

EXECUTIVE SUMMARY

This Tompkins County Multi-Jurisdictional All Hazard Mitigation Plan was prepared in response to The Disaster Mitigation Act of 2000 (DMA 2000). DMA 2000 (also known as Public Law 106-390) improves the disaster planning process by increasing hazard mitigation planning requirements for hazard events. DMA 2000 requires states and local governments to prepare hazard mitigation plans to document their hazard mitigation planning process and identify hazards, potential losses, and mitigation needs, goals, and strategies. This type of planning supplements already strong disaster response, recovery, and relief capabilities.

Hazard Mitigation is any sustained action taken to reduce or eliminate the long-term risk and effects that can result from specific hazards.

FEMA defines a **Hazard Mitigation Plan** as the documentation of a state or local government's evaluation of natural hazards and the strategy to mitigate such hazards.

Tompkins County Multi-Jurisdictional Planning Process

DMA 2000 requires state to submit comprehensive all hazard mitigation plans to the Federal Emergency Management Agency (FEMA) by November 2004 to be eligible for disaster relief grant funding in the future. Local entities must also develop plans. To comply, Tompkins County and seven towns located in the county (Caroline, Danby, Enfield, Groton, Ithaca, Lansing, and Ulysses) have developed this Multi-Jurisdictional All Hazard Mitigation Plan (also to be referred to as the mitigation plan). The City of Ithaca and Towns of Dryden and Newfield have elected to complete individual mitigation plans and therefore, are not included in the assessments of this document. Once mitigation plans for all of the jurisdictions in Tompkins County are completed and approved, the jurisdictions will begin to work collaboratively to address data gaps and implement complementary mitigation actions.

To support the planning process for this all hazard mitigation plan, Tompkins County and the seven participating jurisdictions accomplished the following:

- Developed a planning group;
- Identified hazards of concern;
- Profiled and prioritized these hazards;
- Estimated inventory at risk and potential losses associated with these hazards;
- Developed mitigation strategies and goals that address the hazards that impact the area; and
- Developed mitigation plan maintenance procedures to be executed after obtaining conditional approval of the plan from the New York State Emergency Management Office (SEMO) and FEMA.

As required by DMA 2000, the participating jurisdictions and Tompkins County have informed the public about these efforts and provided opportunities for public comment and input on the planning process. In addition, several agencies and stakeholders have participated as core or support members to provide input and expertise to the planning process. This All Hazard Mitigation Plan documents the process and outcomes of the jurisdictions' mitigation planning efforts.

Tompkins County and the seven participating jurisdictions intend to incorporate mitigation planning as an integral component of daily government operations through existing processes and programs. A notice regarding the existence of the plan and the location of copies of the mitigation plan has been publicized in the *Ithaca Journal* and the plan will be posted on the Tompkins County web site and made available for review at local libraries. Updates to the plan will be similarly announced after annual plan reviews and 5-year updates. Each jurisdiction will be responsible for receiving, tracking, and filing public comments regarding this plan.

Tompkins County Mitigation Plan Adoption

To obtain plan approval, specific prerequisites for plan approval have been met by the participating partners and Tompkins County. This multi-jurisdictional mitigation plan will be reviewed and adopted by both Tompkins County and each participating jurisdiction. The signatures of the appropriate representatives will be found on page 3-2 of this plan to document formal adoption. Copies of the resolutions regarding adoption of the plan will be included as Appendix A.

Tompkins County Risk Assessment to Support Mitigation Plan

A key component of a mitigation plan is the accurate identification of risks posed by a hazard and the corresponding impacts to the community. The process of identifying hazards of concern, profiling hazard events, and conducting a vulnerability assessment is known as a risk assessment. The risk assessment portion of the mitigation planning process included the steps shown in Figure ES-1. Each of these steps is summarized below.

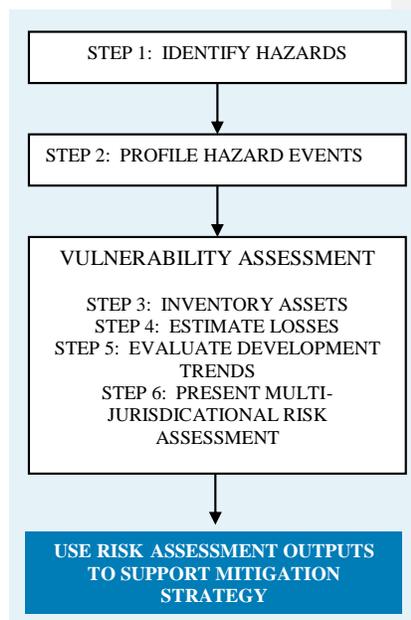
Step 1: Hazard Identification

The area considered as the study area for this risk assessment includes the Towns of Caroline, Danby, Enfield, Groton, Ithaca, Lansing, and Ulysses (Tompkins County Multi-Jurisdictional Study Area). The risk assessment process was initiated by implementation of the Hazards New York (HAZNY) analysis, a qualitative initial ranking system developed by the American Red Cross and SEMO. HAZNY is an automated interactive spreadsheet designed to evaluate hazards on a statewide scope and basis. The program interface asks specific questions about potential hazards in a community and records and evaluates the responses to these questions. HAZNY also includes historical and expert data on selected hazards. HAZNY is designed specifically for group, rather than individual use.

A full range of natural hazards was considered by the planning group. Initially, some hazards were screened out from consideration based on their low frequency of occurrence in this geographical area; for example, tsunamis and earthquakes were considered to be unlikely and of low potential impact in the area. The HAZNY screening process included consideration of 25 hazards. Some Tompkins County recognized other hazards of concern beyond those included with HAZNY and considered the following initial pool of hazards, many of which are defaults in the HAZNY program: blight, civil unrest, dam failure, drought, earthquake, epidemic, explosion, extreme temperatures, fire, flood, food shortage, hazardous material (HazMat) (fixed site), HazMat (in transit), hurricane, ice jam, ice storm, landslide, mine collapse, severe storm, structural collapse, tornado, utility failure, water supply contamination, and winter storm (severe). All geographically relevant hazards were considered and a list of 13 hazards was selected from the initial pool of hazards. Hazards retained for further evaluation included those with HAZNY scores of at least moderately low severity based on the HAZNY scoring system (i.e., the hazard scored at least 161 points out of a possible 400 using the model).

The order and grouping of the 13 hazards was re-configured by the planning group based on additional research and the professional judgment and evaluation of the planning group regarding the frequency,

Figure ES-1. Risk Assessment Process



magnitude, geographic extent, possible direct and cascading effects, impacts to critical facilities and vulnerable populations, and historic costs associated with each hazard. Two hazards, landslide and drought, were screened out at this point based on the historically low frequency of landslide events and the low financial losses associated with droughts in Tompkins County and the seven participating jurisdictions. The following list of 11 hazards of concern, in order of significance to the community, was selected for further evaluation in the mitigation plan:

- 1) Flood
- 2) Severe Winter Storm (Including Ice Storm)
- 3) Utility Failure
- 4) Severe Storm (Including Hurricane)
- 5) Epidemic (Agricultural)
- 6) Major Transportation Accident (Including HazMat Release In Transit)
- 7) Water Supply Contamination
- 8) Terrorism
- 9) Epidemic (Human)
- 10) Fire (Urban and Wild)
- 11) Civil Unrest

Of the 11 selected hazards, only one, flood, was ranked as moderately high severity based on the initial HAZNY scoring system. The remaining 10 hazards are considered to present moderately low to moderate risk.

Step 2: Hazard Event Profiles

As shown above, some hazards initially considered were consolidated with, or separated from, other hazards to avoid redundancy and to facilitate conceptualization of the hazards. The hazards are grouped by their root causes, natural (flood, severe winter storm, severe storm, agricultural epidemic, human epidemic, fire), technological (utility failure), and human-caused (transportation accident, water supply contamination, terrorism, civil unrest). Profiles of these hazards are grouped by these categories in Section 4 and are addressed in order according to the priority of each hazard. Water supply contamination is categorized as human-caused because most historical instances in the Tompkins County Multi-Jurisdictional Study Area have resulted from spills or tank leaks that caused HazMat to impact a water supply.

For each hazard listed above, a hazard event profile presents following information:

- 1) Background and local conditions
- 2) Historic frequency and probability of occurrence
- 3) Severity
- 4) Historic losses and impacts
- 5) Designated hazard areas

Other factors considered in the profiling process include the potential impact, onset, frequency, hazard duration, cascading effects and recovery time for each hazard. For this mitigation plan, considerable research was conducted to complete the profiles for the 11 hazards of interest. Where applicable, the source(s) of information and data and maps showing vulnerable areas, relevant community components, and GIS coverage also are provided. Table ES-1 summarizes the hazards identified for the Tompkins County Multi-Jurisdictional Study Area and those that impact particular jurisdictions. Input from each town, the public and local agencies and hazard experts were used to complete the town-specific columns of the table.

Table ES-1. Summary of Multi and Single Jurisdiction Risk Assessment Outcomes – Risks of Particular Concern

Hazard	County-wide	Town of Caroline	Town of Danby	Town of Enfield	Town of Groton	Town of Ithaca	Town of Lansing	Town of Ulysses
Natural Hazards								
Flood	✓	✓	✓	✓	✓	✓	✓	✓
Severe Winter Storm (including ice storm)	✓	✓	✓	✓	✓	✓	✓	✓
Severe Storm (including hurricane)	✓	✓	✓	✓	✓	✓	✓	✓
Epidemic - Agricultural				✓	✓		✓	✓
Epidemic - Human						✓	✓	
Fire (urban and wildland)			✓		✓	✓	✓	✓
Technological Hazards								
Utility Failure	✓	✓	✓	✓	✓	✓	✓	✓
Human-Caused Hazards								
Transportation Accident (including HazMat in transit)	✓	✓	✓	✓	✓	✓	✓	✓
Water Supply Contamination		✓	✓		✓	✓		✓
Terrorism	✓					✓	✓	
Civil Unrest						✓		✓

For each hazard, the Tompkins County’s mitigation planning group provided a preliminary overall assessment of the relative risk of that hazard as part of the profile. The overall assessment of each hazard ranges from no concern to severe concern. The Hazard Risk Gauge presented with each profile summarizes the preliminary ranking assigned to each hazard.

Vulnerability Assessment

The vulnerability assessment is summarized below.

Step 3: Inventory of Assets

After a prioritized ranking of hazards of concern was developed, a GIS-based risk assessment methodology called Hazards U.S.-Multi-Hazard (HAZUS-MH) was used to prepare and display the inventory of assets for the multi-jurisdictional study area. The inventory of assets considers the range of resources that could be lost or damaged if a hazardous event occurs. Local data supplemented the HAZUS-MH provided data. Specific assets evaluated for this risk assessment include: population, general building stock (residential and commercial), critical facilities (including, hospitals, schools, police and fire stations), and infrastructure (transportation systems and utility systems). Over \$2.5 billion of assets (including buildings and infrastructure) were identified in the Tompkins County study area.

Step 4: Loss Estimates

Quantitative loss estimates were obtained for the flood and severe storm (hurricane) hazards. Qualitative evaluations were performed for those hazards with limited past event and total loss data. All of the hazards of interest were analyzed using the best available data and FEMA tools and methodologies.

Where quantifiable loss estimates are not yet feasible, comparative evaluations present the types of impacts that could occur, current knowledge of the study area relative to each hazard, and a qualitative assessment of each hazard. For these hazards, future efforts will include the development of additional data so that in the long term, quantitative loss estimates may be feasible.

For this portion of the risk assessment, available data, methodologies, and assumptions were used to select and apply a risk assessment methodology for each hazard. Table ES-2 shows the risk assessment methodologies selected for each hazard.

Table ES-2. Summary of Risk Assessment Methodology Selection

Hazard	Comments	Output
HAZUS-MH Methodology		
Flood	HAZUS-MH-provided data were used and supplemented with local data for critical facilities. The HAZUS-MH models were used to obtain exposure and loss estimates.	HAZUS-MH Exposure and Loss Estimate Maps, Tables and Text
Hurricane (Part of Severe Storm)		
HAZUS-MH Supported Methodology		
Severe Winter Storm (Including Ice Storm)	Sufficient historic data were not available to forecast the probability of future hazard events. However, available historic and professional expertise regarding areas at risk for each hazard was compiled from a variety of sources. Professional judgment and available data were then used to evaluate past and potential events, and assess risks in a qualitative manner. HAZUS-MH was used to support inventory evaluations and graphical presentations of areas at risk.	HAZUS-MH Supported Exposure Estimates and Input to Data Needs Portion of Mitigation Strategy (Section 5)
Utility Failure		
Severe Storm (Non-Hurricane Portion)		
Epidemic (Agricultural)		
Transportation Accident (Including Hazmat Release [In Transit])		
Water Supply Contamination		
Terrorism		
Epidemic (Human)		
Fire (Urban and Wild)		
Civil Unrest		

Table ES-3 present the total exposure value for buildings in the flood zone considered “at risk” for both the 100-year and 500-year MRP flood events.

Table ES-3. Estimated Exposure Values for General Building Stock from Floods in Tompkins County Study Area

Occupancy Class	100-year Flood		500-year Flood	
	Building Count	Dollar Value	Building Count	Dollar Value
Residential Exposure (Single and Multi-Family Dwellings)	396	\$89.9M	422	\$99.9M
Commercial Exposure At-Risk	3	\$6.8M	4	\$11.2M
Industrial Exposure At-Risk	0	NA	0	\$0.6M
Educational (Universities)	0	NA	0	NA
TOTAL AT-RISK	399	\$96.7M	426	\$111.7M

Note: TBD indicates to be determined. NE indicates not evaluated. Dollars rounded to the nearest hundred thousand.

Although terrorism and human epidemic hazards are addressed, detailed planning for these events is the purview the Tompkins County Office of Emergency Response and the Tompkins County Health Department; therefore, close coordination with these agencies will be included for the terrorism and epidemic hazards.

For this risk assessment, loss estimates and exposure calculations 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 inventory, or built, environment. Therefore, potential exposure and loss estimates are approximate and does not predict precise results but are used to characterize risk and assign priorities for mitigation efforts.

Step 5: Evaluation of Population and Land Use Trends

Tompkins County, located in the Finger Lakes region of central New York, contains a mixture of rural and urban landscapes, dramatic terrain and natural features, agriculturally productive areas, an internationally renowned academic institution and major research center (Cornell University), and two smaller, higher education institutions (Ithaca College and Tompkins Cortland Community College). The Tompkins County Multi-Jurisdictional Study Area is a primarily rural area located in central New York, approximately 250 miles northwest of New York City. The area occupies approximately 500 square miles and serves a population of approximately 100,000 (Tompkins County and 2000 Census). While the population density of the area is low compared to the densely populated New York Boroughs, it is typical of the other counties in the region.

Development increases population and structures and therefore, can increase the impact of hazards on a community. For example, heavy development planned for a flood-prone area would likely increase the impact of the flood event as time progresses.

This mitigation plan provides a general overview of current and anticipated population and land use within the study area. This information provides a basis for making decisions regarding 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 decisions regarding future development in vulnerable areas. The Tompkins County Comprehensive Plan and Vital Communities Initiative focus on long-term plans for the area. Mitigation strategies in this plan, therefore, align with and will be coordinated with the Tompkins County Comprehensive plan and the Vital Communities Initiative principles. Therefore, these efforts are discussed below, followed by a summary of population, land use, and the potential impact of development trends on the hazard assessment.

Tompkins County Comprehensive Plan and Vital Communities Initiative

The purpose of the Tompkins County Comprehensive Plan is to address in a coordinated way those issues that can best be considered on a county or regional scale and for which solutions often require cooperation and collaboration across local, county, State, and Federal levels of government. Key elements of the comprehensive plan include transportation, economic development, housing, land use, open space and water resources, and a guide to the County government's facility and infrastructure plans, which are also addressed in the hazard risk assessment and mitigation activities in this plan (Tompkins County Planning Department, 2003g). The Tompkins County Comprehensive Plan also will provide a mechanism for coordination of topic-specific plans (such as this hazard mitigation plan) that are being developed by county departments, other independent agencies and other levels of government. Successful implementation of such topic-specific plans will require coordination across program areas and levels of government.

The Tompkins County Comprehensive Plan builds on the Vital Communities Initiative Principles, and the County Legislature's mission statement. These principles and the mission statement identify specific policies and strategies to achieve a secure and sustainable community and also focus on community participation in the development process (similar to the public involvement elements of this plan). By identifying population and land use trends and projections and considering mitigation actions within a broader context, areas of opportunity and potential conflict between existing plans can be identified and addressed. The Tompkins County Comprehensive Plan, therefore, provides a framework within which

community goals can be addressed in a proactive, coordinated manner (Tompkins County Planning Department 2003g).

Population

From 1990 to 2000, The Tompkins County Multi-Jurisdictional Study Area saw a population increase of only 3%. This represents a decrease in the rate of population growth from the previous two, 10-year periods. Growth was approximately 13% from 1970 to 1980 and approximately 8% from 1980 to 1990. Based on available data and input from the planning team, the 1990 to 2000 level of population growth is projected to continue for the next few years.

Land Use

Land use regulatory authority is vested in New York State's towns, villages, and cities. However, many development and preservation issues transcend local political boundaries. The Tompkins County Multi-Jurisdictional Study Area's land cover can be divided into five major categories. The first category is forest, which makes up approximately 53 percent of the study area. The second category is agriculture, including crops, pastures and inactive farmland (30 percent coverage). The third category is residential usage at 7 percent. Water and wetland usage is the fourth category, comprising 6 percent of land use. The fifth category, industrial, commercial, educational and recreational land use comprises an estimated 4 percent of the land area. Projected land use is anticipated to remain relatively stable, with some pockets residential and commercial development anticipated as discussed in the body of this plan.

Impact on Hazard Assessment

Development can be expected to increase the population and inventory at risk over time and these increases in inventory will increase the potential losses for the Tompkins County Multi-Jurisdictional Study Area. By focusing on development, appropriate mitigation planning can be conducted in a timely manner. By projecting land use and population trends in the Tompkins County Multi-Jurisdictional Study Area, the communities can evaluate if future land use and development will increase the risk posed by some hazards. For potential increases in vulnerability, the towns can then plan ahead to mitigate those vulnerabilities early in the development process or can direct development to areas of lower risk. The planning group will revisit the mitigation plan regularly to ensure that mitigation strategies support growth in a manner that minimizes increased risk and that supports the implementation and targeting of specific mitigation actions to address the potential impacts of development over time.

Step 6: Multi-Jurisdictional Risk Assessment

Because Tompkins County has prepared a multi-jurisdictional risk assessment, the risk assessment section also summarizes any particular risks faced by individual towns adopting the plan. See Table ES-1 for the results of the multi-jurisdictional risk assessment. Losses for each town for particular hazards are included in the vulnerability assessment for those hazards, as appropriate in Section 4.4 and are summarized in Section 4.5.

Tompkins County Mitigation Strategies

The outcomes of the risk assessment, supplemented by community input, provided a basis to review past mitigation actions, future goals, and appropriate countywide and town-specific mitigation strategies. Tompkins County identified the following four overarching mitigation goals or general guidelines that summarize the hazard reduction outcomes that the county wants to achieve:

1. Protect life and property
2. Increase public awareness
3. Encourage partnerships
4. Provide for emergency services

The mitigation strategy portion of the plan includes:

- A summary of past and current mitigation efforts and foundations
- Local hazard mitigation goals and objectives
- Identification and analysis of mitigation measures and projects being considered
- Multi-Jurisdictional mitigation strategy (goals and objectives)
- Mitigation action plan (summary of specific activities)

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The county developed several corresponding objectives for each goal that further define the specific strategies or implementation steps that will be needed to attain the identified goals. The goals, along with their corresponding objectives, then guided the development and evaluation of specific mitigation activities. The text below summarizes mitigation activity identification, analysis, and implementation.

Identification

Outputs of the risk assessment combined with significant partner, planning group, and public input helped to identify potential mitigation activities. Potential activities were submitted from each individual planning group member during the brainstorming sessions such as the meeting of the planning group on March 4, 2004. Many of the mitigation objectives and action items were identified based on current programs and activities in Tompkins County. The mitigation activities developed for this plan are grouped by hazard and presented in a series of tables in Section 5 of this plan.

Analysis

Throughout the mitigation planning process, the mitigation activities were evaluated at the various planning group meetings. At various intervals, members of the planning group met and communicated via email and telephone to analyze mitigation activities for the hazards identified in this plan based on the criteria listed above, current programs and policies, public considerations, and results of the risk and exposure assessments. Each alternative mitigation activity was evaluated qualitatively using several evaluation criteria, including the social, technical, administrative, political, legal, economic, and environmental (STAPLEE) opportunities and constraints of implementation.

Particular attention was given to those mitigation activities that addressed existing and new buildings and infrastructure. Few mitigation activities were removed from consideration based on the concept that it is best not to rule out any activity that may help make the communities more disaster resistant (even if funding was not currently available or an action was a lower priority at present). As a result only infeasible options were ruled out, including those mitigation actions that were considered to present prohibitive costs, low benefit/cost analysis ratios, or other concerns based on community priorities and needs.

Implementation

Prioritization of mitigation activities was based on several factors: (1) “the extent to which benefits are maximized according to a cost benefit review” as required by DMA, (2) maximization of benefits, (3) prevention of future losses, and (4) possibility of using existing programs and efforts for implementation.

These ranking criteria will help ensure that the money allocated to these mitigation projects is being spent efficiently and effectively. For example, many mitigation activities focus on public awareness and education programs or integrating the mitigation plan into current programs. These types of mitigation measures are more affordable and achievable and have an immediate benefit.

The implementation of new and/or additional mitigation activities is dependent on approval of the local elected governing body as well as obtaining funding from outside sources if funding has not already been secured.

Tompkins County Plan Maintenance Procedures

Hazard mitigation planning is an ongoing process. Section 6 of this plan presents procedures for plan maintenance and updates. Therefore, the Tompkins County Planning Group will continue ongoing mitigation efforts to implement the mitigation plan and revise and update the plan as necessary.

To monitor implementation of the mitigation plan, the planning group members will meet annually to discuss the status of plan implementation and will prepare a summary report of the plan status and any needed updates. The mitigation evaluation will address changes as new hazard events occur, as the area develops, and as more is learned about hazards and their impacts. The evaluation will therefore, include an assessment of whether the planning process and actions have been effective, whether development or other issues warrant changes to the plan or its priorities, if the communities' goals are being reached, and whether changes are warranted. In addition, the mitigation plan will be updated at a minimum within the 5-year cycle specified by DMA 2000.

POINT OF CONTACT

To request information or provide comments regarding this plan, please contact the Tompkins County Planning Department:

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