

9.1 TIOGA COUNTY

This section presents the jurisdictional annex for Tioga County.

A.) HAZARD MITIGATION PLAN POINT OF CONTACT

Primary Point of Contact	Alternate Point of Contact
Name: Wendy Walsh, District Manager Address: 183 Corporate Drive, Owego, NY 13827 Phone Number: 607-687-3553 Email address: walshw@co.tioga.ny.us	Name: Elaine Jardine, Director of Planning Address: 56 Main Street, Owego, NY 13827 Phone Number: 607-687-8257 Email address: jardinee@co.tioga.ny.us

B.) PROFILE

Location

Tioga County is located in the south-central part of New York. It is bordered on the north by Cortland and Tompkins Counties; on the east by Broome County; on the south by Pennsylvania’s Susquehanna and Bradford Counties; and on the west by Chemung County.

Climate

The climate is characterized by moderately warm summers and cool winters with mean monthly temperatures ranging between 26.4 degrees Fahrenheit (F) in February to 71.8 F in July. Annual precipitation averages 38.3 inches; the spring and fall months are the wettest, but the precipitation is usually well distributed throughout the year. Snowfall ranges between 50 and 80 inches per year (USACE, 1975).

Population

According to the 2010 U.S. Census Bureau, the population of Tioga County was 51,125 and the land area was 518.69 square miles (U.S. Census, 2007).

Tioga County has changed in the last 50 years and will continue to do so. The population of the county has sprawled, become older, and more racially diverse. However a decline in population is projected for the next ten years. As the median age continues to rise and baby boom population ages, the county will be faced with an increase in services for the elderly and will have less residents to pay for those services. The first step in preventing the decline in residents is to stop the out-migration of residents. Tioga County in general has a higher birth rate than death rate, which would allow for a population gain if not for the out-migration. (Tioga County Strategic Plan, 2005)

History of Flooding

The past history of flooding along the Susquehanna River indicates that flooding can occur in any month of the year. The majority of the larger floods, however, have occurred in the late winter or early spring and have resulted from a combination of heavy rains and extensive snowmelt. The area is also susceptible to floods due to tropical storms or hurricanes moving up the Atlantic coast in the summer or fall. The floods in March 1936 and June 1972. The estimated discharges of these floods were 128,000 cubic feet per second (cfs) and 121,000 cfs, respectively. Other major floods occurred in 1940, 1942, 1948, 1964, 1972, 1977, and 1979. The estimated recurrence intervals for the 1936 and 1972 floods are approximately 35 years and 25 years, respectively. The Town of Barton experienced substantial damage from the flooding of the Susquehanna River in June 1972.

Based on historic data, the Susquehanna River, Apalachin Creek, Owego Creek, East Branch Owego Creek, and West Branch Owego Creek, Catatunk Creek, Pipe Creek, Wappasening Creek, and Cayuta Creek are major sources of flooding problems in Tioga County. The floodplains of the streams include developed areas. Tioga County has experienced damage from a number of floods in the past. Most notable of these floods occurred in 1935, 1936, 1940, 1942, 1948, 1964, 1972, 1977, 1979, 2005, 2006 and 2011.

The flood in June 2006 was a result of heavy rains from extratropical storm Ernesto. The flood caused widespread damage throughout the Susquehanna River basin. Record discharges were recorded by USGS stream gages at Windsor, New York (55,900 cfs), Conklin, New York (76,800 cfs), and Vestal, New York (119,000 cfs) (URS Group Inc. and Dewberry & Davis LLC, 2009).

The flood threat to Tioga County has been reduced by an upstream flood control reservoir system. The major elements of this system that affect the study area are the USACE's East Sidney and Whitney Point reservoirs, which are located on Ouleout Creek and the Otselic River, respectively. These reservoirs were projects of the USACE and were completed in 1950 and 1942, respectively. These two reservoirs would reduce the water-surface elevation of a flood with a magnitude equal to the March 1936 flood by approximately 2 feet at the Town of Owego and the Village of Owego and 1 foot in the Towns of Barton, Nichols, and Tioga, and the Village of Nichols (USACE, 1977). Peak discharges of such a flood would be reduced by 13 percent for the Town of Owego and the Village of Owego and 6 percent for the Towns of Barton, Nichols, and Tioga, and the Village of Nichols.

In September 2011, Tioga County was devastated by Tropical Storm Lee. The National Weather Service recorded a maximum of 11 to 12-inches of rain in a 48 hour period fell over the County, with most of this rain falling over a 24-hour period on September 7th & 8th. Unofficial reports in Apalachin, Town of Owego recorded maximum rainfall amounts of up to 14-inches. The storm caused widespread flash flooding on the county's smaller streams on September 7th and historic flooding along the river corridor on September 8th. This storm caused massive destruction to local roads, bridges, businesses and private properties. It is estimated that for Tioga County alone there was \$300 million in damages; \$100 million in infrastructure and \$200-million in property loss. As a result of the storm many streams were choked with gravel, with their main channels being completely un-identifiable in numerous locations. This lead to subsequent flooding of many homes even a week or more after the original floodwaters receded.

There are minimal existing and no proposed structural flood protection works in Tioga County along the Susquehanna River. However, a local flood protection project does exist for the Village of Nichols and consists of a levee extending along the left bank of Wappasening Creek to its junction with the Susquehanna River.

FEMA specifies that all levees must have a minimum of 3 foot freeboard against 1- percent annual chance flooding to be considered a safe flood protection structure. Levees exist in the study area that provide the community with some degree of protection against flooding. However, it has been ascertained that (specific levee name/some of these levees) may not protect the community from rare events such as the 1-percent annual chance flood. The criteria used to evaluate protection against the 1-percent annual chance flood are 1) adequate design, including freeboard, 2) structural stability, and 3) proper operation and maintenance. Levees that do not protect against the 1-percent annual chance flood are not considered in the hydraulic analysis of the 1-percent annual chance floodplain.

Most communities within Tioga County use non-structural methods of flood protection, such as adopting a Flood Hazard District ordinance to restrict and regulate development within floodplains. (FEMA FIS 2009)

Please refer to Section 4, Volume 1 of this Plan for further details on Tioga’s County’s population, location, climate, history, growth, and development.

Brief History of County

Please refer to the Section 4, County Profile, of Volume 1 of this Plan.

C.) DOCUMENTED LOSSES TO NATURAL HAZARD EVENTS SPECIFIC TO THE COUNTY

Please refer to the Previous Occurrences and Losses section of the appropriate hazard profiles in Section 5.4 of this Plan in Section 5.4, Volume 1.

D.) NATURAL HAZARD RISK/VULNERABILITY RISK RANKING

Rank #	Hazard type	Estimate of Potential Dollar Losses to Structures Vulnerable to the Hazard ^{a, c}	Probability of Occurrence	Risk Ranking Score (Probability x Impact)	Hazard Ranking ^b
1	Flood	1% Annual Chance: \$3,225,969,000 0.2% Annual Chance: \$3,413,827,000	Frequent	54	High
2	Severe Storm	100-Year MRP: \$0 500-Year MRP: \$795,149 Annualized Loss: \$10,084	Frequent	30	Medium
2	Severe Winter Storm	1% of GBS: \$32,341,300 5% of GBS: \$161,706,500	Frequent	39	High
3	Earthquake	500-Year MRP: \$312,370 2,500-Year MRP: \$3,227,384 Annualized Loss: \$29,293	Occasional	20	Low
4	Drought	Not available	Frequent	18	Low

^{a.} Building damage ratio estimates based on FEMA 386-2 (August 2001)

- b. High = Total hazard priority risk ranking score of 38 and above
Medium = Total hazard priority risk ranking of 21-37
Low = Total hazard risk ranking 20 or below
- c. The valuation of general building stock and loss estimates was based on the default general building stock database provided in HAZUS-MH 2.0 (RSMeans 2006).
- d. Loss estimates are structural values only; does not include the value of contents.
- e. Loss estimates represent both structure and contents.
- f. The HAZUS-MH earthquake model results are reported by Census Tract.

E.) CAPABILITY ASSESSMENT

This section identifies the following capabilities of the local jurisdiction:

- Legal and regulatory capability
- Administrative and technical capability
- Fiscal capability
- Community classification.

E.1) LEGAL AND REGULATORY CAPABILITY

Regulatory Tools (Codes, Ordinances., Plans)	Do you have this?	Enforcement Authority	Code Citation (Section, Paragraph, Page Number, Date of adoption)
1) Building Code	N	Local	
2) Zoning Ordinance	N	Local	
3) Subdivision Ordinance	N	Local	
4) NFIP Flood Damage Prevention Ordinance	N	Local	
4a) Cumulative Substantial Damages	N	Local	
4b) Freeboard	N	Local	
5) Growth Management	N	Local	
6) Floodplain Management / Basin Plan	N	Local or Watershed	
7) Stormwater Management Plan/Ordinance	Y	Local	Y – Adopted 2011
8) Comprehensive Plan / Master Plan/ General Plan	Y	Local	Y –Adopted 1998
9) Capital Improvements Plan	Y	Local or County	Y
10) Site Plan Review Requirements	N	Local	
11) Open Space Plan	N	Local or County	
12) Stream Corridor Management Plan	N	Local or Watershed	
13) Watershed Management or Protection Plan	N	Local or Watershed	
14) Economic Development Plan	Y	County	1996
15) Comprehensive Emergency Management Plan	Y	Local or County	
16) Emergency Response Plan	Y	Local or County	2004
17) Post Disaster Recovery Plan	N	Local	
18) Post Disaster Recovery Ordinance	N	Local	
19) Real Estate Disclosure Requirement	N	State	
20) Other [Special Purpose Ordinances (i.e., critical or sensitive areas)]	N	Local or County	

E.2) ADMINISTRATIVE AND TECHNICAL CAPABILITY

Staff/ Personnel Resources	Available (Y or N)	Department/ Agency/ Position
1) Planner(s) or Engineer(s) with knowledge of land development and land management practices	Y	ED&P
2) Engineer(s) or Professional(s) trained in construction practices related to buildings and/or infrastructure	Y	DPW, ED&P, DOH
3) Planners or engineers with an understanding of natural hazards	Y	SWCD, DPW
4) NFIP Floodplain Administrator	N	
5) Surveyor(s)	N	
6) Personnel skilled or trained in "GIS" applications	Y	GIS
7) Scientist familiar with natural hazards	Y	SWCD, EMO, DOH, DPW
8) Emergency Manager	Y	EMO
9) Grant Writer(s)	Y	ED&P, SWCD, DOH, Treasurer, DSS, Mental Hygiene
10) Staff with expertise or training in benefit/cost analysis	N	

While this table demonstrates on the surface that Tioga County has adequate professional and technical capability to implement a Hazard Mitigation Plan with engineers, planners, and GIS personnel, in reality the situation is more limited. Tioga County is a small, rural county with a correspondingly small budget, especially for departments outside of social and human services. So while the county does have those professionals on staff, the actual personnel existence is quite minimal. County Planning and GIS have only 1 staff person each. The County Emergency Manager Officer is just part-time, with only 1 other part-time staff. Existing demands on these few individuals leaves little time to dedicate to hazard mitigation activities. Realizing this deficiency, the Tioga County Legislature has authorized to contract Hazard Mitigation Coordinator duties to the Tioga County Soil & Water Conservation District on an annual basis. This too, however, is problematic in that the Tioga County SWCD is also short-staffed, so it is just a temporary solution. Eventually the Tioga County Legislature will have to address hazard mitigation to find a more suitable and permanent solution.

E.3) FISCAL CAPABILITY

Financial Resources	Accessible or Eligible to use (Yes/No/Don't know)
1) Community Development Block Grants (CDBG)	Yes
2) Capital Improvements Project Funding	Yes
3) Authority to Levy Taxes for specific purposes	Yes
4) User fees for water, sewer, gas or electric service	No
5) Impact Fees for homebuyers or developers of new development/homes	No

Financial Resources	Accessible or Eligible to use (Yes/No/Don't know)
6) Incur debt through general obligation bonds	Yes
7) Incur debt through special tax bonds	Yes
8) Incur debt through private activity bonds	No
9) Withhold public expenditures in hazard-prone areas	No
10) State mitigation grant programs (e.g. NYSDEC, NYCDEP)	Yes
11) Other	

E.4) COMMUNITY CLASSIFICATIONS

Program	Classification	Date Classified
Community Rating System (CRS)	NA	
Building Code Effectiveness Grading Schedule (BCEGS)	NA	
Public Protection	NA	
Storm Ready	Yes	12/1/03
Firewise	NA	

N/A = Not applicable. NP = Not participating. - = Unavailable.

The classifications listed above relate to the community's effectiveness in providing services that may impact its vulnerability to the natural hazards identified. These classifications can be viewed as a gauge of the community's capabilities in all phases of emergency management (preparedness, response, recovery and mitigation) and are used as an underwriting parameter for determining the costs of various forms of insurance. The CRS class applies to flood insurance while the BCEGS and Public Protection classifications apply to standard property insurance. CRS classifications range on a scale of 1 to 10 with class one (1) being the best possible classification, and class 10 representing no classification benefit. Firewise classifications include a higher classification when the subject property is located beyond 1000 feet of a creditable fire hydrant and is within 5 road miles of a recognized Fire Station.

Criteria for classification credits are outlined in the following documents:

- The Community Rating System Coordinators Manual
- The Building Code Effectiveness Grading Schedule
- The ISO Mitigation online ISO's Public Protection website at <http://www.isomitigation.com/ppc/0000/ppc0001.html>
- The National Weather Service Storm Ready website at <http://www.weather.gov/stormready/howto.htm>
- The National Firewise Communities website at <http://firewise.org/>

F. MITIGATION STRATEGY

F.1) Past Mitigation Actions/Status

Tioga County departments, agencies and partners including municipalities worked on items and activities listed in the 2006 County All Hazard Mitigation Plan. After the 2006 flood, there was an obvious need to form a group to look specifically at flooding and flooding issues on a Countywide basis. As a result, the County Flood Mitigation Group formed made up of members from County Planning Department, Emergency Management Office, Soil and Water Conservation District, municipalities (including Village and Town of Owego representatives), and Cornell Cooperative Extension. The group researched funding, mitigation strategies and implemented projects to help mitigate flooding issues in Tioga County. Accomplishments since 2006 included:

- Stream Rehabilitation Projects:
 - Apalachin Creek Streambank Rehabilitation (\$10,000 Finch Grant)
 - Pipe Creek Rehabilitation Projects
 - 500-feet of streambank protection (funded by DEC Water Quality Improvement Project \$ 45,735)

- 2000-feet of stream rehabilitation (funded by EPF \$6000)
 - Long Creek Streambank Stabilization to protect local bridge (\$17,000 Libous funding)
 - \$125,000 from Senator Libous to promote Countywide Stream Rehabilitation. All funds spent in the Apalachin Creek Watershed the hardest hit watershed in the 2006 flood.
 - \$12,500 Chesapeake Bay Small Watershed Grant –Long Creek Stream Rehabilitation
 - \$50,000 FEMA Hazard Mitigation - Apalachin Creek Sewerline Protection Project
 - \$44,000 DEC Water Quality Improvement Project – Stream Rehabilitation
- Wetland Restoration Project – Brick Pond partnership with USFWS & USC
- Completed numerous site visits on private properties to educate on streambank processes.
- Completed 33 stream permit applications for highway depts., municipalities and private residents (June 2006-March 2008) assisted with design and construction oversight.
- \$20,000 FEMA Education Grant Award: funded the development of a flood brochure that was distributed to all of Tioga County residents as well as a public officials training on flooding and educational signs that identify the 2006 and 100-year flood levels.

The Flood Mitigation group also researched additional strategies specific to flooding to include in the updated Hazard Mitigation Plan. These strategies included suggestions specific to flood prone areas as well as broader goals for communication and education.

Specific to flood mitigation strategies the County Legislature adopted the following strategies in May 2008:

- **County Hazardous Areas Map**
Create a Countywide Hazardous Areas Map with floodplains, steep slopes between 10 and 15% and greater, and highly erodible soils. Municipalities should then consider updating or amending various land use regulations to protect these areas.
- **Land Use Regulations**
Municipalities along the Susquehanna River with existing zoning ordinances should create overlay zoning districts that encompass the Hazardous Areas mapped in #1. Regulations for the overlay district could provide restrictions or incentives to limit or direct new development out of designated Hazardous Areas. Tools like incentive zoning can be used to provide for increased housing densities in areas out of the 100-year floodplain. Similarly, site plan review regulations can include requiring proof of compliance with floodplain regulations before granting approval within the Hazardous Areas.
- **Buy Out Areas**
Municipalities should continue with residential buyouts by designating buyout areas along the Susquehanna River that have experienced repetitive loss– include on map in #1. Suggested areas include:
 - Town of Owego: Kinney Road, Miller Beach Road, Hiawatha Road

- Village of Owego: Water Street and River Street
- Town of Nichols: East River Road near Village of Nichols
- Town of Tioga: Route 17C in Tioga Center, Goodrich Settlement
- Town of Barton: Canon Hole
- Review these areas when updated flood maps are produced and released.
- **Enforcement**
Municipalities should consistently enforce their existing floodplain regulations and update them to include new Uniform Fire Prevention and Building Code standards such as requiring residential building elevation 2 feet above the base flood elevation.

Recognizing that many of these strategies could not undertake without education and communication the flood mitigation group also developed the following strategies specific to those two areas:

Education:

- A holistic, watershed approach is desired for flood mitigation planning.
- Citizen’s need to understand the application process for assistance from SEMO and FEMA.
- Communities need to know about available state and federal resources.
- Citizen’s need to understand buyout process.
- Educate town supervisors, highway superintendents, and other municipal leaders about stream management and flood mitigation.(Example resource from Chemung County.)
- Educate the public using scientific information to increase the understanding of the complexities of the problem, to gain support for possible solutions and to encourage the development of emergency plans.
- Develop a “Contractor Certification” for those working on stream restoration.
- Encourage municipal leaders to review and enforce current flood laws and regulations, as well as building codes.
- Share flood insurance information with the public and those people involved in purchasing property.
- Share updated flood maps from the June 2006 flood prepared locally as well as from FEMA with community leaders as they become available.
- Educate engineers about hydrology.
- Share website links for tracking the depth of the river.
- Develop an awareness campaign in partnership with fire and emergency personnel.

Communication:

- Develop communication strategies and emergency plans based on anticipated amounts of rain.
- Review and update communication plans in each community. These should be coordinated across the county.
- Develop a “point” of reference that people can use to assess the level of current danger.
- Develop direct link with the national weather service. Communication should go both ways.
- Review and update plans regularly.
- Work with local media to get better coverage for Tioga County
- Identify and let public know where find accurate and up-to-date information

F.2) Hazard Vulnerabilities Identified

It is estimated that in Tioga County, 6107 residents live within the 1% annual chance flood area (NFIP Special Flood Hazard Area). Of the municipality's total land area, 6% is located within the 1% annual chance flood area. \$3,225,969,000 (60.7%) of the municipality's general building stock replacement cost value (structure and contents) is located within the 1% annual chance flood area.

There are 1025 NFIP policies in the community and there are 691 policies located within the 1% annual chance flood area. FEMA has identified 239 Repetitive Loss (RL) including 23 Severe Repetitive Loss (SRL) properties in the municipality.

NFIP Summary

	# Policies (1)	# Claims (Losses) (1)	Total Loss Payments (2)	# Rep. Loss Prop. (1)	# Severe Rep. Loss Prop. (1)	# Policies in 100- year Boundary (3)	# Policies in 500- Boundary (3)	# Policies Outside the 500-year Flood Hazard (3)
Tioga County	1,025	1,539	\$52,617,423	239	23	691	810	215

Source:

- (1) Policies, claims, repetitive loss and severe repetitive loss statistics provided by FEMA Region 2, in April 2012 using the “Comm_Name”. These statistics are current as of January 31, 2012. Please note the total number of repetitive loss properties includes the severe repetitive loss properties.
- (2) Total building and content losses from the claims file provided by FEMA Region 2 (current as of January 31, 2012).
- (3) The policy locations used are based on the latitude and longitude provided by FEMA Region 2.

HAZUS-MH estimates that for a 1% annual chance flood, \$109712000 (2.1%) of the municipality's general building stock replacement cost value (structure and contents) will be damaged, 4877 people may be displaced, 1994 people may seek short-term sheltering, and an estimated 17588 tons of debris could be generated.

Please refer to the Hazard Profiles for additional vulnerability information relevant to this jurisdiction.

Status of Past Projects

Initiative Number	Mitigation Initiative	Status
2006 Plan-1	<i>Hydrological study</i> of the total watershed including having the county flown by <i>LiDAR</i> in order to generate more accurate floodplain maps and reduce cost of flood insurance for residents	Flight completed by FEAM to update flood maps after 2006 event; coverage for approximately 85% of the County. Portions of the Town of Spencer have been flown by LiDAR including Sulphur Springs and Hulbert Hollow watersheds (funded by the Town of Spencer). Also sections of Owego Creek have been flown. The County still has LiDAR as a priority in order to complete the entire county for flood mitigation projects (specifically wetland flood attenuation complexes and stream restoration projects).
2006 Plan- 2	<i>Streambed maintenance program</i> within each municipality as well as an active <i>road ditch program</i>	<p>In progress; continued program.</p> <ul style="list-style-type: none"> -Several municipalities in the County have Memorandum of Understandings (MOUs) with NYS DEC to complete routine stream maintenance 50' above and below culverts, bridges, etc. These must be renewed yearly. Town of Tioga, Barton, Candor, Newark Valley and County Highway all have current MOUs with DEC. -Each municipality has an active road ditch maintenance program. Some use SWCD hydroseeder to reseed road ditches. Municipalities utilize Cornell Local Roads Program. -Need to conduct more training on proper road maintenance and promote utilization of hydroseeding program. -District proposing a series of Highway personnel training for proper stream maintenance techniques. Most highway depts. contact SWCD prior to initiating work in streams for necessary permits. -Need to look into alternate methods to road ditches such as catchment basins in order to allow water to infiltrate into the ground recharging the water table. -5 Highway Depts participated in SWCD training session on Environmentally Sensitive Maintenance of Stream Workshop in Jan '08. <p>SWCD continues to attend Highway Assoc. Mtg to review programs specific to highway departments (including hydro-seeding and stream program).</p> <ul style="list-style-type: none"> -SWCD has permit approval authority for ACE Regional Permit 97-000-1.

F.3) PROPOSED HAZARD MITIGATION INITIATIVES

Note some of the identified mitigation initiatives in Table F are dependent upon available funding (grants and local match availability) and may be modified or omitted at any time based on the occurrence of new hazard events and changes in municipal priorities.

Initiative	Mitigation Initiative	Applies to New and/or Existing Structures*	Hazard(s) Mitigated	Goals and Objectives Met	Lead and Support Agencies	Estimated Benefits	Estimated Cost	Sources of Funding	Timeline	Priority	Mitigation Category
1	Purchase and distribute alternate-powered (battery, solar or hand crank) NOAA weather radios to 20,300 households in County	Existing	All	1-10, 2-2, 6-2	County Planning Dept.	High	High (\$50/household)	NOAA/HMGP	Phased – Flood prone areas first	Medium	PE ES
2	Create and promote brochure and web page on county website – What to do in a Disaster Event for Citizens. Webpage will become County home page during disaster with information for residents	New	Drought, Flood, Severe Winter Storm, Severe Storm, Earthquake	1-10, 2-2, 3-3	County Planning Dept. w/ support from EMO, Sheriff, and IT	High	High	HMGP	Short	High	PE
3	Develop outreach methods to educate public on Flood Hazard Areas and NFIP.	Existing	Flood	2-1, 2-2, 3-3	County Planning Dept. w/ support from Flood Mitigation Group and NYSDEC	High	High	HMGP	Short	High	PE
4	Promote the use of County website to have citizens input their cell phone numbers for reverse 911.	Existing	Drought, Flood, Severe Winter Storm, Severe Storm, Earthquake	2-2, 2-3	County Planning Dept. w/ support from EMO and flood mitigation group	High	Low	County Funds	Short	High	PE ES
5	Create and Hire a Hazard Mitigation Plan Coordinator.	New	All	1-3, 1-7, 1-9, 2-1, 2-3, 2-5, 3-1, 5-1, 5-2, 5-3, 6-1, 6-2, 6-3	County Planning Dept and County Legislature	High	High	County Funds	Short	High	PP
6	Purchase 6-8 variable	New	All	1-10, 2-2,	County DPW	High	High	DHSES	Short	Medium	ES

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	message signs with back up solar power. Message boards would be placed along main travel corridors to inform the Public of impending storm events.			6-2	and EMO						
7	Purchase 4-6 automated flagging assistance devices with backup solar power to relieve manpower during sever storm events	New	All	1-10, 2-2, 6-2	County DPW	High	High	DHSES	Short	Medium	ES
8	Creation of social media outlets (Facebook, Twitter, MySpace) for Tioga County to inform public of flood hazards and severe storm events. Educate the public via the county website on how these applications can be used in an emergency situation.	New	All	1-10, 2-2, 5-2	IT	High	Low	County Funds	Ongoing	High	PE
9	Develop annual articles or seminars on Flood Hazards to educate the public and keep them aware of the dangers of flooding.	New	Flood	1-7, 2-2, 2-3, 2-4	Flood Mitigation Group	High	Low	County Funds	Short	High	PE
10	Create/Enhance mutual aid agreements with neighboring communities for continuity of operations. Having such agreements in place will ensure the prompt availability of	New	All	5-1, 5-3, 6-3, 6-4	Law Office w/ support from all county depts.	High	Low	County Funds	Short	High	ES



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	assistance from outside the disaster are so that essential government services will continue uninterrupted.										
11	Annually bid contracts with entities to provide essential services to the County in areas such as damage assessment, cleanup of county buildings, consulting services for FEMA/SOME paperwork, debris clean up and disposal, trucking services, road construction services, road construction products and document retrieval and stabilization.	New	All	6-1, 6-2	Law Dept. w/ support from DPW, Budget Office, IT and Records Management	High	Low	County Funds	Short	High	ES
12	Produce county post disaster manuals to provide efficient procedures for continuity of good governmental procurement practices, managing vendors and contractors.	New	All	6-2	Law Dept w/ support from Treasurer, Budget Office	High	Low	County Funds and HMGP	Short	High	ES
13	Implement safe document archiving system to preserve important records	New	All	6-2	Records Management w/ support Law Dept and DPW	High	High	FEMA/CDBG	Short	Medium	ES
14	Identification and mapping of historic and potential evacuation shelters and geodatabase entry of inventory of attributes such as facility capacity,	Existing	All	6-2	GIS w/ support EMO, Sheriff, Fire Services, churches, schools	Medium	Low	Local Funding sources	Short/On-going	High	ES



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	duration of availability after a hazard event, staffing, contact information, suitability for different hazard events, etc.										
15	Map groundwater recharge areas. This will help identify areas that need to be protected in order to minimize loss of life and property due to drought conditions by ensuring that groundwater supplies are renewed during periods of rain and snowmelt	Existing	Drought	1-5, 2-3, 4-3, 4-5, 4-6	GIS	Medium	Low	County Funds	Short	High	NR
16	Establishment of agreement with aerial photography company to capture geo-referenced ortho and oblique aerial imagery during and/or immediately after hazard events to provide information for response and recovery from incidents	Existing	All	1-4, 2-3	GIS	High	Low	County Funds	Short/Ongoing	High	PP PE
17	Mapping of Potential emergency response helicopter landing places	Existing	All	6-2, 6-3	GIS	Medium	Low	County Funds	Short/Ongoing	High	ES
18	Mapping of relief supply routes.	Existing	All	6-2, 6-3	GIS	Medium	Low	County Funds	Short/Ongoing	High	ES
19	Identification and mapping of evacuation routes for residents living in flood zones for escape to shelters and to communicate hazard areas.	Existing	Flood	6-2, 6-3	GIS	Medium	Low	County Funds	Short	High	ES



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	Including the use of both hard copy and digital maps available on line and through mobile apps.										
20	Internet and mobile app developed to obtain information from the public and emergency response personnel to identify roads impacted by downed trees and wires, damage to roads and bridges, etc.	Existing	All	1-10, 5-2, 5-3	GIS/NYS DOT	High	Medium	County Funds	Short/Ongoing	Medium	PE
21	Install rain gauges for early flood warning system. (Expand IFLOWS network of precipitation and stream gauges).	Existing	Flood	1-5, 2-2, 5-2	EMO w/ support SWCD	High	Medium	NYS, NOAA	Short	High	PE
22	Develop flood response plan with this in place emergency responders and government personal will have a Standard operating Procedure to facilitate their responsibility during and emergency	Existing	Flood	3-1, 6-2, 6-3	EMO & Local Gov't Elected Officials	High	Medium	HSSP grant	Short	High	ES
23	Creation of full time EMO position based on increased frequency and intensity of disaster events	Existing	All	6-1, 6-2, 6-3	EMO w/ personnel	High	High	County Funds	High or Medium	High or Medium	ES
24	Develop and conduct training for contractors and highway personnel on emergency stream intervention during flood events.	Existing	Flood	3-1, 3-3, 6-2	SWCD	High	Low	Local/WQIP	Short	Medium	ES



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Initiative	Mitigation Initiative	Applies to New and/or Existing Structures*	Hazard(s) Mitigated	Goals and Objectives Met	Lead and Support Agencies	Estimated Benefits	Estimated Cost	Sources of Funding	Timeline	Priority	Mitigation Category
25	Train contractors and highway personnel in environmentally sensitive maintenance of streams near culverts, roads and bridges.	Existing	Flood	4-3	SWCD	High	Low	Local/WQIP	Short	Medium	NR
26	Educate town supervisors, highway superintendents, and other municipal leaders about stream management and flood mitigation	Existing	Flood	1-5, 1-8, 2-4, 2.5	SWCD w/ Flood Mitigation Group	High	Low	Local/WQIP	Short	Medium	PE
27	Educate the public using scientific information to increase the understanding of the complexities of the problem, to gain support for possible solutions and to encourage the development of emergency plans.	Existing	Flood	2-2, 2-3, 2-4	Flood Mitigation Group	High	Low	Local/WQIP	Short	High	PE
28	Share website links for tracking the depth of the river.	Existing	Flood	1-10, 2-2	Flood Mitigation Group	High	Low	County funds	Short	High	PE
29	Encourage municipal leaders to review and enforce current flood laws and regulations, as well as building codes.	Existing	Flood	1-3, 1-6, 1-7	Flood Mitigation group	High	Low	County Funds	Short	High	PP
30	Develop communication strategies and emergency plans	Existing	Flood	1-10, 3-1, 6-2	EMO	High	Low	DHSES	Short	High	ES



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Initiative	Mitigation Initiative	Applies to New and/or Existing Structures*	Hazard(s) Mitigated	Goals and Objectives Met	Lead and Support Agencies	Estimated Benefits	Estimated Cost	Sources of Funding	Timeline	Priority	Mitigation Category
	based on anticipated amounts of rain.										
31	Review and update communication plans in each community. These should be coordinated across the county.	Existing	All	1-10, 6-2	EMO	High	Low	DHSES	Short	High	ES
32	Quantify and Qualify current condition of streams and stream corridors. A county wide stream investigation report for all watersheds will allow us to create watershed strategies to disseminate to municipalities for future rehabilitation efforts.	New	Flood	1-3, 1-4, 1-5	SWCD	High	Medium	DEC	Short	Medium	PP
33	Identify and evaluate opportunities to alleviate flooding problems using structural projects that do not impair the benefits of existing floodplain functions (such as small impoundments, high flow channels, and wetland creation, etc) Seek implementation for cost-effective practices.	Existing	Flood	1-1, 1-2, 4-1	SWCD	High	High	ACOE	Shoret	High	SP
34	Capture/survey/display high water marks from previous flood events.	Existing	Flood	1-3, 1-4	SWCD	Medium	High	HMGP	Short/On-going	High	PP
35	Support the protection of federally operated precipitation and river gauge systems from repeated threats of	Existing	Flood	1-4, 1-6, 1-7, 1-9	County Legislature/Flood mitigation group	High	Low	County Funds	Short	High	PP



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Initiative	Mitigation Initiative	Applies to New and/or Existing Structures*	Hazard(s) Mitigated	Goals and Objectives Met	Lead and Support Agencies	Estimated Benefits	Estimated Cost	Sources of Funding	Timeline	Priority	Mitigation Category
	budget cuts and support the expansion of existing data collection and data processing as warranted.										
36	Expand the use of strategically located signs that inform the public of flood hazards	Existing	Flood	1-10	Flood Mitigation group	High	Low	HMGP	Short	High	PE
37	Create one or more shelter locations outside of existing floodplain that can house up to 500 County residents for an extended period of time.	Existing	Flood	6-2	Dept. of Social Services	High	High	DSS	Short	High	ES
38	Flood proofing of the Tioga County Historic Courthouse	Existing	Flood	1-1, 1-2, 6-3	DPW	High	High	FEMA/CBDG/HMGP	Short	High	PP
39	Flood proofing of the Tioga County Court Annex and County Clerks Building	Existing	Flood	1-1, 1-2, 6-3	DPW	High	High	FEMA/CDBG and HMGP	Short	High	PP
40	Flood Proofing of Tioga County Office Building	Existing	Flood	1-1, 1-2, 6-3	DPW	High	High	FEMA/CBDG/HMGP	Short	High	PP
41	Relocate backup 911 generator to protect from future flood events.	Existing	Flood	1-1, 6-3	Sheriff w/ support from DPW	High	Medium	911 Funding	Short	High	PP
42	Construction of a new Tioga County Records Storage Facility to reduce flood vulnerability and to replace the records storage facility that was flooded outside of the flood area and subsequently demolished	Existing	Flood	1-1, 1-3	DPW with support Buildings and Grounds	High	High	FEMA/CBDG/HMGP	Short	Medium	PP
43	Intersection of West	Existing	Flood	1-1, 6-3	DPW	High	High	HMGP	Short	High	SP



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Initiative	Mitigation Initiative	Applies to New and/or Existing Structures*	Hazard(s) Mitigated	Goals and Objectives Met	Lead and Support Agencies	Estimated Benefits	Estimated Cost	Sources of Funding	Timeline	Priority	Mitigation Category
	River Road and Mt. Pleasant Road – Replace double cross pipes with a larger structure to allow for additional capacity during flood events										
44	Mitigating elevator controls and power supply to elevators as well boilers at the County Court Annex and Clerks Building.	Existing	Flood	1-1, 6-3	DPW	High	High	FEMA/CBDG	Short	High	PP
45	Mitigating elevator controls and power supply in County Courthouse	Existing	Flood	1-1, 6-3	DPW	High	High	FEMA/CBDG	Short	High	PP
46	Mitigation electric panels and elevator controls at County Office Building.	Existing	Flood	1-1, 6-3	DPW	High	High	FEMA/HMGP	Short	High	PP
47	Gaskill Road Bridge Streambank Protection.	Existing	Flood	1-1, 6-3	DPW w/ support from SWCD	High	\$55,000	EWP	Short	High	SP
48	Dry Brook Creek culvert protection and streambank stabilization	Existing	Flood	1-1, 6-3	DPW w/ support from SWCD	High	\$87,000	EWP	Short	High	SP
49	Support the purchase, or relocate structures located in hazard-prone areas to protect structures from future damage, with repetitive loss and severe repetitive loss properties as priority. Phase 1: Identify appropriate candidates for relocation based on cost-effectiveness versus retrofitting.	Existing	Flood, Severe Storm	1-1, 1-2	Municipality (via Municipal Engineer/NFIP Floodplain Administrator) with support from NYSOEM, FEMA	High	High	FEMA Mitigation Grant Programs and local budget (or property owner) for cost share	Long-term DOF	Medium-High*	PP



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Initiative	Mitigation Initiative	Applies to New and/or Existing Structures*	Hazard(s) Mitigated	Goals and Objectives Met	Lead and Support Agencies	Estimated Benefits	Estimated Cost	Sources of Funding	Timeline	Priority	Mitigation Category
	Phase 2: Where relocation is determined to be a viable option, work with property owners toward implementation of that action based on available funding from FEMA and local match availability.										
50	Support municipal compliance with and good-standing in the NFIP including adoption and enforcement of floodplain management requirements (e.g. regulating all new and substantially improved construction in Special Hazard Flood Areas), floodplain identification and mapping, and flood insurance outreach to the community.	New & Existing	Flood, Severe Storms	1-1, 1-2	Municipality (via Municipal Engineer/NFIP Floodplain Administrator) with support from NYSOEM, ISO FEMA	High	Low - Medium	Local Budget	Ongoing	High	PP
51	Continue to support the implementation, monitoring, maintenance, and updating of this Plan, as defined in Section 7.0	New & Existing	All Hazards	All	Municipality (via mitigation planning point of contacts) with support from Planning Partners (through their Points of Contact), NYSOEM	High	Low – High (for 5-year update)	Local Budget, possibly FEMA Mitigation Grant Funding for 5-year update	Ongoing	High	PP
52	Complete the ongoing updates of the Comprehensive	New & Existing	All Hazards	6-3, 1-11	Municipality with support from NYSOEM	Low	Low	Local Budget	Ongoing	High	ES



Initiative	Mitigation Initiative	Applies to New and/or Existing Structures*	Hazard(s) Mitigated	Goals and Objectives Met	Lead and Support Agencies	Estimated Benefits	Estimated Cost	Sources of Funding	Timeline	Priority	Mitigation Category
	Emergency Management Plans										
53	Work with regional agencies (i.e. County and SOEM) to help develop damage assessment capabilities at the local level through such things as training programs, certification of qualified individuals (e.g. code officials, floodplain managers, engineers).	NA	All Hazards	5-1, 5-2	Municipality with support from County, NYSOEM	Medium	Medium	Local budget, FEMA HMA and HLS grant programs	Short – Long-term DOF	Medium	PP
	See above.	Existing	All Hazards	1-1, 2-3, 5.1	HMP Coordinator	Medium-High	Medium-High	Mitigation grant programs (PDM or HMGP) with local match	Long term DOF	Medium	PP

Notes:

*Does this mitigation initiative reduce the effects of hazards on new and/or existing buildings and/or infrastructure? Not applicable (NA) is inserted if this does not apply.

Costs:

Where actual project costs have been reasonably estimated:

Low = < \$10,000

Medium = \$10,000 to \$100,000

High = > \$100,000

Where actual project costs cannot reasonably be established at this time:

Low = Possible to fund under existing budget. Project is part of, or can be part of an existing on-going program.

Medium = Could budget for under existing work-plan, but would require a reapportionment of the budget or a budget amendment, or the cost of the project would have to be spread over multiple years.

High = Would require an increase in revenue via an alternative source (i.e., bonds, grants, fee increases) to implement. Existing funding levels are not adequate to cover the costs of the proposed project.

Benefits:

Where possible, an estimate of project benefits (per FEMA’s benefit calculation methodology) has been evaluated against the project costs, and is presented as:

Low = < \$10,000

Medium = \$10,000 to \$100,000

High = > \$100,000

Where numerical project benefits cannot reasonably be established at this time:

Low = Long term benefits of the project are difficult to quantify in the short term.



Medium = Project will have a long-term impact on the reduction of risk exposure to life and property, or project will provide an immediate reduction in the risk exposure to property.

High = Project will have an immediate impact on the reduction of risk exposure to life and property.

Potential Funding Sources:

ACOE = US Army Corps of Engineers

CBDG = Community Development Block Grants

DEC = NY Department of Environmental Conservation

DHSES=Department of Homeland Security Emergency Services

EMPG = Emergency Management Planning Grant

EWP = Emergency Watershed Protection Grants (NRCS)

FMA = Flood Mitigation Assistance Grant Program (FEMA)

HLS = Homeland Security Programs

HMGP= Hazard Mitigation Grant Program (FEMA)

HMA = Hazard Mitigation Assistance (FEMA)

NOAA= National Oceanic and Atmospheric Association

PDM = Pre-Disaster Mitigation Grant Program (FEMA)

RFC = Repetitive Flood Claims Grant Program

SHSP = State Homeland Security Program Grant

SRL = Severe Repetitive Loss Grant Program (FEMA)

WQIP = Water Quality Improvement Project Program (NYSDEC)

Timeline:

Short = 1 to 5 years. Long Term= 5 years or greater. OG = On-going program.

DOF = Depending on funding.

Notes (for Mitigation Type):

1. PP=Prevention and Property Protection: Government, administrative or regulatory actions or processes that influence the way land and buildings are developed and built. These actions also include public activities to reduce hazard losses or actions that involve (1) modification of existing buildings or structures to protect them from a hazard or (2) removal of the structures from the hazard area. Examples include planning and zoning, floodplain local laws, capital improvement programs, open space preservation, and storm water management regulations and acquisition, elevation, relocation, structural retrofits, storm shutters, and shatter-resistant glass.
2. PE=Public Education and Awareness: 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 school-age and adult education programs.
3. NR=Natural Resource Protection: Actions that minimize hazard loss and also 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.
4. SP=Structural 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.
5. ES=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.

G.) PRIORITIZATION OF MITIGATION INITIATIVES

This table summarized the input to determine the prioritization of the initiatives that comprise the mitigation strategy. In addition, this table summarizes the participant's mitigation actions by hazard of concern and the six mitigation types to illustrate that the municipality has selected a comprehensive range of actions/projects.

Initiative #	# of Objectives Met	Benefits	Costs	Do Benefits equal or exceed Costs? (Yes or No)	Is project Grant eligible? (Yes or No)	Can Project be funded under existing programs/budgets? (Yes or No)	Priority (High, Med., Low)
1	3	High	High (\$50/household)	Yes	Yes	Yes	M
2	3	High	Medium	Yes	Yes	Yes	H
3	3	High	Low	Yes	Yes	Yes	H
4	2	High	Low	Yes	No	Yes	H
5	13	High	Medium	Yes	No	Yes	H
6	3	High	High	Yes	Yes	Yes	M
7	3	High	High	Yes	Yes	No	M
8	3	High	Medium	Yes	No	Yes	H
9	4	High	Low	Yes	Yes	Yes	H
10	4	High	Low	Yes	No	Yes	H
11	2	Medium	Low	Yes	No	Yes	H
12	1	High	Low	Yes	Yes	Yes	H
13	1	High	High	Yes	Yes	Yes	M
14	1	Medium	Low	Yes	No	Yes	H
15	5	Medium	Low	Yes	No	Yes	H
16	2	High	High	Yes	Yes	Yes	H
17	2	Medium	Low	Yes	No	Yes	H
18	2	Medium	Low	Yes	No	Yes	H
19	2	Medium	Low	Yes	No	Yes	H
20	3	High	Medium	Yes	Yes	Yes	M
21	3	High	Medium	Yes	Yes	Yes	H
22	3	High	Medium	Yes	Yes	Yes	H
23	3	High	Medium	Yes	Yes	Yes	H or M
24	3	High	Low	Yes	Yes	Yes	M
25	1	High	Low	Yes	Yes	Yes	M
26	4	High	Low	Yes	Yes	Yes	M
27	3	High	Low	Yes	Yes	Yes	H
28	2	High	Low	Yes	No	Yes	H

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29	3	High	Low	Yes	No	Yes	H
30	3	High	Low	Yes	Yes	Yes	H
31	2	High	Low	Yes	No	Yes	H
32	3	High	Medium	Yes	No	No	M
33	3	High	High	Yes	Yes	No	H
34	2	Medium	Low	Yes	No	Yes	H
35	4	High	High	Yes	?	Yes	H
36	2	High	Low	Yes	Yes	Yes	H
37	1	High	High	Yes	Yes	No	H
38	3	High	High	Yes	Yes	Yes	H
39	3	High	High	Yes	Yes	Yes	H
40	3	High	High	Yes	Yes	Yes	H
41	2	High	Medium	Yes	Yes	Yes	H
42	2	High	High	Yes	Yes	Yes	H
43	2	High	High	Yes	Yes	Yes	H
44	2	High	High	Yes	Yes	Yes	H
45	2	High	High	Yes	Yes	Yes	H
46	2	High	High	Yes	Yes	Yes	H
47	2	High	\$55,000	Yes	Yes	Yes	H
48	2	High	\$87,000	Yes	Yes	Yes	H
49	2	High	High	Yes	Yes	Yes	M-H
50	2	High	Low - Medium	Yes	No	Yes	H
51	2	Low	Low	Yes	No	Yes	H
52	2	Low - Medium	Low - Medium	Yes	No	Yes	H
53	All	High	Low – High (for 5-year update)	Yes	Yes	Yes	M

Notes:

1. H = High. L = Low. M = Medium. N = No. N/A = Not applicable. Y = Yes.

*This initiative has a Medium priority based on the prioritization scheme used in this planning process (implementation based on grant funding), however it is recognized that addressing repetitive and severe repetitive loss properties is considered a high priority by FEMA and SOEM (as expressed in the State HMP), and thus shall be considered a High priority for all participants in the planning process.

Explanation of Priorities

High Priority = A project that meets multiple objectives (i.e., multiple hazards), benefits exceeds cost, has funding secured or is an on-going project and project meets eligibility requirements for the Hazard Mitigation Grant Program (HMGP) or Pre-Disaster Mitigation Grant Program (PDM) programs. High priority projects can be completed in the short term (1 to 5 years).

Medium Priority = A project that meets goals and objectives, benefits exceeds costs, funding has not been secured but project is grant eligible under, HMGP, PDM or other grant programs. Project can be completed in the short term, once funding is completed. Medium priority projects will become high priority projects once funding is secured.

Low Priority = Any project that will mitigate the risk of a hazard, benefits do not exceed the costs or are difficult to quantify, funding has not been secured and project is not eligible for HMGP or PDM grant funding, and time line for completion is considered long term (1 to 10 years). Low priority projects may be eligible other sources of grant funding from other programs. A low priority project could become a high priority project once funding is secured as long as it could be completed in the short term.

Prioritization of initiatives was based on above definitions: Yes

Prioritization of initiatives was based on parameters other than stated above: Not applicable.

H.) FUTURE NEEDS TO BETTER UNDERSTAND RISK/VULNERABILITY

None at this time.

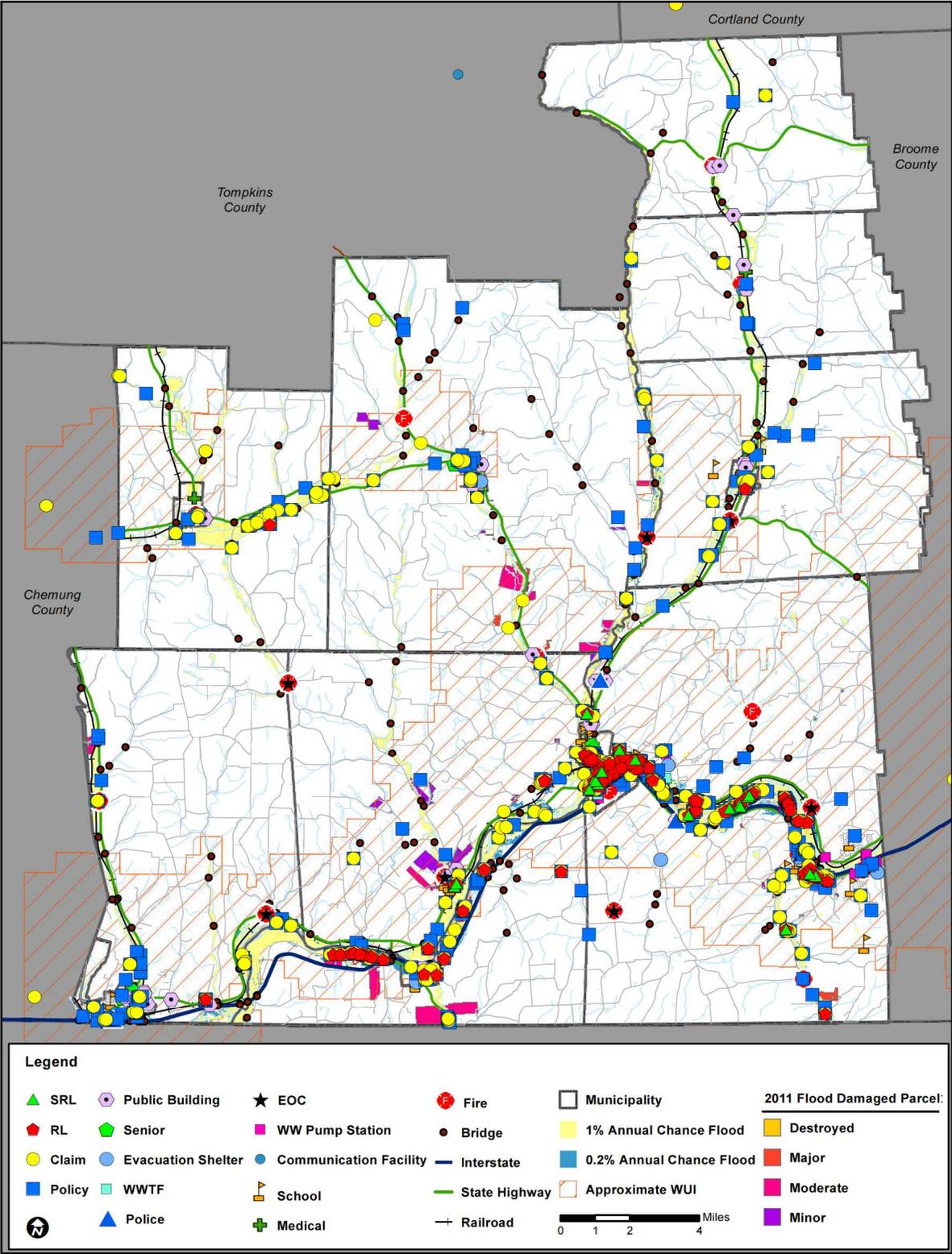
I.) HAZARD AREA EXTENT AND LOCATION

A hazard area extent and location map has been generated and is provided below for Tioga County to illustrate the probable areas impacted within Tioga County. This map is based on the best available data at the time of the preparation of this Plan, and is considered to be adequate for planning purposes. Maps have only been generated for those hazards that can be clearly identified using mapping techniques and technologies, and for which Tioga County has significant exposure. The Planning Area maps are provided in the hazard profiles within Section 5.4, Volume I of this Plan.

J.) ADDITIONAL COMMENTS

No additional comments at this time.

Figure 9.1-1. Tioga County Hazard Area Extent and Location Map



Sources: FEMA, 2011

Notes: NFIP = National Flood Insurance Program. RL = Repetitive Loss. SRL = Severe Repetitive Loss. The entire County is vulnerable to the following hazards: drought, earthquake, severe storm, and severe winter storm.

