

Section 3.0 – Risk Assessment

The following requirement(s) are met throughout this section:

- *§201.4(c)(2): [The State plan must include a risk assessment] that provides the factual basis for activities proposed in the strategy portion of the mitigation plan. Statewide risk assessments must characterize and analyze natural hazards and risks to provide a statewide overview. This overview will allow the State to compare potential losses throughout the State and to determine their priorities for implementing mitigation measures under the strategy, and to prioritize jurisdictions for receiving technical and financial support in developing more detailed local risk and vulnerability assessments.*
- **Requirement §201.4(c)(2)(i):** *[The State risk assessment shall include an overview of the] location of all natural hazards that can affect the State, including information on previous occurrences of hazard events, as well as the probability of future hazard events, using maps where appropriate*
- **Requirement §201.4(c)(2)(ii):** *[The State risk assessment shall include an] overview and analysis of the State’s vulnerability to the hazards described in this paragraph (c)(2), based on estimates provided in local risk assessments as well as the State risk assessment. The State shall describe vulnerability in terms of the jurisdictions most threatened by the identified hazards, and most vulnerable to damage and loss associated with hazard events. State owned critical or operated facilities located in the identified hazard areas shall also be addressed*
- **Requirement §201.4(c)(2)(iii):** *[The State risk assessment shall include an] overview and analysis of potential losses to the identified vulnerable structures, based on estimates provided in local risk assessments as well as the State risk assessment. The State shall estimate the potential dollar losses to State owned or operated buildings, infrastructure, and critical facilities located in the identified hazard areas.*

3.1 – New York State Hazard Identification

In its role as the staff arm of the State's Disaster Preparedness Commission (DPC) and coordinator of Federal Emergency Management Agency (FEMA) Programs in the State, SOEM has identified many natural, technological and human-caused hazards which have impacted, or could impact, New York State. However, given the scope of this plan, only relevant natural hazards are addressed and their operational definitions described below in **Table 3-1**.

**Table 3-1
Hazard Definitions**

Hazard Type	Definition
Natural Hazards	
Flood	<p>A general and temporary condition of partial or complete inundation on normally dry land from the following:</p> <ul style="list-style-type: none"> • Riverine flooding, including overflow from a river channel, flash floods, alluvial fan floods, and ice-jam floods. • Riverine flooding including dam-break floods; • Local drainage or high groundwater levels; • Fluctuating lake levels; • Coastal Flooding; • Coastal erosion

Hazard Type	Definition
Natural Hazards	
Hurricanes	Tropical cyclones, formed in the atmosphere over warm ocean areas, in which wind speeds reach 74 miles per hour or more and blow in a large spiral around a relatively calm center or "eye". Circulation is counterclockwise in the Northern Hemisphere.
Tornado	A local atmospheric storm, generally of short duration, formed by winds rotating at very high speeds, usually in a counterclockwise direction. The vortex, up to several hundred yards wide, is visible to the observer as a whirlpool-like column of winds rotating about a hollow cavity or funnel. Winds have been estimated to be in excess of 300 miles per hour.
Winter Storm (Severe)	Includes ice storms, blizzards and can be accompanied by extreme cold. The National Weather Service characterizes blizzards as being combinations of winds in excess of 35 miles per hour with considerable falling or blowing snow, which frequently reduces visibility.
Hail Storm	Showery precipitation in the form of irregular pellets or balls of ice more than 5 mm in diameter, falling from a cumulonimbus cloud.
Wildfire	Any instance of uncontrolled burning in grasslands, brush, or woodlands.
Drought	A prolonged period with no rain, particularly during the planting and growing season in agricultural areas. Limited winter precipitation accompanied by moderately long periods during the Spring and Summer months can also lead to drought conditions.
Extreme Temperatures (Heat and Cold)	Extreme Heat-Temperatures that hover 10 degrees or more above the average high temperature for the region and last for several weeks are defined as extreme heat. Extreme Cold-Although no specific definition exists for Extreme Cold, the following are characteristics of an Extreme Cold event in New York State: temperatures at or below zero degrees for an extended period of time. Note that Extreme Cold events are usually part of Winter Storm events but can occur during anytime of the year and have devastating effects on New York State agricultural production.
Earthquake	The sudden motion or trembling of the ground produced by abrupt displacement of rock masses, usually within the upper 10-20 miles of the earth's surface.
Landslide	The downward and outward movement of slope-forming materials reacting to the force of gravity. Slide materials may be composed of natural rock, soil, artificial fill, or combinations of these materials. The term landslide is generalized and includes rockfalls, rockslides, block glide, debris slide, earth flow, mud flow, slump, and other such terms.
Subsidence	Depressions, cracks, and sinkholes in the earth's surface which can threaten people and property. Subsidence depressions, which normally occur over many days to a few years, may damage structures with low strain tolerances such as dams, factories, nuclear reactors, and utility lines. The sudden collapse of the ground surface to form sinkholes, many yards wide and deep within the span of a few minutes to a few hours poses immediate threat to life and property.
Technological Hazards	
Table 3-1	
Power Failure	Any interruption or loss of electrical service due to disruption of power generation or transmission caused by accident, sabotage, natural hazards, equipment failure, or fuel shortage. A significant power failure is defined as any incident which would require the involvement of the local emergency management organization to coordinate provision of food, water, heating, shelter, etc.

The previously listed hazards that are defined in **Table 3-1** are the hazards that have been determined to be of concern for New York State and its citizens. Through extensive research and evaluation these hazards have proven the need for State and Local assessment. Again these hazards are: Flood (including flooding due to possible dam failure), Hurricane, Tornado, Winter Storm, Hail Storm, Wildfire, Drought, Extreme Temperatures Earthquake, Landslide, Subsidence, and Power Failure. It is the requirement of any Jurisdiction to accurately profile these hazards to the extent of their vulnerability of such hazards.

It is recommended that when conducting a risk assessment a Jurisdiction evaluate (1) the likelihood of an event occurring, (2) the impact on the population, and (3) the impact on property within the Jurisdiction. Jurisdictions should also take into account the affect that climate change may have on their vulnerability to each hazard, for example increased frequency of occurrence and/or severity.

3.2 - Risk Analysis

3.2.1 – U.S. Census Local Population & Housing Data

Table 3-2 shows the populations and percent population changes between the 2005 Census Estimate and 2009 Census Estimate, also shown is the number of housing units in 2009 per county. This information is very valuable in terms of assessing the potential vulnerability of population and housing.

**Table 3-2
U.S. Census Local Population and Housing Data**

County	2005	2009	2005-2009 Change	%Change 2005-2009	Housing Units 2005	Housing Units 2009
Albany	298,605	298,284	-321	- 0.11	129,972	134,071
Allegany	49,824	49,157	-667	- 1.34	27,783	25,057
Bronx	1,364,566	1,397,287	32,721	+ 2.34	497,321	513,425
Broome	196,103	194,630	-1,473	- 0.76	88,817	89,045
Cattaraugus	81,389	79,689	-1,700	- 2.13	39,975	40,749
Cayuga	80,532	79,526	-1,006	- 1.26	35,477	36,048
Chautauqua	134,998	133,503	-1,495	- 1.12	64,900	65,934
Chemung	88,351	88,331	-20	- 0.02	37,745	38,094
Chenango	50,994	50,620	-374	- 0.74	23,890	24,488
Clinton	81,690	81,618	-72	- 0.09	33,091	34,949
Columbia	62,839	61,618	-1,221	- 1.98	30,207	32,181
Cortland	48,315	47,996	-319	- 0.66	20,116	20,475
Delaware	46,820	45,514	-1,306	- 2.87	28,952	29,808
Dutchess	291,586	293,562	1,976	+ 0.67	106,103	113,343
Erie	923,820	909,247	-14,573	- 1.60	427,079	423,872
Essex	38,197	37,686	-511	- 1.36	23,115	24,577
Franklin	50,305	50,274	-31	- 0.06	23,936	24,623
Fulton	54,969	55,053	84	+1.53	27,787	28,216
Genesee	58,701	57,868	-833	- 1.44	24,190	24,594
Greene	48,917	48,947	30	+ 0.06	26,544	28,536
Hamilton	5,128	4,923	-205	- 4.16	7,965	8,359
Herkimer	62,873	62,236	-637	- 1.02	32,026	32,728
Jefferson	116,982	118,719	1,737	+ 1.46	130,384	58,197
Kings	2,511,408	2,567,098	55,690	+ 2.17	930,866	977,516
Lewis	26,199	26,157	-42	- 0.16	15,134	16,232
Livingston	63,497	62,871	-626	- 1.00	24,023	25,177
Madison	69,527	69,954	427	+ 0.61	28,646	29,842
Monroe	731,773	733,703	1,930	+ 0.26	304,388	314,761
Montgomery	48,634	48,616	-18	- 0.03	22,522	22,578
Nassau	1,355,194	1,357,429	2,235	+ 0.16	497,032	459,070
New York	1,606,275	1,629,054	22,779	+ 1.40	809,238	858,268
Niagara	215,508	214,557	-951	- 0.44	110,347	98,550
Oneida	231,563	231,044	-519	- 0.22	102,803	103,876
Onondaga	454,625	454,753	128	+ 0.03	196,633	203,238

Ontario	103,302	105,650	2,348	+ 2.22	42,647	46,178
Orange	370,074	383,532	13,458	+ 3.51	125,427	135,833
Orleans	42,723	42,051	-672	- 1.60	17,347	17,595
Oswego	121,978	121,377	-601	- 0.50	55,438	54,272
Otsego	62,474	61,602	-872	- 1.42	28,481	30,686
Putnam	99,228	99,265	37	+ 0.04	35,030	36,542
Queens	2,256,576	2,306,712	50,136	+ 2.17	823,394	846,095
Rensselaer	153,909	155,541	1,632	+ 1.05	66,120	69,329
Richmond	475,014	491,730	16,716	+ 3.40	164,414	180,104
Rockland	294,636	300,173	5,537	+ 1.84	94,973	99,642
Saratoga	213,245	220,069	6,824	+ 3.10	89,170	96,380
Schenectady	148,687	152,169	3,482	+ 2.29	65,032	66,665
Schoharie	31,911	31,529	-382	- 1.21	15,915	16,683
Schuyler	19,037	18,720	-317	- 1.69	9,181	9,496
Seneca	34,318	34,049	-269	- 0.79	14,794	14,937
St. Lawrence	110,072	109,715	-357	- 0.33	116,429	50,974
Steuben	97,287	96,552	-735	- 0.76	46,132	47,106
Suffolk	1,504,285	1,518,475	14,190	+ 0.93	671,090	545,917
Sullivan	75,591	75,828	237	+ 0.31	44,730	49,239
Tioga	50,673	50,064	-609	- 1.22	21,410	21,914
Tompkins	99,698	101,779	2,081	+ 2.04	38,625	41,031
Ulster	181,305	181,440	135	+ 0.07	77,656	82,329
Warren	65,322	66,021	699	+ 1.06	34,852	37,890
Washington	62,070	62,753	683	+ 1.09	26,794	28,726
Wayne	92,175	91,291	-884	- 0.97	45,521	40,371
Westchester	947,719	955,962	8,243	+ 0.86	365,549	361,609
Wyoming	42,257	41,398	-859	- 2.07	16,940	17,322
Yates	24,618	24,482	-136	- 0.56	12,064	12,539

New York State's large size, varying climate, and large population make hazard mitigation essential for sustained quality of life for the citizen of the State. Hazard mitigation begins with *hazard identification*.

Figure 3-1



3.2.2- Use of Planning Tools in Local Plan Development

Jurisdictions that initiate the development of a Multi-Hazard Mitigation Plan must become completely aware of the FEMA requirements related to hazard identification and profiling. Specifically, jurisdictions are required to fully profile **all natural hazards that impact their jurisdiction**, thus it is essential to use various sources of data to identify the hazards which must be fully profiled in local plans. It is not sufficient to rely on local information or the memory of planning committee members to determine if a hazard has ever occurred. Research must be extended to include information from national and state hazard-related sources. A good general rule of thumb is that all jurisdictions in New York State should fully profile each of the hazards included in the New York State Hazard Mitigation Plan. If a hazard is omitted from a local plan, it is obligatory that a justification be written into the local plan for not including a specific hazard which is profiled in the New York State Hazard Mitigation Plan. FEMA standards will not accept a rationale that local opinion did not support the significance of earthquakes as a potential hazard or that a hazard was ranked very low. Again, the requirement is to fully profile all natural hazards that may impact the jurisdiction.

GIS and the Hazard Mitigation Plan

A statistic that is often associated with the growth of Geographic Information Systems (GIS) technology is that an estimated 80% of all government data is “geographic information,” meaning the data relates to real world locations. For instance, a highway department’s pavement maintenance records, chemicals released from a toxic spill and recorded by an environmental agency, property records from a town assessor, and crime scenes from a police department are all

examples of geographic information. The GIS revolution is characterized by widespread adoption of these systems at the federal, state and local level with significant percentages of government's data now managed within a GIS.

The central value of a GIS is that it enables spatial analysis. This includes the spatial relationships between data of the same type, such as population distribution, as well as the relationships between disparate data, such as population distribution and toxic chemicals released into the environment. Importantly, a GIS provides for the ability to see or visualize data in the form of a map, providing an effective way to comprehend information in a way that tabular or text based information alone can not provide.

Like many activities of government, successful hazard mitigation requires an understanding of geography, including knowledge of the spatial relationships between hazards and the population and property at risk. On the one hand, GIS can be used to help define the location and extent of hazardous areas, which is a requirement of the hazard mitigation plan (§201.4(c)(2)(i)). An example of using GIS to for hazard identification is demonstrated by the "Landslide Susceptibility Pilot Study of Schenectady County, NY" found in Section 3.13 of this document. On the other hand, the technology can be used to identify and estimate potential damages to the property and populations exposed in these hazardous areas, which is another requirement of the hazard mitigation plan (§201.4(c)(2)(ii)). An example of the use of GIS for natural hazard vulnerability analysis is demonstrated in this plan's "100-Year Floodplain Property Exposure Analysis."

The role of GIS in the hazard mitigation plan is primarily in the Risk Assessment Section (Section 3). In addition to the landslide hazard identification and 100-year floodplain property vulnerability analysis examples, GIS is used extensively in the Risk Assessment Section for earthquakes, hurricanes, winter storms, hail storms, and extreme heat.

While state level agencies are more likely to have GIS resources available to support the Hazard Mitigation Plan, the level and extent of GIS resources available at the county and municipal level for plan development is less certain. There are varying levels of GIS resources (staff, hardware, software, and data) within county and local government. It is important for local governments that have limited GIS resources to maximize the resources they do have. GIS staff and the various agencies they are associated with need to be brought into the planning process and become members of the planning team. For instance, a county may have considerable GIS resources within its assessor's office but not within the emergency management agency or another department that has the specific charge to prepare the Hazard Mitigation Plan. The requirement for partnerships and collaboration between agencies called for in the planning guidance is particularly acute in these instances.

As many municipal governments have insufficient GIS resources available to support the Hazard Mitigation Plan, a multi-jurisdictional plan approach that leverages the GIS resources at the county level should be considered as a viable option. Additional options include support from university GIS departments. Many institutions will recognize the valuable educational opportunity for students and faculty that participating in the local plan can provide. There are also a number of regional planning entities in New York State with GIS capabilities that believe hazard mitigation planning is consistent with their mission. Bringing these organizations into the planning team can provide not only access to GIS but also a wealth of expertise in areas of relevance to the Hazard Mitigation Plan. Still another option is to consider contracting with a private sector firm. A number of firms provide GIS services, including some that specifically contract for hazard mitigation plan development.

Regardless of where local governments seek GIS support or what organizations they establish partnerships with for their Hazard Mitigation Plan, there are two critical GIS resources that all hazard mitigation planners should be aware of:

- 1) New York State GIS Coordination Program and the associated New York State GIS Clearinghouse: <http://www.nysgis.state.ny.us/>
- 2) HAZUS-MH, FEMA's GIS based software program for estimating potential losses to earthquakes, wind and floods:
<http://www.fema.gov/plan/prevent/haus/index.shtm>
<http://www.haus.org/>

The New York State GIS Coordination Program provides access to an extensive repository of useful GIS data as well as a host of technical resources, references and training opportunities that can facilitate the Hazard Mitigation Plan. It is strongly recommended that counties and local governments not already enrolled in the New York State GIS Data Sharing Cooperative consider joining as this will expand the data and resources they can access through the NYS GIS Clearinghouse. For instance, several of the datasets used in this plan are accessible through this site. These include, among other datasets, the NYS Office of Real Property (RPS) property parcels and the FEMA Q3 digital floodplain data used in the 100-year floodplain property exposure analysis.

FEMA has developed HAZUS-MH as its primary, nationally standardized tool for hazard mitigation risk assessment. At this time HAZUS-MH can be used for earthquake, hurricane winds or flooding scenarios. The use of HAZUS in a Hazard Mitigation Plan is encouraged by FEMA and can be considered a plus in plan evaluation and approval. The software enables both deterministic (e.g. user determines location for various scenarios) and probabilistic modeling (e.g. calculate annualized potential losses for earthquake, hurricane wind or flooding hazards within your community). While the software provides for more advanced modeling requiring greater GIS background and engineering knowledge, HAZUS is known for the ease of use in the default mode. Consequently, this tool can be used by individuals with little or no GIS experience.

Comment [NF1]: This re-worded paragraph meets FEMA's Crosswalk Required Revision for section 9A found on pg. 16 to update the description of HAZUS-MH.

HAZUS-MH training opportunities are available at FEMA's Emergency Management Institute in Emmitsburg, Maryland: <http://training.fema.gov/> (As funding for staff training is limited, it should be noted that applicants accepted into EMI courses will have their travel costs reimbursed and lodging is provided).

3.2.3- FEMA Profiling Requirements

The FEMA requirements call for a full profiling of all natural hazards that impact a jurisdiction. Specifically, the Risk Assessment regulation (201.6. (c)(2)(i)) requires that *"the plan include a description of all natural hazards that affect the jurisdiction."*

There are FEMA requirements for plans to specifically address the following in their risk assessment: Location, Extent, Previous Occurrences, and Probability of Future Events. The FEMA "How to Guide: Understanding Your Risks" (FEMA 386-2) must be consulted throughout development of the risk assessment development phase of your plan. In addition, FEMA Region II has a "Tool Kit" http://www.fema.gov/about/regions/regionii/toolkit_mit.shtm that provides numerous tables and formats to assist in meeting requirements for plan approval. The FEMA requirements relating to the hazard profile/description section of a plan are provided

in the following paragraphs to help guide jurisdictions toward full compliance with the requirements.

The description of each hazard **shall** include the following information:

- The **location** or geographical areas in the community that would be affected.
- The hazard **extent** (i.e., magnitude or severity) of potential hazard events. For those hazards not geographically determined, plans **shall** indicate their applicable intensity. For example, in areas where tornadoes occur, plans *should* indicate the recorded intensities of previous events.
- The **probability**, likelihood, or frequency that the hazard event would occur in an area.

The plan **shall** also provide a discussion of **past occurrences** of hazard events in or near the community. This discussion *should* include:

- Information on the damages that occurred (e.g., costs of recovery, property damage, and lives lost) to the extent practicable.
- Level of severity (i.e., flood depth or extent, wind speeds, earthquake intensity, etc.).
- Duration of event.
- Date of occurrence.
- Sources of information used or consulted for assembling a history of past occurrences.

When appropriate, the hazard analysis *should* also identify on a map the areas affected by each identified hazard. Additionally, a composite map (i.e., a map showing combined information from different thematic map layers) *should* be provided for hazards with a recognizable geographic boundary (i.e., hazards that are known to occur in particular areas of the jurisdiction, such as floods, coastal storms, wildfires, and landslides).

The characterization of hazards *should* describe the conditions, such as topography, soil characteristics, meteorological conditions, etc., in the area that may exacerbate or mitigate the potential effects of hazards. The hazard analysis *should* be detailed enough to allow identification of the areas of the jurisdiction that are most severely affected by each hazard.

The plan *should* describe the analysis or sources used to determine the probability, likelihood, or frequency of occurrence as well as the severity or magnitude of future hazard events. The plan *should* note any data limitations and create mitigation strategy actions for obtaining the limited data to improve future risk analysis efforts.

As mentioned above, planning jurisdictions are strongly encouraged to utilize the “How to Guides” and the Region II “Tool Kit” as they prepare their mitigation plan. In addition, the plan will have a greater likelihood of receiving FEMA approval if a specific effort is made to review the plan approval criteria in detail using the Local Hazard Mitigation Plan Review Crosswalk Form, and assuring that each element of the requirement is fully addressed in the plan.

3.2.4 - Description of State Facilities

The State of New York owns and operates more than 16,000 building facilities statewide representing more than 210 million gross square feet of space. State-owned buildings are located in every County of the State and all of New York’s major cities. Albany, New York’s State Capital, is located on the Hudson River, approximately 150 miles north of New York City. The largest, single concentration of State-owned and operated facilities is located in the City of Albany and its environs. **Table 3-3**, provides a list of the various State agencies that utilize State-owned and -leased space throughout the State of New York. Agencies in **bold** directly manage State owned and leased properties.

Table 3-3 New York State Entities
Adirondack Park Agency
Aging, Office for the
Agriculture and Markets, Department of
Alcoholism and Substance Abuse Services, Office of
Attorney General, Office of the
Banking, Department of
Budget, Division of the
Children and Family Services, Office of
City University of New York
Civil Service, Department of
Community Renewal, Office of
Correctional Services, Department of
Correctional Services, Division of Industries (Corcraft), Department of
Court Administration Office of
Criminal Justice Services, Division of
Dormitory Authority
Education, Department of
Emergency Management, State Office of (SEMO)
Empire State Development
Energy Research and Development Authority
Environmental Conservation, Department of
Environmental Facilities Corporation
Family Assistance, Department of
General Services, Office of
General Services, Office of
Health, Department of
Homeland Security, Office of
Housing and Community Renewal, Division of
Human Rights, Division of
Insurance, Department of
Labor, Department of
Mental Health, Department of
Metropolitan Transportation Authority
Military and Naval Affairs, Division of
Motor Vehicles, Department of
New York Power Authority
New York State Canal Corporation
New York State Bridge Authority
New York State Division of Parole
New York State Division of Probation and Correctional Alternatives
New York State Office for the Prevention of Domestic Violence
New York State Environmental Facilities Corporation
New York State Housing Finance Agency
New York State Racing and Wagering Board
Office of Mental Health

Table 3-3 New York State Entities
Office for People with Developmental Disabilities
Olympic Regional Development Authority
Parks, Recreation and Historic Preservation, Office of
Port Authority of New York and New Jersey
Power Authority
Public Service Commission
Real Property Services, Office of
State, Department of
State Comptroller, Office of
State Police, Division of
State University Construction Fund
State University of New York
Tax Appeals, Division of
Taxation and Finance, Department of
Technology, Office for
Temporary and Disability Assistance, Office of
Thruway Authority
Transportation, Department of

3.3 – Profiling Hazard Events, Assessing Vulnerability, and Estimating Loss

Each of the following hazard-specific sections includes an overview of the location of natural hazards that can affect the State, with maps provided when available and appropriate, and information on previous occurrences of hazard events and the probability of future hazard events. Additionally, these sections describe locations of jurisdictions most threatened and vulnerable to previously identified hazards and possible potential losses.

3.3.1 – Past Major Disaster Events

From 1956 through the present, all but five of the disasters or emergencies that were declared major disasters or emergencies have been the result of damages from severe floods, hurricanes, coastal storms, and severe winter storms. The five disaster declarations that do not fall into those categories are: the Love Canal, the World Trade Center Bombing in 1993, the Long Island Wildfires in 1995, the September 11, 2001 Terrorist Attacks, and the April 2002 Earthquake.

Table 3-4 and Figure 3-2 provide a listing of New York's disaster and emergency declarations. The disaster history demonstrates the wide variety of disaster types and locations where disasters have occurred in the State. Following many of these disasters, especially since 1996, post-disaster strategy reports have been prepared. These reports, among other things, identify the hazards which caused the disasters or emergencies, assess the severity of the events and the factors contributing to the severity, and make recommendations for the implementation of mitigation and other emergency management actions. As appropriate, elements of these reports were used in the development of the State's Hazard Mitigation Plan. The losses attributed to the listed events range from minor property damage such as streambank erosion and basement flooding, to catastrophic and devastating losses, such as loss of human life and destruction of many homes and businesses resulting in severe Regional and State economic impact.

Table 3-4

FEMA Historical Disaster Declarations

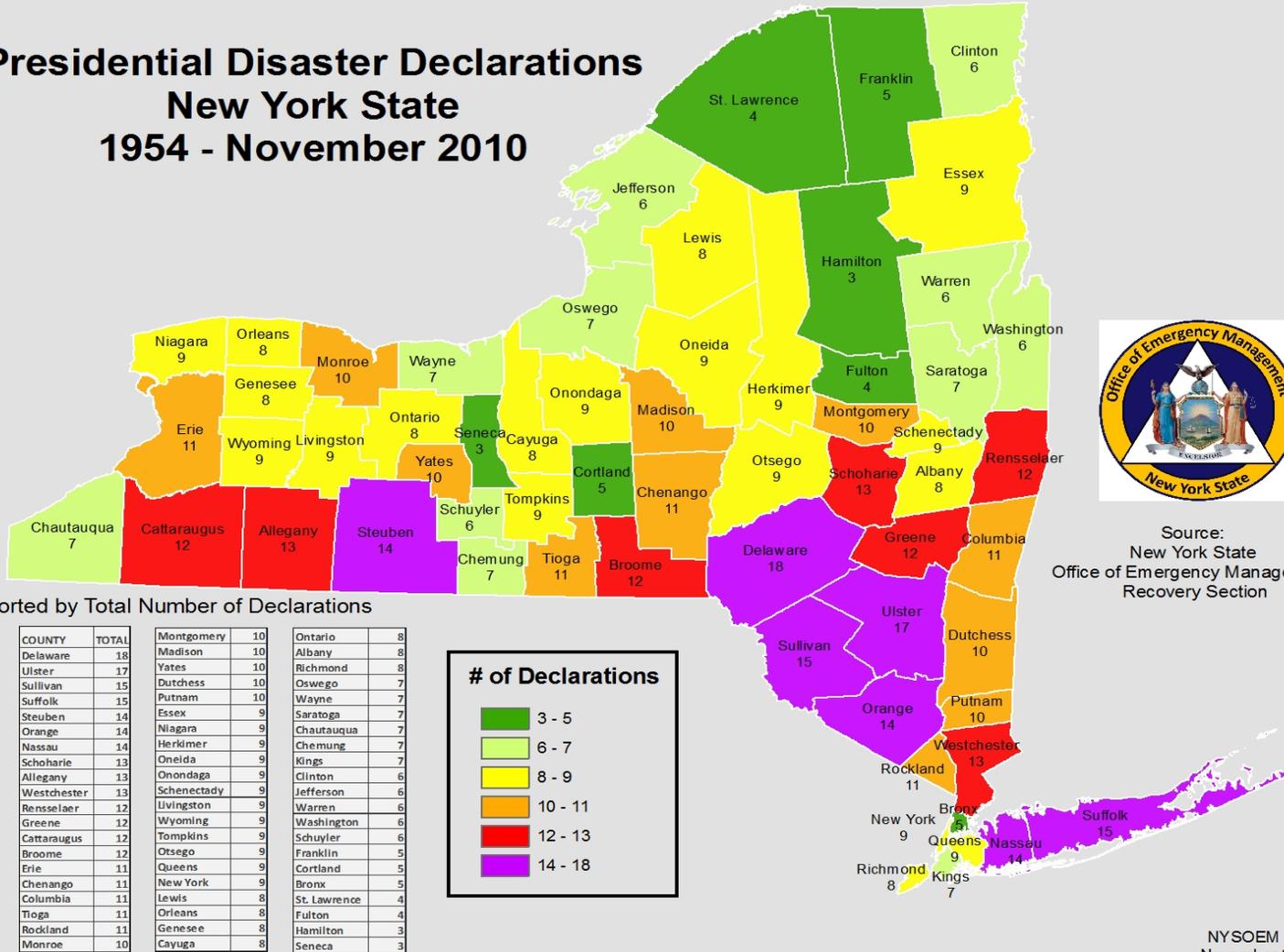
Disaster #	Type/Location/Date Declared/Damages
DR-702	Flooding, Southeastern N.Y.S., declared 4/17/84 Total Eligible Damages: \$11.9 million
DR-725	Flooding, Western N.Y.S., declared 9/25/84 Total Eligible Damages: \$3.3 million
DR-733	Flooding, Northern N.Y.S., declared 3/21/85 Total Eligible Damages: \$1.6 million
DR-734	Flooding, Buffalo/Niagara Falls Area, declared 3/22/85 Total Eligible Damages: \$1.1 million
DR-750	Hurricane Gloria, Long Island, declared 10/18/85 Total Eligible Damages: \$48.5 million
DR-792	Flooding, East Central N.Y.S., declared 5/15/87 Total Eligible Damages: \$3.6 million
DR-801	Snowstorm, East Central N.Y.S., declared 11/10/87 Total Eligible Damages: \$13.5 million
DR-898	Ice storm, West Central N.Y.S., declared 3/18/91 Total Eligible Damages: \$52,441,937
DR-918	Hurricane Bob, Long Island, declared 9/16/91 Total Eligible Damages: \$11,786,640
DR-974	Winter storm, Southeast N.Y.S., declared 12/21/92 Total Eligible Damages: \$31,229,797
DR-984	World Trade Center Bombing, NYS, declared 4/2/93 Total Eligible Damages: \$4,036,035
EM-3107	Statewide Blizzard, declared 3/17/93 Total Eligible Damages: \$8,473,684
FSA-2115	Long Island Wildfires, declared 8/24/95 Total Eligible Damages: \$5 million
DR-1083	Southern New York Blizzard, declared 1/12/96 Total Eligible Damages: \$21,368,854
DR-1095	Severe Flooding, declared 1/24/96 Total Eligible Damages: \$160,048,147
DR-1146	Severe coastal flooding and storm water back-up, declared 11/19/96 Total Eligible Damages: \$16,173,532
DR-1148	Severe Flooding, declared 12/9/96 Total Eligible Damages: \$25,628,778
DR-1196	North Country Ice Storm, declared 1/10/98 Total Eligible Damages: \$68,139,916
DR-1222	Tornado, declared 6/16/98 Total Eligible Damages: \$6,990,031
DR-1233	Severe flooding, declared 7/7/98 Total Eligible Damages: \$27,835,187

Disaster #	Type/Location/Date Declared/Damages
DR-1244	Labor Day Wind Storm, declared 9/11/98 Total Eligible Damages: \$36,061,845
DR-1296	Tropical Storm Floyd, declared 9/19/99 – Eastern NYS Total Eligible Damages: \$62,201,000
DR-1335	Flooding, declared 7/21/00 – Statewide Total Eligible Damages: \$34,687,797
DR-1391	Terrorist Attack, declared 9/11/01 - NYC Total Eligible Damages: \$6,052,138,000
DR-1404	Snowstorm, declared 3/1/02 – Western NYS Total Eligible Damages: \$8,175,000
DR-1415	Earthquake, declared 5/16/02 – Northeastern NYS Total Eligible Damages: \$2,947,653
DR-1467	April Ice Storm, declared 5/12/03 – Central NYS Total Eligible Damages: \$41,451,943
EM-3138	To Be Determined
EM-3157	To Be Determined
EM-3186	New York Power Outage, declared 8/23/03 – Statewide
DR-1486	Severe Storms, Tornadoes and Flooding, declared 8/29/03-Cent&WNYS Total Eligible Damages: \$23,238,095
DR-1534	Severe Storms and Flooding, declared 8/3/04 Central and Western NYS Total Eligible Damages: \$14,000,000
DR-1564	Severe storms and flooding , declared 10/01/04 Western, Central and Northern NYS Total Eligible Damages \$18,027,000
DR-1565	Tropical Depression Ivan, declared 10/1/04 Southern Tier and Catskills Total Eligible Damages \$15,099,000
DR-1589	Severe Storms and flooding, declared 4/19/05 Southern Tier, Capital District, Catskills Total Eligible Damages \$66,210,000
DR-1650	Severe Storms and flooding, declared 7/1/06 Southern Tier, Central, Catskills NYS Total Eligible Damages \$246,325,000
DR-1665	Severe Storms and flooding, declared 10/24/06 Western NYS Total Eligible Damages \$141,579,000
DR-1670	Severe Storms and flooding, declared 12/12/06 Southern Tier, Central, Catskill NYS Total Eligible Damages \$32,587,000
DR-1692	Severe Storms and inland and coastal flooding, declared 4/27/07 Catskill & Lower Hudson Valley NYS Total Eligible Damages - \$12,760,000
DR-1710	Severe Storms and flooding, declared 7/2/07 Delaware Co. NYS Total Eligible Damages – not yet available

Disaster #	Type/Location/Date Declared/Damages
DR-1724	Severe storms, flooding and tornado, declared 8/31/2007 Queens County Total Eligible Damages \$5,100,000
DR-1827	Severe winter storm, declared 3/4/2009, IA Albany, Columbia, Delaware, Greene, Rensselaer, Saratoga, Schenectady, Schoharie, and Washington Counties Total Eligible Damages \$23,993,000
DR-1857	Severe storms and flooding, declared 9/1/2009, IA – Cattaraugus, Chautauqua & Erie Counties, PA – Allegany, Cattaraugus, Chautauqua, Chenango, Cortland, & Erie Counties, Total Eligible Damages \$45,440,000.
DR-1869	Severe storms and flooding associated with tropical depression Ida and a Nor'easter, declared 12/31/2009, PA – Nassau and Suffolk Counties, Total Eligible Damages \$44,440,000
DR-1899	Severe storms and flooding, declared 4/16/2010, PA Nassau, Orange, Richmond, Rockland, Suffolk & Westchester Counties, Total Eligible Damages \$78,700,000.

Figure 3-2

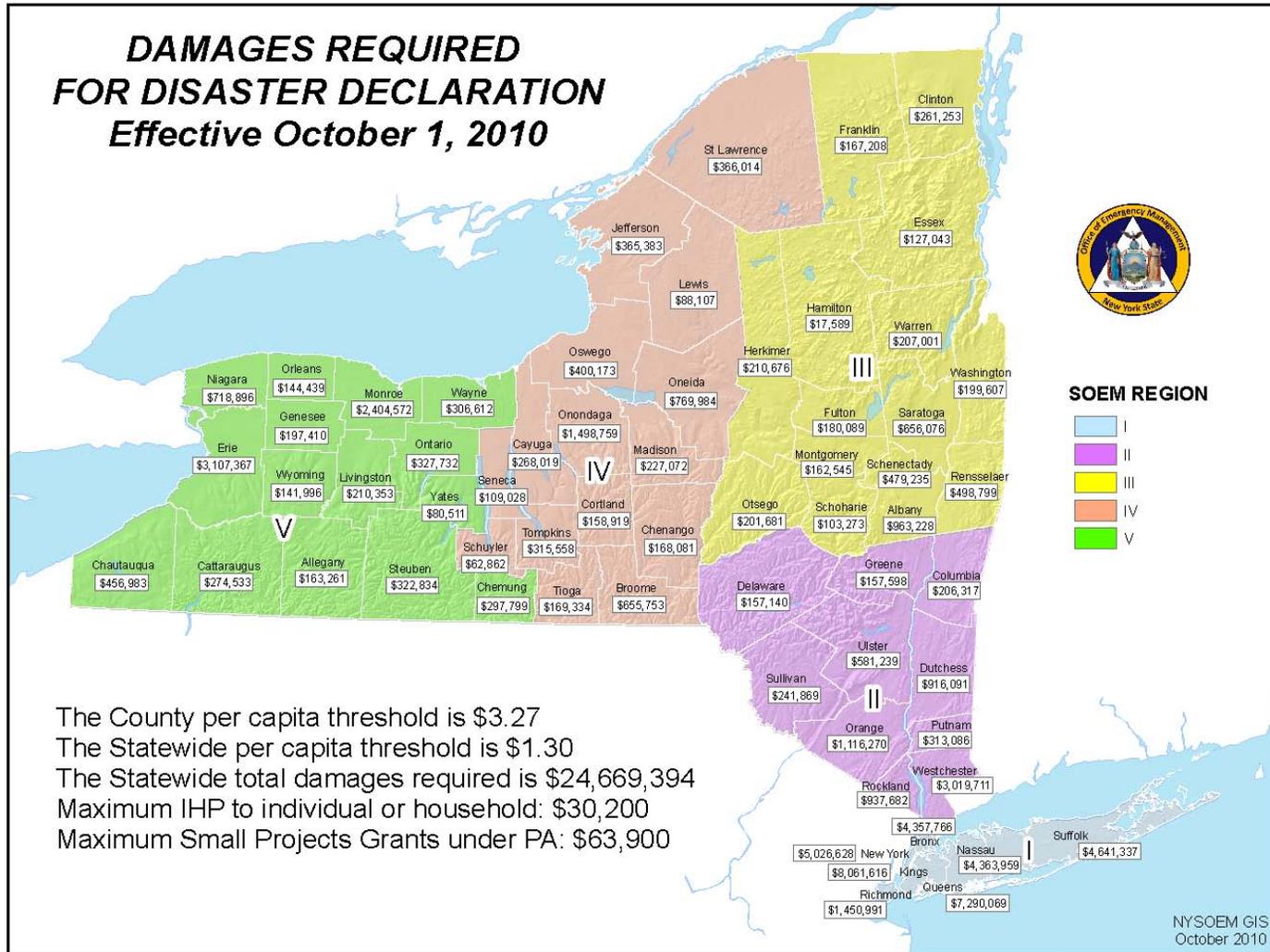
Presidential Disaster Declarations New York State 1954 - November 2010



Source:
New York State
Office of Emergency Management
Recovery Section

NYSOEM GIS
November 2010

Figure 3-3
Amount of Damage Per Capita required to meet the requirements for a Presidential Disaster Declaration.



3.3.1 – Climate Change

While New York State has carefully outlined the natural hazards that threaten our communities in the pages that follow, the State recommends that elected officials, planners, and the emergency response/mitigation community recognize the potential for the changing nature of climate. As the changing climate affects the State's weather, threats and hazards can evolve. "Temperature increases and sea level rise are already occurring and, along with other climate changes, will continue to occur and (*potentially*) accelerate in the future. Climate change is extremely likely to bring warmer temperatures to (*many localities throughout NYS*). Heat waves are very likely to become more frequent, intense, and longer in duration. Total annual precipitation will more likely than not increase and brief, intense rainstorms are also likely to increase. Towards the end of the 21st century, it is more likely than not, that droughts will become more severe. Additionally, rising sea levels are extremely likely, and are very likely to lead to more frequent and damaging flooding related to coastal storm events in the future. "

[Annals of New York Academy of Science: Volume 1196: Climate Change Adaptation in New York City: Building a Risk Management Response: New York City Panel on Climate Change 2010 Report, May 2010.]

Therefore it is recommended that Jurisdictions that are developing or updating their local Hazard Mitigation Plans take into account the effects that climatic change may have on their vulnerability to specific hazards. A number of statewide and regional panels and task forces have been established to begin to address the issue of adaptation and community resiliency to climate change. Representatives from the NYC Mayor's Office, NYS OEM, NYS DEC, NYS DOS and other agencies have participated on these panels and task forces. Some of these panels and task forces have produced guidance documents and climate adaptation assistance tools that Hazard Mitigation Planners and elected officials may find of use in developing or updating local Hazard Mitigation Plans, including the following:

(Ctrl + click to follow the links to various Climate Change related web sites)

1. NYS Legislative Sea Level Rise Task Force

- <http://www.dec.ny.gov/energy/50399.html>
- <http://www.dec.ny.gov/energy/45202.html>
- [draft report](#)

2. NYC Panel on Climate Change

- <http://www3.interscience.wiley.com/journal/123443047/issue?CRETRY=1&SRETRY=0>
- <http://www3.interscience.wiley.com/cgi-bin/fulltext/123443052/HTMLSTART>
- <http://www3.interscience.wiley.com/cgi-bin/fulltext/123443048/HTMLSTART>
- <http://www3.interscience.wiley.com/cgi-bin/fulltext/123443061/HTMLSTART>

3. ClimAid

- http://www.nyserda.org/programs/Environment/EMEP/climate_change_newyork_impacts.asp
- http://www.nyserda.org/programs/Environment/EMEP/conference_2009/presentations/Solecki_DeGaetano_Horton_Climate%20Change%20in%20New%20York%20State.pdfIntegrated

- [Assessment for Effective Climate Change Adaptation Strategies in New York State \(ClimAID\)](#), funded by the New York State Energy Research and Development Authority (NYSERDA), provides the best available scientific information specific to New York State.
4. The interim report of the [Climate Action Council](#)