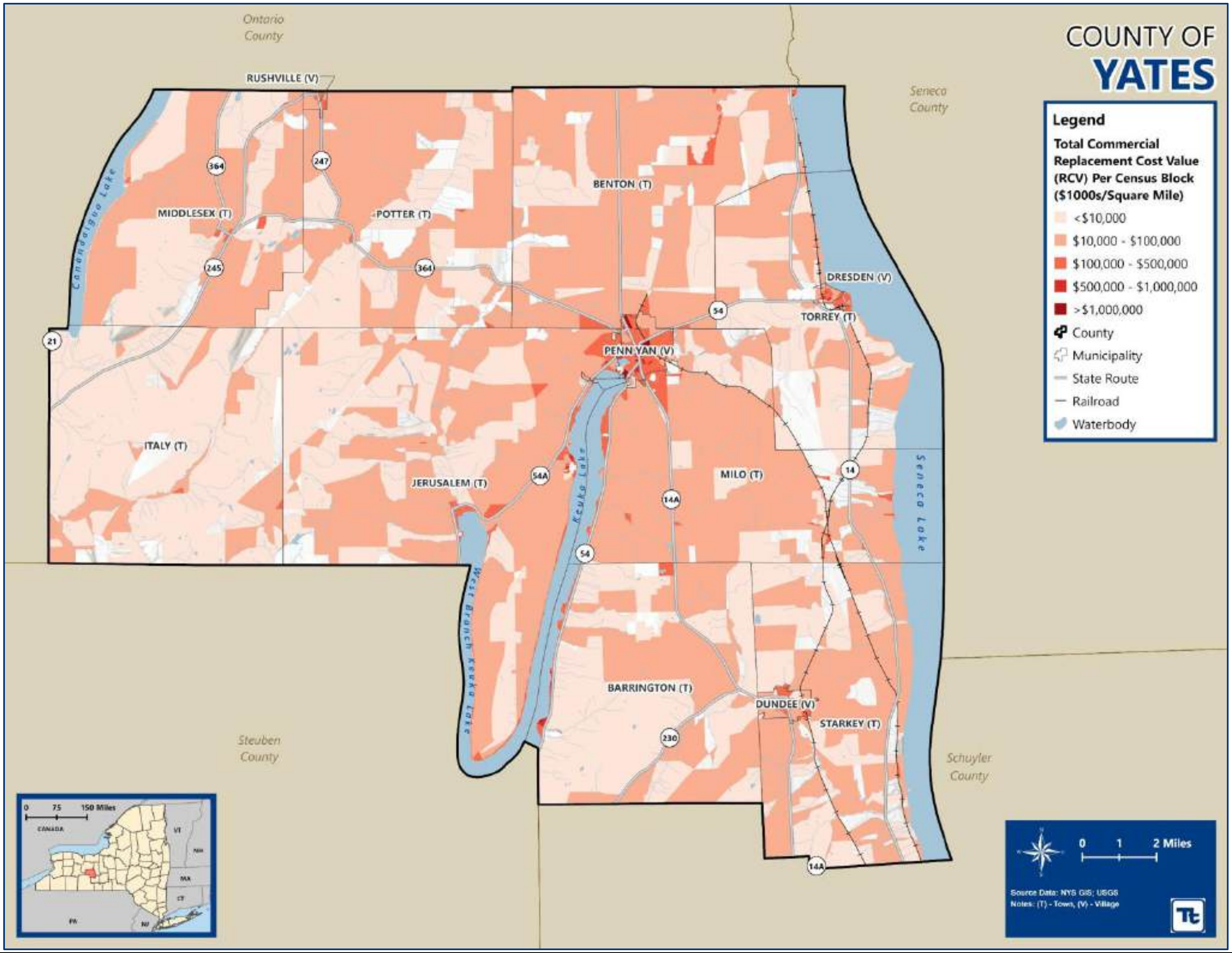
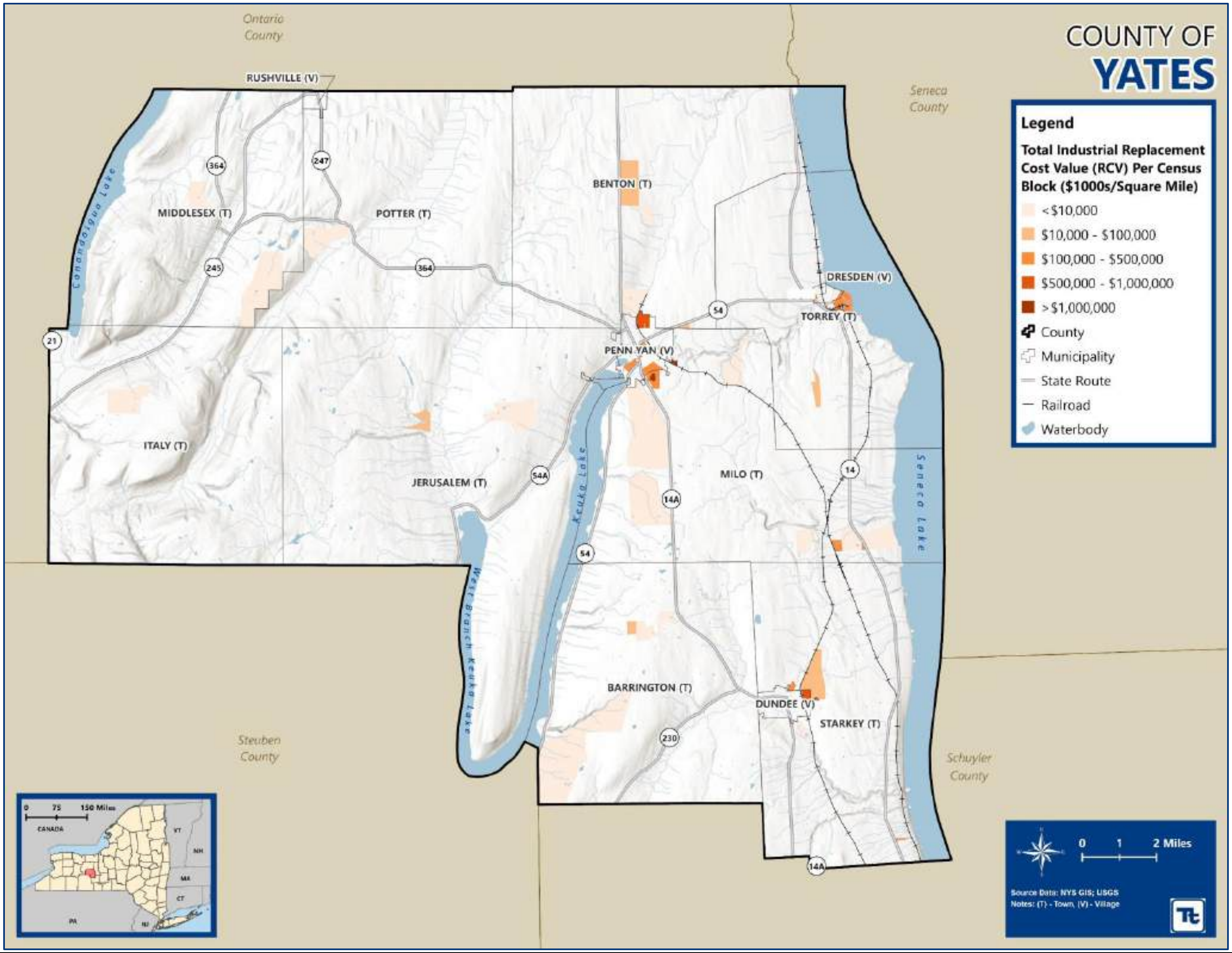


Figure 3-15. Replacement Cost Value of Industrial Properties in Yates County



FEMA defines some types of critical facilities, as well as public services or activities, as “community lifelines.” Community lifelines provide the fundamental services in a community that, when stabilized, enable all other aspects of society. Following a disaster event, intervention is required to stabilize lifelines. FEMA defines eight categories of community lifelines as summarized in Table 3-8.

Table 3-8. FEMA-Defined Categories of Community Lifelines

Community Lifeline Category	Types of Facilities and Services Included
Safety and security	Law enforcement/security, fire service, search and rescue, government service, community safety
Food, hydration, shelter	Food, hydration, shelter, agriculture
Health and medical	Medical care, public health, patient movement, medical supply chain, fatality management
Energy	Power grid, fuel
Communications	Infrastructure, responder communications, alerts warnings and messages, finance, 911 and dispatch
Transportation	Highway/roadway/motor vehicle, mass transit, railway, aviation, maritime
Hazardous materials	Facilities, hazmat, pollutants, contaminants
Water systems	Potable water infrastructure, wastewater management

Source: (FEMA 2024b)

A comprehensive inventory of community lifelines in Yates County was developed from various sources, including input from the Steering Committee and Planning Partnership. The following sections describe the inventory of community lifelines that was used for the risk assessment in this HMP. Although many lifeline facilities could fall within numerous categories, the lifeline facilities identified for this planning effort have been categorized according to their primary function.

3.9.1 Safety and Security

Safety and security community lifelines include facilities related to law enforcement, security, fire service, search and rescue, and government service. Overall, there are 100 safety and security lifelines in Yates County. Table 3-9 summarizes the number of each critical facility within the safety and security lifeline category. Figure 3-16 shows the location of these facilities. Key facilities are described in the sections below.

Table 3-9. Yates County Safety and Security Lifeline Facilities

Facility Type	Number of Facilities
Dam	62
Fire Station	11
Military Facility	2
Municipal Hall	14
Police Station	3
Post-Secondary Education Facility	1
Primary Education Facility	2
Secondary Education Facility	4
Total	**100**

Note: The identified lifeline facilities may not include all facilities within the County. Facilities may have been missed in the information gathering process.

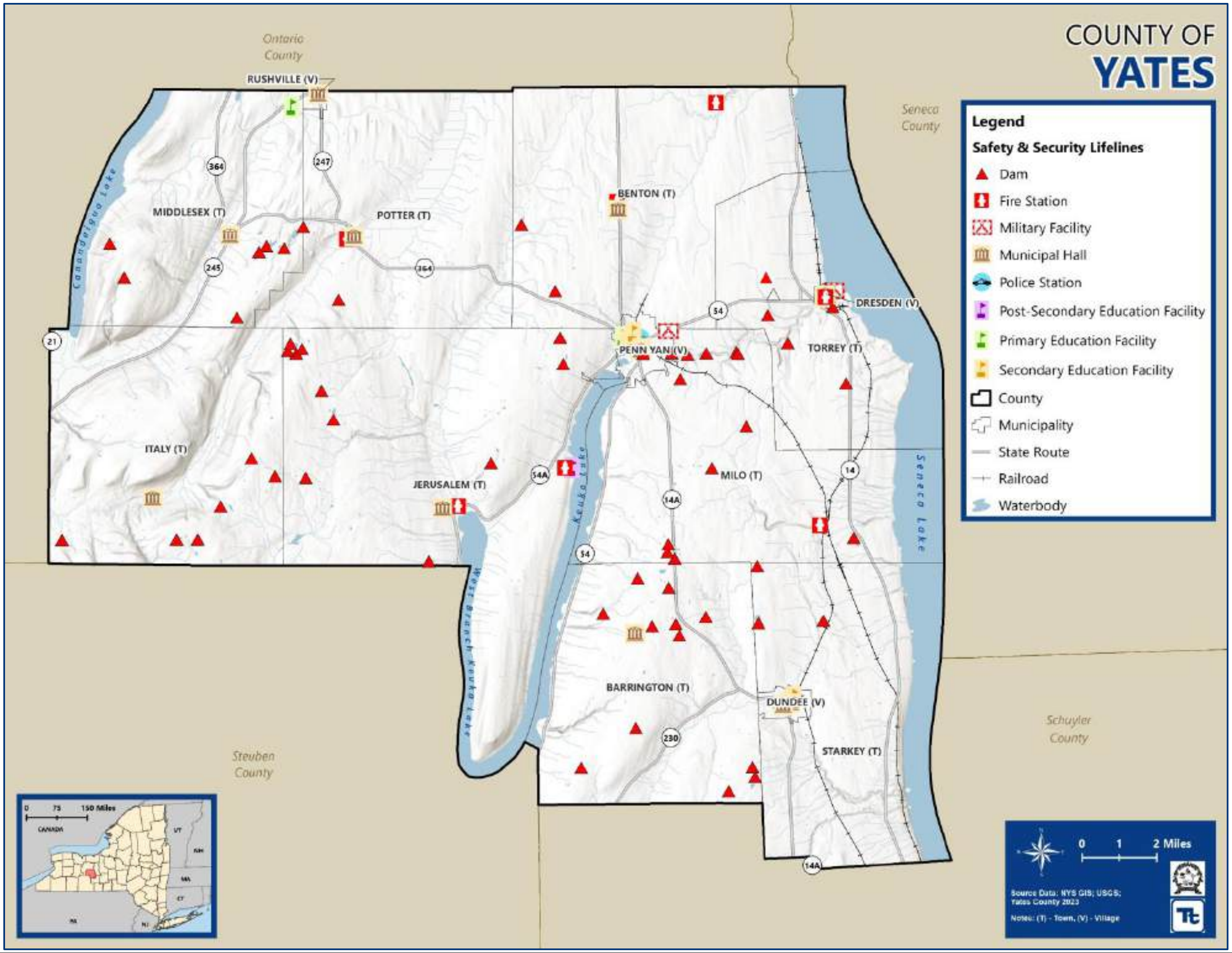
Emergency Facilities

The Yates County Office of Emergency Services provides opportunities of training to County Emergency Responders, coordinates the response to emergencies of all kinds, collaborates on policies with the Enhanced 911 Dispatch Center, develops and maintains plans, coordinates disaster preparedness and hazardous mitigation activities, and provides support services to many local government organizations.

The Office of Emergency Services maintains and administers an integrated Emergency Services program to ensure a safe environment through prevention, mitigation, readiness, response, and recovery.

There are 10 fire department facilities and three emergency medical services providers in Yates County. Police enforcement and public safety is maintained by the New York State Police Department, Yates County Sheriff's Office, and the Penn Yan Police Department.

Figure 3-16. Safety and Security Lifelines in Yates County



Dams

The U.S. Army Corps of Engineers (USACE) National Inventory of Dams (NID) lists nine dams in Yates County: one undesignated dam, five low hazard dams, two intermediate hazard dams, and one high hazard dam (USACE n.d.). NYSDEC lists 57 dams in Yates County: 41 undesignated dams, 13 low hazard dams, two intermediate hazard dams, and one high hazard dam (NYSDEC 2024). High hazard dams are required to develop emergency action plans. Refer to Appendix H for the names and locations of the dams in the County.

Military Installations

The U.S. Marines and U.S. Army operate recruiting offices in the Village of Penn Yan. The U.S. Army also has a reserve office in the Village of Penn Yan.

Schools

There are two primary educational facilities, four secondary educational facilities, and one post-secondary educational facility in Yates County. The public educational facilities are split between four school districts.

3.9.2 Food, Hydration, and Shelter

For this plan, food, hydration and shelter facilities include community centers and food pantries. No facilities in Yates County were identified as food, hydration, and shelter lifelines for this HMP.

3.9.3 Health and Medical

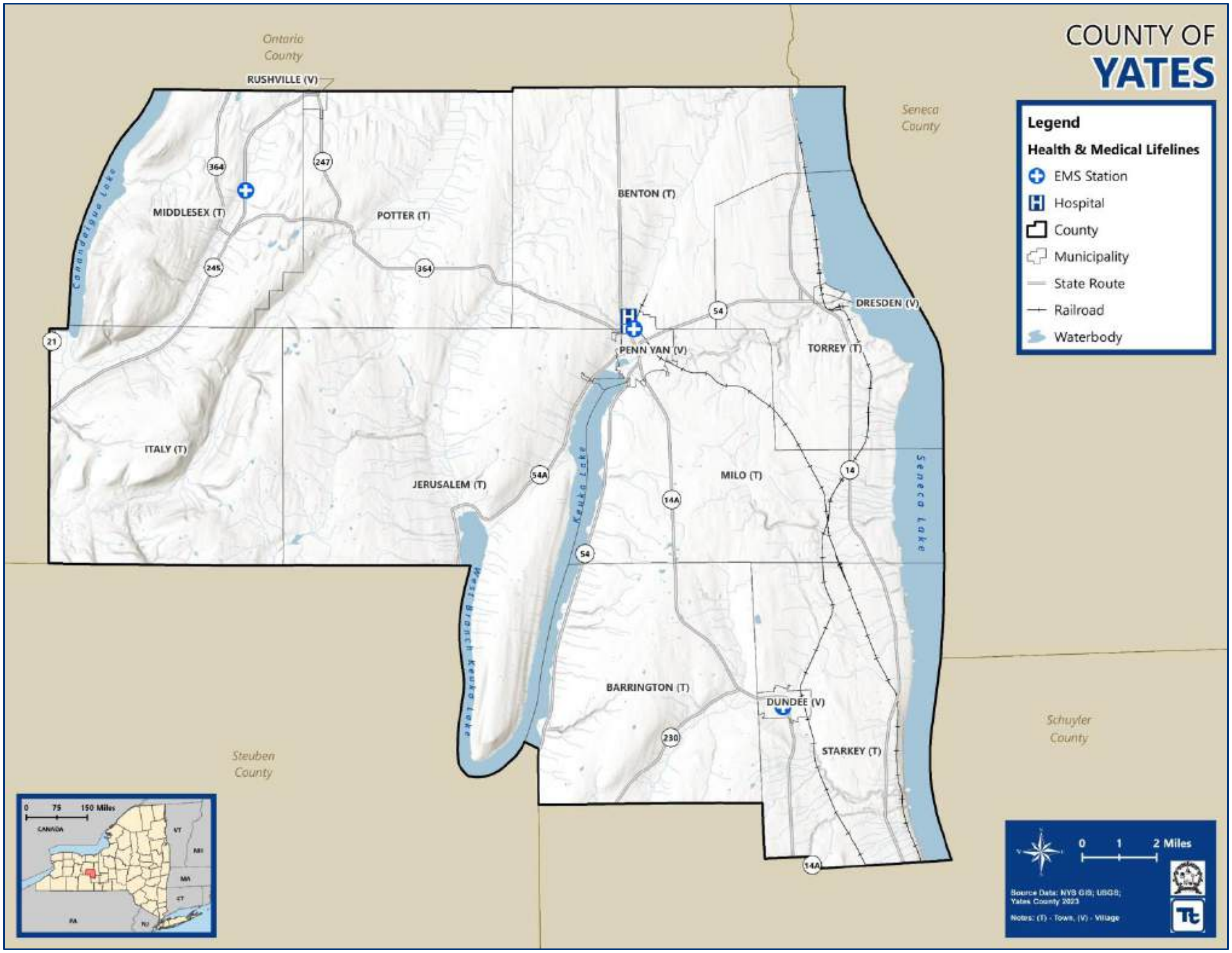
Health and medical community lifelines include facilities related to medical care, patient moving, public health, fatality management, and medical supply chain. For this plan, health and medical facilities include drug/alcohol rehabilitation centers, EMS stations, hospitals, and public health clinics. Table 3-10 summarizes the number of each facility within the health and medical lifeline. Figure 3-17 displays the location of these facilities in the County.

Table 3-10. Yates County Health and Medical Lifeline Facilities

Facility Type	Number of Facilities
Hospital	1
EMS Station	4
Total	

Note: The identified lifeline facilities may not include all facilities within the County. It is recognized that facilities may have been missed in the infromation gathering process.

Figure 3-17. Health and Medical Lifelines in Yates County



Hospitals and Medical Facilities

Soldiers & Sailors Memorial Hospital in Penn Yan is the only hospital in Yates County. Geneva General Hospital and Soldiers & Sailors Memorial Hospital are part of a multi-institutional health system named UR Finger Lakes Health, located in Ontario County, which provides hospital services to residents of Yates County. Soldiers & Sailors Memorial Hospital operates a 25-bed critical access hospital, including one medical-telemetry unit Geneva General Hospital is a 132-bed general acute care hospital providing both primary care and a full range of secondary-level services. Geneva General Hospital operates 10-bed intensive care unit, and a 12-bed telemetry unit as well as six pediatric beds (Finger Lakes Health n.d.).

3.9.4 Energy

For the purpose of this HMP update, the following facilities are energy lifelines: gas facilities, oil wells, substations, and wind power. No facilities in Yates County were identified as energy lifelines for this HMP.

Gas and electric power in Yates County are transmitted and distributed by one main company and one municipal provider: New York State Electric and Gas Corporation (NYSEG) and Penn Yan Municipal (NY DPS 2022). Homes in the County are heated by many different sources, with a significant number using utility gas piped into the home. The second most frequent source of home heating is bottled, tank, or LP gas.

3.9.5 Communications

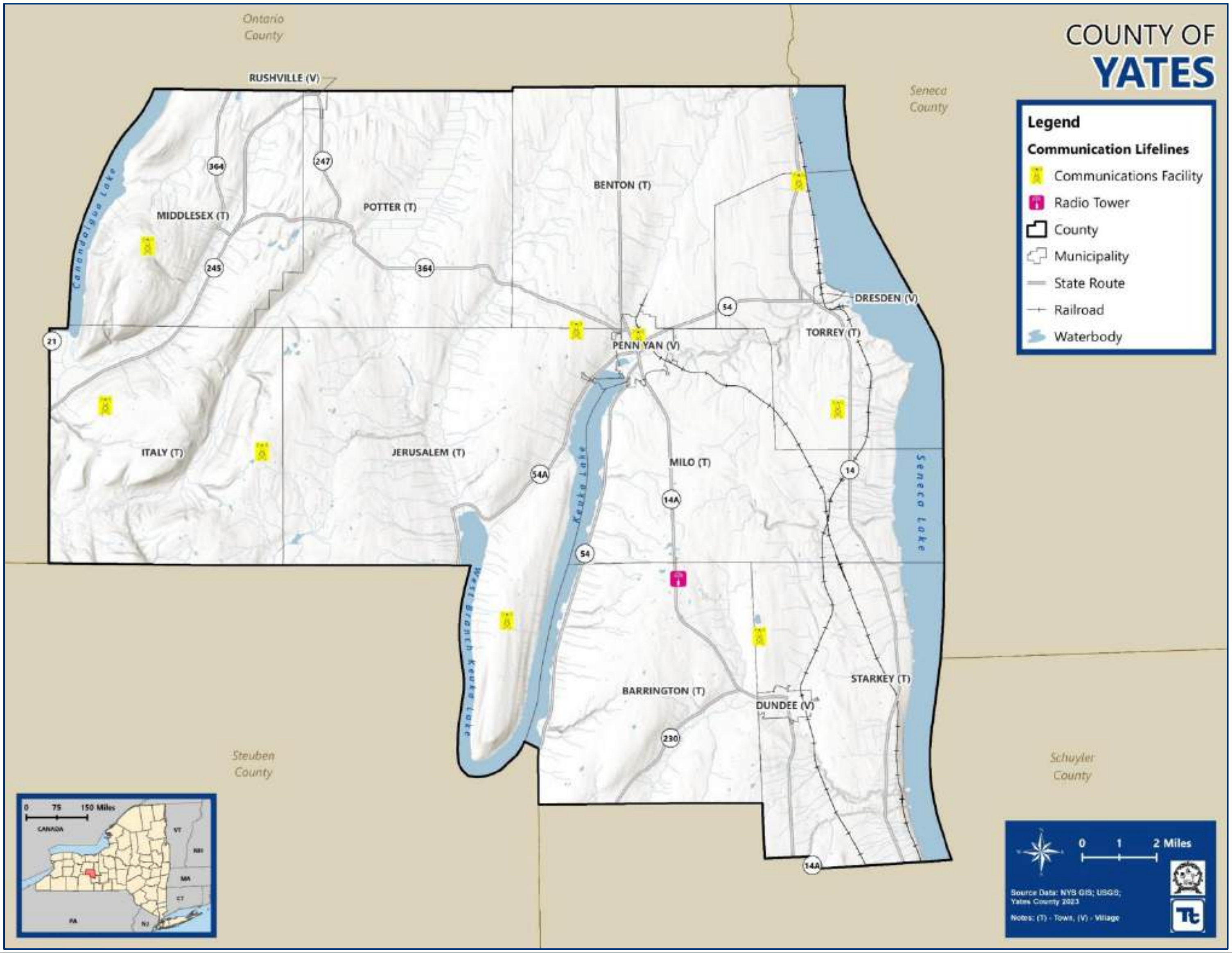
Communication lifelines include communications infrastructure; responder communications; alerts, warnings, and messages; finance; 911; and dispatch. For the purpose of this HMP update, the following facility types fall under the communications category: communication towers and telephone facilities. Figure 3-18 shows the location of each facility in the County and Table 3-11 lists the communication lifelines in the County. Due to heightened security concerns, local utility lifeline data needed to complete the analysis were only partially obtained.

Table 3-11. Yates County Communication Lifeline Facilities

Facility Type	Number of Facilities
Communications Facility	12
Radio Tower	8
Total	**20**

Note: The identified lifeline facilities may not include all facilities within the County. It is recognized that facilities may have been missed in the infromation gathering process.

Figure 3-18. Communication Lifelines in Yates County



Emergency Warnings and Responder Communications

Yates County Office of Emergency Services operates its Enhanced 911 Dispatch Center in the Village of Penn Yan. The Enhanced 911 Dispatch Center dispatches for one law enforcement agency in addition to 10 fire departments and four ambulance companies (Yates County n.d.).

Communications

Yates County is served by traditional land lines and satellite, cable, and cellular service provided by multiple companies, such as Time Warner Cable Spectrum, DIRECTV, DISH TV, HughesNet, Sprint, Verizon, AT&T, and T-Mobile (Broadband Now 2023). Each carrier has individual plans for emergency situations during hazard events and post-disaster recovery efforts. Additionally, Yates County utilizes an extensive radio communications network that is used by emergency services agencies, hospitals, law enforcement, public works, transportation, and other supporting organizations. Nine communication facilities in Yates County are identified as critical facilities.

3.9.6 Transportation

For the purpose of this HMP update, the following critical facilities fall under the transportation category: airports, bridges, bus facilities, freight stations, and passenger stations. Figure 3-19 shows the location of each facility in the County and Table 3-12 lists the facilities. The Penn Yan Airport in the Village of Penn Yan is one of the leading general aviation airports in New York State. The airport has more than 5,000 feet of runway. It offers mechanic and fuel services, charter services, and a flying club (Penn Yan Airport n.d.).

Table 3-12. Yates County Transportation Lifeline Facilities

Facility Type	Number of Facilities
Airport	4
Total	**4**

Note: The identified lifeline facilities may not include all facilities within the County. It is recognized that facilities may have been missed in the infromation gathering process.

The County maintains specific evacuation plans and can assist with the coordination and communication of evacuation routing as necessitated by the execution of local municipal emergency operation plans. Figure 3-20 shows the identified evacuation routes in the Yates County.

Figure 3-19. Transportation Lifelines in Yates County

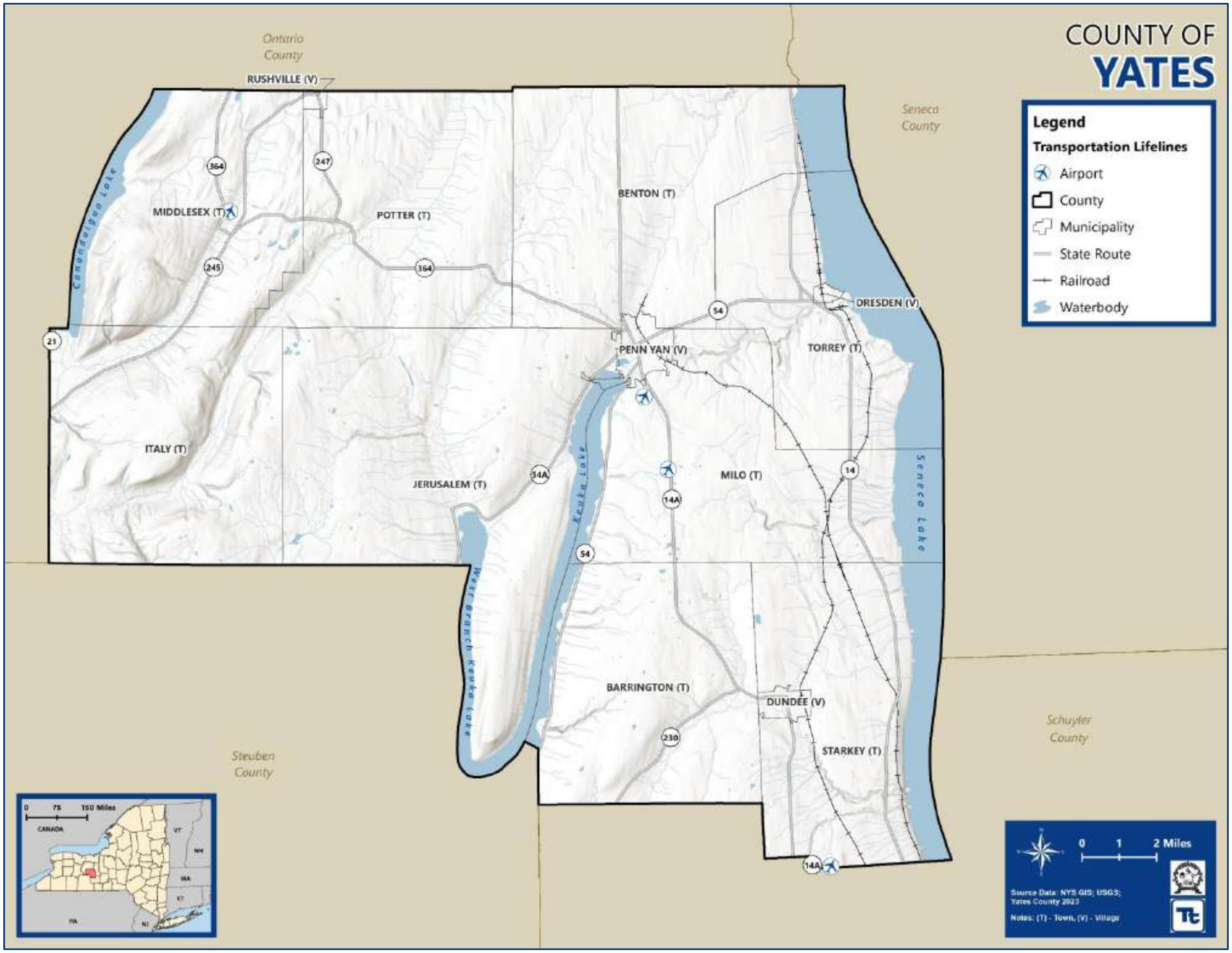
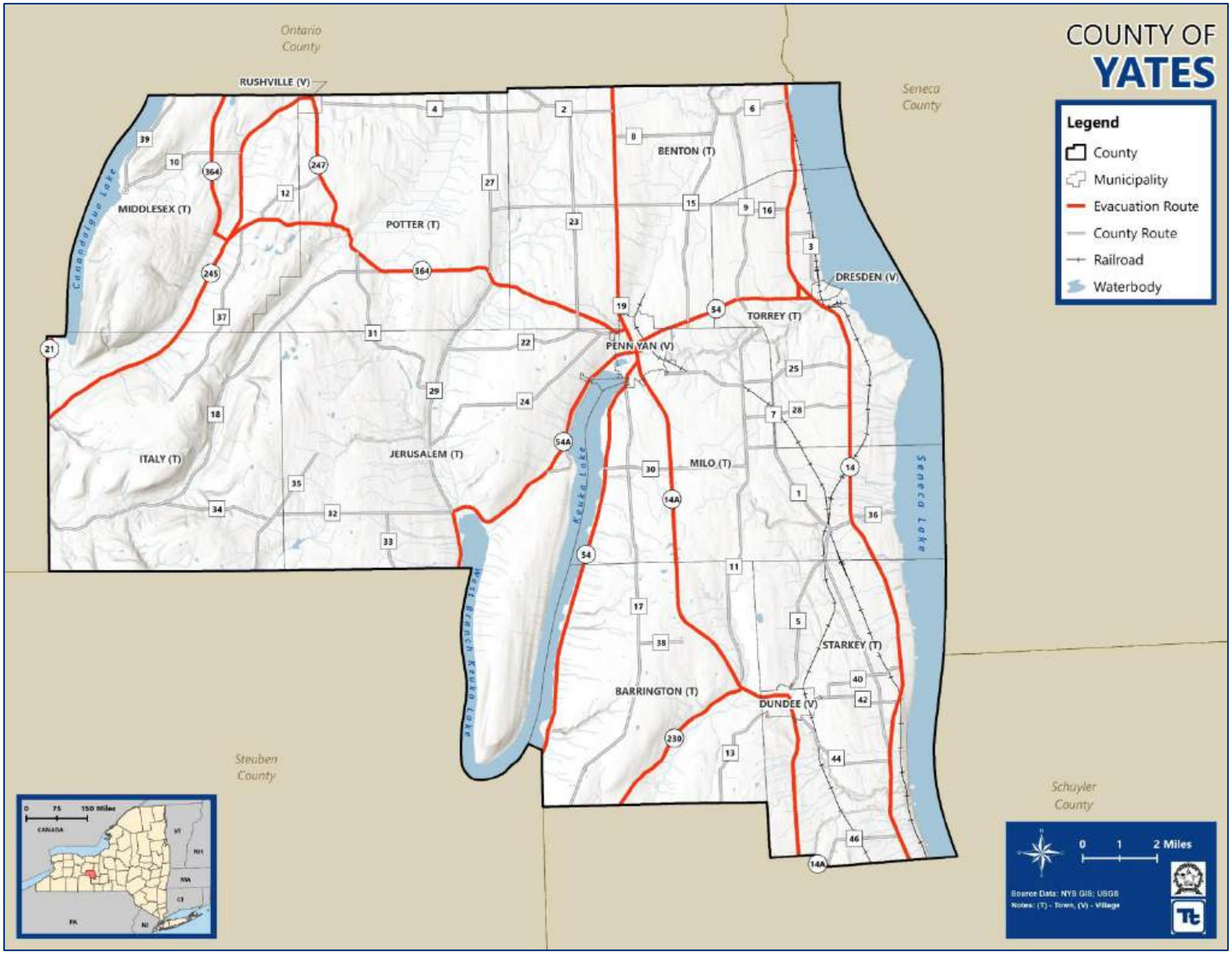


Figure 3-20. Evacuation Routes in the County



Yates County's extensive transportation network offer residents and employees various options for transportation throughout the county and the region. The transportation system includes an extensive network of roads, countywide bus service, a county-owned airport (Penn Yan Airport), and an extensive walking and biking trail system. The following sections describe other transportation facilities in Yates County that were not identified as community lifelines.

Roadways

Yates County is mainly accessible by road, including New York State Routes 14, 14A, 54, 54A, 245 and 364. The Yates County Highway Department is responsible for the construction, maintenance, and repair of the county transportation system. The system includes 180 centerline miles of roads and 40 bridges that make up the County's evacuation system. The Highway Department accomplishes its mission through various capital improvement, maintenance and repair projects, and bridge maintenance, repair or replacement projects. The Highway Department also provides snow and ice control services as needed (Yates County Highway Department n.d.).

Bus and Other Transit Facilities

Yates Transit Service began in 1993 and offers public transportation in and around Yates County. Currently, seven bus routes run throughout the County twice a day and cover approximately 700 miles to surrounding areas, including Geneva, Dundee, Naples, Rushville, and Dresden (Yates Transit Service 2021).

Railroad Facilities

Rail systems in Yates County are limited to freight traffic. Norfolk Southern operates the main rail line that runs north-south on the eastern edge of the county between Geneva and Corning (Norfolk Southern n.d.). The Finger Lakes Railroad runs from Watkins Glen to Penn Yan.

3.9.7 Hazardous Materials

The hazardous materials community lifeline category includes hazardous materials facilities, pollutants, and contaminants. Due to heightened security concerns, local hazardous materials lifeline data sufficient to complete the analysis have only partially been obtained. No facilities in Yates County were identified as hazardous material lifelines for this HMP.

As of August 2023, Yates County hosts no Superfund sites (land contaminated by hazardous waste and identified by the U.S. Environmental Protection Agency as a candidate for cleanup) (EPA 2023). As of August 2023, there are 154 sites listed in the NYSDEC's Bulk Storage Program Database in Yates County (NYSDEC 2023).

3.9.8 Water Systems

Water system lifelines include potable water infrastructure (e.g., intake, treatment, storage, and distribution) and wastewater management facilities (e.g., collection, storage, treatment, and discharge). Figure 3-21 illustrates the water system lifelines in the County and Table 3-13 summarizes the lifelines by critical facility type.

Table 3-13. Yates County Water System Lifeline Facilities

Facility Type	Number of Facilities
Potable Water Well	223
Potable Water Treatment Facility	2
Wastewater Treatment Facility	1
Water Tank	5
Water Tower	6
Total	**237**

Note: The identified lifeline facilities may not include all facilities within the County. It is recognized that facilities may have been missed in the infromation gathering process.

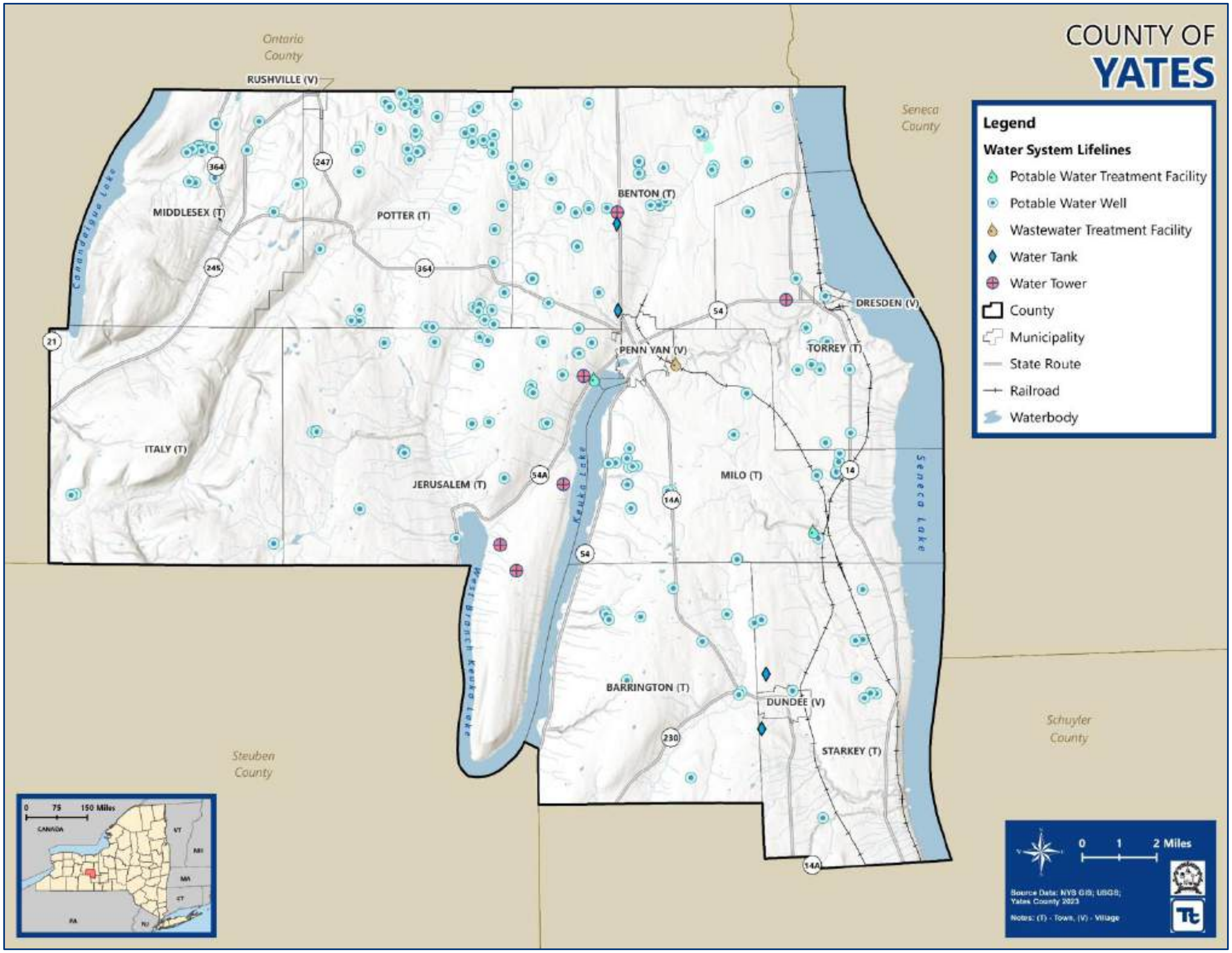
Potable Water

In Yates County, public water suppliers serve some of the county's population, but a large portion of the population relies on private wells. Water districts providing potable water to municipalities include Benton Water District, Dresden, Dundee, Jerusalem, Middlesex, and Penn Yan. Many rural areas are dependent on private wells. Large industries may have their own supply source and treatment facilities, and fire departments often have an alternate water source for firefighting. According to the NYSDEC, there are 1,161 registered domestic private wells in the County (NYSDEC 2023).

Wastewater Facilities

Yates County does not have an established countywide sewer system, but several municipalities and areas in the county have local sewer systems. The Villages of Penn Yan and Dundee have sewer service throughout the entire village. The Towns of Jerusalem and Milo have municipal sewer services through portions of the town (Yates County HMP 2020). There are also numerous individual sewage disposal systems located throughout the county.

Figure 3-21. Water System Lifelines in Yates County



3.9.9 Additional Critical Facilities

In addition to the facilities and lifelines described above, Yates County identified library and mobile home park facilities as critical but not community lifelines. Table 3-14 lists the other critical facilities in Yates County. Figure 3-22 displays the location of these facilities.

Table 3-14. Yates County Other Critical Facilities

Facility Type	Number of Facilities
Library	5
Mobile Home Park	15
Total	**18**

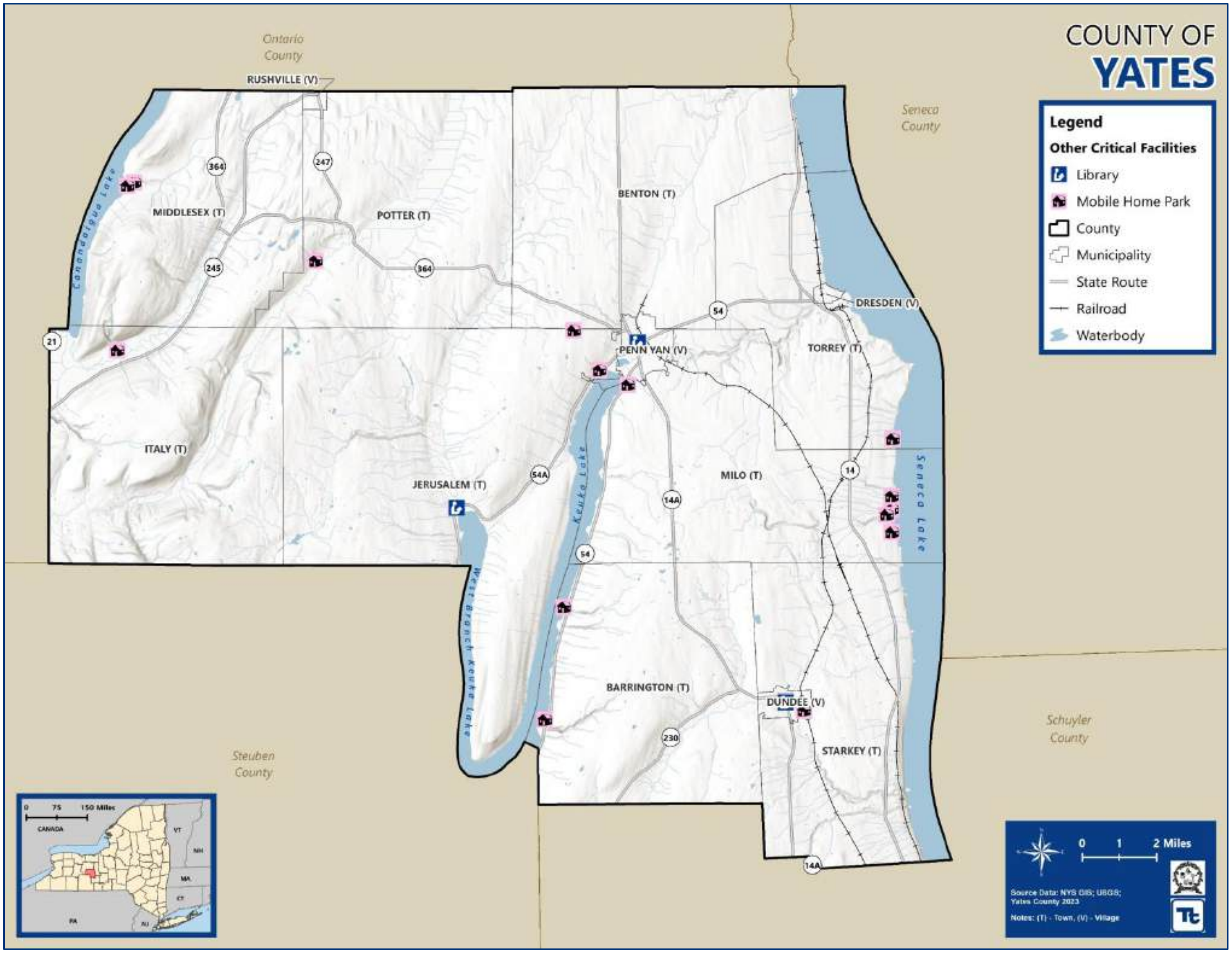
Note: The identified lifeline facilities may not include all facilities within the County. It is recognized that facilities may have been missed in the infromation gathering process.

Socially Vulnerable Populations and Undeserved Community Support Facilities

Yates County and partnering agencies offer assistance to socially vulnerable populations and underserved communities. The list below identifies these agencies:

- County Agencies
  - Yates County Community Services Department
  - Yates County Public Health Department
  - Yates County Social Services Department
  - Yates County Veterans Service Agency
  - Yates County Workforce Development
  - Yates County Youth Bureau
- State Agencies
  - New York State Central Register of Child Abuse and Maltreatment
  - New York State Office for the Aging
  - New York State Office of Children and Family Services
  - New York State Office of Temporary and Disability Assistance
  - Southern Tier Mobile Integration Team

Figure 3-22. Other Critical Facilities in Yates County



Part 2:
Risk Assessment

4. RISK ASSESSMENT METHODOLOGY AND TOOLS

A risk assessment is the process of evaluating the potential loss of life, personal injury, and economic and property damage that could result from identified hazards. Identifying potential hazards and vulnerable assets allows planning personnel to address and reduce hazard impacts and allows emergency management personnel to establish early response priorities. Results of the risk assessment are used in subsequent mitigation planning processes, including determining and prioritizing mitigation actions that reduce each jurisdiction's risk from each hazard. Past, present, and future conditions must be evaluated to assess risk most accurately for the county and participating jurisdictions. The process focuses on the following elements:

- **Identify Hazards of Concern**—Use all available information to determine what types of hazards may affect a jurisdiction.
- **Profile Each Hazard**—Understand each hazard in terms of:
  - Description—Overview of general the hazard's general principles, causes, and behaviors
  - Location—Geographic area most likely to be affected by the hazard
  - Extent—The potential severity of each hazard
  - Previous occurrences and losses
  - Probability of future hazard events (including changes in probability due to climate change)
- **Assess Risk**—Estimate how local assets may be adversely affected by a hazard:
  - Determine vulnerability—Estimate the total number of assets in the jurisdiction that are likely to experience a hazard event if it occurs by overlaying hazard maps with the asset inventories.
  - Estimate potential impacts—Assess the impact of hazard events on the people, property, economy, and lands of the region, including estimates of the cost of potential damage or cost that can be avoided by mitigation.
  - Evaluate future changes that may affect vulnerability and impacts—Analyze how demographic changes, projected development and climate change impacts can alter vulnerability and potential impacts.

4.1 ASSET INVENTORIES

This HMP update assesses vulnerability and potential hazard impacts for the following types of assets: population, buildings, critical facilities/community lifelines, the environment, and new development. Each asset type is described below.

4.1.1 Population

Total population statistics from the U.S. Census Bureau's 2020 Decennial Census were used to estimate vulnerability and potential impacts for the county's population. To determine population statistics for villages and towns, village population totals were subtracted from the total town population. Population counts at the jurisdictional level were averaged among the residential structures in the county to estimate the population at the structure level. This provides a more precise distribution of population across the county compared to only using the Census block or Census tract boundaries. Limitations of these analyses are recognized, but the results are suitable to provide a general estimate for planning purposes.

FEMA's Hazus program was used to estimate sheltering and injuries as part of the hazard analysis for flood and severe storm hazards. Hazus contains 2020 U.S. Census block data and was used.

Vulnerable populations in Yates County included in the risk assessment are children, elderly, population below the poverty level, non-English speaking individuals, and persons institutionalized with a disability. Data on these populations was taken from the 2021 5-Year Estimates in the U.S. Census Bureau's American Community Survey.

4.1.2 Buildings

Building Attributes

The countywide general building stock inventory was updated with a custom building inventory. Building attributes were updated using parcel tax assessor information provided by Yates County Planning Department and building footprints from the New York State Geographic Information System (NYS GIS) Clearinghouse and U.S. Army Corps of Engineers National Structure Inventory data. Attributes used to define each structure include year built, number of stories, occupancy class, and square footage. The centroid of each building footprint was used to define the building location.

Replacement Cost Value

Replacement cost value (RCV) is the current cost of returning a destroyed asset to its pre-damaged condition using present-day cost of labor and materials. Total RCV consists of both the structural cost to replace a building and the estimated value of contents of a building. Structural and content RCVs were calculated for each building using assessor data, the building footprint, and RSMeans 2022 values. The following regional location factors were applied based on the individual building's zip code:

- Zip codes starting with 144-145:
  - Residential factor = 1.00
  - Non-residential factor = 1.00
- Zip codes starting with 148:
  - Residential factor = 0.92
  - Non-residential factor = 0.97

Occupancy Class

The occupancy classes available in Hazus were condensed into the categories of residential, commercial, industrial, and "other" (agricultural, religious, governmental, and educational) to facilitate analysis and presentation of results. Residential loss estimates addressed both multi-family and single-family dwellings.

4.1.3 Critical Facilities and Community Lifelines

Datasets used to create the critical facility inventory were provided by Yates County GIS. The development of the inventory involved a review for accuracy, additions, or deletions of new or moved critical assets, identification of backup power for each asset (if known) and whether the critical facility is considered a lifeline in accordance with FEMA's definition (see Section 3.9). To protect individual privacy and the security of assets, information is presented in aggregate, without details about specific individual properties or facilities.

> A lifeline provides indispensable service that enables the continuous operation of critical business and government functions, and is critical to human health and safety, or economic security (FEMA).

4.1.4 Environment and Land Cover

Land cover information was derived from the Multi-Resolution Land Characteristics (MRLC) Consortium national land use and land cover database. The MRLC is a consortium of federal agencies that coordinates and generates consistent and relevant land cover information at the national scale for use in environmental, land management, and modeling applications. This 2019 dataset was converted from a raster to a vector polygon, which informed spatial areas of built and natural land cover areas. Built areas were defined as urban land cover and include developed open space and low, medium, and high intensity development. Non-urban areas were extracted into agricultural, barren, forest, rangeland, water, and wetland land cover categories.

4.1.5 New Development

An exposure analysis was conducted in GIS to determine hazard exposure of new development. Identifying these changes and integrating new development into the risk assessment provides communities information to consider when developing the mitigation strategy to reduce these vulnerabilities in the future.

Planning Partners identified new development in their jurisdictions as that which was built over the last 5 years and that which is anticipated over the next 5 years. New development is presented in Chapter 3 and the jurisdictional annexes in Volume II.

4.2 METHODOLOGY

Yates County used standardized tools, combined with local, state, and federal data and expertise to assess potential vulnerability and losses associated with hazards of concern. Three levels of analysis were used, depending upon the data available for each hazard:

- **Historical Occurrences and Qualitative Analysis—**This analysis includes an examination of historical impacts to understand potential impacts of future events of similar size. Potential impacts and losses are discussed qualitatively using best-available data and professional judgment.
- **Vulnerability Analysis—**This analysis involves overlaying available spatial hazard layers, for hazards with defined locations, on asset mapping in GIS to determine which assets are located in the hazard area.
- **Loss Estimation**—The FEMA Hazus modeling software was used to estimate potential losses for flood and severe storm.

Table 4-1 summarizes the type of analysis conducted by hazard of concern.

4.2.1 Hazus

Hazus is a GIS-based software tool developed by FEMA that applies engineering and scientific risk calculations developed by hazard and information technology experts to estimate damage and loss. Damage reports can include induced damage (inundation, fire, threats posed by hazardous materials and debris) and direct economic and social losses (casualties, shelter requirements, and economic impact) depending on the hazard and available local data. The Hazus methodologies are accepted by FEMA and provide a consistent framework for assessing risk across a variety of hazards. The use of this software promotes consistency of data output now and in the future and standardization of data collection and storage.

Table 4-1. Summary of Risk Assessment Analyses

Hazard	Population	General Building Stock	Critical Facilities	New Development
Dam Failure	Q	Q	Q	Q
Disease Outbreak	Q	Q	Q	Q
Drought	Q	Q	Q	Q
Extreme Temperature	Q	Q	Q	Q
Flood	V, H	V, H	V, H	V
Harmful Algal Blooms	Q	Q	Q	Q
Hazardous Materials	V	V	V	V
Landslide	V	V	V	V
Severe Storm	H	H	H	Q
Transportation Accident	Q	Q	Q	Q
Winter Storm	Q	Q	Q	Q
Utility Failure	Q	Q	Q	Q

Note: V = Vulnerability analysis; H = Hazus analysis; Q = Qualitative analysis

Hazus uses GIS technology to estimate a hazard's direct physical damage to building stock and critical facilities. The Hazus software incorporates default data for asset inventories, vulnerability, and hazards; this default data can be supplemented with local data to provide a more refined analysis. Table 4-2 displays the levels of analysis that can be conducted using the Hazus software.

Table 4-2. Summary of Hazus Analysis Levels

Level 1	Hazus provides hazard and inventory data with minimal outside data collection or mapping.
Level 2	Analysis involves augmenting the Hazus provided hazard and inventory data with more recent or detailed data for the study region, referred to as "local data"
Level 3	Analysis involves adjusting the built-in loss estimation models used for the hazard loss analyses. This Level is typical done in conjunction with the use of local data.

For this HMP, Hazus was used to estimate losses from flooding using depth grids. Probabilistic analyses were performed to estimate distribution of losses for hurricane wind. The probabilistic model generates estimated damage and losses for specified return periods (e.g., 100-year or 500-year).

4.2.2 Hazard-Specific Methodologies

Flood

Vulnerability

To evaluate vulnerability to the flood hazard, an analysis was conducted for the 1 percent and 0.2 percent annual chance flood events using FEMA's Preliminary Digital Flood Insurance Rate Map (DFIRM) dated May 1, 2023. These flood events are generally those considered by planners and evaluated under federal programs such as the National Flood Insurance Program. The preliminary map is considered adequate for vulnerability analysis.

To estimate vulnerability, a Level 2 Hazus riverine flood analysis was performed. The DFIRM 1 percent and 0.2 percent annual chance flood boundaries were overlaid on the centroids of updated assets (population, building stock, critical facilities, and new development). Centroids that intersected the flood boundaries were totaled to estimate the building count, building RCV, and population vulnerable to flooding.

Impact/Loss

Effective digitized floodplain hazard data to use for loss estimates was not available for the entire County. Yates County provided digitized versions of three effective municipal flood maps: Village of Dundee (Effective Date: 03/01/88), Village of Penn Yan (Effective Date: 06/15/81), and Town of Middlesex (Effective Date: 09/29/89). This data was used to evaluate potential flood loss in these municipalities only. No impact analysis was conducted for the remainder of the County because digitized floodplain hazard data is not available.

To estimate potential impacts, a depth grid was created using County-provided digitized floodplain hazard data and a 1/3 arc-second Digital Elevation Map model from the U.S. Geological Survey (USGS). The depth grids were integrated into Hazus, and the model was run to estimate potential losses at the structure level using the County's custom general building inventory for the 1 percent annual chance flood event.

The critical facility and building inventories were formatted to be compatible with Hazus. Once updated with the inventories, the Hazus riverine flood model was run to estimate potential losses for the 1 percent annual chance flood event. Based on the depth grids generated and the default damage functions in the Hazus flood model, the analysis estimated potential losses to population (default 2020 U.S. Census data across dasymetric blocks), potential damage to the general building stock, and potential damage to critical facilities.

Hazardous Materials

The hazard area for hazardous materials was defined as a 0.5-mile buffer around major roadways, railroads, and pipelines, using data provided by Yates County, the New York Department of Transportation (NYDOT), and the U.S. Energy Information Administration (EIA). Inventory data (population, general building stock, critical facilities, and new development) was overlaid with the buffered hazard areas. Assets with their centroid or polygon in the hazard area were totaled to estimate the total counts and values at risk from hazardous materials.

Landslide

The "Landslide Incidence and Susceptibility" GIS layer from USGS was used to evaluate the landslide hazard. The general landslide hazard area for this risk assessment was defined as areas indicated as "medium incidence" in that GIS layer (1.5 to 15 percent of the area has been involved in landsliding). This hazard area was overlaid on the Yates County 2020 U.S. Census municipality population data, updated building inventory, and critical facility inventory to estimate vulnerability to the landslide hazard. Limitations of this analysis are recognized, but the results are suitable to provide a general estimate for planning purposes. Future collection of additional data would allow better analysis for this hazard.

Severe Storm

A Hazus probabilistic analysis was performed to analyze the hazard losses due to wind for the 100- and 500-year mean return period events. The probabilistic Hazus hurricane model uses a database of hurricane events and wind speeds for thousands of storms with tracks and intensities reflecting the full spectrum of Atlantic hurricanes observed since 1886. The analysis for this HMP identified tracks associated with Yates County. Hazus includes data on surface roughness and tree coverage to support the modeling of wind force across various types of land surfaces.

Default demographic and updated building and critical facility inventories in Hazus were used for the analysis. Although damage is estimated at the census tract level, results were presented at the municipal level. Because there are multiple census tracts that contain more than one jurisdiction, a density analysis was used to extract the percent of building structures that fall within each tract and jurisdiction. The percentage was multiplied against the results calculated for each tract and summed for each jurisdiction.

Winter Storm

The entire general building stock inventory in Yates County is vulnerable to the severe winter storm hazard. In general, structural impacts include damage to roofs and building frames, rather than building content. Current modeling tools are not available to estimate specific losses for the severe winter storm hazard.

Historical data on structural losses to general building stock are not adequate to predict specific losses to this inventory; therefore, a percentage of the custom building stock structural RCV was used to estimate damage that could result from winter storm conditions. This methodology is based on FEMA guidance (FEMA 2001, FEMA 2004). This approach overestimates potential losses, hence providing a conservative estimate for losses associated with winter storm events.

Other Hazards of Concern

A qualitative assessment of vulnerability and potential impacts was conducted for the following hazards:

- Dam failure
- Disease outbreak
- Drought
- Extreme temperature
- Harmful algal blooms
- Transportation accident
- Utility failure

4.3 DATA SOURCE SUMMARY

Table 4-3 summarizes the data sources used for the risk assessment for this plan.

Table 4-3. Risk Assessment Data Documentation

Data	Source	Date	Format
Population data	U.S. Census Bureau, Decennial Census & American Community Survey 5-Year Estimates	2020; 2017-2021	Digital (GIS)
Building Inventory	Yates County Planning Department; NYS GIS Clearinghouse, USACE National Structure Inventory; RSMeans 2022	2022; 2023	Digital (GIS)
Critical Facilities and Lifelines	Yates County	2023	Digital (GIS)
Land Cover	National Land Cover Database	2019	Digital (GIS)
Natural/Historical/Cultural Resources	Yates County	2023	Digital (GIS)
Digitized FIRM maps	FEMA	1981, 1988, 1989, 2023	Digital (GIS)
New Development Data	Participating Yates County Municipalities	2023	Digital (GIS)
Landslide	USGS 2011	2014	Digital (GIS)
Hazardous Materials	Yates County; New York Department of Transportation; U.S. EIA	2020; 2013; 2023	Digital (GIS)
Social Vulnerability Index	Centers for Disease Control and PRevention	2020	Digital (GIS)

4.4 LIMITATIONS

Loss estimates, vulnerability analyses, and hazard-specific impact evaluations rely on the best-available data and methodologies. Uncertainties are inherent in any loss estimation methodology and arise in part from incomplete scientific knowledge concerning natural hazards and their effects on the built environment. Uncertainties also result from the following:

- Approximations and simplifications necessary to conduct such a study
- Incomplete or dated inventory, demographic, or economic parameter data
- The unique nature, geographic extent, and severity of each hazard
- Mitigation measures already employed by the participating jurisdictions
- The amount of advance notice residents have to prepare for a specific hazard event
- Uncertainty of climate change projections

These factors can result in a range of uncertainty in loss estimates, possibly by a factor of two or more. Therefore, potential vulnerability and loss estimates are approximate. These results do not predict precise results and should be used to understand relative risk. Over the long term, Yates County will collect additional data and update and refine existing inventories to assist in estimating potential losses.

Potential economic loss is based on the present value of the general building stock using best-available data. The County acknowledges significant impacts may occur to critical facilities and infrastructure as a result of these hazard events, causing great economic loss. However, monetized estimates of economic impacts and damage to critical facilities and infrastructure were not developed. In addition, economic impacts on industries such as tourism and real-estate were not analyzed.

4.5 CONSIDERATIONS FOR MITIGATION AND NEXT STEPS

The following items are to be discussed for considerations for the next plan update to enhance the vulnerability assessment:

- All Hazards
  - Create an updated user-defined general building stock dataset using up-to-date parcels, footprints, and RSMeans values.
  - Utilize updated and current demographic data.

  - Utilizing assessor data, include updated occupancy class attributes in general building stock.
- Extreme Temperatures
  - Track extreme temperature data for injuries, deaths, shelter needs, pipe freezing, agricultural losses, and other impacts to determine distributions of most at-risk areas.
- Flood
  - Create a new depth grid with the FEMA Preliminary FIRM data that was released in May 2023.
  - The general building stock inventory can be updated to include attributes regarding first floor elevation and foundation type (basement, slab on grade, etc.) to enhance loss estimates.
  - As more current FEMA floodplain data become available (i.e., DFIRMs), update the exposure analysis and generate a more detailed flood depth grid that can be integrated into the current Hazus version.
  - Conduct a Hazus loss analysis for more frequent flood events (e.g., 10 percent and 2 percent annual chance flood events).
  - Conduct a repetitive loss area analysis.
  - Continue to expand and update urban flood areas to further inform mitigation.
- Severe Storm
  - The general building stock inventory can be updated to include attributes regarding protection against strong winds, such as hurricane straps, to enhance loss estimates.
  - Integrate evacuation route data that is currently being developed.
- Severe Winter Storm
  - If available for the region, obtain average snowfall distributions to determine if various areas in the county have historically received higher snowfalls and might continue to be more susceptible to higher snow loads on the building stock and critical facilities.

5. IDENTIFICATION OF HAZARDS OF CONCERN

To provide a strong foundation for mitigation actions in this plan, Yates County considered a full range of hazards that could impact the area and then identified and ranked those that present the greatest concern. These hazards of concern were identified based on the following:

- Input from all participating jurisdictions
- Review of the New York State Hazard Mitigation Plan
- Review of the 2020 Yates County HMP
- Research on the frequency, magnitude, and costs associated with hazards that have previously or could feasibly impact the region
- Qualitative information regarding natural (not human-caused) hazards and the perceived vulnerability of the study area's assets to them.

Hazards of Concern are hazards that are most likely to impact a community. These are identified using available data and local knowledge.

Natural Hazards are sources of harm or difficultly created by a meteorological, environmental, or geological events.

Table 5-1 documents the process of identifying the hazards of concern for further profiling and evaluation.

Table 5-1. Identification of Hazards of Concern for Yates County

Hazard	In Yates County		Why was this determination made?
	May Occur	Poses Significant Threat	
Avalanche	No	No	• The 2023 New York State Hazard Mitigation Plan (NYS HMP) identifies avalanche as a hazard of concern. • The topography and climate of Yates County does not support the occurrence of an avalanche. • New York State, in general, had a very low occurrence of avalanche events between 1998 and 2018, based on statistics provided by National Avalanche Center – American Avalanche Association (NAC-AAA). • There have been no occurrences of avalanche in Yates County. The Steering Committee and Planning Partnership do not consider the hazard to be a significant concern.

Hazard	In Yates County		Why was this determination made?
	May Occur	Poses Significant Threat	
Coastal Hazards	Yes	Yes	• The 2023 NYS HMP identifies coastal hazards as a hazard of concern for New York State. • The NYS HMP identifies coastal erosion as a hazard of concern for New York State. Erosion can impact all of the state's coastal counties along Lake Erie and the Niagara River, Lake Ontario and the St. Lawrence River, Atlantic Ocean and Long Island Sound, Hudson River south of the federal dam in Troy, the East River, the Harlem River, the Kill van Kull and Arthur Kill, Seneca Lake, Canandaigua Lake, Keuka Lake, and all connecting waterbodies, bays, harbors, shallows, and wetlands. • Yates County is bordered by Seneca Lake on the east, Canandaigua Lake to the west, and Keuka Lake to the southern and mid-section. • The Steering Committee and Planning Partnership consider coastal flooding to be a hazard of concern and have grouped it in the "Flood" hazard profile.
Dam Failure	Yes	Yes	• The 2023 NYS HMP does not identify dam failure as a hazard of concern for New York State, though it is included in the Flood hazard profile. • According to the NYSDEC, there are 57 dams in Yates County. Of these, two pose intermediate risk and one is a high hazard dam (NYSDEC 2022). • The Steering Committee and Planning Partnership identified dam failure to be a significant concern.
Disease Outbreak	Yes	Yes	• The 2023 NYS HMP does not identify disease outbreak as a hazard of concern for New York State. • The County has been impacted by various diseases (influenza, COVID-19). • The Steering Committee and Planning Partnership identified disease outbreak as a hazard of concern for Yates County.
Drought	Yes	Yes	• The 2023 NYS HMP identifies drought as a hazard of concern for the state. • Yates County has been impacted by several drought events. • Agriculture is a substantial industry in Yates County. Drought conditions would severely impact the county's economy. • New York State was included in one FEMA drought-related disaster declaration, which did not include Yates County. • The Steering Committee and Planning Partnership identified drought as a hazard of concern for Yates County.
Earthquake	Yes	No	• The 2023 NYS HMP identifies earthquake as a hazard of concern for the state. • New York State was included in one FEMA earthquake-related disaster declaration (DR-1415); Yates County was not included in this declaration. • From 2019 to 2023, there were no significant earthquakes with epicenters in Yates County. • The Steering Committee and Planning Partnership did not identify earthquake as a hazard of concern for Yates County.
Extreme Cold	Yes	Yes	• The Steering Committee and Planning Partnership elected to group this hazard into the "Extreme Temperature" profile.
Extreme Heat	Yes	Yes	• The Steering Committee and Planning Partnership elected to group this hazard into the "Extreme Temperature" profile.

<table>
<tr><th rowspan="2">Hazard</th><th colspan="2">In Yates County</th><th rowspan="2">Why was this determination made?</th></tr>
<tr><th>May Occur</th><th>Poses Significant Threat</th></tr>
<tr><td>Extreme Temperature</td><td>Yes</td><td>Yes</td><td>The 2023 NYS HMP identifies extreme cold and extreme heat as hazards of concern for New York State.
According to the National Oceanic and Atmospheric Administration (NOAA) National Centers for Environmental Information database, between 2000 and 2022, there were 11 extreme temperature events in Yates County.
Yates County was included in three recent USDA disaster declarations related to extreme temperature events:
S5485 – 2023 Frost, Freeze
S4903 – 2020 Frost, Freeze
S4904 – 2020 Frost, Freeze
The Steering Committee and Planning Partnership identified extreme temperature as a hazard of concern for Yates County.</td></tr>
<tr><td>Flooding (riverine, lakeshore, ice jam, dam failure, urban flooding, and flash flooding)</td><td>Yes</td><td>Yes</td><td>The 2023 NYS HMP identifies flooding as a hazard of concern for New York State.
Yates County has been included in eight flood-related FEMA disaster declarations:
FEMA-DR-487 – Storms, Rain, Landslides & Flooding, October 2, 1975
FEMA-DR-725 – Severe Storms & Flooding, September 25, 1984
FEMA-DR-1095 – Severe Storms and Flooding, January 19 – 30, 1996
FEMA-DR-1335 – Severe Storms and Flooding, May 3 – August 12, 2000
FEMA-DR-1486 – Severe Storms, Flooding, and Tornadoes, July 21 – August 13, 2003
FEMA-DR-1534 – Severe Storms and Flooding, May 13 – June 17, 2004
FEMA-DR-1993 – Severe Storms, Flooding, Tornadoes, and Straight-Line Winds, April 26 – May 8, 2011
FEMA-DR-4180-Severe Storms and Flooding, May 13 – 22, 2014
Based on the history of flooding and its impacts on Yates County and input from the Steering Committee and Planning Partnership, flooding has been identified as a hazard of concern for the County.</td></tr>
<tr><td>Hail</td><td>Yes</td><td>Yes</td><td>The Steering Committee and Planning Partnership elected to group this hazard into the “Severe Storm” profile.</td></tr>
<tr><td>Harmful Algal Bloom</td><td>Yes</td><td>Yes</td><td>The 2023 NYS HMP does not identify harmful algal blooms as a hazard of concern for New York State.
The population of Yates County has significant exposure to harmful algal bloom. There are over 70 miles of shoreline from Keuka Lake, Seneca Lake, and Canandaigua Lake in Yates County. These three lakes have experienced documented harmful algal blooms in recent years. Residents who rely on water intake for drinking water are most exposed to the impacts of harmful algal bloom.
According to the NYSDEC harmful algal bloom testing results from Keuka Lake, Seneca Lake, and Canandaigua Lake confirmed toxins were present in quantities to potentially cause health effects if people or animals come in contact with the water.</td></tr>
</table>

Hazard	In Yates County: May Occur	In Yates County: Poses Significant Threat	Why was this determination made?
Hazardous Materials	Yes	Yes	• The 2023 NYS HMP does not identify hazardous materials as a hazard of concern for New York State. • There are major roadways and railways in Yates County that may carry hazardous materials throughout the County. • The NYSDEC Spill Incidents Database lists 368 spill incidents throughout the County from January 1, 2000, through April 19, 2018, with an average of 21 incidents per year. • Based on input from the Steering and Planning Committees and the history of events and losses, hazardous material incidents were identified as a hazard of concern for Yates County.
Hurricane (tropical cyclones, including tropical storms and tropical depressions)	Yes	Yes	• The Steering Committee and Planning Partnership elected to group this hazard into the “Severe Storm” profile.
Ice Jams	Yes	Yes	• The Steering Committee and Planning Partnership elected to group this hazard into the “Flood” profile.
Ice Storm	Yes	Yes	• The Steering Committee and Planning Partnership elected to group this hazard into the “Winter Storm” profile.
Land Subsidence	No	No	• The 2023 NYS HMP indicates New York State is vulnerable to land subsidence. In general, moderate to low land subsidence susceptibility exists for New York State; however, the NYS HMP states that this hazard has a very low risk to population or property. • NYS HMP does not identify Yates County as a community that has experienced land subsidence in the past. • The Steering Committee and Planning Partnership did not identify land subsidence as a hazard of concern for Yates County.
Landslide	Yes	Yes	• The 2023 NYS HMP includes landslide as a hazard of concern for New York State. • Between 1954 and 2022, New York State was included in one landslide-related disaster declaration, which did not include Yates County. • Based on previous occurrences and input from the Steering Committee and Planning Partnership, the landslide hazard was identified as a hazard of concern for Yates County.
Lightning	Yes	Yes	• The Steering Committee and Planning Partnership elected to group this hazard into the “Severe Storm” profile.

Hazard	In Yates County		Why was this determination made?
	May Occur	Poses Significant Threat	

Severe Storm (windstorm, thunderstorm, hail, and tornado)	Yes	Yes	• The 2023 NYS HMP identifies severe storm as a hazard of concern for New York State. The state HMP profiled storm-related hazards in individual sections: lightning, hail, tornadoes, high winds, and hurricanes/tropical storms.
			• Between 1954 and 2022, Yates County was included in four FEMA severe storm-related declarations.
			  ◦ FEMA DR-1335; May 3 – August 12, 2000; New York Severe Storms and Flooding
			  ◦ FEMA DR-1486; July 21 – August 13, 2003; New York Severe Storms and Flooding
			  ◦ FEMA DR-1534; May 13 – June 17, 2004; New York Severe Storms and Flooding
			  ◦ FEMA DR-4180; May 13 – May 22, 2014; New York Severe Storms and Flooding
			• Based on previous occurrences and input from the Steering Committee and Planning Partnership, severe storms are identified as a hazard of concern for Yates County. For the Yates County HMP, the related hazards were combined into one profile.

Snowstorm	Yes	Yes	• The Steering Committee and Planning Partnership elected to group this hazard into the "Winter Storm" profile.
Tornado	Yes	Yes	• The Steering Committee and Planning Partnership elected to group this hazard into the "Severe Storm" profile.
Transportation Accidents	Yes	Yes	• The 2023 NYS HMP does not identify transportation accidents as a hazard of concern for New York State. • There are over 820 miles of roadway in Yates County. Transportation accidents can occur at any point along the roadways. The Finger Lakes Railway Corporation provides rail service along the eastern side of the County and connects with CSX, Norfolk Southern, Canadian Pacific, and New York Susquehanna & Western Railroad. A railway accident could occur anywhere along these rail lines. Also, there are three airports in the County, and all have potential for an accident occurring at any given time. • Based on input from the Steering and Planning Committees, transportation accidents were identified as a hazard of concern for Yates County.
Utility Failure	Yes	Yes	• Utility failure is not identified as its own hazard of concern in the 2023 NYS HMP. • Yates County experiences utility failures (generally power outages) several times each year. These failures are usually due to severe storms or winter storms that affect the county. • Based on previous occurrences and input from the Steering Committee and Planning Partnership, utility failure is identified as a hazard of concern for Yates County.

	In Yates County		
Hazard	**May Occur**	**Poses Significant Threat**	**Why was this determination made?**
Wildfire	Yes	No	• The 2023 NYS HMP identifies wildfire as a hazard of concern for New York State. • Yates County was not included in any FEMA wildfire-related disaster declarations. • Wildfires have occurred within Yates County. • Based on available data and the nature of the county, the Steering Committee and Planning Partnership did not identify wildfire as a hazard of concern.
Wind	Yes	Yes	• The Steering Committee and Planning Partnership elected to group this hazard into the "Severe Storm" profile.

Winter Storm (heavy snow, blizzards, ice storms)	Yes	Yes	• The 2023 NYS HMP identifies ice storms and snowstorms as hazards of concern for New York State. According to the 2023 NYS HMP, Yates County has experienced six ice storm events and incurred $2 million in damage.
			• FEMA included Yates County in three snowstorm/ice storm-related disaster declarations:
			  ◦ FEMA DR-898; March 3 – 4, 1990; New York Severe Storm, Winter Storm
			  ◦ FEMA EM-3107; March 13 – 17; New York Severe Blizzard
			  ◦ FEMA DR-1467; April 3 – 5, 2003; New York Ice Storm
			• Based on previous occurrences and input from the Steering Committee and Planning Partnership, winter storms are identified as a hazard of concern for Yates County.

Note: DR = Federal Disaster Declaration Number; EM = Federal Disaster Emergency Number; FEMA = Federal Emergency Management Agency; NYSDEC = New York State Department of Environmental Conservation; NYS HMP = New York State Hazard Mitigation Plan; USDA = U.S. Department of Agriculture; USGS = U.S. Geologic Survey

5.1 SUMMARY OF HAZARDS OF CONCERN

Based on the review of potential hazards of concern, 12 hazards of concern were identified as significant hazards affecting the entire County, to be addressed at the County level in this plan (shown here in alphabetical order):

- Dam failure
- Disease outbreak
- Drought
- Extreme temperature
- Flood
- Harmful algal blooms
- Hazardous materials
- Landslide
- Severe storm
- Transportation accidents
- Utility failure
- Winter storm

Other natural and human-caused hazards of concern have occurred within Yates County, but have a low potential to occur, are addressed by other planning mechanisms, and/or do not result in significant impacts within the County. Therefore, these hazards are not addressed in this update. If deemed necessary by the County, these hazards may be considered in future plan updates.

5.2 HAZARD GROUPINGS

The Steering Committee approved use of the following hazard event groupings:

- The dam failure hazard profile includes the description, location, extent, previous occurrences and losses, probability of future occurrences, impact of climate change, and vulnerability assessment for the hazards posed by dams in Yates County.
- The drought hazard profile includes meteorological, agricultural, hydrological, and socioeconomic droughts.
- The disease outbreak hazard profile includes the description, extent, previous occurrences and probability of future occurrences of influenza, West Nile Virus, Lyme disease, and coronavirus.
- The extreme temperature hazard includes both heat and cold events, which can have a significant impact on human health, commercial/agricultural businesses, and primary and secondary effects on infrastructure.
- The flood hazard includes riverine flooding, lakeshore flooding, flash flooding, shallow flooding, ice jam flooding, and urban drainage flooding. Inclusion of the various forms of flooding under a general flood hazard is consistent with FEMA guidance and the NYS HMP.
- The harmful algal bloom hazard includes the blooms that are made up of phytoplankton that naturally produces bio-toxins that are harmful to the resident population. This includes eutrophication, fish die-offs and human sickness when affected organisms are consumed.
- The hazardous materials profile includes materials and wastes that are considered severely harmful to human health and the environment, as defined by the U.S. Environmental Protection Agency (EPA) Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) (also known as Superfund). Both fixed-site and transportation-related releases are considered in this profile.
- The landslide hazard includes rock falls, rock topples, rotational slump, transitional slide, earth flows, creep, block slides, debris avalanche, and debris flows.
- The severe storm hazard includes windstorms that often entail a variety of other influencing weather conditions, including thunderstorms, hail, lightning, and tornadoes. Tropical

disturbances (hurricanes, tropical storms, and tropical depressions) are identified as a type of severe storm.

- The transportation accident hazard is composed of car, rail, and air accidents that impact people and the environment that surrounds them.
- The utility failure hazard is composed of all power/cellular failures and pipe breaks/leaks that occur and impact continuity of operations.
- The winter storm hazard includes blizzards, ice storms, snowstorms, sleet, and freezing rain.

These groupings are the same as those provided by FEMA (FEMA 2001, FEMA 2023d) and take into consideration the hazard grouping in the NYS HMP.

6. DAM FAILURE

6.1 HAZARD PROFILE

6.1.1 Hazard Description

A dam is an artificial barrier allowing storage of water, wastewater, or liquid-borne materials for many reasons (flood control, human water supply, irrigation, livestock water supply, energy generation, containment of mine tailings, recreation, or pollution control). Many dams fulfill a combination of functions (ASDSO 2022).

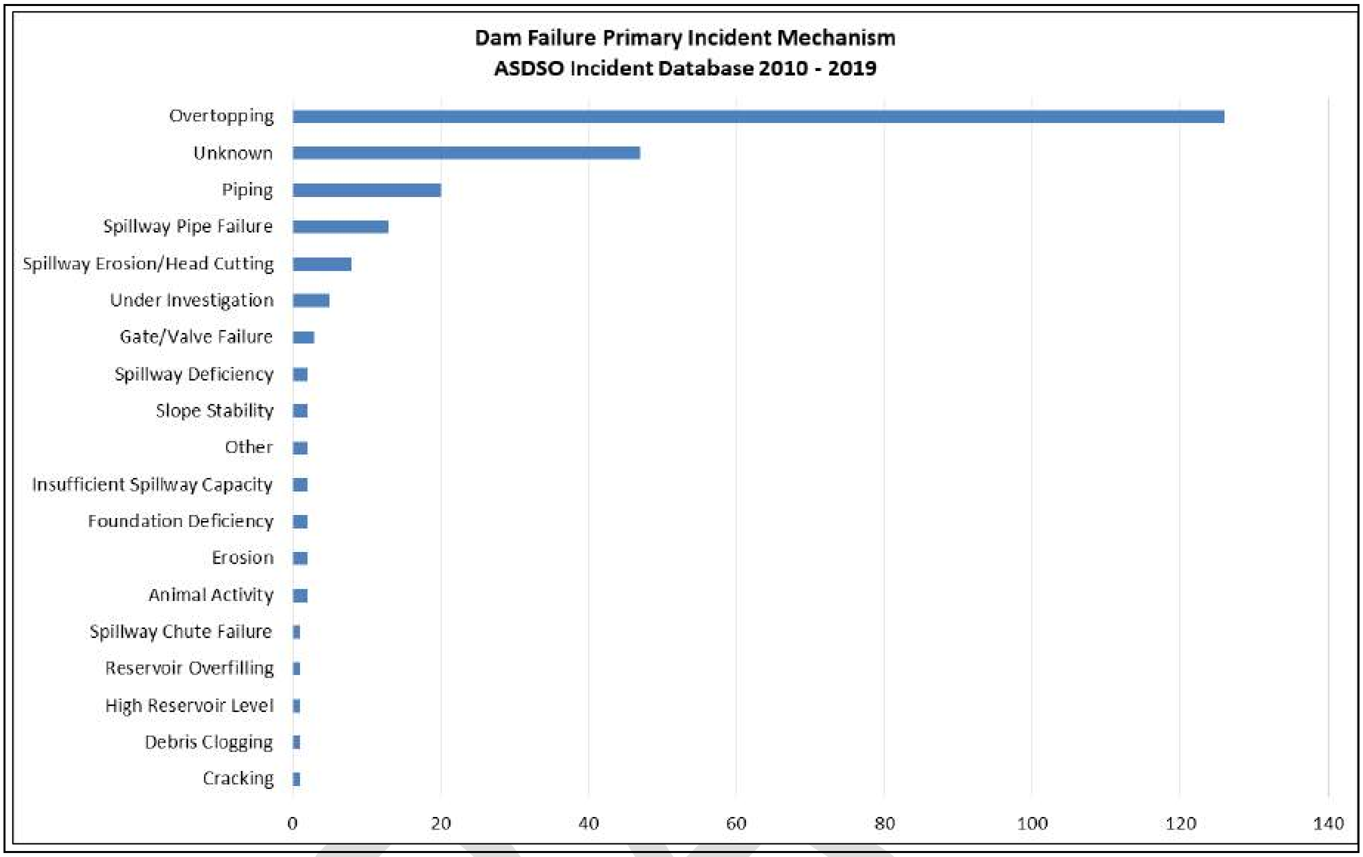
Human-built dams can be classified according to type of construction material used, methods applied in construction, slope, or cross-section of the dam, how a dam resists forces of water pressure behind it, means used to control seepage, and occasionally, purpose of the dam. Materials used for construction of dams include earth, rock, tailings from mining or milling, concrete, masonry, steel, and timber (ASDSO 2022).

Dams typically fail when spillway capacity is inadequate and excess flow overtops the dam or when internal erosion occurs through the dam or its foundation. Complete failure occurs if internal erosion or overtopping results in a complete structural breach, releasing a high-velocity wall of debris-filled water that rushes downstream, damaging anything in its path. Dam failures can result from the following scenarios (FEMA 2018a):

- Overtopping caused by floods that exceed capacity of the dam
- Deliberate acts of sabotage
- Structural failure of materials used in dam construction
- Movement or failure of the foundation supporting the dam
- Settling and cracking of concrete or embankment dams
- Internal erosion of soil in embankment dams
- Inadequate maintenance and upkeep

Dam failures can occur suddenly and without warning during normal operating conditions or during a large storm or seismic event. Significant rainfall can quickly inundate an area and cause floodwaters to overwhelm a reservoir. If the spillway of the dam cannot safely pass the resulting flows, water will begin flowing in areas not designed for such flows, and a failure may occur. Figure 6-1 indicates the primary causes of dam failures nationally.

Figure 6-1. Dam Failure Causes



Source: (ASDSO n.d.)

Regulatory Oversight of Dams and Funding

New York State Department of Environmental Conservation

New York State dam safety regulations are established under the state codes, rules, and regulations for the New York State Department of Environmental Conservation's (NYSDEC) Division of Water Resources (N.Y. Comp. Codes R. & Regs. Tit. 6 Part 673).

The NYSDEC Dam Safety Section is responsible for safety inspection of dams, technical review of proposed dam construction or modification, monitoring of remedial work for compliance with dam safety criteria, and emergency preparedness for all dams in the state. NYSDEC is responsible for more than 100 flood control projects throughout the state, most of which were constructed by the U.S. Army Corps of Engineers (USACE) and are operated and maintained by NYSDEC (in some cases with local municipal partners) (NYSDEC 2014).

The state inspects high hazard dams every two years and moderate hazard dams every four years. To support emergency planning efforts and raise awareness among local officials and emergency managers, a copy of each inspection report is sent to the chief executive of the community in which the dam is located. Municipal officials or emergency managers from any municipality in the dam's inundation area may receive a copy of the inspection report upon request (NYSDEC 2023).

NYSDEC regulates dam safety and emergency action plans (EAPs) for all dams in New York. EAPs are formal dam failure procedures written by the dam owner/operator. They are site-specific plans that outline the facility's procedures to prevent/mitigate occurrence of a catastrophic dam failure. USACE is responsible for submitting an EAP for each dam it owns, operates, and maintains. EAPs for hydroelectric dams fall under the purview of the Federal Energy Regulatory Commission (FERC).

U.S. Army Corps of Engineers Dam Safety Program

USACE is responsible for safety inspections of some federal and non-federal dams that meet the size and storage limitations specified in the National Dam Safety Act (Public Law 92-367). USACE has inventoried dams and has surveyed each state's and federal agency's capabilities, practices, and regulations regarding design, construction, operation, and maintenance of the dams. USACE has also developed guidelines for inspection and evaluation of dam safety (USACE 2014).

Federal Energy Regulatory Commission Dam Safety Program

FERC has the largest dam safety program in the United States (18 CFR Part 12). FERC cooperates with federal and state agencies to ensure and promote dam safety and homeland security. FERC staff inspect hydroelectric projects on an unscheduled basis to investigate the following (FERC 2022):

- Potential dam safety problems
- Complaints about constructing and operating a project
- Safety concerns related to natural disasters
- Issues concerning compliance with terms and conditions of a license

Every five years, an independent FERC-approved consulting engineer must inspect and evaluate projects with dams higher than 32.8 feet (10 meters) or with total storage capacity of more than 2,000 acre-feet (FERC 2022).

FERC monitors seismic research in areas where seismic activity is a concern. This information is applied to analyze structures of hydroelectric projects within these areas. FERC staff also evaluates effects of potential and actual large floods on safety of dams. FERC staff visit dams and licensed projects during and after floods, assess extents of damage, and direct any studies or remedial measures the licensee must undertake. FERC's *Engineering Guidelines for the Evaluation of Hydropower Projects* guides FERC engineering staff and licensees in evaluations of dam safety. The publication is frequently revised to reflect current information and methodologies (FERC 2017).

FERC requires licensees to prepare EAPs and conducts training sessions on developing and testing these plans. The plans outline an early warning system in the event of an actual or potential sudden release of water from a dam failure. The plans include operational procedures that may be implemented during regulatory measures, such as reducing reservoir levels and downstream flows, as well as procedures for notifying affected residents and agencies responsible for emergency management. These plans are frequently updated and tested to ensure that all applicable parties are informed of the proper procedures in emergencies (FERC 2017).

FEMA Dam Safety Program

FEMA's National Dam Safety Program is a partnership among states, federal agencies, and other stakeholders that encourages individual and community responsibility for dam safety. Under this program, states are responsible for regulating non-federal dams. The guidelines provide information for federal and state agencies, local governments, dam owners, and emergency management officials to use for reducing flood hazards and the resulting potential for economic damage and loss of life. It is a resource for developing state-specific guidelines for dam safety and as a reference manual for mapping dam breach inundation zones (FEMA 2013a).

Funding through this program allows all participating states to improve their programs through increased inspections, emergency action planning, and purchase of needed equipment. FEMA has expanded existing training programs and initiated new training programs (FEMA 2022a). Grant assistance from FEMA provides support for improvement of dam safety programs that regulate most dams in the United States (FEMA 2023c).

6.1.2 Location

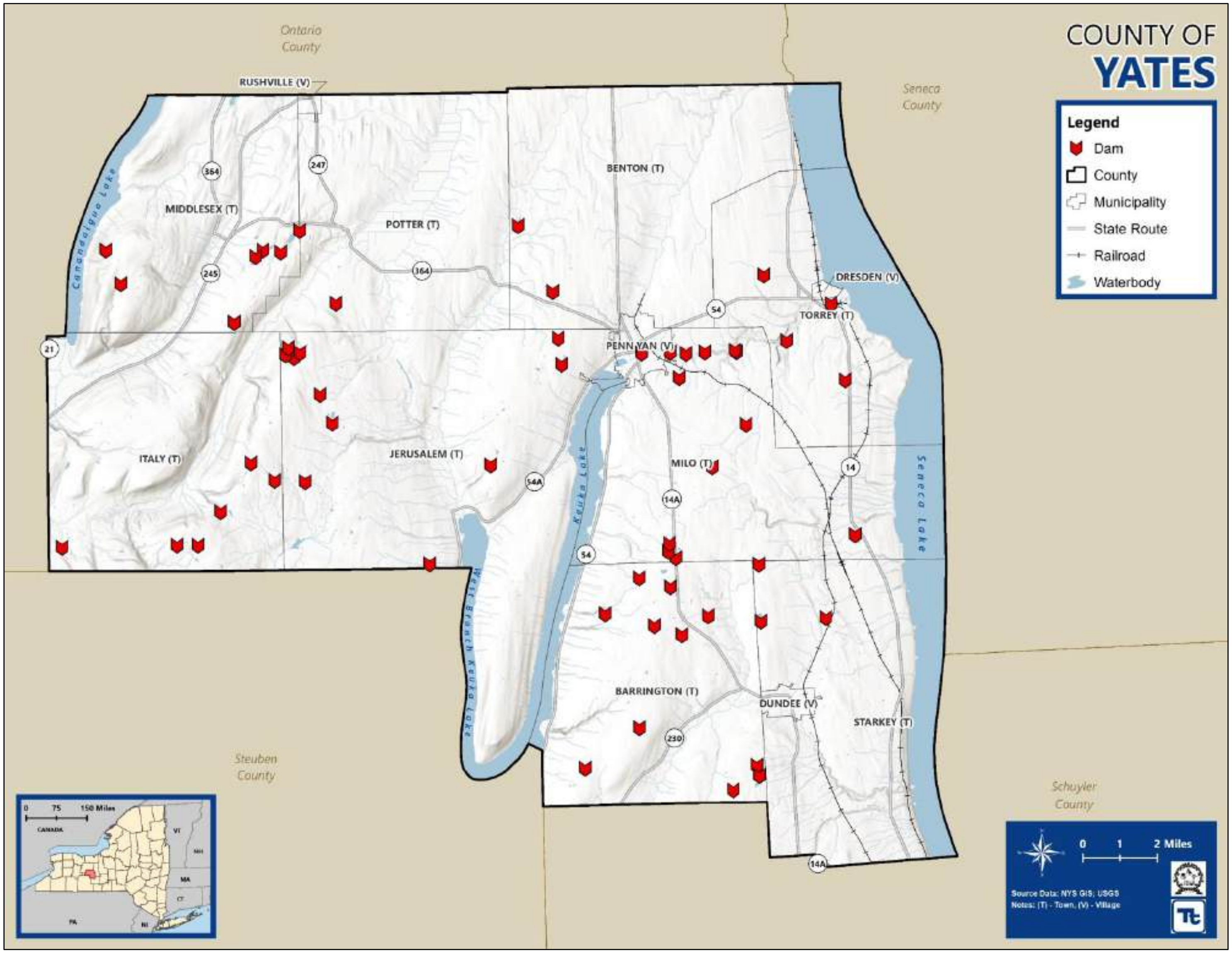
According to NYSDEC, there are 57 dams in Yates County, including 41 undesignated dams, 13 low hazard dams, two intermediate hazard dams, and one high hazard dams (NYSDEC 2024). High hazard dams are required to develop emergency action plans. Dams with hazard classification are listed in Table 6-1. Figure 6-2 shows all Yates County dam locations.

Table 6-1. Dams by Hazard Classification per Jurisdiction in Yates County

	Dam Name	Waterbody	Hazard Potential Classification
Keuka Lake Outlet Dam	Village of Penn Yan	Keuka Lake Outlet	High
Emerson Produce Reservoir Dam & Dike	Town of Middlesex	Tributary of West River	Intermediate
Emerson Produce Reservoir Dike	Town of Middlesex	Tributary of West River	Intermediate
Edward Bauer Dam	Town of Barrington	Tributary of Keuka Lake	Low
Frank Meeks & Son Dam	Town of Barrington	Chubb Hollow Creek	Low
George Bossard Dam	Town of Barrington	Tributary of Big Stream Creek	Low
Lamont Campbell Pond Dam	Town of Barrington	Tributary of Chub Hollow Creek	Low
Grant Pealer Pond Dam	Town of Benton	Tributary of Ugar Creek	Low
M S Abbey & Paul Emerson Dam	Town of Middlesex	Tributary of Flint Creek	Low
Sanford C Emerson Rec Pond Dams A & B	Town of Middlesex	Tributary of Flint Creek	Low
Stuart Mitchell Pond Dam	Town of Middlesex	Tributary of West River	Low
Whaleback Dam	Town of Middlesex	-	Low
Barney A Moravec Pond Dam	Town of Milo	Tributary of Keuka Lake Outlet	Low
Morton Salt Lagoon #3 Dam	Town of Milo	Tributary of Plum Point Creek	Low
Robert Angle Recreational Pond Dam	Town of Starkey	Tributary of Big Stream Creek	Low
Cascade Mills Dam	Town of Torrey	Keuka Lake Outlet	Low

Source: NYSDEC 2024

Figure 6-2. Dams in Yates County



6.1.3 Extent

Several state and federal agencies assign ratings to dams based on the potential consequences of the dam's failure. These ratings represent the hazard extent for dam failure. Three such rating systems are described in the sections below. All of these classifications are based on the consequences of dam failure, not the likelihood of failure occurring.

New York State Department of Environmental Conservation

The NYSDEC hazard classification of a dam is based on the potential for downstream damage if the dam were to fail (NYSDEC 2009):

- *Low Hazard (Class A)* is a dam located in an area where failure will damage only isolated buildings, undeveloped lands, or township or county roads and/or will cause no significant economic loss or serious environmental damage. Failure or mis-operation would result in no probable loss of human life. Losses are principally limited to the owner's property.
- *Intermediate Hazard (Class B)* is a dam located in an area where failure may damage isolated homes, main highways, minor railroads, interrupt the use of relatively important public utilities, and/or will cause significant economic loss or serious environmental damage. Failure or mis-operation would result in no probable loss of human life, but can cause economic loss, environment damage, disruption of lifeline facilities, or impact other concerns. These dams are often located in predominantly rural or agricultural areas but could be located in areas with population and significant infrastructure.
- *High Hazard (Class C)* is a dam located in an area where failure may cause loss of human life, serious damage to homes, industrial or commercial buildings, important public utilities, main highways or railroads and/or will cause extensive economic loss. This is a classification for dams in which excessive economic loss (in an area with extensive urban community, industry, agriculture, or natural resources) would occur as a direct result of dam failure.
- *Negligible or No Hazard (Class D)* is a dam that has been breached or removed, has failed or otherwise no longer materially impounds waters, or was planned but never constructed. Class "D" dams are defunct dams posing negligible or no hazard. NYSDEC may retain pertinent records regarding such dams.

Federal Emergency Management Agency

FEMA uses the following classification levels for dam hazard potential (FEMA 2021):

- Low-hazard potential dams are those where failure or mis-operation would result in no probable loss of human life and low economic or environmental losses. Losses are principally limited to the owner's property.

- Significant-hazard potential dams are those where failure or mis-operation would result in no probable loss of human life but could cause economic loss, environmental damage, or disruption of lifeline facilities. Significant-hazard potential dams are often located in predominantly rural or agricultural areas.
- High-hazard potential dams are those where failure or mis-operation will probably cause loss of human life.

U.S. Army Corps of Engineers

Table 6-2 lists USACE-developed classifications of hazard potentials of dam failures, based on potential consequences of a dam failure.

Table 6-2. Dam Hazard Classification

Hazard Category[a]	Direct Loss of Life[b]	Lifeline Losses[c]	Property Losses[d]	Environmental Losses[e]
Low	None (rural location, no permanent structures for human habitation)	No disruption of services (cosmetic or rapidly repairable damage)	Private agricultural lands, equipment, and isolated buildings	Minimal incremental damage
Significant	Low probability (rural location, only transient or day-use facilities)	Disruption of essential facilities and access	Major public and private facilities	Major mitigation required
High	Certain (one or more) extensive residential, commercial, or industrial development	Disruption of essential facilities and access	Extensive public and private facilities	Extensive mitigation cost or impossible to mitigate

Source: USACE 2016

a. Categories are assigned to overall projects, not individual structures at a project.

b. Loss-of-life potential is based on inundation mapping of area downstream of the project. Analysis of loss-of-life potential should consider the population at risk, time of flood wave travel, and warning time.

c. Lifeline losses include indirect threats to life caused by the interruption of lifeline services from project failure or operational disruption: for example, loss of critical medical facilities or access to them.

d. Property losses include damage to project facilities and downstream property and indirect impact from loss of project services, such as impact from loss of a dam and navigation pool, or impact from loss of water or power supply.

e. Environmental impacts downstream caused by the incremental flood wave produced by the project failure, beyond what would normally be expected for the magnitude flood event under which the failure occurs.

6.1.4 Previous Occurrences

Federal Major Disaster and Emergency Declarations

Yates County has not been included in any major disaster (DR) or emergency (EM) declarations for dam failure-related events (FEMA 2023b).

U.S. Department of Agriculture Declarations

Since the previous Yates County HMP, the County has not been included in any USDA declarations issued for dam failure-related events (USDA 2024).

6.1.4.1 Previous Events

There are no known dam failure-related events that impacted Yates County between October 2018 and December 2023 (ASDSO 2024, Stanford University 2023). For events prior to 2018, refer to the previous Yates County HMP.

6.1.5 Probability of Future Occurrences

Probability Based on Past Events

Information on previous dam failure occurrences in the County was used to calculate the probability of future occurrence of such events, as summarized in Table 6-3. Based on historical records and input from the Steering Committee, the probability of occurrence for dam failure-related events in the County is considered "occasional."

Table 6-3. Probability of Future Dam Failure Events in Yates County

Hazard Type	Number of Occurrences Between 1868[a] and 2023	Percent Chance of Occurring in Any Given Year
Dam Failure	0	0.00%

Source: ASDSO 2024; Stanford University 2023

Note: Available records may not include all actual occurrences. Counts in this table may underestimate actual probability.

a. 1868 is the oldest reported dam incident in New York State in the Stanford University National Performance of Dams Program Dam Incident Database.

Potential Effect of Climate Change on Hazard Probability

Projections of climate change for New York State and for the Central/Finger Lakes region that includes Yates County are summarized in Section 3.5.4. Dams are designed partly based on assumptions about a river's flow behavior, expressed as hydrographs. Changes in weather patterns can have significant effects on the hydrograph used for the design of a dam. If the hygrograph changes, it is conceivable that the dam can lose some of its designed margin of safety. Loss of designed margin of safety may cause floodwaters more readily to overtop the dam or create unintended loads. Such situations could lead to a dam failure.

Warming atmospheric temperatures influence ocean temperatures. With the projected increase in temperature, it is anticipated that ocean waters will increase as well, causing ice sheets and glaciers to melt, increasing the level of the ocean's waters. With an increase in water, the inundation area of a dam failure may increase, causing damage further than originally anticipated.

6.1.6 Cascading Impacts on Other Hazards

Dam failure can cause severe downstream flooding, depending on the magnitude of the failure. Other potential secondary hazards of dam failure are landslides around the reservoir perimeter, bank erosion on the rivers, and destruction of downstream habitat (FEMA 2013). Dam failure events are frequently associated with other natural hazard events such as earthquakes, landslides, or severe weather, which limits their predictability and compounds the hazard.

6.2 VULNERABILITY AND IMPACT ASSESSMENT

The dam failure hazard is of significance to Yates County because there are two intermediate-hazard dams in the county and one high-hazard dam. (Table 6-1) (USACE 2023). Dam failure inundation maps and downstream hazard areas are considered sensitive information and are not made available in this HMP. To assess the County's risk from dam failure, a qualitative review was implemented.

6.2.1 Life, Health, and Safety

Overall Population

Dam failure may mimic flood events, depending on the size of the dam reservoir and breach. it can cause, in the most extreme case, loss of life or physical injury. It can cause persons to become displaced if flooding of structures occurs.

Dam failure impacts depend on the severity of the event and whether advance warning is possible. People living in or near the inundation areas are most vulnerable to the hazard. Other vulnerable populations include people traveling in inundated areas, or anyone whose access to emergency services is compromised during an event. The degree of impact varies and is not strictly measurable.

Socially Vulnerable Population

Vulnerable populations, while they may not have more exposure to the dam failure hazard, can experience exacerbated impacts from a dam failure and prolonged recovery after the event due to their physical and financial ability to react or respond. The most vulnerable include the economically disadvantaged and the population over age 65. Economically disadvantaged populations may be more vulnerable if they lack the financial resources to evacuate. The population over age 65 is more vulnerable because they are more likely to need medical attention that may not be available due to isolation during a dam failure event. They also may have more difficulty evacuating.

Table 3-5 shows social vulnerability statistics for Yates County and participating municipalities from the ACS 5-year estimates. Table 3-6 shows low-income populations based on United for ALICE data. The municipalities with the highest and lowest numbers and percentages in each social vulnerability category are listed in Table 6-4.

Table 6-4. Municipalities With Highest and Lowest Socially Vulnerable Populations

Category	Municipality Highest in Category		Municipality Lowest in Category	
	Number	Percent	Number	Percent
Population Over 65	Penn Yan (V): **1,367**	Penn Yan (V): **27.0%**	Dresden (V): **54**	Potter (T): **12.1%**
Population Under 5	Jerusalem (T): **306**	Dresden (V): **9.9%**	Starkey (T): **1**	Starkey (T): **0.1%**
Non-English-Speaking Population	Benton (T): **89**	Potter (T): **7.0%**	Dundee (V), Rushville (V), Starkey (T): **0**	Dundee (V), Rushville (V), Starkey (T): **0.0%**
Population With Disability	Penn Yan (V): **789**	Dundee (V): **18.9%**	Potter (T): **12**	Potter (T): **1.0%**
Population Below Poverty Level	Penn Yan (V): **776**	Dundee (V): **27.6%**	Rushville (V): **30**	Rushville (V): **4.6%**
Households Below ALICE Threshold	—	Italy (T): **58%**	—	Barrington (T): **33%**

6.2.2 General Building Stock

All buildings in the dam failure inundation zone are vulnerable to dam failure. Property closest to the dam inundation area has the greatest potential to experience the largest, most destructive surge of water. Widespread damage to buildings affected by an event would result in large costs to repair these locations.

6.2.3 Community Lifelines and Other Critical Facilities

Dam failure may impact critical facilities and infrastructure in the inundation zone. Dam failure can cut evacuation routes, limit emergency access, and create isolation issues. Widespread damage to infrastructure affected by an event would result in large costs to repair these locations. Utilities such as overhead power lines, cable and phone lines could also be vulnerable. Loss of these utilities could create additional isolation issues for people in the inundation areas.

Flood waters can back up sanitary sewer systems and inundate wastewater treatment plants, causing raw sewage to contaminate residential and commercial buildings and the flooding waterway. Water supplies and wastewater treatment could be off-line for weeks.

6.2.4 Economy

Dam failure events can significantly impact the local and regional economy. Businesses can be closed while flood waters retreat and utilities are returned to a functioning state. Other impacts include tax loss associated with general building stock damage, impacts on utilities and infrastructure, and impacts on tourism. In areas that are directly flooded, renovations of commercial and industrial buildings may be necessary, disrupting associated services.

6.2.5 Natural, Historic and Cultural Resources

Natural

The environment is vulnerable to several risks in the event of a dam failure. Water releases from dams can lead to scouring of riverbeds and banks. The inundation may introduce foreign elements into local waterways, resulting in destruction of downstream habitat and impacting animal and plant species, especially endangered species. The subsequent rush of water downstream can rapidly increase flow rate and turbidity of streams and rivers in minor dam failures or overwhelm terrestrial habitat with floodwaters in severe dam failure events.

Dam failures can often result in the release of hazardous materials, swept up in floodwaters or accumulated in sediment that is contained behind the dam as is often the case in areas that have had mining activities take place upstream. The contents of unsecured containers of oil, fertilizers, pesticides, and other chemicals get added to flood waters. After the flood waters subside, contaminated and flood damaged building materials and contents must be properly disposed. Contaminated sediment must be removed from buildings, yards, and properties.

Historic

Historic buildings and structures, sites, monuments, districts, and historic documents are often irreplaceable, and may become damaged or destroyed in the flood waters following a dam failure.

Cultural

Cultural resources include “moveable heritage,” such as collections of artifacts, statuary, artwork, and important documents or repositories. These resources are housed in libraries, museums, archives, historical repositories, or historic properties. Flood waters following a dam failure create the largest risk to these resources.

6.3 CHANGE OF VULNERABILITY SINCE 2020 HMP

Overall, Yates County remains vulnerable to the dam failure hazard. To estimate losses to these elements in the future, dam inundation areas and depths of flooding may be used to generate depth grids and better analyze vulnerability. Hazus could be used to estimate potential losses. Inspections of dams may inform the status of each dam and maintenance and mitigation measures that may be needed.

6.4 FUTURE CHANGES THAT MAY AFFECT RISK

6.4.1 Potential or Planned Development

Chapter 3 identifies areas targeted for future growth and development across the County. Any areas of growth located in the inundation zone could be impacted by dam failure.

6.4.2 Projected Changes in Population

Yates County has experienced a decrease in its population since 2010. According to the U.S. Census Bureau, the County's population decreased by 2.3 percent between 2010 and 2020 (Census 2020). Cornell University's Program on Applied Demographics projects that Yates County will have a population of 24,706 by 2030 and 24,857 by 2040 (Cornell University 2018).

Any changes in the density of population can impact the number of persons exposed to the dam failure inundation hazard areas. Higher density can not only create issues for local residents during evacuation of a dam failure event but also have an effect on commuters that travel into and out of the County for work. Chapter 3 provides more information about population trends in the County.

6.4.3 Climate Change

Yates County is expected to experience increased precipitation and more frequent, intense storms. Excessive rainfall often causes a dam to overflow since these structures are designed partly based on assumptions about river flow and precipitation patterns. More frequent and intense precipitation lead to more intense dam overtopping, potentially affecting a larger area and producing stronger water velocities that exacerbate damage to general building stock and critical facilities.

7. DISEASE OUTBREAK

7.1 HAZARD PROFILE

7.1.1 Hazard Description

A pandemic is a global outbreak of disease that occurs when a new virus emerges in the human population, spreading easily in a sustained manner, and causing serious illness. An epidemic is a smaller-scale infectious outbreak, within a region or population, that emerges at a disproportional rate. Infectious disease outbreaks impact large numbers of people, may be widely dispersed geographically, and can arrive in waves lasting several months at a time (Columbia University 2021).

For the purposes of this hazard mitigation plan update, the following infectious diseases are discussed in detail: influenza, West Nile Virus (WNV), Lyme disease, and coronavirus.

Influenza

Influenza (flu) is a contagious virus that affects the nose, throat, lungs, and other parts of the body. It can quickly spread from one person to another, causing mild to severe illness and can lead to death. Symptoms include fever, cough, sore throat, runny or stuffy nose, muscle or body aches, headache, and tiredness (NYSDOH 2021).

Pandemic influenza differs from seasonal influenza. Seasonal influenza is caused by viruses already living amongst people, happens annually, and usually peaks between December and February. Pandemic influenza is a global outbreak of a new influenza virus, which can infect people easily and spread from person to person in an efficient and sustained manner (CDC 2020). Pandemic influenza does not occur as regularly as seasonal influenza.

The risk of a global influenza pandemic has increased in recent years. This type of disease can claim thousands of lives and adversely affect critical infrastructure and key resources. An influenza pandemic can reduce the health, safety, and welfare of the essential services workforce; immobilize core infrastructure and induce fiscal instability.

West Nile Virus

West Nile Virus (WNV) is the leading cause of mosquito-borne disease in the United States. It is mostly spread to people who are bitten by an infected mosquito. WNV is usually diagnosed during mosquito season, starting in the summer and continuing through the fall (CDC 2021). WNV was first found in the State of New York in 1999. Between 2000 and 2017, 490 human cases and 37 deaths of WNV were reported statewide (NYS DOH 2017). When WNV progresses to severe infection it is called West Nile encephalitis or meningitis, which can include headache, high fever, neck stiffness, muscle weakness, stupor, disorientation, tremors, seizures, paralysis, and coma. WNV can cause serious illness, and in some cases, death. Usually, symptoms occur from three to 14 days after being bitten by an infected mosquito (NYS DOH 2017).

Lyme Disease

Lyme disease is the most common vector-borne disease in the United States (vectors are living sources such as mosquitoes, ticks, and fleas that spread pathogens). This disease is caused when an individual is bitten by a tick carrying a specific bacterium (*Borrelia burgdorferi* or *Borrelia mayoni)*. Typical symptoms include fever, headache, fatigue, and skin rash. If left untreated, symptoms can be severe. Most cases of Lyme disease can be treated successfully with a few weeks of antibiotics. Steps to prevent Lyme disease include using insect repellent, removing ticks promptly, applying pesticides, and reducing tick habitat (CDC 2022). In New York, the commonly infected tick is the deer tick. Immature ticks become infected by feeding on infected white-footed mice and other small mammals. Anyone who is bitten by a tick carrying the bacteria can become infected (NYS DOH 2019).

Coronavirus

Coronaviruses are a type of virus spread through droplets and virus particles released into the air when an infected person breathes, talks, laughs, sings, coughs, or sneezes. Larger droplets may fall to the ground in a few seconds, but tiny infectious particles can linger in the air and accumulate in indoor places, especially where many people are gathered and there is poor ventilation (John Hopkins University 2022).

COVID-19 is an infectious coronavirus disease first identified in 2019. The virus rapidly spread into a global pandemic by spring of 2020. Older people, and those with underlying medical problems such as cardiovascular disease, diabetes, chronic respiratory disease, and cancer are more likely to develop serious illnesses (WHO 2022). The COVID-19 virus spreads primarily through droplets of saliva or discharge from the nose when an infected person coughs or sneezes.

Reported illnesses have ranged from mild symptoms to severe illness and death. Reported symptoms include difficulty breathing and shortness of breath, fever or chills, cough, fatigue, muscle or body aches, loss of smell or taste, sore throat, congestion, and nausea or vomiting. Emergency symptoms that require immediate medical attention include trouble breathing, persistent pain or pressure in the chest, confusion, or inability to wake or stay awake, and bluish lips or face. Symptoms may appear two to 14 days after exposure to the virus (CDC 2021).

7.1.2 Location

Disease outbreaks can occur throughout Yates County without regard for location.

7.1.3 Extent

The magnitude of disease outbreaks ranges from nuisance to widespread, depending on how easily the illness is spread, the mode of transmission, and the amount of contact between infected and uninfected individuals. The transmission rates of pandemic illnesses are often higher in more densely populated areas. The transmission rate of infectious diseases will depend on the mode of transmission of a given illness, and whether a vaccine, cure, or treatment is available. The threat is typically intensified when the ecosystem or host species is already stressed, such as during periods of drought. The already weakened state of the ecosystem causes it to more easily be impacted by an infestation. The severity and length of the next pandemic cannot be predicted; however, experts anticipate that its effect on the United States could be severe.

The World Health Organization (WHO) has identified the six phases of a global influenza pandemic (World Health Organization 2009). Phases 1 to 3 and 5 to 6 have been grouped to include common action points. The WHO pandemic phases are outlined in Table 7-1. New York State uses WHO classification system guidance to inform its activities during a pandemic event.

Table 7-1. WHO Global Influenza Pandemic Phases

Phase	Description
Preparedness and Response- Global, Regional, National, Sub-National Level	
Phase 1	No influenza virus circulating among animals has been reported to cause infection in humans.
Phase 2	An influenza virus circulating in domesticated or wild animals is known to have caused infection in humans and is therefore considered a potential pandemic threat.
Phase 3	An influenza virus has caused sporadic cases or small clusters of disease in people but has not resulted in human-to-human transmission sufficient to sustain community-level outbreaks.
Containment	
Phase 4	Human-to-human transmission of an influenza virus able to sustain community-level outbreaks has been verified.
Response-Global Level	
Phase 5	The identified virus has caused sustained community-level outbreaks in two or more countries in a single WHO region.
Phase 6	In addition to the criteria defined in Phase 5, the virus has caused sustained community-level outbreaks in at least one other country in another WHO region.
Post Pandemic	
Post-Peak Period	Levels of pandemic influenza in most countries with adequate surveillance have dropped below peak levels.
Possible New Wave	Level of pandemic influenza activity in most countries with adequate surveillance rising again.
Post-Pandemic Period	Levels of influenza activity have returned to the levels seen for seasonal influenza in most countries with adequate surveillance

Source: World Health Organization 2009

Influenza

Fine droplets and particles spread and accumulate more rapidly in an indoor setting. Therefore, the transmission of respiratory illness from contact with infected individuals is more likely to occur in indoor spaces. Seasonal influenza epidemics occur yearly, typically beginning at the end of October and continuing through the colder months (NYS DOH 2023).

West Nile Virus

West Nile Virus (WNV) disease is spread by the bite of a mosquito infected with the virus. Mosquitos become infected when they feed on infected birds (NYS DOH 2017). West Nile Virus cases increase in portions of the state during late summer and early fall. There are no vaccines to prevent or medications to treat WNV in people. Those infected rarely experience sickness or symptoms (CDC 2023).

Lyme Disease

Most cases of Lyme disease in New York are reported from May through August, which corresponds to the peak activity period for nymphs (young ticks). This suggests that the majority of Lyme disease cases are transmitted by nymphal deer ticks. Adult ticks are most active from March to mid-May and from mid-August to November. Both nymphs and adults can transmit Lyme disease. Ticks can be active any time the temperature is above freezing (NYS DOH 2023).

Coronavirus

Coronaviruses are spread through droplets and virus particles released into the air when an infected person breathes, talks, laughs, sings, coughs, or sneezes, which is more likely to occur in indoor spaces.

7.1.4 Previous Occurrences

Federal Major Disaster and Emergency Declarations

Yates County has been included in three federal major disaster (DR) or emergency (EM) declarations for disease outbreak-related events, as listed in Table 7-2 (FEMA 2023b). Two of these declarations have been issued since the previous Yates County HMP.

Table 7-2. FEMA Declarations for Disease Outbreak Events in Yates County (1954 to 2023)

Event Date	Declaration Date	Disaster Declaration Number	Description
May 22, 2000 – November 1, 2000	October 11, 2000	EM-3155-NY	New York Virus Threat
January 20, 2020 – May 11, 2023	March 20, 2020	DR-4480	COVID-19 Pandemic
January 20, 2020 – May 11, 2023	March 13, 2020	EM-3434	COVID-19 Pandemic

Source: FEMA 2023

USDA Declarations

Since the previous Yates County HMP, the County has not been included in any USDA declarations issued for disease outbreak-related events (USDA 2024).

Previous Events

As of April 4, 2024, Yates County had reported 5,403 positive cases of COVID-19 (NYS 2024). Yates County's average annual incidence rate (per 100,000) of West Nile Virus is 0.33 (CDC 2023).

Known disease outbreak-related events that impacted Yates County between January 2020 and December 2023 are presented in Table 7-3. For events prior to 2020, refer to the previous Yates County HMP.

7.1.5 Probability of Future Occurrences

Probability Based on Past Events

The best available data on past hazard event was used to calculate the probability of future occurrence of hazard events in Yates County. Information from the CDC, New York State Department of Health, the 2023 State of New York HMP, the previous Yates County HMP, and FEMA were used to identify the number of events that occurred between 2020 and 2023. Table 7-4 provides the calculated probability of future disease outbreak events in Yates County. Based on historical records and input from the Planning Partnership, the probability of occurrence for disease outbreak in the County is considered "occasional."

One factor that influences the spread of disease is population density. Populations that live close to one another are more likely to spread diseases, depending on how they are transmitted. As population density increases in the County, so too will the probability of a disease outbreak event.

Table 7-3. Disease Outbreak Events in Yates County (2020 to 2023)

Event Date	Event Type	Disaster Declaration Number	Yates County Included in declaration?	Location Impacted	Description
2020	Influenza	N/A	N/A	Countywide	The County had 272 laboratory-confirmed cases of influenza.
2020	Lyme Disease	N/A	N/A	Countywide	The County had 13 confirmed cases of Lyme disease.
2020	Coronavirus	DR-4480, EM-3434	Yes	Countywide	The County had 575 confirmed cases of coronavirus.
2021	Influenza	N/A	N/A	Countywide	The County had 16 laboratory-confirmed cases of influenza.
2021	Lyme Disease	N/A	N/A	Countywide	The County had 28 confirmed cases of Lyme disease.
2021	Coronavirus	DR-4480, EM3434	N/A	Countywide	The County had 1,914 confirmed cases of coronavirus.
2022	Influenza	N/A	N/A	Countywide	The County had 445 laboratory-confirmed cases of influenza.
2022	Lyme Disease	N/A	N/A	Countywide	The County had 49 confirmed cases of Lyme disease.
2022	Coronavirus	DR-4480, EM-3434	Yes	Countywide	The County had 2,156 confirmed cases of coronavirus.
2023	Influenza	N/A	N/A	Countywide	The County had 68 laboratory-confirmed cases of influenza.
2023	Coronavirus	DR-4480, EM-3434	Yes	Countywide	The County had 615 confirmed cases of coronavirus.

Source: NYS DOH 2023; FEMA 2023; CDC 2023

Note: There were no reported cases of West Nile Virus in the County between 2020 and 2023. There were no record cases of Lyme Disease in the County in 2023

Table 7-4. Probability of Future Disease Outbreak Events in Yates County

Hazard Type	Number of Occurrences Between 2020 and 2024	Percent Chance of Occurring in Any Given Year
Disease Outbreak	11	100%

Source: NYS DOH 2023; FEMA 2023; CDC 2023

Note: Available records may not include all actual occurrences. Counts in this table may underestimate actual probability.

Another factor in the likelihood of future events is how well-prepared Yates County is to respond to a disease outbreak. Instances of WNV have been generally decreasing throughout the northeast United States due to planning and eradication efforts. Disease-carrying ticks will continue to inhabit

Yates County and the threat of Lyme disease and other tick-borne diseases will continue. There are eradication efforts in place to control the tick population and new methods of control are being developed (Steere, Coburn and Glickstein 2004). Therefore, based on all available information and available data regarding mosquito and tick populations, it is anticipated that mosquito- and tick-borne diseases will continue to be a threat to Yates County. However, vaccines are currently being developed for Lyme DISEASE, which may assist in slowing the contraction rates (CDC 2022).

Potential Effect of Climate Change on Hazard Probability

Projections of climate change for New York State and for the Central/Finger Lakes region that includes Yates County are summarized in Section 3.5.4. Some scientists anticipate an increase in WNV and other mosquito-borne diseases due to changing climate conditions creating suitable habitats for disease carriers (CDC 2013). Warmer temperatures and changing rainfall patterns provide an environment where mosquitos can remain active longer, greatly increasing the risk for animals and humans. Lyme disease could also expand as temperatures warm, allowing ticks to move into new areas. Climate change can also allow tropical and subtropical insects to move from regions where diseases thrive into new places (NRDC 2015). An increase in temperature and humidity may also lead to a larger number of influenza outbreaks, as studies have shown that warmer winters led to an increase in influenza cases (Towers, et al. 2013).

7.1.6 Cascading Impacts on Other Hazards

There are no known cascading impacts that disease outbreaks can cause to other hazards of concern for Yates County.

7.2 VULNERABILITY AND IMPACT ASSESSMENT

7.2.1 Life, Health, and Safety

The entire population of Yates County is vulnerable to disease outbreak. Healthcare providers and first responders have an increased risk of exposure due to their frequent contact with infected populations. Areas with a higher population density also have an increased risk of exposure or transmission of disease due to their proximity to potentially infected people. The elderly and immunocompromised individuals may have increased vulnerability to becoming infected or experience exacerbated impacts depending upon the disease.

Overall Population

The entire population of Yates County (24,773) is vulnerable to the disease outbreak hazard. Due to a lack of quantifiable loss information, a qualitative assessment was conducted to evaluate the assets exposed to this hazard and the potential impacts associated with this hazard.

Socially Vulnerable Population

The CDC has indicated that persons 65 years and older, persons living in a nursing home or long-term care facility, and persons with underlying medical conditions such as diabetes, severe obesity, serious heart conditions, etc. are at a higher risk of getting severely ill (CDC, People with Certain Medical Conditions 2023).

Table 3-5 shows social vulnerability statistics for Yates County and participating municipalities from the ACS 5-year estimates. Table 3-6 shows low-income populations based on United for ALICE data. The municipalities with the highest and lowest numbers and percentages in each social vulnerability category are listed in Table 7-5.

Table 7-5. Municipalities With Highest and Lowest Socially Vulnerable Populations

Category	Municipality Highest in Category		Municipality Lowest in Category	
	Number	Percent	Number	Percent
Population Over 65	Penn Yan (V): **1,367**	Penn Yan (V): **27.0%**	Dresden (V): **54**	Potter (T): **12.1%**
Population Under 5	Jerusalem (T): **306**	Dresden (V): **9.9%**	Starkey (T): **1**	Starkey (T): **0.1%**
Non-English-Speaking Population	Benton (T): **89**	Potter (T): **7.0%**	Dundee (V), Rushville (V), Starkey (T): **0**	Dundee (V), Rushville (V), Starkey (T): **0.0%**
Population With Disability	Penn Yan (V): **789**	Dundee (V): **18.9%**	Potter (T): **12**	Potter (T): **1.0%**
Population Below Poverty Level	Penn Yan (V): **776**	Dundee (V): **27.6%**	Rushville (V): **30**	Rushville (V): **4.6%**
Households Below ALICE Threshold	—	Italy (T): **58%**	—	Barrington (T): **33%**

7.2.2 General Building Stock

No structures are anticipated to be directly affected by disease outbreaks.

7.2.3 Community Lifelines and Other Critical Facilities

A disease outbreak will not directly impact the structure of critical facilities or infrastructure. However, the effect of worker absenteeism will impact local government services. The most significant impact on critical facilities would be the increased service demands, such as hospitalization and emergency room visits that would take place because of the outbreak. This would create a greater demand on these critical facilities, their staff, and resources. The healthcare system would be severely taxed, if not overwhelmed, from the large number of illnesses and complications from disease requiring hospitalization and critical care. Ventilators will be the most critical shortage if a respiratory disease outbreak were to occur (Homeland Security Council 2006).

Any catastrophic incident that results in mass fatalities would place extraordinary demands (including religious, cultural, and emotional burdens) on local jurisdictions and the families of the victims (Homeland Security Council 2006). Mortuary services could be substantially impacted due to the increased numbers of deaths. The timely, safe, and respectful disposition of the deceased is an essential component of an effective response.

7.2.4 Economy

The impact disease outbreaks have on the economy in estimated dollar losses is difficult to measure. Costs associated with the activities and programs implemented to conduct surveillance and address disease outbreaks have not been quantified in available documentation. Instead, activities and programs have been implemented by the County and state to address this hazard.

The COVID-19 pandemic had significant economic impacts across the State of New York, including Yates County. Over the course of two months, nearly 2 million jobs were lost as businesses were forced to close, disrupting the economy at the state, county, and local levels.

7.2.5 Natural, Historic and Cultural Resources

Natural

Disease outbreaks may have an impact on the environment if the outbreaks are caused by invasive species. Invasive species tend to be competitive with native species and their habitat. Invasive species of mosquitos can be the major transmitters of disease such as Zika, dengue, and yellow fever (CDC 2020).

Secondary impacts from mitigating disease outbreaks could also have an impact on the environment. If pesticides used to control disease-carrying insects such as mosquitos are applied in large concentrations, they could leach into waterways and harm nearby terrestrial species. New York State Department of Environmental Conservation's (NYSDEC) Bureau of Pest Management's pesticide laws, regulations and policies ensure that pesticides are used and sold in compliance with the Environmental Conservation Law (NYSDEC 2014).

Historic

Pandemics and disease outbreaks may limit access to historic resources. During the COVID-19 pandemic, historic monuments, facilities, and sites restricted access to minimize the spread of the disease. The limitation of access during a pandemic can assist in lowering the rate of contraction.

Cultural

Similar to historic resources, cultural resources may have limited access during a pandemic and disease outbreak to minimize the spread of disease.

7.3 CHANGE OF VULNERABILITY SINCE 2020 HMP

Yates County included epidemic as a hazard of concern in the 2020 HMP. With the start of the coronavirus pandemic, the hazard profile was renamed disease outbreak and was included in the plan with the inclusion of new diseases.

7.4 FUTURE CHANGES THAT MAY AFFECT RISK

7.4.1 Potential or Planned Development

Any areas of growth could be impacted by the disease outbreak hazard because the entire county is exposed. Development patterns that result in higher concentrations of persons traveling via public transportation may increase vulnerability associated with airborne disease transmission. Increased development in rural areas may expose a higher percentage of the population to insect-borne diseases.

7.4.2 Projected Changes in Population

Yates County has experienced a decrease in its population since 2010. According to the U.S. Census Bureau, the County's population decreased by 2.3 percent between 2010 and 2020 (Census 2020). Cornell University's Program on Applied Demographics projects Yates County will have a population of 24,706 by 2030 and 24,857 by 2040 (Cornell University 2018).

An increase in population will expose more people to the pandemic hazard. Population density changes that occur when households move throughout the County could influence the number of persons exposed to disease outbreaks. Higher density areas are at risk of greater exposure to disease outbreak, and density may reduce available basic services provided by critical facilities such as hospitals and emergency facilities for persons that are not affected by a disease.

7.4.3 Climate Change

Changes in climate may create a more livable habitat for vectors carrying disease (CDC 2021). Localized changes in climate and human interaction may also be a factor in the spread of disease. For example, in the wake of significant flooding events, prolonged and intense precipitation often provides breeding grounds for mosquitos that necessitate mosquito control measures.

8. DROUGHT

8.1 HAZARD PROFILE

8.1.1 Hazard Description

A drought is a period of unusually constant dry weather that persists long enough to cause deficiencies in water supply (surface or underground) that can last a short period or many years. Droughts are slow-onset hazards that over time can severely affect crops, municipal water supplies, recreational resources, and wildlife. If drought conditions extend over several years, the direct and indirect economic impacts can be significant. High temperatures, high winds, and low humidity can worsen drought conditions and make areas more susceptible to wildfire. In addition, human actions and demands for water resources can accelerate drought-related impacts (MitigateNY 2018). Droughts can be classified as one or more of the following types (National Weather Service n.d.):

- **Meteorological Drought** is characterized by or precipitation deficits relative to expected average or typical amounts.
- **Agricultural Drought** is characterized by its impacts on crops and other agricultural products, specifically through reduced rainfall, soil water, groundwater, or reservoir levels needed for irrigation. Typically, crop yield is affected.
- **Hydrological Drought** is characterized by reduced water supply, such as stream flow, reservoir/lake levels, and the groundwater table. Typically, low water supply becomes evident to the human eye during a hydrological drought.
- **Socioeconomic Drought** is impacts on the supply and demand of economic goods dependent upon precipitation, such as fruits, vegetables, grains, and meat. Socioeconomic drought occurs when demand for the economic goods exceed supply because of weather-related deficits in the water supply.

Drought conditions depend on seasonal characteristics. The State of New York experiences drought seasonally, normally peaking in the summer and lessening during winter. Temperatures generally increase during the summer, causing evapotranspiration to rise and resulting in drier soils. Precipitation varies with seasons, as much of the state's rainfall occurs during the summer.

8.1.2 Location

Droughts can occur in all parts of the United States and any time of the year. Drier regions are more susceptible to long-term or extreme drought conditions, while other areas tend to be more susceptible to short-term, less severe droughts. All areas in Yates County are exposed to this hazard.

8.1.3 Extent

The severity of a drought depends on moisture deficiency, duration, and size of the affected area. The longer the drought and the larger the area impacted, the more severe the potential impacts (NOAA 2022). Moderate to severe drought events typically last less than six months. They primarily affect agriculture and grasslands. Extreme to exceptional drought events typically last over six months and start to affect the hydrology and ecology of the affected area.

The U.S. Drought Monitor (USDM) classifies droughts into one of five stages: normal conditions, abnormally dry (D0), moderate drought (D1), severe drought (D2), extreme drought (D3), and exceptional drought (D4) (USDM 2023).

The New York State Department of Environmental Conservation (NYSDEC) has divided the state into nine drought management regions based on drainage basins and county lines. NYSDEC monitors precipitation, lake and reservoir levels, stream flow, and groundwater level at least monthly in each region and more frequently during periods of drought. NYSDEC and the New York State Drought Management Task Force use this data to assign each region one of the following four drought stages (NYSDEC 2023):

- ***Normal*** is considered the standard moisture soil levels found throughout the state.
- ***Drought Watch*** is the first stage of drought. This stage is declared by the NYSDEC to give advance notice of a developing drought. The public is urged to conserve water. Public water purveyors and industries are urged to update and begin to implement individual drought contingency plans.
- ***Drought Warning*** is the second stage of drought. This stage is declared by the NYSDEC as a notice of impending and imminent severe drought conditions. A warning declaration includes stepping up public awareness and increasing voluntary conservation. Public water supply purveyors and industries are urged to continue to implement local drought contingency plans. Federal, state, and local water resource agencies are notified to prepare for emergency response measures.
- ***Drought Emergency*** is the third stage of drought. This stage is declared by the NYS DHSES, based on recommendation of the New York State Drought Management Task Force. It is a notice of existing severe and persistent drought conditions. An emergency declaration is a notice for local water resource agencies to mandate conservation and implement other emergency response measures. A continuing and worsening drought emergency may result in the governor declaring a drought disaster. It is a notice of the most severe and persistent drought conditions. At this stage, a significant proportion of communities in the impacted area may lack the capabilities to respond to a drought of this scale.

The State of New York uses two primary methodologies to determine drought stages. The Palmer Drought Severity Index (PDSI) is a commonly used drought indicator and is primarily based on soil conditions. These are typically the first indicators that a moisture deficit is present. These values range from negative 5 to positive 5, where positive values indicate wetter conditions and negative values represent drier conditions (NYSDEC 2023). Refer to Table 8-1 for more details on the PDSI.

Table 8-1. Drought Severity Classifications and Palmer Drought Severity Index

Classification	Impacts	Palmer Drought Severity Index
Normal Conditions	No impacts from drought affecting the area.	--
Abnormally Dry (D0)	Crop growth is stunted, and planting is delayed. Fire danger is elevated, and spring fire season starts early. Lawns will brown early, and gardens will start. Surface water levels will decline.	-1.0 to -1.9
Moderate Drought (D1)	Honey production will decline. Irrigation uses increase, as hay and grain yields are lower than normal. Trees and landscaping are stressed. Voluntary water conservation will take place. Reservoirs and lakes will be below normal capacity. An increase in wildfires and ground fires will occur.	-2.0 to -2.9
Severe Drought (D2)	Fish kills will occur, and wildlife will increasingly damage crops in search of food. Golf courses will begin to conserve water. Hay prices will rise. Specialty crop yields and fruit size are impacted. Trees will become brittle and susceptible to insects and disease. Air quality will become poor due to particles in the air. Warnings will be issued on outdoor burns. Water quality will be poor as groundwater declines. Irrigation ponds will dry out and outdoor water restrictions will be implemented.	-3.0 to -3.9
Extreme Drought (D3)	Crop loss will be widespread. Christmas tree farms will be stressed, and dairy farmers will struggle financially. River temperatures will be warm as there is a reduction in water flow. Wells will run dry, resulting in people digging deeper in search of water. Water recreation and hunting will be altered, and wildlife disease outbreak will occur. Well drillers and bulk water haulers will see an increase in business.	-4.0 to -4.9
Exceptional Drought (D4)	Exceptional and widespread crop and pasture loss. Shortages of water reservoirs, streams, and wells. Water emergencies will occur.	-5.0 or less

Source: USDM, 2023; NOAA, n.d.

The State of New York also tracks the Standardized Precipitation Evapotranspiration Index (SPEI) as an additional drought measurement tool. The SPEI, along with the PDSI, can be used to evaluate the levels of soil moisture and forecast potential impacts to agriculture within the state (NYSDEC 2023). The PDSI and SPEI are monitored to help the state understand potential impacts of drought on agricultural conditions (NYSDEC 2023).

The second methodology used by the state is the State Drought Index (SDI), developed by the NYSDEC. The SDI evaluates drought conditions on a more comprehensive basis by measuring whether numerous indicators reach dire thresholds. The data collected is compared against critical threshold values to show a normal or changeable drought condition. The indicators are weighted on a regional basis to reflect the unique circumstances of each drought management region (NYSDEC 2023). It is through the SDI that the State of New York determines if various regions are experiencing the various levels of drought conditions detailed above.

8.1.4 Previous Occurrences

Federal Major Disaster and Emergency Declarations

Yates County has not been included in any federal major disaster (DR) or emergency (EM) declarations for drought-related events (FEMA 2023b).

USDA Declarations

Since the previous Yates County HMP, the County has not been included in any USDA declarations issued for drought-related events (USDA 2024).

Previous Events

Known drought-related events that impacted Yates County between January 2020 and December 2023 are presented in Table 8-2. For events prior to 2020, refer to the previous Yates County HMP.

Table 8-2. Drought Events in Yates County (2020 to 2023)

Event Date	Event Type	Disaster Declaration Number	Yates County Included in declaration?	Location Impacted	Description
July 29, 2022 – August 28, 2022	Drought	N/A	N/A	Regional	A drought watch was issued for 21 New York counties, including Yates County. Residents were urged to conserve water, especially those dependent upon private groundwater wells.

Source: NDMC, Drought Impact Reporter, 2023

8.1.5 Probability of Future Occurrences

Probability Based on Past Events

Information on previous drought occurrences in the County was used to calculate the probability of future occurrence of such events, as summarized in Table 8-1. Based on historical records and input from the Steering Committee, the probability of occurrence for drought-related events in the County is considered “occasional.”

Table 8-3. Probability of Future Drought Events in Yates County

Hazard Type	Number of Occurrences Between 1950 and 2024	Percent Chance of Occurring in Any Given Year
Drought	6	8%

Source: NOAA-NCEI, 2024
Note: Available records may not include all actual occurrences. Counts in this table may underestimate actual probability.

Potential Effect of Climate Change on Hazard Probability

Climate change is altering the natural pattern of droughts, making them more common, longer in duration, and far more intense. Groundwater and surface water is heavily impacted by droughts as the dry ground acts as a sponge to absorb surface water. Snowpack and snowmelt move through the environment to keep groundwater at a sustainable level. When snow melts too soon and the ground absorbs water rapidly, the affected area can experience drought conditions. This can negatively impact plant and animal communities that rely on ground and surface water (USGS n.d.). Other impacts from climate change include an unequal distribution of precipitation, which can lead to an increase in drought events as well.

Projections of climate change for New York State and for the Central/Finger Lakes region that includes Yates County are summarized in Section 3.5.4. Overall, from 1895 to 2022, the state has become slightly wetter, but has continued to experience short-term droughts, especially in the summer. Long, multiyear droughts are not expected to increase in New York State, however, short-term seasonal droughts lasting weeks or months could increase, especially in the summer. This is because of precipitation falling in more intense bursts with longer dry spells in between, as well as higher temperatures in the summer causing more water to evaporate. Reduced snow cover may also play a role, as soils dry out sooner because snow is melting earlier. The potential increase of short-term drought may impact water systems with less storage, resulting in water shortages that will impact crop yields (Stevens & Lamie 2024).

Droughts in New York—specifically seasonal summer ones—could become more common because of climate change. It is less clear what impacts climate change will have on longer term “multi-year” droughts. Climate change increases the potential for drought events, can make drought conditions more severe and lengthier, and accelerates the water cycle leading to secondary impacts such as drier soils, melting of polar ice, and increases occurrence of extreme weather events (World Economic Forum 2020). Since 1970, average annual temperatures in the state have increased by 0.6°F per decade (NYSERDA 2014).

In the Central Lakes region, the number of days per year with maximum temperatures over 90 °F to 95 °F and the total number of heat waves per year are expected to increase into the 2070s (Stevens & Lamie 2024). These increases in temperature have the potential to worsen drought conditions, elevating the risk for adverse impacts for the County.

8.1.6 Cascading Impacts on Other Hazards

Drier conditions resulting from droughts increase the likelihood and severity of wildfires. Reduced soil moisture and dried vegetation provide ample fuel for fires, which can spread rapidly and pose significant threats to ecosystems, communities, and infrastructure. Droughts lead to decreased water availability, impacting water resources for drinking, agriculture, industry, and ecosystems. This scarcity can intensify conflicts over water resources, exacerbate economic losses, and compromise public health and sanitation.

8.2 VULNERABILITY AND IMPACT ASSESSMENT

8.2.1 Life, Health, and Safety

Overall Population

The entire population of Yates County (24,773) is exposed to this hazard. Drought conditions can affect people's health and safety, including health problems related to low water flows and poor water quality, and health problems related to dust. Droughts also can lead to loss of human life (NDMC 2013). Other possible impacts on health from drought include increased recreational risks; effects on air quality; diminished living conditions related to energy, air quality, and sanitation and hygiene; compromised food and nutrition; and increased incidence of illness and disease. Health implications of drought are numerous. Some drought-related health effects are short-term while others can be long-term (CDC 2012).

Socially Vulnerable Population

Socially vulnerable populations are susceptible to drought events based on factors including their physical and financial ability to react or respond during a drought. Vulnerable populations include homeless persons, elderly people (over 65 years old), low income or linguistically isolated populations, people with life-threatening illnesses, and residents that may have limited access to water as is. The population over the age of 65 may require extra water supplies or need assistance to obtain water and are more likely to need medical attention.

Table 3-5 shows social vulnerability statistics for Yates County and participating municipalities from the ACS 5-year estimates. Table 3-6 shows low-income populations based on United for ALICE data. The municipalities with the highest and lowest numbers and percentages in each social vulnerability category are listed in Table 8-4. The SVI for Yates County is identified as "relatively moderate."

Table 8-4. Municipalities With Highest and Lowest Socially Vulnerable Populations

Category	Municipality Highest in Category		Municipality Lowest in Category	
	Number	Percent	Number	Percent
Population Over 65	Penn Yan (V): **1,367**	Penn Yan (V): **27.0%**	Dresden (V): **54**	Potter (T): **12.1%**
Population Under 5	Jerusalem (T): **306**	Dresden (V): **9.9%**	Starkey (T): **1**	Starkey (T): **0.1%**
Non-English-Speaking Population	Benton (T): **89**	Potter (T): **7.0%**	Dundee (V), Rushville (V), Starkey (T): **0**	Dundee (V), Rushville (V), Starkey (T): **0.0%**
Population With Disability	Penn Yan (V): **789**	Dundee (V): **18.9%**	Potter (T): **12**	Potter (T): **1.0%**
Population Below Poverty Level	Penn Yan (V): **776**	Dundee (V): **27.6%**	Rushville (V): **30**	Rushville (V): **4.6%**
Households Below ALICE Threshold	—	Italy (T): **58%**	—	Barrington (T): **33%**

8.2.2 General Building Stock

A drought event is not expected to directly affect any structures. However, droughts contribute to conditions conducive to wildfires and reduce fire-fighting capabilities. Risk to life and property is greatest where forested areas adjoin urbanized areas (high-density residential, commercial, and industrial).

8.2.3 Community Lifelines and Other Critical Facilities

Drought events generally do not impact buildings; however, droughts have the potential to impact agriculture-related facilities and critical facilities that are associated with water supplies such as water used with fire-fighting services.

Drought affects groundwater sources, but generally not as quickly as surface water supplies. Groundwater supplies generally take longer to recover. Reduced precipitation during a drought means that groundwater supplies are not replenished at a normal rate. This can lead to a reduction in groundwater levels and problems such as reduced pumping capacity or wells going dry. Shallow wells are more susceptible than deep wells. Reduced replenishment of groundwater affects streams also. Much of the flow in streams comes from groundwater, especially during the summer when there is less precipitation and after snowmelt ends. Reduced groundwater levels mean that even less water will enter streams when steam flows are lowest.

8.2.4 Economy

Drought can produce a range of impacts that span many economic sectors and can reach beyond an area experiencing physical drought. Water withdrawals are used for drinking water and for use in the commercial/industrial/mining sectors and power generation.

When drought conditions persist with little to no relief, water restrictions may be put into place by local or state governments. These restrictions may include placing limitations on lawn watering, car washing services, or any other commercial or recreational outdoor use of water supplies (NC State University 2013).

Industries that rely on water for business (e.g., landscaping businesses) could be impacted the most. Although most businesses will still be operational, they may be impacted aesthetically. These aesthetic impacts are most significant within the recreation and tourism industry. Moreover, droughts in another area can impact the food supply and price of food for residents of the county.

Drought causes many economic impacts on agriculture and related sectors (forestry, fisheries, and waterborne activities). In addition to losses in yields in crop and livestock production, drought is associated with increased insect infestations, plant diseases, and wind erosion. Drought can lead to other losses because so many sectors are affected—losses that include reduced income for farmers and reduced business for retailers and others who provide goods and services to farmers. This leads to unemployment, increased credit risk for financial institutions, capital shortfalls, and loss of tax revenue. Prices for food, energy, and other products may also increase as supplies decrease. Economic impacts that could occur from drought include the following (NYS DHSES 2023):

- Decreased land prices
- Loss to industries directly dependent on agricultural production (machinery, fertilizer manufacturers, food processors, dairies, etc.)
- Unemployment from drought-related declines in production
- Strain on financial institutions (foreclosures, more credit risk, capital shortfalls)
- Revenue losses to federal, state, and local governments (from reduced tax base)
- Reduction of economic development
- Fewer agricultural producers (due to bankruptcies, new occupations)
- Rural population loss

The primary direct economic impact of drought in the agricultural sector is crop failure and pasture losses. These costs are often passed on to consumers through increased prices, or they may be offset through government disaster assistance programs. Indirect impacts of drought in the sector can include reduced supplies to associated industries, such as food processors, and reduced demand for input such as fertilizer and farm labor.

Based on the 2022 Census of Agriculture, 838 farms were present in Yates County, encompassing 117,491 acres of total farmland. The average farm size was 140 acres. Yates County farms had a total market value of products sold of over $152 million. Table 8-5 lists the acreage of agricultural land exposed to the drought hazard (USDA 2022).

Table 8-5. Agricultural Land in Yates County in 2022

Number of Farms	Land in Farms (acres)	Total Cropland (acres)	Total Pastureland (acres)	Total Woodland (acres)	Area Irrigated (acres)
838	117,491	82,958	5,549	19,834	524

Source: USDA 2022

Loss of income is another factor in assessment of impacts of drought. Examples of income loss include reduced income for farmers and for retailers and others who provide goods and services to farmers. The recreation and tourism industries may undergo a loss of income because of increased costs of food, energy, and other products as supplies decrease. Some local shortages of certain goods trigger the need to import goods from outside the affected region. Reduced water supply affects use of rivers and other water bodies. Hydropower production may be impacted (NYS DHSES 2023).

8.2.5 Natural, Historic and Cultural Resources

Natural

Drought can impact the environment because it can trigger wildfires, increase insect infestations, and exacerbate the spread of disease (CDC 2020). Droughts also impact water resources that are relied upon by aquatic and terrestrial species. Ecologically sensitive areas, such as wetlands, can be particularly vulnerable to drought because they are dependent on steady water levels and soil moisture availability to sustain growth (NIDIS 2023).

Historic

The primary impacts on historic resources from drought would be an increased risk of wildfires, which could threaten these assets, and impacts on structure foundations from the shrink-swell cycle of expansive soils.

Cultural

The primary impacts on cultural resources from drought would be an increased risk of wildfires, which could threaten these assets, and impacts on structure foundations from the shrink-swell cycle of expansive soils.

Droughts may impact the traditional and customary practices of indigenous persons, who rely on healthy terrestrial ecosystems. These practices may include the collection of plants, animals, and minerals and other practices. Drought and its secondary impacts on watersheds and nearshore waters may impair, diminish, or impede the exercise of traditional and customary practices.

Drought impacts on agriculture in the County could also negatively impact events associated with agriculture, including farmers' markets and harvest festivals.

8.3 CHANGE OF VULNERABILITY SINCE 2020 HMP

The average size of farms has increased since the 2017 USDA report by 6 percent, which may increase the overall stress on the water supply during a drought event.

8.4 FUTURE CHANGES THAT MAY AFFECT RISK

8.4.1 Potential or Planned Development

Any areas of growth in the County could be susceptible to drought. Specific areas of recent and future development are indicated in tables and maps included in Volume II of this plan.

8.4.2 Projected Changes in Population

Yates County has experienced a decrease in its population since 2010. According to the U.S. Census Bureau, the County's population decreased by 2.3 percent between 2010 and 2020 (U.S. Census Bureau 2023). Cornell University's Program on Applied Demographics projects Yates County will have a population of 26,014 by 2030 and 25,787 by 2040 (Cornell University 2018). Any changes in the distribution of the population can impact the source of water resources required to sustain the user demand of each household, agricultural operation, and business operation.

8.4.3 Climate Change

The State of New York is expected to observe a rise in average annual temperatures, fostering a heightened frequency of drought. Climate change exacerbates the likelihood and severity of drought events, prolonging their duration and intensifying their impact. Furthermore, it expedites the water cycle, resulting in consequential effects such as soil desiccation, polar ice melt, and heightened frequency of extreme weather occurrences. Over the past five decades, there has been a notable increase in average annual temperatures within the state, with an increment of 0.6°F per decade since 1970 (NYSERDA 2014).

9. EXTREME TEMPERATURE

9.1 HAZARD PROFILE

9.1.1 Hazard Description

Extreme temperature includes both heat and cold events, which can have a significant impact on human health, commercial/agricultural businesses, and primary and secondary effects on infrastructure (e.g., burst pipes and power failure). What constitutes extreme cold or extreme heat can vary across different areas of the country, based on temperatures that are typical for the area.

Extreme Cold

Extreme cold events occur when temperatures drop well below what is normal for an area. For example, near-freezing temperatures are considered "extreme cold" in regions relatively unaccustomed to winter weather. In regions that are subjected to temperatures below freezing on a regular basis, "extreme cold" might be used to describe temperatures below 0 °F. For the purposes of this HMP, extreme cold is defined as when the ambient air temperature drops to 0 °F or below (NWS n.d.). It also considers wind chill, which is how wind and cold feel on exposed skin. As the wind increases, heat is carried away from the body at an accelerated rate, driving down the body temperature.

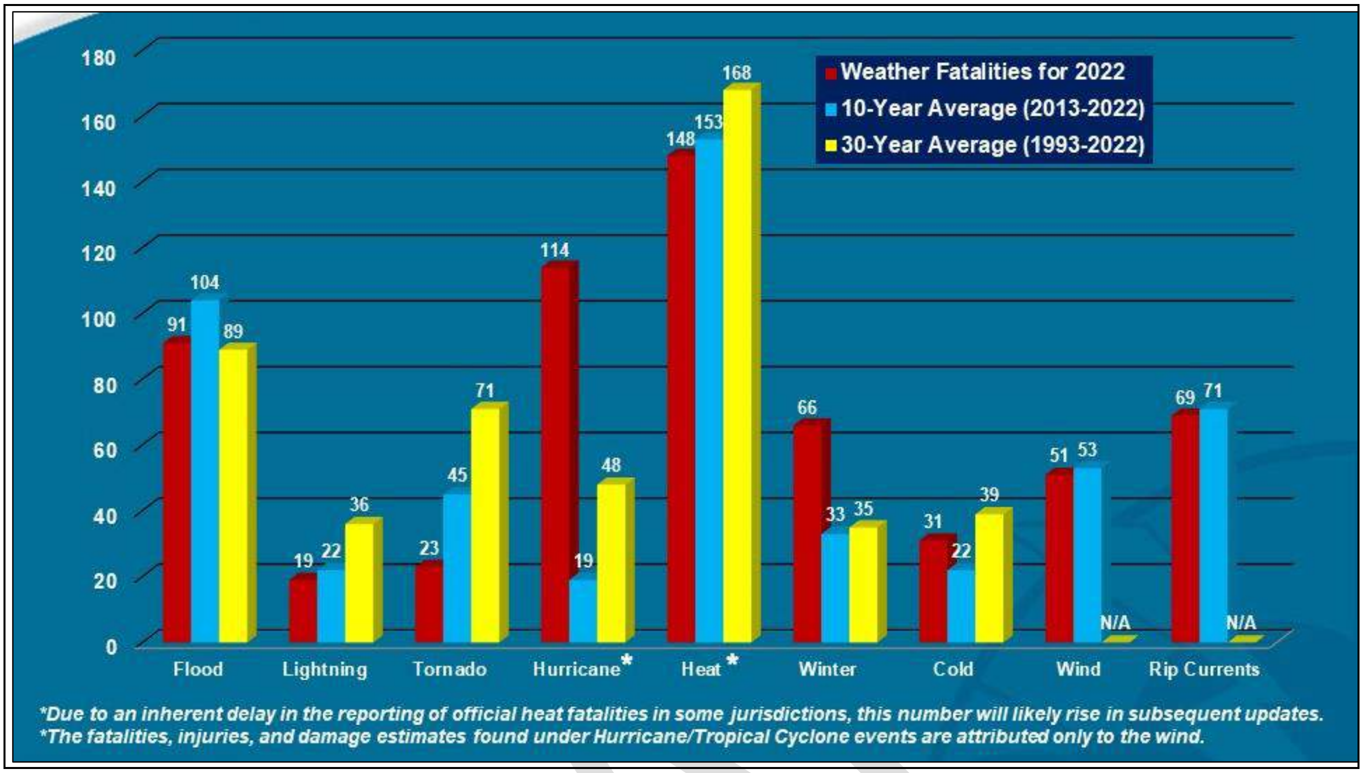
Extreme Heat

Extreme heat is defined as temperatures that hover 10 °F or more above the average high temperature for a region for an extended period (CDC 2012). A heat wave is a period of abnormally and uncomfortably hot and unusually humid weather. Humid conditions occur when a dome of high atmospheric pressure traps hazy, damp air near the ground. A heat wave will typically last two or more days (NOAA 2009).

Extreme hot days in New York State are defined as individual days with maximum temperatures at or above 90 °F or 95 °F. Heat waves in New York State are defined as three or more consecutive days with maximum temperatures above 90 °F (Horton, et al. 2014).

Extreme heat is the number one weather-related cause of death in the U.S. On average, nearly 150 people die each year in the United States from excessive heat (NWS 2022). Figure 9-1 shows the national number of weather fatalities based on a 10-year average and a 30-year average.

Figure 9-1. Average Number of Weather-Related Fatalities in the U.S.



Source: NWS 2022

9.1.2 Location

Extreme Cold

Extreme cold temperatures occur throughout the winter and generally accompany winter storm events. Under higher-than-normal atmospheric pressures when arctic air masses are present, extreme winter temperatures hover over Yates County, flowing southward from central Canada or the Hudson Bay (Horton, et al. 2014). Conditions in the region are strongly modified by the proximity of the Great Lakes.

Temperature readings recorded at Penn Yan Airport since 1998 have been used to represent climatic conditions in Yates County. According to the Midwest Regional Climate Center (MRCC), average Yates County high and low temperatures during the winter are as identified in Table 9-1. The average annual low temperature at the station is 40.2°F.

Table 9-1. High and Low Winter Temperature Range in Yates County, 2019 to2023

Month	Average High	Average Low	Record Low Event
November	49.4°F	33.5°F	17°F
December	39.4°F	26.4°F	2°F
January	33.8°F	20.2°F	-9°F
February	36.3°F	19.3°F	-9°F
March	46.5°F	27.5°F	6°F

Source: (MRCC 2023)

Extreme Heat

Extreme heat occurs throughout the county for most of the summer, except for areas with high altitudes. High-pressure systems often move just off the Atlantic coast and become stagnant for several days, and then a persistent airflow from the southwest or south affects the weather in the state. This circulation brings the very warm, often humid weather of the summer and the mild, more pleasant temperatures during fall, winter, and spring (Horton, et al. 2014). As provided by the MRCC, average Yates County high and low temperatures during the summer are as identified in Table 9-2.

Table 9-2. High and Low Summer Temperature Range in Yates County, 2019 to 2023

Month	Average High	Average Low	Record High Event
May	68.8°F	46.0°F	93°F
June	77.9°F	57.3°F	94°F
July	82.5°F	63.2°F	96°F
August	80.4°F	61.2°F	93°F
September	72.9°F	53.7°F	90°F

Source: MRCC 2023

9.1.3 Extent

Extreme Cold

The extent (severity or magnitude) of extreme cold temperatures is generally measured through the Wind Chill Temperature (WCT) Index (see Figure 9-2).

Figure 9-2. NWS WCT Index

WIND CHILL CHART (Source: NWS)

Temperature (°F)

Wind (mph)

Calm	40	35	30	25	20	15	10	5	0	-5	-10	-15	-20	-25	-30	-35	-40	-45
5	36	31	25	19	13	7	1	-5	-11	-16	-22	-28	-34	-40	-46	-52	-57	-63
10	34	27	21	15	9	3	-4	-10	-16	-22	-28	-35	-41	-47	-53	-59	-66	-72
15	32	25	19	13	6	0	-7	-13	-19	-26	-32	-39	-45	-51	-58	-64	-71	-77
20	30	24	17	11	4	-2	-9	-15	-22	-29	-35	-42	-48	-55	-61	-68	-74	-81
25	29	23	16	9	3	-4	-11	-17	-24	-31	-37	-44	-51	-58	-64	-71	-78	-84
30	28	22	15	8	1	-5	-12	-19	-26	-33	-39	-46	-53	-60	-67	-73	-80	-87
35	28	21	14	7	0	-7	-14	-21	-27	-34	-41	-48	-55	-62	-69	-76	-82	-89
40	27	20	13	6	-1	-8	-15	-22	-29	-36	-43	-50	-57	-64	-71	-78	-84	-91
45	26	19	12	5	-2	-9	-16	-23	-30	-37	-44	-51	-58	-65	-72	-79	-86	-93
50	26	19	12	4	-3	-10	-17	-24	-31	-38	-45	-52	-60	-67	-74	-81	-88	-95
55	25	18	11	4	-3	-11	-18	-25	-32	-39	-46	-54	-61	-68	-75	-82	-89	-97
60	25	17	10	3	-4	-11	-19	-26	-33	-40	-48	-55	-62	-69	-76	-84	-91	-98

Frostbite Times

30 minutes 10 minutes 5 minutes

Where, T= Air Temperature (°F) V= Wind Speed (mph)

Wind Chill (°F) = 35.74 + 0.6215T - 35.75(V0.16) + 0.4275T(V0.16)

Source: NYS DHSES 2019

Wind chill represents what the air temperature feels like to the human skin due to the combination of cold temperatures and winds blowing on exposed skin. The colder the air temperature and the higher the wind speeds the colder it will feel on skin (NOAA n.d.). The National Weather Service (NWS) provides alerts when wind chill approaches hazardous levels. Table 9-3 explains these alerts.

Table 9-3. National Weather Service Alerts for Extreme Cold

Alert	Criteria
Wind Chill Advisory	Seasonably cold wind chill values are expected or occurring, but not extremely cold values.
Wind Chill Watch	Dangerously cold wind chill values are possible.
Wind Chill Warning	Dangerously cold wind chill values are expected or occurring.

Source: NWS 2018

Additionally, the NWS issues freeze watch, warning, and frost advisories. The criteria for these alerts are described in Table 9-4.

Table 9-4. National Weather Service Alerts for Freezing

Alert	Criteria
Hard Freeze Warning	Temperatures are expected to drop below 28 °F for an extended period of time, killing most types of commercial crops and residential plants.
Freeze Warning	Temperatures are forecasted to go below 32 °F for a long period of time. This temperature threshold kills some types of commercial crops and residential plants.
Freeze Watch	There is a potential for significant, widespread freezing temperatures within the next 24 to 36 hours. A freeze watch is issued in the autumn until the end of the growing season and in the spring at the start of the growing season.
Frost Advisory	Areas of frost are expected or occurring, posing a threat to sensitive vegetation.

Source: NYS DHSES 2019

Several health hazards are related to extreme cold temperatures (CDC 2023):

- *Frostbite* is damage to body tissue caused by extreme cold. A wind chill of -20°F will cause frostbite in 30 minutes. Frostbite can cause a loss of feeling and a white or pale appearance in extremities.
- *Hypothermia* is a condition brought on when the body temperature drops to less than 95 °F, and it can be deadly. Warning signs of hypothermia include uncontrollable shivering, memory loss, disorientation, incoherence, slurred speech, drowsiness, and apparent exhaustion.

Extreme cold can cause emergencies in susceptible populations, such as those without shelter, those who are stranded, or those who live in a home that is poorly insulated or without heat (such as mobile homes). Infants and the elderly are most susceptible to the effects of extreme changes in temperatures and are particularly at risk, but anyone can be affected (CDC 2012).

Extreme Heat

The extent of extreme heat generally is measured through the NWS's heat index, identified in Figure 9-3. The heat index measures apparent temperature of the air as it increases with the relative humidity. The values are determined for shady, light wind conditions. Exposure to full sun can increase the index by up to 15 °F (NYS DHSES 2023). NWS provides alerts when the heat index approaches hazardous levels, as outlined in Table 9-5. Table 9-6 describes health hazards related to extreme heat.

Figure 9-3. Heat Index Chart

Source: NYS DHSES 2019

Table 9-5. National Weather Service Alerts for Extreme Heat

Alert	Criteria
Heat Advisory	A heat index at or above 95 °F to 104 °F for a minimum of 2 hours. Heat advisories are issued by a county when any location in that county is expected to reach criteria.
Excessive Heat Watch	50 to 79 percent chance of heat warning criteria being met in 1 to 2 days.
Excessive Heat Warning	A heat index of 105 °F or greater that will last for 2 hours or more. Excessive heat warnings are issued by a county when any location in that county is expected to reach criteria.

Source: NWS 2020

Table 9-6. Adverse Effects of Prolonged Exposure to Direct Sunlight

Category	Heat Index	Effects on the Body
Caution	80°F – 90°F	Fatigue possible with prolonged exposure and/or physical activity
Extreme Caution	90°F – 103°F	Heat stroke, heat cramps, or heat exhaustion possible with prolonged exposure and/or physical activity
Danger	103°F – 124°F	Heat cramps or heat exhaustion likely, and heat stroke possible with prolonged exposure and/or physical activity
Extreme Danger	125°F or higher	Heat stroke highly likely

Source: NWS 2023

9.1.4 Previous Occurrences

Federal Major Disaster and Emergency Declarations

Yates County has not been included in any federal major disaster (DR) or emergency (EM) declarations for extreme temperature-related events (FEMA 2023b).

USDA Declarations

Table 9-7 lists the three USDA declarations issued for extreme temperature-related events since the previous Yates County HMP (USDA 2024).

Table 9-7. USDA Declarations for Extreme Temperature Events in Yates County (2018 to 2023)

Event Date	USDA Declaration Number	Description
April 2020	S4904	Freeze and frost
April 2020	S4903	Freeze and frost
May 2023	S5485	Freeze and frost

Source: USDA 2024

Previous Events

There have been no known extreme temperature-related events that impacted Yates County between October 2018 and December 2023 (NOAA 2024). For events prior to 2020, refer to the previous Yates County HMP.

9.1.5 Probability of Future Occurrences

Probability Based on Past Events

Information on previous extreme temperature occurrences in the County was used to calculate the probability of future occurrence of such events, as summarized in Table 9-8. Based on historical records and input from the Steering Committee, the probability of occurrence for extreme temperature-related events in the County is considered “frequent.”

Potential Effect of Climate Change on Hazard Probability

Projections of climate change for New York State and for the Central/Finger Lakes region that includes Yates County are summarized in Section 3.5.4. Figure 9-4 depicts the projected average temperature increase in New York State.

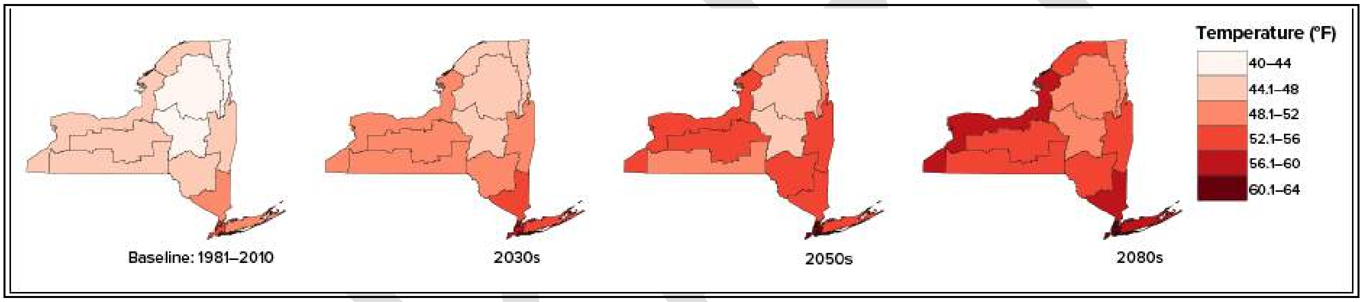
Table 9-8. Probability of Future Extreme Temperature Events in Yates County

Hazard Type	Number of Occurrences Between 1954 and 2023	Percent Chance of Occurring in Any Given Year
Cold/Wind Chill	9	12%
Excessive Heat	1	1%
Extreme Cold/Wind Chill	1	1%
Heat	3	4%
Total	**14**	**19%**

Source: NOAA-NCEI 2023

Note: Disaster occurrences include federally declared disasters since the 1950 Federal Disaster Relief Act and selected extreme temperature events since 1968. Available records may not include all actual occurrences. Counts in this table may underestimate actual probability.

Figure 9-4. Projected Annual Average Temperature in New York State



Source: Stevens & Lamie 2024 2023

New York State has warmed more rapidly than the national average, and winter is warming faster than other seasons. Evidence shows that extremely hot days are happening more often, and multiday heat waves are expected to occur more often and last longer in the upcoming decades. Areas with a lot of buildings and pavement and fewer green spaces are more affected by heat because they retain and intensify heat as "heat islands." Extremely cold days are becoming less common in New York State as the climate continues to warm. The number of days per year with temperatures below freezing or 0°F are projected to decrease across the state (Stevens & Lamie 2024). Table 9-9 summarizes the prediction of extreme heat and cold days in upcoming decades.

Table 9-9. Projected Extreme Temperatures in the Central Lakes Region

# Days Per Year	Baseline	10th percentile	50th percentile	90th percentile
2030s				
Days over 90°F	9	15	19	42
Days over 95°F	1	3	6	15
Days below 32°F	134	89	110	118
Days below 0°F	8	0.9	2	4
Number of Heat Waves	0.8	2	2	5
Average Length of Heat Waves	4	4	4	5
Maximum Heat Index	96	102	104	108
Days Heat Index is over 85°F	17	30	39	52
Days Heat Index is over 95°F	1	5	8	15
2050s				
Days over 90°F	9	19	35	63
Days over 95°F	1	4	11	33
Days below 32°F	134	64	102	114
Days below 0°F	8	0.2	1	3
Number of Heat Waves	0.8	2	4	8
Average Length of Heat Waves	4	4	5	6
Maximum Heat Index	96	104	109	116
Days Heat Index is over 85°F	17	39	54	75
Days Heat Index is over 95°F	1	8	16	30
2070s				
Days over 90°F	9	27	42	77
Days over 95°F	1	6	19	49
Days below 32°F	134	27	89	110
Days below 0°F	8	0	0.1	2
Number of Heat Waves	0.8	3	5	9
Average Length of Heat Waves	4	5	5	7
Maximum Heat Index	96	107	114	126
Days Heat Index is over 85°F	17	47	66	99
Days Heat Index is over 95°F	1	12	24	54

Source: Stevens & Lamie 2024

9.1.6 Cascading Impacts on Other Hazards

Extreme heat events may accelerate evaporation rates, drying out the air and soils. Extreme heat can also dry out terrestrial species, making them more susceptible to catching fire. Extreme variation in temperatures could create ideal atmospheric conditions for severe storms or worsen the outcome of winter storm during freezing and thawing periods.

Depending on severity, duration, and location; extreme heat events can lead to secondary hazards such as dust storms, droughts, wildfires, water shortages, and power outages. These secondary hazards can result in widespread impacts such as economic costs in transportation, agriculture, production, energy, and infrastructure; and losses of ecosystems, wildlife habitats, and water resources (NYS DHSES 2023).

9.2 VULNERABILITY AND IMPACT ASSESSMENT

9.2.1 Life, Health, and Safety

Overall Population

Extreme temperature events have potential health impacts including injury and death. Milder winters resulting from a warming climate can reduce illness and injuries associated with extreme cold temperatures and reallocate them to extreme heat events. The entire population of Yates County (24,773) is exposed to the extreme temperature hazard.

Particular risks are faced by people who overexert during work or exercise during extreme heat events or experience extended exposure to the outdoors during extreme cold events.

Socially Vulnerable Population

The following populations are most at risk from extreme cold and heat events (CDC 2022, CDC 2005):

- The elderly, who are less able to withstand temperature extremes because of their age, health conditions, and limited mobility to access shelters
- Children up to 4 years of age
- Individuals who are physically ill (such as with heart disease or high blood pressure)
- Low-income persons who cannot afford proper heating and cooling

Table 3-5 shows social vulnerability statistics for Yates County and participating municipalities from the ACS 5-year estimates. Table 3-6 shows low-income populations based on United for ALICE data. The municipalities with the highest and lowest numbers and percentages in each social vulnerability category are listed in Table 9-10.

Table 9-10. Municipalities With Highest and Lowest Socially Vulnerable Populations

Category	Municipality Highest in Category		Municipality Lowest in Category	
	Number	Percent	Number	Percent
Population Over 65	Penn Yan (V): **1,367**	Penn Yan (V): **27.0%**	Dresden (V): **54**	Potter (T): **12.1%**
Population Under 5	Jerusalem (T): **306**	Dresden (V): **9.9%**	Starkey (T): **1**	Starkey (T): **0.1%**
Non-English-Speaking Population	Benton (T): **89**	Potter (T): **7.0%**	Dundee (V), Rushville (V), Starkey (T): **0**	Dundee (V), Rushville (V), Starkey (T): **0.0%**
Population With Disability	Penn Yan (V): **789**	Dundee (V): **18.9%**	Potter (T): **12**	Potter (T): **1.0%**
Population Below Poverty Level	Penn Yan (V): **776**	Dundee (V): **27.6%**	Rushville (V): **30**	Rushville (V): **4.6%**
Households Below ALICE Threshold	—	Italy (T): **58%**	—	Barrington (T): **33%**

9.2.2 General Building Stock

All buildings in the County are exposed to the extreme temperature hazard. Extreme heat generally does not impact buildings; however, elevated summer temperatures increase the energy demand for cooling. Losses can be associated with the overheating of heating, ventilation, and air conditioning (HVAC) systems.

Extreme cold temperature events can damage buildings through freezing/bursting pipes and freeze/thaw cycles, as well as increasing vulnerability to home fires. Additionally, manufactured homes (mobile homes) and antiquated or poorly constructed facilities can have inadequate capabilities to withstand extreme temperatures.

9.2.3 Community Lifelines and Other Critical Facilities

All critical facilities in the County are exposed to the extreme temperature hazard; however, direct impacts are expected to be minimal. Impacts on critical facilities are the same as were described for general building stock. Additionally, it is essential that critical facilities remain operational during natural hazard events. Extreme heat events can sometimes cause short periods of utility failures, commonly referred to as “brownouts,” created by increased usage from air conditioners, appliances, and similar equipment. Heavy snowfall and ice storms, associated with extreme cold temperature events, can interrupt power as well. Backup power is recommended for critical facilities and infrastructure. During extreme temperature events, facilities serving as warming or cooling shelters may be opened. Power supply is vital at these facilities.

9.2.4 Economy

Extreme temperature events have impacts on the economy, including loss of business function and damage and loss of inventory. Business owners may be faced with increased financial burdens due to unexpected repairs caused to a building (pipes bursting), higher than normal utility bills, or business interruption caused by power failure (loss of electricity and telecommunications).

The agricultural industry is most at risk in terms of economic impact and damage caused by extreme temperature events. Extreme heat events can result in drought and dry conditions and directly affect livestock and crop production. Examples of income loss include reduced income for farmers, and for retailers and others who provide goods and services to farmers. The recreation and tourism industries may also undergo a loss of income because of increased costs of food, energy, and other products as supplies decrease. Some local shortages of certain goods trigger the need to import goods from outside the affected region (NYS DHSES 2023).

Based on the 2022 Census of Agriculture, 838 farms were present in Yates County, encompassing 117,491 acres of total farmland. The average farm size was 140 acres. Yates County farms had a total market value of products sold of approximately $152 million. Table 9-11 lists the acreage of agricultural land exposed to the drought hazard (USDA 2022).

Table 9-11. Agricultural Land in Yates County in 2022

Number of Farms	Land in Farms (acres)	Total Cropland (acres)	Total Pastureland (acres)	Total Woodland (acres)	Area Irrigated (acres)
838	117,491	82,958	5.549	19,834	521

Source: USDA 2022

9.2.5 Natural, Historic and Cultural Resources

Natural

Extreme temperature events can have a major impact on the environment. Freezing and warming weather patterns can create changes in natural processes. An excess amount of snowfall and earlier warming periods may affect natural processes such as flow within water resources (United State Geological Survey 2020). Extreme heat events can have particularly negative impacts on aquatic systems, contributing to fish kills, aquatic plant die offs, and increased likelihood of harmful algal blooms. These extreme temperature events can also affect the surrounding ecosystems, which can destroy food webs and deplete resources in the environment.

Historic

Proper strategies help safeguard historic buildings and their contents. Sudden and dramatic fluctuations in heating or cooling should be minimized. Slower heating and cooling give building materials and stored contents time to acclimate to new temperatures in the building and corresponding new humidity levels (CCAHA 2019).

Extreme heat can increase the risk of ignition of fires and their propagation. Fire causes material loss and deformation of historic assets and may increase the probability of cracking or splitting in built structures. Under extreme heat, stones can face both macro (e.g., cracking of stones, soot accumulation, color change in stone containing iron) and micro degradation (e.g., mineralogical and textural changes), leading to potential structural instability. The long-term impacts include weakened stones and increased susceptibility to deterioration processes such as salt weathering and temperature cycling (Sesana, et al. 2021).

Cultural

Cultural heritage sites, particularly those exposed to the elements, are subject to weathering. Temperature is a potential threat to these sites as it exacerbates the expected rates of decay and contributes to the appearance of new decay. Extreme temperature may aggravate the physical, chemical, and biological mechanisms, causing degradation by affecting the structure or composition of building materials (Sesana, et al. 2021).

9.3 CHANGE OF VULNERABILITY SINCE 2020 HMP

The County's overall vulnerability to this hazard has not changed, and the entire County will continue to be vulnerable to extreme temperature events.

9.4 FUTURE CHANGES THAT MAY AFFECT RISK

9.4.1 Potential or Planned Development

The ability of new development to withstand extreme temperature impacts lies in sound land use practices and consistent enforcement of codes and regulations for new construction. As a relatively rural county, Yates County is fortunate to have areas of greenery that decrease the overall county's vulnerability to heat waves. However, as the County increases development, preservation of such spaces can become more difficult. New development will change the landscape where buildings, roads, and other infrastructure potentially replace open land and vegetation. Surfaces that had been permeable and moist will become impermeable and dry. These changes cause urban areas to become warmer than the surrounding areas forming heat islands (as described above). Specific areas of recent and new development are indicated in tables and maps included in the jurisdictional annexes in Volume II of this plan.

9.4.2 Projected Changes in Population

Yates County has experienced a decrease in its population since 2010. According to the U.S. Census Bureau, the County's population decreased by 2.3 percent between 2010 and 2020 (Census 2020). Cornell University's Program on Applied Demographics projects Yates County will have a population of 24,706 by 2030 and 24,857 by 2040 (Cornell University 2018).

Any changes in the density of population may require utility system upgrades to keep up with utility demands (e.g., water, electric) during extreme temperature events to prevent increased stresses on these systems. Additionally, by increasing development, green space preservation will need to continue to be a priority to mitigate increased heat islands.

9.4.3 Climate Change

Most studies project that the State of New York will see an increase in average annual temperatures and precipitation. As the climate warms, extreme cold events might decrease in frequency, while extreme heat events might increase in frequency; the shift in temperatures could result in hotter extreme heat events. With increased temperatures, vulnerable populations could face increased vulnerability to extreme heat and its associated illnesses, such as heatstroke and cardiovascular and kidney disease. Additionally, as temperatures rise, more buildings, facilities, and infrastructure systems may exceed their ability to cope with the heat.

10. FLOOD

10.1 HAZARD PROFILE

10.1.1 Hazard Description

A flood is an overflow of water from oceans, rivers, groundwater, or rainfall that submerges areas that are usually dry. This natural phenomenon can be exacerbated by features of the built environment.

Flooding is a natural hazard that can occur during any season. It typically occurs during prolonged rainfall over several days, intense rainfall over a short period of time, or when an ice or debris jam causes a river or stream to overflow onto the surrounding area. The most common cause of flooding is rain or snowmelt that accumulates faster than soils can absorb it or rivers can carry it away. Flooding can also result from the failure of a water control structure (NWS 2019).

Floods are one of the most frequent and costly natural hazards in terms of human hardship and economic loss, particularly to communities that lie within flood prone areas or floodplains of a major water source. A variety of flood types, such as riverine, flash flooding, stormwater, urban, and ice jam flooding can cause widespread damage throughout rural and urban areas, causing loss of life, injury, and severe water damage to residential and commercial buildings, bridge and road closures, transit service disruptions, electrical and communication networks, and agriculture.

For this HMP, as determined by the HMP Steering Committee, riverine, flash, and ice jam flooding are the main flood types of concern for the County.

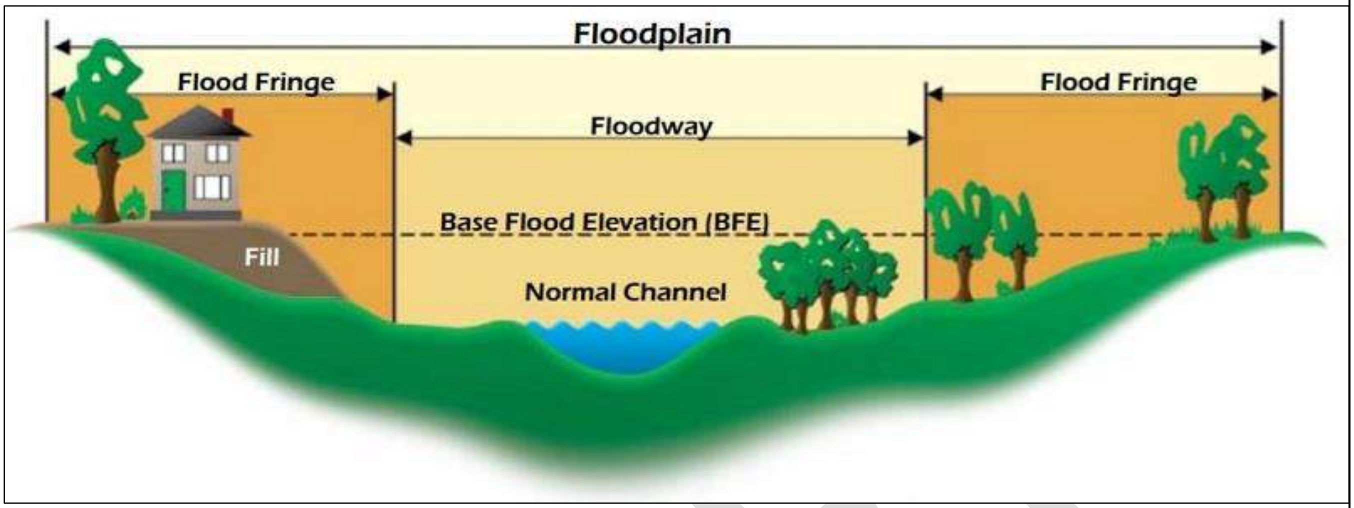
Riverine Flooding

Riverine flooding is when the water in streams and rivers exceeds the capacity of their natural or constructed channels to accommodate water flow. This causes the water to overflow the banks, spilling out into adjacent low-lying, dry land, which is called the floodplain. A floodplain is the land adjoining a river, stream, ocean, lake, or other water body that becomes inundated with water during a flood. It consists of the following components (FEMA 2019c):

- Floodway is the channel of a river or other waterway and the adjacent land areas that are under water or reserved to carry and discharge the overflow of water caused by flooding.
- Flood fringe is the area within the floodplain but outside the floodway. This area extends from the outer banks of a floodway to the river valley, where the elevation begins to rise.

Figure 10-1 depicts the flood hazard area, the flood fringe, and the floodway areas of a floodplain.

Figure 10-1. Characteristics of a Floodplain



Source: FEMA 2022

The 1 percent annual chance floodplain, also referred to as the special flood hazard area (SFHA), is the area that has requirements for flood insurance and floodplain management regulations (FEMA 2020b). This is the area inundated by a flood that has a 1 percent chance of being equaled or exceeded in any given year. FEMA maps of floodplains identify the SFHA. Areas outside of the SFHA can be subject to flooding and may even act as an unofficial floodplain. Flooding outside of the SFHA area may include stormwater or urban flooding and flash flooding. Additional definitions relating to flood maps can be seen in Table 10-1.

Although the 1 percent annual chance flood is sometimes called the "100-year" flood, it is statistically possible for such events to occur over much shorter intervals than 100 years. Similarly the 0.2 percent annual chance flood is sometimes called the 500-year flood, but it cannot be assumed that such a flood won't occur more often than once every 500 years.

Table 10-1. Flood Map Terms

Term	Description
Special Hazard Flood Areas (SFHAs)	Labeled as Zone A, Zone AO, Zone AH, Zones A1-A30, Zone AE, Zone A99, Zone AR, Zone AR/AE, Zone AR/AO, Zone AR/A1-A30, Zone AR/A, Zone V, Zone VE, and Zones V1-V30.
Zone B or Zone X (shaded)	Moderate flood hazard areas and are the areas between the limits of the 1 percent annual chance flood and the 0.2 percent-annual-chance flood.
Zone C or Zone X (unshaded)	Areas of minimal flood hazard, which are the areas outside the SFHA and higher than the elevation of the 0.2 percent-annual-chance flood.

Source: FEMA 2020

Floodplain mapping is based on riverine and coastal flooding conditions. The mapped boundaries of floodplains are affected by changes in land use, the amount of impervious surface, placement of obstructing structures, changes in precipitation and runoff patterns, improvements in technology for measuring topographic features, and utilization of different hydrologic modeling techniques. Urban and stormwater flooding and future conditions (e.g., sea level rise and rainfall areas) are not reflected in FEMA floodplain mapping. As such, FEMA floodplain maps may underestimate flood risk in many areas. As a result, the public may also underestimate risk.

Flash Flooding

Flash floods are defined by the National Weather Service (NWS) as floods caused by heavy or excessive rainfall in a short period of time, generally less than 6 hours (NWS 2015). A flash flood results from a rapid inundation of low-lying areas caused by heavy rain associated with severe thunderstorms, tropical systems, or melting water from ice or snow. Flash flooding can occur far away from water bodies when a large volume of water cannot be absorbed by the soil or storm water systems and travels overland unimpeded (NWS 2019).

Flash floods are usually characterized by raging torrents after heavy rains that rip through riverbeds, urban streets, or mountain canyons. They can occur within minutes or a few hours of excessive rainfall.

Ice Jam Flooding

An ice jam occurs when pieces of floating ice are carried with a stream's current and accumulate behind an obstruction to the stream flow. Obstructions may include river bends, mouths of tributaries, points where the river slope decreases, dams, and bridges. The water held back by this obstruction can cause flooding upstream, and if the obstruction suddenly breaks, flash flooding can occur as well (NOAA 2023).

The formation of ice jams depends on the weather and physical condition of the river and stream channels. Ice jams are common in locations where the channel slope changes from relatively steep to mild and where a tributary stream enters a large river. Ice jams and resulting floods can occur during different times of the year: fall freeze-up from the formation of frazil ice; mid-winter periods when stream channels freeze solid, forming anchor ice; and spring breakup when rising water levels from snowmelt or rainfall break existing ice cover into pieces that accumulate at bridges or other types of obstructions (FEMA 2018b).

There are two main types of ice jams: freeze-up and breakup. Freeze-up jams occur when floating ice slows or stops due to a change in water slope as it reaches an obstruction to movement. Breakup jams occur during periods of thaw, generally in late winter and early spring. The ice cover breakup is usually associated with a rapid increase in runoff and corresponding river discharge due to a heavy rainfall, snowmelt, or warmer temperatures (FEMA 2018c).

Ice jams are common in the northeast United States. According to USACE, New York State ranks second in the United States for total number of ice jam events, with over 1,600 incidents documented between 1867 and 2015. Areas of the state that include characteristics lending to ice jam flooding are the northern counties of the Finger Lakes region and far western New York, the Mohawk Valley of central and eastern New York, and the North Country.

Warnings and Advisories

Most floods are preceded by a warning period that allows emergency managers to communicate the need to prepare for the event through advisories such as the following (NWS n.d.):

- **Flood Watch**—A Flood Watch is issued when conditions are favorable for flooding. It does not mean flooding will occur, but it is possible. If specifically flash flooding is possible, the Flood Watch will state: "Flash flooding caused by excessive rainfall is possible."
- **Flash Flood Warning—**A Flash Flood Warning is issued when flash flooding is imminent or occurring.
- **Flood Warning—**A Flood Warning is issued when flooding is imminent or occurring.
- **River Flood Watch—**A River Flood Watch is issued when river flooding is possible at one or more forecast points along a river.
- **River Flood Warning—**A River Flood Warning is issued when river flooding is occurring or imminent at one or more forecast points along a river.

Warnings issued through official sources, such as the NWS and the Storm Prediction Center, provide the most reliable and timely preparedness information, but the exact flood location and depth depends on the amount, duration, and location of rainfall. Many floods, especially flash floods, occur outside of FEMA-designated flood zones.

10.1.2 Location

Yates County's topographic, climatological, and meteorological features create an environment conducive to year-round flooding. Warm weather flooding is caused by severe thunderstorms bringing heavy rainfall that leads to flash floods and riverine or overbank flooding; in cold weather fast-melting snow overwhelms waterways. Bank erosion and sediment deposits exacerbate flooding by blocking and re-directing the natural flow of waterways. Yates County is not directly affected by hurricanes or tropical storms; however, the severe storms associated with these systems can result in additional flooding.

Riverine Flooding

In Yates County, floodplains line the rivers, streams, and lakes of the County. These water bodies cover significant area throughout the County, as summarized below:

- 36 miles of shoreline along Keuka Lake
- 26 miles of shoreline along Seneca Lake
- 9 miles of shoreline along Canandaigua Lake
- 8,417 acres of wetlands
- 1,804 miles of rivers/streams

Numerous factors can cause flooding along the bodies of water, including heavy and/or prolonged periods of rainfall, snowmelt, soil saturation, ground freeze, severe wind events and inadequate drainage systems.

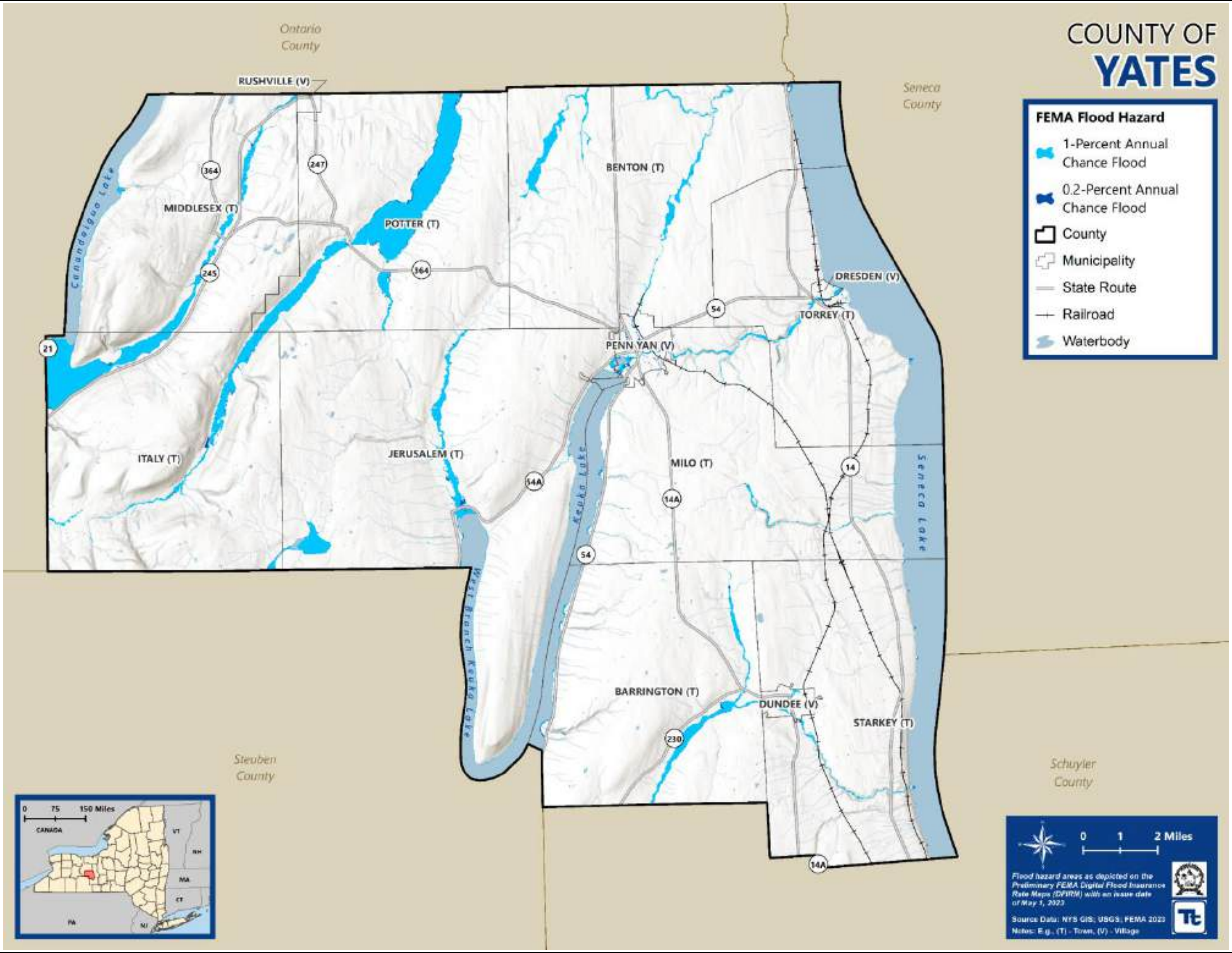
Locations of flood zones in Yates County as depicted on the FEMA preliminary Digital Flood Insurance Rate Map (DFIRM) are illustrated in Figure 10-2 and the total land area in the floodplain, exclusive of water bodies, is summarized in Table 10-2. Refer to Volume II for maps depicting the floodplains in each jurisdiction.

Table 10-2. Land Area in the 1 Percent and 0.2 Percent Annual Chance Flood Zones

		1% Flood Event Hazard Area		0.2% Flood Event Hazard Area	
	Total Area (acres)	Total Area (Acres)	% of Jurisdiction Total	Total Area (acres)	% of Jurisdiction Total
Barrington (T)	22,823	557	2.4%	592	2.6%
Benton (T)	26,316	738	2.8%	759	2.9%
Dresden (V)	194	27	13.9%	28	14.4%
Dundee (V)	688	49	7.1%	54	7.8%
Italy (T)	25,593	2,030	7.9%	2,091	8.2%
Jerusalem (T)	37,311	835	2.2%	904	2.4%
Middlesex (T)	19,739	615	3.1%	634	3.2%
Milo (T)	23,494	222	0.9%	251	1.1%
Penn Yan (V)	1,363	66	4.8%	116	8.5%
Potter (T)	23,598	2,953	12.5%	3,052	12.9%
Rushville (V)	212	0	0.0%	0	0.0%
Starkey (T)	20,259	82	0.4%	96	0.5%
Torrey (T)	14,333	103	0.7%	115	0.8%
Yates County	**215,923**	**8,277**	**3.8%**	**8,692**	**4.0%**

Source: Yates County; USGS, National Hydrography Dataset (NHD); FEMA 2023
Note: land areas shown exclude water bodies

Figure 10-2. Flood Zones in Yates County



Flash Flooding

Flash flooding, like riverine/inland flooding, occurs throughout County, primarily along the bodies of water that flow through it. Severe thunderstorms and periods of heavy rainfall can lead to flash floods (NWS 2014).

Ice Jam Flooding

Ice jam flooding occurs on a body of water (The Hartford 2016). Ice can begin to pile up and accumulate if it encounters an obstruction to the flow, including sharp bends on a river or objects such as a bridge that lie close to the river's elevation. Ice jams can also occur at the mouth of a tributary or an area where the river's slope decreases enough to slow the current and allow for the buildup of ice (Niziol 2020).

10.1.3 Extent

Riverine Flooding

The strength or magnitude of a flood varies based meteorological, environmental, and geological factors, including latitude, altitude, topography, and atmospheric conditions. Flooding is also affected by seasonal variation, storm characteristics, warning time, speed of onset, and duration (O'Connor, Grant and Costa 2002). The NWS classifies riverine flood severity based on its potential threat to the public and property. The agency has defined the following types of flooding (NOAA 2021):

- **Minor Flooding** incurs minimal or no property damage, but possibly some public threat or inconvenience.
- **Moderate Flooding** results in some inundation of structures and roads near streams. Some evacuations of people and/or transfer of property to higher elevations are necessary.
- **Major Flooding** incurs extensive inundation of structures and roads. Significant evacuations of people and/or transfer of property to higher elevations.

The U.S. Geological Survey uses stream gages to determine the severity of flood at different points along a body of water. There are two gages in Yates County, both along Keuka Lake. The flood stage is identified at the gage. Yates County and its municipalities rely on these gages to determine water heights during heavy rain events and to determine whether residents need to evacuate. Table 10-3 shows information on each gage with the determined flood stage and record flood event. The USGS website provides details about each of the gages and the gage heights of flooding events (USGS 2024). The NWS provides the different flood stages for the gages https://water.weather.gov/ahps/ (NOAA 2024).

Table 10-3. Stream Gage Statistics for Yates County

Gage Site Number	Site Name	Minor Flood Stage (feet)	Moderate Flood Stage (feet)	Major Flood Stage (feet)	Record Flood
04232482	Keuka Lake Outlet at Dresden NY	Not available	Not available	Not available	9.67 feet on May 14, 2014
KKPN6	Keuka Lake at Penn Yan	5.5	7.0	8.0	Not available

Source: NOAA 2023; USGS 2023

Flash Flooding

The extent of a flash flood is consistent with that of a riverine flood.

Ice Jam Flooding

Ice jam flooding events often occur suddenly and are difficult to predict, allowing for little time to prepare for and warn of an event. The size of the snowpack and the rate of snowmelt controls the extent of an ice jam (Rokaya 2018).

10.1.4 Previous Occurrences

Federal Major Disaster and Emergency Declarations

Yates County has been included in nine federal major disaster (DR) or emergency (EM) declarations for flood-related events, as listed in Table 10-4 (FEMA 2023b). None of these were issued since the previous Yates County HMP.

Table 10-4. FEMA Declarations for Flood Events in Yates County (1954 to 2023)

Event Date	Declaration Date	Disaster Declaration Number	Description
June 23, 1972	June 23, 1972	DR-338-NY	Tropical Storm Agnes
October 2, 1975	October 2, 1975	DR-487-NY	Severe Storms, Heavy Rain, Landslides, Flooding
September 25, 1984	September 25, 1984	DR-725-NY	Severe Storms, Flooding
January 19-30, 1996	January 24, 1996	DR-1095-NY	Severe Storms, Flooding
May 3 – August 12, 2000	July 21, 2000	DR-1335-NY	Severe Storms and Flooding
July 21 – August 13, 2003	August 29, 2003	DR-1486-NY	Severe Storms, Flooding, and Tornadoes
May 13 – June 17, 2004	August 3, 2004	DR-1534-NY	Severe Storms and Flooding
April 26 – May 8, 2011	June 10, 2011	DR-1993-NY	Severe Storms, Flooding, Tornadoes, and Straight-Line Winds
May 13-22, 2014	July 8, 2014	DR-4180-NY	Severe Storms and Flooding

Source: FEMA 2023

USDA Declarations

Since the previous Yates County HMP, the County has not been included in any USDA declarations issued for flood-related events (USDA 2024). (New Declaration for Tropical Storm Debby – September 24, 2024 DR-4825)

Previous Events

Known flood-related events that impacted Yates County between October 2018 and December 2023 are presented in Table 10-5. For events prior to 2020, refer to the previous Yates County HMP.

Table 10-5. Flood Events in Yates County (2020 to 2023)

Event Date	Event Type	Disaster Declaration Number	Yates County Included in declaration?	Location Impacted	Description
August 18, 2021	Flash flood	N/A	N/A	Finger Lakes region	The remnants of Tropical Storm Fred moved across parts of the mid-Atlantic and northeast United States between August 18 to 20. As this feature moved over the central parts of New York and northeast Pennsylvania it produced locally heavy rainfall and severe flash flooding. Areas around the Finger Lakes region were affected by localized flash flooding.

Source: NOAA-NCEI 2023

The Ice Jam Database maintained by the Ice Engineering Group at the USACE Cold Regions Research and Engineering Laboratory, currently consists of over 19,000 records from across the United States. According to the database, no ice jams have occurred Yates County (USACE 2024).

10.1.5 Probability of Future Occurrences

Probability Based on Past Events

Information on previous flood occurrences in the County was used to calculate the probability of future occurrence of such events, as summarized in Table 10-6. Based on historical records and input from the Steering Committee, the probability of occurrence for flood-related events in the County is considered "occasional."

Given the history of flood events that have impacted Yates County, it is apparent that future flooding of varying degrees will occur. Based on previous occurrences of flooding events and presence of elements required for flooding in the vicinity of the County, many people and properties are at risk from flood hazards in the future.

Table 10-6. Probability of Future Flood Events in Yates County

Hazard Type	Number of Occurrences Between 1972 and 2023	Percent Chance of Occurring in Any Given Year
Flood	11	21.5%
Flash Flood	41	80.3%
Ice Jam	0	0
Total	**43**	**100.0%**

Source: NOAA 2023; FEMA 2023; NOAA-NCEI 2023

Note: Disaster occurrences include federally declared disasters since the 1950 Federal Disaster Relief Act, and selected flood events since 1968. Available records may not include all actual occurrences. Counts in this table may underestimate actual probability.

Annual direct and indirect impacts of floods on the County are expected to continue. Some flooding events may induce secondary hazards such as concerns related to water quality and supply levels, and may lead to evacuations, infrastructure deterioration and failure, utility failures, power outages, transportation delays/accidents/inconveniences, and public health concerns.

Potential Effect of Climate Change on Hazard Probability

Projections of climate change for New York State and for the Central/Finger Lakes region that includes Yates County are summarized in Section 3.5.4. The projected increase in precipitation (see Table 10-7) is expected to fall as heavy downpours. Downpours are likely to increase in frequency and intensity, a change which has the potential to heighten the risk of riverine flooding (Stevens & Lamie 2024).

Table 10-7. Projected Mean Annual Changes in Precipitation in the Central Lakes

Decade	10th percentile	25th percentile	50th percentile	75th percentile	90th percentile
2030s	-1%	1%	4%	7%	9%
2040s	-1%	3%	6%	8%	10%
2050s	0%	3%	6%	10%	11%
2060s	0%	4%	8%	11%	13%
2070s	0%	6%	9%	12%	14%
2080s	2%	7%	10%	13%	17%
2100	-3%	5%	11%	17%	22%

Source: Stevens & Lamie 2024

From 1965 to 2015, floods in rivers and streams have become larger and have happened more frequently in the state. Many of New York's lakes have seen ice freezing later and thawing earlier since the late 19th and early 20th century. Warming temperatures also make the likelihood of ice jams less likely (Stevens & Lamie 2024).

10.1.6 Cascading Impacts on Other Hazards

Erosion

Riverine flooding often results in bank erosion. This is especially true in the upper courses of rivers with steep gradients, where floodwaters may pass quickly and without much property damage, but scour the banks, edging properties closer to the floodplain or causing them to fall in. Flooding is also responsible for hazards such as landslides when high flows over-saturate soils on steep slopes, causing them to fail.

Public Health

After flood events, excess moisture and standing water contribute to the growth of mold in buildings. Mold may present a health risk to building occupants, especially those with already compromised immune systems such as infants, children, the elderly, and pregnant women. The degree of impact will vary and is not strictly measurable. Mold spores can grow in as short a period as 24 to 48 hours in wet and damaged areas of buildings that have not been properly cleaned. Very small mold spores can easily be inhaled, creating the potential for allergic reactions, asthma episodes, and other respiratory problems. Buildings should be properly cleaned and dried out to safely prevent mold growth (CDC n.d.).

Floodwaters also can be contaminated by pollutants such as sewage, human and animal feces, pesticides, fertilizers, oil, asbestos, and rusting building materials. Common public health risks associated with flood events also include:

- Unsafe food
- Contaminated drinking and washing water and poor sanitation
- Mosquitos and animals
- Carbon monoxide poisoning
- Secondary hazards associated with re-entering/cleaning flooded structures
- Mental stress and fatigue

The best level of mitigation for these public health impacts is to be aware that they can occur, educate the public on prevention, and be prepared to deal with them in responding to flood events.

Utility Disruption

Floods of any type have the potential to impact water and power utilities, which may impact public and private use, as well as cause disruption to critical infrastructure. Flooding's harmful effects on the water supply include the following:

- **Water Supply Contamination**—Excess floodwater can contaminate private drinking water sources, such as wells and springs. Floodwater picks up debris, increasing the number of bacteria, sewage, and other industrial waste and chemicals into the water source or leaky pipes. Excess water also makes it more difficult for water treatment plants to treat the water efficiently and effectively. If there is a contamination at any step of the water flow process, this puts consumers at risk of exposure to dangerous toxins that could result in serious harm, such as wound infections, skin rashes, gastrointestinal illnesses, and tetanus; in extreme cases, death may occur.
- **Disruption to Clean Drinking and Cooking Water**—In the event of having access only to contaminated water, consumers are unable to cook or clean in their home until the water is certified as safe. Depending on the severity of the flood and the storm, this could take days, months, or, in some cases, even years. Without access to clean drinking and cooking water, consumers ultimately become reliant on bottled water. In impoverished communities, this is even more detrimental because those affected may not have the economic means to purchase sufficient bottled water. Moreover, in a flood, retail locations are often inaccessible or low on supplies of bottled water.

Floodwaters can also cause damage to power utilities. In particular, floods may disrupt utilities if a building's service panel, generator, meter, etc. are not elevated above the flood protection level. Oversaturated soils from periods of heavy rain and flooding may cause utility poles to tip over or fall completely, interrupting the power grid for a potentially large area, especially if the transformer is impacted.

Dam Failure

Severe weather, which is often a precursor to flooding events, can result in large quantities of rain upstream of a dam that will ultimately be impounded by the dam. This can raise water levels behind the dam, resulting in overtopping of the dam or flooding of properties upstream of the dam. Should the flooding result in a dam failure, the water behind the dam, including flood waters, may inundate jurisdictions downstream of the dam. More information on dam failure can be found in Chapter 6.

10.2 VULNERABILITY AND IMPACT ASSESSMENT

The 1 percent and 0.2 percent annual chance flood events were examined to evaluate the county's risk from the flood hazard. These flood events are generally those considered by planners and evaluated under federal programs such as NFIP. Additional information on the methodology used for this analysis can be found in Chapter 4.

10.2.1 Life, Health, and Safety

The impact of flooding on life, health, and safety is dependent upon several factors, including the severity of the event and whether adequate warning time is provided to residents. The vulnerable population consists of those living in or near floodplain areas who could be impacted should a flood event occur. It also includes people traveling in flooded areas, or whose access to emergency services is compromised during a flood.

Overall Population

The DFIRM flood boundaries were used to estimate population exposure to the 1 percent and 0.2 percent annual chance flood events. Table 10-8 summarizes the results.

Table 10-8. Population in the Evaluated Flood Hazard Areas

	Total Population (2020 Decennial Census)	Population in the 1% Annual Chance Flood Hazard Area		Population in the 0.2% Annual Chance Flood Hazard Area	
		Number of Persons	% of Total	Number of Persons	% of Total
Barrington (T)	1,541	62	4.0%	175	11.4%
Benton (T)	2,580	10	0.4%	31	1.2%
Dresden (V)	293	12	4.1%	12	4.1%
Dundee (V)	1,690	9	0.5%	9	0.5%
Italy (T)	1,099	39	3.5%	51	4.6%
Jerusalem (T)	4,253	153	3.6%	271	6.4%
Middlesex (T)	1,377	64	4.6%	95	6.9%
Milo (T)	2,303	71	3.1%	134	5.8%
Penn Yan (V)	5,056	16	0.3%	109	2.2%
Potter (T)	1,207	39	3.2%	50	4.1%
Rushville (V)	651	0	0.0%	0	0.0%
Starkey (T)	1,717	40	2.3%	131	7.6%
Torrey (T)	1,006	7	0.7%	14	1.4%
Yates County (Total)	**24,773**	**522**	**2.1%**	**1,082**	**4.4%**

Source: U.S. Census Bureau 2020; FEMA 2023

There are an estimated 522 residents living in the 1 percent annual chance floodplain, 2.1 percent of the County's total population. There are an estimated 1,082 residents living in the 0.2 percent annual chance floodplain, 4.4 percent of the County's total population. The Town of Jerusalem has the greatest number of residents living in the 1- and 0.2 percent annual chance flood hazards areas, with approximately 153 residents and 271 residents, respectively.

Using the effective flood maps available for the Villages of Dundee and Penn Yan and the Town of Middlesex, Hazus estimates the number of people displaced or seeking short-term shelter for the 1 percent annual chance flood event in those communities as shown in Table 10-9.

Table 10-9. Displaced Population in the 1 Percent Annual Chance Flood Hazard Area

	Total Population (2020 Decennial)	1% Annual Chance Flood Impacts on People	
		Displaced Population	Persons Seeking Short-Term Shelter
Dundee (V)	1,690	117	46
Middlesex (T)	1,377	46	7
Penn Yan (V)	5,056	95	62

Source: Hazus v6.0; U.S. Census Bureau 2020; FEMA 1981, 1988, 1989

Note: Results based on digital flood maps for the Village of Dundee (Effective Date: 03/01/88), Village of Penn Yan (Effective Date: 06/15/81), and Town of Middlesex (Effective Date: 09/29/89). Digitized floodplain hazard data for this analysis was not available for the remainder of the County.

The total number of injuries and casualties resulting from flooding is generally limited if proper warning and precautions are in place. Ongoing mitigation efforts should help to avoid the most likely cause of injury, which results from persons trying to cross flooded roadways or channels.

Socially Vulnerable Population

Some populations experience exacerbated impacts and prolonged recovery from flooding due to factors including their physical and financial ability to react or respond during a flood event. The most vulnerable are the economically disadvantaged and the population over age 65. Economically disadvantaged populations may be more vulnerable because they lack financial resources to evacuate. People over age 65 are more vulnerable because they are more likely to need medical attention that may not be available due to isolation during a flood event, and they may have more difficulty evacuating. Table 3-5 shows social vulnerability statistics for Yates County and participating municipalities from the ACS 5-year estimates. Table 3-6 shows low-income populations based on United for ALICE data. Special consideration should be taken when planning for disaster preparation, response, and recovery for these vulnerable groups.

Table 10-10 presents the estimated socially vulnerable populations living in the 1 percent annual chance flood hazard area. There are 99 persons over 65, 28 persons under 5, five non-English speakers, 50 persons with a disability, and 53 living in poverty located in the 1 percent annual chance flood hazard area.

Table 10-11 presents the estimated socially vulnerable populations living in the 0.2 percent annual chance flood hazard areas. There are 219 persons over 65, 59 persons under 5, 10 non-English speakers, 105 persons with a disability, and 116 living in poverty located in the 0.2 percent annual chance flood hazard area.

10.2.2 General Building Stock

Vulnerable buildings are those located in the flood hazard zone. Table 10-12 summarizes these results countywide.

There are 465 buildings in the 1 percent annual chance flood hazard area with an estimated $177 million of replacement cost value (building and contents). This represents 2.1 percent of the County's total general building stock inventory.

There are 877 buildings in the 0.2 percent annual chance flood hazard area with an estimated $384 million of replacement cost value (building stock and contents). This represents 4 percent of the County's total general building stock inventory.

Table 10-13 list buildings in the 1 or 0.2 percent annual chance flood hazard areas by general occupancy. The exposure analysis estimates that the residential occupancy is the most vulnerable, accounting for 284 structures in the 1 percent annual chance flood hazard area and 565 structures in the 0.2 percent annual chance flood hazard area.

Potential damage is the loss that could occur to vulnerable buildings, including structural and content replacement cost values. Hazus analysis to estimate loss from the 1 percent annual chance flood was conducted for the municipalities with digitized effective flood maps (the Villages of Dundee and Penn Yan and the Town of Middlesex. Results are shown in Table 10-14. The estimated total loss in all evaluated communities is less than 1 percent of the communities' total existing building stock replacement cost value.

Table 10-10. Socially Vulnerable Populations in the 1 Percent Annual Chance Flood Hazard Area

	Total Population (Decennial 2020)	Percent of County Total	Estimated Number of Vulnerable Persons in the 1% Annual Chance Flood Hazard Area									
			Over 65	Percent of Jurisdiction Total	Under 5	Percent of Jurisdiction Total	Non-English Speaking	Percent of Jurisdiction Total	Disability	Percent of Jurisdiction Total	Poverty Level	Percent of Jurisdiction Total
Barrington (T)	1,541	6.2%	15	4.0%	4	3.4%	1	2.9%	4	3.8%	4	3.4%
Benton (T)	2,580	10.4%	2	0.4%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Dresden (V)	293	1.2%	2	3.7%	1	3.4%	0	0.0%	1	3.0%	2	3.2%
Dundee (V)	1,690	6.8%	1	0.4%	0	0.0%	0	0.0%	1	0.3%	2	0.4%
Italy (T)	1,099	4.4%	6	3.2%	1	2.0%	0	0.0%	7	3.5%	3	3.4%
Jerusalem (T)	4,253	17.2%	26	3.5%	11	3.6%	2	3.5%	14	3.4%	13	3.4%
Middlesex (T)	1,377	5.6%	13	4.4%	2	4.7%	0	0.0%	8	4.7%	6	4.3%
Milo (T)	2,303	9.3%	19	3.1%	6	2.9%	0	0.0%	9	3.1%	15	3.0%
Penn Yan (V)	5,056	20.4%	4	0.3%	0	0.0%	0	0.0%	2	0.3%	2	0.3%
Potter (T)	1,207	4.9%	4	2.7%	3	2.6%	2	2.4%	0	0.0%	2	3.1%
Rushville (V)	651	2.6%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Starkey (T)	1,717	6.9%	6	2.1%	0	0.0%	0	0.0%	3	2.3%	3	1.9%
Torrey (T)	1,006	4.1%	1	0.5%	0	0.0%	0	0.0%	1	0.6%	1	0.7%
Yates County (Total)	**24,773**	**100.0%**	**99**	**1.9%**	**28**	**1.9%**	**5**	**1.4%**	**50**	**1.7%**	**53**	**1.7%**

Source: U.S. Census Bureau 2017-2021 American Community Survey; FEMA 2023

Table 10-11. Socially Vulnerable Populations in the 0.2 Percent Annual Chance Flood Hazard Area

	Total Population (Decennial 2020)	Percent of County Total	Estimated Number of Vulnerable Persons in the 0.2% Annual Chance Flood Hazard Area									
			Over 65	Percent of Jurisdiction Total	Under 5	Percent of Jurisdiction Total	Non-English Speaking	Percent of Jurisdiction Total	Disability	Percent of Jurisdiction Total	Poverty Level	Percent of Jurisdiction Total
Barrington (T)	1,541	6.2%	42	11.2%	13	10.9%	3	8.6%	11	10.5%	13	11.1%
Benton (T)	2,580	10.4%	6	1.1%	2	1.0%	1	1.1%	2	1.2%	2	1.1%
Dresden (V)	293	1.2%	2	3.7%	1	3.4%	0	0.0%	1	3.0%	2	3.2%
Dundee (V)	1,690	6.8%	1	0.4%	0	0.0%	0	0.0%	1	0.3%	2	0.4%
Italy (T)	1,099	4.4%	8	4.3%	2	4.1%	0	0.0%	9	4.5%	4	4.6%
Jerusalem (T)	4,253	17.2%	47	6.4%	19	6.2%	3	5.3%	26	6.3%	24	6.3%
Middlesex (T)	1,377	5.6%	20	6.8%	2	4.7%	0	0.0%	11	6.4%	9	6.4%
Milo (T)	2,303	9.3%	35	5.7%	12	5.8%	0	0.0%	16	5.5%	29	5.8%
Penn Yan (V)	5,056	20.4%	29	2.1%	3	1.7%	0	0.0%	17	2.2%	16	2.1%
Potter (T)	1,207	4.9%	6	4.1%	4	3.4%	3	3.6%	0	0.0%	2	3.1%
Rushville (V)	651	2.6%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Starkey (T)	1,717	6.9%	21	7.3%	0	0.0%	0	0.0%	9	6.9%	11	7.1%
Torrey (T)	1,006	4.1%	2	1.0%	1	1.3%	0	0.0%	2	1.2%	2	1.4%
Yates County (Total)	**24,773**	**100.0%**	**219**	**4.2%**	**59**	**3.9%**	**10**	**2.9%**	**105**	**3.6%**	**116**	**3.7%**

Source: U.S. Census Bureau 2017-2021 American Community Survey; FEMA 2023

Table 10-12. Estimated General Building Stock Located in the Evaluated Flood Hazard Areas—All Occupancies

	Jurisdiction Total Buildings		1% Annual Chance Flood Hazard Area				0.2% Annual Chance Flood Hazard Area			
			Number of Buildings		Replacement Cost Value		Number of Buildings		Replacement Cost Value	
	Count	Replacement Cost Value	Count	% of Jurisdiction Total	Value	% of Jurisdiction Total	Count	% of Jurisdiction Total	Value	% of Jurisdiction Total
Barrington (T)	1,943	$1,087,359,607	52	2.7%	$20,442,312	1.9%	139	7.2%	$51,738,147	4.8%
Benton (T)	2,125	$1,712,144,740	4	0.2%	$1,092,618	0.1%	13	0.6%	$4,460,469	0.3%
Dresden (V)	189	$96,035,909	7	3.7%	$1,257,004	1.3%	7	3.7%	$1,257,004	1.3%
Dundee (V)	808	$565,406,673	12	1.5%	$11,235,331	2.0%	12	1.5%	$11,235,331	2.0%
Italy (T)	1,227	$446,736,385	41	3.3%	$11,839,795	2.7%	54	4.4%	$17,234,456	3.9%
Jerusalem (T)	4,305	$2,222,802,811	144	3.3%	$49,477,266	2.2%	246	5.7%	$85,748,891	3.9%
Middlesex (T)	1,600	$733,491,126	59	3.7%	$13,446,558	1.8%	83	5.2%	$19,326,671	2.6%
Milo (T)	2,708	$1,920,559,675	62	2.3%	$24,536,568	1.3%	110	4.1%	$47,976,238	2.5%
Penn Yan (V)	2,300	$1,828,807,125	14	0.6%	$14,509,612	0.8%	68	3.0%	$87,598,040	4.8%
Potter (T)	1,402	$1,046,854,169	26	1.9%	$9,092,718	0.9%	32	2.3%	$10,699,658	1.0%
Rushville (V)	214	$108,056,906	0	0.0%	$0	0.0%	0	0.0%	$0	0.0%
Starkey (T)	1,958	$1,239,984,737	34	1.7%	$11,402,470	0.9%	98	5.0%	$32,447,143	2.6%
Torrey (T)	1,317	$1,022,674,865	10	0.8%	$9,274,007	0.9%	15	1.1%	$14,765,147	1.4%
Yates County (Total)	**22,096**	**14,030,914,727**	**465**	**2.1%**	**$177,606,258**	**1.3%**	**877**	**4.0%**	**$384,487,195**	**2.7%**

Source: Yates County Planning Department; NYS GIS Clearinghouse; U.S. Army Corps of Engineers National Structure Inventory; RS Means 2022; FEMA 2023

Table 10-13. Buildings in the Evaluated Flood Hazard Areas by General Occupancy Class

	Total Buildings	Residential		Commercial		Other[a]	
		1% Annual Chance Flood Hazard Area	0.2% Annual Chance Flood Hazard Area	1% Annual Chance Flood Hazard Area	0.2% Annual Chance Flood Hazard Area	1% Annual Chance Flood Hazard Area	0.2% Annual Chance Flood Hazard Area
Barrington (T)	1,943	34	96	17	42	1	1
Benton (T)	2,125	3	9	1	4	0	0
Dresden (V)	189	5	5	2	2	0	0
Dundee (V)	808	3	3	7	7	2	2
Italy (T)	1,227	25	33	16	21	0	0
Jerusalem (T)	4,305	83	147	60	98	1	1
Middlesex (T)	1,600	42	62	17	21	0	0
Milo (T)	2,708	41	77	21	33	0	0
Penn Yan (V)	2,300	5	34	9	30	0	4
Potter (T)	1,402	17	22	5	6	4	4
Rushville (V)	214	0	0	0	0	0	0
Starkey (T)	1,958	21	68	12	29	1	1
Torrey (T)	1,317	5	9	5	6	0	0
Yates County (Total)	**22,096**	**284**	**565**	**172**	**299**	**9**	**13**

Source: Yates County Planning Department; NYS GIS Clearinghouse; U.S. Army Corps of Engineers National Structure Inventory; RS Means 2022; FEMA 2023

a. "Other" occupancy classes include government, religion, agriculture, and education

Table 10-14. Estimated Building Stock Loss Due to the 1 Percent Annual Chance Flood Event

	Total Replacement Cost Value	Estimated Loss for All Occupancies	Percent of Total	Estimated Loss for Residential Properties	Estimated Loss for Commercial Properties	Estimated Loss for All Other Occupancies
Dundee (V)	$565,406,673	$1,925,835	0.3%	$1,841,582	$84,254	$0
Middlesex (T)	$733,491,126	$3,499,174	0.5%	$2,357,691	$713,192	$428,292
Penn Yan (V)	$1,828,807,125	$6,107,072	0.3%	$1,131,614	$436,566	$4,538,892

Source: Hazus v6.0; FEMA 1981, 1988, 1989; Yates County Planning Department; NYS GIS Clearinghouse; U.S. Army Corps of Engineers National Structure Inventory; RS Means 2022

Note: Results based on digital flood maps for the Village of Dundee (Effective Date: 03/01/88), Village of Penn Yan (Effective Date: 06/15/81), and Town of Middlesex (Effective Date: 09/29/89). Digitized floodplain hazard data for this analysis was not available for the remainder of the County.

NFIP Statistics

The risk assessment for flooding evaluated available data on flood policies, claims, and repetitive loss (RL) properties. FEMA Region 2 provided a list of residential properties with NFIP policies, past claims, and multiple claims (RLs). The data indicates losses reported by individuals who have federal flood insurance. It identifies a property as a repetitive loss property if there are two or more reported losses that were paid more than $1,000 for each loss, within 10 years of each other and at least 10 days apart. Only losses since January 1, 1978, that are closed are included. Severe repetitive loss (SRL) properties, defined by additional claims and additional losses, were not available to be examined for Yates County.

Table 10-15 summarizes NFIP policies, claims, and repetitive loss statistics for Yates County as of April 2024. The majority of RL properties are single-family residences.

Table 10-15. NFIP Statistics in Yates County

	# Policies	# Claims (Losses)	Total Loss Payments	# Repetitive Loss Properties
Barrington (T)	18	6	$4,281	0
Benton (T)	9	0	$0	0
Dresden (V)	1	4	$3,064	0
Dundee (V)	2	8	$11,312	0
Italy (T)	4	4	$29,427	0
Jerusalem (T)	41	51	$487,617	0
Middlesex (T)	7	5	$54,537	1
Milo (T)	18	17	$256,218	1
Penn Yan (V)	11	26	$199,270	0
Potter (T)	3	2	$958	0
Rushville (V)	1	5	$4,258	0
Starkey (T)	22	12	$30,649	0
Torrey (T)	14	5	$4,409	0
Yates County (Total)	**151**	**145**	**$1,086,000**	**2**

Source: FEMA 2024

10.2.3 Community Lifelines and Other Critical Facilities

Critical services during and after a flood event may not be available if critical facilities are directly damaged or transportation routes to access these critical facilities are impacted. Roads that are blocked or damaged can isolate residents and can prevent access throughout the planning area to many service providers needing to get to vulnerable populations or to make repairs. Utilities such as overhead power, cable, and phone lines could also be vulnerable due to utility poles damaged by standing water. Loss of these utilities could create isolation issues for the inundation zones.

Flooding can cause extensive damage to public utilities and disruptions to delivery of services. Flooding can cause isolation if bridges are washed out or blocked by water or debris, health problems due to water and sewer systems that are flooded or backed up, drinking water contamination if floodwaters carry pollutants into water supplies, and urban flooding if culverts become blocked with debris. Loss of power and communications may occur, and drinking water and wastewater treatment facilities may be temporarily out of operation.

Table 10-16 and Table 10-17 summarize the number of critical facilities exposed to the 1 percent and 0.2 percent flood inundation areas by jurisdiction.

Mitigation planning should consider means to reduce impact on critical facilities and ensure enough emergency services remain when a significant event occurs. If short-term functionality of critical facilities in the County is impacted by flooding, facilities of neighboring municipalities may need to increase support response functions. Actions addressing shared services agreements are included in Volume II of this plan.

10.2.4 Economy

Flood events can significantly impact the local and regional economy. This includes tax loss associated with general building stock damage, business interruption, and impacts on tourism. In areas that are directly flooded, renovations of commercial and industrial buildings may be necessary, disrupting associated services. After the floodwaters subside, contaminated and flood-damaged building materials and contents must be properly disposed of. Contaminated sediment must be removed from buildings, yards, and properties.

Debris management may also be a large expense after a flood event. Hazus estimates the amount of structural debris generated during a flood event. The model breaks down debris into three categories:

- Finishes (dry wall, insulation, etc.)
- Structural (wood, brick, etc.)
- Foundations (concrete slab and block, rebar, etc.).

These distinctions are necessary because of the different types of equipment needed to handle debris.

Table 10-16. Number of Critical Facilities in the 1 percent Annual Chance Flood Hazard Area

	Number of Critical Facilities in the 1 Percent Annual Chance Flood Hazard Area, by Lifeline Category									Total Facilities in Hazard Area	
	Communications	Energy	Food, Hydration, Shelter	Hazardous Materials	Health & Medical	Safety & Security	Transportation	Water Systems	Other Critical Facilities	Number	% of Jurisdiction Total
Barrington (T)	0	0	0	0	0	0	0	1	0	1	3.4%
Benton (T)	0	0	0	0	0	0	0	0	0	0	0.0%
Dresden (V)	0	0	0	0	0	0	0	0	0	0	0.0%
Dundee (V)	0	0	0	0	0	0	0	0	0	0	0.0%
Italy (T)	0	0	0	0	0	0	0	0	0	0	0.0%
Jerusalem (T)	0	0	0	0	0	0	0	0	0	0	0.0%
Middlesex (T)	0	0	0	0	0	0	0	0	1	1	2.6%
Milo (T)	0	0	0	0	0	2	0	0	0	2	4.0%
Penn Yan (V)	0	0	0	0	0	1	0	0	0	1	5.3%
Potter (T)	0	0	0	0	0	1	0	0	0	1	1.8%
Rushville (V)	0	0	0	0	0	0	0	0	0	0	0.0%
Starkey (T)	0	0	0	0	0	0	0	0	0	0	0.0%
Torrey (T)	0	0	0	0	0	0	0	0	0	0	0.0%
Yates County (Total)	**0**	**0**	**0**	**0**	**0**	**4**	**0**	**1**	**1**	**6**	**1.6%**

Source: Yates County 2023; FEMA 2023

Table 10-17. Number of Critical Facilities in the 0.2 percent Annual Chance Flood Hazard Area

	Number of Critical Facilities in the 0.2 percent Annual Chance Flood Hazard Area, by Lifeline Category									Total Facilities in Hazard Area	
	Communications	Energy	Food, Hydration, Shelter	Hazardous Materials	Health & Medical	Safety & Security	Transportation	Water Systems	Other Critical Facilities	Number	% of Jurisdiction Total
Barrington (T)	0	0	0	0	0	0	0	1	0	1	3.4%
Benton (T)	0	0	0	0	0	0	0	0	0	0	0.0%
Dresden (V)	0	0	0	0	0	0	0	0	0	0	0.0%
Dundee (V)	0	0	0	0	0	0	0	0	0	0	0.0%
Italy (T)	0	0	0	0	0	0	0	0	0	0	0.0%
Jerusalem (T)	0	0	0	0	0	0	0	0	0	0	0.0%
Middlesex (T)	0	0	0	0	0	0	0	0	1	1	2.6%
Milo (T)	0	0	0	0	0	2	0	0	0	2	4.0%
Penn Yan (V)	0	0	0	0	0	1	0	0	0	1	5.3%
Potter (T)	0	0	0	0	0	1	0	0	0	1	1.8%
Rushville (V)	0	0	0	0	0	0	0	0	0	0	0.0%
Starkey (T)	0	0	0	0	0	0	0	0	0	0	0.0%
Torrey (T)	0	0	0	0	0	0	0	0	0	0	0.0%
Yates County (Total)	**0**	**0**	**0**	**0**	**0**	**4**	**0**	**1**	**1**	**6**	**1.6%**

Source: Yates County 2023; FEMA 2023

Table 10-18 summarizes the Hazus debris estimates for the 1 percent annual chance flood event in the communities for which digitized effective flood mapping is available. This table only estimates structural debris generated by flooding and does not include non-structural debris or additional potential damage and debris possibly generated by wind that may be associated with a storm that causes flooding.

Table 10-18. Estimated Debris Created During the 1 percent Annual Chance Food Event

	Estimated Debris Created During the 1 percent Annual Chance Food Event			
	Total (tons)	Finish (tons)	Structure (tons)	Foundation (tons)
Dundee (V)	80.6	41.4	19.5	19.8
Middlesex (T)	145.5	56.6	38.0	51.0
Penn Yan (V)	78.3	61.5	9.5	7.3

Source: Hazus v6.0; FEMA 1981, 1988, 1989; Yates County Planning Department; NYS GIS Clearinghouse; U.S. Army Corps of Engineers National Structure Inventory; RS Means 2022

Note: Results based on digital flood maps for the Village of Dundee (Effective Date: 03/01/88), Village of Penn Yan (Effective Date: 06/15/81), and Town of Middlesex (Effective Date: 09/29/89). Digitized floodplain hazard data for this analysis was not available for the remainder of the County.

10.2.5 Natural, Historic and Cultural Resources

Natural

The environmental impacts of a flood can include significant water quality and debris-disposal issues. Floodwaters can back up sanitary sewer systems and inundate wastewater treatment plants, causing raw sewage to contaminate the flooded waterway. The contents of unsecured containers of oil, fertilizers, pesticides, and other chemicals get added to flood waters. Hazardous materials may be released and distributed widely across the floodplain.

In addition, severe erosion from flooding can negatively impact local ecosystems. The erosion of riverbanks can cause additional flooding in locations that otherwise may have not experienced flooding conditions.

Historic

Historic places and institutions are vulnerable to impacts from flooding. Historic buildings face structural damage during flood events. Historic structures often are not built to modern building code requirements, including design flood elevation and construction standards. Historic resources and structures were often built close to waterways, increasing their flood risk.

Cultural

Cultural institutions, parks and open spaces, community facilities, and religious institutions are all vulnerable to impacts from flooding. Venues such as museums face structural damage during flood events, with additional risk of damage to important cultural artifacts housed within them. Parks, recreation, and community space closures due to flood events can disrupt residents' lives and hinder access to community services. Parks and recreational areas are often located near waterways. Although these facilities often experience flooding, they are positioned with flooding in mind, as many parks are considered as open space to disallow development.

10.3 CHANGE OF VULNERABILITY SINCE 2020 HMP

The entire County continues to be vulnerable to the flood hazard. Since the 2020 analysis, population statistics have been updated using the 2020 Decennial Census. The general building stock was also updated using RSMeans 2022 building valuations that estimated replacement cost value for each building in the inventory. This provides an up-to-date look at the entire building stock for Yates County and gives more accurate results for the vulnerability and loss estimation analysis. Additionally, the 2020 critical facility dataset was updated by the County and includes FEMA community lifelines.

10.4 FUTURE CHANGES THAT MAY AFFECT RISK

10.4.1 Potential or Planned Development

As Yates County communities grow, flood events may increase in frequency and/or severity as land use changes, more structures are built, and impervious surfaces expand. Chapter 3 identifies areas targeted for future growth and development across the County. Any new development located in the SFHA could be impacted by riverine flooding. Areas outside of the SFHA can be impacted by urban flooding and less frequent and more severe flooding events. Specific areas of recent and new development are indicated in tables and maps included in Volume II of this plan.

Development leads to increased amounts of impervious surfaces such as roads, parking lots, and buildings and can increase rainwater runoff. Development in floodplains or wetlands can result in an increased floodplain level (New York State 2019).

10.4.2 Projected Changes in Population

Yates County has experienced a decrease in its population since 2010. According to the U.S. Census Bureau, the County's population decreased by 2.3 percent between 2010 and 2020 (Census 2020).

Cornell University's Program on Applied Demographics projects Yates County will have a population of 24,706 by 2030 and 24,857 by 2040 (Cornell University 2018). Any changes in the density of population can create issues for local residents during evacuation of a flood event. Historically, flooding and debris have severely impacted transportation corridors and infrastructure. As areas continue to be cleared for new development and runoff increases, the population in the County will remain exposed to this hazard.

10.4.3 Climate Change

Climate defines the type, frequency, and intensity of weather events. Both globally and at the local scale, climate change has the potential to alter the prevalence and severity of events that exacerbate flooding. Warmer temperatures may lead to an increase in frequency of storms, thus leading to more weather events with potentially increased severity.

11. HARMFUL ALGAL BLOOM

11.1 HAZARD PROFILE

11.1.1 Hazard Description

Algae

Algae are a part of a diverse group of aquatic organisms that are characterized by photosynthesizing. They are found in many environments, including lakes, ponds, oceans, hot springs, springs, and land. Algae are categorized based on their morphology and growing state (Lewin 2023). Most are considered harmless and are key components of the food chain. The following are some of the most common types (Smithsonian n.d.):

- **Diatoms (Bacillariophyta)—**Diatoms are unicellular organisms that are a primary food source for zooplankton in marine and freshwater systems. Most are considered planktonic, but some reside on the bottom of the marine floor or grow on other algae and plants.
- **Stoneworts (Charophyta)—**Stoneworts are freshwater plants that grow anchored to a substrate. Some scientists identify this alga as ancestor to mosses.
- **Green Algae (Chlorophyta)—**Most green algae are aquatic, but some live on snow surfaces, tree bark, soils, or symbiotically with protozoans, hydras, or fungi. There are over 8,000 species of green algae, from microscopic to large enough for the naked eye to see.
- **Golden Algae (Chrysophyta)—**Golden algae are photosynthetic, unicellular organisms that are found in freshwater and marine ecosystems.
- **Blue-Green Algae (Cyanobacteria)—**Blue-green algae may produce toxins that are harmful to other animals, though some forms, such as Spirulina, are grown commercially and used as dietary supplements.
- **Dinoflagellates (Dinophyta)—**Dinoflagellates are free swimming protist with two flagella, a nucleus, chloroplasts, mitochondria, and Golgi bodies. They have a wide range of morphology and sizes.
- **Brown Algae (Phaeophyta)—**Brown algae are mostly marine and sometimes reside on rocky shores in cold to temperate waters. They can be found throughout the world. Common forms of brown algae are giant kelp, which makes up large seaweed forests. Other species include Sargassum and Trubinaria, which can be found in tropical waters. They are often harvested for dietary supplements, fertilizer, and emulsion stabilizers for foods.

- **Red Algae (Rhodophyta)—**Most red algae are marine organisms, though some reside in freshwater environments. There are over 6,000 known species. Red algae are mostly multicellular and attach to rocks or other algae. Unicellular red algae form colonies. Red algae are often harvested for the food and drug industry.

Identifying HABs

Algae species can grow rapidly, forming blooms and covering large portions of an area. These instances can produce negative impacts on the ecosystem and other species. These algal blooms can also produce toxins.

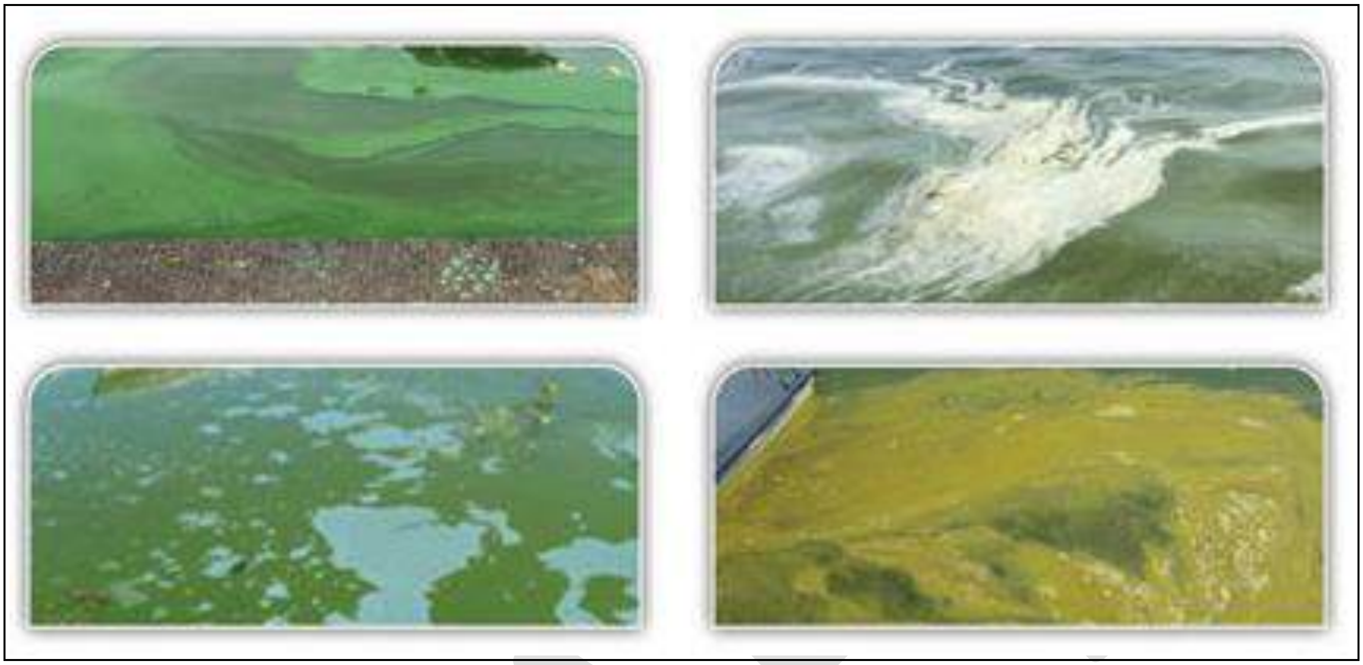
Cyanobacteria, also known as blue-green algae, are responsible for the Earth's oxygen-rich atmosphere. Their photosynthesis to produce carbohydrates and oxygen byproducts led to the time in Earth's history 2.4 to 2.1 billion years ago when oxygen accumulated in the atmosphere and became abundant. This led to a boom in the evolutionary timeline, as more land species were able to flourish and evolve due to the abundance of oxygen in the air (Aiyer 2022). However, cyanobacteria also produce toxins, which in large quantities can threaten humans and animals. When cyanobacteria form colonies, they are referred to as harmful algal blooms (HABs). There are over 40 cyanobacterial species that can produce toxins harmful to humans and animals (Mohamed 2019).

HABs can be difficult to determine if not sampled and tested in a laboratory. HABs often look like areas of a waterbody that are shades of green, blue-green, yellow, brown, red or white. Blooms are often clumps but can also be seen in the form of floating dots or streaks (DOH 2022). Figure 11-1 illustrates the differing appearance of blue-green algal blooms along the water surface. HABs that form on rocks along the bottom and shorelines of the waterbody are referred to as benthic blooms. Figure 11-2 illustrates the common appearance of blue-green algal benthic blooms in a waterbody.

The New York State Department of Health (NYS DOH) warns community members to stay away from toxic algal blooms if spotted. There are many resources available to educate the community on the identification and risks associated with HAB exposure in the State of New York.

HAB events are monitored by NYSDEC's Lake Classification and Inventory Program. This statewide program is largely operated by citizen and volunteers, and partners with other HAB monitoring programs to educate and promote HAB awareness. The status of waterbodies in the state is reported on the DECinfo Locator (NYSDEC, DECinfo Locator 2022). Figure 11-3 illustrates the current and archived HAB reports for New York State. The HAB indicators on the map highlighted by a dark circle are those which are current; the HAB indicators without are archived reports.

Figure 11-1. Blue-Green Algae Bloom in Surface Water

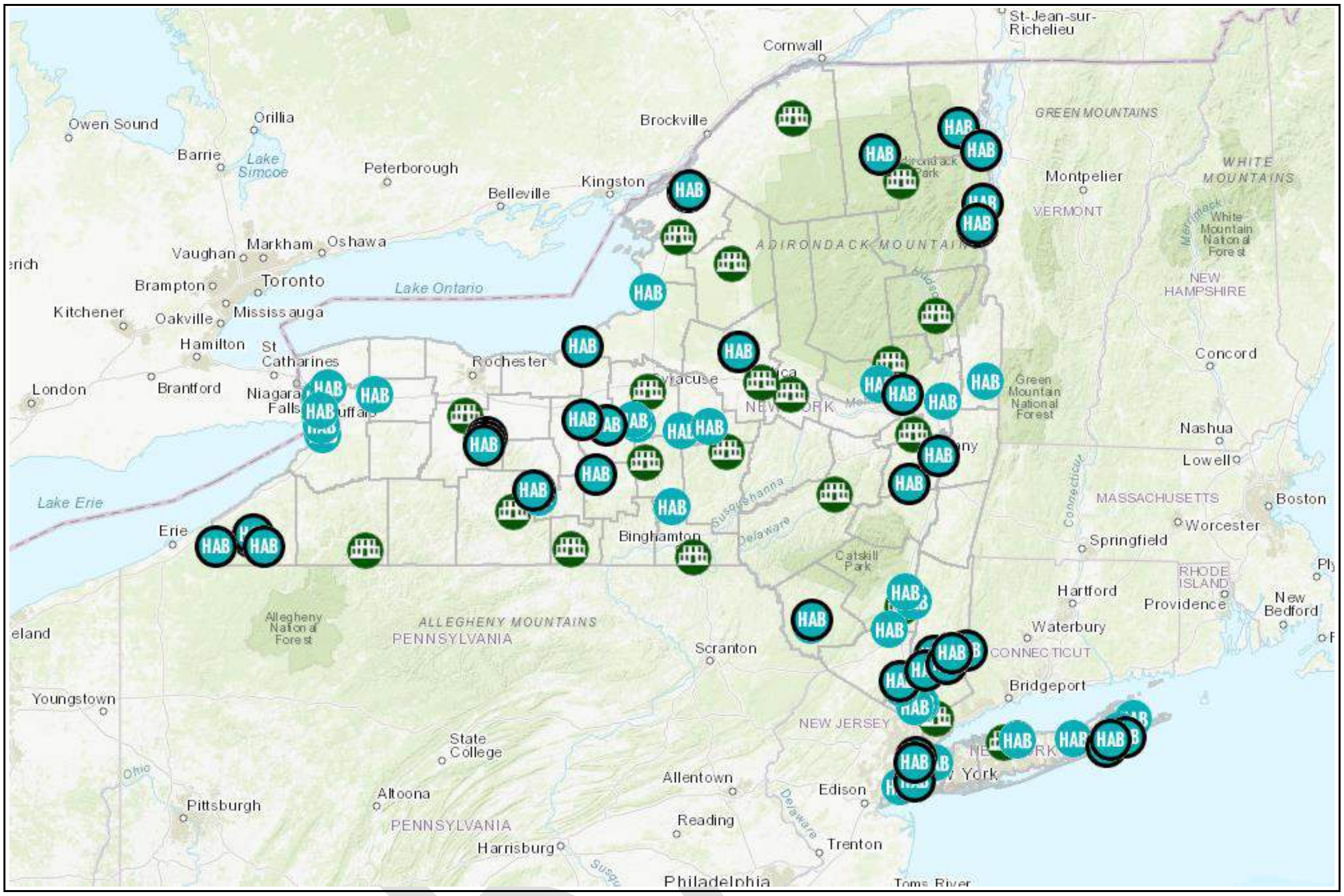


Source: California State Water Resources Control Board

Figure 11-2. Blue-Green Algae Benthic Blooms

Source: California State Water Resources Control Board

Figure 11-3. Current Harmful Algal Bloom Reports and Archived Harmful Algal Bloom Reports for New York State



Source: NYSDEC 2022

11.1.2 Location

Yates County currently does not have HAB reported events based on the statewide monitoring program. However, many large waterbodies in the county have experienced and are ideal for HAB hazard events to occur.

Figure 11-4 through Figure 11-6 show the major lakes in Yates County that may be susceptible to HABs. The largest lake systems in the County are Keuka Lake, covering over 11,000 acres, and Seneca Lake covering over 43,000 acres. These lakes contain many of the game fish unique to the state and communities: brown trout, lake trout, largemouth bass, northern pike, pickerel, rainbow trout, rock bass, smallmouth bass, sunfish, yellow bullhead, yellow perch, black crappie, and more. HAB events pose a threat to the health of these fish species and to the lake ecosystems as a whole.

Figure 11-4. Canandaigua Lake in Yates County

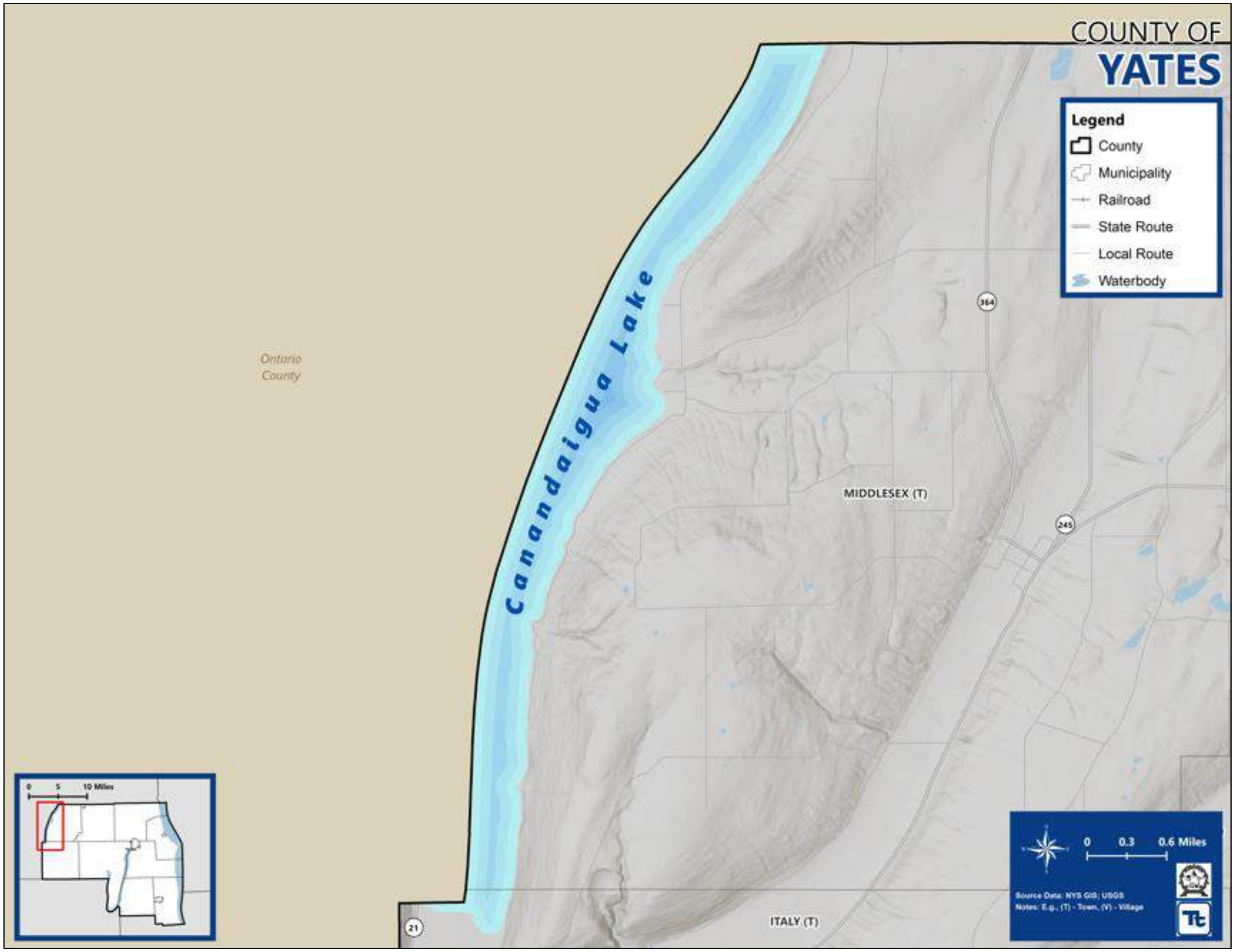


Figure 11-5. Keuka Lake in Yates County

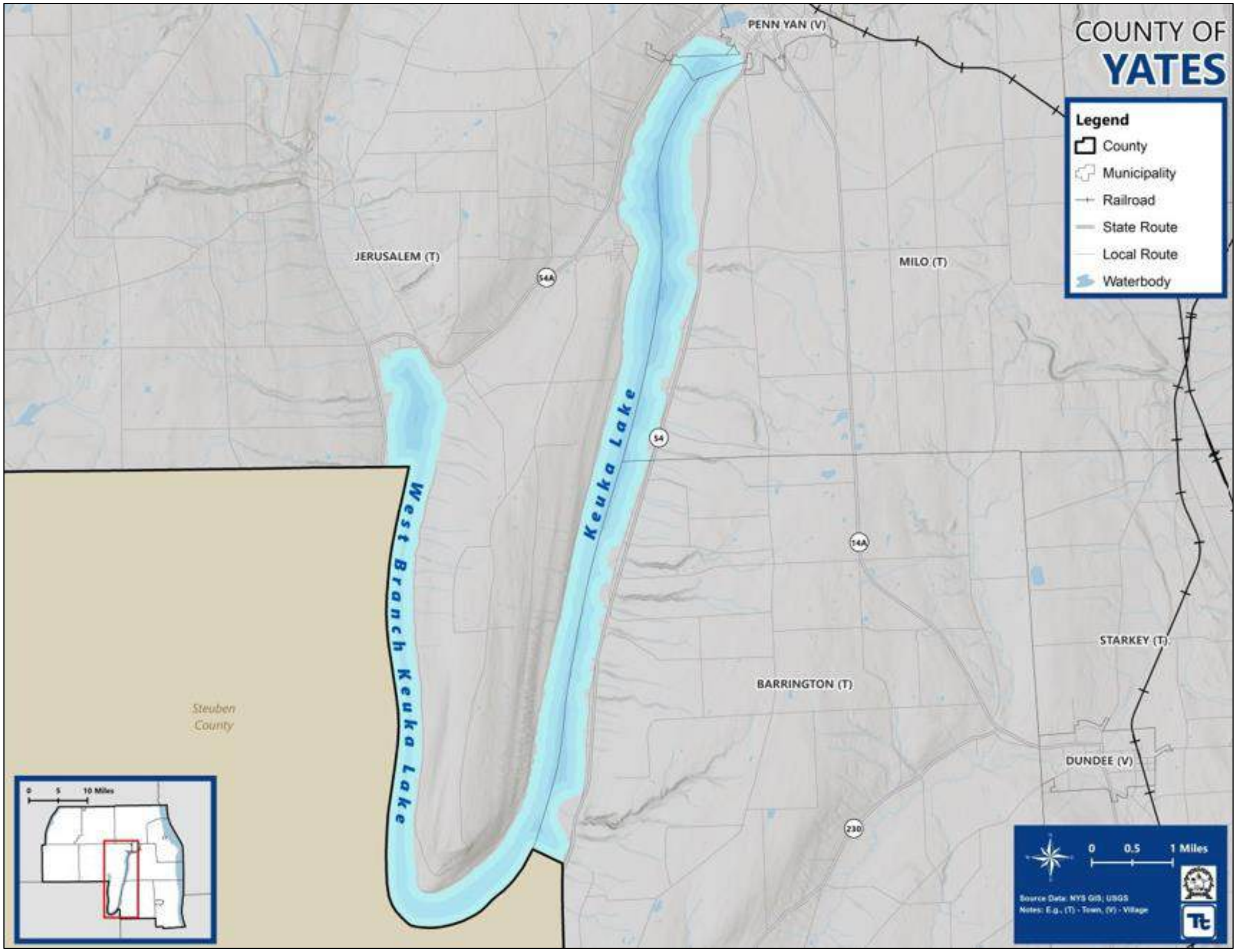
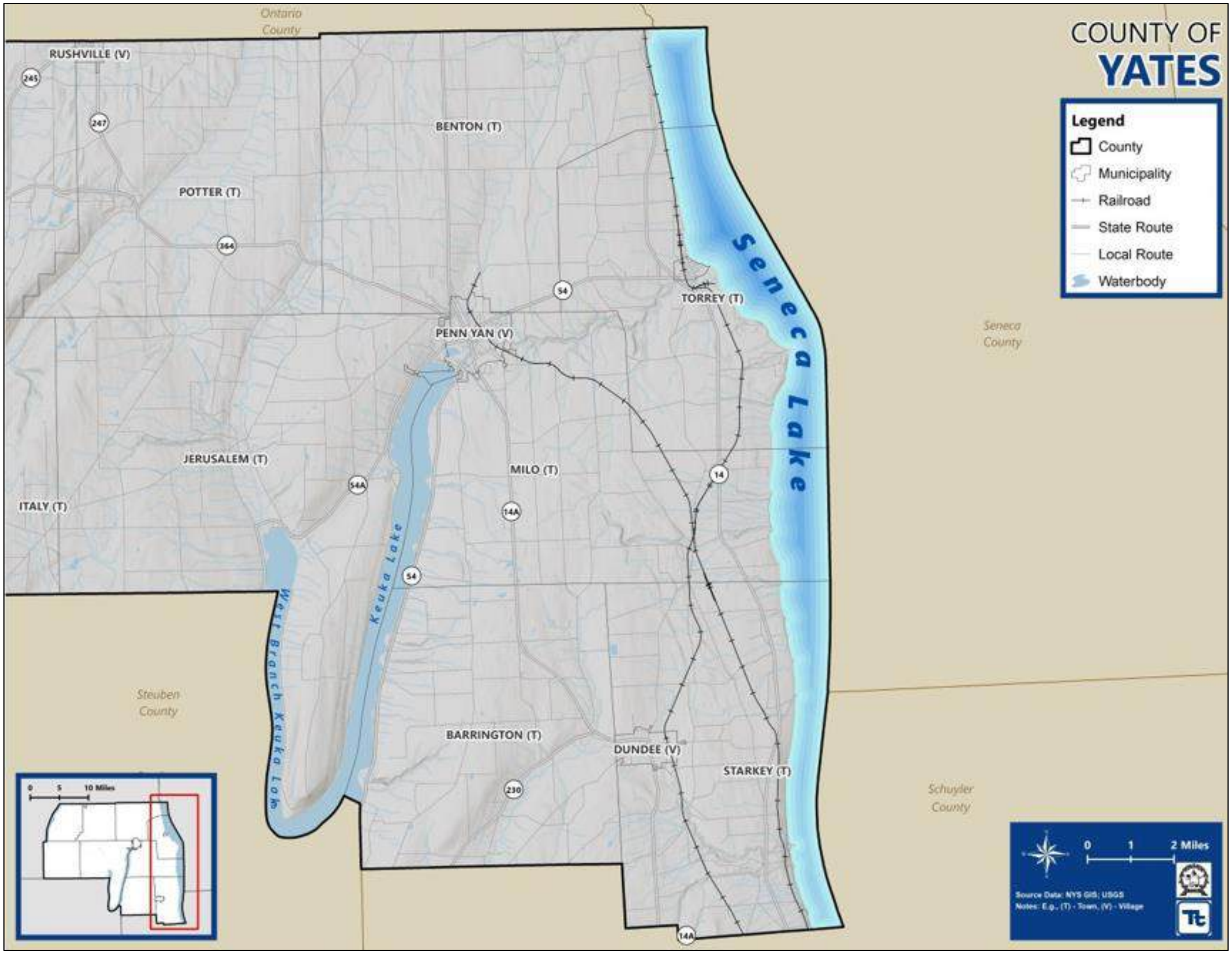


Figure 11-6. Seneca Lake in Yates County



11.1.3 Extent

The NYSDEC monitoring program defines four classifications for HAB extent based on the impacted area of the waterbody:

- **Small localized—**When a HAB affects a small area of the waterbody. Limited to just one or a few neighboring properties.
- **Large localized—**When a HAB affects multiple properties within a large area of a shoreline or specific region of the waterbody.
- **Widespread/lake-wide—**When a HAB affects the waterbody in entirety, or a majority of the shoreline.
- **Open water—**When a HAB is located near the center of the waterbody. Conditions may be widespread, and toxins can be higher near shoreline areas (NYSDEC, Harmful Algal Bloom (HAB) Action Plans n.d.).

HAB hazard events are collected by visual observations, photographs, and laboratory sampling to help determine the cyanobacteria or other algae present. Suspicious blooms are reported to NYSDEC, local health departments, or the NYS DOH. Status definitions are as follows (NYSDEC, Harmful Algal Bloom (HAB) Action Plans n.d.):

- **Suspicious Bloom (Type S)—**NYSDEC has confirmed that it is a cyanobacteria HAB based upon visual observations and photographs. However, laboratory sampling has not been conducted to confirm this determination. Toxins present in the waterbody are to be determined.
- **Confirmed Bloom (Type C)—**Water samples confirm the presence of a cyanobacteria HAB, which has the potential to produce harmful toxins.
- **Confirmed with High Toxins Bloom (Type HT)—**Water samples confirm the presence of a cyanobacteria HAB as well as toxin present in the waterbody. The toxin quantity is enough to potentially cause health problems for human and animals that come into contact with the waterbody by swimming or drinking.

11.1.4 Previous Occurrences

Federal Major Disaster and Emergency Declarations

Yates County has not been included in any major disaster (DR) or emergency (EM) declarations for harmful algal bloom-related events (FEMA 2023b).

USDA Declarations

Since the previous Yates County HMP, the County has not been included in any USDA declarations issued for harmful algal bloom -related events (USDA 2024).

Previous Events

Known harmful algal bloom-related events that impacted Yates County between January 2020 and December 2024 are presented in Table 11-1. For events prior to 2020, refer to the previous Yates County HMP.

Table 11-1. Harmful Algal Bloom Events in Yates County (2020 to 2024)

Event Date	Disaster Declaration Number	Yates County Included in declaration?	Location Impacted	Description
July 20, 2020	N/A	N/A	Yates County; Ontario County	A HAB event occurred in Canandaigua Lake in Yates and Ontario Counties. There were 75 reports issued for this HAB event.
July 21, 2020	N/A	N/A	Yates County; Steuben County	A HAB event occurred in Keuka Lake in Yates and Steuben Counties. There were 15 reports issued for this HAB event.
July 31, 2020	N/A	N/A	Yates County	A type C (confirmed bloom) HAB event was reported in Half Moon Lake in Yates County.
June 29, 2021	N/A	N/A	Yates County; Ontario County	A HAB event occurred in Canandaigua Lake in Yates and Ontario Counties. There were 84 reports issued for this HAB event.
August 16, 2021	N/A	N/A	Yates County; Steuben County	A HAB event occurred in Keuka Lake in Yates and Steuben Counties. There were 12 reports issued for this HAB event.
August 25, 2021	N/A	N/A	Yates County; Ontario County; Schuyler County; Seneca County	A HAB event occurred in Seneca Lake in Yates, Ontario, Schuyler, Seneca Counties. There were 72 reports issued for this HAB event.
August 4, 2022	N/A	N/A	Yates County; Steuben County	A HAB event occurred in Keuka Lake in Yates and Steuben Counties. There were 16 reports issued for this HAB event.
August 16, 2022	N/A	N/A	Yates County; Ontario County; Schuyler County; Seneca County	A HAB event occurred in Canandaigua Lake and Seneca Lake in Yates, Schuyler, Seneca, and Ontario Counties. There were 32 reports issued for the Canandaigua Lake HAB event and 57 for the Seneca Lake HAB event.

Source: NYSDEC 2023

11.1.5 Probability of Future Occurrences

Probability Based on Past Events

Information on previous harmful algal bloom occurrences in the County was used to calculate the probability of future occurrence of such events, as summarized in Table 11-2. Based on historical records and input from the Steering Committee, the probability of occurrence for harmful algal bloom-related events in the County is considered "frequent."

Table 11-2. Probability of Future Harmful Algal Bloom Events in Yates County

Hazard Type	Number of Occurrences Between 2020 and 2024	Percent Chance of Occurring in Any Given Year
Harmful Algal Bloom	8	100%

Source: NYSDEC 2023

Note: Available records may not include all actual occurrences. Counts in this table may underestimate actual probability.

Potential Effect of Climate Change on Hazard Probability

Projections of climate change for New York State and for the Central/Finger Lakes region that includes Yates County are summarized in Section 3.5.4. Climate change is projected to have an impact on HAB hazard events and algal growth. Climate change significantly increases the severity and frequency of HABs by altering the salinity and temperature levels in waterbodies, increasing carbon dioxide levels and changing precipitation events (EPA 2022).

The warming of waterbodies and changing salinity levels can increase HAB occurrence. Toxic blue-green algae thrive on warm waters, which allow for the algae to float along the surface, absorbing necessary sunlight for growth. Climate change is increasing drought events, which are leading to increased freshwater salinity levels. Saltier waterbodies are allowing for toxic marine algae to invade freshwater systems, resulting in significant increase in fish kills since 2000 (EPA 2022).

Higher levels of carbon dioxide are optimal for HABs, as toxic algae need carbon dioxide to survive and grow. Increase in carbon dioxide in both the atmosphere and water leads to a boom in algal growth. This can increase the frequency and intensity of HAB events in many waterbodies that are already vulnerable to blooms.

Changes in precipitation due to climate change can impact drought occurrences and intensity of storm events. As more rainfall-induced flooding occurs, increased runoff and pollution enters waterbody systems, allowing for toxic algae to nourish and multiply (EPA 2022).

11.1.6 Cascading Impacts on Other Hazards

While harmful algal blooms may not present a direct impact on other hazards identified within this HMP update, cascading impacts are still present. For example, HABs have the potential to cause increased water quality degradation in an area due to the production of harmful toxins. These toxins can contaminate drinking water sources, recreation waters, and fisheries, posing a threat to the health of the community and ecosystem. This may also put strains on water needs and may worsen during drought conditions when water is already scarce or over utilized.

11.2 VULNERABILITY AND IMPACT ASSESSMENT

11.2.1 Life, Health, and Safety

Overall Population

The entire population of Yates County (24,773) is exposed to this hazard. HAB conditions can affect people's health and safety, including health problems related to exposure to harmful toxins through drinking water causing respiratory problems, gastrointestinal illness, skin irritation, and more. Other possible impacts on health from HAB include increased recreational risks; effects on air quality; diminished living conditions related to water quality; and increased incidence of illness and disease. Health implications of HAB are numerous. Some HAB-related health effects are short-term while others can be long-term.

Socially Vulnerable Population

Socially vulnerable populations are susceptible to HAB events based on their physical ability to react and recover after HAB exposure. Vulnerable populations include homeless persons, people over 65 years old, low income or linguistically isolated populations, people with life-threatening illnesses, and residents that may have limited access to healthcare. The population over 65 is more likely to need medical attention for pre-existing conditions and may not have the capacity to respond or recover quickly from HAB exposure.

Table 3-5 shows social vulnerability statistics for Yates County and participating municipalities from the ACS 5-year estimates. Table 3-6 shows low-income populations based on United for ALICE data. The municipalities with the highest and lowest numbers and percentages in each social vulnerability category are listed in Table 11-3. The SVI for Yates County is identified as "relatively moderate."

Table 11-3. Municipalities With Highest and Lowest Socially Vulnerable Populations

Category	Municipality Highest in Category		Municipality Lowest in Category	
	Number	Percent	Number	Percent
Population Over 65	Penn Yan (V): **1,367**	Penn Yan (V): **27.0%**	Dresden (V): **54**	Potter (T): **12.1%**
Population Under 5	Jerusalem (T): **306**	Dresden (V): **9.9%**	Starkey (T): **1**	Starkey (T): **0.1%**
Non-English-Speaking Population	Benton (T): **89**	Potter (T): **7.0%**	Dundee (V), Rushville (V), Starkey (T): **0**	Dundee (V), Rushville (V), Starkey (T): **0.0%**
Population With Disability	Penn Yan (V): **789**	Dundee (V): **18.9%**	Potter (T): **12**	Potter (T): **1.0%**
Population Below Poverty Level	Penn Yan (V): **776**	Dundee (V): **27.6%**	Rushville (V): **30**	Rushville (V): **4.6%**
Households Below ALICE Threshold	—	Italy (T): **58%**	—	Barrington (T): **33%**

11.2.2 General Building Stock

A HAB event is not expected to directly affect any structures within the County.

11.2.3 Community Lifelines and Other Critical Facilities

For example, when a HAB event occurs, drinking water can be unsafe for consumption, putting strain on drinking water treatment costs. Water treatment facilities may need to implement additional treatment procedures and invest in advanced monitoring technologies to mitigate the impacts of HABs on drinking water supplies. This financial strain on water treatment facilities could lead to higher water utility bills for County residents.

11.2.4 Economy

HAB events may deter tourists from visiting an affected area due to health and safety concerns. This impact on tourism and recreation can negatively affect local businesses and restaurants that rely on tourism for revenue and employment.

11.2.5 Natural, Historic and Cultural Resources

Natural

Harmful algal blooms can release toxins that can kill fish and invertebrate. Animals that prey on fish and invertebrates in surface waters, such as birds and mammals, may be affected if they ingest impacted prey (CDC 2022). Both harmful and non-harmful algal blooms can have drastic impacts on oxygen levels in surface waters. When algae begin to die off following a bloom, bacteria begin to decompose the organic material. This decomposition consumes dissolved oxygen and releases carbon dioxide. If the bloom and die off is large enough, dissolved oxygen levels in aquatic systems can rapidly crash. Anoxic conditions connected to algal blooms have resulted in large fish and invertebrate kills (National Oceanic and Atmospheric Administration 2023).

Historic

HAB events are unlikely to have direct impacts on historic resources.

Cultural

HAB events have the potential to impact cultural activities that rely on access to clean water and healthy aquatic environments, such as fishing, water-based community events, and cultural ceremonies. These impacts can negatively affect a community's cultural identity, particularly among coastal communities with a strong connection to the aquatic resources in the area.

11.3 CHANGE OF VULNERABILITY SINCE 2020 HMP

The County's overall vulnerability to this hazard has not changed, and the entire County will continue to be vulnerable to HAB events.

11.4 FUTURE CHANGES THAT MAY AFFECT RISK

11.4.1 Potential or Planned Development

Any areas of growth in the County could be susceptible to HAB, especially those near waterbodies. Specific areas of recent and new development are indicated in tables and maps included in Volume II of this plan. Increased human productivity can increase the HAB risk due to added nutrient pollution. Tourism in Yates County is projected to increase, which can place a greater stress and dependence on the natural aquatic environment during a HAB event.

11.4.2 Projected Changes in Population

Yates County has experienced a decrease in its population since 2010. According to the U.S. Census Bureau, the County's population decreased by 2.3 percent between 2010 and 2020 (U.S. Census Bureau 2023). Cornell University's Program on Applied Demographics projects Yates County will have a population of 26,014 by 2030 and 25,787 by 2040 (Cornell University 2018). Changes in the density of the population can impact the number of persons exposed to HAB and reliance upon water resources.

11.4.3 Climate Change

The State of New York is expected to see a rise in average annual temperatures, fostering a heightened frequency of HAB occurrences. Climate change exacerbates the likelihood and severity of HAB events, prolonging their duration and intensifying their impact. Over the past five decades, there has been a notable Increase in average annual temperatures within the state, with an increment of 0.6°F per decade since 1970 (NYSERDA 2014).

12. HAZARDOUS MATERIALS

12.1 HAZARD PROFILE

12.1.1 Hazard Description

Causes and Types of Incidents

Hazardous materials can be released due to accident, human neglect, intentional acts, or natural hazards. They can affect nearby populations and contaminate critical or sensitive environmental areas. When caused by natural hazards, these incidents are considered to be secondary events. The hazardous materials hazard for this HMP refers to accidental incidents related to the manufacture, transportation, storage, and use of hazardous materials. Hazardous material incidents most commonly occur as one of the following types:

- **A fixed-facility hazardous materials incident** is the uncontrolled release of materials from a fixed site capable of posing a risk to health, safety, and property. It is possible to identify and prepare for a fixed-site incident because laws require facilities to notify state and local authorities about what is being used or produced at the site.
- **A hazardous materials transportation incident** is an event resulting in uncontrolled release of hazardous materials during transport that can pose a risk to health, safety, and property. Hazardous materials transportation incidents can occur anywhere, although most occur on interstate highways, major federal or state highways, or major rail lines. Many incidents occur in sparsely populated areas and affect very few people. Hazardous products are shipped daily on highways, railroads, waterways, and pipelines. Transportation incidents are difficult to prepare for because there is little, if any, notice about what materials could be involved should an accident happen.

Regulations

Hazardous materials at fixed sites are regulated nationally by the U.S. Environmental Protection Agency (EPA) and in New York by the New York Department of Environmental Conservation (NYSDEC). The U.S. Department of Transportation's Pipeline and Hazardous Materials Safety Administration is responsible for ensuring the safe movement of hazardous materials to industry and consumers by all modes of transportation.

The EPA regulates hazardous materials under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), commonly referred to as "Superfund." Congress established the Superfund program in 1980 to clean up sites where hazardous materials incidents occur. The CERCLA and the Superfund Amendments and Reauthorization Act (SARA) required that a National Priorities List (NPL) of sites throughout the United States be maintained and revised at least annually (EPA 1989). SARA, signed into law on October 17, 1986, is a federal law that applies nationwide.

The EPA administers the Superfund program in cooperation with individual states. The NYSDEC's Inactive Hazardous Waste Disposal Site (IHWDS) Program is the State of New York's program for identifying, investigating, and cleaning up sites where consequential amounts of hazardous waste have been disposed. These sites go through a process of investigation, evaluation, cleanup, and monitoring.

The NYSDEC's Bulk Storage Program Database identifies petroleum bulk storage (PBS) and chemical bulk storage (CBS) facilities that require registration with NYSDEC (PBS facilities with a capacity of 1,100 gallons or more and CBS facilities with a capacity of 185 gallons or more).

Defining Hazardous Materials

Hazardous materials can include explosives, flammable and combustible substances, radioactive materials, toxic chemicals (poisonous vapors, aerosols, liquids and solids that have toxic effects on people, animals or plants), infectious substances, and hazardous wastes. The EPA identifies more than 800 substances as hazardous and many more as potentially hazardous depending on their characteristics and the circumstances of their release. CERCLA defines a hazardous substance as any of the following materials (EPA 2013):

- Any element, compound, mixture, solution, or substance designated as hazardous under Section 102 of CERCLA.
- Any hazardous substance designated under Section 311(b)(2)(a) of the Clean Water Act (CWA), or any toxic pollutant listed under Section 307(a) of the CWA.
- Any hazardous waste having the characteristics identified or listed under Section 3001 of the Resource Conservation and Recovery Act.
- Any hazardous air pollutant listed under Section 112 of the Clean Air Act.
- Any imminently hazardous chemical substance or mixture for which the EPA Administrator has taken action under Section 7 of the Toxic Substances Control Act.

Such materials are present in nearly every county in facilities that produce, store, or use them, and they are transported along interstate highways and railways daily. A common example is a water treatment plant, which uses chlorine on-site to eliminate bacterial contaminants. Many products containing hazardous materials are used and stored in homes. Even the natural gas used in homes and businesses is a dangerous substance when a leak occurs.

Hazardous Materials in Transit

A hazardous material is any solid, liquid, or gas that, when released, can harm people, the environment, or property (FEMA 2019a). The Department of Transportation (DOT) classifies hazardous materials in transit as follows (FEMA 2019a):

- **Class 1**—Explosives
- **Class 2**—Gases
- **Class 3**—Flammable liquids (and combustible liquids)
- **Class 4**—Flammable solids; substances liable to spontaneous combustion, substances that emit flammable gases on contact with water
- **Class 5**—Oxidizing substances and organic peroxides
- **Class 6**—Toxic (poisonous) substances
- **Class 7**—Radioactive materials
- **Class 8**—Corrosive substances
- **Class 9**—Miscellaneous dangerous goods/hazardous materials and articles

Hazardous materials can cause death, serious injury, long-lasting health effects, and damage to buildings, homes, and other property. An accident involving a vehicle carrying hazardous materials becomes a hazmat incident if the hazardous material leaks or is involved in a fire, or if potential for release, fire, or another hazard exists (NFPA 2022).

12.1.2 Location

Fixed-Facility Sites

Historically, hazardous materials were dumped on the ground or in rivers or left out in the open by public and private companies. As a result, thousands of uncontrolled or abandoned contaminated sites were created nationwide. These sites include abandoned warehouses, manufacturing facilities, processing plants, and landfills. Fixed-site facilities that use, manufacture, or store hazardous materials in Yates County pose risk and must comply with Title III of SARA. Yates County's map of industrial/business sites that file Tier II Reports in compliance with SARA Title III is not included for security purposes. The following sources list known locations of fixed-facility hazardous waste sites in the County:

- The EPA Hazardous Waste Report provides detailed data on the generation of hazardous waste from large quantity generators and on the waste management practices of treatment, storage, and disposal facilities. The 2019 report lists 99 facilities in Yates County (EPA 2021).

- The Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS) database indicates no Superfund sites in Yates County (EPA 2023).
- As of August 2023, there are 154 sites listed in the NYSDEC's Bulk Storage Program Database in Yates County (NYSDEC 2023). Most of these sites (93 percent) are petroleum bulk storage sites, and the remaining 6 percent are chemical bulk storage sites.

Transportation Routes

Highways

Incidents involving hazardous materials in transit can occur anywhere in Yates County, as hazardous materials are transported via roadways every day. Major State roadways in the County include Route 14, Route 14-A, Route 54, Route 54A, Route 245, Route 364 and Reference Route 961H (NY DOT 2004). County roads are also subject to the potential for hazardous material incidents. Yates County has 44 county roads—Route 1 is the longest, at 13.62 miles, followed by Route 18 at 12.83 miles (NY DOT 2022). Figure 12-1 shows the major transportation routes in Yates County.

Pipelines

Yates County has a relatively small network of natural gas and petroleum pipelines. Users in the State of New York consume natural gas delivered by other states' pipelines. New York State has few natural gas reserves and modest production (USEIA 2022). Empire Pipeline Inc., Columbia Gas Transmission, LLC., Tennessee Gas Pipeline Commission, and Greenidge Pipeline, LLC all operate pipelines in Yates County that transport natural gas (PHMSA n.d.). Table 12-1 shows how many miles of pipeline each company has within the County. Figure 12-2 and Figure 12-3 show the extent and locations of pipelines throughout the County.

Table 12-1. Miles of Pipeline in Yates County by Company

Company Name	Miles of Pipeline in Yates County
Empire Pipeline Inc.	22.91 miles
Columbia Gas Transmission, LLC.	0.96 miles
Tennessee Gas Pipeline Commission	14.69 miles
Greenidge Pipeline, LLC	4.6 miles

Source: PHMSA n.d.

Figure 12-1. Major Transportation Routes in Yates County

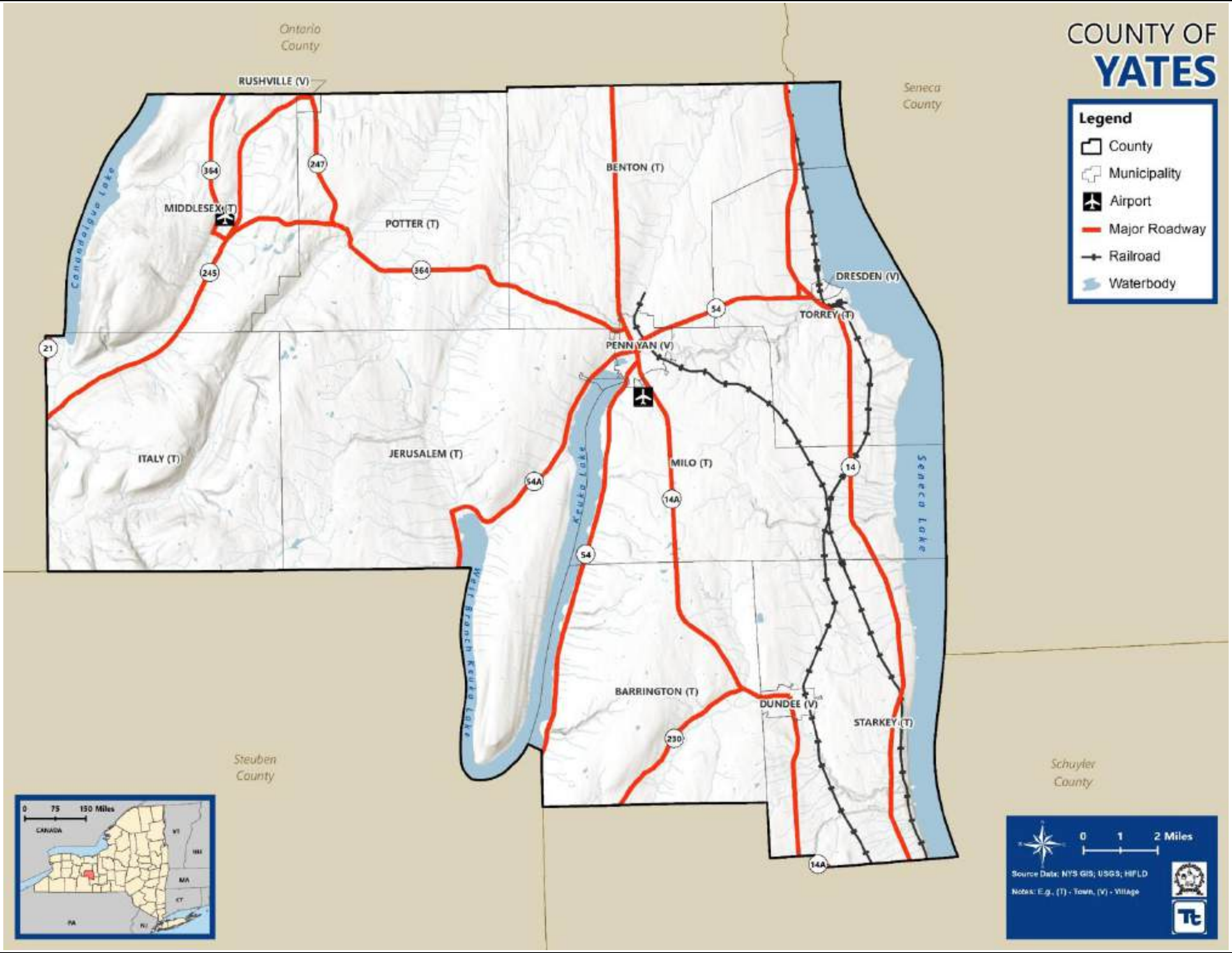
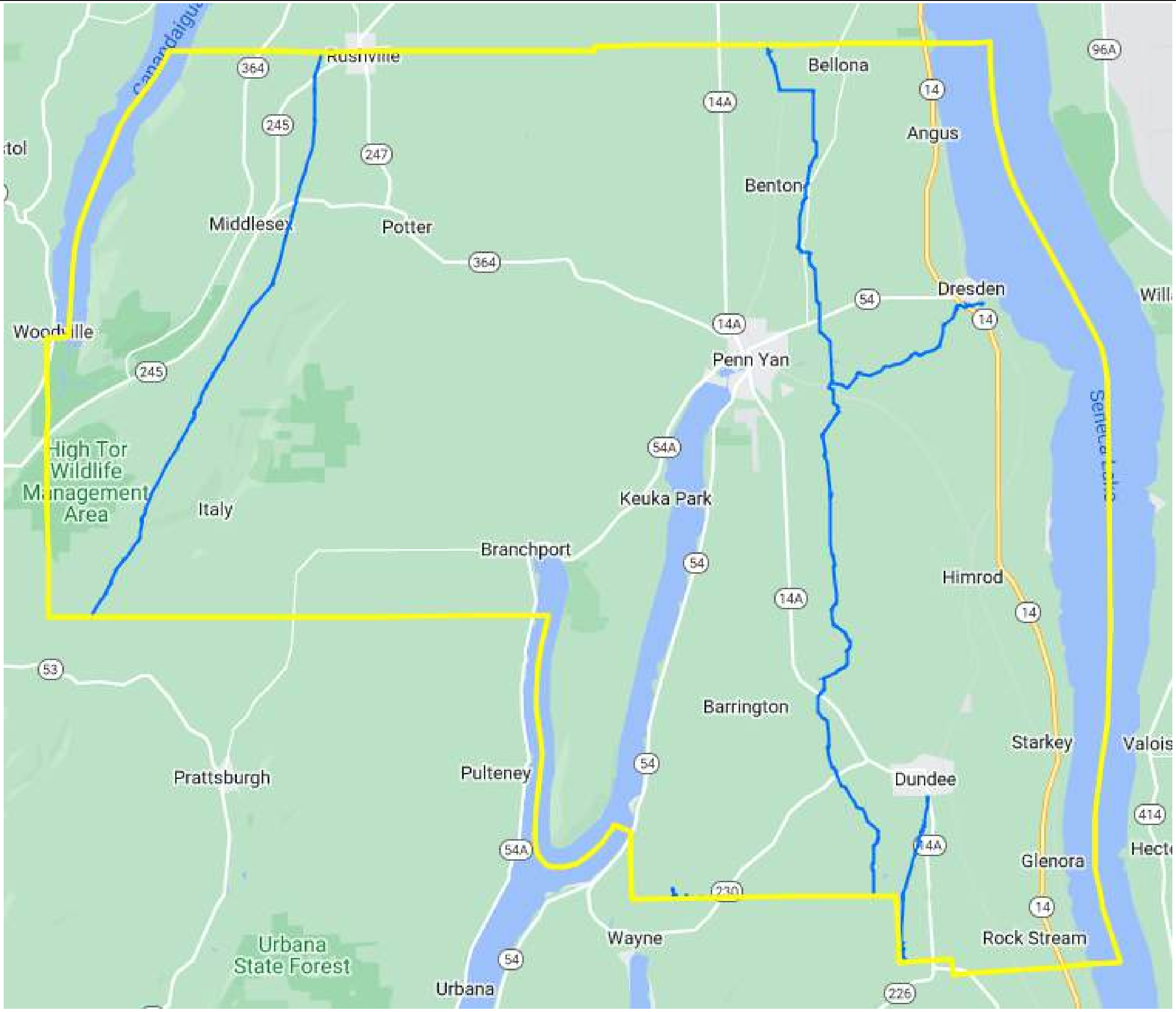


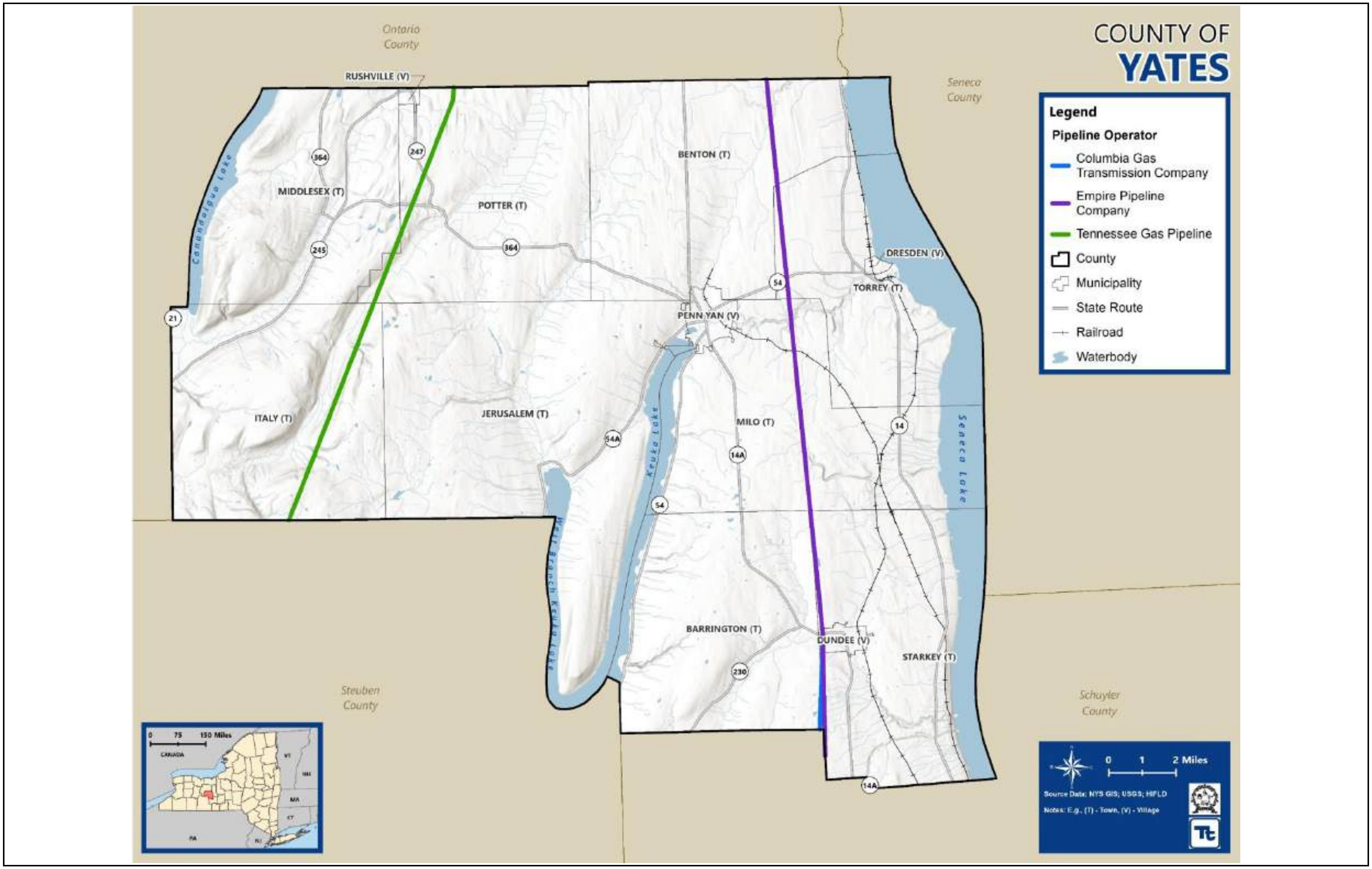
Figure 12-2. Location of Gas Transmission Pipelines in Yates County



Note: Blue lines indicate gas transmission pipelines

Source: PHMSA n.d.

Figure 12-3. National Fuel Pipelines in Yates County



Railroads

Hazardous materials also travel by rail, specifically on the railways of the Finger Lakes Railway Corporation (FGLK). The FGLK branch line runs from Watkins Glen in Schuyler County to Penn Yan; the North-South FGLK line runs from Lyons in Wayne County, through Ontario, Yates, and Schuyler Counties, to Corning in Steuben County (NY DOT 2022). The commodities hauled on the two rail lines include steel, scrap metals, pulpboard, scrap paper, canned goods, sand, chemicals, salt, aggregates, grain, fertilizers, plastic, corn syrup, clay, soda ash, lumber and building materials like shingles, roofing, panel products and pipe (Finger Lakes Railway 2015). Not all of these goods are considered hazardous materials by themselves, but a hazardous materials incident could occur if they are exposed to a reactive agent, such as heat, pressure, or water.

County Overview

Figure 12-4 shows buffer areas along the hazardous materials transport routes (rail, pipeline, roadway) in Yates County. Areas closest to a hazardous materials release are generally at greatest risk; however, depending on the agent, a release can travel great distances or remain present in the environment for a long time (i.e., centuries to millennia).

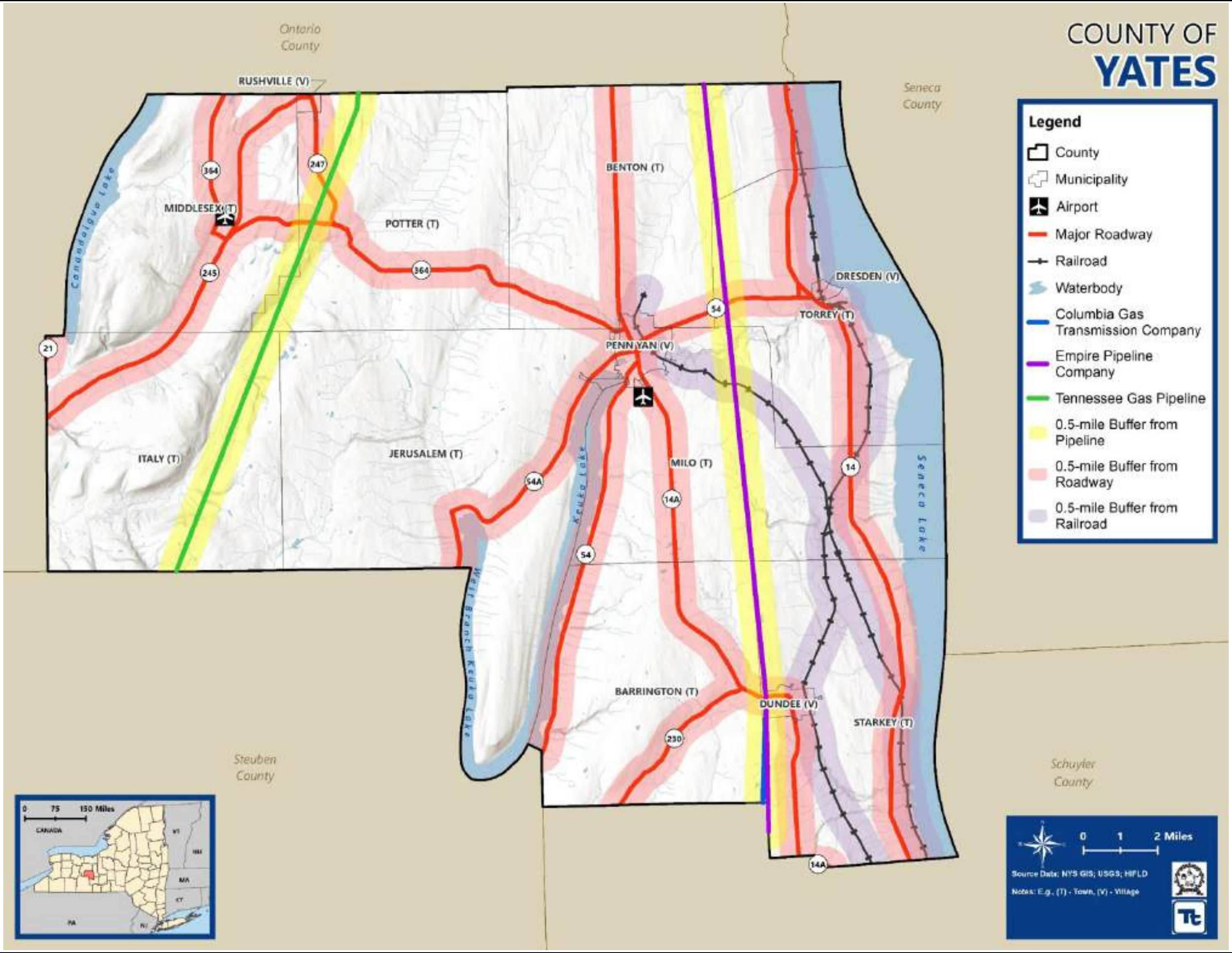
12.1.3 Extent

Hazardous material releases contaminate air, water, and soils, possibly resulting in death and/or injuries to humans, animals, and vegetation. Dispersion takes place rapidly when the hazardous material is transported by water and wind. The severity of a hazardous material release depends on whether it is from a fixed or mobile source, the toxicity and properties of the material, the duration of the release, and the environmental conditions (e.g., wind, precipitation, or terrain).

The Yates County Hazardous Materials Plan classifies three types of hazardous material incidents:

- A "Level I" incident is not likely to adversely impact or threaten life, health, property, or the environment; control of the incident is within capabilities of local response jurisdictions.
- A "Level II" incident may adversely impact or threaten life, health, property, or the environment within an area immediately surrounding the point of release; control of the incident is outside the capabilities of local fire departments and would require assistance of a regional hazardous materials team.
- A "Level III" incident poses a serious threat to a large area or poses a major threat to life, environment, or property. This incident would require assistance from a regional hazardous materials team and possibly state and/or federal responders.

Figure 12-4. Hazardous Materials Transport Methods with 1-Mile Buffer



An incident occurring at an on-site or fixed facility may be sudden and without any warning, such as an explosion, or slowly developing, such as a leaking container. Facilities that store extremely hazardous substances are required to notify local officials when an incident occurs. Local emergency responders and emergency management officials would determine the need to evacuate the public or to advise sheltering in place.

The amount of warning time for incidents associated with hazardous substances in transit (or off-site events) varies based on the nature of the incident, the scope of the incident, and the characteristics of the substance released. If an explosion does not occur immediately following an accident, there may be time for warning of adjacent neighborhoods and enough time to facilitate appropriate protective actions.

12.1.4 Previous Occurrences

Federal Major Disaster and Emergency Declarations

Yates County has not been included in any major disaster (DR) or emergency (EM) declarations for hazardous materials-related events (FEMA 2023b).

USDA Declarations

Since the previous Yates County HMP, the County has not been included in any USDA declarations for hazardous materials-related events (USDA 2024).

Previous Events

The NYSDEC Spill Incidents Database recorded 886 spill incidents throughout the County from January 1, 1978, through May 2024 (NYSDEC 2023). Table 12-2 lists incidents between January 2020 and May 2024. Earlier events are listed in the previous Yates County HMP.

Table 12-2. Hazardous Materials Events in Yates County (2020 to 2024)

Event Date	Disaster Declaration Number	Yates County Included in Declaration?	Location Impacted	Description
January 1, 2020	N/A	N/A	Penn Yan (V)	1 gallon of hydraulic oil spilled on an impervious surface at 425 N Main Street in Penn Yan.
January 21, 2020	N/A	N/A	Starkey (T)	An unknown amount of an unknown material spilled at 4620 Route 226 in Starkey.
February 3, 2020	N/A	N/A	Jerusalem (T)	An unknown amount of diesel fuel spilled at 2905 State Route 54A in Jerusalem.

Event Date	Disaster Declaration Number	Yates County Included in Declaration?	Location Impacted	Description
February 27, 2020	N/A	N/A	Dundee (V)	Multiple materials spilled at 635 Shannon Corners Road in Dundee. Materials included 12 gallons of motor oil, 60 gallons of hydraulic oil, and 45 gallons of diesel fuel. These materials affected soil, surface water, and sewers.
March 4, 2020	N/A	N/A	Penn Yan (V)	5 gallons of transformer oil spilled at 3275 E Sherman Hollow Road in Penn Yan, affecting the surrounding soil.
March 14, 2020	N/A	N/A	Dundee (V)	An unknown amount of motor oil impacted surrounding soil at 5316 State Route 14 in Dundee.
March 16, 2020	N/A	N/A	Penn Yan (V)	An unknown amount of an unknown material spilled at 7962 State Route 14 in Penn Yan.
April 3, 2020	N/A	N/A	Torrey (T)	150 gallons of diesel fuel spilled at the intersection of State Route 14 and Leach Road in Torrey, impacted the surrounding soil and surface water.
April 10, 2020	N/A	N/A	Penn Yan (V)	50 gallons of milk spilled at 2472 Stape Road in Penn Yan, impacting the surrounding soil.
May 11, 2020	N/A	N/A	Penn Yan (V)	1 gallon of fuel oil spilled at 234 State Route 54 in Penn Yan, impacting the surrounding soil.
May 20, 2020	N/A	N/A	Penn Yan (V)	An unknown amount of diesel fuel spilled at 105 Horizon Park Drive in Penn Yan.
May 29, 2020	N/A	N/A	Dundee (V)	30 gallons of hydraulic oil spilled at 19 Union Street in Dundee, impacting the surrounding soil.
June 4, 2020	N/A	N/A	Starkey (T)	An unknown amount of diesel fuel and motor oil spilled at 4421 Log City Road in Starkey, impacting the surrounding soil.
June 18, 2020	N/A	N/A	Jerusalem (T)	1 pound of gasoline spilled at 13760 W Lake Road in Jerusalem, impacting nearby surface water.
June 23, 2020	N/A	N/A	Dundee (V)	15 gallons of transformer oil spilled at 719 Dundee Starkey Road in Dundee, impacting the surrounding soil.
July 6, 2020	N/A	N/A	Dundee (V)	An unknown amount of an unknown material spilled at 11 Water Street in Dundee.
July 7, 2020	N/A	N/A	Dundee (V)	2 gallons of transmission fluid spilled at 4571 State Route 14A in Dundee, flowing onto the impervious roadway.
July 18, 2020	N/A	N/A	Jerusalem (T)	An unknown amount of gasoline, motor oil, and antifreeze spilled at 6508 E Bluff Drive in Jerusalem, impacting nearby surface water.

Event Date	Disaster Declaration Number	Yates County Included in Declaration?	Location Impacted	Description
July 28, 2020	N/A	N/A	Milo (T)	An unknown amount of an unknown material spilled at 3839 Severne Road in Milo, impacting nearby surface water and groundwater.
August 10, 2020	N/A	N/A	Penn Yan (V)	150 gallons of diesel fuel spilled at 2300 Milo Mill Road in Penn Yan, flowing onto the impervious roadway.
August 12, 2020	N/A	N/A	Penn Yan (V)	An unknown amount of auto waste fluid spilled at the Penn Yan Village Boat Launch on Water Street in Penn Yan, impacting nearby surface water.
August 13, 2020	N/A	N/A	Penn Yan (V)	221 gallons of gasoline spilled at 823 E Lake Road in Penn Yan, impacting the surrounding soil and groundwater.
September 12, 2020	N/A	N/A	Jerusalem (T)	An unknown amount of raw sewage spilled 150 yards south of 7424 W Bluff Drive in Jerusalem, impacting the surrounding soil and nearby surface water.
September 17, 2020	N/A	N/A	Penn Yan (V)	An unknown amount of petroleum spilled at 108-112 Lake Street in Penn Yan, impacting the surrounding soil.
October 9, 2020	N/A	N/A	Penn Yan (V)	An unknown amount of an unknown material spilled at 139 Elm Street in Penn Yan
January 26, 2021	N/A	N/A	Starkey (T)	4,800 gallons of milk and 5 gallons of motor oil spilled at the intersection of State Route 14 and Rock Stream Road (Fir Tree Point Road), in Starkey, impacting the surrounding soil and nearby surface water.
March 23, 2021	N/A	N/A	Potter (T)	1 gallon of hydraulic oil and 1 gallon of antifreeze spilled at the intersection of Voak Road and Ferguson Corner Road in Potter, impacting the surrounding soil and flowing onto the impervious roadway.
April 6, 2021	N/A	N/A	Starkey (T)	An unknown amount of an unknown material spilled at 4620 Route 226 in Starkey, impacting the surrounding soil.
April 6, 2021	N/A	N/A	Benton (T)	10 gallons of hydraulic oil spilled at the intersection of State Route 364 and Lovejoy Road in Benton.
May 4, 2021	N/A	N/A	Dresden (V)	An unknown amount of an unknown material spilled on Arrowhead Beach Road in Dresden, impacting the air quality.
May 22, 2021	N/A	N/A	Jerusalem (T)	5 gallons of auto waste fluids and 5 gallons of motor oil spilled at the intersection of Italy Hill Road and Corwin Road in Jerusalem.

Event Date	Disaster Declaration Number	Yates County Included in Declaration?	Location Impacted	Description
May 26, 2021	N/A	N/A	Penn Yan (V)	An unknown amount of an unknown material spilled at 214 Lake Street in Penn Yan.
May 27, 2021	N/A	N/A	Penn Yan (V)	An unknown amount of an unknown material spilled at 102 Delanco Place in Penn Yan, impacting the surrounding soil.
May 27, 2021	N/A	N/A	Penn Yan (V)	An unknown amount of diesel fuel spilled at 33 Champlin Ave in Penn Yan, impacting the surrounding soil.
May 28, 2021	N/A	N/A	Potter (T)	15 gallons of hydraulic oil spilled at the intersection of State Route 247 and Mothersill Road in Potter, impacting the surrounding soil.
May 30, 2021	N/A	N/A	Jerusalem (T)	An unknown amount of an unknown material spilled at 587 Acorn Road in Jerusalem.
August 9, 2021	N/A	N/A	Jerusalem (T)	An unknown amount of an unknown material spilled near 382 W Lake Road in Jerusalem, impacting nearby surface water.
August 24, 2021	N/A	N/A	Penn Yan (V)	An unknown amount of an unknown material spilled at 411 Clinton Street in Penn Yan.
August 30, 2021	N/A	N/A	Jerusalem (T)	An unknown amount of paint spilled at the intersection of Italy Hill Road and State Route 54A in Jerusalem, impacting nearby sewers.
September 11, 2021	N/A	N/A	Jerusalem (T)	An unknown amount of an unknown material spilled at 658 Acorn Road in Jerusalem.
September 25, 2021	N/A	N/A	Penn Yan (V)	An unknown amount of raw sewage spilled at 2474 State Route 14 in Penn Yan, impacting the surrounding soil and groundwater.
October 5, 2021	N/A	N/A	Rushville (V)	An unknown amount of hydraulic oil spilled at 497 Fitch Road in Rushville, impacting the surrounding soil.
October 22, 2021	N/A	N/A	Penn Yan (V)	10 gallons of petroleum spilled at School Drive in Penn Yan.
October 27, 2021	N/A	N/A	Penn Yan (V)	496 gallons of fuel oil spilled at 3480 Old Bath Road in Penn Yan, impacting the surrounding soil and nearby surface water.
October 31, 2021	N/A	N/A	Jerusalem (T)	2 gallons of transformer oil spilled at 3023 W Bluff Drive in Jerusalem, impacting the surrounding soil.
November 2, 2021	N/A	N/A	Penn Yan (V)	An unknown amount of diesel fuel spilled at 366 Clinton Street in Penn Yan.
November 12, 2021	N/A	N/A	Starkey (T)	An unknown amount of an unknown material spilled at 16 Starkey Point Road in Starkey.

Event Date	Disaster Declaration Number	Yates County Included in Declaration?	Location Impacted	Description
November 12, 2021	N/A	N/A	Penn Yan (V)	An unknown amount of gasoline and motor oil spilled at 4482 E Bluff Drive in Penn Yan, impacting the surrounding soil and nearby surface water.
November 23, 2021	N/A	N/A	Jerusalem (T)	An unknown amount of an unknown material spilled at 505 Assembly Ave in Jerusalem.
January 10, 2022	N/A	N/A	Penn Yan (V)	An unknown amount of petroleum was spilled at 2469 Route 54A in Penn Yan, impacting the surrounding soil and groundwater.
February 3, 2022	N/A	N/A	Penn Yan (V)	An unknown amount of milk spilled at 930 Leach Road in Penn Yan, impacting the surrounding soil.
February 17, 2022	N/A	N/A	Dundee (V)	An unknown amount of an unknown material spilled at 4860 Starkey Point Road in Dundee, impacting the surrounding soil, nearby surface water, and sewers.
March 25, 2022	N/A	N/A	Jerusalem (T)	An unknown amount of wastewater spilled at 642 W Lake Road in Jerusalem, impacting the surrounding soil and nearby surface water.
May 6, 2022	N/A	N/A	Starkey (T)	An unknown amount of manure spilled at 259 Rock Stream Road in Starkey, impacting the surrounding soil and nearby surface water.
May 12, 2022	N/A	N/A	Penn Yan (V)	An unknown amount of petroleum spilled at 119 Benham Street, impacting the surrounding soil and nearby surface water.
May 13, 2022	N/A	N/A	Jerusalem (T)	50 gallons of diesel fuel spilled at the intersection of Belknap Hill Road and Guyangoa Street in Jerusalem, impacting the surrounding soil.
May 20, 2022	N/A	N/A	Rushville (V)	An unknown amount of an unknown materials spilled at 440 E Lake Road in Rushville, impacting nearby surface water.
June 1, 2022	N/A	N/A	Penn Yan (V)	An unknown amount of gasoline spilled at 139 Elm Street in Penn Yan, impacting the surrounding soil.
June 2, 2022	N/A	N/A	Italy (T)	An unknown amount of an unknown material spilled at 3195 Shay Road in Italy, impacting the surrounding soil and groundwater.
June 10, 2022	N/A	N/A	Italy (T)	An unknown amount of hydraulic oil spilled at 1280 Italy Valley Road in Italy, flowing on the impervious roadway.
June 21, 2022	N/A	N/A	Torrey (T)	An unknown amount of diesel fuel was spilled at the intersection of State Route 14 and Lampman Road in Torrey.

Event Date	Disaster Declaration Number	Yates County Included in Declaration?	Location Impacted	Description
July 18, 2022	N/A	N/A	Jerusalem (T)	An unknown amount of used oil was spilled at 555 Berc's Bar Bay in Jerusalem, impacting the surrounding soil and nearby surface water.
July 23, 2022	N/A	N/A	Jerusalem (T)	2 gallons of petroleum spilled at the intersection of Belknap Hill Road and Guyangoa Street in Jerusalem, impacting the surrounding soil.
July 25, 2022	N/A	N/A	Milo (T)	2,400 gallons of diesel fuel and 350 gallons of motor oil spilled at 616 Severne Road in Milo, impacting the surrounding soil and nearby surface water.
August 11, 2022	N/A	N/A	Penn Yan (V)	50 gallons of gasoline spilled at 101 North Ave in Penn Yan.
August 19, 2022	N/A	N/A	Penn Yan (V)	An unknown amount of diesel fuel and hydraulic oil spilled at 1680 Flat Street in Penn Yan.
September 26, 2022	N/A	N/A	Milo (T)	An unknown amount of farm waste spilled on Hall Road in Milo, impacting nearby surface water and sewers.
September 28, 2022	N/A	N/A	Dresden (V)	An unknown amount of fuel oil spilled at 590 Plant Road in Dresden, impacting the surrounding soil.
November 6, 2022	N/A	N/A	Milo (T)	402 pounds of milk spilled at 1274 Himrod Road in Milo, impacting the surrounding soil and nearby surface water.
November 11, 2022	N/A	N/A	Starkey (T)	40 gallons of an unknown material spilled at 4620 Route 226 in Starkey.
November 21, 2022	N/A	N/A	Starkey (T)	30 gallons of diesel fuel spilled at the intersection of State Route 14 and Rock Stream Road (Fir Tree Point Road) in Starkey, impacting the surrounding soil and flowing onto the impervious roadway.
March 23, 2023	N/A	N/A	Torrey (T)	An unknown amount of an unknown material spilled at 1685 Spur Road in Torry, impacting the surrounding soil.
March 28, 2023	N/A	N/A	Penn Yan (V)	An unknown amount of petroleum spilled at 939 Route 14A in Penn Yan, impacting the surrounding soil.
May 2, 2023	N/A	N/A	Dresden (V)	An unknown amount of motor oil spilled at 50 Min Street in Dresden.
May 16, 2023	N/A	N/A	Penn Yan (V)	An unknown amount of petroleum spilled at 939 Route 14A in Penn Yan, impacting the surrounding soil.
May 22, 2023	N/A	N/A	Jerusalem (T)	250 gallons of raw sewage spilled at 5811 E Bluff Drive in Jerusalem, impacting the surrounding soil.

Event Date	Disaster Declaration Number	Yates County Included in Declaration?	Location Impacted	Description
July 6, 2023	N/A	N/A	Penn Yan (V)	An unknown amount of diesel fuel spilled at 939 Route 14A in Penn Yan, impacting the surrounding soil and groundwater.
August 16, 2023	N/A	N/A	Dundee (V)	An unknown amount of raw sewage spilled at 5150 Lakemont Himrod Road in Dundee, impacting the surrounding soil and nearby surface water.
August 21, 2023	N/A	N/A	Dundee (V)	An unknown amount of raw sewage spilled at 5150 Lakemont Himrod Road in Dundee, impacting the surrounding soil and nearby surface water.
September 5, 2023	N/A	N/A	Italy (T)	An unknown amount of hydraulic oil spilled near 6088 Italy Valley Road in Italy, flowing onto the impervious roadway.
September 11, 2023	N/A	N/A	Middlesex (T)	An unknown amount of used oil spilled at 1240 Mill Street in Middlesex, impacting the surrounding soil and flowing onto the impervious roadway.
November 2, 2023	N/A	N/A	Penn Yan (V)	3 gallons of gasoline spilled at 227 Lake Street in Penn Yan, impacting air quality and flowing onto the impervious roadway.
January 10, 2024	N/A	N/A	Penn Yan (V)	10 gallons of transformer oil spilled at 2573 Sturdevant Road in Penn Yan, impacting the surrounding soil.
February 14, 2024	N/A	N/A	Jerusalem (T)	An unknown amount of manure spilled at Italy Hill Road in Jerusalem, flowing onto the impervious roadway.
April 15, 2024	N/A	N/A	Penn Yan (V)	An unknown amount of diesel fuel spilled at 216 Liberty Street, flowing onto the impervious roadway.

Source: NYSDEC 2023

Between 1978 and May 2024, over 800 incidents occurred in Yates County, all of which occurred along highways. Cumulatively, these events released over 3,200 liquid gallons of fuel oil, gasoline, or diesel fuel, 210 liquid gallons of propane, and 55 liquid gallons of rein solution (PHMSA 2023).

In addition to the occurrences notes in Table 12-2, the EPA documented 108,437 pounds of on- and off-site disposals and other releases from facilities contained in its Toxic Release Inventory (EPA 2023).

12.1.5 Probability of Future Occurrences

Probability Based on Past Events

Information on previous hazardous materials occurrences in the County was used to calculate the probability of future occurrence of such events, as summarized in Table 12-3. Small spills, both fixed site and in-transit, occur throughout the year. It is estimated that the County will continue to experience direct and indirect impacts of hazardous material incidents annually that may induce secondary hazards such as infrastructure deterioration or failure, water quality and supply concerns, and transportation delays, accidents, and inconveniences. Based on historical records and input from the Steering Committee, the probability of occurrence for hazardous materials-related events in the County is considered "frequent."

Table 12-3. Probability of Future Hazardous Materials Events in Yates County

Hazard Type	Number of Occurrences Between 1978 and 2024	Percent Chance of Occurring in Any Given Year
Hazardous Materials	892	100%

Source: PHMSA 2023; NYSDEC 2023
Note: Available records may not include all actual occurrences. Counts in this table may underestimate actual probability.

Projected Effects of Climate Change

Hazardous materials moved by transportation systems could be impacted by climate change, depending on the method for storing materials. If storage systems do not adapt to changing temperatures, hazardous materials could react to any increase in extreme temperatures caused by climate change. Furthermore, if climate change leads to a significant increase in temperature, roads and potential rail lines may buckle and warp. Climate change may increase the frequency and magnitude of flood and severe weather events, which may lead to an increased release of hazardous substances at both fixed sites and in-transit.

In State Climate Region 1 (Western New York and Great Lakes Plain Region), which includes Yates County, it is estimated that, by the 2080s, temperatures will increase by 4.5 °F to 8.5 °F and precipitation totals will increase between 0 and 15 percent (NYSERDA 2014).

12.1.6 Cascading Impacts on Other Hazards

Hazardous materials releases have the potential to cause major disruptions to local businesses that house hazardous materials and to other major businesses in the vicinity. Depending on the severity of the release event, this could result in additional economic impacts to the region, such as prolonged business closures or supply chain disruptions.

12.2 VULNERABILITY AND IMPACT ASSESSMENT

The hazard area for hazardous materials was defined as a 0.5-mile buffer around major roadways, railroads, and pipelines (see Figure 12-4). Inventory mapping (population, general building stock, critical facilities, and new development) was overlaid with the buffered hazard area. Assets with their centroid or polygon in the hazard area were totaled to estimate the totals and values at risk from a release of hazardous materials. Hazardous materials data, including roadways, pipelines, railroads, and facilities, were provided by Yates County, the New York Department of Transportation, and the U.S. Energy Information Administration.

12.2.1 Life, Health, and Safety

Overall Population

Hazardous materials incidents can cause acute and chronic health issues and have an impact on long-term public health. People near facilities producing, storing, or transporting hazardous substances are at higher risk of exposure, with populations downstream, downwind, and downhill of a released substance at particular risk. Depending on the substance released, people in a larger area may be in danger from explosion, absorption, injection, ingestion, or inhalation. People outside the immediate affected area may be evacuated for precautionary reasons or told to shelter-in-place, depending on the release type and wind conditions.

The vulnerability analysis evaluated populations within 0.5 miles of major transportation infrastructure where a hazardous materials event could occur. Table 12-4 summarizes population vulnerability to hazardous material incidents by jurisdiction. According to this analysis:

- There are 14,553 persons, 7,582 persons, and 1,660 persons living within 0.5 miles of all roadways, railways, and pipelines, respectively.
- The Village of Penn Yan has the greatest number of people living within 0.5 miles of all roadways and railways, with 4,849 and 3,983 persons, respectively.
- The Village of Dundee has the greatest number of people living within 0.5 miles of all railways (480).

If a facility is in a densely populated neighborhood with high rates of overcrowded units or low-income households, then these populations may face elevated vulnerability. People employed at facilities producing elevated levels of hazardous materials also face an increased risk of exposure due to their direct contact with the hazardous materials.

Table 12-4. Population in the Hazardous Materials Buffer Hazard Areas

	Total Population	Population Vulnerable to Hazardous Material Incidents					
		Within 0.5 Miles of Hazardous Materials Roadways		Within 0.5 Miles of Hazardous Materials Railways		Within 0.5 Miles of Hazardous Materials Pipelines	
		Number of People	Percent of Total	Number of People	Percent of Total	Number of People	Percent of Total
Barrington (T)	1,541	911	59.1%	0	0.0%	104	6.7%
Benton (T)	2,580	1,338	51.9%	538	20.9%	351	13.6%
Dresden (V)	293	213	72.7%	293	100.0%	0	0.0%
Dundee (V)	1,690	1,526	90.3%	1,108	65.6%	480	28.4%
Italy (T)	1,099	171	15.6%	0	0.0%	128	11.6%
Jerusalem (T)	4,253	1,611	37.9%	5	0.1%	0	0.0%
Middlesex (T)	1,377	419	30.4%	0	0.0%	9	0.7%
Milo (T)	2,303	1,083	47.0%	355	15.4%	197	8.6%
Penn Yan (V)	5,056	4,849	95.9%	3,983	78.8%	0	0.0%
Potter (T)	1,207	356	29.5%	0	0.0%	264	21.9%
Rushville (V)	651	651	100.0%	0	0.0%	0	0.0%
Starkey (T)	1,717	1,065	62.0%	782	45.5%	100	5.8%
Torrey (T)	1,006	360	35.8%	518	51.5%	27	2.7%
Yates County (Total)	**24,773**	**14,553**	**58.7%**	**7,582**	**30.6%**	**1,660**	**6.7%**

Source: Yates County 2020; U.S. Census Bureau 2020

Note: % = percent

Hazardous materials pose a significant risk to emergency response personnel. All first responders and emergency personnel in the County currently are and will be properly trained to the level of emergency response actions required of their individual position at the response scene.

Mitigating conditions are measures taken in advance to reduce the impact of a release on the surrounding environment. Primary and secondary containment or shielding by sheltering-in-place can protect people and property from the harmful effects of a hazardous material release.

Exacerbating conditions, characteristics that can enhance or magnify the effects of a hazardous material release, include the following factors:

- Weather conditions, which affect how the hazard occurs and develops
- Micro-meteorological effects of buildings and terrain, which affect dispersion of hazardous materials
- Non-compliance with applicable codes (such as building or fire codes)
- Maintenance failures (such as fire protection and containment features), which can substantially increase the damage to the facility itself and to surrounding buildings.

Socially Vulnerable Population

Socially vulnerable populations may be impacted by hazardous material events differently than others. For example, in the event of an evacuation, younger and older populations and those with disabilities may have mobility issues or rely on others (i.e., parents, aides) to get around. Low-income households have less disposable capital to pay for temporary shelter (i.e., hotels) should their place of occupancy become unlivable. Individuals who do not speak English very well, or speak another language, may receive warning or evacuation notices but not understand them.

As shown in Table 12-5, the Village of Penn Yan has the highest population over 65 (1,311), the largest population under the age of 5 (164), highest disabled population (756), and the greatest population living in poverty (744) located within 0.5 miles of all roadways. The Town of Benton has the largest population of non-English speaking persons (46) located within 0.5 miles of all roadways.

As shown in Table 12-6, the Village of Penn Yan has the highest population over 65 (1,077), the largest population under the age of 5 (135), highest disabled population (621), and the greatest population living in poverty (611) located within 0.5 miles of all railways. The Town of Torrey has the largest population of non-English speaking persons (21) located within 0.5 miles of all railways.

As shown in Table 12-7, the Town of Benton has the highest population over 65 (75). The Village of Dundee has the highest population under 5 (42), largest disabled population (90), and the greatest population living in poverty (132) located within 0.5 miles of all pipelines. The Township of Sparta has the located largest population of non-English speaking persons within 0.5 miles of all pipelines.

Table 12-5. Estimated Vulnerable Population in the 0.5-Mile Hazardous Materials Roadway Buffer Hazard Area

	Estimated Number of Vulnerable Persons in the 0.5-Mile Hazardous Materials Roadways Buffer Hazard Area				
	Persons Over 65	Persons Under 5	Non-English-Speaking Persons	Persons with a Disability	Persons in Poverty
Barrington (T)	222	70	20	62	69
Benton (T)	288	106	46	87	97
Dresden (V)	39	21	1	24	45
Dundee (V)	204	136	0	289	421
Italy (T)	28	7	0	30	13
Jerusalem (T)	279	115	21	157	144
Middlesex (T)	89	13	1	52	42
Milo (T)	288	97	5	135	234
Penn Yan (V)	1,311	164	15	756	744
Potter (T)	43	34	24	3	19
Rushville (V)	111	17	0	87	30
Starkey (T)	177	0	0	80	96
Torrey (T)	74	28	14	60	50
Yates County (Total)	**3,153**	**808**	**147**	**1,822**	**2,004**

Source: Yates County 2020; U.S. Census Bureau 2017-2021 American Community Survey

Table 12-6. Estimated Vulnerable Population in the 0.5-Mile Hazardous Materials Railway Buffer Hazard Area

	Estimated Number of Vulnerable Persons in the 0.5-Mile Hazardous Materials Railways Buffer Hazard Area				
	Persons Over 65	Persons Under 5	Non-English-Speaking Persons	Persons with a Disability	Persons in Poverty
Barrington (T)	0	0	0	0	0
Benton (T)	116	42	18	35	39
Dresden (V)	53	28	2	33	62
Dundee (V)	148	99	0	209	306
Italy (T)	0	0	0	0	0
Jerusalem (T)	0	0	0	0	0
Middlesex (T)	0	0	0	0	0
Milo (T)	94	31	1	44	76
Penn Yan (V)	1,077	135	12	621	611
Potter (T)	0	0	0	0	0
Rushville (V)	0	0	0	0	0
Starkey (T)	130	0	0	59	70
Torrey (T)	106	41	21	87	72
Yates County (Total)	**1,724**	**376**	**54**	**1,088**	**1,236**

Source: U.S. Census Bureau 2017-2021 American Community Survey; NYSDOT 2013

Table 12-7. Estimated Vulnerable Population in the 0.5-Mile Hazardous Materials Pipeline Buffer Hazard Area

	Estimated Number of Vulnerable Persons in the 0.5-Mile Hazardous Materials Pipeline Buffer Hazard Area				
	Persons Over 65	Persons Under 5	Non-English-Speaking Persons	Persons with a Disability	Persons in Poverty
Barrington (T)	25	8	2	7	7
Benton (T)	75	28	12	22	25
Dresden (V)	0	0	0	0	0
Dundee (V)	64	42	0	90	132
Italy (T)	21	5	0	23	10
Jerusalem (T)	0	0	0	0	0
Middlesex (T)	1	0	0	1	0
Milo (T)	52	17	1	24	42
Penn Yan (V)	0	0	0	0	0
Potter (T)	31	25	18	2	14
Rushville (V)	0	0	0	0	0
Starkey (T)	16	0	0	7	9
Torrey (T)	5	2	1	4	3
Yates County (Total)	**290**	**127**	**34**	**180**	**242**

Source: U.S. Census Bureau 2017-2021 American Community Survey; U.S. EIA 2023

12.2.2 General Building Stock

Potential losses to property caused by a hazardous materials release, whether in transit or at fixed sites, are difficult to quantify. The degree of damage depends on the scale of the incident. Potential impacts may include inaccessibility, loss of service, contamination, and/or potential damage to the structure or contents. Hazardous materials can pose a serious long-term threat to property, particularly to the fixed-site facilities where hazardous materials are stored.

The impact of a fixed-facility incident will often be localized to the property where it occurs. It is difficult to determine potential losses to surrounding development because of the variable nature of a hazardous material spill. For example, a very small chemical spill in a less populated area would be much less costly and possibly limited to remediation of soil. Local building stock characteristics and the type of substance released during a spill will greatly affect the extent of property damage.

The vulnerability analysis indicates 10,722 buildings with an estimated value of $7 billion within 0.5 miles of all roadways, 4,694 buildings with an estimated value of $3.5 billion within 0.5 miles of all railways, and 1,488 buildings with an estimated value of $900,000 within 0.5 miles of all pipelines. The Village of Penn Yan has the greatest number of buildings within 0.5 miles of all roadways and 0.5 miles of all railways, with 2,200 and 1,773 respectively. The Town of Benton has the greatest number of buildings (283) within 0.5 miles of all pipelines. Refer to Table 12-8 through Table 12-10 for building vulnerability to hazardous material incidents by jurisdiction.

Table 12-11 through Table 12-13 list the buildings within the hazardous material hazard areas by general occupancy. The vulnerability analysis estimates that across all hazardous materials hazard areas, residential buildings face the most vulnerability to the hazardous material hazard, accounting for 55 percent, 59 percent, and 46 percent of the buildings within 0.5 miles of railways, 0.5 miles of roadways, and 0.5 miles of pipelines, respectively.

12.2.3 Community Lifelines and Other Critical Facilities

Most community lifelines house and store hazardous materials and thus are vulnerable to possible incidents. Potential impacts to community lifelines may include inaccessibility, loss of service, contamination, and/or potential damage to the structure or contents if an explosion related to a hazardous materials release occurs. Hospitals often store large quantities of hazardous materials and may face elevated risk in the event of a spill. If an incident were to occur in a hospital setting, patients would be jeopardized, and accessibility issues could prevent them from being moved and first responders from gaining access to the building. Patients who are moved may influx surrounding hospitals in addition to any new patients from the incident.

Table 12-8. Estimated Number and Total Replacement Cost Value of Structures in the 0.5-Mile Hazardous Materials Roadway Buffer Hazard Area

	Jurisdiction Total Buildings		Number of Buildings		Replacement Cost Value	
	Count	Replacement Cost Value	Count	% of Jurisdiction Total	Value	% of Jurisdiction Total
Barrington (T)	1,943	$1,087,359,607	1,065	54.8%	$555,156,329	51.1%
Benton (T)	2,125	$1,712,144,740	928	43.7%	$677,210,689	39.6%
Dresden (V)	189	$96,035,909	144	76.2%	$80,064,592	83.4%
Dundee (V)	808	$565,406,673	740	91.6%	$472,390,334	83.5%
Italy (T)	1,227	$446,736,385	148	12.1%	$56,692,395	12.7%
Jerusalem (T)	4,305	$2,222,802,811	1,432	33.3%	$765,768,764	34.5%
Middlesex (T)	1,600	$733,491,126	541	33.8%	$307,265,061	41.9%
Milo (T)	2,708	$1,920,559,675	1,205	44.5%	$894,410,609	46.6%
Penn Yan (V)	2,300	$1,828,807,125	2,200	95.7%	$1,765,539,210	96.5%
Potter (T)	1,402	$1,046,854,169	423	30.2%	$268,559,858	25.7%
Rushville (V)	214	$108,056,906	214	100.0%	$108,056,907	100.0%
Starkey (T)	1,958	$1,239,984,737	1,141	58.3%	$610,960,191	49.3%
Torrey (T)	1,317	$1,022,674,865	541	41.1%	$513,625,873	50.2%
Yates County (Total)	**22,096**	**$14,030,914,727**	**10,722**	**48.5%**	**$7,075,700,808**	**50.4%**

Source: Yates County Planning Department; NYS GIS Clearinghouse; U.S. Army Corps of Engineers National Structure Inventory; RS Means 2022

Table 12-9. Estimated Number and Total Replacement Cost Value of Structures in the 0.5-Mile Hazardous Materials Railway Buffer Hazard Area

	Jurisdiction Total Buildings		Number of Buildings		Replacement Cost Value	
	Count	Replacement Cost Value	Count	% of Jurisdiction Total	Value	% of Jurisdiction Total
Barrington (T)	1,943	$1,087,359,607	0	0.0%	$0	0.0%
Benton (T)	2,125	$1,712,144,740	291	13.7%	$140,433,193	8.2%
Dresden (V)	189	$96,035,909	189	100.0%	$96,030,349	100.0%
Dundee (V)	808	$565,406,673	556	68.8%	$429,908,561	76.0%
Italy (T)	1,227	$446,736,385	0	0.0%	$0	0.0%
Jerusalem (T)	4,305	$2,222,802,811	6	0.1%	$3,024,662	0.1%
Middlesex (T)	1,600	$733,491,126	0	0.0%	$0	0.0%
Milo (T)	2,708	$1,920,559,675	429	15.8%	$351,747,933	18.3%
Penn Yan (V)	2,300	$1,828,807,125	1,773	77.1%	$1,448,861,911	79.2%
Potter (T)	1,402	$1,046,854,169	0	0.0%	$0	0.0%
Rushville (V)	214	$108,056,906	0	0.0%	$0	0.0%
Starkey (T)	1,958	$1,239,984,737	882	45.0%	$623,192,338	50.3%
Torrey (T)	1,317	$1,022,674,865	568	43.1%	$423,574,853	41.4%
Yates County (Total)	**22,096**	**$14,030,914,727**	**4,694**	**21.2%**	**$3,516,773,799**	**25.1%**

Source: Yates County Planning Department; NYS GIS Clearinghouse; U.S. Army Corps of Engineers National Structure Inventory; RS Means 2022; NYDOT 2013

Table 12-10. Estimated Number and Total Replacement Cost Value of Structures in the 0.5-Mile Hazardous Materials Pipeline Buffer Hazard Area

	Jurisdiction Total Buildings		Number of Buildings		Replacement Cost Value	
	Count	Replacement Cost Value	Count	% of Jurisdiction Total	Value	% of Jurisdiction Total
Barrington (T)	1,943	$1,087,359,607	124	6.4%	$55,281,934	5.1%
Benton (T)	2,125	$1,712,144,740	283	13.3%	$210,143,350	12.3%
Dresden (V)	189	$96,035,909	0	0.0%	$0	0.0%
Dundee (V)	808	$565,406,673	195	24.1%	$102,109,076	18.1%
Italy (T)	1,227	$446,736,385	147	12.0%	$54,336,972	12.2%
Jerusalem (T)	4,305	$2,222,802,811	0	0.0%	$0	0.0%
Middlesex (T)	1,600	$733,491,126	16	1.0%	$6,882,160	0.9%
Milo (T)	2,708	$1,920,559,675	274	10.1%	$172,068,024	9.0%
Penn Yan (V)	2,300	$1,828,807,125	0	0.0%	$0	0.0%
Potter (T)	1,402	$1,046,854,169	232	16.5%	$136,680,171	13.1%
Rushville (V)	214	$108,056,906	0	0.0%	$0	0.0%
Starkey (T)	1,958	$1,239,984,737	118	6.0%	$63,993,930	5.2%
Torrey (T)	1,317	$1,022,674,865	99	7.5%	$98,044,076	9.6%
Yates County (Total)	**22,096**	**$14,030,914,727**	**1,488**	**6.7%**	**$899,539,693**	**6.4%**

Source: Yates County Planning Department; NYS GIS Clearinghouse; U.S. Army Corps of Engineers National Structure Inventory; RS Means 2022; U.S. EIA 2023

Table 12-11. Buildings in the 0.5-Mile Hazardous Materials Roadway Buffer Hazard Area by General Occupancy Class

	Buildings in the 0.5-Mile Hazardous Materials Roadway Buffer Hazard Area			
	Residential	Commercial	Industrial	Other[a]
Barrington (T)	499	497	4	65
Benton (T)	388	409	6	125
Dresden (V)	88	49	2	5
Dundee (V)	467	241	6	26
Italy (T)	110	38	0	0
Jerusalem (T)	872	526	0	34
Middlesex (T)	273	257	1	10
Milo (T)	619	533	12	41
Penn Yan (V)	1,506	641	16	37
Potter (T)	154	195	1	73
Rushville (V)	143	66	0	5
Starkey (T)	553	468	11	109
Torrey (T)	226	195	22	98
Yates County (Total)	**5,898**	**4,115**	**81**	**628**

Source: Yates County Planning Department; NYS GIS Clearinghouse; U.S. Army Corps of Engineers National Structure Inventory; RS Means 2022

a. "Other" occupancy classes include government, religion, agriculture, and education

Table 12-12. Buildings in the 0.5-Mile Hazardous Materials Railway Buffer Hazard Area by General Occupancy Class

	Buildings in the 0.5-Mile Hazardous Materials Railway Buffer Hazard Area			
	Residential	Commercial	Industrial	Other[a]
Barrington (T)	0	0	0	0
Benton (T)	156	123	2	10
Dresden (V)	121	59	2	7
Dundee (V)	339	190	9	18
Italy (T)	0	0	0	0
Jerusalem (T)	3	3	0	0
Middlesex (T)	0	0	0	0
Milo (T)	203	186	8	32
Penn Yan (V)	1,237	479	23	34
Potter (T)	0	0	0	0
Rushville (V)	0	0	0	0
Starkey (T)	406	333	14	129
Torrey (T)	325	171	22	50
Yates County (Total)	**2,790**	**1,544**	**80**	**280**

Source: Yates County Planning Department; NYS GIS Clearinghouse; U.S. Army Corps of Engineers National Structure Inventory; RS Means 2022; NYDOT 2013

a. "Other" occupancy classes include government, religion, agriculture, and education

Table 12-13. Buildings in the 0.5-Mile Hazardous Materials Pipeline Buffer Hazard Area by General Occupancy Class

	Buildings in the 0.5-Mile Hazardous Materials Pipeline Buffer Hazard Area			
	Residential	Commercial	Industrial	Other[a]
Barrington (T)	57	58	0	9
Benton (T)	102	143	0	38
Dresden (V)	0	0	0	0
Dundee (V)	147	46	0	2
Italy (T)	82	58	0	7
Jerusalem (T)	0	0	0	0
Middlesex (T)	6	9	1	0
Milo (T)	113	151	2	8
Penn Yan (V)	0	0	0	0
Potter (T)	114	101	0	17
Rushville (V)	0	0	0	0
Starkey (T)	52	51	0	15
Torrey (T)	17	34	0	48
Yates County (Total)	**690**	**651**	**3**	**144**

Source: Yates County Planning Department; NYS GIS Clearinghouse; U.S. Army Corps of Engineers National Structure Inventory; RS Means 2022; U.S. EIA 2023

a. "Other" occupancy classes include government, religion, agriculture, and education

Hazardous material incidents have the potential to lead to major transportation route closures in the County. The closure of railroads, airports, and highways as a result of hazard material release incidents has the potential to impact the ability to deliver goods and services. The County has roughly 180 miles of County-maintained roadways, 511.5 miles of locally maintained roadways, and 112 miles of State-maintained roadways that are vulnerable to hazardous materials incidents (NYDOT 2023, NYSDOT 2017).

12.2.4 Economy

If a significant hazardous materials release occurred, not only would life, safety, and building stock be at risk, but the economy of the County may be impacted as well. A significant incident in a developed area may force businesses to close for an extended period of time because of contamination or direct damage. The potential losses to existing development vary because of the variable nature of hazardous material spills, but costs from product loss, property damage and decontamination, and other costs can add up to millions of dollars.

Hazardous material incidents can cause major economic disruptions. Not only do these events impact the companies transporting the materials, but the incidents may also impact facilities surrounding the location of the incident. A hazardous materials event can become costly quickly due to the cost of responders, response equipment, and clean-up.

Hazardous material incidents can lead to extended business closures that greatly affect the local economy. As businesses close and tourists are prohibited from entering the affected area, tourism may decline and public perception of the area may be permanently affected.

The closure of railroads, airports, and highways as a result of a hazardous materials incident has the potential to impact the ability to deliver goods and services efficiently. Potential impacts may be local, regional, or statewide, depending on the magnitude of the event and level of service disruptions.

12.2.5 Natural, Historic and Cultural Resources

Natural

Hazardous materials incidents can have obvious, direct environmental impact as well as long-term, hidden environmental damage. If spilled, hazardous substances can contaminate wells, kill wildlife, and impact ecosystems. Water pollution is an immediate concern for direct human consumption, recreation, crop irrigation, and fish and wildlife consumption. Depending on the material, pollutants can bio-accumulate to differing degrees, affecting animals high on the food chain long after a spill. Hazardous wastes can also leach into soils and travel with wind, which not only impacts the localized habitat but also can create issues for surrounding communities. Strict disposal regulations have been defined by the EPA to ensure that the environment and community are protected from these types of events (EPA 2023). Hazardous material incidents would not likely affect geology but could significantly impact soils and farmlands, requiring expensive remediation.

Historic and Cultural

Hazardous materials can pose a serious long-term threat to historic and cultural resources, particularly if the incident is on, near, or adjacent to a historic or cultural site. Historic sites are typically not built to modern building codes, making them susceptible to damage. These sites often cannot be easily moved or upgraded without getting special permits if on a historic or cultural registry.

12.3 CHANGE OF VULNERABILITY SINCE 2020 HMP

Overall, the County's vulnerability has not changed since the previous HMP. Vulnerability of the entire County to hazardous materials incidents will continue.

12.4 FUTURE CHANGES THAT MAY AFFECT RISK

12.4.1 Potential or Planned Development

As discussed in Chapter 3 (County Profile) and Volume II (Jurisdictional Annexes), areas targeted for future growth and development have been identified across Yates County. Any areas of growth could be impacted by hazardous material incidents because the entire County is vulnerable. The number and types of hazardous chemicals stored in and transported through the County may increase as the County and its municipalities continue to develop available land. Specific areas of development are indicated in the jurisdictional annexes in Volume II of this plan.

Development near the transit routes for hazardous materials and facilities will increase the County's overall risk. Therefore, the County and its municipalities should take precautions with the location of new development and the development's proximity to hazardous material facilities and transit routes. The County and its municipalities may want to consider implementing designs into new development that enable improved evacuation or protection from residual impacts of hazardous materials.

12.4.2 Projected Changes in Population

Yates County has experienced a decrease in its population since 2010. According to the U.S. Census Bureau, the County's population decreased by 2.3 percent between 2010 and 2020 (Census 2020). Cornell University's Program on Applied Demographics projects Yates County will have a population of 24,706 by 2030 and 24,857 by 2040 (Cornell University 2018). An increase in population density and future development can increase the exposure to a hazardous substance incident.

12.4.3 Climate Change

It can be assumed that the projected increase in temperatures may impact the storage and ultimately transportation of hazardous materials. If stored improperly or if storage methods are not adapted to withstand extreme temperatures, hazardous materials may have an adverse reaction, leading to a potential hazardous materials incident (OSHA 2016).

Similarly, the increase in frequency and magnitude of flood and severe weather events may impact hazardous materials at fixed sites and during transit. The County experiences significant flooding events already, and based on future climate projections, these events may become more frequent and intense. If not properly stored, hazardous materials could mix with flood waters and cause adverse impacts (EPA 2021). Hazardous materials in-transit would be at risk, varying by mode of transport. Transport by rail and highway would need to be aware of flooding conditions and visibility during severe storms; transport by water would need to be aware of wave action and water elevation levels; transport by pipeline would need to be aware of potential excess soil saturation, which could influence the integrity of pipelines during extreme conditions.

13. LANDSLIDE

13.1 HAZARD PROFILE

13.1.1 Hazard Description

A landslide is a process that results in the downward or outward movement of slope-forming materials (NYS Geological Survey, n.d.). Landslide materials consist of natural rock, soil, artificial fill, or any combination of these materials (NYS DHSES 2014). These materials which make up landslides often move by falling, toppling, sliding, spreading, or flowing (NYS Geological Survey, n.d.).

Landslide Types

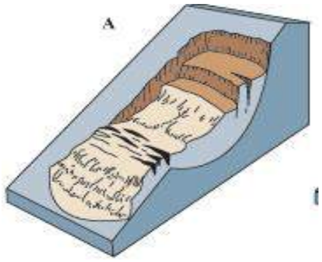
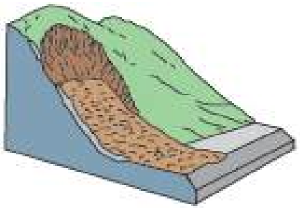
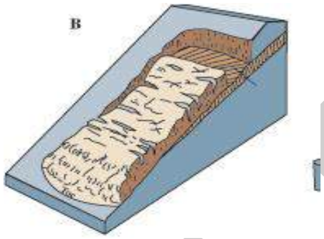
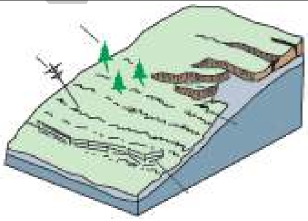
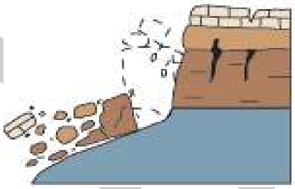
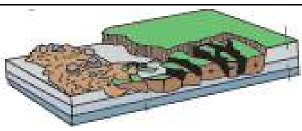
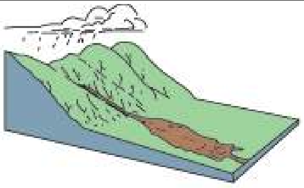
Figure 13-1 shows common landslide types as classified by the USGS. All these types of landslides are considered aggregately in USGS landslide mapping.

Landslide Causes

Both natural and human-caused changes to the environment can trigger a landslide hazard event. Examples of natural changes include heavy rain, snow melt, earthquakes, and steepening of slopes by erosion. Examples of human-caused changes include steepening of slopes by construction practices, and changes in groundwater levels from overconsumption.

These changes can trigger a landslide through several factors, such as changes in slope, increased load size, shocks or vibrations, changes in water content, groundwater movements, front actions, weathering of rocks, and the removal of vegetation from inclined surfaces. Areas that are characterized by these factors and materials are considered landslide hazard areas. Examples of common landslide hazard areas include previous landslide areas, the base of steep slopes, the base of drainage channels, developed hillsides, and areas recently burned by wildfires (NYS-DHSES n.d.).

Figure 13-1. Common Landslides Types

Rotational slides—Slides in which the surface of rupture is curved upward, and the slide movement rotates parallel to the ground surface.		**Debris avalanches—**Debris flows that travel faster than about 10 miles per hour (mph). Speeds in excess of 20 mph are not uncommon, and speeds in excess of 100 mph can occur. The slurry can travel miles from its source, growing as it descends, picking up trees, boulders, cars, and anything else in its path.	
Translational slides—Slides in which the mass moves along a roughly flat surface with little rotation.		**Earthflows—**Landslides with an “hourglass” shape. The slope material liquefies and runs out, forming a bowl or depression at the head.	
Falls—Abrupt movements of geologic materials, such as rocks and boulders, that become detached from steep slopes or cliffs. Falls are strongly influenced by gravity, weathering, and the presence of water in a mineral’s pores.		**Creep—**Slow, steady, downward movements of slope-forming soil or rock. Creep is indicated by curved tree trunks, bent fences, or retaining walls, tilted poles or fences, and small soil ripples or ridges.	
Topples—Slides involving the forward rotation of a unit about some point under the actions of gravity and forces exerted by surrounding objects or by fluids in cracks.		**Lateral Spreads—**Slides on very gentle slopes or flat terrain caused by liquefaction, the process whereby saturated, loose, sediments are transformed from a solid into a liquefied state. The failure starts suddenly in a small area and spreads rapidly.	
Block slide—Rapid landslides in which loose soil, rock, organic matter, air, and water mobilize as a slurry that flows downslope. Commonly caused by intense surface water flow due to heavy rain or rapid snowmelt that erodes loose soil or rock on steep slopes.		**Debris flows—**Rapid landslides in which loose soil, rock, organic matter, air, and water mobilize as a slurry that flows downslope. Commonly caused by intense surface water flow due to heavy rain or rapid snowmelt that erodes loose soil or rock on steep slopes.	

Source: (U.S. Geological Survey 2006, USGS 2004)

Landslide Warning Signs

The New York State Division of Homeland Security and Emergency Services (NYS DHSES), identified the following as warning signs of landslides (NYS-DHSES n.d.):

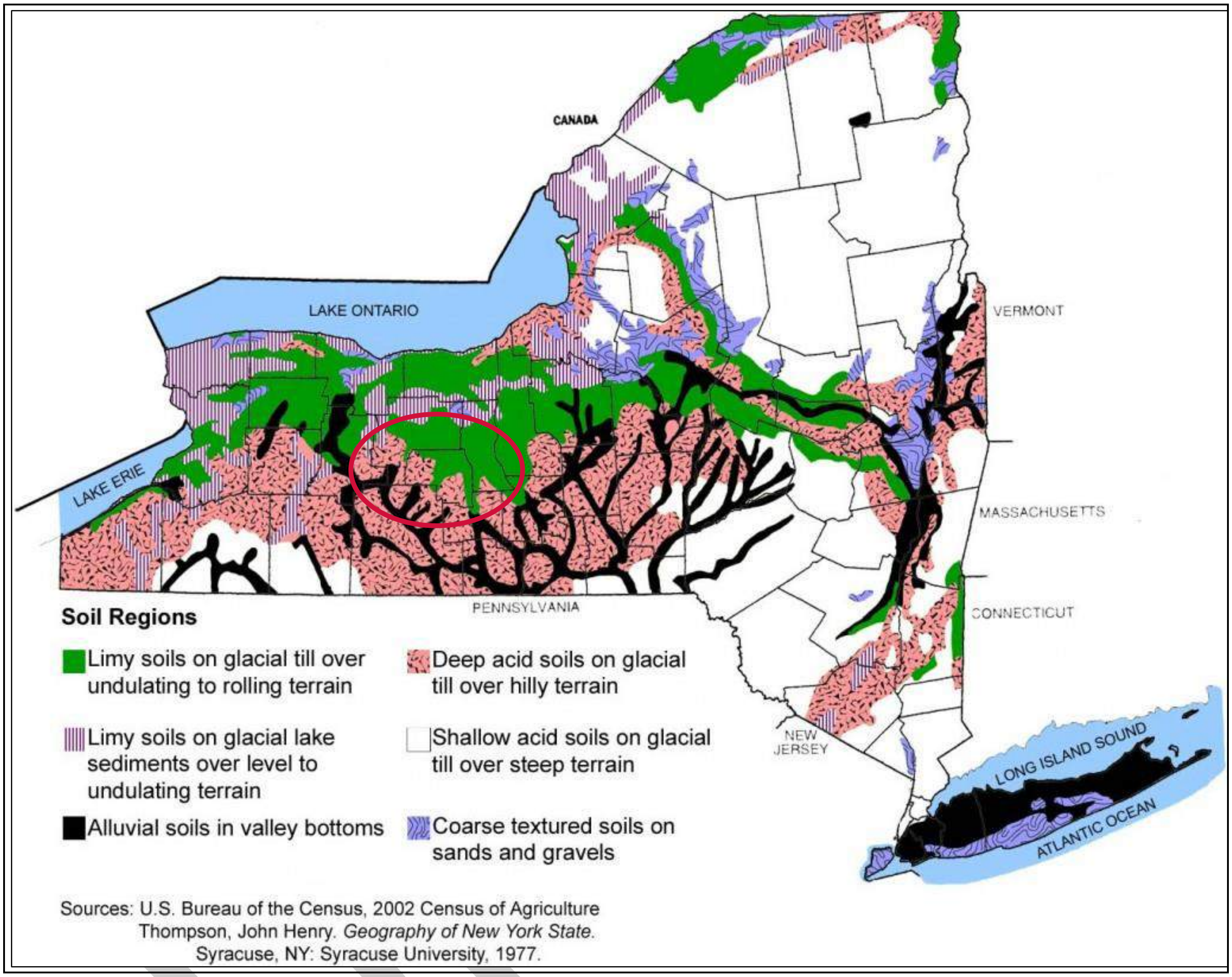
- Springs, seeps, or saturated ground in areas not typically wet
- New cracks or unusual bulges in the ground, street pavements, or sidewalks
- Soil, sidewalks, or stairs pulling away from foundations
- Ancillary structures, such as decks and patios, tilting or moving away from the house
- Tilting or cracking of concrete floors and foundations
- Broken water lines or other underground utilities
- Offset telephone poles, trees, retaining walls or fences
- Sunken or down-dropped roadbeds
- Rapid increase in creek water levels, accompanied by increase in turbidity
- Sudden decrease in creek water levels when rain is falling or suddenly stopped
- Sticking doors and windows
- Collapsed pavement, mud, fallen rocks, or other indications of debris flow seen when driving (embankments along roadsides are particularly susceptible to landslides)

13.1.2 Location

Landslide hazard events have occurred throughout the State of New York due to its geologic history and processes that are ideal conditions for slope failure and debris movement. The most common landslides occur because of the state's physiography and glacial history. Lakes in the state trap fine sediments, like clay and silts, that are ideal materials for landslide events (Kozlowski n.d.).

Figure 13-2 illustrates the soil regions of New York. Yates County is characterized by a mix of limey soils on glacial till over rolling terrain and deep acid soils on glacial till over hilly terrain. These soil characteristics are common for counties that are located near a freshwater body, such as Lake Erie and Lake Ontario, and make up the soil region for this area. Loose grain soils located on rolling or hilly terrain are prime components for landslide susceptibility because of the instability and downslope potential, which can easily cause landslide events.

Figure 13-2. Soil Regions of New York



Source: U.S. Census Bureau, 2002.
Note: Red Circle indicates Yates County Soil Region.

As shown in Figure 13-3, the majority of Yates County has a low susceptibility or incidence rate, while portions of the Towns of Middlesex, Potter, and Jerusalem and the Village of Rushville have a moderate susceptibility or incidence rate to the landslide hazard.

Figure 13-4 shows the landslide risk from FEMA's National Risk Index for Yates County at the County scale. The County has a relatively low risk from landslides. However, two neighboring counties have a relatively moderate susceptibility to landslides; this could have secondary or cascading impacts on Yates County if a landslide occurs along a county boundary (FEMA 2019b).

Figure 13-3. Location of Low and Moderate Landslide Susceptibility in Yates County

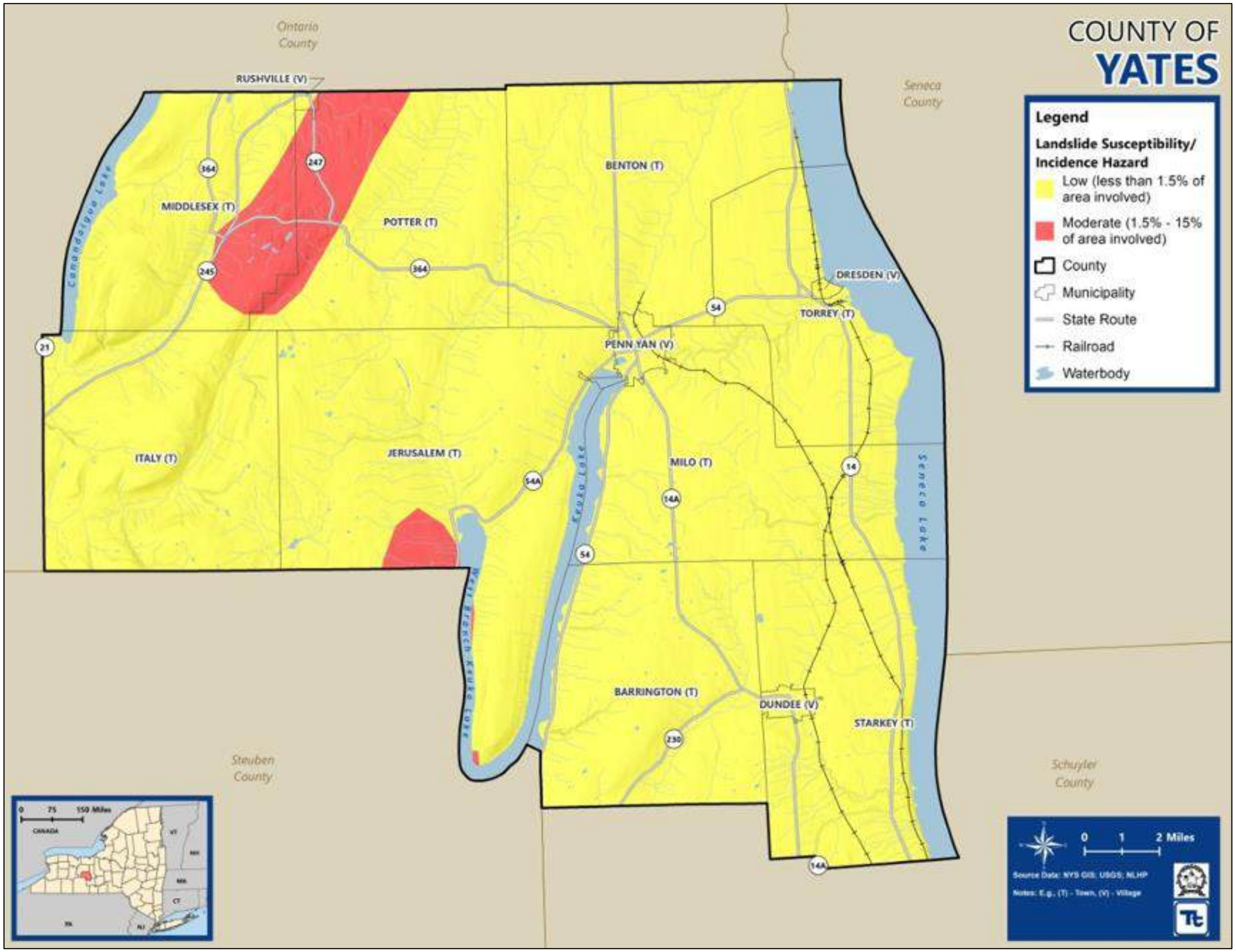
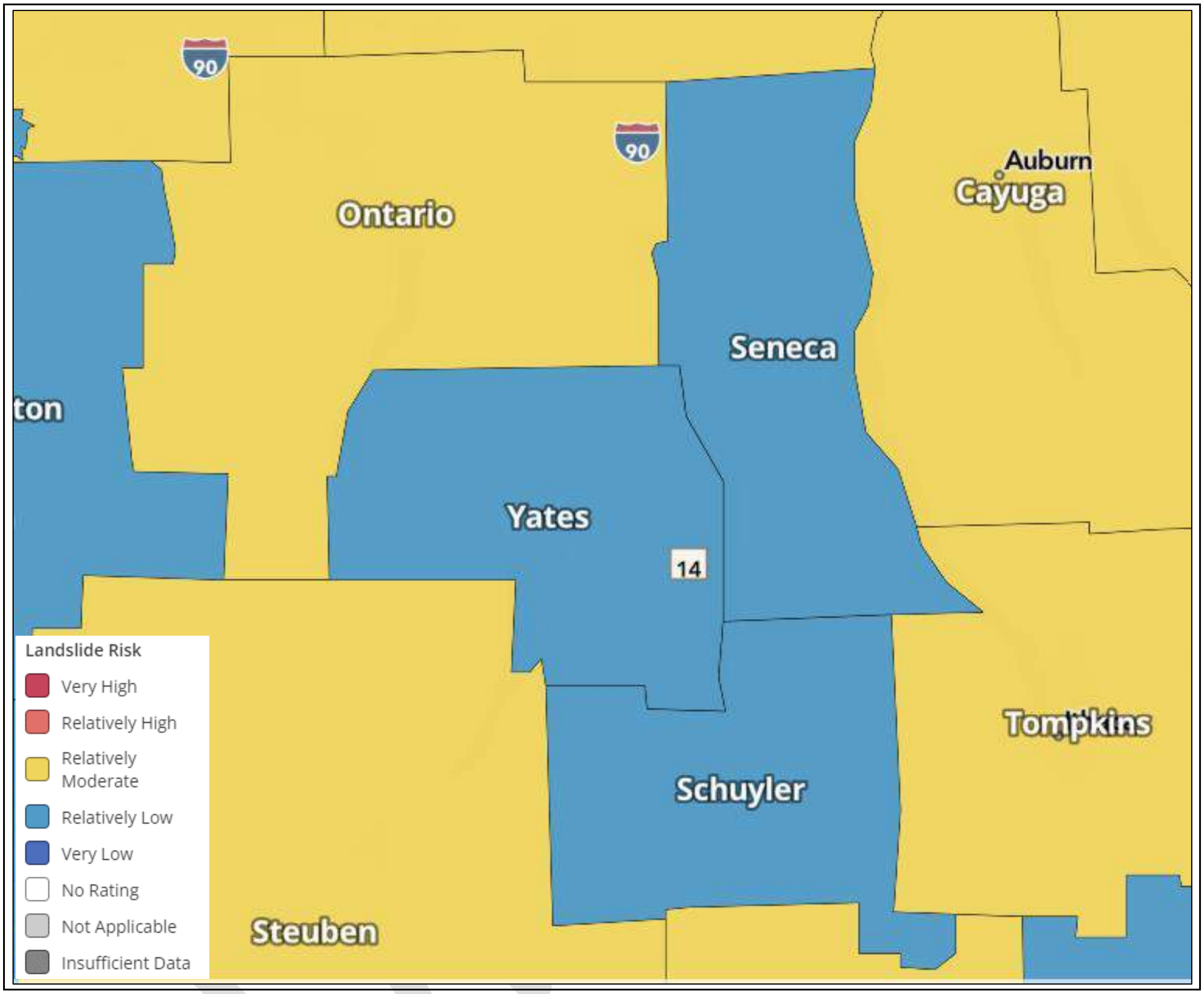


Figure 13-4. National Risk Index, Landslide Risk Index Score Using the County Scale



Source: FEMA 2019

13.1.3 Extent

The extent of a landslide is measured by the characteristics of the affected area (susceptibility) and the history of landslides (incidence). There are several natural variables, as mentioned in Section 13.1.1, that contribute to the extent of landslide activity. These include soil properties, topographic slope, and historical incidence.

The "Landslide Overview Map of the Coterminous United States" classifies areas as having high, medium, or low landslide incidence and high, medium, or low susceptibility to landsliding (Radbruch-Hall, et al. 1982):

- Incidence:
  - High—More than 15 percent of a location's area has been involved in landsliding
  - Medium—1.5 to 15 percent of a location's area has been involved in landsliding
  - Low—Less than 1.5 percent of a location's area has been involved in landsliding
- Susceptibility:
  - High—More than 15 percent of a location's area would move in response to cutting or heavy rainfall
  - Medium—1.5 to 15 percent of a location's area would move in response to cutting or heavy rainfall
  - Low—Less than 1.5 percent of a location's area would move in response to cutting or heavy rainfall

Landslide susceptibility is defined as the probable degree of response of geologic formations to natural or artificial cutting, to loading of slopes, or to unusually high precipitation. Unusually high precipitation or changes in existing conditions can initiate landslide movement in areas where rocks and soils have experienced numerous landslides in the past. Landslide susceptibility depends on slope angle and the geologic material underlying the slope. Landslide susceptibility only identifies areas potentially affected and does not imply a time frame when a landslide might occur.

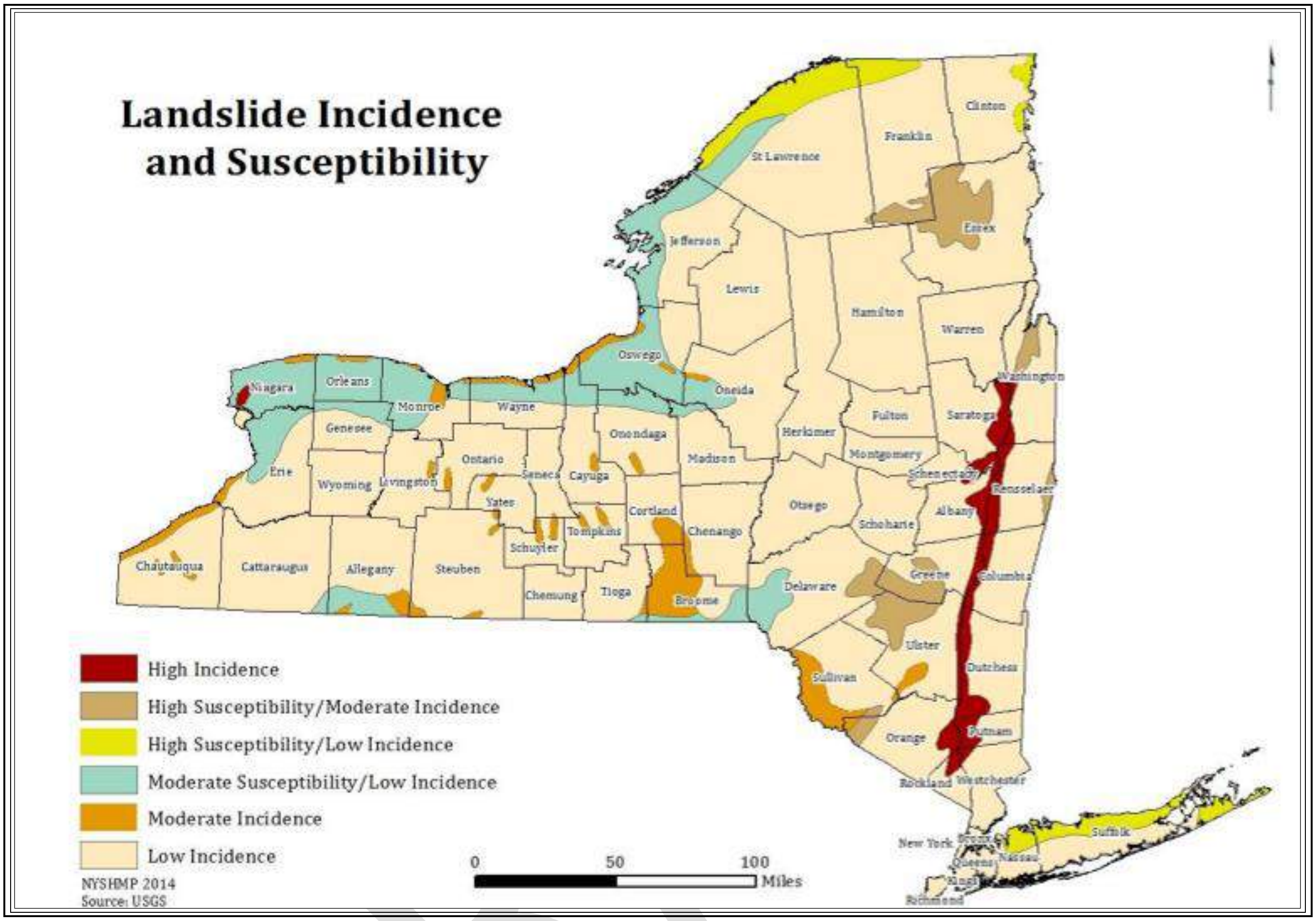
As illustrated in Figure 13-5, an area in the northern section of Yates County has a moderate incidence of landslide events. This area has steep slopes, resulting in bed rock topples and soil slides (also known as debris slides). The remainder of the County has a low landslide incidence, but landslides are a concern for some jurisdictions.

13.1.4 Previous Occurrences

Federal Major Disaster and Emergency Declarations

Yates County has been included in one major disaster (DR) or emergency (EM) declaration for landslide-related events, as shown in Table 13-1 (FEMA 2023b). There have been no such declarations since the previous HMP.

Figure 13-5. Landslide Susceptibility in New York State



Source: NYS DHSES 2014

Table 13-1. FEMA Declarations for Severe Storm Events in Yates County (1954 to 2023)

Event Date	Declaration Date	Disaster Declaration Number	Description
October 2, 1975	October 2, 1975	DR-487-NY	Storms, Rain, Landslides, and Flooding

Source: FEMA 2023

USDA Declarations

Since the previous Yates County HMP, the County has not been included in any USDA declarations issued for landslide -related events.

Previous Events

There are few recorded events of landslide events occurring in Yates County. However, this does not mean that landslide events have not and do not occur regularly in the area. There is insufficient data and reporting capabilities for landslide-related hazards at this time.

13.1.5 Probability of Future Occurrences

Probability Based on Past Events

Information on previous landslide occurrences in the County was used to calculate the probability of future occurrence of such events, as summarized in Table 13-2. Based on historical records and input from the Steering Committee, the probability of occurrence for landslide-related events in the County is considered “rare.”

Table 13-2. Probability of Future Landslide Events in Yates County

Hazard Type	Number of Occurrences Between 1954 and 2024	Percent Chance of Occurring in Any Given Year
Landslides	1	1.42%

Source: FEMA 2023; NOAA NCEI 2023; NYS DHSES 2023

Potential Effect of Climate Change on Hazard Probability

Projections of climate change for New York State and for the Central/Finger Lakes region that includes Yates County are summarized in Section 3.5.4. Recent studies show that climate change is impacting slow-moving landslides, which is where the land creeps downhill just inches to feet in a single year. A NASA study shows that landslides in wet and dry regions showed similar sensitivity to extreme precipitation events, moving on average faster and farther downhill during rainy periods compared to drought years. These slides have the ability to damage infrastructure over time and are directly related to the frequency and intensity of precipitation events (NASA 2022).

Climate change may increase the probability of more frequent, intense storms with varying duration. Increase in global temperature could affect the snowpack and its ability to hold and store water. Warming temperatures also could increase the occurrence and duration of droughts, which would increase the probability of wildfire, reducing the vegetation that helps to support steep slopes. All these factors would increase the probability of landslide occurrences.

13.1.6 Cascading Impacts on Other Hazards

Landslides can cause secondary effects such as blocking roads, which can isolate residents and businesses and delay commercial, public, and private transportation. Other potential problems can result from landslides if vegetation or poles on slopes are knocked over, causing losses to power and communication lines. Landslides also have the potential of destabilizing the foundation of structures, which may result in monetary loss for residents. Landslides can damage rivers or streams, potentially harming water quality, fisheries, and spawning habitat. Landslides can contribute to instances of flooding if the collapsed soil and sediment block streams, causing waters to flow outside of their banks.

13.2 VULNERABILITY AND IMPACT ASSESSMENT

To assess Yate County's risk from the landslide hazard, an exposure analysis was conducted for the County's assets using the USGS's Landslide Incidence and Susceptibility data. The USGS data map the incidence and susceptibility ratings from the "Landslide Overview Map of the Coterminous United States," as described in Section 13.1.3 (Radbruch-Hall, et al. 1982). This vulnerability assessment evaluates risk in the low and moderate landslide susceptibility hazard areas.

13.2.1 Life, Health, and Safety

Generally, a landslide is an isolated incident that impacts the population within the immediate vicinity. Therefore, the population living immediately downslope of high landslide incidence hazard areas are particularly vulnerable. In addition to displacing residents, landslides can block or damage major roadways and inhibit travel for emergency responders or populations trying to evacuate.

Overall Population

Table 13-3 summarizes the estimated population living in the landslide hazard areas by municipality. An estimated 23,696 residents, or 95.7 percent of the County's population, are in the low landslide hazard area; an estimated 1,069 residents, or 4.3 percent of the County's population, are in the moderate landslide hazard area. The Village of Penn Yan has the highest population in the low landslide hazard (5,056), and the Town of Potter has the greatest population in the moderate landslide hazard area (405).

Socially Vulnerable Population

Economically disadvantaged populations, including those living below the poverty level, are more vulnerable to landslides because they are likely lack financial resources for evacuation. The population over age 65 and those living with a disability are also more vulnerable because they are more likely to need medical attention that may not be available due to isolation during a landslide event, and they may have more difficulty evacuating. Children under 5 may be more vulnerable because they are dependent on others for essential needs and mobility. Individuals that are not proficient in English may be unable to interpret emergency warning messages to evacuate or providing resources to protect or mitigate damage to themselves and/or their property.

Table 3-5 shows social vulnerability statistics for Yates County and participating municipalities from the ACS 5-year estimates. Table 3-6 shows low-income populations based on United for ALICE data. The municipalities with the highest and lowest numbers and percentages in each social vulnerability category are listed in Table 13-4.

Table 13-3. Estimated Population in the Evaluated Landslide Hazard Areas

		Estimated Population in Low Landslide Incidence Hazard Area		Estimated Population in Moderate Landslide Incidence Hazard Area	
	Total Population	Number of Persons	Percent of Total	Number of Persons	Percent of Total
Barrington (T)	1,541	1,540	99.9%	0	0.0%
Benton (T)	2,580	2,580	100.0%	0	0.0%
Dresden (V)	293	293	100.0%	0	0.0%
Dundee (V)	1,690	1,689	99.9%	0	0.0%
Italy (T)	1,099	1,098	99.9%	0	0.0%
Jerusalem (T)	4,253	4,049	95.2%	203	4.8%
Middlesex (T)	1,377	1,124	81.6%	252	18.3%
Milo (T)	2,303	2,303	100.0%	0	0.0%
Penn Yan (V)	5,056	5,056	100.0%	0	0.0%
Potter (T)	1,207	801	66.4%	405	33.6%
Rushville (V)	651	441	67.7%	209	32.1%
Starkey (T)	1,717	1,716	99.9%	0	0.0%
Torrey (T)	1,006	1,006	100.0%	0	0.0%
Yates County (Total)	**24,773**	**23,696**	**95.7%**	**1,069**	**4.3%**

Source: U.S. Census Bureau 2020; USGS 2011
Note: % = percent

Table 13-4. Municipalities With Highest and Lowest Socially Vulnerable Populations

	Municipality Highest in Category		Municipality Lowest in Category	
Category	Number	Percent	Number	Percent
Population Over 65	Penn Yan (V): **1,367**	Penn Yan (V): **27.0%**	Dresden (V): **54**	Potter (T): **12.1%**
Population Under 5	Jerusalem (T): **306**	Dresden (V): **9.9%**	Starkey (T): **1**	Starkey (T): **0.1%**
Non-English-Speaking Population	Benton (T): **89**	Potter (T): **7.0%**	Dundee (V), Rushville (V), Starkey (T): **0**	Dundee (V), Rushville (V), Starkey (T): **0.0%**
Population With Disability	Penn Yan (V): **789**	Dundee (V): **18.9%**	Potter (T): **12**	Potter (T): **1.0%**
Population Below Poverty Level	Penn Yan (V): **776**	Dundee (V): **27.6%**	Rushville (V): **30**	Rushville (V): **4.6%**
Households Below ALICE Threshold	—	Italy (T): **58%**	—	Barrington (T): **33%**

Table 13-5 shows the estimated number of vulnerable persons located in the low landslide susceptibility hazard area: 4,982 people over the age of 65 (96.6 percent), 1,424 people under the age of 5 (95.2 percent), 312 people that are non-English speaking (90.2 percent), 2,800 people with disabilities (96.9 percent), and 3,025 people below the poverty level (97.3 percent).

Table 13-6 shows the estimated number of vulnerable persons located in the moderate landslide susceptibility hazard area: 172 people over the age of 65 (3.3 percent), 64 people under the age of 5 (4.3 percent), 30 people that are non-English speaking (8.7 percent), 82 people with disabilities (2.8 percent), and 73 people below the poverty level (2.3 percent), that are vulnerable to moderate landslides.

13.2.2 General Building Stock

In general, buildings located in the landslide hazard areas and downslope are vulnerable to this hazard. The Census blocks having their center (centroid) within the boundary of the landslide susceptibility hazard areas were used to calculate the estimated building stock exposed to this hazard.

Table 13-7 displays the buildings by general occupancy within the low landslide susceptibility hazard area. The exposure analysis estimates that the residential occupancy is the most exposed to the low landslide susceptibility hazard area, accounting for 48.4 percent of the buildings. Table 13-8 displays the buildings by general occupancy located within the moderate landslide susceptibility hazard area. The exposure analysis estimates that the residential occupancy is the most exposed to the moderate landslide susceptibility hazard area, accounting for 2.2 percent of the buildings.

13.2.3 Community Lifelines and Other Critical Facilities

Landslides can cause significant physical damage to critical facilities and community lifelines that may interrupt key services and resources in the region. They can cause significant damage to buildings and the supply chains that provide health and medical, public safety and security, and food, water, and shelter services. If these facilities and lifelines are not functional during or after an emergency, the County may experience cascading impacts, like additional injuries or health issues or prolonged economic impacts, if a significant number of displaced individuals cannot access temporary or transitional housing.

Access to major roads is crucial to life-safety after a disaster event and to response and recovery operations. Landslides can block egress and ingress on roads and bridge, causing isolation for neighborhoods, traffic problems, and delays for public and private transportation. This can result in economic losses for businesses.

Table 13-5. Socially Vulnerable Population in the Low Landslide Susceptibility Area

	Total Population (Decennial 2020)	Percent of County Total	Population in the Hazard Area (2021 ACS 5-Year Estimates)									
			Over 65	Percent of Jurisdiction Total	Under 5	Percent of Jurisdiction Total	Non-English Speaking	Percent of Jurisdiction Total	Disability	Percent of Jurisdiction Total	Poverty Level	Percent of Jurisdiction Total
Barrington (T)	376	24.4%	376	100.0%	118	99.2%	35	100.0%	105	100.0%	116	99.1%
Benton (T)	557	21.6%	557	100.0%	206	100.0%	89	100.0%	167	99.4%	187	99.5%
Dresden (V)	54	18.4%	53	98.1%	28	96.6%	2	100.0%	33	100.0%	62	98.4%
Dundee (V)	226	13.4%	226	100.0%	151	100.0%	0	0.0%	320	100.0%	466	99.8%
Italy (T)	185	16.8%	185	100.0%	49	100.0%	4	80.0%	197	99.5%	87	100.0%
Jerusalem (T)	737	17.3%	701	95.1%	291	95.1%	54	94.7%	396	95.2%	363	95.0%
Middlesex (T)	295	21.4%	241	81.7%	35	81.4%	4	80.0%	140	81.4%	114	81.4%
Milo (T)	613	26.6%	613	100.0%	207	100.0%	12	100.0%	289	100.0%	498	100.0%
Penn Yan (V)	1,367	27.0%	1,367	100.0%	171	99.4%	16	100.0%	788	99.9%	775	99.9%
Potter (T)	146	12.1%	96	65.8%	77	66.4%	55	65.5%	7	58.3%	43	66.2%
Rushville (V)	111	17.1%	75	67.6%	11	64.7%	0	0.0%	59	67.0%	20	66.7%
Starkey (T)	286	16.7%	286	100.0%	1	100.0%	0	0.0%	129	99.2%	154	99.4%
Torrey (T)	207	20.6%	206	99.5%	79	98.8%	41	100.0%	170	100.0%	140	99.3%
Yates County (Total)	**5,160**	**20.8%**	**4,982**	**96.6%**	**1,424**	**95.2%**	**312**	**90.2%**	**2,800**	**96.9%**	**3,025**	**97.3%**

Source: U.S. Census Bureau 2017-2021 American Community Survey; USGS 2011

Table 13-6. Socially Vulnerable Population in the Moderate Landslide Susceptibility Area

	Total Population (Decennial 2020)	Percent of County Total	Population in the Hazard Area (2021 ACS 5-Year Estimates)									
			Over 65	Percent of Jurisdiction Total	Under 5	Percent of Jurisdiction Total	Non-English Speaking	Percent of Jurisdiction Total	Disability	Percent of Jurisdiction Total	Poverty Level	Percent of Jurisdiction Total
Barrington (T)	376	24.4%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Benton (T)	557	21.6%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Dresden (V)	54	18.4%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Dundee (V)	226	13.4%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Italy (T)	185	16.8%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Jerusalem (T)	737	17.3%	35	4.7%	14	4.6%	2	3.5%	19	4.6%	18	4.7%
Middlesex (T)	295	21.4%	53	18.0%	7	16.3%	0	0.0%	31	18.0%	25	17.9%
Milo (T)	613	26.6%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Penn Yan (V)	1,367	27.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Potter (T)	146	12.1%	49	33.6%	38	32.8%	28	33.3%	4	33.3%	21	32.3%
Rushville (V)	111	17.1%	35	31.5%	5	29.4%	0	0.0%	28	31.8%	9	30.0%
Starkey (T)	286	16.7%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Torrey (T)	207	20.6%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Yates County (Total)	**5,160**	**20.8%**	**172**	**3.3%**	**64**	**4.3%**	**30**	**8.7%**	**82**	**2.8%**	**73**	**2.3%**

Source: U.S. Census Bureau 2017-2021 American Community Survey; USGS 2011

Table 13-7. Buildings in Low Landslide Susceptibility Area by Occupancy Class

	Jurisdiction Total Buildings	Buildings in the Low Landslide Susceptibility Hazard Area			
		Residential	Commercial	Industrial	Other[a]
Barrington (T)	1,943	844	888	15	196
Benton (T)	2,125	748	983	9	385
Dresden (V)	189	121	59	2	7
Dundee (V)	808	517	256	9	26
Italy (T)	1,227	703	503	2	19
Jerusalem (T)	4,305	2,192	1,794	4	124
Middlesex (T)	1,600	732	533	1	13
Milo (T)	2,708	1,316	1,272	23	97
Penn Yan (V)	2,300	1,570	666	25	39
Potter (T)	1,402	346	454	1	215
Rushville (V)	214	97	44	0	5
Starkey (T)	1,958	891	768	15	284
Torrey (T)	1,317	631	415	25	246
Yates County (Total)	**22,096**	**10,708**	**8,635**	**131**	**1,656**

Source: Yates County Planning Department; NYS GIS Clearinghouse; U.S. Army Corps of Engineers National Structure Inventory; RS Means 2022; USGS 2011

a. "Other" occupancy classes include government, religion, agriculture, and education

Table 13-8. Buildings in Moderate Landslide Susceptibility Area by Occupancy Class

	Jurisdiction Total Buildings	Buildings in the Moderate Landslide Susceptibility Hazard Area			
		Residential	Commercial	Industrial	Other[a]
Barrington (T)	1,943	0	0	0	0
Benton (T)	2,125	0	0	0	0
Dresden (V)	189	0	0	0	0
Dundee (V)	808	0	0	0	0
Italy (T)	1,227	0	0	0	0
Jerusalem (T)	4,305	110	72	0	9
Middlesex (T)	1,600	164	149	1	7
Milo (T)	2,708	0	0	0	0
Penn Yan (V)	2,300	0	0	0	0
Potter (T)	1,402	175	185	0	26
Rushville (V)	214	46	22	0	0
Starkey (T)	1,958	0	0	0	0
Torrey (T)	1,317	0	0	0	0
Yates County (Total)	**22,096**	**495**	**428**	**1**	**42**

Source: Yates County Planning Department; NYS GIS Clearinghouse; U.S. Army Corps of Engineers National Structure Inventory; RS Means 2022; USGS 2011

a. "Other" occupancy classes include government, religion, agriculture, and education

Landslides can knock out bridge abutments or significantly weaken the soil supporting them, making them hazardous for use. Landslides can block travel along rail lines, and it is not as easy to detour a rail line as it is to detour a local road or highway.

Power lines are generally elevated above steep slopes; but the towers supporting them can be subject to landslides. A landslide could trigger failure of the soil underneath a tower, causing it to collapse and take down the lines. Power and communication failures due to landslides can create problems for vulnerable populations and businesses. For example, for individuals that rely on medical equipment, a prolonged power outage can present serious health risks or complications. Similarly, water systems can become dammed or contaminated by landslide materials.

Table 13-9 summarizes the number of community lifelines exposed to low landslide incidence hazard area. Of the 353 community lifelines located in low landslide incidence hazard area, the water system category has the greatest number of facilities (223). Table 13-10 summarizes the number of community lifelines exposed to moderate landslide incidence hazard area. Of the 22 community lifelines located in moderate landslide incidence hazard area, the water system category has the greatest number of facilities (14).

13.2.4 Economy

Landslides can impose direct and indirect impacts on society. Direct costs include the actual damage sustained by buildings, property, and infrastructure. Indirect costs, such as clean-up costs, business interruption, loss of tax revenues, reduced property values, and loss of productivity are difficult to measure. Additionally, landslides threaten transportation corridors, fuel and energy conduits, and communication lines.

Direct building losses are the estimated costs to repair or replace the damage caused to the building. There are an estimated 21,130 buildings in low landslide incidence hazard area, representing 96.2 percent of the County's total general building stock inventory replacement cost value. The Town of Jerusalem has the greatest number of its buildings in the low landslide incidence hazard area (4,114 buildings or 95.6 percent of its total building stock). A total risk exposure of $13.4 billion or 95.6 percent of Yates County's total inventory is estimated for the buildings in the low landslide incidence hazard area. Refer to Table 13-11 for the estimated exposure of low landslide incidence hazard area by jurisdiction.

Table 13-9. Critical Facilities Located in the Low Landslide Incidence Hazard Area

	Number of Facilities in the Landslide Hazard Area, by Lifeline Category									Total Facilities in Hazard Area	
	Communications	Energy	Food, Hydration, Shelter	Hazardous Materials	Health & Medical	Safety & Security	Transportation	Water Systems	Other Critical Facilities	Number	% of Jurisdiction Total
Barrington (T)	1	0	0	0	0	14	0	12	2	29	100.0%
Benton (T)	0	0	0	0	0	5	0	49	0	54	100.0%
Dresden (V)	0	0	0	0	0	8	0	1	0	9	100.0%
Dundee (V)	0	0	0	0	1	5	0	0	2	8	100.0%
Italy (T)	2	0	0	0	0	7	0	3	1	13	100.0%
Jerusalem (T)	2	0	0	0	0	13	0	33	3	51	98.1%
Middlesex (T)	2	0	0	0	1	4	1	19	2	29	76.3%
Milo (T)	0	0	0	0	0	13	2	30	5	50	100.0%
Penn Yan (V)	1	0	0	0	3	11	0	3	1	19	100.0%
Potter (T)	0	0	0	0	0	3	0	42	0	45	78.9%
Rushville (V)	0	0	0	0	0	2	0	0	0	2	100.0%
Starkey (T)	1	0	0	0	0	3	1	13	0	18	100.0%
Torrey (T)	2	0	0	0	0	5	0	18	1	26	100.0%
Yates County (Total)	**11**	**0**	**0**	**0**	**5**	**93**	**4**	**223**	**17**	**353**	**94.1%**

Source: Yates County 2023; USGS 2011

Table 13-10. Critical Facilities Located in the Moderate Landslide Incidence Hazard Area

	Number of Facilities in the Landslide Hazard Area, by Lifeline Category									Total Facilities in Hazard Area	
	Communications	Energy	Food, Hydration, Shelter	Hazardous Materials	Health & Medical	Safety & Security	Transportation	Water Systems	Other Critical Facilities	Number	% of Jurisdiction Total
Barrington (T)	0	0	0	0	0	0	0	0	0	0	0.0%
Benton (T)	0	0	0	0	0	0	0	0	0	0	0.0%
Dresden (V)	0	0	0	0	0	0	0	0	0	0	0.0%
Dundee (V)	0	0	0	0	0	0	0	0	0	0	0.0%
Italy (T)	0	0	0	0	0	0	0	0	0	0	0.0%
Jerusalem (T)	0	0	0	0	0	1	0	0	0	1	1.9%
Middlesex (T)	0	0	0	0	0	6	0	3	0	9	23.7%
Milo (T)	0	0	0	0	0	0	0	0	0	0	0.0%
Penn Yan (V)	0	0	0	0	0	0	0	0	0	0	0.0%
Potter (T)	0	0	0	0	0	0	0	11	1	12	21.1%
Rushville (V)	0	0	0	0	0	0	0	0	0	0	0.0%
Starkey (T)	0	0	0	0	0	0	0	0	0	0	0.0%
Torrey (T)	0	0	0	0	0	0	0	0	0	0	0.0%
Yates County (Total)	**0**	**0**	**0**	**0**	**0**	**7**	**0**	**14**	**1**	**22**	**5.9%**

Source: Yates County 2023; USGS 2011

Table 13-11. Estimated Buildings Located in the Low Landslide Incidence Area

	Total Number of Buildings	Total Replacement Cost Value	Buildings in the Low Landslide Incidence Hazard Area			
			Number of Buildings	Percent of Total	Total Replacement Cost Value of Buildings	Percent of Total
Barrington (T)	1,943	$1,087,359,607	1,943	100.0%	$1,086,830,544	100.0%
Benton (T)	2,125	$1,712,144,740	2,125	100.0%	$1,711,914,324	100.0%
Dresden (V)	189	$96,035,909	189	100.0%	$96,030,349	100.0%
Dundee (V)	808	$565,406,673	808	100.0%	$565,406,673	100.0%
Italy (T)	1,227	$446,736,385	1,227	100.0%	$446,096,144	99.9%
Jerusalem (T)	4,305	$2,222,802,811	4,114	95.6%	$2,132,206,497	95.9%
Middlesex (T)	1,600	$733,491,126	1,279	79.9%	$556,169,126	75.8%
Milo (T)	2,708	$1,920,559,675	2,708	100.0%	$1,919,428,318	99.9%
Penn Yan (V)	2,300	$1,828,807,125	2,300	100.0%	$1,828,795,401	100.0%
Potter (T)	1,402	$1,046,854,169	1,016	72.5%	$820,676,558	78.4%
Rushville (V)	214	$108,056,906	146	68.2%	$73,441,963	68.0%
Starkey (T)	1,958	$1,239,984,737	1,958	100.0%	$1,239,462,508	100.0%
Torrey (T)	1,317	$1,022,674,865	1,317	100.0%	$1,022,743,467	100.0%
Yates County (Total)	**22,096**	**$14,030,914,727**	**21,130**	**95.6%**	**$13,499,201,872**	**96.2%**

Source: Yates County Planning Department; NYS GIS Clearinghouse; U.S. Army Corps of Engineers National Structure Inventory; RS Means 2022; USGS 2011

There are an estimated 966 buildings in moderate landslide incidence hazard area, representing 4.4 percent of the County's total general building stock inventory replacement cost value. The Town of Potter has the greatest number of its buildings located in the moderate landslide incidence hazard area (386 buildings or 27.5 percent of its total building stock). A total risk exposure of $526 million, or 3.4 percent of Yates County's total inventory, is estimated for the buildings in the moderate landslide susceptibility hazard area. Refer to Table 13-12 for the estimated exposure of moderate landslide incidence hazard area by jurisdiction.

Table 13-12. Estimated Buildings Located in the Moderate Landslide Incidence Area

	Total Number of Buildings	Total Replacement Cost Value	Estimated Buildings Located in the Moderate Landslide Incidence Hazard Area			
			Number of Buildings	Percent of Total	Total Replacement Cost Value of Buildings	Percent of Total
Barrington (T)	1,943	$1,087,359,607	0	0.0%	$0	0.0%
Benton (T)	2,125	$1,712,144,740	0	0.0%	$0	0.0%
Dresden (V)	189	$96,035,909	0	0.0%	$0	0.0%
Dundee (V)	808	$565,406,673	0	0.0%	$0	0.0%
Italy (T)	1,227	$446,736,385	0	0.0%	$0	0.0%
Jerusalem (T)	4,305	$2,222,802,811	191	4.4%	$89,061,036	4.0%
Middlesex (T)	1,600	$733,491,126	321	20.1%	$176,810,851	24.1%
Milo (T)	2,708	$1,920,559,675	0	0.0%	$0	0.0%
Penn Yan (V)	2,300	$1,828,807,125	0	0.0%	$0	0.0%
Potter (T)	1,402	$1,046,854,169	386	27.5%	$226,096,565	21.6%
Rushville (V)	214	$108,056,906	68	31.8%	$34,614,944	32.0%
Starkey (T)	1,958	$1,239,984,737	0	0.0%	$0	0.0%
Torrey (T)	1,317	$1,022,674,865	0	0.0%	$0	0.0%
Yates County (Total)	**22,096**	**$14,030,914,727**	**966**	**4.4%**	**$526,583,396**	**3.8%**

Source: Yates County Planning Department; NYS GIS Clearinghouse; U.S. Army Corps of Engineers National Structure Inventory; RS Means 2022; USGS 2011

13.2.5 Natural, Historic and Cultural Resources

Natural

A landslide event alters the landscape. In addition to changes in topography, vegetation and wildlife habitats may be damaged or destroyed. Soil and sediment runoff will accumulate downslope, potentially blocking waterways and roadways and impacting quality of streams and other water bodies. Additional environmental impacts include loss of forest productivity.

Soil and sediment runoff can accumulate downslope, potentially blocking waterways and roadways and impacting quality of streams and other water bodies. Mudflows that erode into downstream waterways can threaten the life of freshwater species (USGS 2020). The impacts of eroded landscape can travel for miles downstream into adjacent waterways and create issues for surrounding watersheds.

Historic

Landslide impacts on historic resources within the County are highest in areas near hillsides that are characterized by unstable soil and erosion. Historical landmarks in these areas are highly susceptible to landslide occurrences.

Cultural

Landslide impacts on cultural resources within the County are highest in areas near hillsides that are characterized by unstable soil and erosion. Cultural landmarks in these areas are highly susceptible to landslide occurrences especially.

13.3 CHANGE OF VULNERABILITY SINCE 2020 HMP

The County’s overall vulnerability to this hazard has not changed, and the entire County will continue to be vulnerable to extreme temperature events.

13.4 FUTURE CHANGES THAT MAY AFFECT RISK

13.4.1 Potential or Planned Development

Any areas of growth in areas with moderate landslide incidence or susceptibility could be impacted by the landslide hazard. Specific areas of development are indicated in the jurisdictional annexes in Volume II of this plan.

13.4.2 Projected Changes in Population

Yates County has experienced a decrease in its population since 2010. According to the U.S. Census Bureau, the County's population decreased by 2.3 percent between 2010 and 2020 (U.S. Census Bureau 2023). Cornell University’s Program on Applied Demographics projects Yates County will have a population of 26,014 by 2030 and 25,787 by 2040 (Cornell University 2018). Changes in density not only can create issues for local residents during evacuation of a landslide event but also can have an effect on commuters that travel into and out of the County for work, particularly during a landslide event that breaches major transportation corridors, which are also major commuter roads.

13.4.3 Climate Change

The County is expected to see an increase in average annual temperatures and precipitation due to climate change. Increased severe storm and heavy rainfall events may elevate the likelihood of a landslide occurring in steep sloped areas because precipitation may fall faster or in larger quantities than the soil can absorb in a given timeframe. However, these changes depend on to what degree steep sloped areas are developed and other climate trends, such as seasonal precipitation and drought, which affect vegetation growth.

14. SEVERE STORM

14.1 HAZARD PROFILE

14.1.1 Hazard Description

Severe storm events are a common occurrence in Yates County. A variety of severe storm types, such as thunderstorms, lightning, hail, tornadoes, high winds, and tropical cyclones have damaged property and infrastructure, disrupted power, downed trees and power lines, and caused injuries and fatalities.

Thunderstorms

A thunderstorm is a local storm produced by a cumulonimbus cloud and accompanied by lightning and thunder (NOAA-NSSL n.d.). A thunderstorm forms from a combination of moisture, rapidly rising warm air, and a force capable of lifting air such as a warm and cold front, a sea breeze, or a mountain. Thunderstorms form at the equator to as far north as Alaska. Although thunderstorms generally affect a small area when they occur, they have the potential to become dangerous due to their ability to generate tornadoes, hailstorms, strong winds, flash flooding, and lightning.

Typical thunderstorms are 15 miles in diameter and last an average of 30 minutes. The National Weather Service (NWS) considers a thunderstorm severe only if it produces damaging wind gusts of 58 mph or higher, large hail 1 inch in diameter or larger, or tornadoes (NWS n.d.). An estimated 100,000 thunderstorms occur each year in the U.S., with approximately 10 percent of them classified as severe (U.S. Department of Commerce; NOAA; NWS 1994).

Lightning

Lighting is a bright flash of electrical energy produced by a thunderstorm. The resulting clap of thunder is the result of a shock wave created by the rapid heating and cooling of the air in the lightning channel. All thunderstorms produce lightning, which ranks as one of the top weather killers in the United States, killing approximately 28 people and injuring hundreds each year (CDC 2022). Lightning can occur anywhere there is a thunderstorm (NOAA 2014).

Hailstorms

Hail forms inside a thunderstorm where there are strong updrafts of warm air and downdrafts of cold water. If a water droplet is picked up by the updrafts, it can be carried well above the freezing level. Water droplets freeze when temperatures reach 32°F or colder. As the frozen droplet begins to fall, it might thaw as it moves into warmer air toward the bottom of the thunderstorm, or the droplet might be picked up again by another updraft and carried back into the cold air to re-freeze. With each trip above and below the freezing level, the frozen droplet adds another layer of ice. The longer a hailstone spends in the clouds, the larger it becomes. Hail falls when it becomes heavy enough to overcome the strength of the thunderstorm updraft and is pulled to the earth by gravity. Smaller hailstones may be blown away from the updraft by horizontal winds, so larger hail typically falls closer to the updraft than smaller hail (NOAA n.d.).

The frozen droplet, with many layers of ice, eventually falls to the ground as hail (NSSL 2021).

High Winds

Wind is the horizontal movement of air caused by uneven heating of the earth's surface. It ranges from local breezes lasting a few minutes to global winds resulting from solar heating of the earth. High winds are often associated with other severe weather events such as thunderstorms, tornadoes, hurricanes, and tropical storms (NWS 2012). The following are common types of damaging winds (NOAA n.d.):

- **Derecho:** Long-lived windstorm associated with rapidly moving precipitation or thunderstorms. An event can be classified as a derecho if wind damage swatch is more than 240 miles and includes gusts of wind that reach 58 mph or greater
- **Downburst:** General term to describe macro and microbursts
- **Downdraft**: A small-scale column of air that sinks toward the ground
- **Gust front:** Leading edge of rain-cooled air that clashes with a warm thunderstorm inflow
- **Macroburst**: An outward burst of strong winds that is more than 2.5 miles in diameter
- **Microburst**: A small, concentrated downburst that produces an outward burst of relatively strong winds near the surface
- **Straight-line wind**: Used to define thunderstorm wind that is not linked with rotation, mainly to differentiate from tornadic winds

Tornadoes

A tornado is a narrow, violently rotating column of air that extends from the base of a thunderstorm to the ground (NOAA 2011). A tornado can be seen when it forms a condensation funnel made up of water droplets, dust, and debris. Tornadoes are the most violent of all atmospheric storms and the most hazardous when they occur in populated areas. Tornadoes can topple mobile homes, lift cars, snap trees, and turn objects into destructive missiles. Among the most unpredictable of weather phenomena, tornadoes can occur at any time of day, in any state in the country, and in any season. While the majority of tornadoes cause little or no damage, some are capable of tremendous destruction, reaching wind speeds of 200 mph or more (NOAA 2023).

Tropical Cyclones

Tropical cyclones (hurricanes) are fueled by a different heat mechanism than other cyclonic windstorms such as nor'easters and polar lows. The characteristic that separates a tropical storm from another cyclonic system is that at any height in the atmosphere, the center of a tropical storm will be warmer than its surroundings, a phenomenon called "warm core" storm systems (NOAA 2011). Tropical cyclones strengthen when water evaporated from the ocean is released as the saturated air rises, resulting in condensation of water vapor contained in the moist air. Tropical cyclones begin as disturbed areas of weather, often referred to as tropical waves. As the storm organizes, it is designated as a tropical depression.

A tropical storm system is characterized by a low-pressure center and numerous thunderstorms that produce winds of 39 to 73 mph and heavy rain. A tropical storm becomes a hurricane when its wind speed exceeds 74 mph. Tropical systems may develop in the Atlantic Ocean between the Lesser Antilles and the African coast or in the warm tropical waters of the Caribbean and Gulf of Mexico. These storms may move up the Atlantic coast of the United States and impact the eastern seaboard or move inland along the Gulf Coast, bringing wind and rain as far north as New England before moving offshore and heading east (NOAA n.d.).

14.1.2 Location

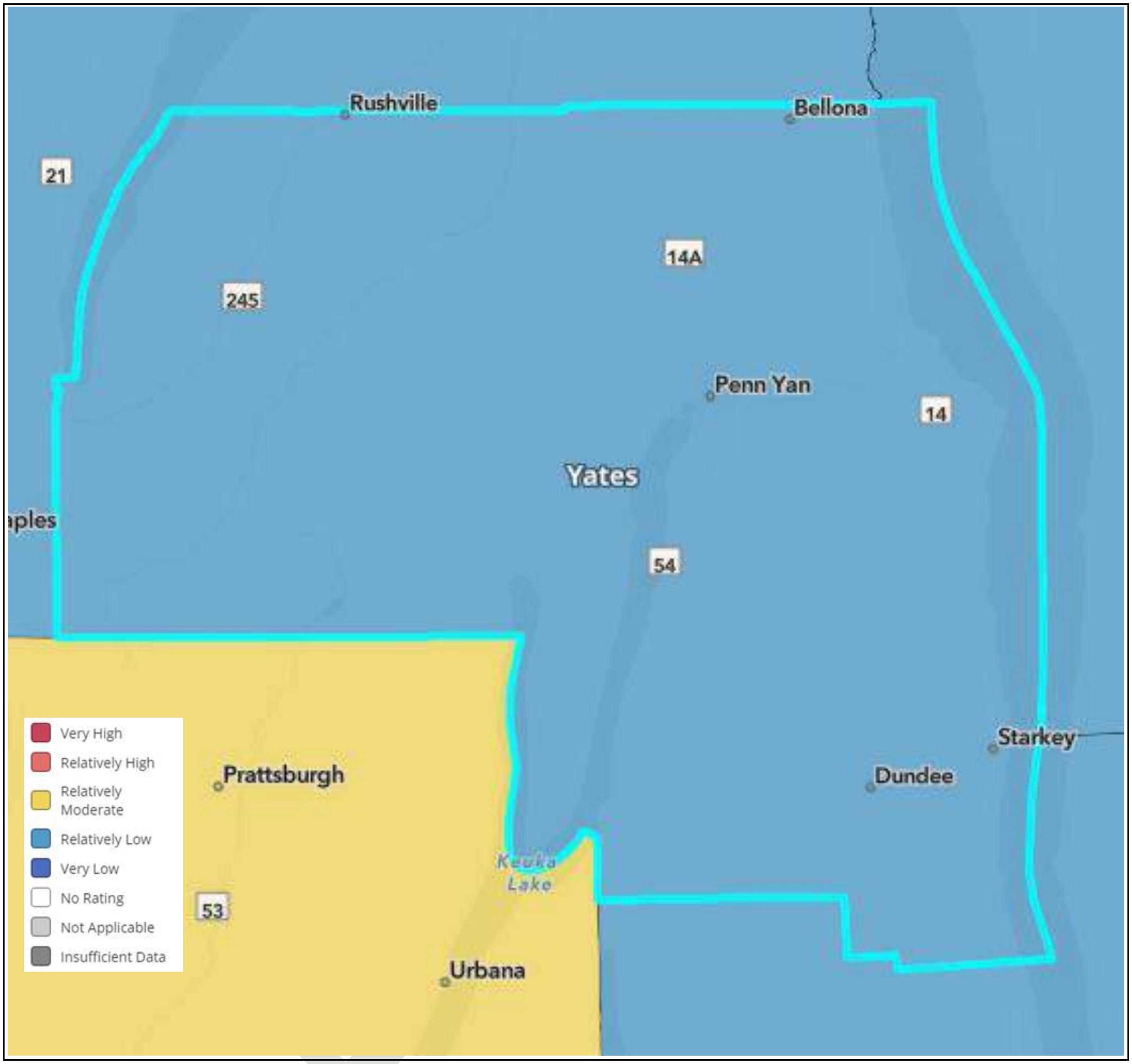
Thunderstorms

Thunderstorms affect relatively small areas, rather than large regions like winter storms and hurricanes. Thunderstorms can strike anywhere but are most common in the central and southern United States.

Lightning

Lightning affects relatively small, localized areas. It is most common in the central and southern United States because the atmospheric conditions in these regions are ideal for generating storms that can produce lightning. Figure 14-1 shows FEMA's Lightning Risk Index for Yates County on the county scale. The County has a relatively low risk of lightning (FEMA 2019b).

Figure 14-1. National Risk Index, Lightning

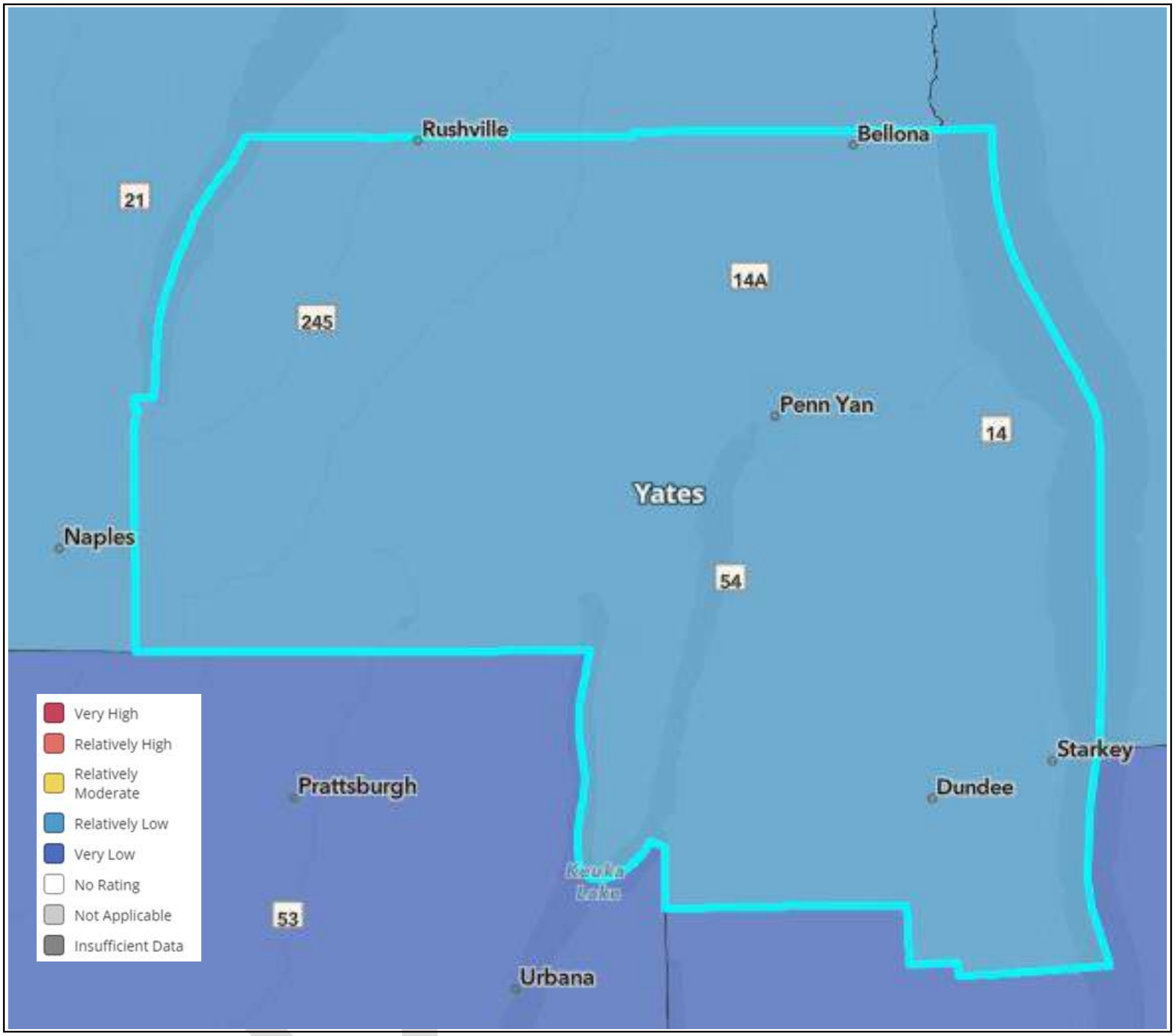


Source: FEMA 2019

Hailstorms

Hailstorms are most likely in areas with many thunderstorms. Figure 14-2 show FEMA's Hailstorm Risk Index for Yates County on the county scale. The County has a relatively low risk from hail (FEMA 2019b).

Figure 14-2. National Risk Index, Hailstorms

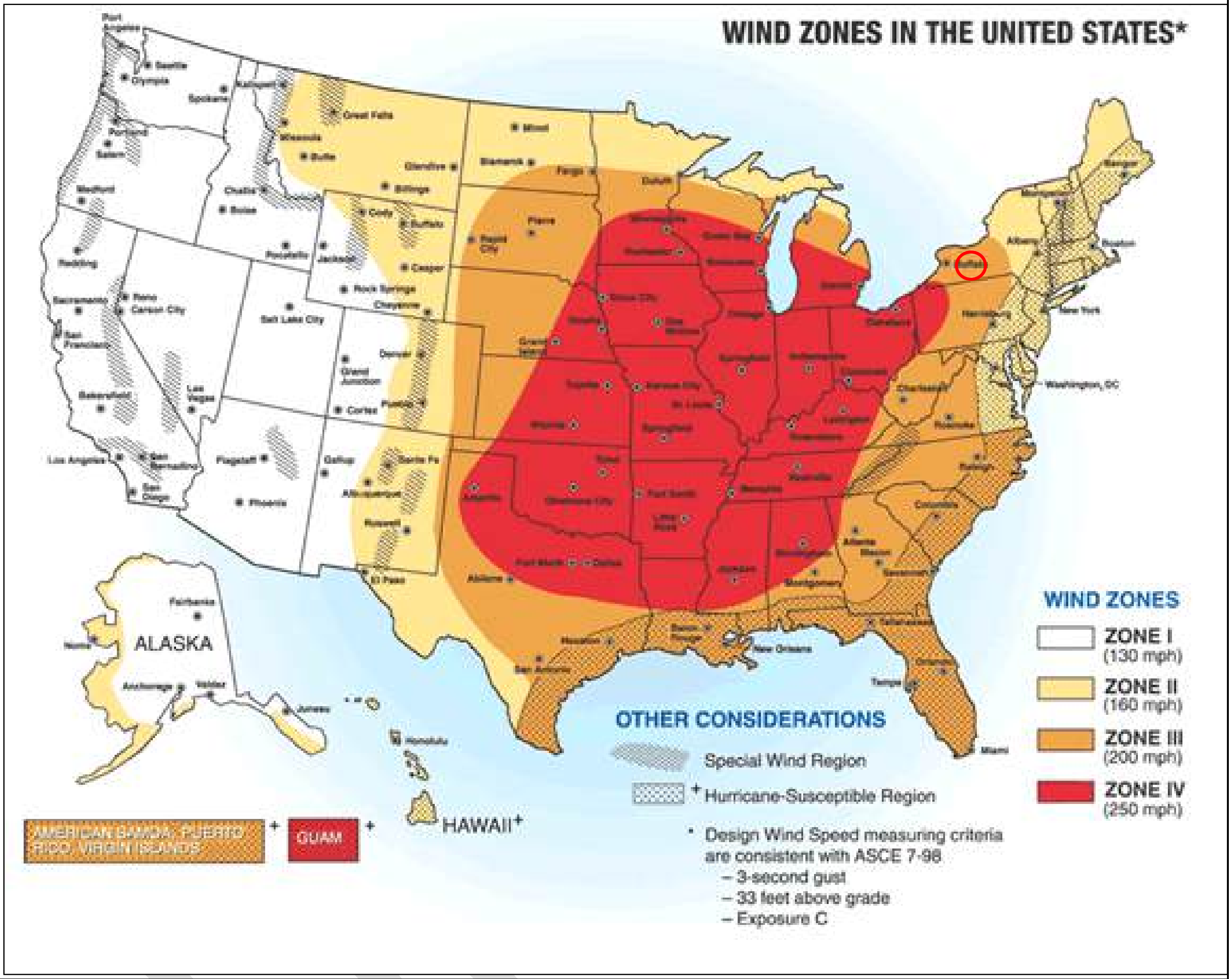


Source: FEMA 2019

High Winds

All of Yates County is subject to high winds from thunderstorms, hurricanes/tropical storms, tornadoes, and other severe weather events. According to FEMA Winds Zones of the United States map, Yates County is located in Wind Zone II, where wind speeds can reach up to 160 mph, as shown in Figure 14-3. Figure 14-4 shows FEMA's Strong Wind Risk Index for Yates County on the county scale. The County has a relatively low risk from strong wind events (FEMA 2019b).

Figure 14-3. Wind Zones in the United States



Source: National Institute of Standards and Technology 2011
Note: The red circle indicates the approximate location of Yates County.

Figure 14-4. National Risk Index, Strong Wind

Source: FEMA 2019

Tornadoes

The entire State of New York is vulnerable to tornado impacts. From 1996 to 2018, an average of eight tornadoes occurred each year in the State, ranging from F0 to F4, (NYS 2019). This resulted in an average of $6.4 million in annualized statewide loss from tornadoes. Approximately 143 injuries and six fatalities were recorded from 1996 to 2018 as a result of tornado impacts (NYS 2019). Figure 14-5 shows FEMA's Tornado Risk Index for Yates County on the county scale. The County has a very low risk from tornado events (FEMA 2019b).

Figure 14-5. National Risk Index, Tornado

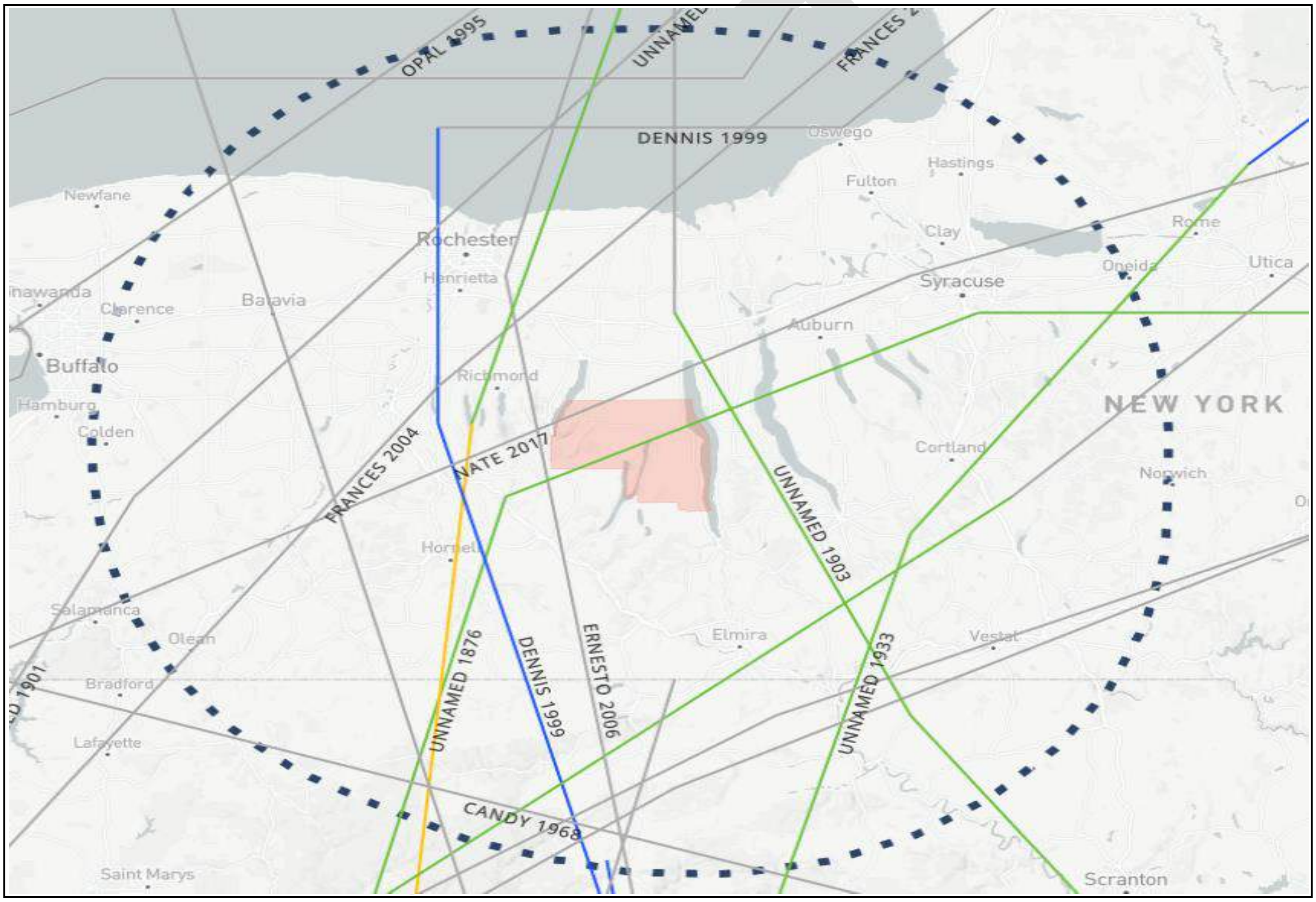
Source: FEMA 2019

Tropical Cyclones

The official hurricane season for the eastern United States, including the State of New York, is from June to November. Hurricanes and tropical storms are most likely to affect the state after late July due to the coolness of the Atlantic Ocean (NYS 2019).

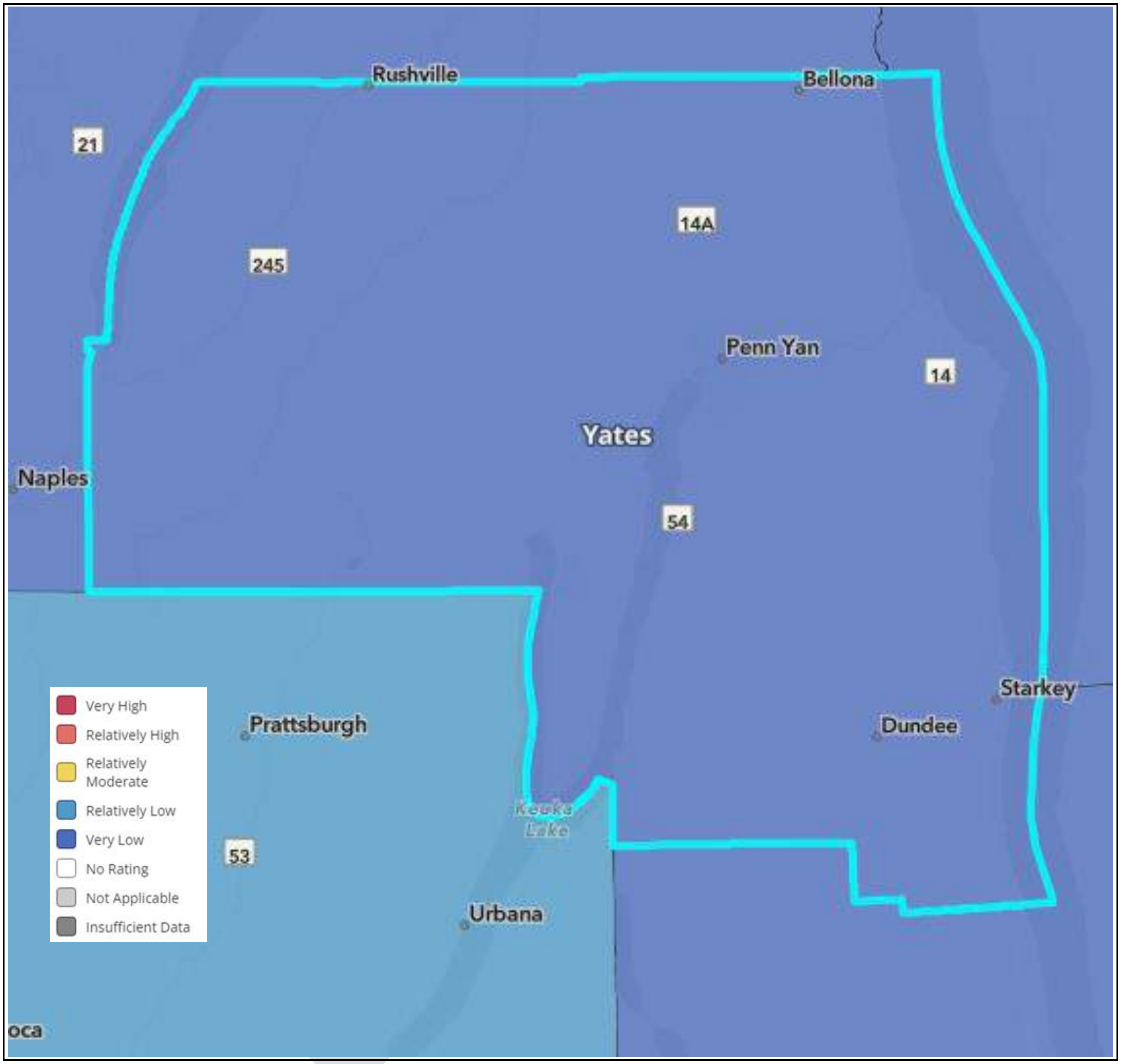
Inland areas like Yates County are at risk of damage from the heavy rain and winds produced by hurricanes and tropical storms, as most recently experienced during Hurricane Irene in August 2011. NOAA's Historical Hurricane Tracks tool is an interactive mapping application that displays Atlantic Basin and East-Central Pacific Basin tropical cyclone data from 1950 to 2023 (latest date available from data source). In that period, 17 tropical cyclones tracked within 60 nautical miles of Yates County (NOAA 2023). Figure 14-6 displays the tropical cyclone tracks for Yates County that tracked within 60 nautical miles. Figure 14-7 shows FEMA's Hurricane Risk Index for Yates County on the county scale. The County has a very low risk from hurricane events (FEMA 2019b).

Figure 14-6. Historical Tropical Storms and Hurricane Tracks



Source: NOAA 2023

Figure 14-7. National Risk Index, Hurricane



Source: FEMA 2019

14.1.3 Extent

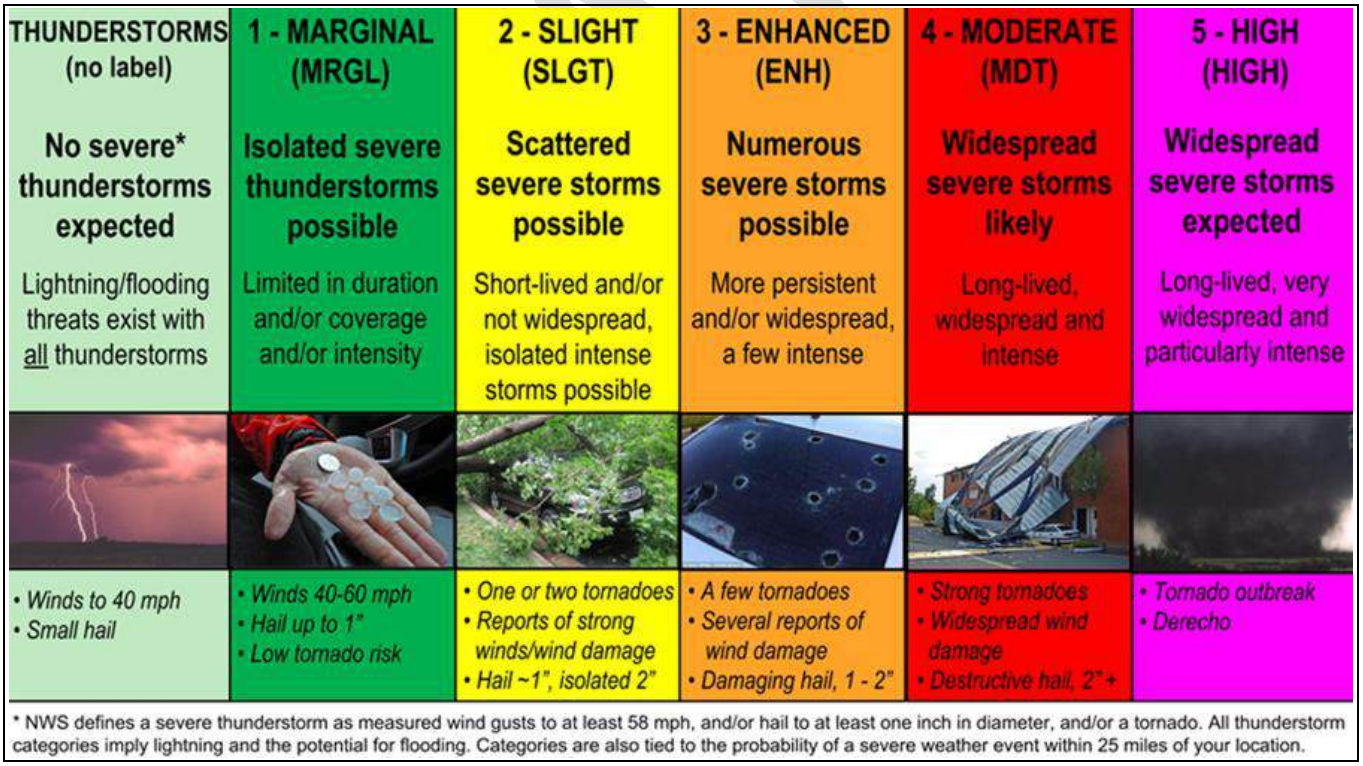
Thunderstorms

Severe thunderstorm watches and warnings are issued by the local NWS office and the Storm Prediction Center (SPC). The NWS and SPC update watches and warnings and notify the public when they are no longer in effect. NWS issues the following statements, watches, and warnings for thunderstorm events (NWS 2020):

- **Special Weather Statements** are issued for strong storms that may have impacts and are usually reserved for the threat of wind gust of 40 to 58 mph or small hail less than 1 inch.
- **Severe Thunderstorm Watches** are issued for severe thunderstorms where large hail, damaging winds, and/or tornadoes are possible, but the exact time and location of storm development is still uncertain. A watch means to be prepared for storms.
- **Severe Thunderstorm Warnings** are issued when a severe thunderstorm is imminent or occurring. It is either detected by weather radar or reported by storm spotters. A severe thunderstorm is one that produces winds 58 mph or stronger and/or hail 1 inch in diameter or larger. A warning means to take shelter.

Figure 14-8 shows the SPC risk categories for severe thunderstorm risk based on the best estimate of a severe weather event occurring within 25 miles of a point.

Figure 14-8. Severe Thunderstorm Risk Categories



Source: NOAA SPC 2017

Lightning

Lightning severity is determined by the frequency of lightning strikes during a storm. The New York City Office of Emergency Management notes that lightning strikes occur with moderate frequency in the State of New York, with 3.8 strikes occurring per square mile each year. Devices available to track and monitor the frequency of lightning include a ground-based system and a space-based system (NYC Emergency Management 2023).

Hailstorms

The severity of hail is measured by duration, hail size, and geographic extent. Size is often estimated by comparing a hailstone to a familiar object (Table 14-1). Most hailstorms are made up of a mix of different sizes, and only the very largest hailstones pose serious risk to people caught in the open (NSSL 2021).

Table 14-1. Hail Size

Description	Diameter (in inches)	Description	Diameter (in inches)
Pea	0.25	**Golf Ball**	1.75
Marble or Mothball	0.50	**Tennis Ball**	2.5
Penny or Dime	0.75	**Baseball**	2.75
Nickel	0.88	**Tea Cup**	3.00
Quarter	1.00	**Softball**	4.00
Ping Pong Ball	1.25	**Grapefruit**	4.50

Source: National Oceanic and Atmospheric Administration 2023

High Winds

Table 14-2 describes winds and their associated sustained wind speed used by the NWS during wind-producing events.

Table 14-2. NWS Wind Descriptions

Descriptive Term	Sustained Wind Speed
Strong, dangerous, or damaging	≥40 mph
Very Windy	30 – 40 mph
Windy	20 – 30 mph
Breezy, brisk, or blustery	15 – 25 mph
None	5 – 15 or 10 – 20 mph
Light or light and variable wind	0 – 5 mph

Source: NWS 2010

The NWS issues site-specific high wind advisories, watches, and warnings when wind speeds can pose a hazard. The criteria for each of these varies from state to state. According to the NWS (2020), wind warnings and advisories for the State of New York are as follows:

- High Wind Warnings are issued when sustained wind speeds of 40 mph or greater lasting for one hour or longer, winds of 58 mph or greater for any duration, or widespread damage are possible.
- Wind Advisories are issued when sustained winds of 30 to 39 mph are forecast for one hour or longer, or wind gusts of 46 to 57 mph for any duration.

Tornadoes

The Enhanced Fujita Scale (EF-Scale) is the standard used to measure the strength of a tornado. It is used to assign tornadoes a rating based on estimated wind speeds and related damage. When tornado-related damage is surveyed, it is compared to a list of damage indicators and degree of damage scales to estimate the range of wind speeds produced by the tornado. From that, a rating is assigned, with six categories from EF0 to EF5, representing increasing degrees of damage (NWS n.d.). Figure 14-9 illustrates the relationship between EF ratings, wind speed, and expected tornado damage. Yates County typically experience tornadoes ranging from EF0 to EF1.

The NOAA Storm Prediction Center issues watch and warning alerts for tornado activity. A tornado watch is when conditions are favorable for a tornado to form. A watch can cover parts of a state or span several states (NOAA-NSSL n.d.). A tornado warning is when a tornado is spotted by a radar and indicates action to be taken to ensure safety and shelter. Warnings can cover parts of counties or several counties, depending on the tornado's path (NOAA-NSSL n.d.). The current average lead time for tornado warnings is 13 minutes. Occasionally, tornadoes develop so rapidly that little, if any, advance warning is possible (NWS n.d.).

Tropical Cyclones

The extent of a hurricane or tropical storm is commonly categorized with the Saffir-Simpson Hurricane Wind Scale. This scale designates tropical storms as events with sustained wind speeds below 74 mph and rates hurricanes from 1 to 5 based on the event's increasing sustained wind speed. This scale estimates potential property damage. Hurricanes reaching Category 3 and higher are considered major hurricanes because of their potential for significant loss of life and damage. Tropical storms and Category 1 and 2 storms are still dangerous and require preventative measures (NOAA n.d.).

Figure 14-9. Explanation of EF-Scale Ratings

EF Rating	Wind Speeds	Expected Damage
EF-0	65-85 mph	'Minor' damage: shingles blown off or parts of a roof peeled off, damage to gutters/siding, branches broken off trees, shallow rooted trees toppled.
EF-1	86-110 mph	'Moderate' damage: more significant roof damage, windows broken, exterior doors damaged or lost, mobile homes overturned or badly damaged.
EF-2	111-135 mph	'Considerable' damage: roofs torn off well constructed homes, homes shifted off their foundation, mobile homes completely destroyed, large trees snapped or uprooted, cars can be tossed.
EF-3	136-165 mph	'Severe' damage: entire stories of well constructed homes destroyed, significant damage done to large buildings, homes with weak foundations can be blown away, trees begin to lose their bark.
EF-4	166-200 mph	'Extreme' damage: Well constructed homes are leveled, cars are thrown significant distances, top story exterior walls of masonry buildings would likely collapse.
EF-5	> 200 mph	'Massive/incredible' damage: Well constructed homes are swept away, steel-reinforced concrete structures are critically damaged, high-rise buildings sustain severe structural damage, trees are usually completely debarked, stripped of branches and snapped.

Source: NOAA 2020

Figure 14-10 presents the Saffir-Simpson Hurricane Wind Scale which is used to estimate the potential property damage and flooding expected when a hurricane makes landfall. Most tropical cyclones that impact Yates County are remnants of former tropical storms or hurricanes.

Figure 14-10. The Saffir-Simpson Scale

Source: NOAA 2020

Mean Return Period

In evaluating the potential for hazard events of a given magnitude, a mean return period (MRP) is often used. Figure 14-11 shows the estimated maximum three-second gust wind speeds that can be anticipated in Yates County associated with the 500-year MRP events. These peak wind speed projections were generated using Hazus model runs for the 500-year event. The maximum 3-second gust wind speeds for Yates County range from 39 to 73 mph for the 500-year MRP event, equivalent to a tropical storm.

14.1.4 Previous Occurrences

Federal Major Disaster and Emergency Declarations

Yates County has been included in 12 federal major disaster (DR) or emergency (EM) declarations for severe storm-related events, as listed in Table 14-3 (FEMA 2023b). One severe storm declarations has been issued since the previous Yates County HMP.

Figure 14-11. Wind Speeds for the 500-Year Mean Return Period Event

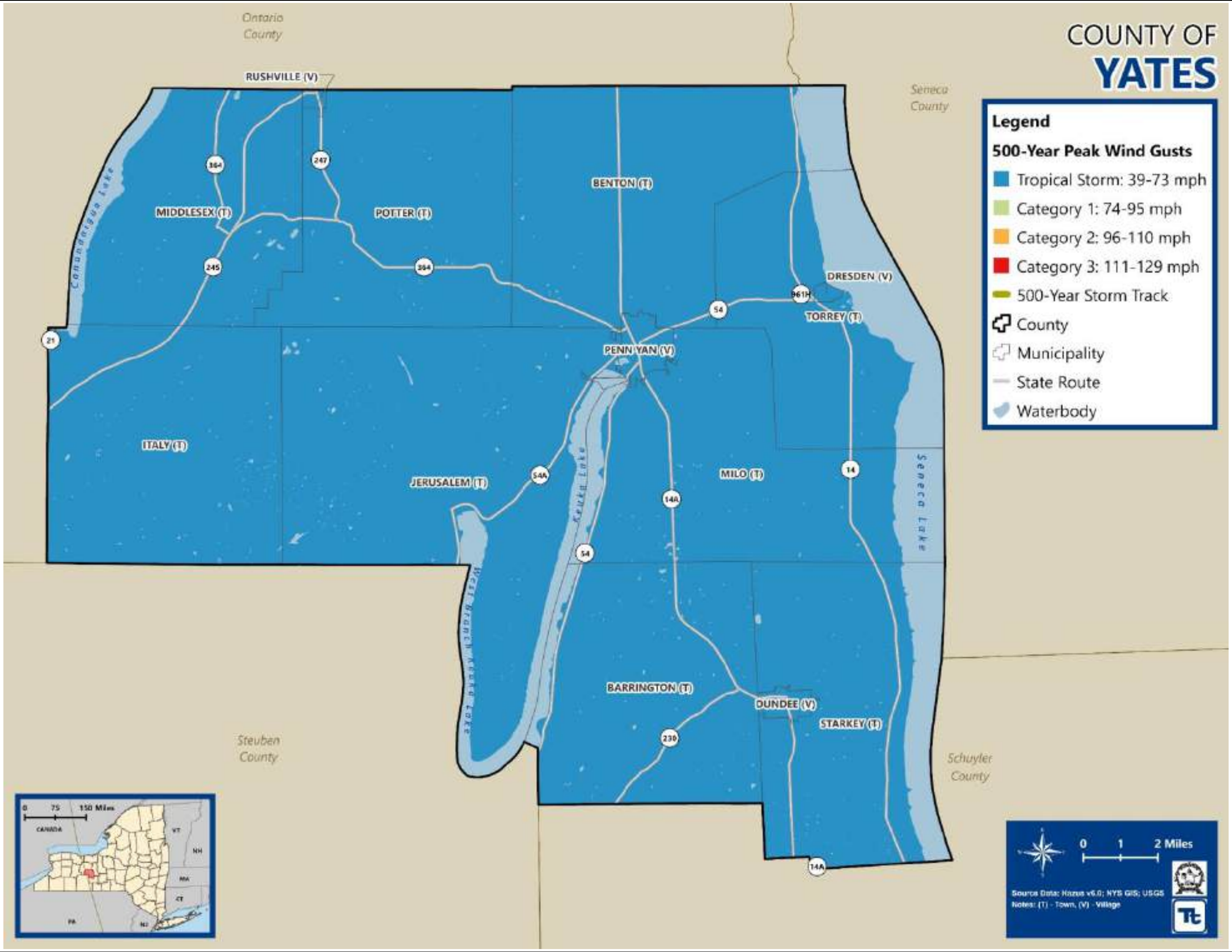


Table 14-3. FEMA Declarations for Severe Storm Events in Yates County (1954 to 2023)

Event Date	Declaration Date	Disaster Declaration Number	Description
June 23, 1972	June 23, 1972	DR-338-NY	Tropical Storm Agnes
October 2, 1975	October 2, 1975	DR-487-NY	Storms, Rain, Landslides, and Flooding
September 25, 1984	September 25, 1984	DR-725-NY	Severe Storms and Flooding
January 19 – 30, 1996	January 24, 1996	DR-1095-NY	Severe Storms and Flooding
May 3 – August 12, 2000	July 21, 2000	DR-1335-NY	Severe Storms and Flooding
July 21 – August 13, 2003	August 29, 2003	DR-1486-NY	Severe Storms, Flooding, and Tornadoes
May 13 – June 17, 2004	August 3, 2004	DR-1534-NY	Severe Storms and Flooding
August 29 – October 1, 2005	September 30, 2005	EM-3262-NY	Hurricane Katrina Evacuation
April 26 – May 8, 2011	June 10, 2011	DR-1993-NY	Severe Storms, Flooding, Tornadoes, and Straight-Line Winds
October 27 – November 8, 2012	October 28, 2012	EM-3351-NY	Hurricane Sandy
May 13 – 22, 2014	July 8, 2014	DR-4180-NY	Severe Storms and Flooding
August 18 – 19, 2021	October 8, 2021	DR-4625-NY	Remnants of Tropical Storm Fred

Source: FEMA 2023

USDA Declarations

Since the previous Yates County HMP, the County has not been included in any USDA declarations issued for dam failure-related events (USDA 2024).

Previous Events

Known severe storm-related events that impacted Yates County between January 2020 and December 2023 are presented in Table 14-2. For events prior to 2020, refer to the previous Yates County HMP.

14.1.5 Probability of Future Occurrences

Probability Based on Past Events

Information on previous severe storm occurrences in the County was used to calculate the probability of future occurrence of such events, as summarized in Table 14-3. Based on historical records and input from the Steering Committee, the probability of occurrence for severe storm-related events in the County is considered "frequent."

Table 14-4. Severe Storm Events in Yates County (2020 to 2023)

Event Date	Event Type	Disaster Declaration Number	Yates County Included in declaration?	Location Impacted	Description
May 11, 2020	Hail	N/A	N/A	Second Milo, Himrod	A low-pressure system moved through the area, bringing showers and thunderstorms that resulted in reports of severe 1-inch sized hail across the County. No property or crop damages were reported.
May 15, 2020	Thunderstorm Wind	N/A	N/A	Yates County	A cold front sparked some severe showers and thunderstorms with damaging winds. Mainly tree and power line damage was observed. $25,000 in property damage was reported.
May 29, 2020	Thunderstorm Wind	N/A	N/A	Dundee	A line of thunderstorms produced damaging winds that caused tree and power line damage. $5,000 in property damage was reported.
June 2, 2020	Thunderstorm Wind	N/A	N/A	Dresden	A severe thunderstorm caused tree damage and produced $10,000 in property damage.
July 8, 2020	Thunderstorm Wind	N/A	N/A	Middlesex	Scattered showers and thunderstorms produced tree damage and $5,000 in reported damage.
August 27, 2020	Thunderstorm Wind	N/A	N/A	Yates County	Numerous thunderstorms caused wind and wire damage. $10,000 in property damage was reported.
May 26, 2021	Thunderstorm Wind	N/A	N/A	Penn Yan	Severe scattered storms destroyed a lumber building, which resulted in three injuries and $15,000 in reported property damage.
June 29, 2021	Thunderstorm Wind	N/A	N/A	Yates County	Thunderstorms produced strong, damaging winds that resulted in numerous trees and utility wires knocked over. $14,000 in property damage was reported.
July 13, 2021	Thunderstorm Wind	N/A	N/A	Yates County	Severe thunderstorms with damaging winds resulted in numerous reports of trees and wires being knocked down. $7,000 in property damage was reported.
December 11, 2021	High Wind	N/A	N/A	Yates County	High winds knocked over trees and wires, which led to a car accident that resulted in an injury. $2,000 in property damage was reported.
July 22, 2022	Thunderstorm Wind	N/A	N/A	Yates County	Severe storms produced damaging wind gusts and large hail. $2,500 in property damage was reported.

Event Date	Event Type	Disaster Declaration Number	Yates County Included in declaration?	Location Impacted	Description
Juley 28, 2022	Thunderstorm Wind	N/A	N/A	Yates County	Damaging winds from storms knocked down trees and wires across the region. A couple of downed trees landed on structures, resulting in some damage. $6,000 in property damage was reported.
August 29, 2022	Thunderstorm Wind	N/A	N/A	Yates County	A line of severe thunderstorms brought damaging wind gusts up to 74 mph, that knocked down trees and wires. $9,000 in property damage was reported.
April 5, 2023	Thunderstorm Wind	N/A	N/A	Yates County	A strong disturbance triggered showers and thunderstorms. One storm produced an 85-mph microburst in Penn Yan that damaged a barn and knocked over trees. $53,000 in property damage was reported.

Source: FEMA 2023; NOAA 2023

Table 14-5. Probability of Future Severe Storm Events in Yates County

Hazard Type	Number of Occurrences Between 1954 and 2023	% Chance of Occurring in a Given Year
Hail	25	34.25%
High Wind	17	23.29%
Lightning	0	0%
Thunderstorm Wind	72	98.63%
Tornado	5	6.85%
Total	119	100%

Source: FEMA 2023, USDA 2023

Note: Disaster occurrences include federally declared disasters since the 1950 Federal Disaster Relief Act and selected severe storm events since 1968. Available records may not include all actual occurrences. Counts in this table may underestimate actual probability.

Potential Effect of Climate Change on Hazard Probability

Projections of climate change for New York State and for the Central/Finger Lakes region that includes Yates County are summarized in Section 3.5.4. Heavy rainstorms are projected to happen more often and can become more intense as the climate continues to warm, a change which has the potential to affect drinking water; heighten the risk of riverine flooding; flood key rail lines, roadways, and transportation hubs; and increase weather-related delays and hazards.

Hurricanes and tropical storms have become more intense since the mid 1990s and their winds and associated flooding are expected to increase. The number of hurricanes and tropical storms in the Atlantic basin may not increase but storms that do form are projected to be stronger and shift farther north (Stevens & Lamie 2024). The length of hurricane season is also likely to expand due to rising water temperatures.

Research suggests that there is a greater risk of more off-season tornadoes in a warmer future climate, which suggests that more tornadic activity may occur when people are not expecting it (NOAA 2023).

14.1.6 Cascading Impacts on Other Hazards

Severe storm incidents can lead to utility failure and downed trees and wires due to strong winds. Electrical utility failure also has the potential to start fires that can damage infrastructure and woodlands. The damage from electrical utility failure can include fatalities and injuries, depending on the location and severity of the failure. Damage incurred from utility failure can also be costly and time consuming to fix.

14.2 VULNERABILITY AND IMPACT ASSESSMENT

14.2.1 Life, Health, and Safety

Outdoor workers are vulnerable to severe weather events. Employers should prepare for the hazards associated with adverse weather conditions that may require special facilities and safety equipment being provided to employees, or in some instances, work stoppage to ensure the safety and health of workers. Wet weather and high wind conditions can pose a greater threat to employees in construction industries, who may be bound to work in open spaces, at heights, with electrical equipment and metals, or in excavation areas and trenches (Hazwoper OSHA 2020).

Overall Population

The entire population of Yates County (24,773) is exposed to this hazard. Impacts on life, health, and safety are dependent upon factors including the severity of the event and whether adequate warning time is provided to residents.

As a result of a significant hurricane event, residents may be displaced or require temporary to long-term sheltering. The number of people requiring shelter is generally less than the number displaced, as some displaced persons use hotels or stay with family or friends following a disaster event. Hazus estimates that there will not be any displaced households or persons seeking short-term shelter from the 500-year MRP event in Yateks County.

Socially Vulnerable Population

Socially vulnerable populations are most susceptible due to their physical and financial ability to react and respond during extreme severe weather. This population includes the elderly, young, and individuals with disabilities or access or functional needs who may be unable to evacuate in the event of an emergency. The elderly are considered most vulnerable because they require extra time or outside assistance during evacuations and are more likely to need medical attention that might not be readily available due to isolation during a storm event. The vulnerable population also includes those who would not have adequate warning from an emergency warning system (e.g., television or radio); this would include residents and visitors. The population adversely affected by severe weather may also include those beyond the disaster area that rely on affected roads for transportation.

Economically disadvantaged people are at high risk from severe weather because of the potential inability to afford up-to-code homes and buildings that are deemed safe from storms. They also may face health issues that water seepage may cause, such as exposure to mold. These populations may also lack access to vehicles for any necessary evacuations.

Table 3-5 shows social vulnerability statistics for Yates County and participating municipalities from the ACS 5-year estimates. Table 3-6 shows low-income populations based on United for ALICE data. The municipalities with the highest and lowest numbers and percentages in each social vulnerability category are listed in Table 14-6.

Table 14-6. Municipalities With Highest and Lowest Socially Vulnerable Populations

	Municipality Highest in Category		Municipality Lowest in Category	
Category	**Number**	**Percent**	**Number**	**Percent**
Population Over 65	Penn Yan (V): **1,367**	Penn Yan (V): **27.0%**	Dresden (V): **54**	Potter (T): **12.1%**
Population Under 5	Jerusalem (T): **306**	Dresden (V): **9.9%**	Starkey (T): **1**	Starkey (T): **0.1%**
Non-English-Speaking Population	Benton (T): **89**	Potter (T): **7.0%**	Dundee (V), Rushville (V), Starkey (T): **0**	Dundee (V), Rushville (V), Starkey (T): **0.0%**
Population With Disability	Penn Yan (V): **789**	Dundee (V): **18.9%**	Potter (T): **12**	Potter (T): **1.0%**
Population Below Poverty Level	Penn Yan (V): **776**	Dundee (V): **27.6%**	Rushville (V): **30**	Rushville (V): **4.6%**
Households Below ALICE Threshold	—	Italy (T): **58%**	—	Barrington (T): **33%**

14.2.2 General Building Stock

An extreme hailstorm event can carry hailstones traveling at speeds greater than 100 miles per hour (NWS 2019). This could cause structural damage for the general building stock in the County. Severe weather that causes lightning could be a threat to the County's general building stock if the lightning starts a fire. Over 22,000 fires caused by lightning occurred annually throughout the U.S. between 2007 and 2011, resulting in $450 million of damage per year (NFPA 2013).

Potential building damage from a 500-year MRP hurricane was evaluated by Hazus across the following damage categories: none, slight, moderate, extensive, and complete. Table 14-7 provides definitions of these categories of damage for a light wood-framed building. Definitions for other building types are included in the Hazus technical manual documentation.

Table 14-7. State Structural Damage Definitions for a Light Wood-Framed Building

Damage Category	Description
Slight	Small plaster or gypsum-board cracks at corners of door and window openings and wall-ceiling intersections; small cracks in masonry chimneys and masonry veneer.
Moderate	Large plaster or gypsum-board cracks at corners of door and window openings; small diagonal cracks across shear wall panels exhibited by small cracks in stucco and gypsum wall panels; large cracks in brick chimneys; toppling of tall masonry chimneys.
Extensive	Large diagonal cracks across shear wall panels or large cracks at plywood joints; permanent lateral movement of floors and roof; toppling of most brick chimneys; cracks in foundations; splitting of wood sill plates and/or slippage of structure over foundations; partial collapse of room-over-garage or other soft-story configurations.
Complete	Structure may have large permanent lateral displacement, may collapse, or be in imminent danger of collapse due to cripple-wall failure or the failure of the lateral load resisting system; some structures may slip and fall off the foundations; large foundation cracks.

Source: FEMA 2022

Building damage levels as a result of the 500-year MRP hurricanes were estimated for each municipality. Table 14-8 summarizes the results by building occupancy class. Up to 13 buildings will be minorly damaged by the 500-year MRP event. The majority of the losses are estimated to the residential occupancy class.

Table 14-8. Estimated Building Damage Levels from the 500-year MRP Hurricane

Occupancy Class	Total Number of Buildings in Occupancy	Severity of Expected Damage	500-Year Mean Return Period Hurricane	
			Building Count	Percent Buildings in Occupancy Class
Residential Exposure (Single and Multi-Family Dwellings)	11,203	NONE	11,197	99.9%
		MINOR	6	<0.1%
		MODERATE	0	0.0%
		SEVERE	0	0.0%
		DESTRUCTION	0	0.0%
Commercial Buildings	9,063	NONE	9,058	99.9%
		MINOR	5	0.1%
		MODERATE	0	0.0%
		SEVERE	0	0.0%
		DESTRUCTION	0	0.0%
Industrial Buildings	132	NONE	132	99.7%
		MINOR	0	0.0%
		MODERATE	0	0.0%
		SEVERE	0	0.0%
		DESTRUCTION	0	0.0%
Other[a]	1,698	NONE	1,696	99.9%
		MINOR	2	0.1%
		MODERATE	0	0.0%
		SEVERE	0	0.0%
		DESTRUCTION	0	0.0%

Source: Hazus v6.0; Yates County Planning Department; NYS GIS Clearinghouse; U.S. Army Corps of Engineers National Structure Inventory; RS Means 2022

a. "Other" occupancy classes include government, religion, agriculture, and education

Table 14-9 summarizes the Hazus results of damage by dollar amount for the 500-year MRP event. Hazus estimates $677,118 in damage to structures, with the estimated residential damage being the most expensive at $642,864.

Table 14-9. Estimated Building Losses Caused by the 500-Year MRP Hurricane

	Building Loss—500-Year Mean Return Period Hurricane				
	All Occupancies	Residential	Commercial	Industrial	Other[a]
Barrington (T)	$66,063	$66,063	$0	$0	$0
Benton (T)	$75,172	$71,407	$3,028	$555	$181
Dresden (V)	$7,114	$6,152	$530	$326	$106
Dundee (V)	$50,124	$45,396	$2,441	$1,067	$1,220
Italy (T)	$11,220	$11,220	$0	$0	$0
Jerusalem (T)	$75,473	$75,435	$38	$0	$0
Middlesex (T)	$12,285	$12,285	$0	$0	$0
Milo (T)	$103,624	$98,486	$2,871	$1,664	$603
Penn Yan (V)	$82,960	$81,501	$1,459	$0	$0
Potter (T)	$21,108	$20,661	$447	$0	$0
Rushville (V)	$1,643	$1,643	$0	$0	$0
Starkey (T)	$121,050	$109,606	$5,912	$2,593	$2,939
Torrey (T)	$49,282	$43,007	$3,513	$2,084	$678
Yates County (Total)	**$677,118**	**$642,864**	**$20,238**	**$8,289**	**$5,727**

Source: Hazus; Yates County Planning Department; NYS GIS Clearinghouse; U.S. Army Corps of Engineers National Structure Inventory; RS Means 2022

a. "Other" occupancy classes include government, religion, agriculture, and education

14.2.3 Community Lifelines and Other Critical Facilities

All critical facilities in the County are exposed to the severe weather hazard. Critical facilities are at risk of being impacted by high winds associated with structural damage, or falling tree limbs/flying debris, which can result in the loss of power. Power loss can greatly impact households, business operations, public utilities, and emergency personnel. Emergency personnel such as police, fire, and emergency medical services will not be able to effectively respond in a power loss event to maintain public safety unless backup power and fuel sources are available. Loss of power can impact other public utilities, including potable water, wastewater treatment, and communications. In addition to public water services, property owners with private wells might not have access to potable water until power is restored.

It is essential that critical facilities remain operational during natural hazard events. Backup power is recommended for critical facilities and infrastructure. Where backup power is needed for critical facilities that provide essential services, municipalities identified mitigation actions in Volume II.

The Hazus hurricane model was used to assign the range or average probability of each damage state category to the critical facilities and lifelines in Yates County for the 500-year MRP hurricane events. For percent probability of sustaining damage, the minimum and maximum damage estimated value for that facility type is presented. Table 14-10 summarizes the damage state probabilities for critical facilities during the 500-year MRP event. Hazus estimates that water systems and communications have the greatest chance of sustaining minor damage (0.3 percent). Safety and security have the greatest chance of moderate damage (less than 0.1 percent).

Table 14-10. Estimated Critical Facilities Damage for the 500-Year MRP Hurricane

		Average Percent Probability of Sustaining Damage 500-Year MRP Hurricane			
	Loss of Days	Minor	Moderate	Severe	Complete
Communications	0	0.3%	0.0%	0.0%	0.0%
Energy	0	0.0%	0.0%	0.0%	0.0%
Food, Hydration, Shelter	0	0.0%	0.0%	0.0%	0.0%
Hazardous Materials	0	0.0%	0.0%	0.0%	0.0%
Health and Medical	0	0.1%	0.0%	0.0%	0.0%
Safety and Security	0	0.2%	<0.1%	0.0%	0.0%
Transportation	0	0.3%	0.0%	0.0%	0.0%
Water Systems	0	0.3%	0.0%	0.0%	0.0%

Source: Hazus v6.0; Yates County Planning Department; NYS GIS Clearinghouse; U.S. Army Corps of Engineers National Structure Inventory; RS Means 2022

14.2.4 Economy

Severe weather events can have short- and long-lasting impacts on the economy. When a business is closed during storm recovery, there is lost economic activity in the form of day-to-day business and wages to employees. Overall, economic impacts include the loss of business function (e.g., tourism, recreation), damage to inventory, relocation costs, wage loss and rental loss due to the repair/replacement of buildings. Impacts on transportation lifelines affect both short-term (e.g., evacuation activities) and long-term (e.g., day-to-day commuting and goods transport) transportation needs. Utility infrastructure (power lines, gas lines, electrical systems) could suffer damage that can result in the loss of power, which can impact business operations and heating or cooling provision to the population.

Hazus estimates the volume of debris that may be generated as a result of a hurricane event. Debris estimates are divided into two categories: reinforced concrete and steel that require special equipment to break up before it can be transported, and brick, wood, and other debris that can be loaded directly onto trucks with bulldozers (FEMA 2022c). Table 14-11 summarizes the estimated debris generated because of these events by municipality. For the 500-year MRP event, Hazus estimates a total of 10,133.7 tons of debris will be generated countywide.

Table 14-11. Estimated Debris Created During the 500-Year MRP Hurricane

	Estimated Debris Created During the 500-Year MRP Hurricane Wind Event			
	Brick and Wood (tons)	Concrete and Steel (tons)	Tree (tons)	Eligible Tree Volume (tons)
Barrington (T)	0.0	0.0	1,021.8	919.7
Benton (T)	1.7	0.0	0.0	0.0
Dresden (V)	0.7	0.0	0.0	0.0
Dundee (V)	2.9	0.0	725.6	1,088.6
Italy (T)	0.0	0.0	0.0	0.0
Jerusalem (T)	0.0	0.0	0.0	0.0
Middlesex (T)	0.0	0.0	0.0	0.0
Milo (T)	3.7	0.0	775.4	796.2
Penn Yan (V)	0.3	0.0	179.0	248.3
Potter (T)	0.1	0.0	0.0	0.0
Rushville (V)	0.0	0.0	0.0	0.0
Starkey (T)	7.0	0.0	1,743.2	2,615.0
Torrey (T)	4.6	0.0	0.0	0.0
Yates County (Total)	**21.0**	**0.0**	**4,445.0**	**5,667.7**

Source: Hazus v6.0; Yates County Planning Department; NYS GIS Clearinghouse; U.S. Army Corps of Engineers National Structure Inventory; RS Means 2022

14.2.5 Natural, Historic and Cultural Resources

Natural

The long-term impacts of severe weather can be destructive to the natural and local environment. Organizations such as USGS and NOAA have been studying and monitoring the impacts of extreme weather phenomena as on stream flow, river levels, reservoir elevations, floods, landslides, erosion, etc. For example, severe weather that creates longer periods of rainfall can erode natural banks along waterways and degrade soil stability for terrestrial species. Tornadoes can tear apart habitats, causing fragmentation across ecosystems (EPA 2023). Researchers also believe that a greater number of diseases will spread across ecosystems because of impacts of severe weather on water supplies (USGCRP 2016).

Historic

Winds associated with severe weather can cause damage or destruction to historical infrastructure. Historical buildings that are not built to modern building code standards to withstand high winds are more vulnerable than other infrastructure.

Cultural

Winds associated with severe weather can cause damage or destruction to the County's cultural resources. Cultural resources may be located inside of historical buildings and homes, which may not be built to withstand such high winds and are more vulnerable or be located outdoors. Outdoor events are likely to be postponed or cancelled as the result of severe weather conditions.

14.3 CHANGE OF VULNERABILITY SINCE 2020 HMP

Overall, the County's vulnerability has not changed, and the entire County will continue to be vulnerable to severe storm events. As existing development and infrastructure continue to age, they can be at increased risk from failed utility and transportation systems if they are not properly maintained and do not adapt to the changing environment.

14.4 FUTURE CHANGES THAT MAY AFFECT RISK

14.4.1 Potential or Planned Development

The ability of new development to withstand severe weather hazard impacts lies in sound land use practices, building design considerations (e.g., Leadership in Energy and Environmental Design [LEED]), and consistent enforcement of codes and regulations for new construction. New development will change the landscape where buildings, roads, and other infrastructure potentially replace open land and vegetation. Surfaces that were once permeable and moist will become impermeable and dry, potentially making them more susceptible to fires caused by lightning. Specific areas of recent and new development are indicated in tables and maps included in the jurisdictional annexes in Volume II of this plan.

14.4.2 Projected Changes in Population

Yates County has experienced a decrease in its population since 2010. According to the U.S. Census Bureau, the County's population decreased by 2.3 percent between 2010 and 2020 (Census 2020). Cornell University's Program on Applied Demographics projects Yates County will have a population of 24,706 by 2030 and 24,857 by 2040 (Cornell University 2018).

Changes in the density of population can increase the number of persons exposed to flooding and erosion. As areas continue to be cleared for new development and run-off persists, the population in the County will remain exposed to this hazard.

14.4.3 Climate Change

As the climate warms and other changes in climate continue to unfold, the intensity of severe weather may change, producing more ideal conditions for severe storms to form. It is anticipated that the County will continue to experience direct and indirect impacts of severe weather events annually that may induce secondary hazards such as infrastructure deterioration or failure, utility failures, power outages, water quality and supply concerns, and transportation delays, accidents, and inconveniences.

15. TRANSPORTATION ACCIDENT

15.1 HAZARD PROFILE

15.1.1 Hazard Description

The transportation accident hazard can be divided into two categories: hazards created by the material being transported; and hazards created by the transportation medium. For this HMP, the transportation accident hazard includes vehicular accidents, aviation accidents, and railway accidents.

Vehicular Accidents

A vehicular accident is any road traffic incident that involves a vehicle colliding with another vehicle, another road user (such as a pedestrian, cyclist, or animal), or a stationary roadside object. A vehicular accident may result in injury, property damage, or fatalities. Factors that contribute to vehicular accidents include equipment failure, poor road conditions, weather, traffic volume, and driver behavior (FMCSA n.d.).

Railway Accidents

Railway accidents are divided into three groups for reporting purposes (U.S. DOT 2019):

- **Train accidents** are events involving on-track rail equipment (standing or moving) and causing monetary damage to the rail equipment and track above a prescribed amount.
- **Highway-rail grade crossing incidents** are impacts between on-track rail equipment and a highway user (motor vehicle or other user of the crossing) at a designated crossing site, including walkways, sidewalks, etc.
- **Other incidents** include any death, injury, or occupational illness of a railroad employee that is not the result of a train accident or highway-rail incident.

Aviation Accidents

An aviation accident is any accident involving an aircraft with a person on board, whether on the ground or in flight, that results in fatality, serious injury, or substantial damage to the aircraft. (NTSB 2020). Human factors directly cause or contribute to many aviation accidents. About 80 percent of maintenance errors involve human factors (FAA 2011). Some of the most common causes of aviation accidents are violations of Federal Aviation Administration (FAA) and National

Transportation Safety Board (NTSB) regulations. Other typical causes include the following (NCI 2021):

- **Pilot or flight crew errors** result from decisions, actions, or lack of actions by the pilot. Approximately half of all aviation accidents are caused by pilot error. Causes of pilot error include lack of experience, poor training, fatigue, or intoxication.
- **Mechanical failures** are caused by wear and tear of parts or by improper repairs or equipment adjustments. Malfunction of an aircraft part is often a catastrophic, unforeseen failure that can cause an aviation accident.
- **Weather conditions** can cause accidents while a plane is taking off or landing, such as when a plane tries to land in a snowstorm and skids off the runway or when a buildup of slush or ice keeps a plane from reaching take-off speed.
- **Air traffic control error** can result in an aviation accidents involving one or more aircrafts. Air traffic controllers must coordinate the comings and goings of many planes at once. Pilots rely on information from air traffic controllers while in the air. The decisions made are based on things such as weather and fuel while scheduling the takeoffs and landings of planes.

Aviation accidents are often devastating incidents that may result in serious injuries or fatalities. The FAA and the NTSB monitor air travel and accident investigations. According to the NTSB, 12,368 general aviation accidents were reported in the United States between 2012 and 2021—2,269 were fatal accidents, with 3,817 total fatalities. Of these accidents, 11,739 had accident findings, which disclosed that 9,506 accidents involved personnel issues, 9,439 involved mechanical issues, 5,216 involved environmental issues, 155 involved organizational issues, and 1,182 were undetermined (NTSB 2022).

Mass Casualty Incidents

The term mass-casualty incident (MCI) is often applied when an air, rail, or multi-vehicle highway accident results in three or more fatalities or critical injuries. Effects may also include property damage. Because large numbers of patients may be involved, significant MCIs may tax local emergency medical and hospital resources, and therefore require a regional response. First responders, including fire, police, and emergency room staff at local hospitals, follow established protocols for an MCI. Mutual aid is requested should local officials be unable to respond appropriately with available personnel and equipment.

Severe weather may play a role in contributing to such incidents. MCIs may also result from acts of violence or terrorism, which could include a hazardous materials incident contaminating persons and requiring mass decontamination.

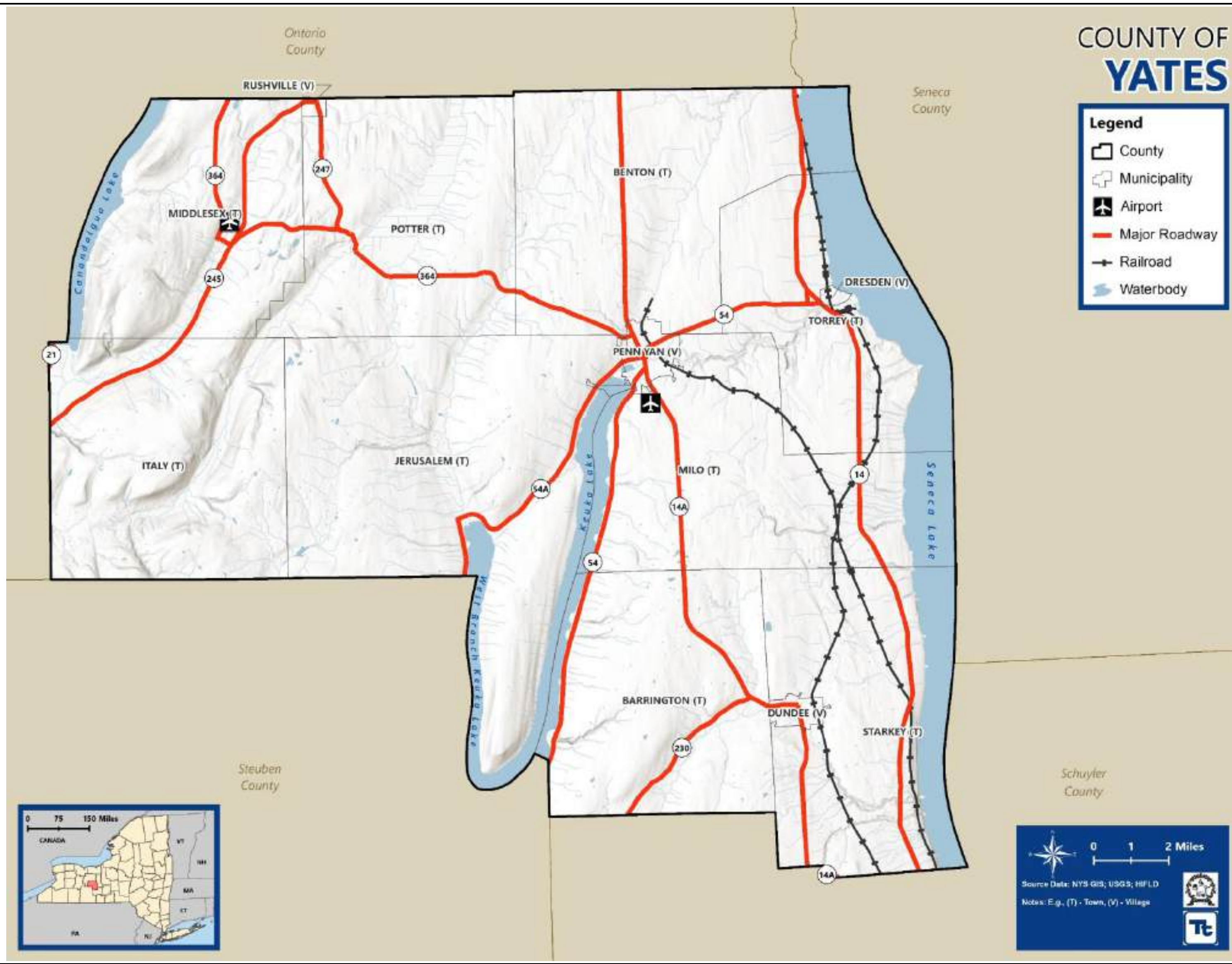
15.1.2 Location

Transportation systems available in Yates County include roadways, railways, and two airports. All County systems and supporting transportation resources provide services locally, regionally, and nationally. Major system are shown in Figure 15-1.

Vehicular Accidents

Yates County is rural county in the Finger Lakes region. Route 14 runs north-south along the County's eastern border, connecting the Village of Watkins Glen in Schuyler County with the City of Geneva in Orlando County. A network of state and local roadways throughout the County makes Yates County at risk from traffic accidents of varying degrees. Higher traveled roadways are more at risk due to travel density.

Figure 15-1. Major Transportation Routes in Yates County


COUNTY OF
YATES
Legend
County
Municipality
Airport
Major Roadway
Railroad
Waterbody
Ontario County
Seneca County
Steuben County
Schuyler County
RUSHVILLE (V)
MIDDLESEX (T)
POTTER (T)
BENTON (T)
DRESDEN (V)
TORREY (T)
PENN YAN (V)
ITALY (T)
JERUSALEM (T)
MILO (T)
BARRINGTON (T)
DUNDEE (V)
STARKEY (T)
Canandaigua Lake
Keuka Lake
West Branch Keuka Lake
Seneca Lake
364
247
245
21
54
14
54A
14A
230
0 1 2 Miles
Source Data: NYS GIS; USGS; HIFLD
Notes: E.g., (T) - Town, (V) - Village
0 75 150 Miles
CANADA
VT
NH
MA
CT
PA
NJ

The County has 804 miles of roadways, as listed in Table 15-1. Vehicular accidents can occur at any point along these roadways, with many occurring at the intersection of two or more roadways.

Table 15-1. Yates County Roadway System

Category	Miles of Roadway
Local Roads	512 miles
County Roads	180 miles
State Roads	112 miles
Total	**804 miles**

Source: NYDOT 2023; NYSDOT 2017

Railway Accidents

The Finger Lakes Railway Corporation (FGLK) provides railroad service along the eastern side of the County. The regional rail service for the Finger Lakes area, FGLK connects with CSX, Norfolk Southern, Canadian Pacific, and New York Susquehanna & Western Railroads. Rail lines in the County are shown in Figure 15-1.

Aviation Accidents

There are two airports in Yates County, as shown in Figure 15-1. In addition to accidents at these airports, it is possible, though unlikely, for aviation accidents to occur while a plane is flying over County airspace.

15.1.3 Extent

Transportation incidents occur without predictability under circumstances that give responders little time to prepare. In 2020 (the most recent data available), the NTSB reported 40,851 transportation-related fatalities in the United States. Highway incidents made up 95 percent of those fatalities, with the remaining 5 percent consisting of rail, marine, aviation, and hazardous materials accidents (NTSB 2022). The severity of a transportation accident depends on the vehicles involved and their contents (passengers and types of goods).

Vehicular Accidents

Roadway accidents in Yates County range from minor crashes to serious incidents that involve injuries or fatalities or result in a release of hazardous materials. MCIs may occur throughout the planning area, day or night, at any time of the year. The following freeways have greater potential for MCIs because of the heavy volume of traffic, although no highway or surface street in the planning area is exempt from this hazard:

- State Route 14
- State Route 14A
- State Route 54
- State Route 54A
- State Route 364
- State Route 245
- Italy Valley Road

There is no warning time for vehicular accidents. Factors contributing to these accidents are typically associated with the driver, vehicle, and the environment. Factors associated with the driver include error, speeding, experience, and blood-alcohol level. Factors associated with the vehicle include type, condition, and center of gravity. Environmental factors include quality of the infrastructure, weather, and obstacles. Most vehicular accidents are attributed to the driver. Vehicular accidents can severely affect those directly involved as well as others not directly involved. Other effects may include severe traffic delays, lost sales to businesses, delayed commodity shipments, and increased insurance costs (NHTSA 2015).

Railway Accidents

Rail accidents can vary widely in terms of injuries, fatalities, property damage, and interruption of service, depending on the nature and severity of the accident. The major types of such accidents are as follows:

- A **derailment** is an accident on a railway when a train leaves the rails entirely
- A **collision** is an accident in which a train strikes another train or a vehicle
- **Other accidents** may be caused by other circumstances like obstructions, fire, or explosions

Passengers and personnel on the FGLK and personnel on commercial railways are considered at risk, as well as any nearby pedestrians.

Aviation Accidents

Aircraft accidents vary from a single-engine plane having a hard landing that damages the aircraft to a crash of a large commercial jet aircraft. They may involve helicopters, experimental vehicles, and radio-controlled or drone aircraft devices. Experimental vehicles and drones may not be subject to regulatory oversight, potentially complicating issues if one of these devices crash.

15.1.4 Previous Occurrences

Federal Major Disaster and Emergency Declarations

Yates County has not been included in any major disaster (DR) or emergency (EM) declarations for transportation accident-related events (FEMA 2023b).

USDA Declarations

Since the previous Yates County HMP, the County has not been included in any USDA declarations issued for transportation accident-related events (USDA 2024).

Previous Events

Known transportation accident-related events that impacted Yates County between January 2020 and December 2023 are presented in Table 15-2. Earlier events are listed in the previous Yates County HMP.

Table 15-2. Transportation Accident Events in Yates County (2020 to 2023)

Year	Vehicle Accidents				Railroad Accidents	Aircraft Accidents
	Total Incidents	Incidents Involving Fatality	Incidents Involving Personal Injury	Incidents Involving Property Damage		
2020	610	2	79	529	1	0
2021	684	4	89	599	1	0
2022	692	5	94	593	1	0
2023	650	4	79	567	0	0
Total	**2,636**	**15**	**341**	**2,288**	**3**	**0**

Source: ITSMR 2022; U.S. DOT 2023; NTSB n.d.

15.1.5 Probability of Future Occurrences

Probability Based on Past Events

Information on previous transportation accident occurrences in the County was used to calculate the probability of future occurrence of such events, as summarized in Table 15-3. Based on historical records and input from the Steering Committee, the probability of occurrence for transportation accident-related events in the County is considered "occasional." Major road accidents in the County are probable, and aviation or rail accidents are unlikely.

Table 15-3. Probability of Future Transportation Accident Events in Yates County

Hazard Type	Number of Occurrences Between 1999 and 2024	Percent Chance of Occurring in Any Given Year
Vehicle Accident	7,316	100 %
Railway Accident	9	36 %
Aviation Accident	5	20 %
Total	**7,330**	**100 %**

Source: ITSMR 2022; U.S. DOT 2023; NTSB n.d.
Note: Available records may not include all actual occurrences. Counts in this table may underestimate actual probability.

Projected Effects of Climate Change

Road, rail, and air traffic are vulnerable to extreme temperature, severe storms, severe winter storms, and flooding. Increasing temperatures lead to shorter duration freezes of Lake Ontario and the Finger Lakes, allowing more moisture to be drawn into the atmosphere. During the winter, that moisture may fall as snow or freezing rain across the central region of the state. Additional snow and icing would result in more transportation accidents. Climate change projections show an increase in the frequency and magnitude of flood and severe weather events. which may lead to an increased risk while traveling by road, rail, or air. If there is a significant increase in temperature, the asphalt on roadways and runways at airports, and potentially rail lines, may buckle and warp (NYSERDA 2014).

In State Climate Region 1 (Western New York and Great Lakes Plain Region), which includes Yates County, it is estimated that, by the 2080s, temperatures will increase by 4.5 °F to 8.5 °F and precipitation totals will increase between 0 and 15 percent (NYSERDA 2014).

15.1.6 Cascading Impacts on Other Hazards

The largest cascading impact caused by transportation accidents would be economic. The economic impacts should a transportation facility be rendered impassable would be significant. The loss of a roadway or railroad would have serious effects on the local economy and the ability to provide services. Loss of major travel routes would result in loss of commerce and could affect the ability to provide emergency services to residents by delaying response times or limiting routes for equipment such as fire apparatus, police vehicles, and ambulances. The ability to receive fuel deliveries would also be affected. Re-routed traffic could affect local roadways.

15.2 VULNERABILITY AND IMPACT ASSESSMENT

Regarding the transportation accident hazard, all of Yates County has been identified as the hazard area. Therefore, all assets within the County (population, structures, critical facilities, and lifelines), as described in the County Profile (Chapter 3), are vulnerable to transportation accidents. A qualitative assessment was conducted to assess the assets vulnerable to the transportation accident hazard.

15.2.1 Life, Health, and Safety

Overall Population

Vehicular accidents and roadway impairments may result in injury or death to drivers and passengers on the road, the public in the immediate vicinity, and emergency services personnel deployed to a crash site; first responders may also have to take on the duty of controlling traffic surrounding an incident, increasing their risk of injury. The number of people exposed to a hazard depends on the time of day, the mode of transport being used (bus, car, train, airplane, etc.) and the population density or development patterns in the immediate area.

Socially Vulnerable Population

Those who are lower-income, persons of color, immigrants, or under 50 are especially likely to use public transportation on a regular basis. More than 40 percent of buses in the United States are in marginal or poor condition, which may increase the likelihood of the vehicle being in an accident (Pew Research Center 2016).

Elderly (65 and older) and young (16 to 19 years old) drivers are the most at risk populations behind the wheel of a vehicle. In 2020, about 7,500 older adults were killed in traffic crashes, and almost 200,000 were treated in emergency departments for crash injuries. Age-related changes in vision, physical functioning, and the ability to reason and remember, as well as some diseases and medications, might affect some older adults' driving abilities (CDC 2022). Young drivers who are at especially high risk for motor vehicle crashes include the following (CDC 2022):

- Males—The motor vehicle crash death rate for male drivers ages 16 to 19 years was three times as high as the death rate for female drivers in the same age group in 2020.
- Teens Driving with Teen or Young Adult Passengers—The presence of teen or young adult passengers increases the crash risk of unsupervised teen drivers. This risk increases with each additional teen or young adult passenger.
- Newly Licensed Teens—Crash risk is particularly high during the first months of licensure. The crash rate per mile driven is about 1.5 times as high for 16-year-old drivers as it is for 18- to19-year-old drivers.

Factors that put young drivers more at risk include inexperience, driving at night or on the weekend, not using seat belts, distracted driving, speeding, drinking alcohol, and using drugs and other substances (CDC 2022).

Table 3-5 shows social vulnerability statistics for Yates County and participating municipalities from the ACS 5-year estimates. Table 3-6 shows low-income populations based on United for ALICE data. The municipalities with the highest and lowest numbers and percentages in each social vulnerability category are listed in Table 15-4.

Table 15-4. Municipalities With Highest and Lowest Socially Vulnerable Populations

	Municipality Highest in Category		Municipality Lowest in Category	
Category	**Number**	**Percent**	**Number**	**Percent**
Population Over 65	Penn Yan (V): **1,367**	Penn Yan (V): **27.0%**	Dresden (V): **54**	Potter (T): **12.1%**
Population Under 5	Jerusalem (T): **306**	Dresden (V): **9.9%**	Starkey (T): **1**	Starkey (T): **0.1%**
Non-English-Speaking Population	Benton (T): **89**	Potter (T): **7.0%**	Dundee (V), Rushville (V), Starkey (T): **0**	Dundee (V), Rushville (V), Starkey (T): **0.0%**
Population With Disability	Penn Yan (V): **789**	Dundee (V): **18.9%**	Potter (T): **12**	Potter (T): **1.0%**
Population Below Poverty Level	Penn Yan (V): **776**	Dundee (V): **27.6%**	Rushville (V): **30**	Rushville (V): **4.6%**
Households Below ALICE Threshold	—	Italy (T): **58%**	—	Barrington (T): **33%**

15.2.2 General Building Stock

Property may be impacted by transportation accidents if a vehicle collides with a structure. A railway incident may break or destroy the rail line; vehicles in urban settings have the potential to impact nearby buildings if the driver loses control of the vehicle; an airplane accident has the potential to impact a variety of forms of property, such as buildings, other vehicles, and open spaces.

15.2.3 Community Lifelines and Other Critical Facilities

Transportation accidents greatly impact the transportation lifeline. Transportation accidents on local roads and major highways can impact roadway travel; an aviation accident may ground multiple airplanes within a defined area; and a railroad accident may interrupt services to and from given stations if the rail is unable to be cleared. Disruption of one or more of these modes of transportation can lead to congestion of another and affect the County and the larger region. Transportation accidents also may impact the delivery of emergency services, such as police, fire, and emergency medical response. Large transportation accidents may lead to an increase in patients at hospitals.

15.2.4 Economy

Loss of roadway use and public transportation services due to a major transportation accident could affect thousands of commuters, employment, and day-to-day operations. Individuals involved in a transportation incident may suffer economically due to loss of pay, potential insurance costs, and potential lawsuits.

15.2.5 Natural, Historic and Cultural Resources

Natural

For some motor vehicle crashes, train derailments, or aviation accidents, the environmental impact is minimal. However, if the accident involves a vehicle moving hazardous materials, the impact will be considerably larger and may include an explosion or the release of the hazardous material.

Historic and Cultural

Transportation accidents in and around historic and cultural landmarks could bring loss of life and property to the affected area. Transportation accidents can occur at any location within the County but may be more likely to occur in high-traffic locations. Historical and cultural landmarks are sites frequented by visitors and locals alike. The traffic volume, combined with the number of pedestrians, may lead to an increased likelihood of a transportation accident at these locations. Furthermore, an accident involving a form of public transportation, including bus and passenger rail, could lead to an MCI due to the number of passengers and members of the public surrounding the public transportation systems. Such an accident also may physically impact the historic and cultural resources to accident debris.

15.3 CHANGE OF VULNERABILITY SINCE 2020 HMP

Overall, the County's vulnerability has not changed since the previous HMP. Vulnerability of the entire County to transportation accidents will continue.

15.4 FUTURE CHANGES THAT MAY AFFECT RISK

15.4.1 Potential or Planned Development

As discussed in Chapter 3 (County Profile) and Volume II (Jurisdictional Annexes), areas targeted for future growth and development have been identified across Yates County. Increased development in the County and region will lead to increased traffic.

15.4.2 Projected Changes in Population

Yates County has experienced a decrease in its population since 2010. According to the U.S. Census Bureau, the County's population decreased by 2.3 percent between 2010 and 2020 (Census 2020). Cornell University's Program on Applied Demographics projects Yates County will have a population of 24,706 by 2030 and 24,857 by 2040 (Cornell University 2018). As population grows, the number of people susceptible to the impacts of transportation incidents (located near existing or future transportation corridors) is expected to increase.

15.4.3 Climate Change

Climate change is projected to increase the frequency and intensity of severe weather events, which could damage transportation infrastructure. Heat waves will likely be more extreme, and precipitation will be more intense. These changes could increase the risk of delays, disruptions, damage, and failure across all modes of transportation (EPA 2019). The increase in heavy precipitation and flooding can create an environment conducive to potential crashes.

16. WINTER STORM

16.1 HAZARD PROFILE

16.1.1 Hazard Description

A winter storm is a weather event with one of the following types of precipitation (see Figure 16-1).

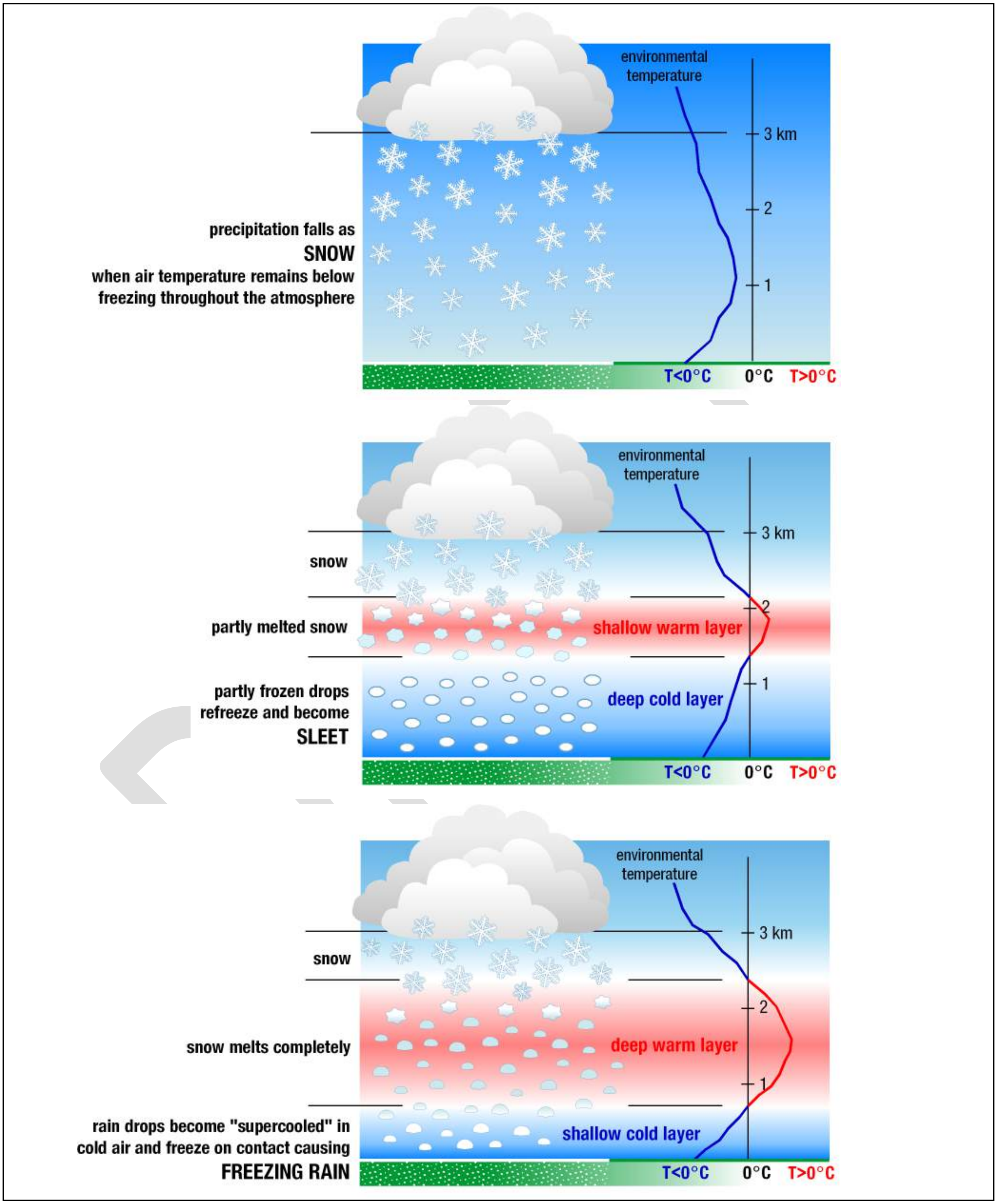
- **Heavy Snow—**Snowflakes are clusters of ice crystals that form from a cloud. They originate in clouds when temperatures are below the freezing point (32 °F) and water vapor in the atmosphere condenses directly into ice without going through the liquid stage. Once an ice crystal has formed, it absorbs and freezes additional water vapor from the surrounding air, growing into snowflakes, which then fall to the earth.
- **Sleet—**Sleet is made up of rain drops or partially melted snowflakes that freeze into ice pellets as they fall through colder lower air layers. The pellets are usually smaller than a third of an inch in diameter (NSSL 2021). A sleet storm involves accumulations of these pellets, causing slippery surfaces and posing a hazard to pedestrians and motorists (NSIDC 2013).
- **Ice Storms/Freezing Rain—**An ice storm is when damaging accumulations of ice result from freezing rain. Significant accumulations of ice pull down trees and utility lines, resulting in loss of power and communication. These accumulations of ice make walking and driving extremely dangerous. Significant ice accumulations are usually 0.25 inches or more (National Weather Service 2009).

The following are the three basic components of a winter storm (NOAA 2021):

- Below freezing temperatures in the clouds and near the ground to make snow and ice.
- A source of moisture, such as air blowing across a large lake or the ocean.
- A lifting force to raise moist air to form clouds, such as warm air colliding with cold air and being forced to rise over the cold dome or air flowing up a mountainside.

A winter storm can affect a wide region or only a small community. It can cause cold temperatures, flooding, storm surge, closed and blocked roadways, downed utility lines, and power outages.

Figure 16-1. Creation of Snow, Sleet, and Freezing Rain



Source: NOAA 2023

Blizzards

A blizzard is a winter snowstorm with sustained or frequent wind gusts of at least 35 miles per hour (mph) and falling or blowing snow that reduces visibility to a quarter mile or less over a three-hour period (NOAA n.d.). Blizzards are most likely when temperatures are below 20 °F. A severe blizzard is defined as a blizzard with temperatures near or below 10 °F, winds exceeding 45 mph, and visibility reduced to near zero.

Storm systems powerful enough to cause blizzards usually form when the jet stream dips far to the south, allowing cold air from the north to clash with warm, moister air from the south. Blizzard conditions often develop on the northwest side of an intense storm system. The difference between the lower pressure in the storm and the higher pressure to the west creates a tight pressure gradient, resulting in strong winds and extreme blowing snow conditions (Lam 2019).

NWS Winter Weather Notifications

NWS winter weather advisories inform people about winter weather conditions expected to cause significant inconveniences that may be hazardous. A winter storm watch means that severe winter conditions (heavy snow, ice, etc.) may affect a certain area, but its occurrence, location and timing are uncertain. A watch is issued to provide 12- to 48-hour notice of the possibility of severe winter weather. A watch is upgraded to a winter storm warning when hazardous winter weather, in the form of heavy snow, heavy freezing rain or heavy sleet, is imminent or occurring. Warnings are usually issued 12 to 24 hours before the event is expected to begin. The NWS may also issue a blizzard warning when snow and strong winds combine and produce a blinding snow, deep drifts, and wind chill (NWS 2021).

16.1.2 Location

The State of New York's climate is marked by abundant snowfall. Winter weather can reach the state as early as October and is usually in full force by late November, with average winter temperatures between 20 and 40 °F. The inland regions of the state receive more snow than most other communities in the nation. The easternmost and west-central portions of the state are more likely than the rest of the state to experience winter storms (NYS DHSES 2019). The average annual snowfall is greater than 70 inches over 60 percent of the State of New York's area. Yates County experiences less than 60 inches of snow a year (NYS DHSES 2019).

FEMA's National Risk Index mapping shows a relatively low risk of winter weather across all of Yates County and a relatively low risk of ice storm everywhere in the County except the southeast corner and the north central area (see Figure 16-2 and Figure 16-3).

Figure 16-2. Winter Weather Risk Index

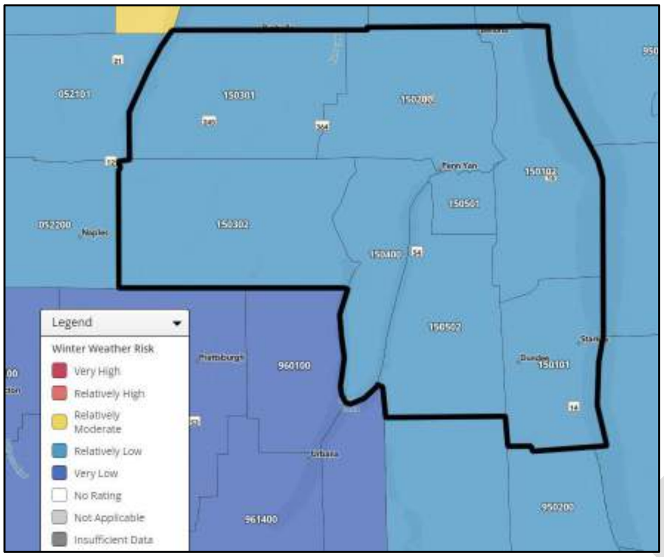
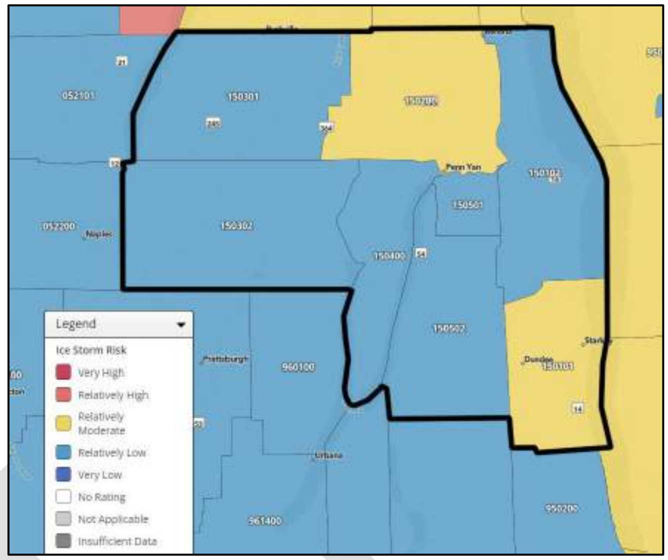


Figure 16-3. Ice Storm Risk Index



Source: (FEMA 2019b)

16.1.3 Extent

The extent of a severe winter storm can be classified both by meteorological measurements and by evaluating societal impacts. The National Oceanic and Atmospheric Administration's (NOAA's) National Centers for Environmental Information (NCEI) produces the Regional Snowfall Index (RSI) for significant snowstorms that impact the eastern two-thirds of the United States. The RSI ranks snowstorm impacts based on the spatial extent of the storm, the amount of snowfall, and the interaction of the extent and snowfall totals with population. The NCEI has analyzed and assigned RSI values to over 500 storms since 1900 (NOAA n.d.). Table 16-1 presents the five RSI ranking categories. Yates County has been affected by one Category 5 snowstorm (March 1993) and two Category 4 snowstorms (February 1961 and January 1978).

Table 16-1. RSI Ranking Categories

Category	Description	RSI Value
1	Notable	1–3
2	Significant	3–6
3	Major	6–10
4	Crippling	10–18
5	Extreme	18.0+

Source: NOAA 2020

Note: RSI = Regional Snowfall Index

16.1.4 Previous Occurrences

Federal Major Disaster and Emergency Declarations

Yates County has been included in three federal major disaster (DR) or emergency (EM) declarations for winter storm-related events, as listed in Table 16-2 (FEMA 2024). No winter storm declarations have been issued since the previous Yates County HMP.

Table 16-2. FEMA Declarations for Severe Winter Storm Events in Yates County (1954 to 2023)

Date of Event	Date of Declaration	Disaster Declaration Number	Description
March 3-4, 1990	March 21, 1991	DR-898	Severe Winter Storm
March 13-17, 1993	March 17, 1993	EM-3107	Severe Blizzard
April 3-5, 2003	May 12, 2003	DR-1467	Ice Storm

Source: FEMA 2024

USDA Declarations

Since the previous Yates County HMP, the County has not been included in any USDA declarations issued for winter storm-related events (USDA 2024).

Previous Events

Known winter storm-related events that impacted Yates County between January 2020 and December 2023 are presented in Table 16-3. For events prior to 2020, refer to the previous Yates County HMP.

16.1.5 Probability of Future Occurrences

Probability Based on Past Events

The best available data on past hazard event was used to calculate the probability of future occurrence of hazard events in Yates County. Information from NOAA, USDA, the 2023 State of New York HMP, the previous Yates County HMP, and FEMA were used to identify the number of events that occurred between 1996 and 2023. Table 16-4 provides the calculated probability of future winter weather events in Yates County. Based on historical records and input from the Planning Partnership, the probability of occurrence for severe winter storms in the County is considered "frequent."

Table 16-3. Winter Storm Events in Yates County (2020 to 2023)

Event Date	Event Type	Disaster Declaration Number	Yates County Included in declaration?	Location Impacted	Description
February 6-7, 2020	Heavy Snow	N/A	N/A	Entire County	The County experienced an intense storm system that deposited 4 to 10 inches.
December 16-17, 2020	Heavy Snow	N/A	N/A	Entire County	The County experienced an intense storm system which deposited 5 to 10 inches.
February 1-3, 2021	Winter Storm	N/A	N/A	Entire County	The County experiences snowfall totals 13 to 18 inches.
January 16-17, 2022	Heavy Snow	N/A	N/A	Entire County	The County experienced snowfall totals 10 to 13 inches.
February 3-4, 2022	Heavy Snow	N/A	N/A	Entire County	The County experienced snowfall totals 7 to 11 inches.
March 10-11, 2023	Heavy Snow	N/A	N/A	Entire County	The County observed snowfall totals 6 to 10 inches.

Source: FEMA 2023; USDA 2023; NOAA NCEI 2023

Table 16-4. Probability of Future Winter Storm Events in Yates County

Hazard Type	Number of Occurrences Between 1996 and 2023	Percent Chance of Occurring in Any Given Year
Blizzard	0	0%
Heavy Snow	39	100%
Ice Storm	7	25%
Sleet	0	0%
Winter Storm	16	57.14%
Winter Weather	2	7.14%
Total	64	100%

Source: FEMA 2023; USDA 2023; NOAA NCEI 2023
Note: Available records may not include all actual occurrences. Counts in this table may underestimate actual probability.

Potential Effect of Climate Change on Hazard Probability

Projections of climate change for New York State and for the Central/Finger Lakes region that includes Yates County are summarized in Section 3.5.4. New York has experienced a decrease in the number of cold winter days (below 32 °F) and is projected to see an additional decrease in the number of cold winter days by more than 50 percent by the 2080s. While projected temperature increases may reduce the likelihood of snow, future changes in frozen precipitation are also dependent upon changes in winter storm intensity and track. On balance, most of New York State is likely to see a shorter snow season, reduced snow cover and snow depth, and fewer snow events.

However, for extratropical cyclones, the largest snow events of all types could grow in magnitude since a warmer atmosphere can hold more moisture (Stevens & Lamie 2024).

As the century progresses, snowfall is likely to become less frequent, with the snow season decreasing in length. Many parts of this region experience lake-effect snow coming off the Great Lakes. As winters continue to warm in the upcoming decades, ice is projected to become rarer, which may lead to more lake-effect snow in the short term due to additional moisture available in the atmosphere to create precipitation. Over the long term, however, more of this is likely to fall as rain (Stevens & Lamie 2024).

16.1.6 Cascading Impacts on Other Hazards

Severe winter storms are often accompanied by extreme cold temperatures, which may require warming shelters to be opened. Snow and ice conditions on the road make transportation accidents more likely, which may lead to utility and power lines being knocked over. Heavy snow and ice can lead to utility failure and downed trees and wires. Electrical utility failure also has the potential to start fires that can damage infrastructure and woodlands. The damage from electrical utility failure can also include fatalities and injuries, depending on the location and severity of the failure. Snow and ice melt may contribute to flooding,.

16.2 VULNERABILITY AND IMPACT ASSESSMENT

16.2.1 Life, Health, and Safety

Overall Population

The entire population of Yates County (24,773) is exposed to severe winter storm events (U.S. Census 2020). Winter weather kills hundreds of people in the United States every year primarily from automobile accidents, overexertion, and exposure. Winter storms are often accompanied by strong winds, with blinding wind-driven snow, drifting snow, and dangerous wind chills (NSSL 2021).

Socially Vulnerable Population

People who experience homelessness, those over the age of 65, and those under the age of 5 are considered to be the most susceptible to this hazard. Older adults are susceptible to this hazard due to their increased risk of injuries and death from falls and overexertion from attempts to clear snow and ice, and/or hypothermia. Young children are at risk from hypothermia or other cold related illnesses due to their inability to care for themselves. Individuals who experience homelessness are at risk from hypothermia due to lack of a warming shelter from cold temperatures. People living below the poverty level are dependent on limited income and may not be able to afford staying at an alternative shelter, such as a hotel. They also may not be able to afford to miss work, regardless of the weather conditions. People who are non-English speaking may not be able to interpret public emergency warnings and signage, which puts them at an increased risk.

Table 3-5 shows social vulnerability statistics for Yates County and participating municipalities from the ACS 5-year estimates. Table 3-6 shows low-income populations based on United for ALICE data. The municipalities with the highest and lowest numbers and percentages in each social vulnerability category are listed in Table 16-5. The SVI for Yates County is identified as "relatively moderate."

Table 16-5. Municipalities With Highest and Lowest Socially Vulnerable Populations

Category	Municipality Highest in Category		Municipality Lowest in Category	
	Number	Percent	Number	Percent
Population Over 65	Penn Yan (V): **1,367**	Penn Yan (V): **27.0%**	Dresden (V): **54**	Potter (T): **12.1%**
Population Under 5	Jerusalem (T): **306**	Dresden (V): **9.9%**	Starkey (T): **1**	Starkey (T): **0.1%**
Non-English-Speaking Population	Benton (T): **89**	Potter (T): **7.0%**	Dundee (V), Rushville (V), Starkey (T): **0**	Dundee (V), Rushville (V), Starkey (T): **0.0%**
Population With Disability	Penn Yan (V): **789**	Dundee (V): **18.9%**	Potter (T): **12**	Potter (T): **1.0%**
Population Below Poverty Level	Penn Yan (V): **776**	Dundee (V): **27.6%**	Rushville (V): **30**	Rushville (V): **4.6%**
Households Below ALICE Threshold	—	Italy (T): **58%**	—	Barrington (T): **33%**

16.2.2 General Building Stock

The entire general building stock inventory is vulnerable to the severe winter storm hazard. An extreme blizzard or snowstorm event can deposit significant amounts of snow that are heavy enough to knock down power and telephone lines as well as damage roofs and aging buildings. Potential structural impacts include partial damage to roofs and building frames, rather than an entire building.

Table 16-6 shows potential losses based on a percentage of total building stock replacement cost value. Planners and emergency managers can assess a range of potential economic impacts based on assumptions about the percent of damage to the general building stock. The information in Table 16-6 should be used only for planning purposes with the knowledge that the associated losses for severe winter storm events vary greatly. Given professional knowledge and the currently available information, the potential loss for this hazard is often overestimated.

Table 16-6. Estimated Damages by Percent Loss for Total Replacement Cost Value of Structures in Yates County

	Total Replacement Cost Value (Structure Only)	1% Damage Loss Estimate	5% Damage Loss Estimate	10% Damage Loss Estimate
Barrington (T)	$585,987,396	$5,859,874	$29,299,370	$58,598,740
Benton (T)	$900,151,561	$9,001,516	$45,007,578	$90,015,156
Dresden (V)	$54,850,024	$548,500	$2,742,501	$5,485,002
Dundee (V)	$308,712,439	$3,087,124	$15,435,622	$30,871,244
Italy (T)	$255,737,729	$2,557,377	$12,786,886	$25,573,773
Jerusalem (T)	$1,214,313,545	$12,143,135	$60,715,677	$121,431,355
Middlesex (T)	$411,651,279	$4,116,513	$20,582,564	$41,165,128
Milo (T)	$1,036,758,566	$10,367,586	$51,837,928	$103,675,857
Penn Yan (V)	$1,010,118,570	$10,101,186	$50,505,929	$101,011,857
Potter (T)	$547,077,009	$5,470,770	$27,353,850	$54,707,701
Rushville (V)	$62,105,344	$621,053	$3,105,267	$6,210,534
Starkey (T)	$666,030,674	$6,660,307	$33,301,534	$66,603,067
Torrey (T)	$542,534,023	$5,425,340	$27,126,701	$54,253,402
Yates County (Total)	**$7,596,028,158**	**$75,960,282**	**$379,801,408**	**$759,602,816**

Source: Yates County Planning Department; NYS GIS Clearinghouse; U.S. Army Corps of Engineers-National Structure Inventory; RS Means 2022

16.2.3 Community Lifelines and Other Critical Facilities

Full functionality of critical facilities, such as police, fire, and medical facilities, is essential for response during and after a severe winter storm event. These critical facility structures are often constructed of concrete and masonry; therefore, they should only suffer minimal structural damage from severe winter storm events. Because power interruption can occur, backup power is recommended. Damage to pipes may limit or prevent the circulation of water and heat in a facility, which poses a risk to people depending on that infrastructure.

Infrastructure at risk for this hazard includes roadways that could be damaged from the application of salt and intermittent freezing and warming conditions that can damage roads over time. Severe snowfall requires clearing of roadways so that emergency responders can access areas that may have people who need medical attention. Following the winter season, resources for road maintenance and repair are required. Severe winter weather also requires alerting of citizens to dangerous conditions (NWS 2019).

Heavy accumulations of ice can bring down trees, electrical wires, telephone poles and lines, and communication towers. Communications and power can be disrupted for days while utility companies work to repair damage. Even small accumulations of ice may cause extreme hazards to motorists and pedestrians. Bridges and overpasses are particularly dangerous because they freeze before other surfaces (NWS 2019).

16.2.4 Economy

FEMA's National Risk Index estimates the following expected annual losses in Yates County's from severe winter weather:

- Ice Storm - $36,000
- Winter Weather - $6,400

Severe winter weather damage to the general building stock, critical facilities, and community lifelines can include roof damage from heavy snow loads, structural damage from downed trees, and power outages.

The cost of snow and ice removal and repair of roads from the freeze/thaw process can drain local financial resources. In addition to snow removal costs, severe winter weather affects the ability of persons to commute into and out of the area for work or school. The loss of power and closure of roads prevents the commuter population traveling to work within and outside of the County and may cause a loss in economic productivity.

16.2.5 Natural, Historic and Cultural Resources

Natural

Severe winter weather can have a major impact on the environment. For example, an excess amount of snowfall and earlier warming periods may affect natural processes such as stream flow. The residual impacts of a community's methods to maintain its infrastructure through winter weather maintenance may also have an impact on the environment. (NSIDC n.d.).

Rain-on-snow events can exacerbate runoff rates with warming winter weather. Resulting excess volumes of water can erode banks, tear apart habitat along stream banks, and disrupt terrestrial plants and animals. Road-salt runoff can cause groundwater salinization, modify the soil structure, and result in loss or reduction in lake turnover. Additionally, road salt can cause changes in the composition of aquatic invertebrate assemblages and pose threats to birds, roadside vegetation, and mammals (Tiwari and Rachlin 2018).

Historic

Historic buildings may be susceptible to damage from severe winter weather conditions, especially if they were not built to modern building standards for snow loading (CCAHA 2019).

Cultural

Cultural heritage sites, particularly those exposed to the elements, are subject to weathering. Severe winter weather exacerbates expected rates of decay and contributes to the appearance of new decay. It may affect physical, chemical, and biological mechanisms causing degradation by affecting the structure or composition of building materials. Changes in temperature, precipitation, atmospheric moisture, and wind intensity have been identified as concerns (Sesana, et al. 2021).

16.3 CHANGE OF VULNERABILITY SINCE 2020 HMP

Yates County remains vulnerable to severe winter storm events. This vulnerability assessment uses a more accurate and updated building inventory, which provides more accurate estimated exposure and potential losses for Yates County.

16.4 FUTURE CHANGES THAT MAY AFFECT RISK

16.4.1 Potential or Planned Development

As discussed in Chapter 3, areas targeted for future growth and development have been identified across the County. Any new development could be impacted by severe winter storm events. Current State land use and building codes incorporate standards that address and mitigate snow accumulation.

16.4.2 Projected Changes in Population

Yates County has experienced a decrease in its population since 2010. According to the U.S. Census Bureau, the County's population decreased by 2.3 percent between 2010 and 2020 (Census 2020). Cornell University's Program on Applied Demographics projects Yates County will have a population of 24,706 by 2030 and 24,857 by 2040 (Cornell University 2018). An increase in population may impact the ability of persons in the County to mobilize or receive essential services during severe winter storm events.

16.4.3 Climate Change

Both globally and at the local scale, climate change has the potential to alter the prevalence and severity of extremes such as winter storms. While predicting changes of winter storm events under a changing climate is difficult, understanding vulnerabilities to potential changes is a critical part of estimating future climate change impacts on human health, society, and the environment (NASA 2023).

17. UTILITY FAILURE

17.1 HAZARD PROFILE

17.1.1 Hazard Description

Utility failure (also referred to as utility outage) is defined as any interruption or loss of a utility's service due to accident, sabotage, natural hazards, or equipment failure. A significant utility failure is any incident of a long duration that requires the involvement of local or state emergency management organizations to coordinate provision of food, water, heating, cooling, and shelter.

Widespread utility outages can occur without warning due to diseased trees toppling onto nearby utility infrastructure or because of a natural disaster. Generally, warning times are short in the case of technological failure, such as a fire at a sub-station, traffic accident, human error, or terrorist attack. When a utility failure is caused by natural hazards, greater warning time is possible. For example, high wind events such as tornados and hurricanes often cause widespread utility failure and are often forecasted before they affect a community. Similarly, severe winter weather such as ice storms, blizzards, and snowstorms can cause utility failure but often have plenty of warning time, so utility response crews can stage resources to prepare for utility failure.

17.1.2 Location

Utility failures can occur anywhere in Yates County but are usually localized and the result of an event involving high winds or severe winter storms.

Power and natural gas are provided throughout Yates County by the New York State Gas and Electric Corporation (NYSEG), except for the Town of Barrington and the eastern edges of the Town of Torrey and the Town of Starkey, where NYSEG provides only electricity. NYSEG can handle minor power and gas interruptions.

Yates County's public water supply comes from Keuka Lake, Canandaigua Lake, two public wells, and private wells. Producers of public drinking water within Yates County are the Village of Penn Yan, the Town of Geneva, the Town of Gorham, and the Town of Milo.

17.1.3 Extent

The extent and severity of a utility outage depends on the cause, location, duration, and time of year. It can range from a small, localized event to a countywide outage. Impacts from an outage can be significant to the county and its residents.

Utility failures often result from damage to an electric power system. System components include power generation plants, substations, circuits, switches, transformers, power lines, and power poles. Due to the varied nature of utility outage causes, ranging from vehicle accidents to severe weather, utility interruptions can happen at any time.

Utility failures lead to the inability to use electric-powered equipment, such as lighting, heating, ventilation, and air conditioning (HVAC), communication equipment (telephones, computers, etc.), fire and security systems, small appliances such as refrigerators, sterilizers, and medical equipment. This all can lead to food spoilage, loss of heating and cooling, basement flooding due to sump pump failure, and loss of water due to well pump failure.

17.1.4 Previous Occurrences

Federal Major Disaster and Emergency Declarations

Yates County has been included in one federal major disaster (DR) or emergency (EM) declaration for utility failure-related events, as shown in Table 17-1 (FEMA 2023b). No such declarations have been issued since the previous Yates County HMP.

Table 17-1. Utility Failure Events in Yates County (1954 to 2024)

Event Date	Event Type	Disaster Declaration Number	Description
August 14-16, 2003	Power Outage	EM-3186-NY	New York Power Outage

Source: FEMA 2023

USDA Declarations

Since the previous Yates County HMP, the County has not been included in any USDA declarations issued for utility failure-related events (USDA 2024).

Previous Events

Known utility failure-related events that impacted Yates County between January 2020 and May 2024 are presented in Table 17-2. Earlier events are listed in the previous Yates County HMP.

Table 17-2. Utility Failure Events in Yates County (2020 to 2024)

Event Date	Event Type	Disaster Declaration Number	Yates County Included in Declaration?	Location Impacted	Description
May 15, 2020	Thunderstorm Wind	N/A	N/A	Italy, Jerusalem, Milo	Severe thunderstorms produced damaging winds, which caused tree and power line damage.

Event Date	Event Type	Disaster Declaration Number	Yates County Included in Declaration?	Location Impacted	Description
May 29, 2020	Thunderstorm Wind	N/A	N/A	Dundee	A line of severe thunderstorms with damaging winds caused mainly tree and power line damage.
July 29, 2020	Thunderstorm Wind	N/A	N/A	Benton, Penn Yan, Jerusalem	Severe thunderstorms with damaging winds caused mainly tree damage but brought down a few wires.
August 27, 2020	Thunderstorm Wind	N/A	N/A	Penn Yan, Middlesex	Numerous severe thunderstorms occurred during the afternoon and early evening, bringing down trees and wires.
June 29, 2021	Thunderstorm Wind	N/A	N/A	Penn Yan, Benton	Scattered thunderstorms produced strong, damaging winds. There were numerous reports of trees and utility wires knocked down, often onto roadways, which resulted in roadway closures.
July 13, 2021	Thunderstorm Wind	N/A	N/A	Penn Yan, Dresden	Severe thunderstorms with damaging winds resulted in numerous reports of trees and wires being knocked down.
December 11, 2021	High Wind	N/A	N/A	Countywide	A strong storm resulted in high wind gusts. There were reports of trees and wires down across numerous counties, including Yates.
July 28, 2022	Thunderstorm Wind	N/A	N/A	Jerusalem	Storms developed damaging winds, knocking down trees and wires across the region. A couple of downed trees landed on structures, resulting in some damage.
August 29, 2022	Thunderstorm Wind	N/A	N/A	Milo, Penn Yan, Dresen	A line of severe thunderstorms with damaging wind gusts knocked down trees and wires. Strong thunderstorm winds knocked down trees and wires on David Downey Road.
April 5, 2023	Thunderstorm Wind	N/A	N/A	Milo	An 85 mile-per-hour microburst destroyed a barn, snapped several trees, and damaged or snapped utility poles.
June 26, 2023	Thunderstorm Wind	N/A	N/A	Benton	Severe thunderstorms produced winds up to 58 miles per hour. These strong winds knocked down two trees and wires, causing a small power outage in Benton.
August 12, 2023	Thunderstorm Wind	N/A	N/A	Dundee	Severe thunderstorms produced damaging wind gusts that caused downed trees and utility lines and power outages.

Source: FEMA 2023; NOAA 2023

17.1.5 Probability of Future Occurrences

Projections Based on Previous Occurrences

Information on previous utility failure occurrences in the County was used to calculate the probability of future occurrence of such events, as summarized in Table 17-3. Based on historical records and input from the Steering Committee, the probability of occurrence for utility failure-related events in the County is considered "occasional".

Table 17-3. Probability of Future Utility Failure Events in Yates County

Hazard Type	Number of Occurrences Between 1954 and 2024	Percent Chance of Occurring in Any Given Year
Utility Failure	64	87.67 %

Source: NOAA 2023; FEMA 2023
Note: Available records may not include all actual occurrences. Counts in this table may underestimate actual probability.

Projected Effects of Climate Change

Climate change projections are indicating an increase in temperature for the State of New York and Yates County, along with an increase in the number and intensity of severe weather events. Warmer temperatures may lead to an increase in extreme hot and cold temperature events; this can lead to greater strains on utilities, increasing the likelihood of utility failures. More frequent and strong storms with higher wind speeds will increase the chance of utility failures as well. Additionally, climatologists predict an increase in precipitation, which may lead to more severe winter weather, causing additional utility failures.

In State Climate Region 1 (Western New York and Great Lakes Plain Region), which includes Yates County, it is estimated that, by the 2080s, temperatures will increase by 4.5 °F to 8.5 °F and precipitation totals will increase between 0 and 15 percent (NYSERDA 2014).

17.1.6 Cascading Impacts on Other Hazards

Utility failures can lead to secondary hazards with negative impacts on the health and safety of residents. The following are examples of secondary hazard scenarios:

- Residents who rely on electric medical devices such as home oxygen machines, medication nebulizers, home dialysis, infusion pumps, and electric wheelchairs may face life-threatening situations if power failure extends beyond the battery backup timeframe of their device (Huff 2021).

- If climate control systems, such as air conditioning or heating, stop working during periods of extreme heat or extreme cold, vulnerable populations such as the elderly and those with chronic health conditions may face an elevated risk of hypothermia or heat stroke.
- Utility failure can lead to food spoilage, which has negative impacts on public health.
- Downed powerlines can spark fires that can spread and impact the rest of the county.
- Utility failure can affect communication lines that may limit connectivity to emergency responders, which would negatively affect any segment of the population that would need their services.
- Utility outages can also lead to instances of civil disturbance, including looting.
- Utility interruptions at chemical handling plants pose the risk of a chemical spill during restart, with significant health and environmental impacts (EPA 2001).
- Interruption of wastewater and potable water utilities may have cascading economic and environmental impacts.
- Lack of power can prevent fuel pumps from operating and lead to fuel shortages.
- Traffic accidents may increase because of the lack of traffic control devices such as stoplights and railroad crossing advisory signals. Utility outages lasting a long duration will require law enforcement officials to man traffic control points to prevent accidents.

17.2 VULNERABILITY AND IMPACT ASSESSMENT

Regarding the utility failure hazard, all of Yates County has been identified as the hazard area. Therefore, all assets within the County (population, structures, critical facilities, and lifelines), as described in the Chapter 3 (County Profile), are vulnerable to utility failures. A qualitative assessment was conducted to assess the assets vulnerable to the utility failure hazard.

17.2.1 Life, Health, and Safety

Overall Population

Utility failures pose potential health impacts including injury and death. Other issues stemming from such failures include food safety from lack of refrigeration and carbon monoxide poisoning from misuse of generators. Individuals with medical needs are vulnerable to power failures because medical equipment such as oxygen concentrators requires electricity to operate.

Power failure is particularly problematic for homes that are cooled or heated with electricity. According to the 2021 American Community Survey 5-Year Estimates, 29 percent of homes across Yates County are heated with gas and 21.3 percent are heated using electricity (U.S. Census 2022).

During utility failures, water purification systems may not function. Further, populations relying on private wells will not have access to potable water. A lack of clean, potable water has health implications for all people, and a lack of water supply may also impact sewer systems and availability of sewer service.

During communications outages, individuals within the County may not be able to contact emergency response resources through the 911 system. This could lead to a delay or lack of emergency medical care, possibly resulting in death.

Socially Vulnerable Population

Widespread power outages during summer and winter can directly impact vulnerable populations such as the elderly and medically frail. These populations are vulnerable as lack of air conditioning or heating could expose them to extreme heat or extreme cold.

Table 3-5 shows social vulnerability statistics for Yates County and participating municipalities from the ACS 5-year estimates. Table 3-6 shows low-income populations based on United for ALICE data. The municipalities with the highest and lowest numbers and percentages in each social vulnerability category are listed in Table 17-4.

Table 17-4. Municipalities With Highest and Lowest Socially Vulnerable Populations

	Municipality Highest in Category		Municipality Lowest in Category	
Category	**Number**	**Percent**	**Number**	**Percent**
Population Over 65	Penn Yan (V): **1,367**	Penn Yan (V): **27.0%**	Dresden (V): **54**	Potter (T): **12.1%**
Population Under 5	Jerusalem (T): **306**	Dresden (V): **9.9%**	Starkey (T): **1**	Starkey (T): **0.1%**
Non-English-Speaking Population	Benton (T): **89**	Potter (T): **7.0%**	Dundee (V), Rushville (V), Starkey (T): **0**	Dundee (V), Rushville (V), Starkey (T): **0.0%**
Population With Disability	Penn Yan (V): **789**	Dundee (V): **18.9%**	Potter (T): **12**	Potter (T): **1.0%**
Population Below Poverty Level	Penn Yan (V): **776**	Dundee (V): **27.6%**	Rushville (V): **30**	Rushville (V): **4.6%**
Households Below ALICE Threshold	—	Italy (T): **58%**	—	Barrington (T): **33%**

17.2.2 General Building Stock

All the building stock in the county is exposed to the utility interruption hazard. Chapter 3 (County Profile) summarizes the building inventory in Yates County. Impacts on buildings due to utility interruption are likely to be secondary impacts. Should water supply be reduced or not available, then structures could be at increased risk for structural fire since current fire suppression is dependent on accessing water supply from hydrants.

Many power outage events are caused by storm events that can lead to flooding. Without electricity, residents would be unable to pump water from their basements, potentially causing damage to their homes' structure or contents.

17.2.3 Community Lifelines and Other Critical Facilities

During a utility failure event, the County may undergo losses because of an interruption of critical services. Further, increased costs such as providing shelters and costs related to cooling and heating centers may be incurred. Extended power outages or fuel shortages may require officials to shelter victims who need heat and power for activities of daily living. The establishment of reliable backup power at these facilities is extremely important to continue to provide for the health, safety, and well-being of the County's population.

17.2.4 Economy

Utility interruptions can cause economic impacts stemming from lost income and spoiled food and other goods, costs to owners/operators of utility facilities, and costs to government and community service groups. Interruption of utility gas or potable water distribution could cause significant economic impacts such as additional costs for bringing in water tenders to maintain fire suppression capabilities; opening additional warming centers should electric and utility gas utility be interrupted to residential areas; and distribution of potable water for public consumption. There could be significant costs associated with reimbursing fire departments from other counties to travel, staff, and maintain water tenders within the County during the duration of a water outage event.

Potential modeling of economic impacts from utility interruption would require calculating interruption of service costs, which is derived from a standard value per person per day multiplied by the number of customers served. This would help to provide an estimate of the impact of the interrupted utility service but may not be representative of the complete economic impact of a prolonged utility interruption. FEMA's benefit-cost analysis (BCA) methodology measures loss of electrical service, potable water, and wastewater on a per-person-per-day-of-lost-service basis within the service area affected. For the electrical utility, the standard value is $174 per person per day (BCA module version 6.0). For potable water, it is $114 per person per day. For wastewater, it is $58 per person per day (FEMA 2020a).

17.2.5 Natural, Historic and Cultural Resources

Natural

At this time, there are no direct known impacts on the environment caused by utility failures. Some indirect impacts to the environment are potential wildfires sparked from downed electric wires, which could affect animals that rely on the forest as a habitat.

Historic and Cultural

Historic documents and physical artifacts that must be stored in a climate-controlled facility are at risk from utility failures. Additionally, the factors that cause a utility failure, such as severe storms and high winds, can impact the structural integrity of historic and culturally significant buildings. Many historic and culturally significant structures are made of weakened materials and not up to current building codes, which increases the risk of incurring damage.

17.3 CHANGE OF VULNERABILITY SINCE 2020 HMP

Overall, the County's vulnerability has not changed since the previous HMP. Vulnerability of the entire County to the utility failure hazard will continue.

17.4 FUTURE CHANGES THAT MAY AFFECT RISK

17.4.1 Potential or Planned Development

As discussed in Chapter 3 (County Profile) and Volume II (Jurisdictional Annexes) of this HMP, areas targeted for future growth and development have been identified across Yates County. Any areas of growth could be impacted by the utility failure hazard because the entire County is vulnerable. Specific areas of development are indicated in the jurisdictional annexes in Volume II of this plan.

17.4.2 Projected Changes in Population

Yates County has experienced a decrease in its population since 2010. According to the U.S. Census Bureau, the County's population decreased by 2.3 percent between 2010 and 2020 (Census 2020). Cornell University's Program on Applied Demographics projects Yates County will have a population of 24,706 by 2030 and 24,857 by 2040 (Cornell University 2018). As population grows, the number of people susceptible to the impacts of utility failure is expected to increase. Furthermore, as the current population ages, the risk to the elderly population will rise.

17.4.3 Climate Change

Climate change is projected to increase the frequency and intensity of weather events, which could damage utility infrastructure and cause more utility failure. Heat waves will likely be more severe, which can lead to a faster rate of degradation to the coatings on utility wires, and will also cause a higher demand for utilities, such as electricity, to power air conditioners and fans. The increase in demand can be a precursor to utility failure if the grid is not strong enough.

18. HAZARD RANKING

Hazard rankings are one of the bases for identifying the jurisdictional hazard mitigation strategies included in Volume II. These rankings vary among the jurisdictions. For example, a hazard may be ranked low in one municipality but due to differences in vulnerability and impact, be ranked as high for the County or another municipality. Jurisdictional ranking results are presented in each jurisdictional annex in in Volume II.

18.1 HAZARD RANKING METHODOLOGY

Each jurisdiction participating in this HMP has differing levels of vulnerability to and potential impacts from each of the hazards assessed in this plan. Each jurisdiction needs to recognize the hazards that pose the greatest risk to its community and direct its attention and resources accordingly to manage risk and reduce losses. To achieve this, the hazards of concern were ranked using methodologies promoted by FEMA's hazard mitigation planning guidance and input from all participating jurisdictions. Relative ranking scores were generated by FEMA's Hazus risk assessment tool.

18.1.1 Categories Used in Ranking

The ranking methodology is based on four risk assessment categories, with the following scoring parameters defined for each category:

- *Level*—The level is a qualitative description of how each hazard rates in each category (such as low to high, or unlikely to frequent)
- *Benchmark value*—The benchmark values are clearly determinable quantities or descriptions that define which level should apply to each hazard
- *Numeric value*—The numeric value is the hazard's score in each category, based on the assigned level
- *Weighting*—The weighting is a multiplier applied to each hazard's numeric value in each category, to represent the relative importance of the category (the higher the weighting, the more important the category)

The following sections describe the categories and their associated scoring parameters.

Probability of Occurrence

The probability of occurrence is the likelihood of a hazard event occurring in any given year. A review of historical events assists with this determination. Table 18-1 summarizes the scoring parameters for probability of occurrence.

Table 18-1. Values and Weights for Probability of Occurrence

Level	Benchmark Value	Numeric Value	Weighting
Unlikely	Less than a 1 percent annual probability of a hazard event occurring	0	30%
Rare	Between 1 and 10 percent annual probability of a hazard event occurring.	1	
Occasional	Between 10 and 100 percent annual probability of a hazard event occurring.	2	
Frequent	100 percent annual probability; a hazard event may occur multiple times per year.	3	

Consequence

Consequence represents the expected vulnerability and impact associated with the hazard. This is rated for three subcategories: vulnerability of people; vulnerability of property; and economic impacts on the community. A numeric value based on defined benchmarks is assigned for each subcategory, and a factor is applied to those values representing the relative importance of each subcategory. The total numeric value for consequence is the sum of the factored numeric values for each subcategory. Table 18-2 summarizes the scoring parameters for consequence.

Table 18-2. Values and Weights for Consequence

Level	Benchmark Value	Numeric Value	Factor	Weighting
Population (Numeric Value x 3)				**30%**
None	No population vulnerable to the hazard	0	3	
Low	14 percent or less of population is vulnerable to a hazard with potential for measurable life-safety impact due to its extent and location.	1		
Medium	15 to 29 percent of population is vulnerable to a hazard with potential for measurable life-safety impact due to its extent and location.	2		
High	30 percent or more of population is vulnerable to a hazard with potential for measurable life-safety impact, due to its extent and location.	3		

Level	Benchmark Value	Numeric Value	Factor	Weighting
Property (Numeric Value x 2)				
None	No property vulnerable to the hazard	0	2	
Low	Property vulnerability is 14 percent or less of the total number of structures in the community.	1		
Medium	Property vulnerability is 15 to 29 percent of the total number of structures in the community.	2		
High	Property vulnerability is 30 percent or more of the total number of structures in the community.	3		
Economy (Numeric Value x 1)				
None	No estimated loss due to the hazard	0	1	
Low	Loss estimate is 9 percent or less of the total replacement cost of the community.	1		
Medium	Loss estimate is 10 to 19 percent of the total replacement cost of the community.	2		
High	Loss estimate is 20 percent or more of the total replacement cost of the community.	3		

Adaptive Capacity

Adaptive capacity describes a jurisdiction's administrative, technical, planning/regulatory and financial ability to protect from or withstand a hazard event. Mitigation measures that can increase a jurisdiction's capacity to withstand and rebound from events include codes or ordinances with higher standards to withstand hazards due to design or location; deployable resources; or plans and procedures for responding to an event.

A rating of "weak" for adaptive capacity means a jurisdiction does not have the capability to effectively respond, which increases vulnerability. A "strong" adaptive capacity means the jurisdiction does have the capability to effectively respond, which decreases vulnerability. These ratings were assigned using the results of the core capability assessment, with input from each jurisdiction. Table 18-3 summarizes the scoring parameters for adaptive capacity.

Table 18-3. Values and Weights for Adaptive Capacity

Level	Benchmark Value	Numeric Value	Weighting
Weak	Weak, outdated, or inconsistent plans, policies, codes, or ordinances in place; no redundancies; limited or no deployable resources; limited capabilities to respond; long recovery.	1	30%
Moderate	Plans, policies, codes/ordinances in place that meet minimum requirements; mitigation strategies identified but not implemented on a widespread scale; jurisdiction can recover but needs outside resources; moderate Jurisdiction capabilities.	0	
Strong	Plans, policies, codes/ordinances in place that exceed minimum requirements; mitigation/protective measures in place; jurisdiction has ability to recover quickly because resources are readily available and capabilities are high.	-1	

Climate Change

Current climate change projections were evaluated as part of the hazard ranking to account for potential increases in severity or frequency of the hazard. This is important because the hazard ranking helps guide and prioritize the mitigation strategy as a long-term future vision for mitigating the hazards of concern. The potential impacts that climate change may have on each hazard of concern are discussed in the risk assessment chapters for each hazard. Table 18-4 summarizes the scoring parameters for climate change.

Table 18-4. Values and Weights for Climate Change

Level	Benchmark Value	Numeric Value	Weighting
Low	No local data are available; modeling projects are uncertain on whether there is increased future risk; confidence level is low (inconclusive evidence).	1	10%
Medium	Studies and modeling projections indicate a potential for exacerbated conditions due to climate change; confidence level is medium to high (moderate evidence).	2	
High	Studies and modeling projections indicate exacerbated conditions and increased future risk due to climate change; very high confidence level (strong evidence, well documented, and acceptable methods).	3	

18.1.2 Total Ranking Score

The total ranking score based on the categories described above is calculated as follows:

Risk Ranking Score Equation

Ranking Score= 0.3 x [(Consequence on Population x 3) + (Consequence on Property x 2) + (Consequence on Economy x 1)] + [Adaptive Capacity x 0.3] + [Climate Change x 0.1] + [Probability of Occurrence x 0.3]

Using this equation, the highest possible ranking score is 6.9. The higher the number, the greater the relative risk. Based on the score for each hazard, a hazard ranking is assigned to each hazard of concern as follows:

- Low = Ranking score less than 3.8
- Medium = Ranking score between 3.9 and 4.7
- High = Ranking score greater than 4.8.

All participating jurisdictions applied the same methodology to develop the hazard rankings to ensure consistency in the overall ranking of risk. However, each jurisdiction had the ability to alter rankings based on local knowledge and experience in handling each hazard.

18.2 HAZARD RANKING RESULTS

Using the methodology described above, the hazard ranking for the identified hazards of concern was determined for each planning partner. The hazard ranking for Yates County is detailed in the following tables that present the stepwise process for the ranking:

- Table 18-5 shows the unweighted numeric values assigned for the probability of occurrence for each hazard.
- Table 18-6 shows the numeric values assigned for each subcategory of consequence for each hazard. Results are shown for applying the subcategory factors, but not the category-wide weighting.
- Table 18-7 shows the unweighted numeric values assigned for adaptive capacity and climate change for each hazard.
- Table 18-8 shows the total weighted hazard ranking scores for each hazard of concern.

The countywide hazard ranking includes the entire planning area and may not reflect the highest risk for all participating jurisdictions. The overall ranking for each jurisdiction is included in Table 18-9 and in the annexes in Volume II.

Table 18-5. Probability of Occurrence for Hazards of Concern for Yates County

Hazard of Concern	Probability	Numeric Value
Dam Failure	Occasional	2
Disease Outbreak	Occasional	2
Drought	Occasional	2
Extreme Temperature	Frequent	3
Flood	Occasional	2
Harmful Algal Bloom	Frequent	3
Hazardous Materials	Frequent	3
Landslide	Rare	1
Severe Storm	Frequent	3
Transportation Accident	Occasional	2
Utility Failure	Occasional	2
Winter Storm	Frequent	3

Table 18-6. Consequence Rating for Hazards of Concern for Yates County

Hazard of Concern	Population			Property			Economy			Total Impact Rating (Population + Property + Economy)
	Consequence	Numeric Value	Multiplied by Factor (3)	Consequence	Numeric Value	Multiplied by Factor (2)	Consequence	Numeric Value	Multiplied by Factor (1)	
Dam Failure	Low	1	3	Low	1	2	Low	1	1	6
Disease Outbreak	High	3	9	Low	1	2	Medium	2	2	13
Drought	Medium	2	6	Low	1	2	Medium	2	2	10
Extreme Temperature	Medium	2	6	Low	1	2	Medium	2	2	10
Flood	Medium	2	6	Medium	2	4	Low	1	1	11
Harmful Algal Bloom	Medium	2	6	Low	1	2	Medium	2	2	10
Hazardous Materials	Medium	2	6	Medium	2	4	Low	1	1	11
Landslide	Low	1	3	Low	1	2	Low	1	1	6
Severe Storm	High	3	9	Low	1	2	Low	1	1	12
Transportation Accident	Low	1	3	Low	1	2	Low	1	1	6
Utility Failure	Medium	2	6	Medium	2	4	Medium	2	2	12
Winter Storm	High	3	9	Low	1	2	Low	1	1	12

Table 18-7. Adaptive Capacity and Climate Change Ratings for Hazards of Concern for Yates County

Hazard of Concern	Adaptive Capacity		Climate Change	
	Level	Numeric Value	Level	Numeric Value
Dam Failure	Moderate	0	Medium	2
Disease Outbreak	Moderate	0	Medium	2
Drought	Moderate	0	High	3
Extreme Temperature	Moderate	0	High	3
Flood	Moderate	0	High	3
Harmful Algal Bloom	Moderate	0	Medium	2
Hazardous Materials	Strong	-1	Low	1
Landslide	Moderate	0	Medium	2
Severe Storm	Moderate	0	High	3
Transportation Accident	Moderate	0	Low	1
Utility Failure	Moderate	0	Low	1
Winter Storm	Strong	-1	Medium	2

Table 18-8. Total Hazard Ranking Scores for the Hazards of Concern for Yates County

Hazard of Concern	Probability x 30%	Total Consequence x 30%	Adaptive Capacity x 30%	Climate Change x 10%	Total Hazard Ranking Score
Dam Failure	0.6	1.8	0	0.2	2.6
Disease Outbreak	0.6	3.9	0	0.2	4.7
Drought	0.6	3	0	0.3	3.9
Extreme Temperature	0.9	3	0	0.3	4.2
Flood	0.6	3.3	0	0.3	4.2
Harmful Algal Bloom	0.9	3	0	0.2	4.1
Hazardous Materials	0.9	3.3	-0.3	0.1	4.0
Landslide	0.3	1.8	0	0.2	2.3
Severe Storm	0.9	3.6	0	0.3	4.8
Transportation Accident	0.6	1.8	0	0.1	2.5
Utility Failure	0.6	3.6	0	0.1	4.3
Winter Storm	0.9	3.6	0.3	0.2	5.0

Note: Low (yellow) = Values less than 3.8; Medium (orange) = Values between 3.9 and 4.7; High (red) = Values of 4.8 or greater

Table 18-9. Overall Ranking of Hazards by Jurisdiction

	Dam Failure	Disease Outbreak	Drought	Extreme Temperature	Flood	Harmful Algal Bloom	Hazardous Materials	Landslide	Severe Storm	Transportation Accident	Utility Failure	Winter Storm
Barrington (T)	Low	Medium	Medium	Medium	Low	Medium	Low	Low	High	Low	Medium	High
Benton (T)	Low	Medium	Medium	Medium	Low	Medium	Low	Low	High	Low	Medium	High
Dresden (V)	Low	Medium	Medium	Medium	Low	Medium	Medium	Low	High	Low	Medium	High
Dundee (V)	Low	Medium	Medium	Medium	Low	Low	Medium	Low	High	Low	Medium	High
Italy (T)	Low	Medium	Medium	Medium	Low	Medium	Low	Low	High	Low	Medium	High
Jerusalem (T)	Low	Medium	Medium	Medium	Low	Medium	Medium	Low	High	Low	Medium	High
Middlesex (T)	Low	Medium	Medium	Medium	Low	Medium	Medium	Low	High	Low	Medium	High
Milo (T)	Low	Medium	Medium	Medium	Medium	Medium	Low	Low	High	Low	Medium	High
Penn Yan (V)	Low	Medium	Medium	Medium	Low	Medium	Medium	Low	High	Low	Medium	High
Potter (T)	Low	Medium	Medium	Medium	Low	Low	Low	Medium	High	Low	Medium	High
Rushville (V)	Low	Medium	Medium	Medium	Low	Low	Low	Medium	High	Low	Medium	High
Starkey (T)	Low	Medium	Medium	Medium	Low	Medium	Low	Low	High	Low	Medium	High
Torrey (T)	Low	Medium	Medium	Medium	Low	Medium	Low	Low	High	Low	Medium	High
Yates County	**Low**	**Medium**	**Medium**	**Medium**	**Medium**	**Medium**	**Medium**	**Low**	**High**	**Low**	**Medium**	**High**

Note: Low (yellow) = Values less than or equal to 3.8; Medium (orange) = Values between 3.9 and 4.7; High (red) = Values greater than or equal to 4.8

Part 3: Capability Assessment

19. CAPABILITY ASSESSMENT

A capability assessment is an inventory of a community's missions, programs, and policies and an analysis of its capacity to carry them out (FEMA 2003b). This assessment is an integral part of the planning process. It enables identification, review, and analysis of current local and state programs, policies, regulations, funding, and practices that could either facilitate or hinder mitigation. Through assessing its capabilities, a jurisdiction learns how or whether it can implement certain mitigation actions by determining the following:

- Limitations that may exist on undertaking actions
- The range of local and/or state administrative, programmatic, regulatory, financial, and technical resources available to assist in implementing their mitigation actions
- Actions that are infeasible because they are outside the scope of current capabilities
- Types of mitigation actions that may be technically, legally, administratively, politically, or fiscally challenging or infeasible
- Opportunities to enhance local capabilities to support long-term mitigation and risk reduction

This chapter presents a summary and description of the existing plans, programs, and regulatory mechanisms at all levels of government (federal, state, county, local) that reduce hazard risks and support hazard mitigation within the planning area. These capabilities are presented in three categories:

- Planning and regulatory capabilities
- Administrative and technical capabilities
- Fiscal capabilities

19.1 CAPABILITY ASSESSMENT PROCESS

Each participating jurisdiction's annex in Volume II also includes a capability assessment specific to those jurisdictions. In addition to the above categories, the annexes review capabilities in the more localized categories of adaptive capacity and education and outreach. All participating jurisdictions were tasked with developing or updating their capability assessment for this update, evaluating the effectiveness of their capabilities in supporting hazard mitigation and identifying opportunities to enhance local capabilities. Each jurisdiction identified how it has integrated hazard mitigation into its existing planning, regulatory, and operational/administrative framework and how it intends to promote ongoing integration.

The contracted consultant met with Yates County and each jurisdiction virtually to review the capability assessment from the 2020 HMP and update accordingly. The consultant also reviewed plans, codes, and ordinances to enhance the information provided by the jurisdictions.

19.2 PLANNING AND REGULATORY CAPABILITIES

Planning and regulatory capabilities are based on ordinances, policies, local laws, state statutes, plans, and programs that relate to managing growth and development. Planning and regulatory capabilities refer not only to current plans and regulations, but also to the jurisdiction’s ability to change and improve those plans and regulations as needed. This section summarizes planning and regulatory capabilities for Yates County. Further information is provided in the jurisdictional annexes in Volume II.

19.2.1 County and Local

County

Comprehensive Plan

Yates County maintains a comprehensive plan, with the original completed in 1975. In 2020, the Planning Department updated the comprehensive plan. The Yates County Comprehensive Plan is essential for future efforts to plan, leverage future funding sources, and coordinate with the municipalities within the County to encourage positive development, preserve existing cultural and natural resources and mitigate any present and future events such as natural and man-made disasters (Yates County 2020).

Emergency and Evacuation Plans

Emergency responders have implicit authority and powers to take reasonable and immediate action to protect lives and property, absent an emergency declaration or issuance of emergency orders. Should the need for largescale evacuations become necessary, a state of emergency should be declared by the chief executive of the authority having jurisdiction. Chief executives of towns and villages in Yates County have the legal authority to declare a state of emergency and issue emergency orders, including evacuations. This legal authority is provided under Section 24 of the State Executive Laws. If the incident involves multiple jurisdictions and the need for larger-scale evacuations arises, the Chairman of the Yates Legislature will declare a state of emergency and issue emergency orders for evacuation pursuant to the aforementioned statute. The incident commander should coordinate all evacuations with local law enforcement officials, and the ranking law enforcement official on-scene should be placed in charge of evacuation operations (Yates County HMP 2020).

Other than evacuation plans based on the geographically specific risks, evacuations are conducted on an event basis. Due to the variable nature of such events, the Yates County Office of Emergency Services, working with local municipalities, assists with the coordination and communication of evacuation routing for the County (Yates County HMP 2020).

Agricultural Development and Farmland Enhancement Plan

Written in 2004, the Agricultural Development and Farmland Enhancement Plan was developed by the Yates County Agricultural and Farmland Protection Board to provide an overview of contributions to agriculture in Yates County, an inventory of exiting agricultural lands and trends, identify farmland protection tools, and to identify goals for agricultural development in Yates County (Yates County 2004).

Yates County Countywide Water Feasibility Study

The purpose of this study, completed in November 2020, is to discuss the feasibility and identify specific recommendation for water expansion, as well as discuss the benefits of developing a municipal water group for facilitating inter-municipal cooperation and implantation of future public water expansion. In doing so, it will assist the County and Local governments with a clear path toward existing water system efficiency and the future footprint of the County. This report defines this path by exploring existing system deficiencies and needs, while observing areas in the county that urgently need or want public water (Yates County 2020).

This study contains several recommendations for addressing current system needs and increased public demand based on interviews with local leaders and water system operators, an analysis of the extent and general condition of existing systems, and a general review of annual water operation production and operation costs. At its core, future alternative decisions will rely on three key elements (Yates County 2020):

- Funding – The use of local funds, State/Federal grants, loans/bonds, or a combination thereof to carry out improvements and expansions, including any local matches.
- Political will/leadership – Various alternatives made may result in taking facilities offline, staff or operational changes, or cost increases, necessitating the need to carry through with the chosen alternative.
- Community support – The backing of the community is essential as the costs to make any improvements or expansions will be paid for by users over the long term through rate changes, though this will result serving more of the population and high-quality water service.

Final Route 14A Corridor Study

The purpose of this May 2006 study is to develop an achievable plan to improve the safety and efficiency of the Route 14A corridor and to enhance its contribution to the character and economic development goals of the communities it serves within Yates County. To achieve this purpose, this study provides (Yates County 2006):

- An inventory of existing and planned transportation, land use, and economic development characteristics and conditions along the corridor;
- Identification of existing and projected transportation, land use, and economic development issues, needs, and opportunities in the corridor; and
- Achievable recommendations and strategies for transportation, land use, economic development, and other identified issues of the corridor.

The study area encompasses the Route 14A corridor in Yates County and is approximately 23 miles long. Route 14A extends from the Ontario-Yates County line through the towns of Benton, Milo, Barrington, and Starkey, and the villages of Penn Yan and Dundee. It continues south to the Yates-Schuyler County line, northwest of the Village of Watkins Glen (Yates County 2006).

Yates County Looking Ahead: A Planning and Design Guide

This planning and design guide is forward-looking. The intention behind its preparation is to provide Yates County with a strategy for managing growth into the year 2000 and beyond. The guidelines and tools generated in this guide can contribute to the process by forming the foundation upon which each town and village in the county can build its own growth management plan (Yates County 1990).

Comprehensive Regional Community Health Assessment

The Prevention Agenda is New York State's blueprint to help improve the health and well-being of its residents and promote health equity through state and local action. Every three years, New York State requests that local health departments and their local hospital systems work together to create a joint community health assessment and improvement plan using the Prevention Agenda guidelines (Common Ground Health 2022).

The Comprehensive Regional Community Health Assessment provides comprehensive information about the community's current health status, needs, and issues. This information helps develop community health improvement plans by justifying how and where resources should be allocated to best meet community needs. This assessment contains a chapter specific to each County in the Finger Lakes Region, which focuses on specific needs, including additional demographic indicators, main health challenges, and underlying behavioral, political, and built environmental factors contributing to the County's overall health status (Common Ground Health 2022).

Local

Municipal Land Use Planning and Regulatory Authority

The County and municipalities have various land use planning mechanisms that can be leveraged to mitigate flooding and support natural hazard risk reduction. Specific County and local planning and regulatory capabilities are identified in their jurisdictional annexes in Volume II. These include but are not limited to comprehensive plans, flood damage prevention ordinances, local codes and regulations, stormwater regulations, and municipal level plans. A list of plans reviewed is provided in each annex.

19.2.2 Federal and State

Federal

Biggert Waters National Flood Insurance Reform Act of 2012

Under the Biggert-Waters National Flood Insurance Reform Act of 2012, long-term changes to the National Flood Insurance Program have been adopted that have increased rates overall to reflect the flood risk more accurately to buildings in flood hazard areas. This has significantly influenced construction and reconstruction within flood hazard areas.

Property owners are encouraged to consider long-term insurance costs when undertaking reconstruction or elevation of damaged buildings. An investment to reconstruct the lowest floor of a building an additional foot or two higher today may translate into significant future flood insurance savings.

Bunning-Bereuter-Blumenauer Flood Insurance Reform Act of 2004

The Flood Insurance Reform Act of 2004 amended the 1994 National Flood Insurance Reform Act of 1968 to reduce losses to properties for which repetitive flood insurance claim payments have been made. This Act established a program for mitigation of severe repetitive loss properties and gave FEMA the authority to fund mitigation activities for individual repetitive loss claims properties. The Act provides additional coverage for compliance with land-use and control measures.

The New York State Department of Environmental Conservation (NYSDEC) is the lead coordinator of New York's NFIP efforts. NYSDEC is the agency working with New York communities with severe repetitive loss properties. This Statute helps New York residents with affordable flood insurance and gives additional tools to the states and communities to mitigate severe repetitive loss properties.

Community Risk and Resiliency Act

On September 22, 2015, Governor Andrew Cuomo signed bill A06558/S06617-B, the Community Risk and Resiliency Act (CRRA). The purpose of the bill is to ensure that certain state monies, facility-siting regulations, and permits include consideration of the effects of climate risk and extreme weather events. The bill's provisions will apply to all applications and permits no later than January 1, 2017. CRRA includes five major provisions (NYSDEC, Community Risk and Resiliency Act 2020):

- Official Sea-Level Rise Projections—CRRA requires the DEC to adopt science-based sea-level rise projections into regulation.
- Consideration of Sea-Level Rise, Storm Surge and Flooding—CRRA requires applicants for permits or funding in a number of specified programs to demonstrate that future physical climate risk due to sea-level rise, storm surge, and flooding have been considered, and that DEC consider incorporating these factors into certain facility-siting regulations.
- Smart-Growth Public Infrastructure Policy Act Criteria—CRRA adds mitigation of risk due to sea-level rise, storm surge, and flooding to the list of smart-growth criteria to be considered by state public infrastructure agencies.
- Guidance on Natural Resiliency Measures—CRRA requires DEC, in consultation with the Department of State (DOS), to develop guidance on the use of natural resources and natural processes to enhance community resiliency.
- Model Local Laws Concerning Climate Risk—CRRA requires DOS, in cooperation with DEC, to develop model local laws that include consideration of future risk due to sea-level rise, storm surge and/or flooding. These model local laws must be based on available data predicting the likelihood of extreme weather events, including hazard risk analysis.

CRRA requires NYSDEC, in consultation with DOS, to prepare guidance on implementation of the statute. To meet its obligation to develop guidance for the implementation of CRRA, DEC is proposing a new document, State Flood Risk Management Guidance (SFRMG). The SFRMG is intended to inform state agencies as they develop program-specific guidance to require that applicants demonstrate consideration of sea-level rise, storm surge, and flooding, as permitted by program-authorizing statutes and operating regulations. The SFRMG incorporates possible future conditions, including the greater risks of coastal flooding presented by sea-level rise and enhanced storm surge and inland flooding expected to result from increasingly frequent extreme precipitation events (NYSDEC, Community Risk and Resiliency Act 2020).

Code of Federal Regulations, Standard Local Mitigation Plans (44 CFR PART 201.6)

FEMA has prepared policies and procedures for FEMA's review and approval of state and local emergency all-hazard mitigation plans.

The Local Hazards Mitigation Plan is the representation of the jurisdiction's commitment to reduce risks from natural hazards, serving as a guide for decision makers as they commit resources to reducing the effects of natural hazards. Local plans will also serve as the basis for the State to provide technical assistance and to prioritize project funding.

Disaster Mitigation Act of 2000 P.L. 106-390

The Disaster Mitigation Act of 2000 (DMA 2000) is the current federal legislation addressing hazard mitigation planning. DMA 2000 provides an opportunity for states, tribes, and local governments to take a new and revitalized approach to mitigation planning. DMA 2000 amended the Robert T. Stafford Disaster Relief and Emergency Assistance Act by repealing the previous mitigation planning provisions and replacing them with a new set of mitigation plan requirements. This new section emphasizes the need for state, tribal, and local entities to closely coordinate mitigation planning and implementation efforts. It emphasizes planning for disasters before they occur. It specifically addresses planning at the local level, requiring plans to be in place before Hazard Mitigation Assistance grant funds are available to communities. HMPs designed to meet the requirements of DMA will remain eligible for future FEMA Hazard Mitigation Assistance funds. This plan is designed to meet the requirements of DMA, improving eligibility for future hazard mitigation funds.

The New York State Division of Homeland Security and Emergency Services (NYS DHSES) is the lead agency within New York to promote mitigation planning. The law sets forth a more granular review of mitigation planning. Once approved, the applicant is eligible to apply for federal funds for mitigation of hazards. The rules provide detailed guidance on what applicants should include in a plan.

Disaster Recovery Reform Act

This bill amends the Robert T. Stafford Disaster Relief and Emergency Assistance Act (Stafford Act) to modify the Pre-disaster Hazard Mitigation Grant Program to permit the use of technical and financial assistance to establish and carry out enforcement activities to implement codes, specifications, and standards that incorporate the latest hazard-resistant designs; direct the President to establish a National Public Infrastructure Pre-disaster Mitigation Fund; authorize the President's contribution to the cost of hazard mitigation measures to be used to increase resilience in any area affected by a major disaster; and direct the Federal Emergency Management Agency (FEMA) to issue a final rulemaking that defines the terms "resilient" and "resiliency.

The NYS DHSES is the lead agency that reviews, submits, and administers federal funding to programs that mitigate hazards. These programs help find projects that are cost beneficial to help reduce damages from hazards.

Emergency Support Function #14, Long-Term Recovery Planning

Long-Term Community Recovery provides a mechanism for coordinating Federal support to State, tribal, regional, and local governments, nongovernmental organizations (NGOs), and the private sector to enable community recovery from the long-term consequences of extraordinary disasters. Emergency Support Function (ESF) #14 accomplishes this by identifying and facilitating availability and use of sources of recovery funding and providing technical assistance (such as impact analyses) for community recovery and recovery planning (FEMA 2008).

ESF #14 may be activated for incidents that require a coordinated Federal response to address significant long-term impacts (e.g., impacts on housing, government operations, agriculture, businesses, employment, community infrastructure, the environment, human health, and social services) to foster sustainable recovery (FEMA 2008).

Actions coordinated under ESF #14 include pre-incident planning and coordination, immediately prior to the incident, post-event planning, and operations (FEMA 2008).

Through ESF 14, Long-Term Recovery Planning, NYS DHSES works to have a plan for long-term planning and recovery prior to a disaster or emergency. One of the areas of planning includes mitigation. This coordination allows for another Statewide plan to incorporate mitigation principles and planning.

Homeowner's Flood Insurance Affordability Act

This 2014 law repeals and modifies certain provisions of the Biggert-Waters Flood Insurance Reform Act, which was enacted in 2012, and makes additional program changes to other aspects of the program not covered by that Act. The new law lowers the recent rate increases on some policies, prevents some future rate increases, and implements a surcharge on all policyholders. The Act also repeals certain rate increases that have already gone into effect and provides for refunds to those policyholders. The Act also authorizes additional resources for the National Academy of Sciences (NAS) to complete the affordability study.

FEMA, Congress, the private Write Your Own insurance companies, and other stakeholders work together to implement these Congressionally mandated reforms and to work toward shared goals of helping families maintain affordable flood insurance, ensuring the financial stability of the NFIP, and reducing the risks and consequences of flooding nationwide.

National Flood Insurance Program

The U.S. Congress established the National Flood Insurance Program (NFIP) with the passage of the National Flood Insurance Act of 1968 (FEMA 2003a). The NFIP is a Federal program enabling property owners in participating communities to purchase insurance as a protection against flood losses in exchange for State and community floodplain management regulations that reduce future flood damage.

There are three components to the NFIP: flood insurance, floodplain management, and flood hazard mapping. Communities participate in the NFIP by adopting and enforcing floodplain management ordinances to reduce future flood damage. In exchange, the NFIP makes federally backed flood insurance available to homeowners, renters, and business owners in these communities. Community participation in the NFIP is voluntary. Flood insurance is designed to provide an alternative to disaster assistance to reduce the escalating costs of repairing damage to buildings and their contents caused by floods. Flood damage in the U.S. is reduced by nearly $1 billion each year through communities implementing sound floodplain management requirements and property owners purchasing flood insurance. Additionally, buildings constructed in compliance with NFIP building standards suffer approximately 80 percent less damage annually than those not built in compliance (FEMA 2007).

All municipalities in Yates County actively participate in the NFIP. As of 2024, there were 151 NFIP policies in Yates County. There have been 145 claims made, totaling $1,086,000 for damages to structures and contents. There are 2 NFIP Repetitive Loss (RL) properties in the County. Further details on the County's flood vulnerability may be found in Chapter 10 (Flood) of this HMP.

Municipal participation in and compliance with the NFIP is supported at the federal level by FEMA Region 2 and the Insurance Services Organization (ISO), at the state-level by the New York State Department of Environmental Conservation (NYSDEC) and New York State Division of Homeland Security and Emergency Services (NYS DHSES). Additional information on the NFIP program and its implementation throughout the county may be found in Chapter 10 (Flood).

Participating state and municipalities may adopt higher regulatory standards when implementing the provisions of the NFIP. Specifically identified are the following:

- **Base Flood Elevation (BFE)—**The elevation of surface water due to flooding that has a 1 percent chance of being equaled or exceeded in any given year.
- **Freeboard—**By law, the State of New York requires Base Flood Elevation plus 2 feet (BFE+2) for all single- and two-family residential construction, and BFE+1 for all other types of construction. Communities may go beyond this requirement, providing for additional freeboard or requiring BFE+2 for all types of construction. A number of Yates municipalities have supported property owners meeting and exceeding freeboard requirements through the site plan review and zoning board of approvals process; for instance, allowing overall structure heights to be determined from BFE+2 rather than grade within NFIP floodplains.
- **Cumulative Substantial Improvements/Damages—**The NFIP allows improvements valued at up to 50 percent of the building's pre-improvement value to be permitted without

meeting the flood protection requirements. Over the years, a community may issue a succession of permits for different repairs or improvement to the same structures. This can greatly increase the overall flood damage potential for structures within a community. The community may wish to deem "substantial improvement" cumulatively so that once a threshold of improvement within a certain length of time is reached, the structure is considered to be substantially improved and must meet flood protection requirements (FEMA n.d.-c).

NFIP Community Rating System

As an additional component of the NFIP, the Community Rating System (CRS) is a voluntary incentive program that recognizes and encourages community floodplain management activities that exceed the minimum NFIP requirements. As a result, flood insurance premium rates are discounted to reflect the reduced flood risk resulting from the community actions meeting the three goals of the CRS: (1) reduce flood losses; (2) facilitate accurate insurance rating; and (3) promote the awareness of flood insurance (FEMA 2017).

As of June 2024, no communities in Yates County participate in the CRS program.

Presidential Policy Directive 8

Presidential Policy Directive 8 (PPD-8) requires that a Threat Hazard Identification and Risk Assessment (THIRA) be developed for a state to remain eligible for Homeland Security Grant Program (HSGP) and Emergency Management Program Grant (EMPG) funding. The NYS DHSES is the lead agency in preparing the State's THIRA.

Risk Mapping, Assessment, and Planning

FEMA works with federal, state, tribal, and local partners across the nation to identify flood risk and promote informed planning and development practices to help reduce that risk through the Risk Mapping, Assessment, and Planning (Risk MAP) program. Risk MAP provides high-quality flood maps and information, tools to better assess the risk from flooding, and planning and outreach support to communities to help them take action to reduce (or mitigate) flood risk. Each Risk MAP flood risk project is tailored to the needs of each community and may involve different products and services.

According to the Risk MAP Progress interactive map available online at the time of this plan update, there are numerous active Risk MAP projects taking place throughout New York (FEMA n.d.-b). FEMA coordinates and works directly with municipal floodplain managers during the Risk MAP project process. The state NFIP Coordinator is kept apprised of project activities and consults as needed.

Risk Rating 2.0: Equity in Action

Since the 2019 SHMP, FEMA introduced Risk Rating 2.0: Equity in Action to consider specific characteristics of a building to provide a more modern, individualized, and equitable flood insurance rates. The new rating methodology considers frequency of flooding, multiple flood types, proximity to flood sources, and building characteristics such as first floor heights and costs to rebuilt. The update was rolled out in October 2021 through April 2022, and as of April 1, 2023 has been fully implemented (FEMA 2022b). Homeowners that elect to drop NFIP insurance policies will no longer have access to FMA funding for future mitigation efforts. At the time of this HMP update, it is difficult to determine what the aggregate cost increase through Risk Rating 2.0 will be on post-mitigation properties.

Across the country, official are finding it to be increasingly difficult to communicate the benefits of mitigation to some property owners where insurance rates are likely to stay high even after mitigation due to factors such as proximity to flood sources and frequency of flooding. Continued shifts in flood insurance costs, coverage, impacts to mitigation of flood prone properties, and potential updates to Risk Rating 2.0 will be monitored by Yates County throughout the period of performance of the 2024 HMP.

Robert T. Stafford Disaster Relief and Emergency Assistance Act

The Act provides an orderly and continuing means of assistance by the federal government to state and local governments in carrying out their responsibilities to alleviate the suffering and damage that results from disasters. The provisions of the Act include (1) revising and broadening the scope of existing disaster relief programs; (2) encouraging the development of comprehensive disaster preparedness and assistance plans, programs, capabilities, and organizations by state and local governments; (3) achieving greater coordination and responsiveness of disaster preparedness and relief programs; (4) encouraging individuals, and state and local governments to protect themselves by obtaining insurance coverage to supplement or replace governmental assistance; (5) encouraging hazard mitigation measures to reduce losses from disasters, including development of land-use and construction regulations; and (6) providing federal assistance programs for both public and private losses sustained in disasters.

From a mitigation perspective of the Act, the NYS DHSES is the lead agency that reviews, submits, and administers federal funding to programs that mitigate hazards. These programs help find projects that are cost beneficial to help reduce damages from hazards.

U.S. Army Corps of Engineers

Under Section 404(e) of the Clean Water Act, the U.S. Army Corps of Engineers (USACE) can issue general permits to authorize activities that have only minimal individual and cumulative adverse environmental effects. A nationwide permit (NWP) is a general permit that authorizes activities across the country unless a district or division commander revokes the nationwide permit in a state or other geographic region. There are 54 nationwide permits, and they authorize a wide variety of activities, including linear transportation projects, bank stabilization activities, residential development, commercial and industrial developments, aids to navigation and certain maintenance activities (USACE 2017).

There are three types of USACE permits: standard, nationwide (described above), and regional. Standard permits are individual permits that involve full public interest review of an individual permit application and includes the issuance of a public notice for any project that does not meet the terms and conditions of an NWP or a Letter of Permission (LOP). Regional general permits are for small, specialized projects. In New York State, there are six regional general permit categories (USACE Buffalo District 2019).

State

New York State Floodplain Management

There are two departments that have statutory authorities and programs that affect floodplain management at the local jurisdiction level in New York State: the NYSDEC and the Department of State's Division of Code Enforcement and Administration.

The NYSDEC is charged with conserving, improving, and protecting the state's natural resources and environment, and preventing, abating, and controlling water, land, and air pollution. Programs that have bearing on floodplain management are managed by the Bureau of Flood Protection and Dam Safety, which cooperates with federal, state, regional, and local partners to protect lives and property from floods, coastal erosion, and dam failures. These objectives are accomplished through floodplain management and both structural and nonstructural means (NYSDEC 2023).

The Dam Safety Section is responsible for "reviewing repairs and modifications to dams and assuring [sic] that dam owners operate and maintain dams in a safe condition through inspections, technical reviews, enforcement, and emergency planning." The Flood Control Projects Section is responsible for reducing flood risk to life and property through construction, operation, and maintenance of flood control facilities (NYSDEC 2023).

The Floodplain Management Section is responsible for reducing flood risk to life and property through management of activities, such as development in flood hazard areas, and for reviewing and developing revised flood maps. The Section serves as the NFIP State Coordinating Agency and, in this capacity, is the liaison between FEMA and New York communities that elect to participate in the NFIP. The Section provides a wide range of technical assistance (NYSDEC 2023).

New York Power Authority

The New York Power Authority (NYPA) is America's largest state power organization, with 16 generating facilities and more than 1,400 circuit-miles of transmission lines. State and federal regulations shape NYPA's diverse customer base, which includes large and small businesses, not-for-profit organizations, community-owned electric systems, rural electric cooperatives, and government entities. NYPA provides the lowest-cost electricity in New York State and is the only statewide electricity supplier.

Stormwater Management Planning

When proper controls are not in place, research studies show a clear link between urbanization and increased flooding and pollutant export. The goal of stormwater management is to ensure that the quantity and quality of stormwater runoff from a site that is undergoing construction or development should not be substantially altered from its pre-development conditions (NYSDEC 2023).

According to the federal law commonly known as Stormwater Phase II, permits are required for stormwater discharges from Municipal Separate Storm Sewer Systems (MS4s) in urbanized areas and those additionally designated by the New York State Department of Environmental Conservation (NYSDEC). Owners or operators of such MS4s must be authorized in accordance with the State Pollutant Discharge Elimination System General Permit for Stormwater Discharges from Municipal Separate Storm Sewer Systems. The permit requires development of a Stormwater Management Program (SWMP) (NYSDEC 2023).

19.3 ADMINISTRATIVE AND TECHNICAL CAPABILITIES

This section summarizes administrative and technical capabilities in Yates County. Further information is provided in the jurisdictional annexes in Volume II.

19.3.1 County and Local

Yates County Sheriff's Office

The Yates County Sheriff’s Office is responsible for delivering effective and response law enforcement, corrections, court security, civil, and emergency communication services equally and fairly without regard to race, creed, ethnicity, or one’s social or economic standing. Their objective is to make Yates County a safe place to reside, work, visit, and travel. The Sheriff’s Office offer services such as property checks, and child safety seat program (Yates County Sheriff's Office n.d.). They have several divisions to including (Yates County Sheriff's Office n.d.):

- Snowmobile Patrol Unit
- Child Safety Seat Unit
- Juvenile Aid Division/School Resource Officer’s Program
- Underwater Search and Recovery (USRT) Dive Team
- Jail Division
- E911 Dispatch
- Fire Investigation Team
- Fraud Investigation Unit
- Accident Investigation Unit
- Firearms Training Unit
- Law Enforcement Bureau Road Patrol
- Law Enforcement Bureau Criminal Investigations

- Bicycle Patrol Unit
- Public Safety Communications
- Civil Division
- UTV Units
- Marine Patrol Unit
- K9 Unit
- Records Division
- Court Security
- Animal Control

Yates County Planning and Development Department

The Yates County Planning and Development Department is tasked with processing referrals from local municipalities for review by the County Planning Board. The County Planning Board reviews referrals for potential Countywide impact and will forward to local board for final decisions. The Planning and Development Department also provides planning and zoning consultation to the local towns and villages on an as needed basis, reviews and updates the County Comprehensive Plan, develops the County Capital Improvement Plan and undertakes projects and grants that are deemed to provide a positive impact for the community as a whole (Yates County n.d.).

Yates County Public Health Department

The Yates County Public Health Department was established in 1926 by the Yates County Legislature as a partial-service health department. The mission strives to improve the health and wellness of Yates County residents and visitors through disease prevention and control, health promotion, environmental risk reduction and emergency preparedness. The department includes two major program areas: Public Health Prevention Services and Special Children's Services. Environmental Services, including regulatory inspections of pools, restaurants and public sewer and water systems are provided to the County through the New York State Department of Health District Office located in Geneva, New York (Yates County n.d.).

Yates County Legislature

The Legislature serves as the governing body of the County. The nine Towns are divided into four legislative Districts represented by fourteen Legislators who are elected for two-year terms. There are presently two elected Town Supervisors, and two elected Town Councilman who are serving as elected Legislators (Yates County n.d.).

The Legislature holds an organizational meeting every two years and members elect a Chairman and Vice Chairman. The Chairman appoints members to the five standing committees and as representatives to various boards and agencies. Each member serves on two or more of the standing committees (Yates County n.d.).

Yates County Tourism Advisory Committee

The Tourism Advisory Committee reviews the funding requests from tourism agencies and related groups for the upcoming county fiscal year and makes a final recommendation of funding to the Legislature. The ultimate decisions for the allocation of funds are the responsibility of the Legislature.

Programs and initiatives help create destination awareness of Yates County as a place to visit and/or improve the likelihood of repeat visits to the area along with improving the lifestyle of its residents. A key objective for Yates County's tourism industry is to create and promote products and experiences that will attract more visitors, particularly for overnight visits in the pre- and post-summer seasons. Grant funds are not intended for facility maintenance or ongoing operational costs, but rather, the funds are intended to be developmental, i.e., for new or enhanced events or marketing activities, as well as planning and pre-development activities for the creation or enhancement of new attractions and destinations.

Yates County Highway Department

The Yates County Highway Department is responsible for a safe and efficient transportation system that Includes 180 miles of roads and 40 bridges. The department fulfills its mission through a five-year capital plan for new construction projects, road and bridge maintenance or replacement projects, improving traffic control devices, and pavement markings, maintaining and updating the vehicle and equipment fleet and providing customer service to property owners on County roads. They also provide snow and ice control services, as needed (Yates County n.d.).

Yates County Office of Emergency Services

The Yates County Office of Emergency Services provides opportunities of training to County Emergency Responders, coordinates the response to emergencies of all kinds, and collaborates on policies with the Enhanced 911 Dispatch Center. This department also develops and maintains plans, coordinates disaster preparedness and hazardous mitigation activities, and provides support services to local government organizations. The Office of Emergency Services maintains and administers an integrated Emergency Services program designed to assure a safe environment through prevention/mitigation, readiness, response, and recovery (Yates County n.d.).

Yates County Soil & Water Conservation District

The Yates County Soil & Water Conservation District provides technical assistance to county residents on the many ways to protect our soil and water resources. They work with farmers to protect the soil from erosion, manage stormwater runoff, store and handle manure safely, and develop other conservation plans. They also work with contractors on construction projects to help prevent erosion, protect property, and help protect lakes and streams. Additionally, Soil and Water work with local partners on monitoring water quality and preventing the spread of invasive species (Yates County HMP 2020).

Yates County Planning Board

The Yates County Planning Board reviews referrals from the Towns and Villages that may have a Countywide or inter-municipal impact and provide recommendations (approval, approval with modifications, disapproval, or no significant countywide or inter-community impact) and related findings back to those municipalities for final action. Applicants are encouraged to attend the meeting in order to answer questions posed by the Board during review of such project referrals (Yates County n.d.).

Yates County Buildings and Grounds

The Buildings and Grounds Department oversees the maintenance, safety, cleaning and efficient operation of all facilities and equipment at County owned buildings and grounds. The Buildings and Grounds department provides support services for all departments throughout Yates County Government (Yates County n.d.).

The Building Maintenance Supervisor is responsible for planning the work programs, department budgets, establishing operating standards, managing the HVAC systems and ensuring that the buildings, grounds and auxiliary equipment are kept up to approved standards (Yates County n.d.).

Buildings and/or grounds that this department is responsible for (Yates County n.d.):

- Courthouse
- County Office Building
- Public Safety Building
- Highway Department
- All parking lots and grounds at the County Complex and Public Safety Building

Yates County Community Services

The Yates County Community Services Department with its duly appointed Community Services Board is a planning and policy making entity that monitors and oversees all services in the county in the disability areas of mental health, mental retardation and developmental disabilities and alcoholism and substance abuse. Deficit funding is received from the New York State Offices of Mental Health, Mental Retardation/Developmental Disabilities and/or Alcoholism and Substance Abuse (Yates County n.d.).

According to Section 41 of the Mental Hygiene Law, this department is responsible for the development of local government plans for each disability area. The development of these plans includes the participation of local providers, consumers, families of consumers, law enforcement and members of the community at large (Yates County n.d.).

Yates Transit Service

Formed in 2017 at the request of Yates County legislators who sought to create a public transportation system for county residents, Yates Transit Service (YTS) utilizes a mixture of company-owned and state-leased vehicles to meet the needs of the community (Yates Transit Service n.d.).

There are five main routes which run twice daily, covering approximately 700 miles through Geneva, Dundee, Naples, Rushville, and Dresden. YTS also offers midday runs through Penn Yan and Dundee (Yates Transit Service n.d.).

Finger Lakes Economic Development Center

The Finger Lakes Economic Development Center (FLEDC) is the sole economic development agency dedicated to the promotion and growth of Yates County. The FLEDC uses a broad spectrum of natural resources and targeted development programs to sustain the high level of growth Yates County is experiencing (FLEDC n.d.).

Finger Lakes Horizon Economic Development Center

The Finger Lakes Horizon Economic Development Center is a Not-For-Profit Corporation created in 2010 to address the need for the promotion of community and economic development and the creation of jobs in the non-profit and for-profit sectors for the citizens of Yates County (FLEDC n.d.).

Yates County Capital Resource Corporation

The Yates County Capital Resource Corporation was created in 2010 as a Not-For-Profit Local Development Corporation to focus on developing and providing programs for not-for-profit institutions, manufacturing and industrial businesses and other entities to access low interest tax-exempt and non-tax-exempt financing for eligible projects (FLEDC n.d.).

Yates County Farmland Protection Board

The Yates County Agriculture Farmland Protection Board has a regionally diverse membership, representing the various types and sectors of farming in Yates County. Agriculture is the number one or two economic drivers in Yates County and the prognosis looks good for continued growth. The support of local towns and village assessors to promote the expansion of parcels added to the Yates County agriculture districts speaks to the cooperative relationships and understanding of the importance of agriculture to the beauty and rural quality of life in Yates County (CCE 2024).

Finger Lakes Land Trust

The Finger Lakes Land Trust (FLLT) was founded in 1989 to protect forests, farmlands, gorges, and shorelines in the Finger Lakes region of New York. The FLLT has saved over 31,000 acres by creating public nature preserves and helping landowners to conserve beloved properties (FLLT n.d.). The FLLT seeks to conserve forever the lands and waters of the Finger Lakes region, ensuring scenic vistas, clean water, local foods, and wild places for everyone (FLLT n.d.).

19.3.2 Federal and State

Federal

Federal Emergency Management Agency

The Federal Emergency Management Agency (FEMA) is responsible for providing assistance before, during, and after disasters. FEMA is the federal reviewer of hazard mitigation plans and sets federal standards for local and state hazard mitigation plans.

Community Assistance Visits and Community Assistance Contacts

FEMA evaluates NFIP minimum compliance through compliance audits known as Community Assistance Visits (CAVs) or Community Assistance Contacts (CACs). CAVs and CACs are performed to ascertain community compliance with the NFIP, at entry into the CRS, and to maintain participation in the CRS. FEMA may conduct these with Region 2 staff, with NYSDEC staff under the Compliance Assistance Program – State Support Services Element (CAP-SSSE) grant, or with private contractors. While there is some flexibility in how a CAV or a CAC is conducted, CAVs are generally more rigorous than CACs.

FEMA evaluates the following key areas in a compliance audit:

- The Community's Flood Damage Prevention Ordinance
- Mapping Products and other Ordinances used to regulate floodplain development
- Floodplain Development Permitting Procedures
- Floodplain Permit Applications and other Forms/Records, including Substantial Damage and Improvement Determinations
- Floodplain Development Review and Performance Standards
- Floodplain Development Permits Issued to Applicants

Federal Energy Regulatory Commission Dam Safety Program

The Federal Energy Regulatory Commission (FERC) has the largest dam safety program in the United States, cooperating with many federal and state agencies to ensure and promote dam safety and, more recently, homeland security, on dams associated with hydropower. Every five years, an independent consulting engineer, approved by the FERC, must inspect and evaluate projects with dams higher than 32.8 feet (10 meters) or with a total storage capacity of more than 2,000 acre-feet.

HURREVAC

HURREVAC is the decision support tool of the National Hurricane Program, administered by FEMA, the U.S. Army Corps of Engineers (USACE), and the National Atmospheric and Oceanic Administration (NOAA) National Hurricane Center used for tracking hurricanes (HURREVAC n.d.). HURREVAC permits governmental agencies to work as a unified team, coordinate notification, communication, activations, public warning, and evacuation and sheltering efforts. By operating together, the government agencies serve the public better by providing the same advisories and actions.

National Weather Service (NWS)

The NWS monitors weather and delivers weather forecasting for New York. The state is serviced by five weather forecast offices (WFO) – Albany (NY), Binghamton (NY), Buffalo (NY), Burlington (VT), and New York (NY). Allegany, Cattaraugus, Cayuga, Chautauqua, Erie, Genesee, Jefferson, Lewis, Livingston, Monroe, Niagara, Chautauqua, Orleans, Oswego, Seneca, St. Lawrence, Wayne, Wyoming, and Yates County are covered by the Buffalo WFO. NYS DHSES uses conference calling with the NWS and counties to share specific information and needs when severe weather is forecast. The NWS also offers various education and training programs on weather-related hazards (NWS 2023).

StormReady Program

The NWS operates the StormReady program, which encourages communities to take a new, proactive approach to improving local hazardous weather operations by providing emergency managers with clear-cut guidelines on how to improve their hazardous weather operations. To be recognized by the program, a community must establish a 24-hour warning point and emergency operations center; have more than one way to receive severe weather warnings and forecasts and to alert the public; create a system that monitors weather conditions locally; promote the importance of public readiness through community seminars; and develop a formal hazardous weather plan, which includes training severe weather spotters and holding emergency exercises. Yates County is a StormReady community (NWS n.d.).

U.S. Army Corps of Engineers

The U.S. Army Corps of Engineers (USACE) works to strengthen the nation's security by building and maintaining America's infrastructure and providing military facilities where servicemembers train, work, and live. Projects include dredging, storm damage reduction, and ecosystem restoration in and near waterways (USACE n.d.). New York is serviced by the Buffalo, Pittsburgh, and New York districts, with Yates County represented by the Buffalo District. USACE has numerous initiatives to support hazard mitigation measures, including the Silver Jackets, planning assistance, and inspections and repair of flood control structures. USACE also maintains the National Inventory of Dams and the National Levee Database.

Silver Jackets

Silver Jackets, developed by USACE, is the State-level implementation program for the National Flood Risk Management Program. The program's goals are to leverage information and resources from federal, state, and local agencies to improve flood risk management; improve public risk communication through a united effort; and create a mechanism to collaboratively solve issues and implement initiatives beneficial to local communities. The USACE Buffalo District organizes this program in Yates County.

Climate Preparedness and Resilience Community of Practice

The Practice develops and implements practical, nationally consistent, and cost-effective approaches and policies to reduce potential vulnerabilities to the nation's water infrastructure resulting from climate change and variability (USACE n.d.).

Planning Assistance to States Program

Section 22 of the 1974 Water Resources Development Act provides authority for the USACE to assist states, local governments, Native American Tribes, and other non-federal entities in the preparation of comprehensive plans for the development and conservation of water and related land resources. Types of work that can be done include Water Quality Studies, Wetland Evaluation Studies, Flood Plain Management Studies, Coastal Zone Management/Protection Studies, Harbor/Port Studies, or other water resource planning investigations. The individual non-federal sponsors determine the needed planning assistance (USACE n.d.).

Flood Plain Management Services Program

Section 206 of the 1960 Flood Control Act (PL 86-645), as amended, provides the authority for the USACE to provide assistance and guidance on all aspects of floodplain management planning. The program develops or interprets site-specific data on obstructions to flood flows, flood formation, and timing and the extent, duration, and frequency of flooding. Upon request, program services are provided to the state, regional, and local governments, Native American Tribes, and other non-federal public agencies without charge (USACE n.d.).

Inspection of Completed Works Program

Civil works structures whose failure or partial failure could jeopardize the operational integrity of the project, endanger the lives and safety of the public, or cause substantial property damage, are periodically inspected, and evaluated to ensure their structural stability, safety, and operational adequacy. For those structures constructed by the USACE and turned over to others for operation and maintenance, the operating entity is responsible for periodic inspection and evaluation. The USACE may conduct the inspection on behalf of the project sponsor provided appropriate reimbursement to the USACE is made. However, the USACE may participate in the inspection with the operating entity at the government's expense.

Rehabilitation and Inspection Program

The Rehabilitation and Inspection Program is a USACE program that provides for inspection of flood control projects, the rehabilitation of damaged flood control projects, and the rehabilitation of federally authorized and constructed hurricane or shore protection projects.

Dam Safety Program

The USACE is responsible for safety inspections of some federal and non-federal dams in the United States that meet the size and storage limitations specified in the National Dam Safety Act. USACE has inventoried dams and has surveyed each state and federal agency's capabilities, practices, and regulations regarding design, construction, operation, and maintenance of the dams. USACE has also developed guidelines for inspection and evaluation of dam safety.

U.S. Geological Survey

U.S. Geological Survey (USGS) maintains a network of gauges across New York that continuously measure lake, reservoir table, stream, and tidal levels. These data sets are transmitted to the USGS and made available over the Internet. As project needs and funding levels change, gauges may be added or deactivated, and deactivated gauges may be reactivated (USGS 2023). USGS provides data to the Department of Environmental Protection for drought determinations. USGS also recovers high water marks post-coastal flooding (USGS 2018).

State

New York State Division of Homeland Security and Emergency Services

For more than 50 years, NYS DHSES (formerly New York State Office of Emergency Management) and its predecessor agencies have been responsible for coordinating the activities of all State agencies to protect New York's communities, the State's economic well-being, and the environment from natural and human-caused disasters and emergencies. NYS DHSES routinely assists local governments, voluntary organizations, and private industry through a variety of emergency management programs, including hazard identification, loss prevention, planning, training, operational response to emergencies, technical support, and disaster recovery assistance.

NYS DHSES administers the FEMA mitigation grant programs in the state and supports local mitigation planning in addition to developing and routinely updating the state hazard mitigation plan. NYS DHSES prepared the current state hazard mitigation plan working with input from other State agencies, authorities, and organizations. It was approved by FEMA in 2023, and it keeps New

York eligible for recovery assistance in Public Assistance (Categories A through G) and Hazard Mitigation assistance in each of the Unified Hazard Mitigation Assistance Program's five grant programs. The 2023 New York State HMP was used as guidance in completing the Yates County HMP Update.

New York State Department of Environmental Conservation Region 8

NYSDEC Region 8 is located in western New York and includes Chemung, Genesee, Livingston, Monroe, Ontario, Orleans, Schuyler, Seneca, Steuben, Wayne and Yates counties. The main Department of Environmental Conservation (DEC) office is located in Avon with sub-offices in Bath and Elmira. DEC staff have two main areas of responsibility: natural resource management and environmental quality protection. As part of natural resource management, staff oversee state fish and wildlife resources as well as state forests (NYSDEC 2023).

New York State Department of Environmental Conservation Division of Water—Bureau of Flood Protection and Dam Safety

Within the NYSDEC Division of Water, the Bureau of Flood Protection and Dam Safety cooperates with federal, state, regional, and local partners to protect lives and property from floods, coastal erosion and dam failures through floodplain management and both structural and nonstructural means; and provides support for information technology needs in the division (NYSDEC 2023).The bureau consists of the following sections (NYSDEC 2023):

- Coastal Erosion and Flooding: Works to reduce coastal erosion and storm damage to protect lives, natural resources, and properties through structural and nonstructural means.
- Dam Safety: Is responsible for reviewing repairs and modifications to dams and assuring that dam owners operate and maintain dams in a safe condition through inspections, technical reviews, enforcement, and emergency planning.
- Flood Protection and Floodplain Management: Works with communities throughout the state in finding ways to reduce or protect against physical and property damage caused by flooding.

The NYSDEC's Mission is "To conserve, improve and protect New York's natural resources and environment and to prevent, abate and control water, land and air pollution, in order to enhance the health, safety and welfare of the people of the state and their overall economic and social well-being."

NYSDEC's goal is to achieve this mission through the simultaneous pursuit of environmental quality, public health, economic prosperity, and social well-being, including environmental justice and the empowerment of individuals to participate in environmental decisions that affect their lives (NYSDEC 2023).

Northeast Regional Climate Center

The Northeast Regional Climate Center (NRCC) partnered with the New York State Energy Research and Development Authority (NYSERDA) to compare various methods of downscaling global climate model (GCM) output and create extreme precipitation projections for New York State. These projections will ultimately be incorporated into climate change adaptation planning. NRCC develops products for use by municipal officials, researchers, planners, highway departments, and other decision-makers who need to take future storm events into account (NRCC 2014).

NRCC also maintains the Extreme Precipitation in New York & New England website, an interactive tool for extreme precipitation analysis. The site includes estimates of extreme rainfall for various durations (5 minutes to 10 days) and recurrence intervals (1 year to 500 years). These data are interpolated to a 30-second grid. Confidence intervals for these values are included as are the partial duration rainfall series used in their computation. Regional extreme rainfall maps and graphic products are available. Precipitation distribution curves can be generated for each grid either directly or from the USDA NRCS Win TR-20 software, eliminating the need to use a static Type II or Type III curve (NRCC n.d.). This tool can be used by municipalities to assist them in the design and feasibility assessment of future projects and allow them to see the future intensity and frequency of rain events (NRCC 2022).

Department of State's Division of Building Standards and Codes

The New York State Department of State's Division of Building Standards and Codes provides a variety of services related to the development, administration, and enforcement of the Uniform Fire Prevention and Building Code (Uniform Code) and Energy Conservation Construction Code (Energy Code). These codes provide for the construction of safe, resilient, and energy-efficient buildings throughout New York State.

The statutory responsibility for developing and maintaining the Uniform Code and the Energy Code is vested in the State Fire Prevention and Building Code Council (Code Council). If the Code Council decides to amend either code, it commences a process for rulemaking set forth in the State Administrative Procedure Act. The Code Development Unit administers statutory functions and evaluates proposed changes to the codes.

Executive Law §379 authorizes the legislative body of a local government to enact or adopt local laws and ordinances that impose standards for construction that are more restrictive than the corresponding standards imposed by the Uniform Code. Energy Law §11-109 allows counties, cities, towns, villages, school districts, or district corporations to promulgate local energy conservation construction codes that are more stringent than the state Energy Code. The Code Council is empowered to approve these more restrictive standards and codes when they comply with Executive Law §379 and Energy Law §11-109. The Code Development Unit assists with reviewing the technical aspects of these local laws and ordinances and reporting its findings to the Code Council.

The Division of Building Standards and Codes' Code Enforcement Disaster Assistance Response (CEDAR) Program provides requesting communities with post-disaster assistance under the leadership of the DHSES and in accordance with Executive Law 2-B. The program's initial disaster response focuses on performing rapid evaluation safety assessments of damaged structures in affected communities for use as part of the application process to request federal disaster assistance through FEMA. The CEDAR program's long-term disaster response provides a unified method for communities to access the range of resources available within and beyond the Department of State.

New York State Department of Transportation

It is the mission of the New York State Department of Transportation (NYSDOT) to provide a safe, reliable, equitable, and resilient transportation system that connects communities, enhances quality of life, and supports the economic well-being of New York State. Yates County is served by the Southern Tier/Central New York, Region 6 NYSDOT office, which is based out of the Hornell.

NYSDOT offers a variety of grant, education, and training opportunities; has several environmental initiatives and programs; issues permits for traffic signals, driveways, advertisements, and other permitting needs; provides statistical roadway information; and provides information on community resources, such as scenic highways and fishing access sites.

New York State Office of Planning, Development and Community Infrastructure

The New York State Office of Planning, Development and Community Infrastructure works with communities to increase their resilience to climate change impacts, particularly coastal flooding. The Office employs key resilience principles that help communities understand their vulnerabilities, advance resilience measures that reduce risk, including using natural infrastructure and natural processes, and avoid investments that are not highly adapted to a changing climate.

Climate Smart Communities

Climate Smart Communities (CSC) is a New York State program that helps local governments take action to reduce greenhouse gas emissions and adapt to a changing climate. The program offers grants, rebates for electric vehicles, and free technical assistance. The CSC certification program recognizes leaders of local governments that have undergone a rigorous review process to confirm their completion of a suite of actions that mitigate and adapt to climate change at the community level. The goals of the CSC certification program are to engage and educate local governments in New York State, provide a robust framework to guide their climate action efforts, and recognize their achievements.

The structure of the certification program is based on the CSC pledge elements that were developed in 2009. Participation in the program is voluntary. The program is designed to encourage ongoing implementation of actions that reduce greenhouse gas emissions and help communities adapt to the effects of climate change.

While there are no CSC certified jurisdictions in Yates County, the following are registered with the CSC, but have not been ranked:

- County of Yates
- Village of Dundee

Resilient NY

In November 2018, New York State launched the Resilient NY program. The overall goal of the program is to improve community resiliency to extreme weather events that result in flooding and ice jam formations.

NYSDEC and NYS OGS retained two consulting firms to prepare the Resilient NY studies. The consultants will work with NYSDEC experts, municipalities, and interested stakeholders to collect relevant information about flooding and ice jam formations in each priority watershed and use this information to develop specific mitigation projects and actions.

19.4 FISCAL CAPABILITIES

This section summarizes fiscal capabilities in Yates County. Further information is provided in the jurisdictional annexes in Volume II. The *State Capabilities* section of the 2023 New York State Hazard Mitigation Plan features a section on mitigation-related funding administered by state agencies that eligible jurisdictions can use to fund mitigation actions.

19.4.1 County and Local

Yates County and individual jurisdictions are (legally, not necessarily practically) able to fund mitigation projects though existing local budgets, local appropriations (including referendums and bonding), and a variety of federal and state loan and grant programs. Many jurisdictions are faced with increasing fiscal constraints, including decreasing revenues, budget constraints, and tax caps. In an effort to overcome these fiscal challenges, jurisdictions have continued to leverage the sharing of resources and combining available funding with grants and other sources and note that plans and interjurisdictional cooperation are beneficial in obtaining grants.

Yates County Legislature

Natural and Recreational Resources Grant

The Yates County Comprehensive Plan, along with the County Planning Guideline "Looking Ahead", identified the need for protection, preservation and development of the County's natural and recreational resources. The policy is intended to promote and to provide support to those groups pursuing related projects. The Yates County Legislature seeks to establish a policy for funding Natural and Recreational Resources and desires to partner with other levels of government and private organizations to (Yates County n.d.):

- protect and preserve natural and recreational resources in Yates County,
- preserve and develop recreational trail corridors that cross municipal borders, and
- develop outdoor recreation facilities that are intended to serve all county residents.

Finger Lakes Economic Development Corporation

Tax-Exempt Bonding

Under New York State Law, an International Development Association (IDA) is authorized to issue bonds and notes. Subject to the limitations imposed by the Internal Revenue Code of 1986, as amended, the IDA can issue taxable and tax-exempt bonds, the proceeds of which can be used to fund all or substantially all the costs of a project. It is important to understand that an IDA provides no credit enhancement and issues bonds on a non-recourse basis. Therefore, the ability to sell the bonds is premised solely on the creditworthiness of the Company. While IDA involvement does not guarantee the bonds in any way, the involvement does convey certain value to the lender, includes (1) lower start-up costs based on incentive packet (2) a known, or predictable, phase-in of property taxes and (3) a local commitment to the project (FLEDC n.d.):

- Requirements: Capital Investment project must approach at least $1 million to be cost effective. Private placements of bonds are also available. For Tax-Exempt bonding, a company may NOT have had more than $10 million in actual and planned capital investment expenditures (including actual amount of bond issue) within the same municipality going 3 years back and 3 years forward.
- Terms: Interest rates are generally 2-3 percent below a taxable loan from commercial lenders. May be structured as a fixed rate, variable rate or low floater bond. Fixed rate and variable bonds can be structured with maturities ranging from 15–30 years.

Excelsior Jobs Program

The Excelsior Jobs Program provides job creation and investment incentives to firms in such targeted industries as biotechnology, pharmaceutical, high-tech, clean-technology, green technology, financial services, agriculture, and manufacturing. Firms in these industries that create and maintain new jobs or make significant financial investment are eligible to apply for up to four new tax credits. The Program encourages businesses to expand in and relocate to New York while maintaining strict accountability standards to guarantee that businesses deliver on job and investment commitments. Program costs are capped at $500 million annually to maintain fiscal affordability and ensure that New Yorkers realize a positive return on their investment (FLEDC n.d.).

Finger Lakes Horizon Economic Development Corporation

Building Improvement Fund

The Finger Lakes Horizon Economic Development Corporation (FLHEDC) has been awarded funding through the New York State Downtown Revitalization Initiative (DRI) to finance a Building Improvement Fund. A $600,000 Building Improvement Fund has been established to provide grant funding for applicants to implement interior and exterior building improvements in the Village of Penn Yan DRI area. Goals of the Penn Yan DRI Building Improvement Fund are to preserve and renovate historic downtown buildings, stimulate entrepreneurism, and promote mixed-income residential uses including upper-floor units. The fund is available to any commercial and/or mixed-use building owner within the Village of Penn Yan DRI boundary (FLHEDC n.d.).

19.4.2 State and Federal

Federal Hazard Mitigation Funding Opportunities

As noted on the FEMA hazard mitigation assistance website (FEMA n.d.-a), FEMA administers five programs that provide funding for eligible mitigation planning and projects that reduces disaster losses and protect life and property from future disaster damages. The programs are the Hazard Mitigation Grant Program (HMGP), and the HMGP Post Fire Grant, the Flood Mitigation Assistance (FMA) Program, the Pre-Disaster Mitigation (PDM) Program, and the new Building Resilient Infrastructure & Communities (BRIC) Program. Table 19-1 provides an overview of program funding eligibility and cost share.

HMGP assists in implementing hazard mitigation planning and projects following a federal major disaster declaration. PDM provides funds for hazard mitigation planning and projects on an annual basis. FMA provides funds for planning and projects to reduce or eliminate risk of flood damage to buildings that are insured under the National Flood Insurance Program (NFIP) on an annual basis. BRIC supports jurisdictions in hazard mitigation projects, reducing the risks they face from disasters and natural hazards. The BRIC program will replace the existing Pre-Disaster Mitigation (PDM) program. The BRIC program guiding principles are supporting communities through capability- and capacity-building; encouraging and enabling innovation; promoting partnerships; enabling large projects; maintaining flexibility; and providing consistency (FEMA 2023e).

Table 19-1. FEMA Hazard Mitigation Assistance Grant Cost Share Requirements

Programs	Cost Share (Percent of Federal / Non-Federal Share)
HMGP	75 / 25
HMGP Post Fire	75 / 25
FMA (community flood mitigation, project scoping, individual mitigation of insured properties, and planning grants)	75 / 25
FMA—repetitive loss property(2)	90 / 10
FMA—severe repetitive loss property(2)	100 / 0
PDM	75 / 25
PDM—small and impoverished community	Up to 90 / 10
BRIC	75 / 25
BRIC—small and impoverished community	Up to 90 / 10

Source: FEMA 2023; FEMA 2023

Subapplicants should consult their State Hazard Mitigation Officer (SHMO) for the amount of percentage of HMGP subrecipient management cost funding their State has determined to be passed through subrecipients.

To be eligible for an increased federal cost share, a FEMA-approved state or tribal (standard or enhanced) mitigation plan that addressed repetitive loss properties must be in effect at the time of award, and the property is being submitted for consideration must be a repetitive loss property.

HMGP funding is generally 15 percent of the total amount of Federal assistance provided to a State, Territory, or federally recognized tribe following a major disaster declaration. PDM and FMA funding depends on the amount congress appropriates each year for those programs. BRIC is funded by a 6 percent ($500 million) set-aside from federal post-disaster grant funding. Individual homeowners and business owners may not apply directly to FEMA. Eligible local governments may apply on their behalf (FEMA 2023e).

Federal mitigation grant funding is available to all communities with a current hazard mitigation plan (this plan); however, most of these grants require a "local share" in the range of 10-25 percent of the total grant amount. The FEMA mitigation grant programs are described below.

FEMA

Hazard Mitigation Grant Program

The Hazard Mitigation Grant Program (HMGP) is a post-disaster mitigation program. It is made available to states by FEMA after each Federal disaster declaration. The HMGP can provide up to 75 percent funding for hazard mitigation measures. The HMGP can be used to fund cost-effective projects that will protect public or private property in an area covered by a federal disaster declaration or that will reduce the likely damage from future disasters. Examples of projects include acquisition and demolition of structures in hazard-prone areas, flood-proofing or elevation to reduce future damage, minor structural improvements, and development of state or local standards. Projects must fit into an overall mitigation strategy for the area identified as part of a local planning effort. All applicants must have a FEMA-approved hazard mitigation plan (this plan).

Applicants who are eligible for the HMGP are state and local governments, certain nonprofit organizations or institutions that perform essential government services, and Indian tribes and authorized tribal organizations. Individuals or homeowners cannot apply directly for the HMGP; a local government must apply on their behalf. Applications are submitted to NYS DHSES and placed in rank order for available funding and submitted to FEMA for final approval. Eligible projects not selected for funding are placed in an inactive status and may be considered as additional HMGP funding becomes available.

Flood Mitigation Assistance Program

The Flood Mitigation Assistance (FMA) program combines the previous Repetitive Flood Claims and Severe Repetitive Loss Grants into one grant program. The FMA provides funding to assist states and communities in implementing measures to reduce or eliminate the long-term risk of flood damage to buildings, manufactured homes, and other structures insurable under the NFIP. The FMA is funded annually; no federal disaster declaration is required. Only NFIP insured homes and businesses are eligible for mitigation in this program. Funding for FMA is very limited and, as with the HMGP, individuals cannot apply directly for the program. Applications must come from local governments or other eligible organizations. The federal cost share for an FMA project is at least 75 percent. At most, 25 percent of the total eligible costs must be provided by a non-federal source. Of this 25 percent, no more than half can be provided as in-kind contributions from third parties. At minimum, a FEMA-approved local flood mitigation plan is required before a project can be approved. The FMA funds are distributed from FEMA to the state. The NYS DHSES serves as the grantee and program administrator for the FMA program.

Building Resilient Infrastructure and Communities Program

Building Resilient Infrastructure and Communities (BRIC) will support states, local communities, tribes, and territories as they undertake hazard mitigation projects, reducing the risks they face from disasters and natural hazards. BRIC is a new FEMA pre-disaster hazard mitigation program that replaces the existing Pre-Disaster Mitigation (PDM) program.

The BRIC program guiding principles are supporting communities through capability- and capacity-building; encouraging and enabling innovation; promoting partnerships; enabling large projects; maintaining flexibility; and providing consistency.

Rehabilitation of High Hazard Potential Dams Program

The Rehabilitation of High Hazard Potential Dams (HHPD) grant program provides technical, planning, design, and construction assistance for eligible rehabilitation activities that reduce dam risk and increase community preparedness.

The HHPD Grant Program will provide assistance for technical, planning, design, and construction activities toward:

- Repair
- Removal
- Structural/nonstructural rehabilitation of eligible high hazard potential dams

Extraordinary Circumstances

For BRIC and FMA project subawards, the FEMA Region may apply extraordinary circumstances when justification is provided and with concurrence from FEMA Headquarters (Risk Reduction and Risk Analysis Divisions) prior to granting an exception. If this exception is granted, a local mitigation plan must be approved by FEMA within 12 months of the award of the project subaward to that community.

For HMGP, BRIC, and FMA, extraordinary circumstances exist when a determination is made by the Applicant and FEMA that the proposed project is consistent with the priorities and strategies identified in the state (standard or enhanced) mitigation plan and that the jurisdiction meets at least one of the criteria below. If the jurisdiction does not meet at least one of these criteria, the Region must coordinate with FEMA Headquarters (Risk Reduction and Risk Analysis Divisions) for HMGP; however, for BRIC and FMA the Region must coordinate and seek concurrence prior to granting an exception:

- The jurisdiction meets the small, impoverished community criteria (see Part VIII, B.2).
- The jurisdiction has been determined to have had insufficient capacity due to lack of available funding, staffing, or other necessary expertise to satisfy the mitigation planning requirement prior to the current disaster or application deadline.
- The jurisdiction has been determined to have been at low risk from hazards because of low frequency of occurrence or minimal damage from previous occurrences as a result of sparse development.
- The jurisdiction experienced significant disruption from a declared disaster or another event that impacts its ability to complete the mitigation planning process prior to award or final approval of a project award.
- The jurisdiction does not have a mitigation plan for reasons beyond the control of the state, federally recognized tribe, or local community, such as Disaster Relief Fund restrictions that delay FEMA from granting a subaward prior to the expiration of the local or Tribal Mitigation Plan.

For HMGP, BRIC, and FMA, the Applicant must provide written justification that identifies the specific criteria or circumstance listed above, explains why there is no longer an impediment to satisfying the mitigation planning requirement and identifies the specific actions or circumstances that eliminated the deficiency.

When an HMGP project funding is awarded under extraordinary circumstances, the recipient must acknowledge in writing to the Regional Administrator that a plan will be completed within 12 months of the subaward. The recipient must provide a work plan for completing the local or Tribal mitigation plan, including milestones and a timetable, to ensure that the jurisdiction will complete the plan in the required time. This requirement is incorporated into the award (both the planning and project subaward agreements if a planning subaward is also awarded).

Assistance to Firefighters Grant Program

The goal of the Assistance to Firefighters Grants is to enhance the safety of the public and firefighters with respect to fire-related hazards by providing direct financial assistance to eligible fire departments, nonaffiliated emergency medical services organizations, and state fire training academies. This funding is for critically needed resources to equip and train emergency personnel to recognized standards, enhance operations efficiencies, foster interoperability, and support community resilience.

Emergency Management Performance Grants Program

The Emergency Management Performance Grant (EMPG) provides state, local, tribal, and territorial emergency management agencies with the resources required for implementation of the National Preparedness System and works toward the national preparedness goal of a secure and resilient nation. The EMPG's allowable costs support efforts to build and sustain core capabilities across the prevention, protection, mitigation, response, and recovery mission areas.

Homeland Security Grant Program

The Homeland Security Grant Program (HSGP) plays an important role in the implementation of the National Preparedness System by supporting the building, sustainment, and delivery of core capabilities essential to achieving the National Preparedness Goal of a secure and resilient nation. The program supports efforts to build and sustain core capabilities across the Prevention, Protection, Mitigation, Response, and Recovery mission areas. This includes two priorities: building and sustaining law enforcement terrorism prevention capabilities and maturation and enhancement of state and major urban area fusion centers. HSGP is composed of three interconnected grant programs including the State Homeland Security Program (SHSP), Urban Areas Security Initiative (UASI), and the Operation Stonegarden (OPSG). Together, these grant programs fund a range of preparedness activities, including planning, organization, equipment purchase, training, exercises, and management and administration.

Federal and State Disaster and Recovery Assistance Programs

Following a disaster, various types of assistance may be made available by local, state, and federal governments. The types and levels of disaster assistance depend on the severity of the damage and the declarations that result from the disaster event. Among the general types of assistance that may be provided should the President of the United States declare the event a major disaster includes the following:

Individual Assistance

Individual Assistance (IA) provides help for homeowners, renters, businesses, and some nonprofit entities after disasters occur. This program is largely funded by the U.S. Small Business Administration. For homeowners and renters, those who suffered uninsured or underinsured losses may be eligible for a Home Disaster Loan to repair or replace damaged real estate or personal property. Renters are eligible for loans to cover personal property losses. Individuals may borrow up to $200,000 to repair or replace real estate, $40,000 to cover losses to personal property, and an additional 20 percent for mitigation. For businesses, loans may be made to repair or replace disaster damages to property owned by the business, including real estate, machinery and equipment, inventory, and supplies. Businesses of any size are eligible. Nonprofit organizations such as charities, churches, private universities, etc. are also eligible. An Economic Injury Disaster Loan provides necessary working capital until normal operations resume after a physical disaster. These loans are restricted, by law, to small businesses only.

Public Assistance

Public Assistance (PA) provides cost reimbursement aid to local governments (state, county, local, municipal authorities, and school districts) and certain nonprofit agencies that were involved in disaster response and recovery programs or that suffered loss or damage to facilities or property used to deliver government-like services. This program is largely funded by FEMA with both local and state matching contributions required.

Small Business Administration Loans

The Small Business Administration (SBA) provides low-interest disaster loans to homeowners, renters, business of all sizes, and most private nonprofit organizations. SBA disaster loans can be used to repair or replace the following items damaged or destroyed in a declared disaster: real estate, personal property, machinery and equipment, and inventory and business assets.

Homeowners may apply for up to $200,000 to replace or repair their primary residence. Renters and homeowners may borrow up to $40,000 to replace or repair personal property (such as clothing, furniture, cars, and appliances) damaged or destroyed in a disaster. Physical disaster loans of up to $2 million are available to qualified businesses or most private nonprofit organizations.

National Park Service

Land and Water Conservation Fund

The Land and Water Conservation Fund (LWCF) was established by Congress in 1964 to fulfill a bipartisan commitment to safeguard natural areas, water resources, and cultural heritage, and to provide recreation opportunities. Using no taxpayer dollars, the LWCF invests earnings from offshore oil and gas leasing to help strengthen communities, preserve history, and protect the national endowment of lands and waters. The LWCF program is divided into the "State Side," which provides grants to State and local governments, and the "Federal Side," which is used to acquire lands, waters, and interests therein necessary to achieve the natural, cultural, wildlife, and recreation management objectives of federal land management agencies. The LWCF was permanently reauthorized in 2019 and permanently funded in August 2020.

Restore America's Estuaries

Coastal Watersheds Grant Program

Restore America's Estuaries, in close coordination with and financial support from EPA, administers the National Estuary Program (NEP) Coastal Watersheds Grant Program. This grant program funds projects within the geographic areas shown here and supports the following Congressionally set priorities:

- Loss of key habitats resulting in significant impacts on fisheries and water quality such as seagrass, mangroves, tidal and freshwater wetlands, forested wetlands, kelp beds, shellfish beds, and coral reefs.
- Recurring harmful algae blooms.
- Unusual or unexplained marine mammal mortalities.
- Proliferation or invasion of species that limit recreational uses, threaten wastewater systems, or cause other ecosystem damage.
- Flooding and coastal erosion that may be related to sea-level rise, changing precipitation, or salt marsh, seagrass, or wetland degradation or loss.
- Impacts of nutrients and warmer water temperatures on aquatic life and coastal ecosystems, including low dissolved oxygen conditions in estuarine waters.
- Contaminants of emerging concern found in coastal and estuarine waters such as pharmaceuticals, personal care products, and microplastics.

U.S. Department of Agriculture

Community Facilities Direct Loan and Grant Program

This program provides affordable funding to develop essential community facilities in rural areas. An essential community facility is defined as a facility that provides an essential service to the local community for the orderly development of the community in a primarily rural area and does not include private, commercial, or business undertakings. Funds can be used to purchase, construct, and/or improve essential community facilities, purchase equipment, and pay related project expenses. Rural areas including cities, villages, townships, towns, and federally recognized tribal lands, with no more than 20,000 residents according to the latest U.S. Census, are eligible for this program.

Emergency Loan Program

The Emergency loan program is triggered when a natural disaster is designated by the Secretary of Agriculture, or a natural disaster or emergency is declared by the President under the Stafford Act. These loans help producers who suffer qualifying farm-related losses directly caused by the disaster in a county declared or designated as a primary disaster or quarantine area. Also, farmers located in counties that are contiguous to the declared, designated, or quarantined area may qualify for emergency loans.

For production losses, a 30 percent reduction in a primary crop in a designated or contiguous county is required. Losses to quality, such as receiving a 30 percent reduced price for flood-damaged crops, may be eligible for assistance, too.

Emergency Watershed Protection Program

The Emergency Watershed Protection (EWP) Program, a federal emergency recovery program, helps local communities recover after a natural disaster. The EWP program offers technical and financial assistance to help local communities relieve imminent threats to life and property caused by floods, fires, windstorms, and other natural disasters that impair a watershed. EWP does not require a disaster declaration by federal or state government officials for program assistance to begin. The Natural Resources Conservation Service (NRCS) state conservationist can declare a local watershed emergency and initiate EWP program assistance in cooperation with an eligible sponsor. The sponsor must sign a cooperative agreement with NRCS. The EWP program offers financial and technical assistance for various activities, including the following:

- Remove debris from stream channels, road culverts, and bridges
- Reshape and protect eroded streambanks
- Correct damaged or destroyed drainage facilities
- Establish vegetative cover on critically eroding lands
- Repair levees and structures
- Repair certain conservation practices
- Buyouts

Additional information regarding the EWP is detailed below and available on the website: https://www.nrcs.usda.gov/wps/portal/nrcs/main/national/programs/landscape/ewpp/.

EWP – Recovery

The EWP – Recovery program is aimed at relieving imminent hazards to life and property caused by floods, fires, windstorms, and other natural occurrences. Public and private landowners are eligible for assistance but must be represented by a project sponsor that must be a legal subdivision of the state, such as a city, county, township, or conservation district, and Native American Tribes or Tribal governments. NRCS will pay up to 75 percent of the construction cost of emergency measures. The remaining 25 percent must come from local sources and can be in the form of cash or in-kind services.

EWP – Recovery work is not limited to any one set of measures. The program is designed for the installation of recovery measures to safeguard lives and property as a result of a natural disaster. NRCS completes a Damage Survey Report, which provides a case-by-case investigation of the work necessary to repair or protect a site. Watershed impairments that the EWP Program addresses are debris-clogged stream channels, undermined and unstable streambanks, jeopardized water control structures and public infrastructures, wind-borne debris removal, and damaged upland sites stripped of protective vegetation by fire or drought.

EWP – Floodplain Easement

Privately owned lands or lands owned by local and state governments might be eligible for participation in the EWP – Floodplain Easement program. To be eligible, lands must meet one of the following criteria:

- Lands that have been damaged by flooding at least once within the previous calendar year or have been subject to flood damage at least twice within the previous 10 years
- Other lands within the floodplain that would contribute to the restoration of flood storage and flow, provide for control of erosion, or improve the practical management of the floodplain easement
- Lands that would be inundated or adversely impacted as a result of a dam breach

Through this program, easements are restored to the natural environment to the extent practicable. Work can include both structural and nonstructural practices to restore flood storage and flow, control erosion, and improve the practical management of the easement.

Structures, including buildings, within the floodplain easement must be demolished and removed or relocated outside the 1 percent annual chance floodplain or dam breach inundation area.

Regional Conservation Partnership Program

The Regional Conservation Partnership Program promotes coordination of NRCS conservation activities with partners that offer value-added contributions to expand the collective ability to address on-farm, watershed, and regional natural resource concerns. Through this program, NRCS seeks to co-invest with partners to implement projects that demonstrate innovative solutions to conservation challenges and provide measurable improvements and outcomes tied to the resource concerns they seek to address.

U.S. Department of Health and Human Services

Social Services Block Grant Program

The Social Services Block Grant (SSBG) is a flexible funding source that allows states and territories to tailor social service programming to their population's needs. Through the SSBG, states provide essential social services that help achieve a myriad of goals to reduce dependency and promote self-sufficiency; protect children and adults from neglect, abuse, and exploitation; and help individuals who are unable to take care of themselves to stay in their homes or to find the best institutional arrangements.

U.S. Department of Housing and Urban Development

Community Development Block Grants

Community Development Block Grants (CDBG) are federal funds intended to provide low and moderate-income households with viable communities, including decent housing, as suitable living environment, and expanded economic opportunities. Eligible activities include community facilities and improvements, roads and infrastructure, housing rehabilitation and preservation, development activities, public services, economic development, planning, and administration. Public improvements may include flood and drainage improvements. In limited instances, and during the times of "urgent need" (e.g., post-disaster) as defined by the CDBG National Objectives, CDBG funding may be used to acquire a property located in a floodplain that was severely damaged by a recent flood, demolish a structure severely damaged by an earthquake, or repair a public facility severely damaged by a hazard event. Additional information regarding CDBG is available on the website: https://www.hudexchange.info/programs/cdbg-entitlement/.

Community Development Block Grant Disaster Recovery (CDBG-DR) grant funds are appropriated by Congress and allocated by HUD to rebuild disaster-impacted areas and provide crucial seed money to start the long-term recovery process. These flexible grants help cities, counties, Indian tribes, and States recover from federally declared disasters, especially in low-income areas, subject to the availability of supplemental appropriations. Since CDBG-DR assistance may fund a broad range of recovery activities, HUD can help communities and neighborhoods that otherwise might not recover due to limited resources.

Disaster Housing Assistance Program

The Disaster Housing Assistance Program provides emergency assistance for housing, including minor repairs of the home to establish livable conditions, mortgage, and rental assistance.

HOME Investment Partnerships Program

The HOME Investment Partnerships Program (HOME) provides grants to states and localities that communities use—often in partnership with local nonprofit groups—to fund a wide range of activities, including building, buying, and/or rehabilitating affordable housing for rent or homeownership or providing direct rental assistance to low-income people. HOME is the largest federal block grant to state and local governments designed exclusively to create affordable housing for low-income households. HOME funds are awarded annually as grants to participating jurisdictions. The program's flexibility allows states and local governments to use HOME funds for grants, direct loans, loan guarantees or other forms of credit enhancements, or rental assistance or security deposits.

The program's requirement that participating jurisdictions match 25 cents of every dollar in program funds mobilizes community resources in support of affordable housing.

Section 108 Loan Guarantee Program

The Section 108 Loan Guarantee Program (Section 108) provides communities with a source of low-cost, long-term financing for economic and community development projects. Section 108 financing provides an avenue for communities to undertake larger, more costly projects, where they may have limited resources to invest upfront.

Section 108 can fund economic development, housing, public facilities, infrastructure, and other physical development projects, including improvements to increase resilience against natural disasters. This flexibility of use makes it one of the most potent and important public investment tools that HUD offers to states and local governments.

Section 108 assistance can be deployed in two ways:

- Directly by the community or its governmental or non-profit partner to carry out an eligible project
- Indirectly with a community or its partner re-lending (or, in limited circumstances, granting) the funds to a developer or business to undertake an eligible project

U.S. Department of Transportation

Federal Highway Administration Emergency Relief

Federal Highway Administration (FHWA) Emergency Relief is a grant program that can be used for the repair or reconstruction of federal-aid highways and roads on federal lands that have suffered serious damage as a result of a disaster. New York State serves as the liaison between local municipalities and FHWA, making the municipalities sub-applicants of New York State. The program is appropriated $100 million annually. For information regarding the FHWA Emergency Relief Program, refer to: https://www.fhwa.dot.gov/programadmin/erelief.cfm

Federal Transit Administration Emergency Relief

Federal Transit Authority (FTA) Emergency Relief is a grant program that funds capital projects to protect, repair, reconstruct, or replace equipment and facilities of public transportation systems. Administered by the FTA and directly allocated to mass transit and port authorities, this transportation-specific fund was created as an alternative to FEMA's PA. Additional information regarding the FTA Emergency Relief Program is available on the website: https://www.transit.dot.gov/funding/grant-programs/emergency-relief-program/emergency-relief-program.

Federal Highway Administration Recreational Trails

The Recreational Trails Program is an assistance program of the FHWA that provides funds to states to develop and maintain recreational trails and trail-related facilities for both nonmotorized and motorized recreational trail uses. The program requires that states use 30 percent of funds for non-motorized recreation, 30 percent for motorized recreation, and 40 percent for diverse recreational trail use.

In New York State, the Recreational Trails Program is administered by the Office of Parks, Recreation, and Historic Preservation.

Rebuilding American Infrastructure with Sustainability and Equity Grant Program

The Rebuilding American Infrastructure with Sustainability and Equity (RAISE) grant program provides an opportunity for the U.S. Department of Transportation (USDOT) to invest in road, rail, transit, and port projects that promise to achieve national objectives. The RAISE program enables USDOT to examine these projects on their merits to help ensure that taxpayers are getting the highest value for every dollar invested.

The eligibility requirements of RAISE allow project sponsors at the state and local levels to obtain funding for multi-modal, multi-jurisdictional projects that are more difficult to support through traditional USDOT programs. RAISE can provide funding directly to any public entity, including municipalities, counties, port authorities, tribal governments, or others, in contrast to traditional federal programs that provide funding to very specific groups of applicants (mostly state departments of transportation and transit agencies). This flexibility allows RAISE and USDOT partners at the state and local levels to work directly with a host of entities that own, operate, and maintain much of that nation's transportation infrastructure but otherwise cannot turn to the federal government for support.

U.S. Economic Development Administration

The U.S. Economic Development Administration (USEDA) is an agency of the U.S. Department of Commerce that supports regional economic development in communities around the country. It provides funding to support comprehensive planning and makes strategic investments that foster employment creation and attract private investment in economically distressed areas of the United

States. Through its Public Works Program, USEDA invests in key public infrastructure, such as in traditional public works projects, including water and sewer systems improvements, expansion of port and harbor facilities, brownfields, multitenant manufacturing and other facilities, business and industrial parks, business incubator facilities, redevelopment technology-based facilities, telecommunications, and development facilities. Through its Economic Adjustment Program, USEDA administers its Revolving Loan Fund (RLF) Program, which supplies small businesses and entrepreneurs with the gap financing needed to start or expand their business, in areas that have experienced or are under threat of serious structural damage to the underlying economic base.

Public Works Program

Through its Public Works Program, USEDA invests in key public infrastructure, such as traditional public works projects, including water and sewer system improvements, expansion of port and harbor facilities, brownfields, multitenant manufacturing and other facilities, business and industrial parks, business incubator facilities, redevelopment technology-based facilities, telecommunications facilities, and development facilities.

Economic Adjustment Program

Through its Economic Adjustment Program, USEDA administers its Revolving Loan Fund Program, which supplies small businesses and entrepreneurs with the gap financing needed to start or expand their business in areas that have experienced or are under threat of serious structural damage to the underlying economic base.

U.S. Environmental Protection Agency

Smart Growth Implementation Assistance Program

The Smart Growth Implementation Assistance program focuses on complex issues such as stormwater management, code revision, transit-oriented development, affordable housing, infill development, corridor planning, green building, and climate change. Applicants can submit proposals under four categories: community resilience to disasters, job creation, the role of manufactured homes in sustainable neighborhood design, or medical and social service facilities siting.

Clean Water Act Section 604(b) Water Quality Planning Grants

Water Quality Planning Grants provide funding to implement regional comprehensive water quality management planning activities as described in Section 604(b) of the federal Clean Water Act. Funds are to be used for water quality management planning activities, including tasks to determine the nature, extent, and causes of point and nonpoint source water pollution problems, and to develop plans to resolve these problems.

U.S. Fish and Wildlife Service

Partners for Fish and Wildlife

The Partners for Fish and Wildlife Program provides free technical and financial assistance to landowners, managers, tribes, corporations, schools, and nonprofits interested in improving wildlife habitat on their land. These projects range in size from a wetland of a few acres to a grassland restoration covering several hundred thousand acres.

Many Partners for Fish and Wildlife projects take place on working landscapes such as forests, farms, and ranches. Efforts are focused on areas of conservation concern, such as upland forests, wetlands, native prairies, marshes, rivers, and streams. Projects are designed to benefit federal trust species including migratory birds and endangered, threatened, or at-risk species.

State Hazard Mitigation Funding Opportunities

Empire State Development

Empire State Development offers a wide range of financing, grants, and incentives to promote business and employment growth, and real estate development throughout the state. Several programs address infrastructure construction associated with project development, acquisition, and demolition associated with project development and brownfield remediation and redevelopment (NYS ESD 2023).

Local Waterfront Revitalization Program

The Waterfront Revitalization of Coastal Areas and Inland Waterways Act offers local governments the opportunity to participate in the State's Coastal Management Program (CMP) (pdf) on a voluntary basis by preparing and adopting a LWRP, providing more detailed implementation of the State's CMP through use of such existing broad powers as zoning and site plan review. When an LWRP is approved by the New York State Secretary of State, State agency actions are required to be consistent with the approved LWRP to the maximum extent practicable. When the federal government concurs with the incorporation of an LWRP into the CMP, federal agency actions must be consistent with the approved addition to the CMP.

An approved LWRP reflects community consensus and provides a clear direction for appropriate future development. It establishes a long-term partnership among local government, community-based organizations, and the state. Also, funding to advance preparation, refinement, or implementation of Local Waterfront Revitalization Programs is available under Title 11 of the New York State EPF LWRP, among other sources.

In addition, State permitting, funding, and direct actions must be consistent, to the maximum extent practicable, with an approved LWRP. Within the federally defined coastal area, federal agency activities are also required to be consistent with an approved LWRP. This "consistency" provision is a strong tool that helps ensure all government levels work in unison to build a stronger economy and a healthier environment (NYS DOS 2023).

New York State Department of Archives

Local Government Records Management Improvement Fund

The Local Government Records Management Improvement Fund provides grants to assist local governments in establishing records management programs or developing new program components. Funds come from fees collected by county clerks and the New York City Office of the City Register. These fees are collected during the recording of certain documents and when county clerks assign index numbers for certain court cases. The amount of grant funding available each year depends on the number of documents recorded and index numbers assigned that year. Project categories include the following:

- Disaster management
- Document conversion and access
- Files management
- Historical records
- Inactive records

Application types include:

- Individual (up to $75,000)
- Shared services (up to $150,000)
- New York City Department of Records

New York State Department of Environmental Conservation

Clean Water State Revolving Fund

The Clean Water State Revolving Fund (CWSRF) provides interest-free or low-interest rate financing for wastewater and sewer infrastructure projects to municipalities throughout New York State. Projects eligible for financing include construction or restoration of sewers and wastewater treatment facilities, stormwater management, landfill closures, and habitat restoration and protection projects.

The New York State Environmental Facilities Corporation (EFC) provides both short- and long-term financing—interest-free or low-interest—to accommodate municipalities of all population sizes with varying financial needs. When communities repay their financings, it allows EFC to finance new projects, and the funds “revolve” over time.

Climate Smart Communities Grant Program

Climate Smart Community (CSC) grants support mitigation and adaptation projects to reduce greenhouse gas emissions and prepare for the effects of climate change. The CSC program enables high-performing registered communities to achieve recognition for their leadership. Designed around 10 pledge elements, the certification program recognizes communities achieving any of over 130 total possible actions through a rating system leading to four levels of award: Certified, Bronze, Silver, and Gold. Recertification of completed actions is required every five years.

Competitive grants ranging from $25,000 to $100,000 provide support for local governments to become certified CSCs. All counties, cities, towns, and villages of New York State are eligible to receive funding. The CSC grant program will provide 50/50 matching grants for eligible projects. It offers free technical support on energy and climate and guidance tailored to New York State communities. Funding is available for the following:

- Implementation projects that advance climate adaptation and mitigation actions, including the following:
    - Construction of natural resiliency measures
    - Relocation or retrofit of climate-vulnerable facilities
    - Conservation or restoration of riparian areas and tidal marsh migration areas
    - Reduction of flood risk
    - Clean transportation
    - Reduction or recycling of food waste
- Certification projects that advance actions aligned with CSC certification requirements, including the following:
    - Right-sizing government fleets
    - Developing natural resource inventories
    - Conducting vulnerability assessments
    - Developing climate adaptation strategies
    - Updating hazard mitigation plans to address changing conditions and reduce climate vulnerability

As of July 2024, 422 communities have committed to acting on climate through the CSC program. In Yates County, two communities participate in the program:

- County of Yates – No current rating
- Village of Dundee – No current rating

Environmental Protection Fund

New York State's Environmental Protection Fund (EPF) is a source of funding for capital projects that protect the environment and enhance communities. Capital projects are usually large projects that purchase land or construct facilities. Most projects that receive grants of EPF money combine it with other funding sources that require matching funds.

The EPF also supports the stewardship of public lands, including state parks and millions of acres of public lands throughout the state. Through partnerships with volunteer organizations, state agencies use stewardship funding to manage trails and lands, protect natural resources, preserve wildlife habitats, make critical capital improvements at parks and campgrounds, educate students about conservation, and provide access to persons with disabilities.

Volunteer Fire Assistance Grants

This 50/50 matching funds program makes funds available to rural fire companies for the purchase of wildland firefighting equipment such as portable backpack pumps, Nomex protective clothing, hand tools, hard hats, hoses, portable radios, and dry hydrants.

Wastewater Infrastructure Engineering Planning Grant

The Wastewater Infrastructure Engineering Planning Grant assists municipalities with the engineering and planning costs of CWSRF-eligible water quality projects. Eligibility for municipalities is based on median household income as follows:

- Median household income of $65,000 or less in the Regional Economic Development Council (REDC) regions of Capital District, Southern Tier, North Country, Mohawk Valley, Central New York, Finger Lakes, or Western New York (Jefferson County is located in the North Country region)
- Median household income of $85,000 or less in REDC regions of Long Island, New York City, or Mid-Hudson

Grants with a 20 percent required local match could finance activities, including engineering and consultant fees for engineering and planning services to produce an engineering report. Funding priorities go to projects that have one of the following qualities:

- Required by an executed order on consent
- Required by a draft or final State Pollutant Discharge Elimination System permit
- Upgrading or replacing an existing wastewater system
- Constructing a wastewater treatment and/or collection system for an area with failing onsite septic systems
- Identified in a total maximum daily load implementation plan

The goal of the Engineering Planning Grant program is to advance water quality projects to construction, so successful applicants can use the engineering report funded by the grant to seek financing through the CWSRF program, Water Quality Improvement Project program, or other funding entities to further pursue the identified solution. Details regarding this program can be found on the website: https://www.dec.ny.gov/pubs/81196.html.

Water Quality Improvement Project Program

The Water Quality Improvement Project (WQIP) program is a competitive reimbursement grant program that funds projects that directly address documented water quality impairments. The competitive, statewide grant program is open to local governments and not-for-profit corporations. Grant recipients may receive up to 75 percent of the project costs for high priority wastewater treatment improvement, non-agricultural nonpoint source abatement and control, land acquisition for source water protection, aquatic habitat restoration, and municipal separate storm sewer system projects; up to 50 percent for salt storage projects; and up to 40 percent for general wastewater infrastructure improvement projects. Eligible activities include (NYSDEC n.d.):

- Wastewater treatment improvement
- Non-agricultural nonpoint source abatement and control
- Land acquisition for source water protection
- Salt storage
- Aquatic habitat restoration
- Municipal separate storm sewer systems (MS4)

New York State Department of Transportation

BRIDGE NY

The BRIDGE NY program, administered by the NYSDOT, is open to all municipal owners of bridges and culverts. Projects are awarded through a competitive process and support all phases of project development. Projects selected for funding under the BRIDGE NY Initiative are evaluated based on the resiliency of the structure, including such factors as hydraulic vulnerability and structural resiliency; the significance and importance of the bridge, including traffic volumes, detour considerations, number and types of businesses served, and impacts on commerce; and the current bridge and culvert structural conditions. Information regarding the program can be found on the following website: https://www.dot.ny.gov/BRIDGENY.

New York State Division of Homeland Security and Emergency Services

The New York State Emergency Services Revolving Loan

The New York State Emergency Services Revolving Loan Account was established under the State Finance Law to make loans to cities, villages, fire districts, counties, towns, and not-for-profit fire/ambulance corporations at an annual fixed interest rate of 2.5 percent. The loan supports the repair of firefighting apparatus, ambulances, or rescue vehicles and the renovation, rehabilitation, or repair of facilities that house firefighting equipment, ambulances, rescue vehicles, and related equipment. Principal and interest payments made by recipients are deposited in the revolving loan account and loaned once again to new applicants. Therefore, funding levels in the account vary throughout the year depending upon the amount of repayment money, interest accrued, and number of new loans made.

New York State Office of Parks, Recreation, and Historic Preservation

Recreational Trails Grant Program

The Recreational Trails Program (RTP) provides funds to the States to develop and maintain recreational trails and trail-related facilities for both nonmotorized and motorized recreational trail uses. The RTP is an assistance program of the U.S. Department of Transportation's Federal Highway Administration (FHWA). In New York State, the RTP is administered by the Office of Parks, Recreation and Historic Preservation (OPRHP).

The RTP legislation requires that States use 30% of funds for non-motorized recreation, 30% for motorized recreation, and 40% for diverse recreational trail use.

Part 4: Mitigation Strategy

20. MITIGATION STRATEGY

This chapter presents mitigation strategies to reduce potential vulnerability and losses identified as concerns for Yates County in the risk assessment portion of this plan. The Steering Committee reviewed the risk assessment and capability assessment to identify and develop these mitigation strategies.

Hazard mitigation reduces the potential impacts of, and costs associated with, emergency and disaster-related events. Mitigation actions address a range of impacts, including impacts on the population, property, the economy, and the environment.

Mitigation actions can include activities such as revisions to land-use planning, training and education, and structural and nonstructural safety measures.

20.1 PAST MITIGATION ACCOMPLISHMENTS

Yates County, through previous and ongoing hazard mitigation activities, has demonstrated that it is proactive in protecting its physical assets and citizens against losses from natural hazards. Examples of previous and ongoing actions and projects include the following:

- The County facilitated the development of the original Yates County HMP. The current planning process represents the required five-year plan update process, which includes the participation of 12 jurisdictions in the County, along with key County and regional stakeholders.
- All municipalities participating in this HMP update participate in the National Flood Insurance Program (NFIP), which requires the adoption of FEMA floodplain mapping and certain minimum standards for building within the floodplain.
- Reports, plans, and studies relating to or including information on natural hazards or natural hazard policies affecting Yates County have been reviewed and incorporated into this plan update as appropriate, as discussed in Chapter 2 (Planning Process) and References.

20.2 UPDATE OF MITIGATION GOALS AND OBJECTIVES

Hazard mitigation goals and objectives for reducing long-term vulnerabilities to identified hazards were reviewed and revised as appropriate or this HMP update. For the purposes of this plan, goals and objectives are defined as follows:

"The hazard mitigation strategy shall include a description of mitigation goals to reduce or avoid long-term vulnerabilities to the identified hazards."

44 CFR 201.6(c)(3)(i)

- **Goals** are general guidelines that explain what is to be achieved. They are usually broad, long-term, policy-type statements and represent global visions. Goals help define the benefits that the plan is trying to achieve. The success of the plan, once implemented, should be measured by the degree to which its goals have been met (that is, by the actual benefits in terms of hazard mitigation).
- **Objectives** are short-term aims that form a strategy or course of action to meet a goal. Unlike goals, objectives are stand-alone measurements of the effectiveness of a mitigation action. The objectives also are used to help establish priorities. Broadly defined mitigation objectives were eliminated from the updated strategy unless accompanied by discrete actions.

Goals were selected to be compatible with those in other County and local community planning documents. The goals and objectives included in this plan were developed based in part on a review of the hazard mitigation goals and objectives established in the 2023 NYS HMP, the 2020 Yates County HMP, and the current or expired municipal hazard mitigation plans within the county.

Table 20-1 presents the updated hazard mitigation planning goals and objectives for this plan update. Changes are indicated by italicized font.

20.3 MITIGATION STRATEGY DEVELOPMENT AND UPDATE

20.3.1 Update of Local Jurisdiction Mitigation Strategies

Review of Previous Actions

FEMA defines ***mitigation actions*** as actions that help to achieve the mitigation goals and objectives.

To evaluate progress on local mitigation actions, each participating jurisdiction was provided with a Mitigation Action Plan Review Worksheet, pre-populated with the actions identified for their jurisdiction in the prior plan. The participating jurisdictions were asked to indicate the status of each action ("No Progress," "In Progress," "Continuous," "Completed," "Discontinued"). They were requested to provide comments to quantify the extent of progress and provide reasons for the level of progress or why actions were discontinued. This information is included in the jurisdictional annexes.

Mitigation actions identified as "Complete" or "Discontinued" have been removed from the participating jurisdictions' updated mitigation strategies. Actions identified as "No Progress" or "In Progress" have been carried forward in their local updated mitigation strategies. Participating jurisdictions were asked to provide further details on these projects to help better define the projects, identify benefits and costs, and improve implementation.

Table 20-1. Yates County Hazard Mitigation Plan Goals and Objectives

Goals	
Goal 1	Reduce the likelihood and impacts of hazards on life, property, and the environment.
Goal 2	Protect life, property, critical infrastructure *and community lifelines*, the environment, and the economy from hazard impacts.
Goal 3	Educate the public, officials, and other stakeholders about the hazards they face and what can be done to mitigate hazard impacts.
Goal 4	*Reduce the risk of natural hazards for socially vulnerable populations.*
Goal 5	*Address long-term vulnerabilities from high-hazard dams.*
Objectives	
Objective 1	Develop and/or update local regulations based on current information and best practices.
Objective 2	Maintain natural systems to reduce the impacts of hazards.
Objective 3	Acquire, retrofit, or relocate structures from flood-prone areas.
Objective 4	Retrofit critical infrastructure to protect against hazard impacts.
Objective 5	Enhance stormwater management infrastructure.
Objective 6	Ensure that critical facilities can continue to function during and after hazard impacts.
Objective 7	Encourage residents and business owners to insure their property against hazard impacts, including flood insurance through the national Flood Insurance Program.
Objective 8	Work with legislators to develop and enact legislation that reduces long-term vulnerability to hazards.
Objective 9	Ensure that local officials attend current training on regulatory issues and best practices.
Objective 10	Provide information to individuals throughout the county on the hazards they face and what property protection measures they can take.
Objective 11	*Encourage the establishment of policies to help ensure the prioritization and implementation of mitigation actions and/or projects designed to benefit socially vulnerable populations and underserved communities.*
Objective 12	*Ensure dam infrastructure is maintained.*
Objective 13	*Support the identification and access to funding to repair/rehabilitate/replace dams.*
Objective 14	*Ensure emergency action plans are developed and updated.*

Certain continuous or ongoing actions (Ongoing Capabilities) from the previous plan that represent programs that are now fully integrated into the normal operational and administrative framework of the community are identified in the capabilities assessment of each annex and removed from the updated mitigation strategy (marked as "Discontinued").

Identifying New Actions

At the kickoff meeting and during subsequent local level planning meetings, all participating jurisdictions were further surveyed to identify completed mitigation actions, in progress actions, or ongoing capabilities, as well as potential new actions. Communities also were made aware of potential new mitigation actions as such actions that became evident during the plan update process (e.g., through the capability assessment, risk assessment, or the public and stakeholder outreach process).

Developing the Overall Strategy

Beginning in January 2024, members of the Steering Committee and contract consultants worked directly with each jurisdiction (by phone, email, or virtual meetings) to update their annex with mitigation strategies that focus on well-defined, implementable projects that meet the definition or characteristics of mitigation. Mitigation actions were selected with a careful consideration of benefits (risk reduction, losses avoided), costs, and possible funding sources (including mitigation grant programs).

Three annex support meetings were held for participating jurisdictions to assist in the development of additional actions, foster collaboration between neighboring jurisdictions for mitigation actions, discuss actions that involve cooperation between the County and jurisdictions, and identify steps needed to complete the jurisdictional annexes.

Addressing Known Vulnerabilities

To help support the selection of an appropriate risk-based mitigation strategy, each annex includes a summary of hazard vulnerabilities. These were identified during the plan update process by planning partner representatives, through review of available plans and reports, or through the hazard profiling and risk assessment process.

A mitigation strategy workshop was conducted on May 30, 2024, for all participating jurisdictions to support the development of focused problem statements based on the impacts of natural hazards in the County and their communities. These problem statements provide a detailed description of a problem area, including its impacts on the jurisdiction; past damage; loss of service; etc. An effort was made to include the street address of the problem location, adjacent streets, water bodies, and well-known structures as well as a brief description of existing conditions (topography, terrain, hydrology) of the site. These problem statements form a bridge between the hazard risk assessment, which quantifies impacts on each community, and the development of actionable mitigation strategies.

Incorporating a Range of Action Types

Concerted efforts were made to ensure that participating jurisdictions develop updated mitigation strategies that cover the range of mitigation action types described in recent FEMA planning guidance (FEMA “Local Mitigation Planning Handbook” March 2013):

- **Local Plans and Regulations**—These actions include government authorities, policies or codes that influence the way land and buildings are developed and built.

- **Structure and Infrastructure Projects**—These actions involve modifying existing structures and infrastructure to protect them from a hazard or remove them from a hazard area. This could apply to public or private structures as well as community lifelines and other critical facilities. This type of action also involves projects to construct structures to reduce the impact of hazards.
- **Natural Systems Protection**—These are actions that minimize damage and losses to natural systems and preserve or restore their functions.
- **Education and Awareness Programs**—These are actions to inform and educate citizens, elected officials, and property owners about hazards and potential ways to mitigate them. These actions may also include participation in national programs, such as the NFIP, Community Rating System (CRS), StormReady (NOAA), and Firewise Communities (NFPA).

Efforts were also made to develop mitigation strategies that cover the range of mitigation action types described in recent CRS guidance (FEMA 2018d):

- **Preventive Measures**—Government, administrative or regulatory actions or processes that influence the way land and buildings are developed and built. Examples include planning and zoning, local floodplain laws, capital improvement programs, open space preservation, and stormwater management regulations.
- **Property Protection**—Public activities to reduce hazard losses or actions that involve modification of existing structures to protect them from a hazard or removal of the structures from the hazard area. Examples include acquisition, elevation, relocation, structural retrofits, storm shutters, and shatter-resistant glass.
- **Public Information**—Actions to inform and educate citizens, elected officials, and property owners about hazards and potential ways to mitigate them. Such actions include outreach projects, real estate disclosure, hazard information centers, and educational programs for school-age children and adults.
- **Natural Resource Protection**—Actions that minimize hazard loss and preserve or restore the functions of natural systems. These actions include sediment and erosion control, stream corridor restoration, watershed management, forest and vegetation management, and wetland restoration and preservation.
- **Structural Flood Control Projects**—Actions that involve the construction of structures to reduce the impact of a hazard. Such structures include dams, setback levees, floodwalls, retaining walls, and safe rooms.
- **Emergency Services**—Actions that protect people and property during and immediately following a disaster or hazard event. Services include warning systems, emergency response services, and the protection of essential facilities

Protecting Critical Facilities

Planning partner mitigation actions that address vulnerable critical facilities have been proposed in consideration of protection against 500-year events or worst-case scenarios. However, in the case of projects funded through federal mitigation programs, the level of protection may be influenced by cost-effectiveness as determined through a formal benefit-cost analysis. In the case of "self-funded" projects, local jurisdiction discretion must be recognized. Further, it must be recognized that the County and jurisdictions have limited authority with regard to mitigation at any level of protection over privately owned critical facilities.

Accounting for Climate Change

As discussed in the hazard profiles in this HMP, the long-term effects of climate change are anticipated to exacerbate the impacts of weather-related hazards (e.g., flood and severe storm). Communities are working to evaluate and recognize these long-term implications and to incorporate their mitigation strategies into planning and capital improvement updates.

20.3.2 Update of County Mitigation Strategy

The update of the County-level mitigation strategies included a review of progress on the actions identified in the 2020 HMP using a process similar to that used to review local jurisdiction mitigation strategy progress. The County, through various department representatives, was provided with a Mitigation Action Plan Review Worksheet identifying all County-level actions from the 2020 plan. The County reviewed each action and provided information on its progress. Relevant County representatives were asked to indicate the status of each action (No Progress, In Progress, Ongoing, Completed, or Discontinued), and provide review comments on each.

Actions identified as "Complete" or "Discontinued" have been removed from this plan update. Actions the County has identified as "No Progress," "In Progress," or "Ongoing" have been carried forward in the County's updated mitigation strategy.

Additional regional and County-level mitigation actions were identified by the following processes:

- Review of the results and findings of the updated risk assessment
- Review of available regional and County plans, reports, and studies
- Direct input from County departments and other regional agencies, including:
    - Office of Emergency Services
    - Department of Planning
    - Department of Public Works and Transportation
    - Department of Environmental Facilities (Wastewater, Solid Waste)

  - Department of Parks, Recreation and Conservation
  - Department of Information Technology
  - Department of Social Services
  - Department of Health
- Input received through the public and stakeholder outreach process

As discussed in the hazard profiles in this HMP, the long-term effects of climate change are anticipated to exacerbate the impacts of weather-related hazards (e.g., flood and severe storm). The County has included mitigation actions, including continuing and long-term planning and emergency management support, to address these long-term implications and potential impacts.

Various County departments and agencies included mitigation actions to address vulnerable critical facilities. These actions were proposed in consideration of protection against 500-year events, or worst-case scenarios. In the case of projects being funded through federal mitigation programs, the level of protection can be influenced by cost-effectiveness, as determined through a formal benefit-cost analysis. In the case of "self-funded" projects, local government authority can affect the ability to implement. The County has limited authority over privately owned critical facility owners regarding mitigation at any level of protection.

20.3.3 Mitigation Best Practices

Catalogs of hazard mitigation best practices were developed that present a broad range of alternatives to be considered for use in the mitigation strategies, in compliance with 44 CFR Section 201.6(c)(3)(ii). One catalog was developed for each hazard of concern evaluated in this plan. The catalogs present alternatives that are categorized in two ways:

- By who would have responsibility for implementation:
  - Individuals—personal scale
  - Businesses—corporate scale
  - Government—government scale
- By what the alternatives would do:
  - Manipulate the hazard
  - Reduce vulnerability to the hazard
  - Reduce impacts from the hazard
  - Build local capacity to respond to or be prepared for the hazard

The alternatives include actions that will mitigate current risk from hazards and actions that will help reduce risk from changes in the impacts of these hazards resulting from climate change.

Hazard mitigation actions recommended in this plan were selected from among the alternatives presented in the catalogs.

The catalogs provide a baseline of mitigation alternatives that are backed by a planning process, are consistent with the established goals and objectives, and are within the capabilities of the participating jurisdictions to implement. Some of these actions may not be feasible based on the selection criteria identified for this plan. The purpose of the catalogs was to provide a list of what could be considered to reduce risk from natural hazards within the planning area. Actions in the catalog that are not included for the partnership's mitigation strategy were not selected for one or more of the following reasons:

- The action is not feasible
- The action is already being implemented
- There is an apparently more cost-effective alternative
- The action does not have public or political support.

The catalogs are included in Appendix I.

20.3.4 Mitigation Strategy Evaluation and Prioritization

Federal guidelines establish how mitigation strategies are to be prioritized, implemented, and administered by local jurisdictions (44 CFR Section 201.c.3.iii). For this plan update, each mitigation strategy was prioritized using criteria suitable for evaluating hazard mitigation strategies. This method provided a systematic approach that considered the opportunities and constraints of implementing each mitigation action. The Steering Committee chose the following evaluation criteria for this process:

1. Life Safety—How effective will the action be at protecting lives and preventing injuries? Will the proposed action adversely affect one segment of the population?
2. Property Protection—How significant will the action be at eliminating or reducing damage to structures and infrastructure? For example: development in the floodplain or high-risk areas?
3. Cost-Effectiveness—Are the costs to implement the action commensurate with the benefits achieved?
4. Political—Is there overall public support for the action? Is there the political will to support it? Is the action at odds with development pressures?
5. Legal—Does the jurisdiction have the authority to implement the action?

6. Fiscal—Can the action be funded under existing program budgets (i.e., is this action currently budgeted for)? Or would it require a new budget authorization or funding from another source such as grants?
7. Environmental—What are the potential environmental impacts of the action? Will it comply with environmental regulations? Are there co-benefits of this action?
8. Social Vulnerability—Does the action benefit socially vulnerable populations and underserved communities? Additional considerations can include appropriate numerical measures of social vulnerability.
9. Administrative—Does the jurisdiction have the personnel and administrative capabilities to implement the action and maintain it or will outside help be necessary? Does the scale and scope of the action align with the jurisdiction's capabilities?
10. Hazards of Concern—Does the action address one or more of the jurisdiction's high-ranked hazards?
11. Climate Change—Does the action incorporate climate change projections? Is the action designed to withstand/address long-term conditions?
12. Timeline—Can the action be completed in less than five years?
13. Community Lifelines—Does the action benefit community lifelines?
14. Other Local Objectives—Does the action advance other local objectives, such as capital improvements, economic development, environmental quality, or open space preservation? Does it support the policies of other plans and programs?

Participating jurisdictions were asked to use these criteria to prioritize their identified mitigation actions. For each mitigation action, the jurisdictions assigned a numeric score for each of the evaluation criteria:

- 1 = Highly effective or feasible
- 0 = Neutral
- -1 = Ineffective or not feasible

Jurisdictions were asked to provide a brief summary of the rationale behind the numeric rankings assigned. The numerical results were totaled and then used by each jurisdiction to help prioritize the action or strategy as *low*, *medium*, or *high*. Actions that had a total score between 0 and 6 were categorized as *low priority*; actions with total scores between 7 and 10 were categorized as *medium priority*; and actions with total scores between 11 and 14 were categorized as *high priority*. While this provided a consistent, systematic methodology to support the evaluation and prioritization of mitigation actions, jurisdictions may have additional considerations that could influence their overall prioritization of mitigation actions.

Some jurisdictions may be carrying forward mitigation actions from prior mitigation strategies that were prioritized using a different approach. Mitigation actions in a number of the existing and prior Yates County municipal HMPs were prioritized according to the following criteria:

- **High Priority—**A project that meets multiple plan goals and objectives, benefits exceed cost, has funding secured under existing programs or authorizations, or is grant-eligible, and can be completed in 1 to 5 years (short-term project) once project is funded.
- **Medium Priority—**A project that meets at least one plan goal and objective, benefits exceed costs, funding has not been secured and would require a special funding authorization under existing programs, grant eligibility is questionable, and can be completed in 1 to 5 years once project is funded.
- **Low Priority—**A project that will mitigate the risk of a hazard, benefits exceed costs, funding has not been secured, and project is not grant-eligible and/or timeline for completion is considered long-term (5 to 10 years).

It is reasonable to assume that all evaluation and prioritization approaches included similar considerations (e.g. mitigation effectiveness, technical and administrative feasibility, cost-effectiveness, etc.). At their discretion, jurisdictions carrying forward prior actions were encouraged to re-evaluate their priority, particularly if conditions that would affect the prioritization criteria had changed. Where communities have determined that their original priority ranking for "carry forward" initiatives remained valid, their earlier priority ranking is indicated on the prioritization table. In those cases, the plan update criteria ratings are indicated with a dash (—).

For the plan update there has been an effort to develop more clearly defined and action-oriented mitigation strategies. These local strategies include actions that are seen by the community as the most effective approaches to advance their local mitigation goals and objectives within their capabilities. As such, many of the initiatives in the updated mitigation strategy were ranked as "high" or "medium" priority, as reflective of the community's clear intent to implement, available resources not-withstanding. In general, actions that would have had "low" priority rankings were screened out during the local action evaluation process.

20.3.5 Benefit/Cost Review

Federal regulations require the prioritization of the mitigation strategy to emphasize the extent to which benefits are maximized according to a benefit/cost review of the proposed projects (44 CFR Section 201.6.c.3iii). For all actions identified in the local strategies, jurisdictions identified the associated costs and benefits as follows:

- **Costs** include the total project estimation. This can include administrative, construction (engineering, design, and permitting), and maintenance costs.

- **Benefits** are the savings from losses avoided due to project implementation. These can include life safety, structure and infrastructure damage, loss of service or function, and economic and environmental losses.

When possible, jurisdictions were asked to identify the actual or estimated dollar costs and associated benefits. Where estimates of costs and benefits were available, the ratings were defined follows:

Low < = $10,000 Medium = $10,000 to $100,000 High > = $100,000

Often numerical costs and/or benefits were not identified and may be impossible to quantify. In this case, jurisdictions were asked to evaluate project cost-effectiveness using qualitative *high*, *medium*, and *low* ratings based on the definitions in Table 20-2. Using this approach, projects with positive benefit versus cost ratios (such as high over high, high over medium, medium over low, etc.) are considered cost-effective.

Table 20-2 Qualitative Cost and Benefit Ratings

Costs	
High	Existing funding levels are not adequate to cover the costs of the proposed project, and implementation would require an increase in revenue through an alternative source (e.g., bonds, grants, and fee increases).
Medium	The project could be implemented with existing funding but would require a re-apportionment of the budget or a budget amendment, or the cost of the project would have to be spread over multiple years.
Low	The project could be funded under the existing budget. The project is part of or can be part of an existing, ongoing program.
Benefits	
High	Project will have an immediate impact on the reduction of risk exposure to life and property.
Medium	Project will have a long-term impact on the reduction of risk exposure to life and property or will provide an immediate reduction in the risk exposure to property.
Low	Long-term benefits of the project are difficult to quantify in the short-term.

For some of the Yates County actions identified, the Planning Partnership may seek financial assistance under FEMA's Hazard Mitigation Assistance programs. These programs require detailed benefit/cost analysis as part of the application process. The benefit/cost review applied for the prioritization of actions in this update did not include the level of detail required by FEMA for project grant eligibility under Hazard Mitigation Assistance grant programs. These analyses will be performed when funding applications are prepared, using FEMA's Benefit-Cost Analysis model.

The Planning Partnership is committed to implementing mitigation strategies with benefits that exceed costs. For projects not seeking financial assistance from grant programs that require this sort of analysis, the Planning Partnership reserves the right to define benefits according to parameters that meet its needs and the goals and objectives of this plan.

Part 5: Plan Maintenance

21. PLAN MAINTENANCE AND IMPLEMENTATION PROCEDURES

This chapter details the formal process that will ensure that the HMP remains an active and relevant document and that the Planning Partnership maintains its eligibility for applicable funding sources. The plan maintenance process includes a schedule for monitoring and evaluating the plan annually and producing an updated plan every five years. In addition, this chapter describes how public participation will be integrated throughout the plan maintenance and implementation process. It explains how the mitigation strategies outlined in this plan update will be incorporated into existing planning mechanisms and programs, such as comprehensive land use planning processes, capital improvement planning, and building code enforcement and implementation.

21.1 HMP COORDINATOR AND JURISDICTION POINTS OF CONTACT

An HMP Coordinator is assigned to manage the maintenance and update of the plan during its approval period (the five-year period between FEMA's approval of the plan and its expiration), with the following responsibilities:

- Convene the Planning Partnership
- Be the prime point of contact for questions regarding the plan and its implementation
- Coordinate the incorporation of additional information into the plan.
- Manage the monitoring, evaluation, and updating responsibilities identified in this section.

Currently, the Yates County HMP Coordinator is designated as:

Diane DiFabio, Deputy Director
Yates County Office of Emergency Services
227 Main Street
Penn Yan, NY 14527
(315)-536-3000
Email: dcaves@yatescounty.org

Primary and secondary mitigation planning representatives (points of contact) are identified in each jurisdictional annex in Volume II. It will be the responsibility of each jurisdiction and its representatives to inform the HMP Coordinator of any changes in representation.

21.2 MAINTENANCE AND IMPLEMENTATION TASKS

The procedures for monitoring, evaluating, and updating the plan are provided below. The plan maintenance matrix shown in Table 21-1 provides a synopsis of responsibilities for plan monitoring, integration, evaluation, and update, which are discussed in further detail in the sections below.

Table 21-1. Plan Maintenance Matrix

Task	Approach	Timeline	Lead Responsibility	Support Responsibility
Monitoring	Planning Partners will prepare status updates and track action implementation as part of the development of annual progress reports.	January or upon major update to comprehensive plan or major disaster	Jurisdictional points of contact identified in Volume II	Jurisdictional implementation lead identified in Volume II
Integrating	In order for integration of mitigation principles action to become an organic part of ongoing county and municipal activities, the county will distribute the safe growth worksheet (see 7.1.2 below) for annual review and update by all participating jurisdictions.	January each year with interim email reminders to address integration in county and municipal activities.	Jurisdictional points of contact identified in Volume II	HMP Coordinator
Evaluating	Planning Partners will review the status of previous actions as submitted by the monitoring task lead to assess the effectiveness of the plan; and then compile and finalize the annual progress report	Finalized progress report completed by January 15 of each year	Steering Committee; Plan Maintenance element	Jurisdictional points of contacts identified in Volume II
Updating	Planning Partners will reconvene to guide a comprehensive update to review and revise the plan within 5 years.	Every 5 years or upon major update to comprehensive plan or major disaster	HMP Coordinator	Jurisdictional points of contacts identified in Volume II
Grant Monitoring	Notify Planning Partners about grant opportunities, maintain a list of eligible jurisdiction-specific projects for funding consideration, and notify Planning Partners of fiscal year mitigation priorities.	Continuously and as grant opportunities are identified	HMP Coordinator	Jurisdictional points of contacts identified in Volume II
Public Involvement	Maintain the HMP, inform the public of hazard events via social media outlets, promote educational workshops on hazard topics, and track and file public comments received regarding the HMP.	Continuously	HMP Coordinator and jurisdictional points of contact identified in Volume II	Alternate jurisdictional points of contact

21.2.1 Monitoring

The Planning Partnership will be responsible for monitoring and documenting annual progress on the plan. Each year, beginning one year after plan development, Yates County and local Planning Partnership representatives will collect and process information from the persons responsible for initiating or overseeing the mitigation actions in each department, agency, and organization involved in implementing mitigation actions identified in their jurisdictional annexes. In the first year of the approval period, this will be accomplished using an online performance progress reporting system (the BATool℠), which will enable each planning partner to:

- Directly access mitigation actions
- Easily update the status of each project
- Document successes or obstacles to implementation
- Add or delete projects to maintain mitigation strategy implementation

Participating jurisdictions will be prompted by the tool to update progress on a quarterly basis, providing an incentive for them to refresh their mitigation strategies and to continue implementation of actions. This reporting system facilitates the sorting and prioritization of projects and will support the submittal of an increased number of project grant fund applications. Planning Partnership representatives will be expected to document the following:

- Progress on the implementation of mitigation actions
- Obstacles or impediments to implementation of actions
- Any grant applications filed on behalf of any of the participating jurisdictions
- Hazard events and losses occurring in their jurisdiction
- Additional mitigation actions believed to be appropriate and feasible
- Public and stakeholder input.

Plan monitoring for years 2 through 4 of the approval period will be addressed via the BATool℠ or manually.

21.2.2 Integrating the HMP into Municipal Planning Mechanisms

Effective mitigation is achieved when hazard awareness and risk management approaches and strategies become an integral part of public activities and decision-making. Within the County, there are many existing plans and programs that support hazard risk management, and it is critical that this HMP integrate and coordinate with and complement those existing plans and programs. Integrating hazard mitigation into a community's existing plans, policies, codes, and programs leads to development patterns or redevelopment that reduce risk from known hazards.

Planning Partnership representatives will incorporate mitigation planning as an integral component of daily government operations. They will work with local government officials to integrate the newly adopted hazard mitigation goals and actions into the general operations of government and partner organizations. By doing so, the Planning Partnership anticipates that:

- Hazard mitigation planning will be formally recognized as an integral part of overall emergency management efforts.
- The HMP, comprehensive plans, emergency management plans and other relevant planning mechanisms will become mutually supportive documents that work in concert to meet the goals and needs of county residents.

Planning processes to be coordinated with the recommendations of the HMP include the following:

- Emergency response plans
- Training and exercise of emergency response plans
- Debris management plans
- Recovery plans
- Capital improvement programs
- Municipal codes
- Community design guidelines
- Water-efficient landscape design guidelines
- Stormwater management programs
- Water system vulnerability assessments
- Community wildfire protection plans
- Comprehensive flood hazard management plans
- Resiliency plans
- Community Development Block Grant Disaster Recovery action plans
- Public information and improved public participation
- Educational programs
- Continued interagency coordination

During the HMP annual review process, participating jurisdictions will be asked to document how they are utilizing and incorporating the HMP into their day-to-day operations and planning and regulatory processes. Each municipality will also identify additional policies, programs, practices, and procedures that could be modified to accommodate hazard mitigation actions and include these findings and recommendations in the annual HMP progress report.

The checklist in Table 21-2, adapted from FEMA's 2013 Local Mitigation Handbook, will help a community identify areas that currently integrate hazard mitigation and where to make improvements and reduce vulnerability to future development.

Table 21-2. Safe Growth Check List

Planning Mechanisms	Yes	No	How is it being done or how will this be utilized in the future?
Operating, Municipal, and Capital Improvement Program Budgets			
When constructing upcoming budgets, are hazard mitigation actions funded as budget allows?			
Are construction projects evaluated to see if they meet the hazard mitigation goals?			
Does the municipality review mitigation actions when allocating funding during annual budget adoption processes?			
Do budgets limit expenditures on projects that would encourage development in areas vulnerable to natural hazards?			
Do infrastructure policies limit extension of existing facilities and services that would encourage development in areas vulnerable to natural hazards?			
Do budgets provide funding for hazard mitigation projects identified in the HMP?			
Human Resource Manual			
Do any job descriptions specifically include identifying and/or implementing mitigation projects/actions or other efforts to reduce natural hazard risk?			
Building and Zoning Ordinances			
Prior to zoning changes or development permitting, does the municipality review the HMP and other hazard analyses to ensure consistent and compatible land use?			
Does the zoning ordinance discourage development or redevelopment within natural areas, including wetlands, floodways, and floodplains?			
Does the zoning ordinance contain natural overlay zones that set conditions?			
Does the zoning ordinance require developers to take additional actions to mitigate natural hazard risk?			
Do rezoning procedures recognize natural hazard areas as limits on zoning changes that allow greater intensity or density of use?			

Planning Mechanisms	Yes	No	How is it being done or how will this be utilized in the future?
Does the zoning ordinance prohibit development within or filling of wetlands, floodways, and floodplains?			
Subdivision Regulations			
Do the subdivision regulations restrict the subdivision of land within or adjacent to natural hazard areas?			
Do the regulations provide for conservation subdivisions or cluster subdivisions in order to conserve environmental resources?			
Do the regulations allow density transfers where hazard areas exist?			
Comprehensive Plan			
Are the goals and policies of the plan related to those of the HMP?			
Does the future land use map clearly identify natural hazard areas?			
Does the plan provide adequate space for expected future growth in areas located outside natural hazard areas?			
Land Use			
Does the future land use map clearly identify natural hazard areas?			
Do the land use policies discourage development or redevelopment in natural hazard areas?			
Transportation Plan			
Does the transportation plan limit access to hazard areas?			
Is transportation policy used to guide growth to safe locations?			
Are transportation systems designed to function under disaster conditions (e.g., evacuation)?			
Environmental Management			
Are environmental systems that protect development from hazards identified and mapped?			
Do environmental policies maintain and restore protective ecosystems?			
Do environmental policies provide incentives to development located outside protective ecosystems?			
Grant Applications			
Are data and maps used as supporting documentation in grant applications?			
Municipal Ordinances			
Is hazard mitigation a priority when updating municipal ordinances?			
Economic Development			
Does the local economic development group take into account information regarding identified hazard areas when assisting new businesses in finding a location?			

Planning Mechanisms	Yes	No	How is it being done or how will this be utilized in the future?
Public Education and Outreach			
Does the municipality have any public outreach mechanisms/ programs in place to inform citizens on natural hazards, risk, and ways to protect themselves during such events?			

21.2.3 Evaluating

Evaluation of the mitigation plan is an assessment of whether the planning process and actions have been effective, whether the HMP goals are being achieved, and whether changes are needed. The HMP Coordinator will consult with the Planning Partnership members to evaluate the effectiveness of the plan implementation and to identify changes that could affect mitigation priorities or available funding.

The status of the HMP will be discussed and documented at an annual Planning Partnership plan review meeting to be held either in person or via teleconference approximately one year from the date of local adoption of this update and annually thereafter. The HMP Coordinator will be responsible for calling participants and coordinating the annual plan review meeting and soliciting input regarding progress toward meeting plan goals and objectives. At least two weeks before the annual plan review meeting, the HMP Coordinator will advise Planning Partnership members of the meeting date, agenda, and expectations of the members. These evaluations will assess whether:

- Goals and objectives address current and expected conditions
- The nature or magnitude of the risks has changed
- Current resources are appropriate for implementing the HMP and if different or additional resources are now available
- Actions were cost effective
- Schedules and budgets are feasible
- Implementation problems are present, such as technical, political, legal, or coordination issues with other agencies
- Outcomes have occurred as expected
- Changes in local resources impacted plan implementation (e.g., funding, personnel, and equipment)
- New agencies, departments, and staff are included, involving other local governments as defined under 44 CFR 201.6.

The Planning Partnership will review the mitigation goals, objectives, and activities using performance-based indicators, including:

- New agencies/departments
- Project completion
- Underspending/overspending
- Achievement of the goals and objectives
- Resource allocation
- Timeframes
- Budgets
- Lead/support agency commitment
- Resources
- Feasibility

The Planning Partnership will evaluate how other programs and policies have conflicted with or augmented planned or implemented mitigation actions and will identify policies, programs, practices, and procedures that could be modified to accommodate hazard mitigation actions. Other programs and policies can include those that address:

- Economic development
- Environmental preservation
- Historic preservation
- Redevelopment
- Health and safety
- Recreation
- Land use and zoning
- Public education and outreach
- Transportation

The Planning Partnership should refer to evaluation forms in the FEMA 386-4 guidance document to assist in the evaluation process (Worksheets #2 and #4; see Appendix F – Plan Maintenance Tools). Further, the Planning Partnership should refer to any process and plan review deliverables developed by the County or participating jurisdictions as a part of the plan review processes established for prior or existing local HMPs within the county.

The HMP Coordinator will be responsible for preparing an annual HMP progress report for each year of the approval period based on the information provided by the participating jurisdictions and other information as appropriate. These annual reports will provide data for the five-year update of this HMP and will assist in pinpointing any implementation challenges. By monitoring the implementation of the HMP, the Planning Partnership will be able to assess which actions are completed, which are no longer feasible, and which require additional funding.

Following any major disasters, the HMP will be evaluated and revised to determine if the recommended actions remain relevant and appropriate. The risk assessment will also be revisited to see if any changes are necessary based on the pattern of disaster damage or if data listed in the hazard profiles of this plan has been collected to facilitate the risk assessment. This is an opportunity to increase the community's disaster resistance and build a better and stronger community.

21.2.4 Updating

Federal regulations require that communities review, revise, and resubmit local hazard mitigation plans to remain eligible for certain federal funding opportunities (44 CFR 201.6.d.3). The Yates County HMP Planning Partnership will update this plan within five years from the date of initial plan adoption.

The HMP Coordinator, with support of the Planning Partnership, will use the second annual Planning Partnership meeting to develop and commence the implementation of a detailed plan update program. Prior to the five-year update, the HMP Coordinator will invite representatives from the New York State Division of Homeland Security and Emergency Services to provide guidance on plan update procedures. At a minimum, this will establish who will be responsible for managing and completing the plan update effort, items that need to be included in the updated plan, and a detailed timeline with milestones to ensure that the update is completed according to regulatory requirements. This meeting will determine what resources will be needed to complete the update.

A draft of the updated plan will be distributed for public comment. After all comments are addressed, the HMP will be revised and distributed to all participating jurisdictions.

21.2.5 Grant Monitoring and Coordination

Yates County intends to be a resource to the Planning Partnership in the support of project grant writing and development. The degree of this support will depend on the level of assistance requested by participating jurisdictions during openings for grant applications. As part of grant monitoring and coordination, Yates County intends to provide the following:

- Notification to participating jurisdictions about impending grant opportunities

- A current list of eligible, jurisdiction-specific projects for funding pursuit consideration
- Notification about mitigation priorities for the fiscal year to assist the participating jurisdictions in the selection of appropriate projects

21.2.6 Continued Public Involvement

The participating jurisdictions are committed to the continued involvement of the public in the hazard mitigation process. This HMP update will continue to be posted online at the following link: https://www.yatescountynyhmp.com/. In addition, public outreach and dissemination of the HMP will include the following:

- Links to the plan on local websites of each jurisdiction with capability.
- Continued utilization of existing social media outlets (Facebook, X [formerly Twitter]) to inform the public of natural hazard events, such as floods and severe storms. The public can be educated via the jurisdictional websites on how these applications can be used in an emergency situation.
- Promotion of articles or workshops on hazards to educate the public and keep them aware of the dangers of hazards.

The HMP Coordinator will be responsible for receiving, tracking, and filing public comments regarding this HMP. The public will have an opportunity to comment on the plan via the hazard mitigation website at any time. The HMP Coordinator will ensure that:

- Public and stakeholder comments and input on the plan, and hazard mitigation in general, are collected, recorded, and addressed as appropriate.
- The Yates County HMP website is maintained and updated as appropriate.
- Copies of the latest approved plan are available for review at appropriate county facilities, along with instructions to facilitate public input and comment on the plan.
- Public notices, including media releases, are made (as appropriate) to inform the public of the availability of the plan, particularly during plan update cycles.

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