

# Multi-Jurisdictional Natural Hazard Mitigation Plan Ulster County, New York

Prepared for



Ulster County Department of Emergency Communications/Emergency Management  
238 Golden Hill Lane  
Kingston, NY 12401

Prepared by

**URS**

201 Willowbrook Boulevard, Third Floor  
Wayne, New Jersey 07470-7005

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## PLAN ADOPTION RESOLUTIONS

In accordance with Part 201.6 of the Disaster Mitigation Act of 2000 (DMA 2000), Ulster County, New York, has developed this Multi-Jurisdictional Hazard Mitigation Plan to identify hazards that threaten the County and ways to reduce future damages associated with these hazards.

Following this page are the signed adoption resolutions of the County and all participating jurisdictions that have adopted this plan, authorizing municipal government staff to carry out the actions detailed herein.

*Signed resolutions of adoption by all participating jurisdictions shall be inserted following this page after FEMA has reviewed and determined that the Draft plan is approvable.*

**EXECUTIVE SUMMARY**

Across the United States and around the world, natural disasters occur each day, as they have for thousands of years. As the world's population and development have increased, so have the effects of these natural disasters. The time and money required to recover from these events often strain or exhaust local resources. The purpose of hazard mitigation planning is to identify policies, actions, and tools for implementation that will, over time, work to reduce risk and the potential for future losses. Hazard mitigation is best realized when community leaders, businesses, citizens, and other stakeholders join together in an effort to undertake a process of learning about hazards that can affect their area and use this knowledge to prioritize needs and develop a strategy for reducing damages.

Section 322, Mitigation Planning, of the Robert T. Stafford Disaster Relief and Emergency Assistance Act (the Stafford Act), enacted by Section 104 of the Disaster Mitigation Act of 2000 (DMA 2000), provides new and revitalized approaches to mitigation planning. Section 322 continues the requirement for a State mitigation plan as a condition of disaster assistance, and establishes a new requirement for local mitigation plans. In order to apply for Federal aid for technical assistance and post-disaster funding, local jurisdictions must comply with DMA 2000 and its implementing regulations (44 CFR Part 201.6).

While Ulster County has always sought ways to reduce their vulnerability to hazards, the passage of DMA 2000 helped County officials to recognize the benefits of pursuing a long-term, coordinated approach to hazard mitigation through hazard mitigation planning. The County has received grant funds from the Federal Emergency Management Agency (FEMA) for the purpose of developing this very hazard mitigation plan. Funding was received under the Pre-Disaster Mitigation Grant Program for development of a multi-jurisdictional hazard mitigation plan for the County and as many of its 24 municipalities that chose to participate. This **Ulster County Multi-Jurisdictional Natural Hazard Mitigation Plan** represents the collective efforts of the county and 12 participating jurisdictions, the general public, and other stakeholders. Natural disasters cannot be prevented from occurring. However, over the long-term, the continued implementations of this Plan will gradually, but steadily, lessen the impacts associated with hazard events.

The Ulster County Multi-Jurisdictional Hazard Mitigation Plan has been developed by the Ulster County Hazard Mitigation Planning Team (the "Planning Team"), with support from outside consultants. The efforts of the Planning Committee were headed by the Director of the Ulster County Department of Emergency Communications/Emergency Management (UCECEM). The Planning Committee was supplemented by a Core Planning Group (CPG) and Jurisdictional Assessment Teams (JATs), with one JAT for each of the County's participating jurisdictions.

The plan development process was initiated in earnest in the fall of 2007 with the project initiation meeting held on October 25, 2007. A Kickoff Meeting of the full Core Planning Group was conducted on December 11, 2007. Thereafter, the Core Planning Group met on June 19, 2008; July 17, 2008; and August 7, 2008. Jurisdictional Assessment Teams met individually throughout the plan development process as they deemed necessary.

Community support is vital to the success of any hazard mitigation plan. The Planning Committee provided opportunities for participation and input of the public and other stakeholders throughout the plan development process, both prior to this Draft and before approval of the Final plan, providing citizens and other stakeholders with opportunities to take part in the decisions that will affect their future. On a mitigation planning section of the Ulster County web site, the UCECEM posted information on the plan development process and where to go for additional information or comments beginning in early 2008; this web site has been and continues to be maintained and updated regularly. The County also conducted

numerous other outreach actions throughout the planning process. The public and other stakeholders were invited to attend all of the five Core Planning Group Meetings and were also invited to respond to a survey that was posted on the UCECEM mitigation planning web site. They also spoke about the Mitigation Plan at a meeting of Local Emergency Planning Coordinators and CPG members on January 31, 2008. Jurisdictional Assessment Team members supplemented County efforts by reaching out to the public and other stakeholders within their respective jurisdictions to get the word out through various means and provide opportunities for feedback and participation.

The hazard mitigation planning process consisted of the following key steps:

- Researching a full range of natural hazards to identify which hazards could affect the County;
- Identifying the location and extent of hazard areas;
- Identifying assets located within these hazard areas;
- Characterizing existing and potential future assets at risk;
- Assessing vulnerabilities to the most prevalent hazards; and
- Formulation and prioritization of goals, objectives, and mitigation actions to reduce or avoid long-term vulnerabilities to the identified hazards.

Natural hazards that can affect Ulster County that were studied in detail in the Plan are as follows:

- **Atmospheric hazards**, including: extreme temperatures, extreme wind, hurricanes and tropical storms, lightning, nor'easters, tornadoes, and winter storms;
- **Hydrologic hazards**, including: flooding, drought, and dam failures;
- **Geologic hazards**, including: earthquakes and landslides; and
- **Other hazards**, including: wildfires.

After evaluating these hazards and assets within the County to which they are vulnerable, the Planning Team developed a mitigation strategy to increase the disaster resistance of the County, along with procedures for monitoring, evaluating and updating the Plan to ensure that it remains a living document.

This Draft Plan is currently under review by the Planning Team, NYSEMO, FEMA, and the public and other stakeholders. Later, comments will be incorporated, and the County and all participating jurisdictions will each formally adopt the Final Plan. The Final Plan will include copies of adoption resolutions following Page i.

If you have any questions or comments on the Multi-Jurisdictional Natural Hazard Mitigation Plan for Ulster County, New York, additional information can be obtained by contacting:

Art Snyder  
Ulster County Department of Emergency Communication/Emergency Management  
Director:  
238 Golden Hill Lane  
Kingston, NY 12401  
Phone: 845-331-7000  
Fax: 845-331-1738  
E-Mail: [asny@co.ulster.ny.us](mailto:asny@co.ulster.ny.us)

## ACKNOWLEDGEMENTS

Throughout the plan development process, the UCECEM worked tirelessly to involve all of its 24 municipalities. These local jurisdictions were not only invited to participate but were truly guided through the process by UCECEM at every stage.

The following municipal entities (Ulster County and 12 of its constituent municipalities) actively participated in the development of this plan:

*County of Ulster*

*Gardner, Town of  
Hurley, Town of  
Kingston, Town of  
Kingston, City of*

*Lloyd, Town of  
Marbletown, Town of  
Marlborough, Town of  
Rosendale, Town of*

*Saugerties, Town of  
Shandaken, Town of  
Shawangunk, Town of  
Ulster, Town of*

In addition, the records show that the following stakeholder entities participated by attending at least one meeting and/or responding to at least one questionnaire.

*American Red Cross, Ulster County Chapter  
The Kingston Hospital  
The New York State Thruway Authority*

URS Corporation (Wayne, NJ) acted as the plan development consultant providing hazard mitigation planning services.



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## SECTION 1 - INTRODUCTION

### Purpose

Ulster County is susceptible to a number of different natural hazards. These natural hazards have the potential to cause property loss, loss of life, economic hardship, and threats to public health and safety. While an important aspect of emergency management deals with disaster recovery ó those actions that a community must take to repair damages and make itself whole in the wake of a natural disaster ó an equally important aspect of emergency management involves hazard mitigation. Hazard mitigation measures are efforts taken *before* a disaster happens to lessen the impact that future disasters of that type will have on people and property in the community. They are things you do today to be more protected in the future.

Recognizing the risks that natural hazards pose to Ulster County, the Ulster County Department of Emergency Communications/Emergency Management submitted an application, and was approved for, grant monies from the Federal Emergency Management Agency (FEMA) under the Pre-Disaster Mitigation Program in 2006, to be used to develop a hazard mitigation plan for the County.

This **Ulster County Multi-Jurisdictional Natural Hazard Mitigation Plan** (the "Plan") has been developed by the Ulster County Hazard Mitigation Planning Committee (the "Planning Committee"), with support from outside consultants at URS Corporation ("URS," the contractor responsible for providing the Planning Committee with hazard mitigation planning support services). The Plan represents the collective efforts of citizens, elected and appointed government officials, business leaders, volunteers of non-profit organizations, and other stakeholders.

Through the development of this Plan, the Planning Committee has identified the natural hazards that could affect the County, and has evaluated the risks associated with these hazards. The successful implementation of this Plan will make Ulster County more disaster-resistant because the County has taken the initiative to recognize the benefits that can be gained by planning ahead and taking measures to reduce damages before the next disaster strikes. The Plan will also allow Ulster County and participating jurisdictions to comply with the Disaster Mitigation Act of 2000 (DMA 2000) and its implementing regulations (44 CFR Part 201.6), thus resulting in eligibility to apply for Federal aid for technical assistance and post-disaster hazard mitigation project funding.

Natural disasters cannot be prevented from occurring. However, over the long-term, the continued implementation of this Plan will gradually, but steadily, lessen the impacts associated with hazard events.

### About Ulster County

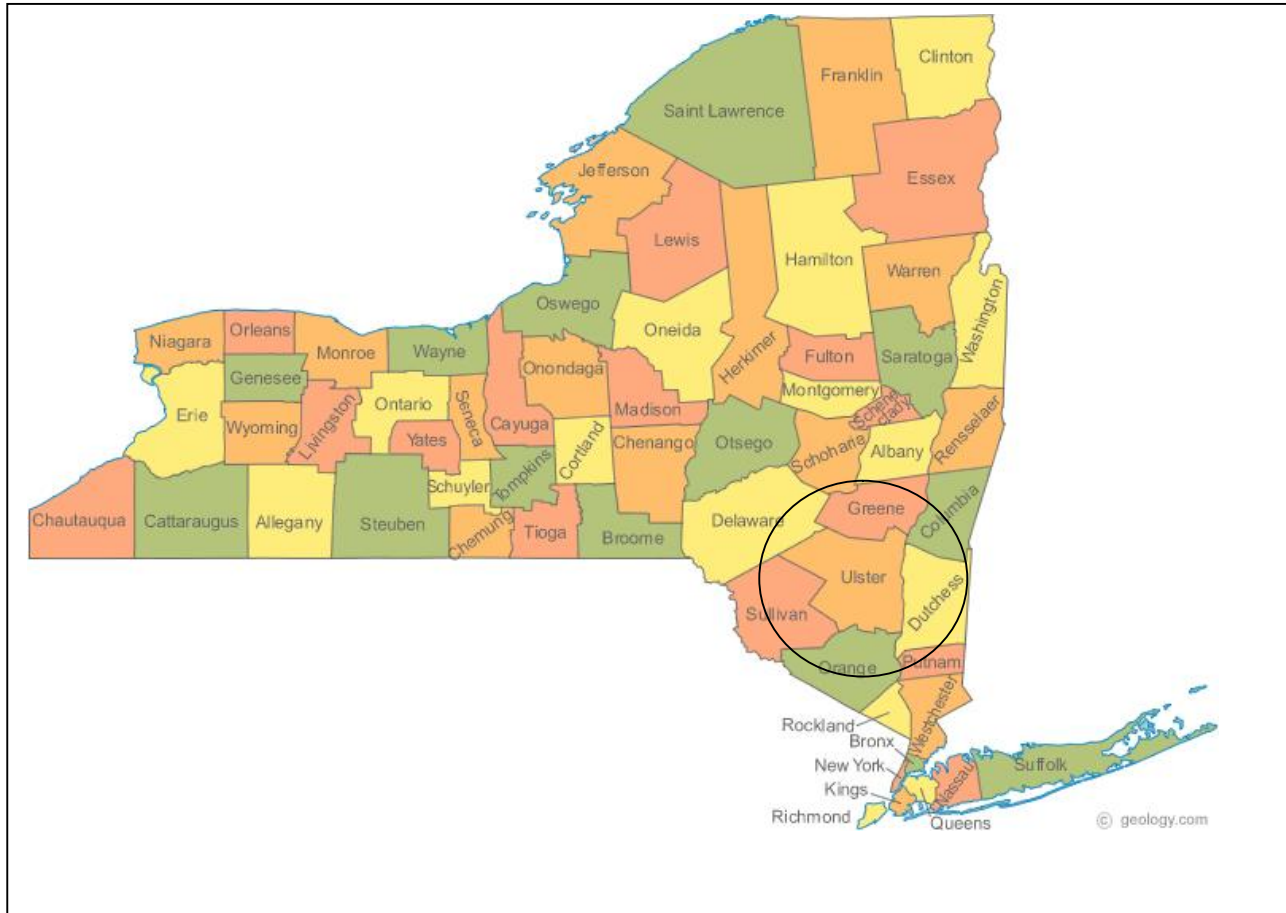
#### Overview

Ulster County is located in the southeast part of New York State in the Mid-Hudson Region of the Hudson Valley approximately 70 miles north of New York City and 45 miles south of Albany. Ulster County is the northernmost county and largest county (by land area) in the New York Metropolitan Area, with a total area of 1,161 square miles, of which roughly three percent is water. Ulster County is comparable in size to the State of Rhode Island. The county seat and only large city is Kingston.

## SECTION 1 - INTRODUCTION

Ulster County is bounded by Orange, Sullivan, Delaware, Greene, Columbia, and Dutchess Counties (from Orange County in the south and moving in a clockwise direction). The Hudson River provides the boundary of eastern sections of Ulster County. As of the year 2000 Census, Ulster County had a population of 177,749 people residing in the county. Figure 1.1 depicts the location of Ulster County in relation to the rest of the State of New York.

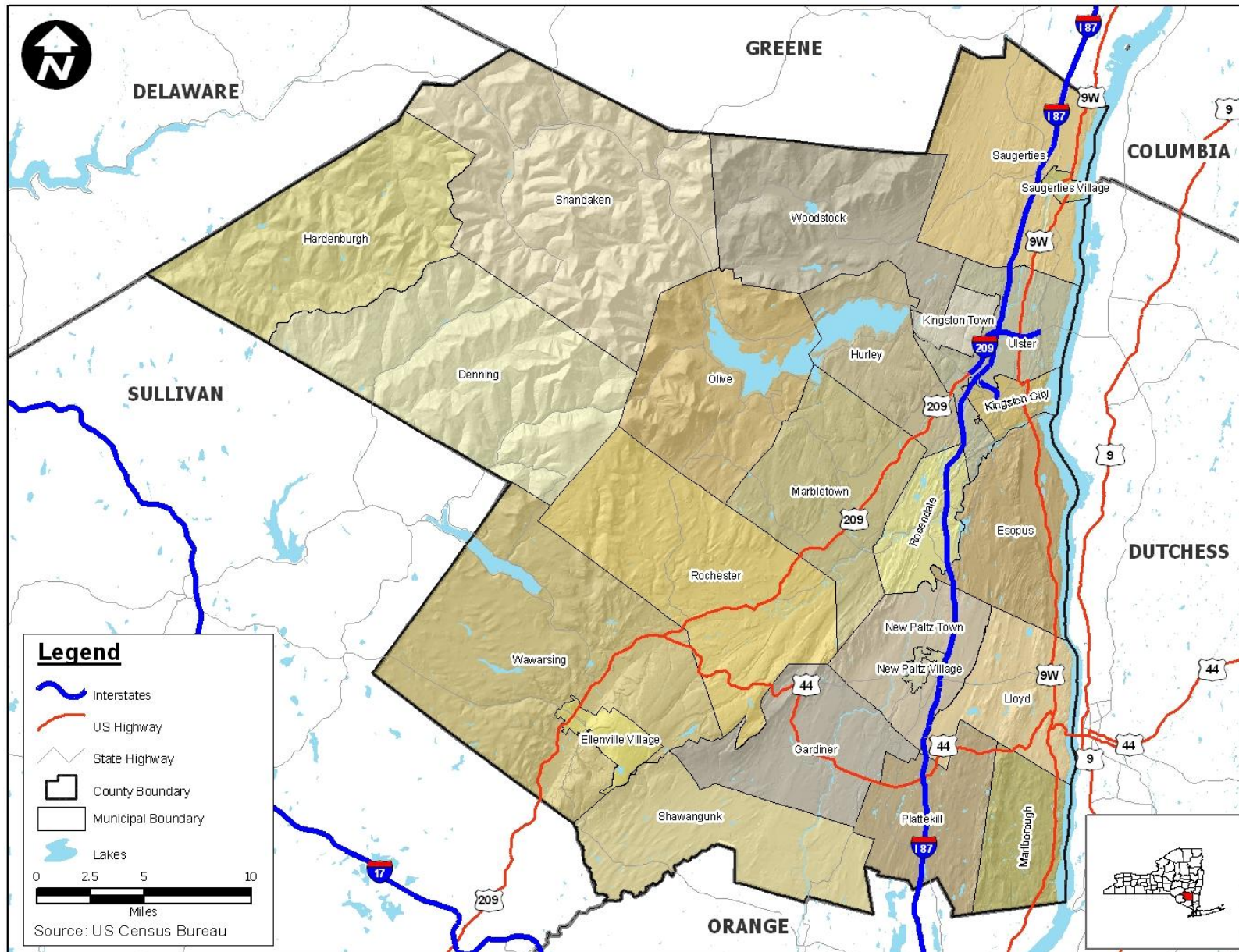
**Figure 1.1** - Location of Ulster County in New York State



Ulster County is home to 24 municipalities (20 towns, three villages and one city). They are the City of Kingston; Villages of Ellenville, New Paltz and Saugerties; and Towns of Denning, Esopus, Gardiner, Hardenburgh, Hurley, Kingston, Lloyd, Marletown, Marlborough, New Paltz, Olive, Plattekill, Rochester, Rosendale, Saugerties, Shandaken, Shawangunk, Ulster, Wawarsing and Woodstock. The location and extent of all these municipalities, as well as significant highways (including the New York State Thruway Interstate 87, which runs north-south through Ulster County), are shown on the base map of the County in Figure 1.2.

Ulster County has a wide variety of natural resources and landscapes including mountains, valleys, rivers, lakes, streams, forests and farmlands. The county is known for its many mountains and parks, u-pick farms and farmers' markets, local wineries and breweries, spas and spiritual retreats, fairs and festivals, luxury resorts.

Figure 1.2 – Base Map of Ulster County



The magnificent Catskill Mountains rise softly above the scenic Hudson River. Ulster County is truly a unique place to visit. It is a year-round vacation center alive with entertainment, adventure, culture and history. In warmer seasons residents and visitors enjoy boating or sailing on the majestic Hudson River; biking, hiking, camping, or rock climbing in the world famous Shawangunk and Catskill Mountains; fishing in the regions many trout streams and lakes; or golfing on some magnificent courses. The county's rich agricultural market abounds farm stands and orchards. As the weather cools, the county's abundance of open space provides glorious fall foliage. During the winter months, opportunities abound for outdoor sports such as skiing, snow boarding, ice skating, and ice climbing. Ulster County is also home to the oldest street in America: Historic Huguenot Street, a National Historic Landmark District which includes seven original stone houses dating to 1705, a burial ground, reconstructed 1717 French church and museum shop. The historic City of Kingston was the first capital of New York State. Ulster County is known for its artisans, museums or art centers, galleries, performing art centers, pottery shops and art festivals.

Ulster County has a rich history. From its agrarian beginnings, to the dawn of the industrial revolution, and then to its emergence as a regional economic powerhouse in Hudson Valley, the County has been an integral part of the economy of upstate New York. During the 1990s, a dramatic change in economic climate was experienced with the closure of a major industrial plant and the dislocation of hundreds of businesses. This had a long-lasting, adverse impact on local workers and families. In the period since, Ulster County has struggled to revitalize its manufacturing base, maintain its legacy in production agriculture, and encourage a vibrant tourism-visitor industry without compromising its unique natural resource endowment. Ulster County is currently implementing economic development strategies to better coordinate the collective activities of the system, and provide focus to the strategic economic development efforts across the County.

In Ulster County:

- The NYC Metropolitan Area connection offers Ulster County access to global markets, intellectual capital, and is relied on by tourism and arts and culture businesses.
- Ulster County has a higher percentage of small businesses than any other county in the region.
- Ulster County has adequate critical infrastructure (water/sewer/transportation) to support growth in many of its central places.

Ulster County's unique location makes it a place that residents from New York City can go to escape the costs, pressures and densities of life in a major metropolis. It also makes the County a place where businesses want to be located that serve the State of New York's two most important cities. At the same time, Ulster County's location between the Hudson River and the Catskill Mountains ensures that development can not get too intense, especially since the County, the State, the local jurisdictions and private organizations have done an excellent job of ensuring that much of the County will remain in public open space.

Ulster County is balancing the objectives of preserving natural, cultural and historic resources; facing the reality of an economy which is undergoing a big change as the nation moves into the post-industrial era; and, seeing development that is driven by agricultural and natural resources as well as the occurrences of the nations largest urban area only 70 miles away. The County is involved in economic development, housing, open space and stormwater and transportation planning. Communities are working to ensure that they are safe, thriving and appealing places to live, work and play. The following recent development trends are expected to continue in the future:

- The County and its jurisdictions will continue to focus on preserving open space throughout the area.

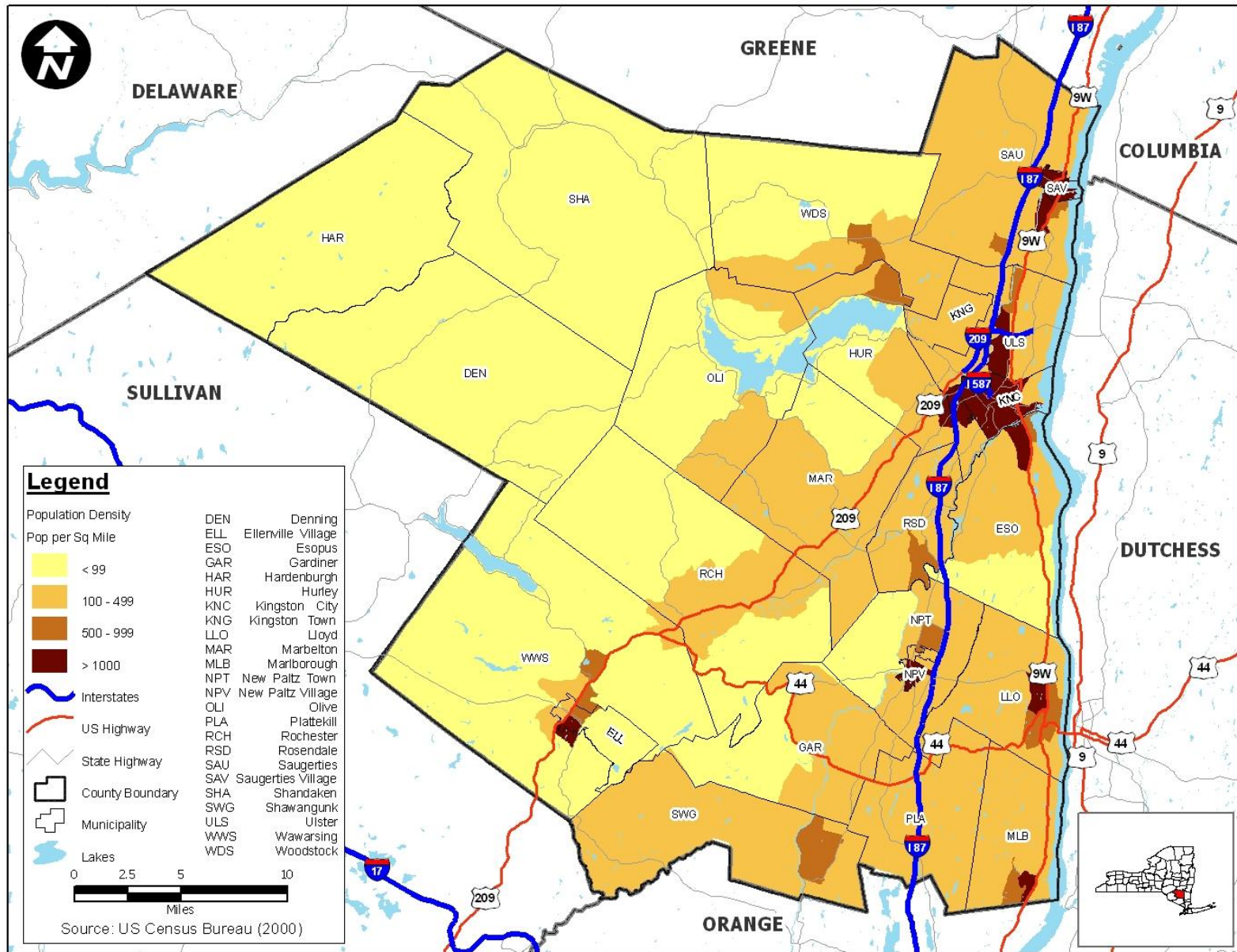
SECTION 1 - INTRODUCTION

- Most new development will continue to occur in the Hudson River Valley, especially along Interstate Highway 87 corridor.
- Additional development will take place along transportation corridors in the County, particularly in and around existing hamlets that have developed throughout the County.;
- Redevelopment will take place throughout the County, as sites that were vacated due to changes in the economy are reused, modified or replaced.
- Agriculture and natural resources will continue to be a focus of the Ulster County economy.
- Ulster County will continue to be both a recreational destination and driver of the commercial and industrial development in the region.
- Ulster County will continue to be a location where individuals that seek to leave the bustle of the New York City urban area choose to relocate.

**Population.** According to the US Census, the population of Ulster County in 1990 was 165,304, whereas, in 2000 it increased to 177,749 ó an increase of approximately 7.5 percent over ten years. County-wide, this general upward trend is expected to continue between now and the year 2020. Table 1.1 shows key County population changes and projections (county-wide and for each municipality) as reported in the Ulster County Transportation Plan, while Figure 1.3 presents population density according to the U.S. Census Bureau.

Municipality	Census Population 1990	Census Population 2000	Population Estimate 2007	Population Projection 2020	Absolute Change Projected 2000-2020	Percent Change Projected 2000-2020
<b>Ulster, County of</b>	<b>165,304</b>	<b>177,749</b>	<b>181,860</b>	<b>214,999</b>	<b>37,250</b>	<b>20.96%</b>
Denning, Town of	524	516	511	716	200	38.76%
Ellenville, Village of	4,243	4,130	3,891	Not reported	Unknown	Unknown
Esopus, Town of	8,860	9,331	9,495	11,531	2,200	23.58%
Gardiner, Town of	4,278	5,238	5,733	8,338	3,100	59.18%
Hardenburgh, Town of	204	208	217	358	150	72.12%
Hurley, Town of	6,741	6,564	6,541	7,764	1,200	18.28%
Kingston, City of	23,095	23,456	22,620	24,656	1,200	5.12%
Kingston, Town of	864	908	915	1,308	400	44.05%
Lloyd, Town of	9,231	9,941	10,749	12,841	2,900	29.17%
Marbletown, Town of	5,285	5,854	6,039	7,654	1,800	30.75%
Marlborough, Town of	7,430	8,263	8,327	10,863	2,600	31.47%
New Paltz, Town of	11,388	12,830	13,804	15,930	3,100	24.16%
New Paltz, Village of	5,463	6,034	6,595	Not reported	Unknown	Unknown
Olive, Town of	4,086	4,579	4,659	5,479	900	19.65%
Plattekill, Town of	8,891	9,892	10,808	13,092	3,200	32.35%
Rochester, Town of	5,679	7,018	7,332	9,418	2,400	34.20%
Rosendale, Town of	6,220	6,352	6,264	7,452	1,100	17.32%
Saugerties, Town of	18,467	19,868	19,559	22,768	2,900	14.60%
Saugerties, Village of	3,915	4,995	3,867	Not reported	Unknown	Unknown
Shandaken, Town of	3,013	3,235	3,090	3,835	600	18.55%
Shawangunk, Town of	10,081	12,022	12,709	15,322	3,300	27.45%
Ulster, Town of	12,329	12,544	12,712	13,844	1,300	10.36%
Wawarsing, Town of	12,348	12,889	13,602	14,589	1,700	13.19%
Woodstock, Town of	6,290	6,241	6,174	7,241	1,000	16.02%

Figure 1.3 –Ulster County population Density



The average percent change between 2000 and 2020 for Ulster County municipalities is roughly a 21 percent increase in population. However, this varies a great deal across municipalities, from a minimum of five percent to a maximum of 72 percent. The three highest projected percent increases are Hardenburgh with a projected increase of 72 percent; Gardiner at 59 percent; and the Town of Kingston at 44 percent. The lowest projected percent increases are the City of Kingston with a projected increase of five percent; the Town of Ulster at ten percent; and Wawarsing at 13 percent.

According to the U.S. Census Bureau, the Ulster County has a total area of 1,161 square miles, of which 1,126 square miles is land and 34 square miles is water.

The 1990 U.S. Census population density per square mile of land in Ulster County was 147 persons per square mile; whereas, in the 2000 U.S. Census, there were 158 persons per square mile ó an increase of 7.5 percent in ten years. By 2020, the population density is projected to be 191 persons per square mile ó an increase of 17.3 percent over the year 2000 values. The population of Ulster County is concentrated in its eastern areas, and decreases significantly moving in westward direction (see Figure 1.3, as per U.S. Census Bureau, Census 2000 Summary File 1, Matrix P1.).

Ulster County's population is also aging. The population is aging faster than state and national averages, as population growth has slowed, with roughly 30 percent of the population potentially retiring by 2026. The overall median age in 2006 has been estimated by the U.S. Census Bureau to be 40.2, up from 38.2 in 2000. However, the percentage of the population over 65 years of age appears to be relatively stable (at 13.3 percent in 2000 and 13.5 percent in 2006).

***Income and Employment.*** In the first half of the current decade both the median household and median family incomes in Ulster County exhibited a greater rise than the national equivalents, according to the U.S. Census Bureau, as shown in Table 1.2. Also, according to the same source, between 2000 and 2006 levels of unemployment and poverty both fell in Ulster County while national levels rose slightly in both categories over the same time period.

Economic Characteristic	2000		2006	
	Ulster Co.	USA	Ulster Co.	USA
Median Household Income	\$42,551	\$41,994	\$52,725	\$48,451
Median Family Income	\$51,708	\$50,046	\$64,040	\$58,526
Families Below Poverty Level	7.2%	9.2%	6.8%	9.8%
Individuals Below Poverty Level	11.4%	12.4%	10.6%	13.3%
Unemployed*	4.0%	3.7%	3.0%	4.1%

\*As a percentage of the population aged 16 years or more

***Transportation Links.*** Ulster County is linked to the surrounding area by road, notably the New York State Thruway (I-187) which traverses the full extent of the County from north to south in its eastern portion, parallel with the Hudson River. There are currently no passenger railroad services, although there are hopes that some may be reinstated in the future, particularly to link the County by rail to the New York metropolitan area. The County is well served by bus links, including services operated by Trailways, Ulster County Area Transit, and the CiTiBus (City of Kingston Bus Service). While there are three airfields in Ulster County with runways capable of operating substantial fixed-wing aircraft, none currently offer regular scheduled passenger services.

**FEMA Disaster Declarations.** Disaster declarations, for the county or counties affected by a disaster, are declared by the President of the United States under the authority of the Robert T. Stafford Disaster Relief and Emergency Assistance Act (the "Stafford Act"). FEMA then manages the entire process, including making federally-funded assistance available in declared areas; coordinates emergency rescue and response efforts; provides emergency resources; and provides other related activities/funding in the process of aiding citizens and local governments in a nationally-declared disaster. Tables 1.3 and 1.4 provide a summary of disaster and emergency declarations for the State of New York (based on review of the FEMA web site and the New York State Hazard Mitigation Plan), with an indication as to whether Ulster County was part of the declared area.

<b>Table 1.3</b>				
<b>New York State Major Disaster Declarations: 1954 – 2007</b>				
<i>(Source: FEMA, online at <a href="http://www.fema.gov/news/disasters_state.fema?id=36">http://www.fema.gov/news/disasters_state.fema?id=36</a> NYSEMO, online at <a href="http://www.semo.state.ny.us/programs/recovery/History.cfm">http://www.semo.state.ny.us/programs/recovery/History.cfm</a> And Appendix N of the New York State Hazard Mitigation Plan)</i>				
<b>Year</b>	<b>Date</b>	<b>Disaster Type</b>	<b>Disaster Number</b>	<b>Was Ulster County Designated?</b>
2007	31-Aug	Severe Storms, Flooding, and Tornado	1724	no
2007	2-Jul	Severe Storms and Flooding	1710	yes
2007	24-Apr	Severe Storms and Inland and Coastal Flooding	1692	yes
2006	12-Dec	Severe Storms and Flooding	1670	no
2006	24-Oct	Severe Storms and Flooding	1665	no
2006	1-Jul	Severe Storms and Flooding	1650	yes
2005	19-Apr	Severe Storms and Flooding	1589	yes
2004	1-Oct	Tropical Depression Ivan	1565	yes
2004	1-Oct	Severe Storms and Flooding	1564	yes
2004	3-Aug	Severe Storms and Flooding	1534	yes
2003	29-Aug	Severe Storms, Tornadoes and Flooding	1486	no
2003	12-May	Ice Storm	1467	no
2002	16-May	Earthquake	1415	no
2002	1-Mar	Snowstorm	1404	no
2001	11-Sep	World Trade Center Terrorist Attack	1391	yes
2000	21-Jul	Severe Storms	1335	yes
1999	19-Sep	Hurricane Floyd	1296	yes
1998	11-Sep	Severe Storms	1244	no
1998	7-Jul	Severe Storms and Flooding	1233	no
1998	16-Jun	New York Severe Thunderstorms and Tornadoes	1222	no
1998	10-Jan	Severe Winter Storms	1196	no
1996	9-Dec	Severe Storms/Flooding	1148	no
1996	19-Nov	Severe Storms/Flooding	1146	no
1996	24-Jan	Severe Storms/Flooding	1095	yes
1996	12-Jan	Blizzard	1083	yes
1993	2-Apr	World Trade Center Explosion	984	no
1992	21-Dec	Coastal Storm, High Tides, Heavy Rain, Flooding	974	no
1991	16-Sep	Hurricane Bob	918	no
1991	21-Mar	Severe Storm, Winter Storm	898	no
1987	10-Nov	Severe Winter Storms	801	no
1987	15-May	Flooding	792	yes
1985	18-Oct	Hurricane Gloria	750	no
1985	22-Mar	Snow Melt, Ice Jams	734	no
1985	20-Mar	Flooding	733	no
1984	25-Sep	Severe Storms/Flooding	725	no



**Table 1.3**  
**New York State Major Disaster Declarations: 1954 – 2007**

(Source: FEMA, online at [http://www.fema.gov/news/disasters\\_state.fema?id=36](http://www.fema.gov/news/disasters_state.fema?id=36)  
 NYSEMO, online at <http://www.semo.state.ny.us/programs/recovery/History.cfm>  
 And Appendix N of the New York State Hazard Mitigation Plan)

Year	Date	Disaster Type	Disaster Number	Was Ulster County Designated?
1984	17-Apr	Coastal Storms/Flooding	702	yes
1977	5-Feb	Snowstorms	527	no
1976	3-Sep	Hurricane Belle	520	no
1976	21-Jul	Severe Storms/Flooding	515	no
1976	29-Jun	Flash Flooding	512	no
1976	19-Mar	Ice Storm, Severe Storms, Flooding	494	no
1975	2-Oct	Severe Storms, Heavy Rain, Landslides, Flooding	487	no
1974	23-Jul	Severe Storms/Flooding	447	no
1973	20-Jul	Severe Storms/Flooding	401	yes
1972	23-Jun	Tropical Storm Agnes	338	yes
1971	13-Sep	Severe Storms/Flooding	311	yes
1970	22-Jul	Heavy Rains, Flooding	290	no
1969	26-Aug	Heavy Rains, Flooding	275	no
1967	30-Oct	Severe Storms/Flooding	233	no
1965	18-Aug	Water Shortage	204	yes
1963	23-Aug	Heavy Rains, Flooding	158	no
1962	16-Mar	Severe Storm, High Tides, Flooding	129	no

**Table 1.4**  
**New York State Emergency Declarations: 1954 – 2007**

(Source: FEMA, online at [http://www.fema.gov/news/disasters\\_state.fema?id=36](http://www.fema.gov/news/disasters_state.fema?id=36)  
 NYSEMO, online at <http://www.semo.state.ny.us/programs/recovery/History.cfm>  
 And Appendix N of the New York State Hazard Mitigation Plan)

Year	Date	Emergency Type	Declaration Number	Was Ulster County Designated?
2007	23-Feb	Snow	3273	no
2006	15-Oct	Snowstorm	3268	no
2005	30-Sep	Hurricane Katrina Evacuation	3262	yes
2004	3-Mar	Snow	3195	no
2003	23-Aug	Power Outage	3186	yes
2003	27-Mar	Snowstorm	3184	yes
2003	26-Feb	Snowstorm	3173	yes
2002	1-Jan	Snowstorm	3170	no
2000	4-Dec	Snow Storm	3157	no
2000	11-Oct	Virus Threat	3155	yes
1999	18-Sep	Hurricane Floyd	3149	no
1999	10-Mar	Winter Storm	3138	no
1999	15-Jan	Winter Storm	3136	no
1993	17-Mar	Severe Blizzard	3107	not available
1980	21-May	Chemical Waste, Love Canal	3080	no
1978	7-Aug	Chemical Waste, Love Canal	3066	no
1977	29-Jan	Snowstorms	3027	no
1974	2-Nov	Flooding (NYS Barge Canal)	3004	no

## Plan Development Process

### Multi-Jurisdictional Approach

Ulster County took a multi-jurisdictional approach to preparing its hazard mitigation plan. The County had resources (i.e., funding, data, GIS, etc.) which local jurisdictions lacked. However, the County could not develop the plan on its own. To undertake such a regional planning effort, the County needed to involve its member municipalities since only they have the legal authority to enforce compliance with land use planning and development issues.

Throughout the plan development process, the Ulster County Department of Emergency Communications/Emergency Management (UCECEM) worked tirelessly to involve all of its 53 municipalities. These local jurisdictions were not only invited to participate but were truly guided through the process by UCECEM at every stage. At the beginning of the process, UCECEM was notified by all 53 of its municipalities that they were interested in participating.

The following municipal entities (Ulster County and 12 of its municipalities) participated successfully in the development of this plan by submitting the key deliverables:

*County of Ulster*

*Gardner, Town of  
Hurley, Town of  
Kingston, Town of  
Kingston, City of*

*Lloyd, Town of  
Marbletown, Town of  
Marlborough, Town of  
Rosendale, Town of*

*Saugerties, Town of  
Shandaken, Town of  
Shawangunk, Town of  
Ulster, Town of*

A more detailed summary of the participation demonstrated by each municipality in the County, including attendance at meetings and submission of requested deliverables, is presented in Table 1.5.

In addition, the records show that the following four stakeholder entities participated through attending at least one meeting or responding to at least one questionnaire.

*American Red Cross, Ulster County Chapter  
The Kingston Hospital  
The New York State Thruway Authority*

Readers are invited to review the contents of **Appendix F – Planning Committee Membership Information** for a list of Steering Committee and Core Planning Group members.

**Table 1.5  
Ulster County Jurisdictions Participation**

Municipality	Expressed Interest in Participating	CPG Meetings Attended				Key Deliverables Submitted						Jurisdiction Considered to be Fully Participating	
		Kickoff Meeting	Progress Meeting	Risk Assessment Q & A	Mitigation Working Session	Wish List	Land Use and Development Questionnaire	Hazard Identification Questionnaire	Capabilities Assessment Questionnaire	Mitigation Prioritization / Implementation Worksheets	NFIP Actions Worksheets		
Ulster, County of	■	■	■	■	■	■	■	■	■	■	■	N/A	■
Denning, Town of													
Ellenville, Village of													
Esopus, Town of													
Gardiner, Town of	■			■	■	■	■	■	■	■	■	■	■
Hardenburgh, Town of													
Hurley, Town of	■	■		■	■	■	■	■	■	■	■	■	■
Kingston, City of	■				■	■	■	■	■	■	■	■	■
Kingston, Town of	■	■		■	■	■	■	■	■	■	■	■	■
Lloyd, Town of	■	■		■	■	■	■	■	■	■	■	■	■
Marbletown, Town of	■	■	■	■	■			■	■	■	■	■	■
Marlborough, Town of	■			■	■	■	■	■	■	■	■	■	■
New Paltz, Town of													
New Paltz, Village of	■								■				
Olive, Town of													
Plattekill, Town of													
Rochester, Town of	■												
Rosendale, Town of	■	■	■	■	■	■	■	■		■	■	■	■
Saugerties, Town of	■	■			■	■		■		■	■	■	■
Saugerties, Village of													
Shandaken, Town of	■				■		■	■	■	■	■	■	■
Shawangunk, Town of	■			■		■		■		■	■	■	■
Ulster, Town of	■	■		■	■	■	■	■	■	■	■	■	■
Wawarsing, Town of	■												
Woodstock, Town of													

While the County did retain the services of a consultant (URS Corporation) to guide participants through the process and author the plan, participating jurisdictions contributed throughout the overall planning process, as follows:

- Each participating jurisdiction provided staff to participate in the overall county-wide Core Planning Group (CPG). The jurisdiction's CPG member(s) were lead members of their municipality's Jurisdictional Assessment Team (JAT). JATs were responsible for reviewing information, data and documents, submitting feedback to the Consultant, completing questionnaires/forms, reaching out to the public and other stakeholders in their respective jurisdictions, developing a unique mitigation strategy for their municipality, and reviewing and commenting on draft documents. *More information on the planning team structure and roles/responsibilities is presented later in this section.*
- The Consultant provided "**Guidance Memorandum 1- Assessing Community Support, Building the Planning Team, and Engaging the Public and Other Stakeholders**" at the project outset (November 9, 2007). This memorandum was prepared to provide Ulster County and its participating jurisdictions with suggestions for: assessing community support, building the planning team and engaging the public and other stakeholders throughout the plan development process and prior to plan approval. The Jurisdictional Assessment Team for each municipality used this memorandum as a guide for outreach, documented their completed activities in the memorandum's "Outreach Log". The County and 11 jurisdictions provided a summary of their outreach activities to the Consultant for incorporation into the plan.
- Participating jurisdictions provided feedback during the Hazard Identification and Hazard Profile steps of the process (Sections 2 and 3.a of the plan, respectively) through their completion and submittal of a **Hazard Identification Questionnaire** to the Consultant. This questionnaire summarized the Consultant's evaluation of a full range of natural hazards, including whether or not each hazard was recommended for inclusion in the plan and why. Municipalities were asked to provide information as to whether or not they concurred with the consultant's findings, and information on impacts from past events in their respective communities. Local responses were used by the Consultant to supplement hazard information obtained through research of past disaster declarations in the County, review of the New York State Hazard Mitigation Plan (2008), and review of readily available online information from reputable sources (such as federal and state agencies). The County and 12 jurisdictions returned this questionnaire or provided a statement of full concurrence with the Consultant's findings.
- Participating jurisdictions provided feedback during the evaluation of Land Uses and Development Trends step of the process (Section 3.d of the plan) through their completion and submittal of a **Land Uses and Development Trends Questionnaire** to the Consultant. This questionnaire asked jurisdictions to: (1) describe development trends occurring within their jurisdiction, such as the predominant types of development occurring, location, expected intensity, and pace by land use; and (2) describe any regulations/ordinances/codes their jurisdiction enforces to protect new development from the effects of natural hazards. Local responses were used by the Consultant to supplement information presented in the County Cross-Acceptance Report. The County and eight jurisdictions returned this questionnaire.
- Participating jurisdictions provided feedback during the Capability Assessment step of the process (Section 4 of the plan) through their completion and submittal of a **Capability Assessment Questionnaire** to the Consultant. This questionnaire asked respondents to examine their jurisdiction's abilities to implement and manage a comprehensive mitigation strategy, which includes a range of mitigation actions. The questionnaires requested information pertaining to existing plans, policies, and regulations that contribute to or hinder the ability to implement hazard mitigation actions. They also requested information pertaining to the legal

and regulatory capability, technical and administrative capacity, and fiscal capability of each jurisdiction. The County and nine jurisdictions submitted completed questionnaires illustrating their capability to implement a mitigation strategy.

- Participating jurisdictions provided feedback regarding **problem areas in need of mitigation and possible mitigation alternatives**. Some municipalities provided this type of information to the consultant separately, either via email or separate written correspondence. Their feedback is included in Section 6 of the plan. At a working session of the Core Planning Group on August 7, 2008, participating jurisdictions were asked to consider range of various types of hazard mitigation actions, and identify a mitigation strategy for their municipality. Ulster County and 12 participating jurisdictions have submitted a unique mitigation strategy.
- The Consultant provided “**Guidance Memorandum #2 – Plan Maintenance Procedures: Monitoring, Evaluating and Updating the Plan**” in June 2008. This memorandum provided participants with an overview of the requirements regarding plan maintenance, types of plan maintenance activities that can be selected to meet the requirements, and some examples of plan maintenance strategies from other FEMA-approved plans in FEMA Region 2. Participating jurisdictions were asked to review this information, coordinate with their Jurisdictional Assessment Team, and provide comments back to UCECEM regarding what types of plan maintenance activities their community was in favor of, versus any elements their community like to see excluded. Jurisdictions were asked to submit their feedback to UCECEM. They were advised that lack of feedback would be interpreted to indicate that their jurisdiction had no particular preferences regarding this plan element. In turn, UCECEM reviewed feedback received and developed a county-wide plan maintenance strategy that best reflected the expressed desires of the full team.
- The Consultant provided “**Guidance Memorandum #3 – Plan Integration**” in June 2008. The memorandum summarized requirements in terms of how mitigation recommendations will be integrated into job descriptions, or existing planning mechanisms such as comprehensive plans, capital improvement plans, zoning and building codes, site reviews, permitting and other planning tools, where such tools are appropriate. Various ways that the hazard mitigation plan can be integrated into local planning mechanisms were presented, along with sample text from other plans approved by FEMA Region 2. Participating jurisdictions were asked to review this information, coordinate with their Jurisdictional Assessment Team, and provide comments back to UCECEM regarding what types of plan integration activities their community was in favor of, versus any elements their community like to see excluded. Jurisdictions were asked to submit their feedback to UCECEM. They were advised that lack of feedback would be interpreted to indicate that their jurisdiction had no particular preferences regarding this plan element. In turn, UCECEM reviewed feedback received and developed a county-wide plan maintenance strategy that best reflected the expressed desires of the full team.

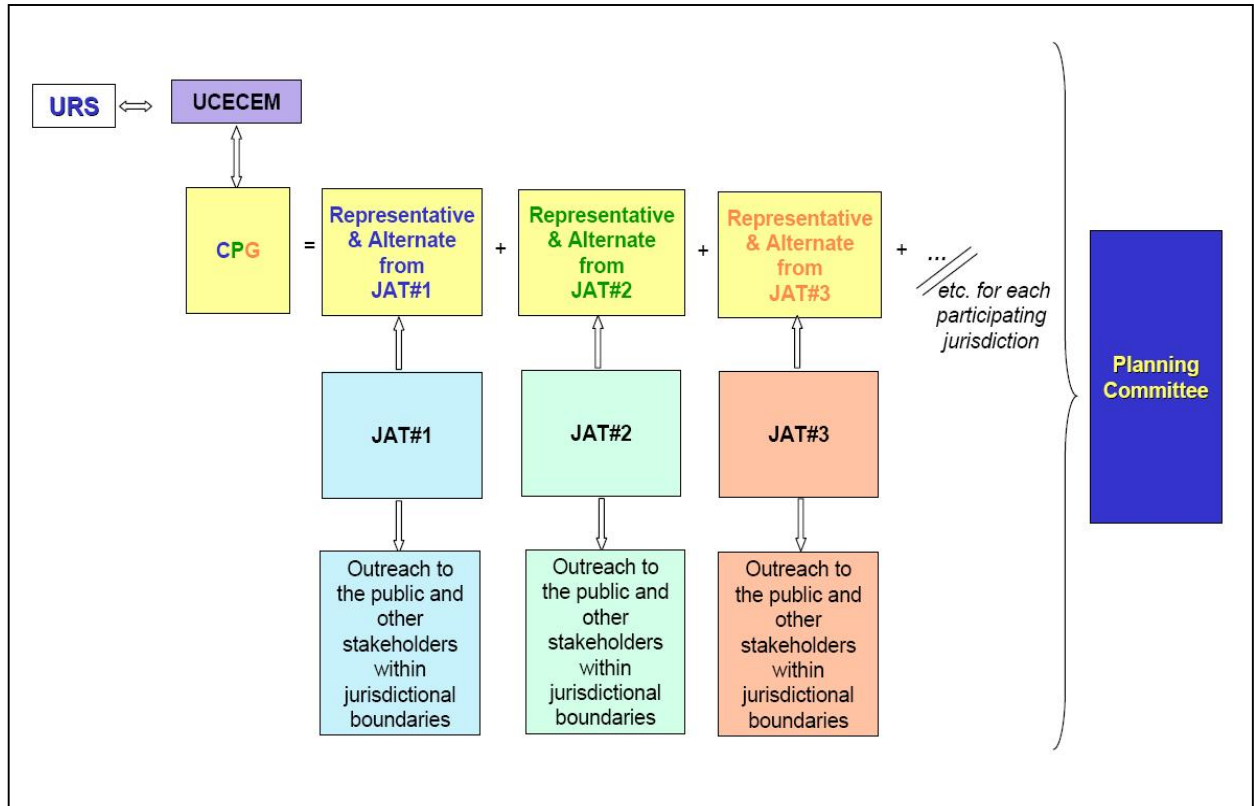
## Ulster County Hazard Mitigation Planning Committee

This Plan has been developed by the **Ulster County Hazard Mitigation Planning Committee (the “Planning Committee”)**, with support from an outside consulting firm (URS Corporation, “URS”). The efforts of the Planning Committee were headed by the Director of the Ulster County Department of Emergency Communication/Emergency Management. The Plan represents the collective efforts of citizens, elected and appointed government officials, business leaders, volunteers of non-profit organizations, and other stakeholders.

The overall **Planning Committee** consisted of members of Ulster County, each participating jurisdiction, and the public and other stakeholders. The overall Planning Committee did not meet together in one

place during the planning process. Instead, a team concept was used to more evenly distribute responsibilities and to make best use of every participant's unique capabilities.

As shown in Figure 1.4, the overall Planning Committee was divided into a **Core Planning Group (CPG)** and a series of **Jurisdictional Assessment Teams (JATs)**, with one JAT for each of the County's participating jurisdictions.



**Figure 1.4 – Planning Committee Organizational Structure**

This team concept was beneficial for two reasons: (1) the Consultant and the County's main point of contact was the Ulster County Planning Committee and the CPG; and (2) JATs with intimate local knowledge were best suited for coordination and outreach within their respective jurisdictions.

All members of the CPG and the JATs were also members of the overall Planning Committee. The CPG included head members of each JAT (the County and each of the municipalities who elected to participate in the process). The Ulster County Planning Committee was responsible for managing the overall plan formulation activities. The CPG was responsible for attending CPG meetings and providing information and feedback, and coordinating an outreach program within their municipality's JAT and beyond to the public and other stakeholders. Each JAT was responsible for coordinating and facilitating local efforts, sending CPG representatives to meetings, providing information and feedback, involving the public and local community stakeholders in the planning process, assessing mitigation alternatives, selecting a course of action to be followed for their community, adopting the plan, and participating in plan monitoring and implementation.

With regard to meetings, UCECEM was responsible for setting meeting dates and times, securing a meeting facility, and notifying all team members of upcoming meetings. They also played a very large

role in reminding CPG members of certain project deadlines. The Consultant prepared meeting agendas, handouts, PowerPoint presentations, and meeting minutes. UCECEM distributed meeting minutes via email, and ensured that all meeting materials and report deliverables were posted on the County web site.

The plan development process was initiated in earnest in the fall of 2007 with the Ulster County **Hazard Mitigation Plan Project Initiation Meeting held on October 25, 2007**. At this meeting, the consultant met with the UCECEM to refine the project work plan, discuss schedule and the anticipated level of County labor support. The Consultant provided a Wish List of information, data and documents they hope each participating jurisdiction can submit for their review and incorporation into the plan. The Consultant also provided Guidance Memorandum #1 regarding assessing community support, building the planning team, and engaging the public. At this meeting, expectations regarding the CPG Project Kickoff Meeting were discussed. Handouts included the project scope of work, targeted implementation schedule and Wish List.

While Jurisdictional Assessment Teams met individually throughout the plan development process as they deemed necessary, the following is an overview of CPG meetings held during the plan development process.

- December 11, 2007 ó Core Planning Group Kickoff Meeting. This was the first meeting of the Core Planning Group. Participants were provided with an overview of: the intent of the project; the organizational structure of the planning group; the plan development process overall; the role of participating jurisdictions, contractors, the public and other stakeholders; what it means to participate; key deliverables; data collection/supporting documents; the project timeline; and next steps. Handouts included the PowerPoint presentation, targeted implementation schedule, Wish List, sources of information on hazard mitigation planning, project Fact Sheet and Guidance Memo #1.
- June 19, 2008 ó Core Planning Group Progress Meeting. This meeting was conducted to provide an overview of plan development progress and continued work to be completed. The Consultant provided an overview of the Hazard Identification and Hazard Profile steps, and the ongoing Risk Assessment portion of the draft plan.
- July 17, 2008 ó Risk Assessment Question and Answer Session. The purpose of the meeting was to provide CPG members with an opportunity to ask questions and submit feedback on the recently distributed Risk Assessment Interim Deliverable. The Risk Assessment Interim Deliverable comprised the following working chapters of the draft report: Hazard Identification, Hazard Profiles, Asset Identification, Vulnerability Assessment, Range of Mitigation Actions to be Considered.
- August 7, 2008 ó Mitigation Strategy Working Session. At this working session, attendees conducted an evaluation and prioritization of hazard mitigation actions and developed an implementation strategy for selected mitigation actions. For jurisdictions not present, or those who were present but who needed more time to complete the Prioritization and Implementation Strategy sheets, an opportunity was provided for jurisdictions to do so remotely. Following this meeting, the County and 12 participating jurisdictions had evaluated, prioritized, and developed a strategy for at least one mitigation action.
- Date TBD ó Presentation of Final Plan.

Additional information, such as meeting agendas, presentations, handouts, and minutes were posted on the Ulster County hazard mitigation planning web site at:

[http://www.ulstercountyny.gov/emergencyservices/management/haz\\_mit/index.html](http://www.ulstercountyny.gov/emergencyservices/management/haz_mit/index.html)

## The Role of the Contractors in the Plan Development Process

This Hazard Mitigation Plan is the County's plan; as such, its success rests on the decisions and directions set by the Planning Committee members throughout the plan development process. URS was contracted by Ulster County to work with the UCECEM and the Planning Committee to assist them in developing a plan that would meet the requirements of DMA 2000. **URS was the lead firm for this assignment**, doing so from their local office in Wayne, New Jersey. URS was the direct County point of contact, assisted in the hazard identification and risk assessment, lead the hazard mitigation planning efforts, authored the final document, and provided overall contract administration.

URS assisted the Planning Committee by conducting the analyses necessary to provide the team members with the information they needed to make sound decisions, and helped guide them through the necessary steps of the plan development process. The Planning Committee, in turn, took the lead by including the local community, assessing the alternatives, and ultimately selecting the course of action to be followed. At the end of the planning process, URS prepared this Plan text (with feedback from the Planning Committee) to document the group's efforts, along with hazard information and findings, in a manner consistent with applicable regulations (DMA 2000), criteria (44 CFR Part 201.6), and guidance (FEMA's Mitigation Planning How-To Guides; FEMA's Multi-Hazard Mitigation Planning Guidance document of March 2004, revised November 2006).

A series of three Guidance Memorandums were distributed to UCECEM and the Core Planning Group by URS Corporation, at various meetings and also were posted on the County's mitigation planning web site. These three memos provide a summary of key information presented in DMA 2000, its implementing regulations (IFR), and the FEMA How-To Guides for three key topic areas. The memos are intended to serve as a supplement and not as a replacement to the FEMA documents. Each memo provides suggestions to municipalities in a certain topic area, and requests feedback from each municipality at the end of the process regarding their decisions. A summary of the Guidance Memos is presented below.

*Guidance Memorandum #1 – Assessing Community Support, Building the Planning Team, and Engaging the Public and Other Stakeholders*, dated November 11, 2007, describes the project and its goal of identifying the risks associated with natural hazards in Ulster County. It is centered on developing the structure of the Planning Committee and identifying the jurisdictions that are interested in participating in the plan; reaching out to various parties (general public, local residents, business owners, non-profit organizations, community leaders and other stakeholders) during the development and maintenance processes; identifying the role of contractors in the planning process; and ultimately, documenting the planning process.

*Guidance Memorandum #2 - Plan Maintenance Procedures: Monitoring, Evaluating and Updating the Plan*, dated June 3, 2008, highlights the essential steps necessary for monitoring, evaluating and maintaining the plan, and its value as a vital tool for mitigating hazards and reducing risk. The memo stresses several key factors that need to be undertaken by the Planning Committee: organizing resources, i.e., identifying and organizing interested parties, including the public, during the planning process; assessing the risks, i.e., identifying the natural hazards that generally affect Ulster County; how the communities will be impacted by the hazards; and developing a mitigation plan, i.e., once the risks have been identified, the Planning Committee determines the methods and strategies for avoiding or minimizing the risks. The memo also conveys the importance of following the regulations that require the plan to be monitored, evaluated and updated within a five-year cycle, and the importance of periodically measuring the effectiveness of the actions contributing to the overall success of the plan.

*Guidance Memorandum #3 - Plan Integration*, dated June 3, 2008, recapitulates the importance of using existing processes and resources by the Planning Committee during plan implementation; thus, saving time and effort in meeting the plan's goals and objectives. The memo states that by following the



requirements and key steps previously discussed, the next essential goal is taking action by integrating the objectives into daily activities and by implementing the plan in a timely manner.

The memos are valuable tools that guide the team members through each step toward the establishment of the hazard mitigation plan. As such, these memos assist the Planning Committee through the planning process that leads to the formal adoption of the plan.

In addition, URS also: (1) Distributed questionnaires for CPG member completion, as described previously beginning on Page 1-9. They were the: Hazard Identification Questionnaire, Land Uses and Development Trends Questionnaire, Capability Assessment Questionnaire; (2) Assisted the CPG through preparation of a project Fact Sheet (discussed on Page 1-18) and development of a project web site (discussed beginning on Page 1-16); and (3) presented at each CPG meeting to guide participating jurisdictions through the process, and advise CPG members regarding each step of the process such as hazards identified and profiled, risks and vulnerabilities identified, possible types of mitigation solutions, etc.

### **Public Involvement in the Plan Development Process**

The role of public involvement in the plan development process is to provide the general public with some variety of means to not only learn about the process that the Planning Committee is undertaking, but to voice concerns and to provide input throughout the planning process. CPG members undertook a range of activities to: (a) alert the public to the fact that the Planning Committee was working to develop this Hazard Mitigation Plan, and (b) provide the public an opportunity to participate with a forum to ask questions, and submit comments and/or suggestions on the process.

The Planning Committee pursued a variety of different ways to provide the public with an opportunity to become involved and engaged during the planning process, in addition to ensuring that the participating jurisdictions were also fully aware of the process and were able to contribute and voice their concerns as well as the general public. As such, the following key activities were employed:

- Ulster County Multi-jurisdictional Mitigation Planning web site
- *Plan Facts* fact sheet
- Core Planning Group Meetings open to the public
- Other Outreach Activities by UCECEM and CPG Members

#### *Ulster County Multi-Jurisdictional Mitigation Planning Web Site*

The CPG made an effort to involve the public and other stakeholders in the process during the drafting stage of the plan in part through a mitigation planning web site. The Ulster County Web site contains a new section on the county-wide multi-jurisdictional hazard mitigation planning process. It can be found online at:

[http://www.ulstercountyny.gov/emergencyservices/management/haz\\_mit/index.html](http://www.ulstercountyny.gov/emergencyservices/management/haz_mit/index.html)

The web site was initiated in Early 2008 and will continue to be maintained and updated by UCECEM on a regular basis. The additional web pages were incorporated into the site for the purpose of informing the public (including businesses, local citizens and the residents that are part of the Ulster County communities) about the importance of hazard mitigation planning and their opportunity to participate and provide feedback during the process. In this section, the UCECEM provides general information about the process, the organizational structure of the planning team, meeting information (agendas,

presentations, handouts, and minutes), other reference materials, a link for the Risk Assessment Interim Deliverable and the Draft Plan, and more. Contact information for the UCECEM Coordinator is also provided and individuals are invited to reach out to this person for information on how to become involved or to provide comments. The image below is a screen-capture of the main mitigation planning web page on the County's site.

The screenshot shows a Microsoft Internet Explorer browser window displaying the Ulster County Emergency Services website. The address bar shows the URL: [http://www.ulstercountyny.gov/emergencyservices/management/haz\\_mit/index.html](http://www.ulstercountyny.gov/emergencyservices/management/haz_mit/index.html). The website header features the Ulster County logo and the text "Ulster County Emergency Services". Below the header is a navigation menu with links for "Emergency Communications", "Emergency Management", "Emergency Medical Services", "Fire Coordinator", and "Police Services". The main content area is titled "Ulster County Multi-Jurisdictional Natural Hazard Mitigation Planning Project" and includes a list of links: "General Information", "Planning Group Organizational Structure", "Meetings", "Participating Jurisdictions", "Core Group Deliverables", "The Draft Plan", "Document Repository", "Useful Links", and "For More Information". A sidebar on the left contains a "Comprehensive Emergency Management Plan" and "Preparedness Tips". The footer of the page includes the text "Ulster County Home Page" and "©Copyright 2008 Ulster County Information Services".

Other jurisdictions have documented that they supplemented this by creating similar pages or links on their jurisdiction web sites to the overall county mitigation planning pages, including the Towns of Saugerties, Marbletown, Marlborough, Hurley, and Shandaken, and the City of Kingston.

On the All Natural Hazards Mitigation Planning page, topics are organized under the following main categories: General Information, Planning Group Work Chart, Meeting Schedule, Useful Links, Press Releases, Planning Group Information, Participating Jurisdictions, The Draft Plan, and Contact Information.

- ✚ The *General Information* section informs the reader about hazard mitigation and the hazard mitigation plan, the purpose and need for the plan, and a general overview of the process. It also

points out that by implementing the hazard mitigation plan over the long-term, the damages and loss of life, as a result of a natural disaster, may be diminished.

- ✚ The *Planning Group Organizational Structure* section contains a flowchart representation of the participating entities in the plan development process.
- ✚ The *Meetings* section offers a listing of all the meetings held during 2007 and 2008 with the Core Planning Group. The meeting agenda, minutes and other documents pertinent to each meeting can be found in this section for viewing or downloading.
- ✚ The *Participating Jurisdictions* section lists all entities that either participated fully in the planning process, contributed some input, were consulted, or expressed interest.
- ✚ The *Core Group Deliverables* section forms a repository of all forms, questionnaires, and worksheets that participating jurisdictions were asked to submit.
- ✚ The *Document Repository* section provides contact details for interested parties without an internet connection wishing to access the library of hard copies of all documents related to the plan established at the Ulster County Emergency Management Offices.
- ✚ The *Draft Plan* section contains the Draft Plan in Adobe PDF format, as well as the Risk Assessment Interim Deliverable.
- ✚ Under *Useful Links*, the reader can find links to various FEMA and New York State Office of Emergency Management (NYSEMO) web pages with information on hazard mitigation, the guidelines, DMA 2000 and other related topics.
- ✚ The *More Information* section provides contact information for the UCECEM Director regarding the County Multi-Jurisdictional Hazard Mitigation Plan.


### *PlanFacts*

The CPG made an effort to involve the public and other stakeholders in the process during the drafting stage of the plan in part through a fact sheet. The Planning Committee increased public awareness of the hazard mitigation plan process by providing a two-page summation on hazard mitigation facts and the mitigation planning process to the public, community leaders, business owners, local residents and other stakeholders in the plan. The flyer, entitled *Ulster County Multi-Jurisdictional Natural Hazard Mitigation Planning Project PlanFacts*, furnishes pertinent plan data that explains the purpose and need for the mitigation plan in Ulster County.

The two-page flyer begins by providing a basic understanding to “What is hazard mitigation?” It then contains information on the plan development process and how jurisdictions can participate in the plan or prepare their own hazard mitigation plans in compliance with DMA 2000 requirements. It also provides an overview of the Hazard Mitigation Planning Committee members and their roles; the steps in the mitigation process (goals, objectives, natural hazards evaluation, etc.); the plan scheduled target completion date; and a point of contact at UCECEM for more information.

*PlanFacts* was distributed to the attendees at the Core Planning Group Kickoff Meeting on December 11, 2007. It was also posted by several Core Planning Group Members on local notice boards throughout the county. The Fact Sheet can be found electronically at the Ulster County Emergency Management web site address given above.

*PlanFacts* was also distributed in hard copy format widely throughout the County by CPG members. Locations that it has been posted/distributed include Local libraries, fire departments, and City/Town Halls. A copy of the full fact sheet is presented below:



Ulster County Multi-Jurisdictional  
Natural Hazard  
Mitigation Planning Project  
**PLAN FACTS**



Town of Ulster, April 2005: Flooding of State Route 28.



New Paltz, April 2007: Washout of the sole means of access and egress to the Mountain View Nursing and Rehabilitation Center.



April 2005 Flooding of homes along the Rondout Creek.

#### WHAT IS HAZARD MITIGATION?

Natural hazards have the potential to cause property damage, loss of life, economic hardship, and threats to public health and safety.

Hazard mitigation measures are the things you do today to be more protected in the future. They are measures taken before a disaster happens to reduce the impact that future disasters will have on people and property in the community. Mitigation reduces the risk of loss and creates a more disaster-resistant and sustainable community. Hazard mitigation measures are essential to breaking the typical disaster cycle of damage, reconstruction, and repeated damage.



#### PURPOSE AND NEED FOR THE PLAN

Hazard mitigation plans are developed BEFORE a disaster strikes. The plans identify community policies, actions, and tools for long-term implementation to reduce risk and potential for future losses. Adopted, implemented and maintained on an ongoing basis, these plans will gradually, but steadily, lessen the impacts associated with hazard events in Ulster County.

As of November 1, 2004 communities that do not have a FEMA-approved hazard mitigation plan in place are no longer eligible for FEMA project grant monies under programs such as the Hazard Mitigation Grant Program (HMGF), Flood Mitigation Assistance Program (FMA) and Pre-Disaster Mitigation Grant Program (PDM).

Ulster County Multi-Jurisdictional Natural Hazard Mitigation Planning Project

PLANFACTS

#### PARTICIPATION

Jurisdictions located within Ulster County who wish to be recognized by FEMA as being compliant with DMA 2000 must either: (a) participate with the County in the multi-jurisdictional plan development process and formally adopt the final plan, or (b) prepare their own hazard mitigation plan. All jurisdictions in Ulster County are being invited to participate in the multi-jurisdictional planning process.

**Active participation** in a mitigation planning process is the only way a jurisdiction can be seen in FEMA's eyes as a "participating jurisdiction" that has met the requirements of DMA 2000 and is therefore eligible to apply for Federal funds for hazard mitigation projects. Participation includes attending meetings, providing feedback and reaching out to the public and other key stakeholders in the community, and adopting the final plan.

Participation has other advantages as well:

- Because Ulster County has hired a consulting team to conduct the analyses and author the plan, participation involves relatively little effort on the part of jurisdictions.
- Because Ulster County has received Federal grant monies to develop the plan, participation involves no cost to local jurisdictions - only allocation of staff time to participate in the process.
- Multi-jurisdictional hazard mitigation plans are practical for addressing issues that do not recognize political boundaries.
- Over time, implementation of the plan will reduce economic damages resulting from future natural disasters.

#### STRUCTURE

Elected and appointed government officials, business leaders, volunteers of non-profit organizations, citizens, and other stakeholders who choose to participate will become part of our overall Ulster County Multi-Jurisdictional Hazard Mitigation Planning Committee. To keep meeting sizes to workable numbers, the Planning Committee will be broken up into a Core Planning Group and Jurisdictional Assessment Teams.

The Core Planning Group (CPG) will include representatives of Ulster County and any of the county's jurisdictions who select to participate in the process. The CPG will manage the overall plan formulation activities and contribute to the decision making process. Representatives on the CPG will coordinate the plan efforts by organizing outreach by means of a team concept through the Jurisdictional Assessment Teams (JATs).

Page 2 of 2

November 2007

The JATs will include representatives from the individual participating jurisdictions. They will be responsible for local community involvement in the multi-jurisdictional mitigation plan.

Regardless of team, all participating jurisdictions must:

- Coordinate and facilitate local efforts.
- Attend meetings.
- Provide information and feedback.
- Involve the public and community stakeholders in the planning process.
- Assess mitigation alternatives.
- Select a course of action to be followed for their communities.
- Implement the plan and monitor its progress.

#### PROCESS

- Research a full range of natural hazards.
- Identify subset of significant hazards; these will be the focus of the plan.
- Identify location and extent of hazard areas.
- Identify assets located within hazard areas.
- Characterize existing and potential future assets at risk.
- Assess vulnerabilities to the identified hazards.
- Evaluate and prioritize goals, objectives, and hazard mitigation actions.
- Implement the Plan and monitor its progress.

#### SCHEDULE

The mitigation plan development process will occur over approximately one year, beginning in mid-October of 2007. A Draft Plan is targeted for completion in August of 2008.

#### OUR WEBSITE

A Multi-Jurisdictional Hazard Mitigation Planning Page is currently under development on the County's web site. We encourage you to check back for additional information and updates at: [www.co.ulster.ny.us](http://www.co.ulster.ny.us).

#### FOR MORE INFORMATION

Thank you for your interest! For questions or other feedback, please contact:

Arthur R. Snyder, Director  
Ulster County Emergency Communications/Emergency  
Management  
238 Golden Hill Lane  
Kingston, New York 12401-6440  
Phone: (845) 331-7000  
Fax: (845) 331-1738  
E-Mail: [atsnyder@co.ulster.ny.us](mailto:atsnyder@co.ulster.ny.us)

## Open Public Meeting

The CPG made an effort to involve the public and other stakeholders in the process during the drafting stage of the plan in part through making two of its five CPG meetings open to interested parties.

- **December 11, 2007 ó Core Planning Group Kickoff Meeting.** This was the first meeting of the Core Planning Group. Participants were provided with an overview of: the intent of the project; the organizational structure of the planning group; the plan development process overall; the role of participating jurisdictions, contractors, the public and other stakeholders; what it means to participate; key deliverables; data collection/supporting documents; the project timeline; and next steps. Handouts included the PowerPoint presentation, targeted implementation schedule, Wish List, sources of information on hazard mitigation planning, project Fact Sheet and Guidance Memo #1.
- **June 19, 2008 ó Core Planning Group Progress Meeting.** This meeting was conducted to provide an overview of plan development progress and continued work to be completed. The Consultant provided an overview of the Hazard Identification and Hazard Profile steps, and the ongoing Risk Assessment portion of the draft plan.
- **July 17, 2008 ó Risk Assessment Question and Answer Session.** The purpose of the meeting was to provide CPG members with an opportunity to ask questions and submit feedback on the recently distributed Risk Assessment Interim Deliverable. The Risk Assessment Interim Deliverable comprised the following working chapters of the draft report: Hazard Identification, Hazard Profiles, Asset Identification, Vulnerability Assessment, Range of Mitigation Actions to be Considered.

- August 7, 2008 ó Mitigation Strategy Working Session. At this working session, attendees conducted an evaluation and prioritization of hazard mitigation actions and developed an implementation strategy for selected mitigation actions. For jurisdictions not present, or those who were present but who needed more time to complete the Prioritization and Implementation Strategy sheets, an opportunity was provided for jurisdictions to do so remotely. Following this meeting, the County and 12 participating jurisdictions had evaluated, prioritized, and developed a strategy for at least one mitigation action.
- Date TBD ó Presentation of Final Plan.

*Other Outreach Activities by UCECEM and CPG Members*

In addition to the web site, fact sheet, and open public meetings held, the Core Planning Group (through their respective JATs) undertook the actions summarized in chronological order in Table 1.6 to raise awareness of the plan development process and provide the public and other stakeholders with a forum for participating in - and providing feedback throughout - the plan development process. While participating jurisdictions have provided comments, to date, no feedback from the public or other stakeholders has been received. Comments received in time to be incorporated into the Final will be reviewed by the Consultant and UCECEM and integrated into the plan as applicable. As this is a living document, other comments will be considered for integration during future maintenance cycles and plan updates.

<b>Date</b>	<b>Jurisdiction</b>	<b>Action</b>
11/15/07	Ulster County	Invitation to kickoff meeting to Chief Elected officials and CEMP committee members.
11/16/07	Ulster County	Page on County website dedicated to the Hazard Mitigation Plan went live
11/19/07	Ulster County	Participation in planning effort by emailing from UCAA.
11/20/07	Ulster County	Letters from Greene Co. OES, spoke to fire chiefs in Highland, Kingston, Shandaken Hwy, Rosendale supervisor-elect, RE: Planning Effort
11/26/07	Ulster County	Email and letters with Kingston Hospital and SUNY Ulster, RE Planning Effort
11/27/07	Ulster County	Letters w/Ulster BOCES & Sullivan County RE Planning effort
11/27/07	Ulster County	Community Involvement by discussing hazard mitigation planning at Criminal Justice/Safety Committee meeting of Legislature.
11/29/07	Ulster County	Letters/email with Sheriff and Red Cross RE planning effort
11/30/07	Town of Saugerties	Placed link on town website to County Mitigation Plan website page
12/5/07	Town of Lloyd	Presentation to Town Board and community members info RE: Haz Mit Plan and requested ongoing input. Indicated that there would be meetings upcoming to discuss mitigation action plans.
12/5/07	Town of Marbletown	Placed link on town website to County Mitigation Plan website page
12/7/07	Ulster County	Spoke to Lower Esopus Watershed Chair
12/10/07	Ulster County	Public Notice of open meeting in the Daily Freeman.
12/12/07	Town of Rosendale	Town Board Meeting with local media coverage: Made public Information about plan.
1/2/08	City of Kingston	Public meeting with City Council to describe intent of plan.
1/8/08	Town of Gardiner	Town Board Meeting: Presentation on Plan and Core Group. Participation Resolution to be passed by The Town Board.

**Table 1.6**  
**Summary of Jurisdiction Outreach Activities**

1/9/08	Town of Lloyd	Town Board Regular Meeting: Presented information concerning outreach efforts to community. Fire Dept and Police Dept. on hand to discuss Emergency Response and incidents in the Town.
1/14/08	Ulster County	Participation in planning effort by speaking to NYSP zone captain.
1/15/08	Ulster County	Engaging community support by addressing UC Town Supervisors Assoc monthly meeting
1/16/08	City of Kingston	Posted info notice in City Hall, alert public of pending Mitigation Plan,.
1/22/08	Ulster County	Engaging community involvement by discussing Haz Mit planning at monthly Criminal Justice/Safety Committee meeting of legislature.
1/28/08	Town of Hurley	Discussion of Multi Jurisdictional Hazard Mitigation Plan at board Meeting.
2/1/08	Town of Saugerties	Ongoing: Mention of Plan in various public forums and on local public access TV23
2/5/08	Town of Rosendale	Public Outreach to Creekside residents via email and correspondence.
2/11/08	Ulster County	Placed notice in Daily Freeman re: plan and capability assessment meeting.
2/12/08	Town of Rosendale	Dept Head Meeting: inform dept heads of UC Hazard Mitigation Process
2/14/08	Ulster County	Conducted open Meeting, re: Capability Assessment Review.
2/14/08	Ulster County	Engaging community involvement - spoke to NYSP Lt. J. Michaels
2/15/08	Town of Gardiner	Meeting w/Highway Supt, Town Supervisor and Code officer, reviewing wish list and land uses and development, trends, deliverables.
2/18/08	Ulster County	Engaging community involvement - contact with NYS Bridge Authority.
2/19/08	City of Kingston	Discussed project at neighborhood meeting.
2/19/08	Town of Lloyd	Sent informational handout to town depts, local library, Fire Dept, Town Hall.
2/22/08	Ulster County	Engaging community involvement - spoke to Cornell Cooperative Extension Re: economic impact of drought on farming; spoke to Soils & Water re: capabilities.
2/25/08	Town of Hurley	Meeting passed Resolution #2008-63 resolving Town's participation in development of Haz Mit Plan.
2/26/08	Ulster County	Discussion about Haz Mit planning at monthly Criminal Justice/Safety committee meeting of Legislature.
3/1/08	Town of Kingston	Town Board Meeting: update Town Board and public regarding Mitigation Project.
3/3/08	Ulster County	Interview with Wallkill Valley Times re: Haz Mit Planning process.
3/4/08	City of Kingston	City Council discussed participation.
3/28/08	Town of Rosendale	Training: Flood Response Workshop attended by several town staff.
4/1/08	Town of Kingston	Meeting with Town of Kingston Bldg Inspector, Mr. Clark Kimble regarding Hazard Mitigation Plan.
4/1/08	Town of Marlborough	Update comprehensive Emergency Management Plan at meeting with Emergency Preparedness Committee.
4/8/08	Town of Gardiner	Public Meeting at Town Board Monthly meeting to update on planning process.
4/10/08	Town of Lloyd	Emergency Response Meeting: meet with key Emergency responders, Town Engineer, Town Bldg Inspector and stormwater

**Table 1.6**  
**Summary of Jurisdiction Outreach Activities**

		coordinator, and Town Board Members to discuss past incidents and brainstorm ideas for future mitigation.
4/15/08	Town of Ulster	Emergency Services Meeting with Fire Chiefs from all five fire districts, discussing Hazard Mitigation in each district.
4/16/08	Town of Rosendale	Stakeholders' Meeting to discuss ACOE Reconnaissance Study
4/21/08	Ulster County	Discussed Haz Mit planning at monthly meeting of Criminal Justice/Safety committee meeting.
4/24/08	Town of Rosendale	Flood Control Inspection: Information gathering
4/28/08	Town of Rosendale	ACOE Meeting @ UCCC to discuss Federal funding of projects
5/1/08	Town of Marlborough	Town Board Meeting: Introduced updated plan to public.
5/7/08	Town of Ulster	Meeting with Town of Ulster Planner, Mr. Alan Sorenson, AICP discussion regarding mitigation plan.
5/15/08	Town of Lloyd	Drainage Committee Meeting: monthly meeting dedicated to considering and brainstorming ideas for mitigation of recurrent problems of flooding in the town. Committee entertained local citizens and heard their concerns.
5/22/08	Town of Rosendale	Town Supervisor's Meeting regarding support of RCWC activities.
5/27/08	Ulster County	Discussed Haz Mit planning at Criminal Justice/Safety committee meeting of Legislature.
5/30/08	Ulster County	Engaging community involvement - email with NYSP.
6/1/08	Town of Ulster	Town Board Meetings updating town Board and public on project status request input from public and Town Board.
6/1/08	Town of Kingston	Town Board Meeting updating public and Town Board the status of the project and request public comment and input.
6/3/08	Ulster County	Engaging community involvement - Email with Towns of Rosendale and Marlboro re: mitigation actions.
6/4/08	Ulster County	Engaging community involvement - Spoke w/Village of New Paltz.
6/9/08	Town of Rosendale	Flood Mapping and Management Seminar to discuss state and local regulations and activities.
6/11/08	Town of Rosendale	Town Board Meeting to discuss Flood maps
6/19/08	Ulster County	Public meeting on status of Hazard Mitigation Plan at County Bldg.
6/25/08	City of Kingston	Linked City website to County website for Info on Ulster County Hazard Mitigation Plan
6/26/08	Town of Rosendale	Dept Head Meeting to discuss UC Hazard Mitigation Plan.
6/30/08	Town of Rosendale	DEC Meeting at New Paltz to discuss Federal money and non-Federal Partners
7/1/08	Town of Ulster	Meeting with John Morrow, Chairman of Comprehensive Plan Committee, discussion regarding hazard plans in Town of Ulster that could save lives.
7/1/08	Town of Marlborough	Linked comprehensive Emergency Mgmt Plan to website for public education, <a href="http://www.Marlboroughny.com">www. Marlboroughny.com</a>
7/1/08	Town of Marlborough	Notice to encourage public to go to Ulster County website for Natural Haz Mit Plan info.
7/2/08	City of Kingston	Radio interview WCNY: discussed city participation in plan.
7/8/08	Town of Rosendale	Public Information Meeting to discuss public impact on Emergency Action Plan for Sturgeon Pool.
7/9/08	Town of Rosendale	Town Board Meeting for public information with local media coverage
7/14/08	Town of Hurley	Posted participation news on Town website, added link to Ulster Counties Website and Info.

**Table 1.6**  
**Summary of Jurisdiction Outreach Activities**

7/17/08	Town of Lloyd	Outreach phone calls and letter to those parcel owners in flood prone areas in response to a call from County Bldg Dept, government. Homeowners were informed of the counties effort in mitigation (including possible purchase of their homes) and were invite
7/18/08	Town of Gardiner	Public Meeting of Gardiner Dem. Committee (nominating caucus) to update on planning process.
7/20/08	Town of Gardiner	Meeting w/Chiefs and other members of Gardiner Fire Dept. to update process. Request for assistance in identifying appropriate mitigation projects.
7/21/08	Town of Rosendale	Emails w/info to Highway Superintendent, Building Inspector, Police Chief, Water/Sewer Superintendant of Planning Mtg.
7/22/08	Town of Gardiner	Fire Co. Meeting w/line officers of Shaw Vly Fire Co. to update on planning process and request for assistance in identifying appropriate mitigation projects.
7/22/08	Ulster County	Discussion of Haz Mit Plan at Criminal Justice/Safety Committee meeting of Legislature.
7/23/08	Town of Gardiner	Public meeting of Gardiner Fire Dist Board of Fire Commissioners updating on planning process and request for assistance in identifying appropriate mitigation projects.
7/24/08	Town of Rosendale	Strategy Meeting to discuss Hazard Mitigation Plan and Core Deliverables.
7/24/08	Town of Gardiner	Town of Gardiner Republican Comm. Mtg. - planning process update.
7/28/08	Town of Hurley	Discussion and posting of Risk Assessment Interim Deliverable in Town Clerk's Office.
8/1/08	Town of Shandaken	Link town website to County Emergency Management Plan. Information for town residents about NIMS and Ulster County Hazard Mitigation.
10/1/08	Town of Gardiner	Meeting with Gardiner Association of Businesses
10/15/08	Town of Gardiner	Meeting with Property Owners of Rutsonville

### Public Response to Outreach Activities

Near the end of the planning process, UCECEM solicited feedback from CPG members regarding response to outreach activities in their municipalities. While municipalities generally indicated positive reactions and support, the Town of Gardner was able to provide some more detailed comments that arose from locally-held meetings and presentations:

- Local fire districts and volunteer fire companies expressed interest in using the Plan to pursue funding for wildfire mitigation programs, such as Community Wildfire Protection Planning (e.g. *Firewise*), and prescribed burns.
- Attendees at town board meetings in which elements of the plan were discussed regarded the effort as worthwhile and were particularly interested in whether the efforts of neighboring municipalities (as well as state and Federal agencies) could be coordinated when addressing the issue of flooding.
- Several speakers at a meeting of the Gardiner Association of Businesses in which the plan was presented considered the Plan to be a worthwhile effort and were pleased that the Town was participating in developing the plan.



## **Involvement of Other Stakeholders in the Plan Development Process**

In order to meet Federal requirements, the plan development process must be open to stakeholders beyond planning group members and the general public. That is, opportunities must be available for other stakeholders (such as businesses, neighboring communities, academia, other relevant private and non-profit interests, and other interested parties) to become involved in the planning process.

As with the general public, other stakeholders must be provided with some variety of means to not only learn about the process that the Planning Committee is undertaking, but to voice concerns and to provide input throughout the planning process. With support and guidance from URS, each JAT took the lead in pursuing a range of activities to: (a) alert other stakeholders to the fact that the planning was working to develop this Hazard Mitigation Plan, and (b) provide other stakeholders with a forum to ask questions, and to submit comments and/or suggestions on the process or directly participate.

**The Core Planning Group determined that outreach activities to the general public as summarized in the previous section would also reach and provide the same opportunities for other stakeholders such as businesses, neighboring communities, academia, other relevant private and non-profit interests, and other interested parties. In addition, targeted outreach to key stakeholder groups included:**

- Greene, Sullivan and Orange Counties (immediately adjacent to Ulster County)
- Ulster Boards of Cooperative Educational Services
- American Red Cross, Ulster County Chapter
- Lower Esopus Watershed Consortium
- Kingston Hospital
- Central Hudson Gas & Electric Corporation
- New York State Police
- New York State Thruway Authority
- New York State Bridge Authority
- New York City Department of Environmental Protection
- SUNY New Paltz
- SUNY Ulster

## **Review and Incorporation of Existing Plans, Studies, Reports, and Technical Information**

In the process of preparing this hazard mitigation plan, many other existing plans, studies, reports, and technical information were evaluated. These sources are noted throughout this report as various topics are discussed. In summary, the development of this hazard mitigation plan included the review and incorporation as applicable of data from the following sources:

- Readily available on-line information from federal and state agency web sites including: FEMA, NYSEMO, NY State Department of Environmental Conservation, US Forest Service National Avalanche Center, US Geological Survey, National Oceanic and Atmospheric Administration (including National Weather Service and National Climatic Data Center, and the National Severe Storms Laboratory), U.S. Army Cold Regions Research and Engineering Laboratory USGS National Geomagnetism Program, National Drought Mitigation Center Drought Impact Reporter, USGS National Earthquake Information Center, NASA Space Environment Center, and the US Department of Transportation Federal Highway Authority.

- Ulster Tomorrow ó Sustainable Economic Development Plan and Strategy Planning Report 2007
- New York State Hazard Mitigation Plan (January 2008)
- FEMA Q3 Flood Data and municipal Flood Insurance Studies
- Ulster County GIS
- Ulster County HAZNY Analysis
- Ulster County Comprehensive Emergency Management Plan
- USGS Earthquake History of New York State
- NY State Geological Survey NEHRP Soil Class Mapping
- NY State Landslide Inventory Mapping
- USGS National Landslides Program Landslide Mapping
- National Agricultural Statistics Service, Ulster County Profile 2002
- American Farmland Trust Agricultural Economic Development for the Hudson Valley, Technical Report and Recommendations 2004
- HAZUS-MH database for emergency facilities and utilities
- Stanford University National Performance of Dams Program web site
- New York State Historic Preservation Office GIS shape files for state and federally listed historic and cultural resources
- FEMA NFIP Community Status Book
- FEMA data for NFIP Repetitive Loss Properties and Community Rating System communities
- FEMA's óNFIP Floodplain Management Requirements: a Study Guide and Desk Reference for Local Officials (FEMA-480)ö
- USGS Landslide Overview Map of the Conterminous United States, prepared in hard copy format in 1982 by Dorothy H. Radbruch-Hall, Roger B. Colton, William E. Davies, Ivo Lucchitta, Betty A. Skipp, and David J. Varnes (Geologic Survey Professional Paper 1183), compiled digitally by Jonathan W. Godt (USGS Open File Report 97-289), as viewed on NationalAtlas.gov
- American Society of Civil Engineers (ASCE) Standard 7-98: Minimum Design Loads for Buildings and Other Structures
- FEMA's óMulti-Hazard Identification and Risk Assessmentö (1997)
- American Society of Civil Engineers óWind Zones in the United Statesö map
- American Meteorological Society óGlossary of Meteorologyö
- In addition, to conduct their Capability Assessments, local jurisdictions considered relevant plans, codes, and ordinances currently in place such as building codes, zoning ordinances, subdivision ordinances, special purpose ordinances, site plan review requirements, growth management ordinances, comprehensive plans, capital improvements plans, economic development plans, emergency response plans, post-disaster recovery plans, post-disaster recovery ordinances, and real estate disclosure ordinances. For additional information, please see the óCapabilities and Resourcesö section of this plan.

## Regulatory Compliance

This Hazard Mitigation Plan was prepared in a manner consistent with applicable regulations, criteria, and guidance. The Plan's components address the local hazard mitigation planning requirements of the DMA 2000. The Planning Group used FEMA's Multi-Hazard Mitigation Planning Guidance document of March 2004 (Revised July 2008) as a guide. This document contains what is known as a Crosswalk Reference Document for FEMA reviewers to track where in a document various criteria are addressed. Each criteria must be addressed satisfactorily for a plan to be approved by FEMA. There are three exceptions, with regard to assessing vulnerability. They are:

- Assessing Vulnerability: Identifying Structures: §201.6(c)(2)(ii)(A)
- Assessing Vulnerability: Estimating Potential Losses: §201.6(c)(2)(ii)(B)
- Assessing Vulnerability: Analyzing Development Trends: §201.6(c)(2)(ii)(C)

For these three criteria, highlighted in gray in Table 1.7, actions are strongly encouraged by FEMA, though not required by the DMA 2000 Interim Final Rule. While FEMA encourages communities to address such criteria, they are not required for Plan approval. For the Ulster County Multi-Jurisdictional Hazard Mitigation Plan, these three criteria were addressed to the greatest extent practicable in the time available and using the best readily-available data.

The following table summarizes specific requirements in the Interim Final Rule, and whether the regulation implementing DMA 2000 is addressed in this plan. Information in this plan is presented in the order of the plan review criteria for NYSEMO/FEMA reviewer's ease in evaluating compliance.

<b>FEMA Plan Review Criteria</b>	<b>Addressed in this Plan</b>
<b>Prerequisites</b>	
Adoption by the Local Governing Body: §201.6(c)(5)	Placeholder following page i
Multi-Jurisdictional Plan Adoption: §201.6(c)(5)	Placeholder following page i
Multi-Jurisdictional Planning Participation: §201.6(a)(3)	Section 1, Apdx F
<b>Planning Process</b>	
Documentation of the Planning Process: §201.6(b) and §201.6(c)(1)	Section 1 and Apdx. A
<b>Risk Assessment</b>	
Identifying Hazards: §201.6(c)(2)(i)	Section 2
Profiling Hazards: §201.6(c)(2)(i)	Section 3
Assessing Vulnerability: Overview: §201.6(c)(2)(ii)	Section 3 and Apdx. A-C
Assessing Vulnerability: Addressing Repetitive Loss Properties: §201.6(c)(2)(ii)	Section 3
Assessing Vulnerability: Identifying Structures: §201.6(c)(2)(ii)(A)	Section 3 and Apdx. C
Assessing Vulnerability: Estimating Potential Losses: §201.6(c)(2)(ii)(B)	Section 3
Assessing Vulnerability: Analyzing Development Trends: §201.6(c)(2)(ii)(C)	Section 3
Multi-Jurisdictional Risk Assessment: §201.6(c)(2)(iii)	Section 3
<b>Mitigation Strategy</b>	
Local Hazard Mitigation Goals: §201.6(c)(3)(i)	Section 5
Identification and Analysis of Mitigation Actions: §201.6(c)(3)(ii)	Sections 6 - 7 and Apdx. D
Identification and Analysis of Mitigation Actions: NFIP Compliance: §201.6(c)(3)(iii)	<i>Sections 6 - 7 and Apdx. D</i>
Implementation of Mitigation Actions: §201.6(c)(3)(iii)	Section 8 and Apdx. E
Multi-Jurisdictional Mitigation Actions: §201.6(c)(3)(iv)	Section 8 and Apdx. E
<b>Plan Maintenance Process</b>	
Monitoring, Evaluating, and Updating the Plan: §201.6(c)(4)(i)	Section 9
Incorporation into Existing Planning Mechanisms: §201.6(c)(4)(ii)	Section 9
Continued Public Involvement: §201.6(c)(4)(iii)	Section 9

## Document Organization

This Multi-Jurisdictional Hazard Mitigation Plan for Ulster County is organized into the following major sections.

**Introduction.** Plan purpose, overview of Ulster County, summary of plan development process, document organization, and key terms.

**Identification of Potential Hazards.** Documentation of the Planning Committee's evaluation of a full range of natural hazards, and indication of which hazards were identified for inclusion in this plan (and why) versus those that were not identified (and why not).

**Risk Assessment.** Hazard profiles, identification and characterization of assets in hazard areas, damage estimates, and summary of land uses and development trends in hazard areas.

**Capabilities and Resources.** Overview of local, state, and federal resources for hazard mitigation.

**Mitigation Goals.** Summary of hazard mitigation goals for the State Hazard Mitigation Plan and also for this county-wide multi-jurisdictional hazard mitigation plan.

**Range of Alternative Mitigation Actions Considered.** Summary of mitigation actions considered by participating jurisdictions.

**Action Item Evaluation and Prioritization.** Information regarding the methodology and process followed by participating jurisdictions to evaluate and prioritize unique hazard mitigation actions for their communities.

**Implementation Strategy.** Summary of hazard mitigation actions selected by each participating jurisdiction.

**Plan Maintenance.** Procedures selected for monitoring, evaluating, and updating this mitigation plan; including participation of the public and other stakeholders in plan maintenance, and plan integration.

## Key Terms

For the purpose of clarity throughout this document, the following definitions are briefly outlined:

- **Hazard mitigation** is the method by which measures are taken to reduce, eliminate, avoid or redirect natural hazards in order to diminish or eradicate the long-term risks to human life and property.
- A **natural hazard** is any hazard that occurs or results from acts of nature such as floods, earthquakes, hurricanes, tornadoes and coastal storms, to name a few.
- A **hazard mitigation plan** is a well-organized and well-documented evaluation of the natural hazards and the extent that the events will occur. In addition, the plan identifies the vulnerability to the effects of the natural hazards typically present in a certain area, as well as the goals,

objectives and actions required for minimizing future loss of life and property damage as a result of natural hazards.

- **Hazard mitigation planning** is the process of managing actions taken by individual citizens and professional organizations involved in mitigation activities. The process involves carrying out plans to reduce loss of life, injuries and damage to property, as well as reducing the costs associated with losses from natural hazards. It is a long-term process with benefits best realized over time.
- A **disaster** is any catastrophic event that causes loss of life, injuries and widespread destruction to property. For the purpose of this document, a disaster is the result of a natural hazard, whether anticipated (such as flash flood warnings) or fortuitous (such as earthquakes).
- The term **human-caused hazards** refers to technological hazards + terrorism, where technological hazards are incidents that arise from human activities such as the manufacture, transportation, storage, and use of hazardous materials, where the incidents are accidental and their consequences unintended; and terrorism is the intentional, criminal, and/or malicious acts resulting from the use of Weapons of Mass Destruction (WMD), including biological, chemical, nuclear, and radiological weapons; arson, incendiary, explosive and armed attacks; industrial sabotage and intentional hazardous materials releases; and cyberterrorism.

**SECTION 2 – IDENTIFICATION OF POTENTIAL HAZARDS FOR  
ULSTER COUNTY, NEW YORK**

FEMA's current regulations and interim guidance require, at a minimum, an evaluation of a full range of natural hazards. An evaluation of "human-caused" hazards (i.e., technological hazards and/or terrorism) is encouraged, though not required, for plan approval under DMA 2000. Ulster County has chosen to focus solely on natural hazards at this time. Human-caused hazards can be evaluated in future versions of the plan, as it is a "living document" which will be monitored, evaluated and updated regularly.

After consideration of a full range of natural hazards, Ulster County has identified several hazards that are addressed in this Multi-Jurisdictional Hazard Mitigation Plan. These hazards were identified through an extensive process that utilized input from Planning Group members, review of the Ulster County Hazards New York (HAZNY) analysis, research of past disaster declarations in the County, and review of the New York State Hazard Mitigation Plan (2008). Readily available online information from reputable sources (such as federal and state agencies) was also evaluated to supplement information from these key sources.

The following table (Table 2.1) presents the full range of natural hazards considered and provides a brief description of the hazard. Subsequently, Table 2.2 documents the evaluation process for the hazards listed in Table HI.1 to determine the hazards worthy of further consideration in the plan. For each hazard considered, Table HI.2 indicates whether or not the hazard was identified as a significant hazard to be addressed in the plan, how this determination was made (i.e. the sources of information that were consulted while researching each hazard) and why this determination was made. The table summarizes not only those hazards that *were* identified (and why) but also those that *were not* identified (and why not).

Some of these hazards are considered to be interrelated or cascading (e.g., hurricanes can cause wind damage and flooding), but for preliminary hazard identification purposes these individual hazards have been broken out separately. It should also be noted that some hazards, such as earthquakes or winter storms may impact a large area yet cause little damage, while other hazards, such as a tornado, may impact a small area yet cause extensive damage within that area.

Because this Hazard Mitigation Plan is a living document, hazard events not identified for inclusion at this time could be addressed during future evaluations and updates of the plan if deemed necessary by the Planning Group at that time.

Lastly, Table 2.3 provides a summary checklist of the hazard identification and evaluation process noting which of the 23 initially identified hazards are considered significant enough for further evaluation through Ulster County's multi-jurisdictional hazard risk assessment (marked with a "☑").

## SECTION 2 - RISK ASSESSMENT: IDENTIFICATION OF POTENTIAL HAZARDS

**Table 2.1**  
**Descriptions of the Full Range of Initially Identified Hazards**

Hazard	Description
<b>ATMOSPHERIC</b>	
<b>Avalanche</b>	A rapid fall or slide of a large mass of snow down a mountainside.
<b>Extreme Temperatures</b>	Extreme heat and extreme cold constitute different conditions in different parts of the country. Extreme cold can range from near freezing in the South to temperatures well below zero in the North. Similarly, extreme heat is typically recognized as the condition whereby temperatures hover ten degrees or more above the average high temperature for a region for an extended period.
<b>Extreme Wind</b>	Wind is air that is in constant motion relative to the surface of the earth. Extreme wind events can occur suddenly without warning. They can occur at any time of the day or night, in any part of the country. Extreme winds pose a threat to lives, property, and vital utilities primarily due to the effects of flying debris and can down trees and power lines. Extreme winds are most commonly the result of hurricanes, tropical storms, nor'easters, severe thunderstorms and tornadoes, but can also occur in their absence as mere windstorms. One type of windstorm, the downburst, can cause damage equivalent to a strong tornado.
<b>Hailstorm</b>	Any storm that produces hailstones that fall to the ground; usually used when the amount or size of the hail is considered significant. Hail is formed when updrafts in thunderstorms carry raindrops in to parts of the atmosphere where the temperatures are below freezing.
<b>Hurricane and Tropical Storm</b>	Hurricanes and tropical storms are classified as cyclones and defined as any closed circulation developing around a low-pressure center in which the winds rotate counter-clockwise in the Northern Hemisphere (or clockwise in the Southern Hemisphere) and with a diameter averaging 10 to 30 miles across. When maximum sustained winds reach or exceed 39 miles per hour, the system is designated a tropical storm, given a name, and is closely monitored by the National Hurricane Center. When sustained winds reach or exceed 74 miles per hour the storm is deemed a hurricane. The primary damaging forces associated with these storms are high-level sustained winds, heavy precipitation and tornadoes. Coastal areas are also vulnerable to the additional forces of storm surge, wind-driven waves and tidal flooding which can be more destructive than cyclone wind. The majority of hurricanes and tropical storms form in the Atlantic Ocean, Caribbean Sea and Gulf of Mexico during the official Atlantic hurricane season, which extends from June through November.
<b>Lightning</b>	Lightning is a discharge of electrical energy resulting from the buildup of positive and negative charges within a thunderstorm, creating a bolt when the buildup of charges becomes strong enough. This flash of light usually occurs within the clouds or between the clouds and the ground. A bolt of lightning can reach temperatures approaching 50,000 degrees Fahrenheit. Lightning rapidly heats the sky as it flashes, but the surrounding air cools following the bolt. This rapid heating and cooling of the surrounding air causes thunder. On average, 73 people are killed each year by lightning strikes in the United States.
<b>Nor'easter</b>	Similar to hurricanes, nor'easters are ocean storms capable of causing substantial damage to coastal areas in the Eastern United States due to their associated strong winds and heavy surf. Nor'easters are named for the winds that blow in from the northeast and drive the storm up the East Coast along the Gulf Stream, a band of warm water that lies off the Atlantic coast. They are caused by the interaction of the jet stream with horizontal temperature gradients and generally occur during the fall and winter months when moisture and cold air are plentiful. Nor'easters are known for dumping heavy amounts of rain and snow, producing hurricane-force winds, and creating high surf that causes severe beach erosion and coastal flooding.
<b>Tornado</b>	A tornado is a violently rotating column of air that has contact with the ground and is often visible as a funnel cloud. Its vortex rotates cyclonically with wind speeds ranging from as low as 40 mph to as high as 300 mph. Tornadoes are most often generated by thunderstorm activity when cool, dry air intersects and overrides a layer of warm, moist air forcing the warm air to rise rapidly. The destruction caused by tornadoes ranges from light to catastrophic depending on the intensity, size and duration of the storm.
<b>Winter Storm</b>	Winter storms may include snow, sleet, freezing rain, or a mix of these wintry forms of precipitation. Blizzards, the most dangerous of all winter storms, combine low temperatures, heavy snowfall, and winds of at least 35 miles per hour, reducing visibility to only a few yards. Ice storms occur when moisture falls and freezes immediately upon impact on trees, powerlines, communication towers, structures, roads and other hard surfaces. Winter storms and ice storms

## SECTION 2 - RISK ASSESSMENT: IDENTIFICATION OF POTENTIAL HAZARDS

**Table 2.1**  
**Descriptions of the Full Range of Initially Identified Hazards**

Hazard	Description
	can down trees, cause widespread power outages, damage property, and cause fatalities and injuries to human life.
<b>HYDROLOGIC</b>	
<b>Coastal Erosion</b>	Landward displacement of a shoreline caused by the forces of waves and currents. Coastal erosion is measured as the rate of change in the position or horizontal displacement of a shoreline over a period of time. It is generally associated with episodic events such as hurricanes and tropical storms, nor'easters, storm surge and coastal flooding but may also be caused by human activities that alter sediment transport. Construction of shoreline protection structures can mitigate the hazard, but may also exacerbate it under some circumstances.
<b>Dam Failure</b>	Dam failure is the collapse, breach, or other failure of a dam structure resulting in downstream flooding. In the event of a dam failure, the energy of the water stored behind even a small dam is capable of causing loss of life and severe property damage if development exists downstream of the dam. Dam failure can result from natural events, human-induced events, or a combination of the two. The most common cause of dam failure is prolonged rainfall that produces flooding. Failures due to other natural events such as hurricanes, earthquakes or landslides are significant because there is generally little or no advance warning.
<b>Drought</b>	A prolonged period of less than normal precipitation such that the lack of water causes a serious hydrologic imbalance. Common effects of drought include crop failure, water supply shortages, and fish and wildlife mortality. High temperatures, high winds, and low humidity can worsen drought conditions and also make areas more susceptible to wildfire. Human demands and actions have the ability to hasten or mitigate drought-related impacts on local communities.
<b>Flood</b>	The accumulation of water within a water body which results in the overflow of excess water onto adjacent lands, usually floodplains. The floodplain is the land adjoining the channel of a river, stream, ocean, lake or other watercourse or water body that is susceptible to flooding. Most floods fall into the following three categories: riverine flooding, coastal flooding, or shallow flooding (where shallow flooding refers to sheet flow, ponding and urban drainage).
<b>Ice Jams</b>	A formation of ice over a body of water that limits the flow of the water due to freezing. Ice jam flooding occurs when warm temperatures and heavy rain cause the snow to melt rapidly, causing frozen rivers or lakes to overflow. As the water lifts, the ice that's formed on top of the body of water breaks into small pieces of varying sizes. These pieces or large chunks of ice tend to float downstream and often pile up near narrow passages or near obstructions, such as bridges and dams. This accumulation can impact the integrity of the structures and also cause upstream flooding as water backs up behind the obstruction.
<b>Storm Surge</b>	A storm surge is a large dome of water often 50 to 100 miles wide and rising anywhere from four to five feet in a Category 1 hurricane up to more than 30 feet in a Category 5 storm. Storm surge heights and associated waves are also dependent upon the shape of the offshore continental shelf (narrow or wide) and the depth of the ocean bottom (bathymetry). A narrow shelf, or one that drops steeply from the shoreline and subsequently produces deep water close to the shoreline, tends to produce a lower surge but higher and more powerful storm waves. Storm surge arrives ahead of a storm's actual landfall and the more intense the hurricane is, the sooner the surge arrives. Storm surge can be devastating to coastal regions, causing severe beach erosion and property damage along the immediate coast. Further, water rise caused by storm surge can be very rapid, posing a serious threat to those who have not yet evacuated flood-prone areas.
<b>Wave Action</b>	The characteristics and effects of waves that move inland from an ocean, bay, or other large body of water. Large, fast moving waves can cause extreme erosion and scour and their impact on buildings can cause severe damage. During hurricanes and other high-wind events, storm surge and wind increase the destructiveness of waves and cause them to reach higher elevations and penetrate further inland.
<b>GEOLOGIC</b>	
<b>Earthquake</b>	A sudden, rapid shaking of the Earth caused by the breaking and shifting of rock beneath the surface. This movement forces the gradual building and accumulation of energy. Eventually, strain becomes so great that the energy is abruptly released, causing the shaking at the earth's surface which we know as an earthquake. Roughly 90 percent of all earthquakes occur at the boundaries where plates meet, although it is possible for earthquakes to occur entirely within



## SECTION 2 - RISK ASSESSMENT: IDENTIFICATION OF POTENTIAL HAZARDS

**Table 2.1**  
**Descriptions of the Full Range of Initially Identified Hazards**

Hazard	Description
	plates. Earthquakes can affect hundreds of thousands of square miles; cause damage to property measured in the tens of billions of dollars; result in loss of life and injury to hundreds of thousands of persons; and disrupt the social and economic functioning of the affected area.
<b>Expansive Soils</b>	Soils that will exhibit some degree of volume change with variations in moisture conditions. The most important properties affecting degree of volume change in a soil are clay mineralogy and the aqueous environment. Expansive soils will exhibit expansion caused by the intake of water and, conversely, will exhibit contraction when moisture is removed by drying. Generally speaking, they often appear sticky when wet, and are characterized by surface cracks when dry. Expansive soils become a problem when structures are built upon them without taking proper design precautions into account with regard to soil type. Cracking in walls and floors can be minor, or can be severe enough for the home to be structurally unsafe.
<b>Landslide</b>	The movement of a mass of rock, debris, or earth down a slope when the force of gravity pulling down the slope exceeds the strength of the earth materials that comprise to hold it in place. Slopes greater than 10 degrees are more likely to slide, as are slopes where the height from the top of the slope to its toe is greater than 40 feet. Slopes are also more likely to fail if vegetative cover is low and/or soil water content is high.
<b>Land Subsidence</b>	The gradual settling or sudden sinking of the Earth's surface due to the subsurface movement of earth materials. Causes of land subsidence include groundwater pumpage, aquifer system compaction, drainage of organic soils, underground mining, hydrocompaction, natural compaction, sinkholes, and thawing permafrost.
<b>Tsunami</b>	A series of waves generated by an undersea disturbance such as an earthquake. The speed of a tsunami traveling away from its source can range from up to 500 miles per hour in deep water to approximately 20 to 30 miles per hour in shallower areas near coastlines. Tsunamis differ from regular ocean waves in that their currents travel from the water surface all the way down to the sea floor. Wave amplitudes in deep water are typically less than one meter; they are often barely detectable to the human eye. However, as they approach shore, they slow in shallower water, basically causing the waves from behind to effectively "pile up", and wave heights to increase dramatically. As opposed to typical waves which crash at the shoreline, tsunamis bring with them a continuously flowing "wall of water" with the potential to cause devastating damage in coastal areas located immediately along the shore.
<b>Volcano</b>	A mountain that opens downward to a reservoir of molten rock below the surface of the earth. While most mountains are created by forces pushing up the earth from below, volcanoes are different in that they are built up over time by an accumulation of their own eruptive products: lava, ash flows, and airborne ash and dust. Volcanoes erupt when pressure from gases and the molten rock beneath becomes strong enough to cause an explosion.
<b>OTHER</b>	
<b>Wildfire</b>	An uncontrolled fire burning in an area of vegetative fuels such as grasslands, brush, or woodlands. Heavier fuels with high continuity, steep slopes, high temperatures, low humidity, low rainfall, and high winds all work to increase risk for people and property located within wildfire hazard areas or along the urban/wildland interface. Wildfires are part of the natural management of forest ecosystems, but most are caused by human factors. Over 80 percent of forest fires are started by negligent human behavior such as smoking in wooded areas or improperly extinguishing campfires. The second most common cause for wildfire is lightning.

**SECTION 2 - RISK ASSESSMENT: IDENTIFICATION OF POTENTIAL HAZARDS**

**Table 2.2  
Documentation of the Hazard Evaluation Process**

Natural Hazards Considered	Was this hazard identified as a significant hazard to be addressed in the plan at this time? (Yes or No)	How was this determination made?	Why was this determination made?
<b>ATMOSPHERIC HAZARDS</b>			
Avalanche	NO	<ul style="list-style-type: none"> <li>• Review of US Forest Service National Avalanche Center web site</li> <li>• Review of NY State Hazard Mitigation Plan</li> <li>• Review of FEMA's Multi-Hazard Identification and Risk Assessment</li> <li>• Ulster County HAZNY</li> <li>• Input from Planning Group</li> </ul>	<ul style="list-style-type: none"> <li>• Avalanches are not included in the NY State Hazard Mitigation Plan, and are not discussed for NY on the US Forest Service Avalanche Center web site.</li> <li>• While avalanches are not unknown in northern New York State, the topography and climate in Ulster County do not support conditions required for the occurrence of significant avalanches.</li> <li>• Avalanches are not included in the Ulster County HAZNY.</li> </ul>
<b>Extreme Temperatures</b>	<b>YES</b>	<ul style="list-style-type: none"> <li>• Review of NY State Hazard Mitigation Plan</li> <li>• Review of NOAA National Climatic Data Center (NCDC) Database</li> <li>• Ulster County HAZNY</li> <li>• Review of FEMA's Multi-Hazard Identification and Risk Assessment</li> <li>• Input from Planning Group</li> </ul>	<ul style="list-style-type: none"> <li>• Extreme heat events are mentioned in the NY State plan as a discrete hazard. Extreme cold is mentioned in the context of winter storms.</li> <li>• The state plan records two significant extreme heat events affecting Ulster County since 1994 and shows that the percentage of the population most susceptible to extreme heat (under 5yrs and over 65yrs) is 18.4%, which is lower than in most other counties in the state.</li> <li>• NCDC reports 8 significant extreme temperature events for areas including Ulster County between February 1993 and March 2007 (including 4 extreme summer heat events and 4 extreme winter cold events). For these events there are no recorded property damages but there are a number of attributed injuries across the affected areas.</li> <li>• Extreme temperatures were ranked 14<sup>th</sup> out of 27 (Moderately High Hazard) among all the hazards included in the Ulster County HAZNY study.</li> </ul>
<b>Extreme Wind</b>	<b>YES</b>	<ul style="list-style-type: none"> <li>• Review of NY State Hazard Mitigation Plan</li> <li>• Review of FEMA's Multi-Hazard Identification and Risk Assessment</li> <li>• Review of NOAA NCDC Storm Events Database</li> <li>• Review of American Society of Civil Engineers (ASCE) Standard 7-02 (Minimum Design Loads for Buildings and</li> </ul>	<ul style="list-style-type: none"> <li>• Extreme wind events are included in the NY State plan and the Ulster County HAZNY in the context of hurricane and tornado events.</li> <li>• The state plan ranks Ulster County as 13<sup>th</sup> out of 62 counties in the state for the threat of extreme wind and vulnerability to extreme wind loss.</li> <li>• Ulster County is located in a climate region that is highly susceptible to numerous types of extreme wind events including severe thunderstorms, hurricanes, tropical storms, nor'easters and severe winter storms.</li> <li>• According to FEMA, Ulster County is located in a wind zone where extreme windspeeds of 160mph are possible.</li> </ul>

**SECTION 2 - RISK ASSESSMENT: IDENTIFICATION OF POTENTIAL HAZARDS**

**Table 2.2  
Documentation of the Hazard Evaluation Process**

Natural Hazards Considered	Was this hazard identified as a significant hazard to be addressed in the plan at this time? (Yes or No)	How was this determination made?	Why was this determination made?
		Other Structures) • Ulster County HAZNY • Input from Planning Group	<ul style="list-style-type: none"> <li>• NCDC reports 46 high wind events (wind speed &gt; 50 knots/58 mph) associated with severe thunderstorms for Ulster County since 1997. These events have caused more than \$650,000 in property damage but no recorded deaths or injuries.</li> <li>• The 3 second wind gust for Ulster County for building design purposes as per ASCE 7-02 is 90 mph. The standard also shows south eastern Ulster County is located in a Special Wind Region, i.e. an area where wind anomalies are known to occur and in which wind speeds may be substantially higher than specified.</li> </ul>
Hailstorm	NO	<ul style="list-style-type: none"> <li>• Review of NY State Hazard Mitigation Plan</li> <li>• Review of FEMA's Multi-Hazard Identification and Risk Assessment</li> <li>• Review of NOAA NCDC Storm Events Database and NOAA NSSL website</li> <li>• Ulster County HAZNY</li> <li>• Input from Planning Group</li> </ul>	<ul style="list-style-type: none"> <li>• The state plan includes hailstorms as a discrete hazard, and records one hailstorm event of 1 inch diameter or greater in Ulster County in the period 2005-7.</li> <li>• NCDC reports 49 severe hailstorm events (<u>3/4 inch</u> diameter hail or greater) for Ulster County between May 1975 and January 2008. For these events there are \$34,000 recorded property damages and \$500,000 crop damages, but no recorded deaths or injuries</li> <li>• NCDC reports only one event in which "damaging" hail (at least <u>2 inches</u> in diameter) fell in Ulster County (City of Kingston on August 13, 2003).</li> <li>• According to NSSL data Ulster County is located in a part of the country with the lowest annual number of days with hailstorms (less than 2), and where the annual average number of damaging hail events is less than 0.25.</li> <li>• Hailstorms are not included in the Ulster County HAZNY.</li> <li>• There are minimal hazard mitigation techniques available to reduce hailstorm impacts outside of the emergency preparedness procedures and severe weather warning systems already in place (i.e. mass public notifications that recommend immediate protective actions).</li> <li>• The only municipality in Ulster County to report that it considers hailstorms to be a significant hazard is the Town of Marlborough, which has both the highest proportion and total acreage of agricultural land use in the County. In the absence of more detailed information about hailstorm risks and losses, there is not sufficient overall concern to warrant further investigation in this</li> </ul>

**SECTION 2 - RISK ASSESSMENT: IDENTIFICATION OF POTENTIAL HAZARDS**

**Table 2.2  
Documentation of the Hazard Evaluation Process**

Natural Hazards Considered	Was this hazard identified as a significant hazard to be addressed in the plan at this time? (Yes or No)	How was this determination made?	Why was this determination made?
			plan. Future updates may revisit this hazard in more detail.
<b>Hurricane and Tropical Storm</b>	<b>YES</b>	<ul style="list-style-type: none"> <li>• Review of NY State Hazard Mitigation Plan</li> <li>• Analysis of NOAA historical tropical cyclone tracks</li> <li>• Review of NOAA National Hurricane Center website</li> <li>• Review of NOAA NCDC Storm Events Database</li> <li>• Review of FEMA’s Multi-Hazard Identification and Risk Assessment</li> <li>• Ulster County HAZNY</li> <li>• Input from Planning Group</li> </ul>	<ul style="list-style-type: none"> <li>• Hurricane and tropical storm events are discussed in the state plan, which includes FEMA mapping showing Ulster County located in a hurricane-prone area where extreme wind speeds of 160 mph are possible.</li> <li>• Ulster County has been included in the area covered by major disaster declarations due to hurricanes or tropical storms on three occasions since 1985.</li> <li>• NOAA historical records indicate 2 hurricane tracks and 13 tropical storm tracks passing within 50 miles of the Ulster County seat between 1863 and 2007.</li> <li>• The most recent of these events was Tropical Storm Beryl, which passed along the southern border of the county in 1994.</li> <li>• According to the NHC the estimated return period for a category 1 hurricane in the New York City area is 17 years, rising to 370 years for a category 5 event</li> <li>• Hurricanes were ranked 15<sup>th</sup> out of 27 (‘Moderately High Hazard’) among all the hazards included in the Ulster County HAZNY study.</li> </ul>
<b>Lightning</b>	<b>YES</b>	<ul style="list-style-type: none"> <li>• Review of NY State Hazard Mitigation Plan</li> <li>• Review of NOAA NCDC Storm Events Database, NOAA lightning statistics, and National Severe Storms Laboratory (NSSL) web site</li> <li>• Review of FEMA’s Multi-Hazard Identification and Risk Assessment</li> <li>• Ulster County HAZNY</li> <li>• Input from Planning Group</li> </ul>	<ul style="list-style-type: none"> <li>• Lightning is not considered as a discrete hazard in the NY State Hazard Mitigation Plan or the Ulster County HAZNY.</li> <li>• According to NOAA and FEMA data, Ulster County is located in an area of the country that experiences an average of less than 40 thunder events and 1 - 4 lightning flashes per square kilometer per year. For comparison, large areas of the country experience more than 100 events per year and more than 10 flashes per square kilometer.</li> <li>• NOAA records that New York State has experienced the fifth most deaths from lightning in the USA from 1959 to 1994.</li> <li>• NCDC reports 18 lightning events for Ulster County between August 1993 and January 2008. These events have resulted in 2 recorded injuries and \$700,000 in property damage.</li> </ul>
<b>Nor’easter</b>	<b>YES</b>	<ul style="list-style-type: none"> <li>• Review of NY State Hazard Mitigation Plan</li> <li>• Review of NOAA NCDC Storm Events Database</li> <li>• Review of FEMA’s</li> </ul>	<ul style="list-style-type: none"> <li>• Nor’easters are discussed in the state plan as a common cause of flooding and snowstorms, particularly in the south eastern part of the state.</li> <li>• NYSEMO has classified nor’easters as a moderate hazard (second only to flooding) in</li> </ul>

**SECTION 2 - RISK ASSESSMENT: IDENTIFICATION OF POTENTIAL HAZARDS**

**Table 2.2  
Documentation of the Hazard Evaluation Process**

Natural Hazards Considered	Was this hazard identified as a significant hazard to be addressed in the plan at this time? (Yes or No)	How was this determination made?	Why was this determination made?
		Multi-Hazard Identification and Risk Assessment <ul style="list-style-type: none"> <li>• Ulster County HAZNY</li> <li>• Input from Planning Group</li> </ul>	the planning area covering Ulster County. <ul style="list-style-type: none"> <li>• Although not specifically included in the Ulster County HAZNY, the county has been affected by numerous nor'easters, with the principal impacts being heavy snowfall and flooding, and the HAZNY ranks "Severe Storms" 4<sup>th</sup> out of 27 ("Moderately High Hazard") among the list of all hazards.</li> </ul>
<b>Tornado</b>	<b>YES</b>	<ul style="list-style-type: none"> <li>• Review of NY State Hazard Mitigation Plan</li> <li>• Review of NOAA NCDC Storm Events Database and National Severe Storms Laboratory (NSSL) web site</li> <li>• Review of FEMA's Multi-Hazard Identification and Risk Assessment</li> <li>• Ulster County HAZNY</li> <li>• Input from Planning Group</li> </ul>	<ul style="list-style-type: none"> <li>• The state plan acknowledges that New York State has a definite vulnerability to tornadoes, with an average annual occurrence of 6 tornadoes per year since 1950.</li> <li>• Tornadoes are ranked as a moderate hazard in the planning area covering Ulster County.</li> <li>• NCDC reports 11 tornado events in Ulster County between September 1975 and January 2008. These events have resulted in no recorded deaths and only a handful of injuries but have caused \$3.1 million in property damage. The most severe being two F2 tornadoes that struck the county in March 1976 and July 1986.</li> <li>• NSSL tornado probability data indicate that while Ulster County is in an area that experiences less than 1 tornado event per year, life-threatening and damaging tornado events remain a possibility.</li> <li>• Tornadoes were ranked 7<sup>th</sup> out of 27 ("Moderately High Hazard") among all hazards included in the Ulster County HAZNY.</li> </ul>
<b>Winter Storm</b>	<b>YES</b>	<ul style="list-style-type: none"> <li>• Review of NY State Hazard Mitigation Plan</li> <li>• Review of FEMA's Multi-Hazard Identification and Risk Assessment</li> <li>• Review of NOAA NCDC Storm Events Database</li> <li>• New York State Climate Office web site</li> <li>• Ulster County HAZNY</li> <li>• Input from Planning Group</li> </ul>	<ul style="list-style-type: none"> <li>• Winter storms including heavy snow and ice storms are discussed in the state plan, which notes that Ulster County averages approximately 60 inches of snowfall per year. The statewide average is 65 inches, with 60% of the state experiencing at least 70 inches annually.</li> <li>• The state plan ranks winter/ice storms as a moderate risk in the planning area covering Ulster County.</li> <li>• The website of the New York State Climate Office records that some areas of higher ground in western Ulster County experience annual average snowfalls of 100 inches and more.</li> <li>• The NY State plan ranks Ulster County 26<sup>th</sup> out of 62 counties in the state for most threatened by snow and vulnerable to snow losses. The plan also ranks Ulster County 42<sup>nd</sup> out of 62 for most vulnerable to ice storms and</li> </ul>

**SECTION 2 - RISK ASSESSMENT: IDENTIFICATION OF POTENTIAL HAZARDS**

<b>Table 2.2 Documentation of the Hazard Evaluation Process</b>			
<b>Natural Hazards Considered</b>	<b>Was this hazard identified as a significant hazard to be addressed in the plan at this time? (Yes or No)</b>	<b>How was this determination made?</b>	<b>Why was this determination made?</b>
			ice storm losses. <ul style="list-style-type: none"> <li>• NCDC reports that Ulster County has been affected by 77 significant snow and ice events between January 1987 and March 2007.</li> <li>• FEMA records show that Ulster County has been included in one snow-related declared disaster in the last 30 years and two snow-related emergency declarations.</li> <li>• There has been one presidential disaster declaration due to ice storm in Ulster County since 1953.</li> <li>• Ice Storms were ranked 9<sup>th</sup> out of 27 (öModerately High Hazardö) among all the hazards included in the Ulster County HAZNY study.</li> </ul>
<b>HYDROLOGIC HAZARDS</b>			
Coastal Erosion	NO	<ul style="list-style-type: none"> <li>• Review of NY State Hazard Mitigation Plan</li> <li>• Review of FEMA's Multi-Hazard Identification and Risk Assessment</li> </ul>	<ul style="list-style-type: none"> <li>• While coastal erosion is identified as a hazard and discussed in the NY State plan, it does not apply to Ulster County since the county has no tidal coastline.</li> </ul>
<b>Dam Failure</b>	<b>YES</b>	<ul style="list-style-type: none"> <li>• Review of NY State Hazard Mitigation Plan</li> <li>• Review of New York State Department of Environmental Conservation (NYSDEC) Bureau of Flood Protection and Dam Safety web site</li> <li>• Review of U.S. Army Corps of Engineers National Inventory of Dams database</li> <li>• Review of Stanford University's National Performance of Dams Program web site</li> <li>• Review of FEMA's Multi-Hazard Identification and Risk Assessment</li> <li>• Ulster County HAZNY</li> <li>• Input from Planning Group</li> </ul>	<ul style="list-style-type: none"> <li>• Dam Failure is briefly discussed in the state plan as a potential cause of flooding.</li> <li>• The USACE NID lists 53 dams of all types in Ulster County, of which 9 are classified as high hazard, 29 are significant hazard, and 18 are low hazard.</li> <li>• The Stanford University NPDP lists an additional two dams in Ulster County, of which one is classified as low hazard and the other is unclassified.</li> <li>• Dam Failures were ranked 18<sup>th</sup> out of 27 (öModerately Low Hazardö) among all the hazards included in the Ulster County HAZNY study.</li> </ul>

**SECTION 2 - RISK ASSESSMENT: IDENTIFICATION OF POTENTIAL HAZARDS**

**Table 2.2  
Documentation of the Hazard Evaluation Process**

Natural Hazards Considered	Was this hazard identified as a significant hazard to be addressed in the plan at this time? (Yes or No)	How was this determination made?	Why was this determination made?
<b>Drought</b>	<b>YES</b>	<ul style="list-style-type: none"> <li>• Review of NY State Hazard Mitigation Plan</li> <li>• Review of FEMA’s Multi-Hazard Identification and Risk Assessment</li> <li>• Review of NOAA NCDC Database</li> <li>• Review of National Drought Mitigation Center /NOAA web sites</li> <li>• Ulster County HAZNY</li> <li>• Input from Planning Group</li> </ul>	<ul style="list-style-type: none"> <li>• Drought is discussed in the state plan, which records that since 1993 Ulster County has been affected by two significant local droughts and one statewide drought event.</li> <li>• NCDC reports that Ulster County has been affected by five drought events of varying severity since 1993.</li> <li>• According to the Palmer Drought Severity Index data released by NOAA, Ulster County experienced moderate drought during 41 weeks and severe drought in one week between January 1998 and December 2007.</li> <li>• Droughts were ranked 23<sup>rd</sup> out of 27 (‘Moderately Low Hazard’) among all the hazards included in the Ulster County HAZNY study.</li> </ul>
<b>Flood</b>	<b>YES</b>	<ul style="list-style-type: none"> <li>• Review of NY State Hazard Mitigation Plan</li> <li>• Review of NOAA NCDC Storm Events Database</li> <li>• Review of FEMA’s Multi-Hazard Identification and Risk Assessment</li> <li>• Review of FEMA’s NFIP Community Status Book and Community Rating System (CRS)</li> <li>• Review of FEMA Q3 flood data for Ulster County</li> <li>• Ulster County HAZNY</li> <li>• Input from Planning Group</li> </ul>	<ul style="list-style-type: none"> <li>• Flooding is described in the state plan as the primary natural hazard in the State of New York and is discussed in comprehensive detail.</li> <li>• Two thirds of all Federal disaster declarations covering Ulster County have involved flooding.</li> <li>• Ulster County has been affected by 12 flood-related Presidential disaster declarations since 1953, with six major flood disaster declarations covering areas including Ulster County since 2004.</li> <li>• NCDC records around 100 flood events affecting Ulster County since March 1993. One fatality, one injury, and almost \$25 million in property damage was attributed to these events.</li> <li>• According to Q3 data, 7% of Ulster County and 2% of all residential properties lie within the identified 100-year floodplain. Ulster County ranks as the 10<sup>th</sup> most threatened and vulnerable to flood loss out of the 62 counties in the state on this basis.</li> <li>• All jurisdictions covered by this plan participate in the NFIP but none participate in the CRS. Ulster County ranks 14<sup>th</sup> out of 62 for the total number of NFIP policies and 12<sup>th</sup> for the total dollar amount of NFIP coverage. Ulster county ranks 15<sup>th</sup> in the state for the total number of NFIP claims since 1978, but 10<sup>th</sup> for the total dollar amount of claims paid.</li> <li>• Flooding was ranked 3<sup>rd</sup> out of 27 (‘Moderately High Hazard’) among all the hazards included in the Ulster County HAZNY study, and was the highest ranked of all natural hazards.</li> </ul>

**SECTION 2 - RISK ASSESSMENT: IDENTIFICATION OF POTENTIAL HAZARDS**

**Table 2.2  
Documentation of the Hazard Evaluation Process**

Natural Hazards Considered	Was this hazard identified as a significant hazard to be addressed in the plan at this time? (Yes or No)	How was this determination made?	Why was this determination made?
Ice Jams	YES	<ul style="list-style-type: none"> <li>• Review of NY State Hazard Mitigation Plan</li> <li>• Review of FEMA's Multi-Hazard Identification and Risk Assessment</li> <li>• USACE Cold Regions Research &amp; Engineering Laboratory Ice Jams Database</li> <li>• Ulster County HAZNY</li> <li>• Input from Planning Group</li> </ul>	<ul style="list-style-type: none"> <li>• Ice jams are mentioned as a significant cause of flooding in the state plan as New York State has experienced more ice jam events than any other U.S. state except Montana in the period 1867 through 2007.</li> <li>• USACE CRREL Ice Jams mapping indicates ice jam incidents at 12 locations on rivers in Ulster County from 1875 to 2007.</li> <li>• Ice jams were ranked 25<sup>th</sup> out of 27 (Moderately Low Hazard) among the all the hazards included in the Ulster County HAZNY study.</li> </ul>
Storm Surge	NO	<ul style="list-style-type: none"> <li>• Review of NY State Hazard Mitigation Plan</li> <li>• Review of U.S. Army Corps of Engineers SLOSH model data</li> <li>• Review of FEMA's Multi-Hazard Identification and Risk Assessment</li> </ul>	<ul style="list-style-type: none"> <li>• While storm surge is discussed in the state plan under flood hazard and hurricane/tropical storm hazard, storm surges are essentially considered a coastal phenomenon and since Ulster County is located more than 50 miles from the nearest coastline, they are not regarded as a hazard for the purposes of this plan.</li> </ul>
Wave Action	NO	<ul style="list-style-type: none"> <li>• Review of NY State Hazard Mitigation Plan</li> <li>• Review of FEMA's Multi-Hazard Identification and Risk Assessment</li> </ul>	<ul style="list-style-type: none"> <li>• While waves are discussed in the state plan under flood hazard, damage-causing waves are considered a coastal phenomenon, and since Ulster County is located more than 50 miles from the nearest coastline, they are not regarded as a hazard for the purposes of this plan.</li> </ul>
<b>GEOLOGIC HAZARDS</b>			
Earthquake	YES	<ul style="list-style-type: none"> <li>• Review of NY State Hazard Mitigation Plan</li> <li>• Review of USGS Earthquake Hazards Program web site</li> <li>• Review of New York City Area Consortium For Earthquake Loss Mitigation website</li> <li>• Review of FEMA's Multi-Hazard Identification and Risk Assessment</li> <li>• Ulster County HAZNY</li> <li>• Input from Planning Group</li> </ul>	<ul style="list-style-type: none"> <li>• Earthquake events are discussed in the state plan, since earthquakes have occurred in and around the State of New York in the past.</li> <li>• The state plan ranks Ulster County 23<sup>rd</sup> out of 62 counties for potential annualized earthquake losses and 31<sup>st</sup> out of 62 for potential annualized earthquake loss per capita.</li> <li>• According to USGS seismic hazard maps, the peak ground acceleration (PGA) with a 10% probability of exceedance in 50 years for Ulster County is between 3% g and 4% g. FEMA recommends that earthquakes be further evaluated for mitigation purposes in areas with a PGA of 3% g or more.</li> <li>• USGS records do not show the historic occurrence of any earthquakes of magnitude 3 or greater in Ulster County. Earthquakes of lesser magnitude are generally too small to be felt and are not considered to be the cause</li> </ul>



**SECTION 2 - RISK ASSESSMENT: IDENTIFICATION OF POTENTIAL HAZARDS**

**Table 2.2  
Documentation of the Hazard Evaluation Process**

Natural Hazards Considered	Was this hazard identified as a significant hazard to be addressed in the plan at this time? (Yes or No)	How was this determination made?	Why was this determination made?
			of damage. • Earthquakes were ranked 24 <sup>th</sup> out of 27 (Moderately Low Hazard) among all the hazards included in the Ulster County HAZNY study.
Expansive Soils	NO	<ul style="list-style-type: none"> <li>• Review of NY State Hazard Mitigation Plan</li> <li>• Review of FEMA's Multi-Hazard Identification and Risk Assessment</li> <li>• Review of USDA Natural Resources Conservation Service (NRCS) Soil Websites</li> <li>• Input from Planning Group</li> <li>• Ulster County HAZNY</li> </ul>	<ul style="list-style-type: none"> <li>• Expansive soils are not identified as a hazard in the NY State plan or the Ulster County HAZNY.</li> <li>• According to FEMA and USDA sources, Ulster County is located in an area that has a slight to moderate clay swelling potential.</li> <li>• According to USDOT FHA Report No. FHWA-RD-76-82, Ulster County lies in an area mapped as non-expansive, except for a small area in the northeastern part of the county, which is potentially of low expansive character and/or low frequency of occurrence.</li> <li>• New York State building codes are based on the International Building Code (2000, with 2001 supplement), in which Chapter 18 includes provisions for building on expansive soils (through design, removal or stabilization) so that new construction will be protected.</li> </ul>
Landslide	YES	<ul style="list-style-type: none"> <li>• Review of NY State Hazard Mitigation Plan</li> <li>• Review of USGS Landslide Incidence and Susceptibility Hazard Map</li> <li>• Review of New York State Geological Survey GIS database of historic landslides in New York</li> <li>• Review of FEMA's Multi-Hazard Identification and Risk Assessment</li> <li>• Ulster County HAZNY</li> <li>• Input from Planning Group</li> </ul>	<ul style="list-style-type: none"> <li>• Landslides are discussed in the NY state plan, which gives Ulster County a weighted rank of 9<sup>th</sup> out of 62 counties in the state for susceptibility to landslides, and 19<sup>th</sup> out of 62 for vulnerability to losses from landslides.</li> <li>• Mapping based on the NYSGS landslide inventory presented in the state plan appears to show five landslide events occurring in Ulster County up to 1989. Tables in the state plan record only a single historic landslide incident in Ulster County since 1837, an event which caused two fatalities in 1921.</li> <li>• USGS landslide hazard maps indicate High landslide incidence (more than 15% of the area is involved in landsliding) for a narrow area immediately adjacent to the Hudson River in Ulster County. A portion of the southern part of the county is identified as Moderate incidence, and the northwestern part of the county is identified as High susceptibility but moderate incidence. The remainder of the county (approximately 70%) is identified as Low incidence.</li> </ul>

**SECTION 2 - RISK ASSESSMENT: IDENTIFICATION OF POTENTIAL HAZARDS**

**Table 2.2  
Documentation of the Hazard Evaluation Process**

Natural Hazards Considered	Was this hazard identified as a significant hazard to be addressed in the plan at this time? (Yes or No)	How was this determination made?	Why was this determination made?
Land Subsidence	NO	<ul style="list-style-type: none"> <li>• Review of NY State Hazard Mitigation Plan</li> <li>• Review of FEMA's Multi-Hazard Identification and Risk Assessment</li> <li>• Review of USGS Fact Sheet 165-00 Land Subsidence in the U.S.</li> <li>• Ulster County HAZNY</li> <li>• Input from Planning Group</li> </ul>	<ul style="list-style-type: none"> <li>• The state plan delineates certain areas that are susceptible to land subsidence hazards in New York. While mapping in the plan depicts a narrow band of carbonate karst rock (in which there can be the potential for subsidence caused by sinkholes) crossing the southern portion of Ulster County, collapses that have resulted in structural damage are not reported.</li> <li>• While there is a history of mining in Ulster County (principally to extract lime for the production of cement), due to the robust nature of the geological strata in which these activities were carried out, it is assumed that there is no significant risk of land subsidence due to mine collapse.</li> <li>• Land subsidence is not included in the Ulster County HAZNY.</li> </ul>
Tsunami	NO	<ul style="list-style-type: none"> <li>• Review of NY State Hazard Mitigation Plan</li> <li>• Review of FEMA's Multi-Hazard Identification and Risk Assessment</li> </ul>	<ul style="list-style-type: none"> <li>• Tsunamis are not discussed in the state plan. Since the southernmost border of Ulster County is located approximately 70 miles from open ocean, and no record exists of a catastrophic Atlantic basin tsunami impacting the mid-Atlantic coast of the United States, FEMA mitigation planning guidance suggests that locations on the U.S. East Coast have a relatively low tsunami risk and need not conduct a tsunami risk assessment at this time.</li> </ul>
Volcano	NO	<ul style="list-style-type: none"> <li>• Review of NY State Hazard Mitigation Plan</li> <li>• Review of USGS Volcano Hazards Program web site</li> </ul>	<ul style="list-style-type: none"> <li>• No volcanoes are located within approximately 2,000 miles of Ulster County.</li> </ul>
<b>OTHER HAZARDS</b>			
<b>Wildfire</b>	<b>YES</b>	<ul style="list-style-type: none"> <li>• Review of NY State Hazard Mitigation Plan</li> <li>• Review of NOAA NCDC Storm Events Database</li> <li>• Review of NYSEMO and NYSDEC web sites</li> <li>• Review of FEMA's Multi-Hazard Identification and Risk Assessment</li> <li>• Ulster County HAZNY</li> <li>• Input from Planning Group</li> </ul>	<ul style="list-style-type: none"> <li>• While NYSEMO and NCDC records do not show any wildfire events in Ulster County since 1903, wildfires are discussed in the state plan as a hazard of concern, and wildfires are ranked as a moderate risk in the planning area covering Ulster County.</li> <li>• Forest fires were ranked 10<sup>th</sup> out of 27 (Moderately High Hazard) among the list of all hazards included in the Ulster County HAZNY study.</li> <li>• According to available GIS data, approximately 70% of the county area is forested, and wildfire hazard risks are expected to increase as development along the urban/wildland interface increases.</li> </ul>

**SECTION 2 - RISK ASSESSMENT: IDENTIFICATION OF POTENTIAL HAZARDS**

Table 2.3 Summary Results of the Hazard Identification and Evaluation Process	
<p><b><u>ATMOSPHERIC</u></b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Avalanche</li> <li><input checked="" type="checkbox"/> Extreme Temperatures</li> <li><input checked="" type="checkbox"/> Extreme Wind</li> <li><input type="checkbox"/> Hailstorm</li> <li><input checked="" type="checkbox"/> Hurricane and Tropical Storm</li> <li><input checked="" type="checkbox"/> Lightning</li> <li><input checked="" type="checkbox"/> Norøaster</li> <li><input checked="" type="checkbox"/> Tornado</li> <li><input checked="" type="checkbox"/> Winter Storm</li> </ul> <p><b><u>HYDROLOGIC</u></b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Coastal Erosion</li> <li><input checked="" type="checkbox"/> Dam Failure</li> <li><input checked="" type="checkbox"/> Drought</li> <li><input checked="" type="checkbox"/> Flood</li> <li><input checked="" type="checkbox"/> Ice Jams</li> <li><input type="checkbox"/> Storm Surge</li> <li><input type="checkbox"/> Wave Action</li> </ul>	<p><b><u>GEOLOGIC</u></b></p> <ul style="list-style-type: none"> <li><input checked="" type="checkbox"/> Earthquake</li> <li><input type="checkbox"/> Expansive Soils</li> <li><input checked="" type="checkbox"/> Landslide</li> <li><input type="checkbox"/> Land Subsidence</li> <li><input type="checkbox"/> Tsunami</li> <li><input type="checkbox"/> Volcano</li> </ul> <p><b><u>OTHER</u></b></p> <ul style="list-style-type: none"> <li><input checked="" type="checkbox"/> Wildfire</li> </ul>

= Hazard considered significant enough for further evaluation through Ulster County's multi-jurisdictional hazard risk assessment.

**SECTION 3a- RISK ASSESSMENT: HAZARD PROFILES**

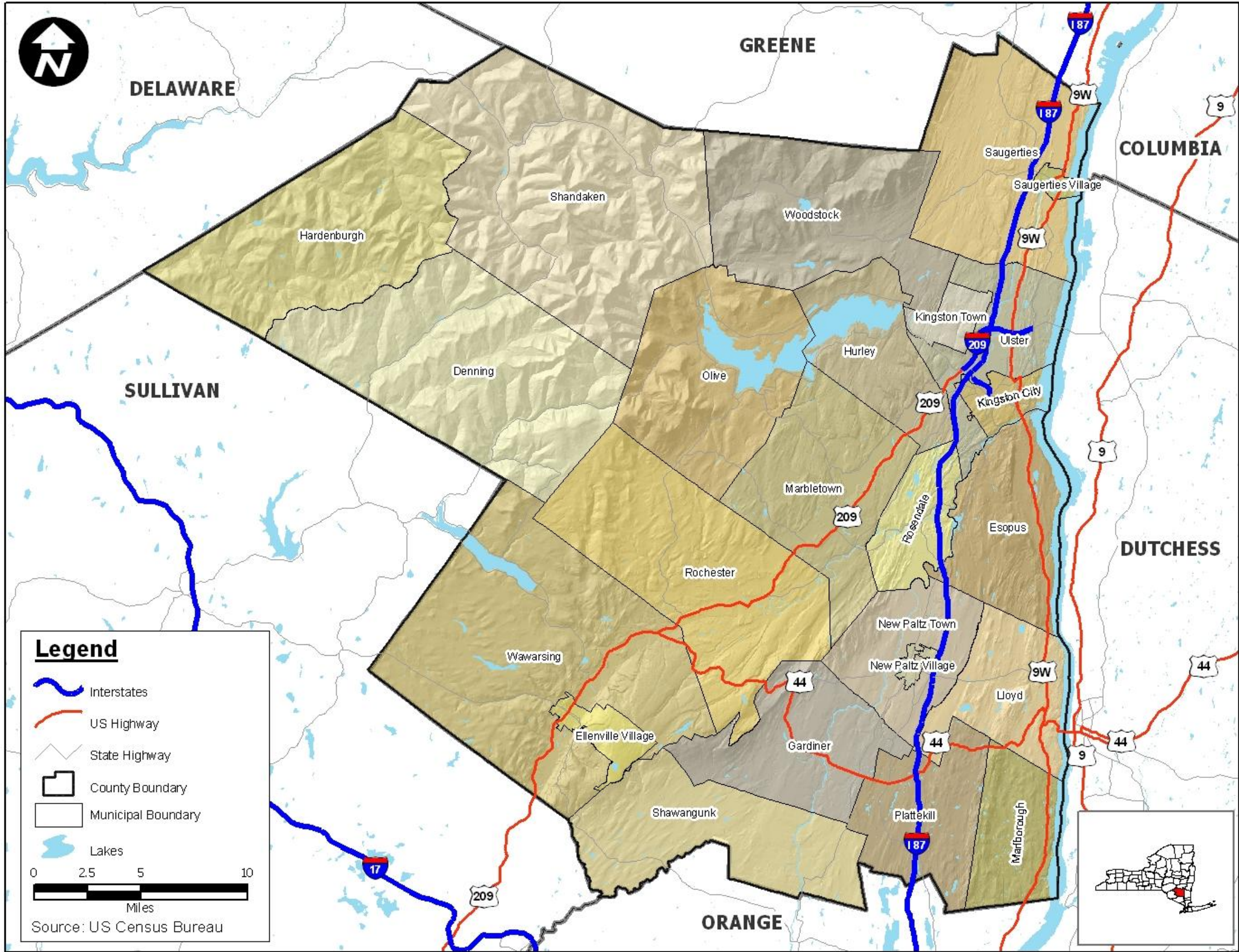
**Overview**

Detailed profiles of hazards identified in the previous section as worthy of further evaluation in the overall risk assessment are provided in this section. Each hazard profile includes a description of the hazard and its causes and impacts, the location and extent of areas subject to the hazard, known historical occurrences, and the probability of future occurrences. The profiles also include specific information noted by members of the planning committee and other stakeholders, including unique observations or relevant anecdotal information regarding individual historical hazard occurrences and individual jurisdictions.

The following table summarizes each hazard, and whether or not it has been identified as a hazard worthy of further evaluation for each of the 24 jurisdictions in the County. Following Table 3a.1, Figure 3a.1 presents a map of Ulster County for reference, including the most significant transport links and the location and boundaries of each participating jurisdiction.

<b>Jurisdiction</b>	<b>Extreme Temperatures</b>	<b>Extreme Wind</b>	<b>Hurricane / Tropical Storm</b>	<b>Lightning</b>	<b>Nor'easter</b>	<b>Tornado</b>	<b>Winter Storm</b>	<b>Dam Failure</b>	<b>Drought</b>	<b>Flood</b>	<b>Ice Jam</b>	<b>Earthquake</b>	<b>Landslide</b>	<b>Wildfire</b>
Ulster, County of	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Denning, Town of	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Ellenville, Village of <sup>1</sup>	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Esopus, Town of	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Gardiner, Town of	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Hardenburgh, Town of	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Hurley, Town of	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Kingston, City of	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Kingston, Town of	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Lloyd, Town of	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Marbletown, Town of	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Marlborough, Town of	■	■	■	■	■	■	■	■	■	■	■	■	■	■
New Paltz, Town of	■	■	■	■	■	■	■	■	■	■	■	■	■	■
New Paltz, Village of	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Olive, Town of	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Plattekill, Town of	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Rochester, Town of	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Rosendale, Town of	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Saugerties, Town of	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Saugerties, Village of	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Shandaken, Town of	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Shawangunk, Town of	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Ulster, Town of	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Wawarsing, Town of	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Woodstock, Town of	■	■	■	■	■	■	■	■	■	■	■	■	■	■

Figure 3a.1: Ulster County Base Map



## **Extreme Temperatures**

Extreme temperatures principally affect the health and safety of the human population, although they can also impact livestock, agricultural crops, and may also cause damage to infrastructure and property. This section provides detailed profiles of both extreme high and extreme low temperatures.

### **Description – Extreme Temperatures**

#### Extreme Cold

According to National Oceanic and Atmospheric Administration (NOAA) National Weather Service (NWS), the term “extreme cold” constitutes different conditions in different parts of the country, ranging from near freezing in the South to temperatures well below zero in the North.

In the South, temperatures near or just below freezing can cause pipes to burst in homes that are poorly insulated or without heat. In the North, where most buildings are insulated to a degree that can protect against most common winter temperatures for the area, long spells of below zero temperatures can result in increased numbers of people using space heaters and fireplaces to stay warm, thus increasing the risk of household fires and carbon monoxide poisoning. In addition, extreme cold can cause rivers to freeze, and ice jams to form, leading to flooding. Regardless of location, freezing temperatures can cause severe damage to crops and other vegetation; increased strain on community shelter facilities providing refuge from the cold to homeless populations and others in need; and an increased likelihood that automobiles/buses will fail to start. Local sources also report that fire departments are called to a noticeably higher number of chimney fires during periods of extreme cold.

Extreme cold can have severe negative impacts on human beings, including frostbite (an injury to the body that is caused by freezing) and hypothermia (the unintentional lowering of the body’s core temperature to below 95 degrees Fahrenheit, which typically causes uncontrollable shivering, memory loss, disorientation, incoherence, slurred speech, drowsiness, and apparent exhaustion). The NWS reports that extreme cold causes the death of roughly 26 people per year nationwide (based on a 10-year average). High winds during a period of extreme cold can exacerbate these affects, as the winds work to carry heat away from the body.

According to the New York State Climate Office, extreme cold events in New York State occur regularly, and are most common between October and March. They are most likely to occur in the northern and western portions of the state, and occur less often as one travels south toward New York City and Long Island. The record coldest temperature in New York State is -52° at Stillwater Reservoir (northern Herkimer County) on February 9, 1934 and also at Old Forge (also northern Herkimer County) on February 18, 1979. Some 30 communities have recorded temperatures of -40° or colder, most of them occurring in the northern one-half of the state and the remainder in the Western Plateau Division and in localities just south of the Mohawk Valley.

#### Extreme Heat

FEMA defines the term “extreme heat” as the condition whereby temperatures hover ten degrees or more above the average high temperature for a region, and last for several weeks. Extreme heat can also contribute to increased demand on energy supplies resulting from increased air conditioning usage, and an associated increased potential for power shortages or outages; and increased demand on medical offices,

hospitals, etc. as individuals suffering from various heat related health effects seek medical attention or shelter in air conditioned facilities.

The National Oceanic and Atmospheric Administration's (NOAA) National Weather Service (NWS) has reported that heat waves occur during most summers in at least some part(s) of North America. East of the Rocky Mountains, high temperatures are often combined with high humidity. Highest temperatures of record and average relative humidity would be sufficient to cause heat-related health effects in all states. Health effects associated with extreme heat can begin with air temperatures as low as 80 degrees Fahrenheit and concurrent relative humidity of at least 40 percent.

Extreme heat can have severe negative impacts on human beings, including heat-related illnesses such as sunburn, fatigue, and heat cramps, heat exhaustion, and heat strokes. The NWS reports that heat waves cause the death of roughly 175 people per year nationwide. High humidity levels during a period of extreme heat can exacerbate these effects. Similarly, periods of extreme heat in urban areas can also result in magnified impacts on human health. This is primarily due to the combined effects of pollutant concentrations, high temperatures/humidity, and poor air circulation.

According to the New York State Climate Office, extreme heat events in New York State occur regularly, and are most common between May and mid-September. They are least likely to occur in the northern and western portions of the state, and occur more often as one travels south toward New York City and Long Island. The New York City area and most of the Hudson Valley record an average of from 18 to 25 days with such temperatures during the warm season, but in the Northern and Southern Plateaus the normal quota does not exceed 2 or 3 days. While temperatures of 100° are rare, many long-term weather stations, especially in the southern one-half of the State, have recorded maximums in the 100° to 105° range on one or more occasions. The highest temperature of record in New York State is 108° at Troy on July 22, 1926. Temperatures of 107° have been observed at Lewiston, Elmira, Poughkeepsie, and New York City.

### **Location and Extent – Extreme Temperatures**

Ulster County is located in a region of the country that is susceptible to extreme heat and extreme cold. During periods of extreme temperature conditions the effects will be felt over widespread geographic areas, and it is generally assumed that Ulster County and all of its municipalities are uniformly exposed to extreme heat and extreme cold. The effects of extreme temperatures will be primarily limited to the elderly and homeless populations, with occasionally minor, sporadic property damages (i.e., bursting pipes) and damages to crops and other vegetation.

### **Historical Occurrence – Extreme Temperatures**

#### Extreme Cold

According to NOAA's National Climatic Data Center (NCDC), there were a total of 55 extreme cold events in New York State between February 1993 and October 2007 (or an average of about 3.8 extreme cold events per year), resulting in 13 deaths and \$533,000 in property damages. Of these, eight were located in Ulster County, resulting in \$50,000 in property damages. All but three of these events occurred between October and March, the time of year when extreme cold events are most common in the area. The three outstanding events occurred only days apart in late April and early May of 2002, where temperatures fell to or below 32 degrees across portions of Ulster and Dutchess Counties where the growing season had already started. Despite the freeze, no crop or plant damages were reported to the National Weather Service.

New York State has received no Federal Disaster or Emergency Declarations due solely to extreme temperatures.

Some recent notable extreme cold events as reported by the NCDC include:

**April 27, 2002**

A cold high pressure system settled into the Mid Hudson Valley during the overnight hours of April 26-27. Under a mostly clear sky, and light wind, temperatures fell to or below 32 degrees across portions of Ulster and Dutchess Counties where the growing season had already started. No damage has been reported to the National Weather Service with this freeze.

**January 25-26, 2007**

An arctic airmass moved into east central New York State late Thursday night on January 25th, and remained in place into Friday, January 26th. Early morning low temperatures on Friday ranged between zero and ten degrees below zero, with some temperatures as low as 15 degrees below zero across higher elevations of the Adirondacks. In addition, northwest winds of 10 to 15 mph produced wind chills as low as 25 to 30 degrees below zero early Friday morning, especially across higher elevations.

**January 15-16, 2008**

A period of gusty north to northwest winds in the 15 to 30 mph range, with higher gusts. This wind, combined with ambient temperatures ranging from zero to 15 below zero, resulted in dangerous wind chills across eastern New York during the night of January 15 through the morning of the 16th. Equivalent wind chill readings ranged from 25 to 30 below zero in the Mid Hudson Valley, to as low as 50 below zero across the Western Adirondacks. The brutal cold spell resulted in many closed schools and businesses on the 16th. The cold also resulted in a scattering of frozen and broken water pipes.

Extreme Heat

According to NOAA's National Climatic Data Center (NCDC), there were a total of 38 extreme heat events in New York State between February 1993 and October 2007 (or an average of about 2.6 extreme heat events per year), resulting in 86 deaths and 51 injuries. Of these, eleven were located in Ulster County, resulting in 50 injuries. Of the eleven located in Ulster County, seven were unseasonably warm temperatures occurring during the winter months between October and March. No property or crop damages were reported.

Some recent notable extreme heat events as reported by the NCDC include:

**June 7, 1999**

On June 7, the season's second Bermuda High brought the first 90 degree temperature of 1999 to much of eastern New York. At the Albany International Airport it was the first official 90 degree temperature since August 16, 1997. The temperature did not stop there, but soared all the way to 95 degrees. This value tied the daily record for the date last set in 1925. The combination of heat and humidity produced a heat index between 100 and 105 degrees during the hottest portion of the day. There were no unusual problems or power outages reported due to the excessive heat.



**July 4-6, 1999**

An intense Bermuda high pumped heat along with very high humidity across eastern New York, especially on July 5 and 6. Temperatures soared to 90 or higher most everywhere while dewpoints climbed well into the 70s. At the Albany International airport, the temperature peaked at 94 on July 5 and 95 on July 6. However, after combining humidity values, the heat index reached as high as 105 on both days. At the Dutchess County airport near Poughkeepsie, the temperature crested at 99 degrees both days. On July 5, the dewpoint reached 79 to produce a heat index of 119 degrees! The heat index peaked around 110 degrees on July 6. The sultry air mass set the stage for a large severe thunderstorm outbreak during the afternoon of July 6 across eastern New York.

**August 8-9, 2001**

A strong Bermuda high developed early in August and brought the most extensive heat wave of the summer to eastern New York and adjacent New England between August 6 and 9. Officially, at the Albany International Airport, there were four consecutive days of 90 degrees or higher, the longest such stretch in over 6 years. The heat wave reached its peak on August 8 and 9. During those days, the high reached 100 and 102 at Poughkeepsie respectively. On those same days the Albany International Airport reached 93 and 96. The 96 was a new daily maximum record for August 9, eclipsing the old record of 94 set in 1949. Humidity levels were also high, which produced heat indices between 105 and 110 near Albany, and 110 to 115 closer to Poughkeepsie. The high heat indices did cause some heat related problems. St. Clare's Hospital in Schenectady reported 9 cases of heat-related symptoms. The victims were all children campers at the Pattersonville Camp also in Schenectady County. Four more campers were treated at the campsite. While there no other heat related problems reported to the National Weather Service, the heat led to record state electricity consumption, three days in a row! Governor Pataki closed down the State government at 200 PM on August 9 to conserve power. Hot weather also caused the railroad bridge to malfunction between the cities of Albany and Rensselaer, resulting in delays for four of Amtrak's passenger trains on August 9.

**Probability of Occurrence – Extreme Temperatures**

Extreme temperature events will remain a very frequent occurrence in Ulster County, and the probability of future occurrences in Ulster County is certain (somewhat higher for extreme heat than extreme cold).

Based on historical records over the last 14.5 years, in New York State, extreme temperature events can be expected to occur approximately 6.4 times per year, with extreme cold events more likely to occur than extreme heat events (extreme cold events can be expected to occur approximately 3.8 times per year while extreme heat events can be expected approximately 2.6 times per year). This trend is slightly different in Ulster County, where extreme temperature events can be expected to occur approximately 1.3 times per year, with extreme heat events more likely to occur than extreme cold events (extreme heat events can be expected to occur approximately 0.8 times per year while extreme cold events can be expected approximately 0.6 times per year).

While the impact of such occurrences on people and property is typically minimal, it is anticipated that the threat to human lives and safety is increasing due to relatively high percentages of elderly populations in many of Ulster County's municipal jurisdictions (ranging from a minimum of 5.3 percent in the Village of New Paltz to a maximum of 19.7 percent in the Town of Hardenburgh, with an average of 14.1 percent).

## Extreme Wind

### Description – Extreme Wind

Wind, as defined by the American Meteorological Society, is air that is in constant motion relative to the surface of the earth. Since vertical components of atmospheric motion are relatively small, especially near the surface of the earth, meteorologists use the term "wind" to denote almost exclusively the horizontal component. Extreme winds are most commonly the result of tornadoes, hurricanes, tropical cyclones, extratropical cyclones (northeasters), destructive wind, and thunderstorms, but can also occur in their absence as mere "windstorms".

Extreme wind events might occur over large, widespread areas or in a very limited, localized area. They can occur suddenly without warning. They can occur at any time of the day or night, at any location within Ulster County. Extreme winds pose a significant threat to lives, property, and vital utilities due to flying debris, such as rocks, lumber, fuel drums, sheet metal and loose gear of any type that can be picked up by the wind and hurled with great force. Extreme winds also down trees and power lines, often resulting in power outages across an affected area.

- (1) **Tornadoes:** Tornadoes are the most commonly known type of windstorm causing the most damage to property and life and all is due to severe winds. As researched by FEMA, there are, on average, 10 severe windstorms, classified as tornadoes, in the United States defined as F4 or F5 on the Fujita scale. (The Fujita scale reflects how much wind damage results from a tornado expressed in wind speeds. For example, wind speeds can vary between 50 and 250 mph in a typical F5 tornado.)
- (2) **Hurricanes:** A hurricane is a tropical storm with winds that have reached a constant speed of 74 mph or more. Hurricane winds blow in a large spiral around a relative calm center known as the "eye." The "eye" is generally 20 to 30 miles wide.
- (3) **Coastal Storms:** Coastal storms include both tropical cyclones and extratropical cyclones. The National Weather Service defines these terms as follows:

- **Cyclone:** An area of low pressure around which winds blow counterclockwise in the Northern Hemisphere. Also the term used for a hurricane in the Indian Ocean and in the Western Pacific Ocean.
- **Tropical Cyclone:** A cyclone that forms over tropical or sub-tropical waters around centers of low barometric pressure. Tropical cyclones derive their energy from the ocean. Tropical cyclones can be further broken down according to maximum sustained winds, as follows:

Tropical Depression:	Winds < 39mph
Tropical Storm:	39 mph – Winds < 74 mph
Hurricane: *	Winds ≥ 74 mph

\* Note that "hurricanes" are tropical cyclones that develop over the Atlantic Ocean, northeast Pacific Ocean, or south Pacific Ocean. Similar storms that develop over the western North Pacific Basin are referred to as "typhoons" (or, if maximum sustained winds are at least 150 mph, "super typhoons").

- **Extratropical Cyclone:** A non-tropical cyclone that forms around a center of low barometric pressure and derives its energy from the atmosphere. Extratropical cyclones are more commonly referred to as "winter storms." Extratropical storms can be experienced on both the East and West Coasts of the United States. On the East Coast, extratropical cyclones are often called "Nor'easters" due to the direction of the storm winds.
  
- (4) **Destructive Wind:** Destructive wind is a windstorm that poses a significant threat to life and property and destroying everything in its path. Destructive wind can also cause damage by flying debris, such as rocks, lumber, fuel drums, sheet metal and loose gear of any type which can be picked up by the wind and hurled with great force.
  
- (5) **Thunderstorms:** A thunderstorm is a combination of moisture, rapidly rising warm air and forceful winds capable of lifting air that's either warm or cold. They also contain lightning and thunder.

### **Location – Extreme Winds**

Extreme wind events are experienced in every region of the United States. A useful tool for determining the location of the extreme wind hazard area in a jurisdiction is depicted in Figure 3a.2 - Wind Zones in the United States. This map of design wind speeds was developed by the American Society of Civil Engineers. It divides the United States into four wind zones, geographically representing frequency and magnitude of potential extreme wind events. The figure shows that a single wind zone covers Ulster County and its jurisdictions; Zone II – Hurricane Susceptible, with a design wind speed for shelters of 160 miles per hour.

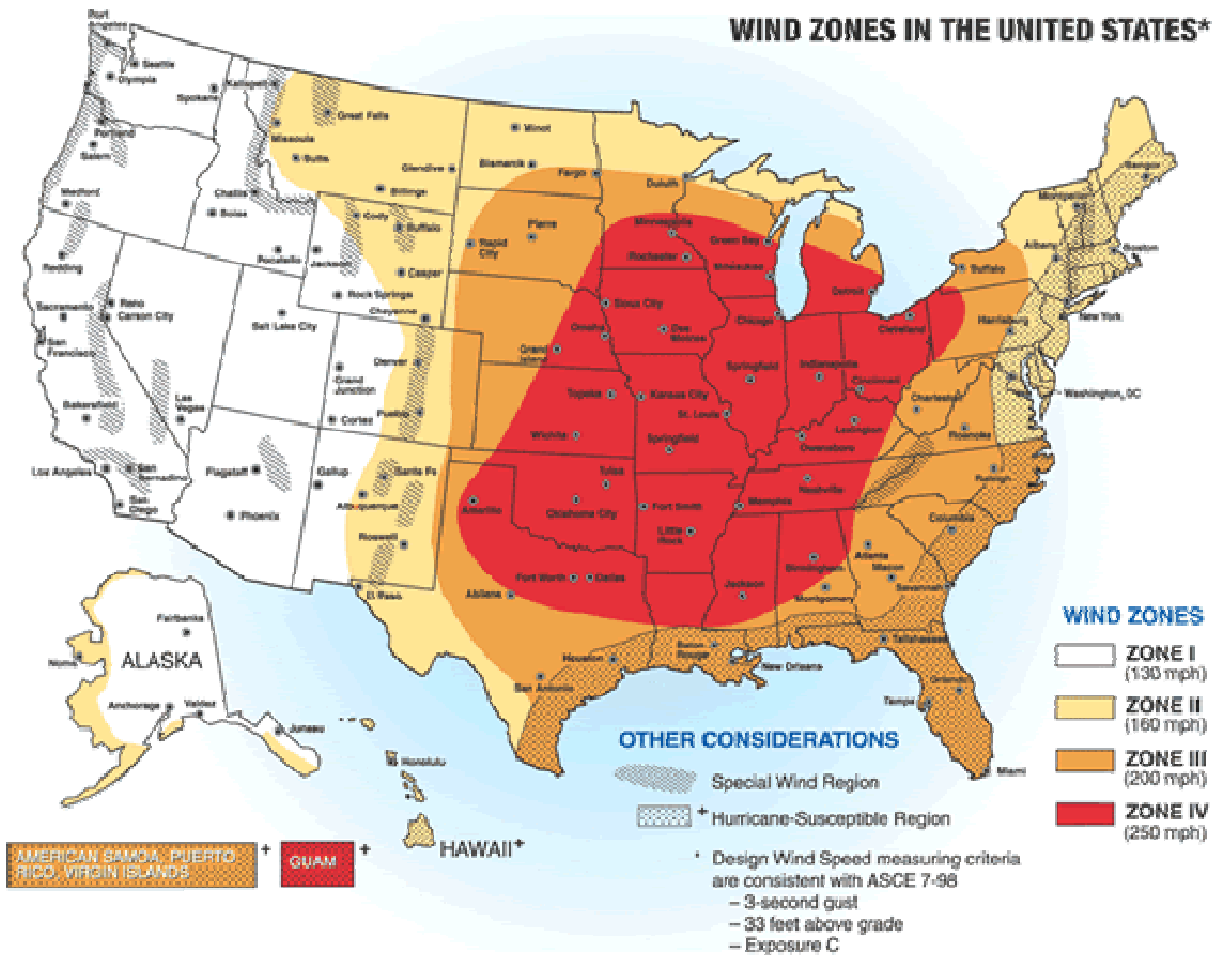


Figure 3a.2 - Wind Zones in the United States

**Extent – Extreme Winds**

The severity of a severe wind event depends upon the maximum sustained winds experienced in any given area. Extreme winds pose a significant threat to lives, property and infrastructure due to direct wind forces but also flying debris, such as rocks, lumber, fuel drums, sheet metal and loose gear of any type that can be picked up by the wind and hurled with great force. Extreme winds also down trees and power lines that often result in power outages across an affected area. Table 3a.2 illustrates the severity and typical effects of various wind speeds, as obtained from the NOAA NCDC web site.

Maximum Wind Speeds	Equivalent Saffir-Simpson Scale* (Hurricanes)	Equivalent Fujita Scale (Tornadoes)	Severity	Typical Effects
40-72 mph (35-62 kt)	Tropical Storm = 39-73 mph	F0	Minimal	Some damage to chimneys; breaks twigs and branches off trees; pushes over shallow-rooted trees; damages signboards; some windows broken; hurricane wind speed begins at 73 mph.
73-112 mph (63-97 kt)	Cat 1 = 74-95mph Cat 2 = 96-110 mph Cat 3 = 111-130 mph	F1	Moderate	Peels surfaces off roofs; mobile homes pushed off foundations or overturned; outbuildings demolished; moving autos pushed off the roads; trees snapped or broken.
113-157 mph (98-136 kt)	Cat 3 = 111-130 mph Cat 4 = 131-155 mph Cat 5 > 155 mph	F2	Considerable	Roofs torn off frame houses; mobile homes demolished; frame houses with weak foundations lifted and moved; boxcars pushed over; large trees snapped or uprooted; light-object missiles generated.
158-206 mph (137-179 kt)	Cat 5 > 155 mph	F3	Severe	Roofs and some walls torn off well-constructed houses; trains overturned; most trees in forests uprooted; heavy cars lifted off the ground and thrown; weak pavement blown off roads.
207-260 mph (180-226 kt)	? Cat 5 > 155 mph	F4	Devastating	Well constructed homes leveled; structures with weak foundations blown off some distance; cars thrown and disintegrated; large missiles generated; trees in forest uprooted and carried some distance away. The maximum wind speeds of hurricanes are not likely to reach this level.
261-318 mph (227-276 kt)	N/A	F5	Incredible	Strong frame houses lifted off foundations and carried considerable distance to disintegrate; automobile-sized missiles fly through the air in excess of 300 ft (100 m); trees debarked; incredible phenomena will occur. The maximum wind speeds of hurricanes are not expected to reach this level.
Greater than 319 mph (277 kt)	N/A	F6	N/A	The maximum wind speeds of tornadoes are not expected to reach this level. The maximum wind speeds of hurricanes are not expected to reach this level.

\* The Saffir-Simpson Scale is a five-category wind speed / storm surge classification scale used to classify Atlantic hurricane intensities. The Saffir-Simpson values range from Category 1 to Category 5. The strongest SUSTAINED hurricane wind speeds correspond to a strong F3 (Severe Tornado) or possibly a weak F4 (Devastating Tornado) value. Whereas the highest wind gusts in Category 5 hurricanes correspond to moderate F4 tornado values, F5 tornado wind speeds are not reached in hurricanes.

## Previous Occurrences – Extreme Winds

Ulster County has experienced numerous types of damaging extreme wind events in the past including severe thunderstorms, tornadoes, hurricanes, tropical storms and nor'easters.

According to NOAA's NCDC, 275 recorded high wind events have affected Ulster County between May 1997 and February 2008 (data includes wind events greater than 50 knots, with the exception of tornado events which are addressed separately within this section). These incidents resulted in a reported total of three deaths, five injuries and caused an estimated \$13.98 million in property damages. Some recent notable events include the following:

### November 6, 1994

High winds downed trees and power lines. Especially hard hit was Kingston, where trees fell on

homes and vehicles. One death and \$0.5 million in property damages were reported during this event.

**December 24, 1994**

A coastal storm which moved over extreme southeast New York on the morning of December 24<sup>th</sup> brought high winds to parts of eastern New York, downing trees, tree limbs and power lines. Especially hard hit were Olive, Woodstock and Hurley where large trees were uprooted and several homes sustained significant damage as trees fell on them (with an estimated \$0.5 million in property damage).

**March 19, 1996**

A strong low pressure system produced damaging winds. In Ulster County trees were blown down in Kingston, Woodstock and Wawarsing resulting in an estimated \$89,000 in property damages.

**May 29, 1998**

Thunderstorm winds downed trees and power lines. An elderly man was instantly killed at Ellenville in Ulster County, when a large tree limb fell on him.

**July 1, 2001**

In Ulster County, microburst damage was surveyed by National Weather Service personnel on the east side of Gardiner. Winds were estimated to be around 100 mph and the damage was generally contained within a semi-circle to the west of Ireland Corners. Large trees were snapped or taken down in an area bounded by Route 44-55, Route 208 and Marabac Road. One tree fell on an automobile, crushing it. Meanwhile to the south of the Route 208 intersection, another tree fell onto the roof of a house. At the same location, a chimney toppled onto another vehicle. At the same time, thunderstorm winds blew down numerous trees in the City of New Paltz. Total estimated property damages in Ulster County totaled \$65,000.

**November 13-14, 2003**

A steep pressure gradient between a low pressure area in the east and a high pressure system building across the Ohio Valley, brought the second major wind event of the fall season to eastern New York. Since the storm was slow moving, this turned out to be a two day high wind event. A roof over gas pumps at a Stewarts in Rosendale in Ulster County was badly damaged. A large tree fell onto a house near Kingston, damaging the roof. Downed live power lines caused a brush fire outside of New Paltz. One injury and \$275,000 in property damages were attributed to this storm in Ulster County.

**July 22, 2006**

A thunderstorm over the lower Catskills shortly before daybreak became severe. It produced a wet-microburst wind gust estimated at 70 to 80 miles an hour in Ellenville. The strong wind blew down about 30 trees, destroyed a car, and damaged 2 homes. The estimated cost of the damage was 35 thousand dollars.

**December 1, 2006**

A tree was blown onto an apartment building, crashing through the roof and killing an individual inside in Wawarsing. This occurred from strong winds, well ahead of any thunderstorms.

### Probability of Occurrence – Extreme Winds

Extreme wind events will remain a very frequent occurrence in Ulster County, and the probability of future occurrences in Ulster County is certain. The entire planning area is susceptible to a wide variety of recurring events that cause extreme wind conditions including severe thunderstorms (most frequent), tornadoes, hurricanes, tropical storms and nor'easters.

Table 3a.3 illustrates a summary of wind-related events in both New York and Ulster County based on historic occurrences reported in NOAA's NCDC Storm Events Database during the 58 year period of record from 1950 to 2008, and provides an associated average annual number of storms. It shows an average annual number of high wind events in Ulster County of 4.74 based on historical occurrences, which agrees with the NOAA National Severe Storms Laboratory's estimate of the mean number of days per year with one or more severe wind events (winds of at least 57.5 miles per hour) in Ulster County is approximately five. Table 3a.3 does not include hurricanes, tropical storms, tornadoes or extratropical storms.

Event Type	Total Number of Events in New York State	Total Number of Events in Ulster County	Average Annual Number of Events in New York State	Average Annual Number of Events in Ulster County
Thunderstorm and High Wind Events	8,591	275	148.12	4.74

Extreme winds are a probabilistic natural phenomenon: it is impossible to predict in what years windstorms will occur or how severe the winds will be. Wind hazards are often expressed in terms of wind frequencies or recurrence intervals, such as a 10-year wind or a 100-year wind. A 100-year wind means that there is a 1 percent chance in any given year of a wind at the 100-year or higher wind speed. A 10-year wind means that there is a 10 percent chance in any given year of a wind at the 10-year or higher wind speed. Wind recurrence intervals do not mean that windstorms occur exactly at these intervals; rather, they express probabilities of winds. Thus, a given location may experience two 100-year windstorms in a short time period or go several decades without experiencing a 10-year windstorm.

Extreme winds can occur during tornadoes, hurricanes, tropical cyclones, extratropical cyclones (northeasters), destructive wind, and thunderstorms, but can also occur in their absence as mere windstorms. Extreme winds have a history of occurrence throughout Ulster County, and are highly likely to occur in the future.

The degree of wind hazard risk at a particular site is characterized by the wind speeds expected at the site with recurrence intervals of 10-, 25-, 50-, 100-, and 2000- years. The FEMA Benefit-Cost Module for Wind Hazard Risk (Version 1.0, 01/20/95) provides wind speed data for various return periods at a series of mileposts located along US Gulf and Atlantic coastlines. The data is provided for locations at the coast and for locations 200 km (approximately 125 miles) inland. For the purposes of estimating wind data applicable for Ulster County, milepost 2550 was assumed to most closely resemble conditions in Ulster County. This milepost is located midway between milepost 2500 (located on the New Jersey shore) and milepost 2600 (located on the east end of Long Island). Table 3a.4 illustrates wind speed data for Ulster County and the surrounding area. FEMA's Hurricane Benefit Cost Analysis module was used to obtain

wind speeds at distances between 85 miles inland (southern Ulster County) to 125 miles inland (northern Ulster County).

<b>Table 3a.4</b> <b>Wind Speed Probabilities for Ulster County and Surrounding Area</b> <i>(Milepost 2550, as per FEMA B-C Module – Wind, Version 1.0, January 20, 1995)</i>							
Recurrence Interval	Annual Probability of Occurrence (%)	Wind Speed At the Coast – New York City approx. (mph)	Wind Speed At 85 Miles Inland - Southern Ulster County (mph)	Wind Speed At 95 Miles Inland (mph)	Wind Speed At 105 Miles Inland (mph)	Wind Speed At 115 Miles Inland (mph)	Wind Speed At 125 Miles Inland – Northern Ulster County (mph)
10	10	51	38	37	35	34	32
25	4	77	66	65	64	62	61
50	2	92	81	80	79	77	76
100	1	101	94	93	92	90	90
2000	0.05	138	133	132	131	130	130

Importing this data into FEMA’s Hurricane Benefit Cost Analysis module allows the user to generate the estimated annual number of wind events that reach various strengths. These estimates are calculated from the wind recurrence interval data, wind speed data, and the number of miles inland the site is from the nearest milepost. “Expected annual number” of windstorms does not mean that this number of windstorms occurs every year, but rather “expected” indicates the long-term statistical average number of windstorms per year. Table 3a.5 illustrates the expected annual number of wind events of various magnitudes at various distances from the coast for Ulster County and surrounding areas, while Table 3a.6 illustrates the associated annual probability of occurrence.

<b>Table 3a.5</b> <b>Expected Annual Number of Wind Events of Various Magnitudes</b> <b>At Various Distances from the Coast</b> <b>For Ulster County and Surrounding Areas</b> <i>(Milepost 2550, as per FEMA B-C Module – Wind, Version 1.0, January 20, 1995)</i>						
Storm Class (Saffir-Simpson Scale)	Wind Speed (mph)	Expected Annual Number of Wind Events				
		Wind Speed At 85 Miles Inland - Southern Ulster County (mph)	Wind Speed At 95 Miles Inland (mph)	Wind Speed At 105 Miles Inland (mph)	Wind Speed At 115 Miles Inland (mph)	Wind Speed At 125 Miles Inland – Northern Ulster County (mph)
0	60-73	0.0197	0.0195	0.0194	0.0193	0.0192
1	74-95	0.0193	0.0184	0.0175	0.0166	0.0158
2	96-110	0.0057	0.0052	0.0048	0.0044	0.0041
3	111-130	0.0017	0.0016	0.0015	0.0014	0.0013
4	131-155	0.0004	0.0004	0.0004	0.0004	0.0004
5	>155	0.0001	0.0001	0.0001	0.0001	0.0001



**Table 3a.6**  
**Annual Probability of Wind Events of Various Magnitudes**  
**At Various Distances from the Coast**  
**For Ulster County and Surrounding Areas**  
*(Milepost 2550, as per FEMA B-C Module – Wind, Version 1.0, January 20, 1995)*

Storm Class (Saffir-Simpson Scale)	Wind Speed (mph)	Annual Probability of Wind Events				
		Wind Speed At 85 Miles Inland - Southern Ulster County (mph)	Wind Speed At 95 Miles Inland (mph)	Wind Speed At 105 Miles Inland (mph)	Wind Speed At 115 Miles Inland (mph)	Wind Speed At 125 Miles Inland – Northern Ulster County (mph)
0	60-73	1.97%	1.95%	1.94%	1.93%	1.92%
1	74-95	1.93%	1.84%	1.75%	1.66%	1.58%
2	96-110	0.57%	0.52%	0.48%	0.44%	0.41%
3	111-130	0.17%	0.16%	0.15%	0.14%	0.13%
4	131-155	0.04%	0.04%	0.04%	0.04%	0.04%
5	>155	0.01%	0.01%	0.01%	0.01%	0.01%

## Hurricanes and Tropical Storms

### Hazards Associated with Hurricane and Tropical Storm Events

Hurricanes and tropical storms are particular types of *events*. The *hazards* associated with a hurricane or tropical storm event are: high winds, flooding (including storm surge), coastal erosion, and wave action. Each of the unique hazards associated with hurricane and tropical storm events are summarized briefly below, and addressed specifically elsewhere in the plan. Hurricane and tropical storm events are discussed in the remainder of this section.

- Winds. After making landfall, hurricane winds can remain at or above hurricane force well inland (sometimes more than 100 miles). In addition, hurricanes can also spawn tornadoes. Typically, the more intense a hurricane is, the greater the tornado threats. High winds are addressed separately in this document.
- Flooding. Upon making landfall, a hurricane rainfall can be as high as 20 inches or more in a 24-hour period, with amounts in the 10 to 15 inch range being most common. If the storm is large and moving slowly, the rainfall amounts can be much higher. Heaviest rainfall tends to be along the coastline, but sometimes there is a secondary maximum further inland. Following a hurricane, inland streams and rivers can flood and trigger landslides. Flooding can also be caused when drainage system capacities are exceeded. Flooding is addressed separately in this document.
- Storm Surge. Even more dangerous than the high winds of a hurricane is the storm surge, a dome of ocean water that is basically pushed ashore by the hurricane winds. Hurricane storm surge can be as much as 20 feet at its peak and 50 to 100 miles wide, depending on hurricane strength and depth of offshore waters. Generally, the stronger the hurricane and the shallower the offshore water depths, the higher the storm surge. Most hurricane fatalities and coastal damages are attributable to storm surge, as opposed to hurricane winds. Storm surge can cause the most damage when it occurs during high tides. Storm surge can come ashore as much as five hours in advance of the time that a hurricane makes landfall. There are no ocean shorelines in Ulster County, and storm surge is not a hazard in Ulster County.
- Coastal Erosion. The currents created by the tide and storm surge, combined with wave action, can severely erode coastlines. Many buildings withstand hurricane force winds until their foundations, undermined by erosion, are weakened and fail. There are no ocean shorelines in Ulster County, and coastal erosion is not a hazard in Ulster County.
- Wave Action. Hurricanes and tropical storms are also associated with significant wave action, which can damage not only buildings but infrastructure and protective features along ocean shorelines. There are no ocean shorelines in Ulster County, and wave action is not a hazard.

### Description – Hurricanes and Tropical Storms

A **hurricane** is a severe tropical cyclone with winds that have reached a constant speed of 74 miles per hour or more. Hurricane winds blow in a large spiral around a relative calm center known as the "eye." The "eye" is generally 20 to 30 miles wide, and the system can extend outward from the eye by up to 400 miles. In the Northern Hemisphere, circulation is in a counterclockwise motion around the eye. These storms are usually short in duration but are extremely powerful and cause the greater amount of damage due to significant storm surges and high winds. If these systems have wind speeds of between 39 and 73 miles per hour, they are classified as **tropical storms**.

In the Atlantic basin, hurricanes and tropical storms are most likely to occur between June 1<sup>st</sup> and November 30<sup>th</sup>, with the peak number of events typically occurring between mid-August and late October.






**Location – Hurricanes and Tropical Storms**

No one jurisdiction within Ulster County is any more likely to have the path of such a system traverse within its borders than any other location. Because of the size of hurricane and tropical storm systems, areas within Ulster County can still be affected even when the eye makes landfall outside of Ulster County. The hazards associated with hurricane and tropical storm events have distinct hazard area locations, discussed in other sections of this report. For Ulster County, these include wind and flood hazards.

**Extent – Hurricanes and Tropical Storms**

The magnitude or severity of hurricanes is categorized by the Saffir-Simpson scale. The Saffir-Simpson Scale is a five-category wind speed / storm surge classification scale used to classify Atlantic hurricane intensities. The scale is used to give an estimate of the potential property damage and flooding that can be expected. The Saffir-Simpson values range from Category 1 to Category 5, as shown in Table 3a.7. Wind speed is the determining factor in the scale, as storm surge values are highly dependent on the slope of the continental shelf in the landfall region.

Note that, for tropical storms (not represented on the scale), winds are between 39 and 73 miles per hour and typical effects include breakage of twigs and branches off trees, toppling of shallow-rooted trees, and some damage to signboards and windows.

Category	Wind Speed (miles per hour)	Storm Surge (feet above normal sea level)	Expected Damage	Photo Example
1	74-96 mph	4-5 ft	<u>Minimal:</u> Damage is done primarily to shrubbery and trees, unanchored mobile homes are damaged, some signs are damaged, no real damage is done to structures	
2	96-110 mph	6-8 ft	<u>Moderate:</u> Some trees are toppled, some roof coverings are damaged, and major damage is done to mobile homes.	
3	111-130 mph	9-12 ft	<u>Extensive:</u> Large trees are toppled, some structural damage is done to roofs, mobile homes are destroyed, and structural damage is done to small homes and utility buildings.	
4	131-155 mph	13-18 ft	<u>Extreme:</u> Extensive damage is done to roofs, windows, and doors; roof systems on small buildings completely fail; some curtain walls fail.	
5	Greater than 155 mph	Greater than 18 ft	<u>Catastrophic:</u> Roof damage is considerable and widespread, window and door damage is severe, there are extensive glass failures, and entire buildings could fail.	

\* Source: FEMA's How-To #2, page 2-23

The magnitude or severity of hurricane and tropical storm events will increase under the following conditions:

- as the storm category increases;
- as the diameter of the storm system increases;
- as the system's forward speed decreases;
- as rainfall amounts increase;
- as the quantity of people, structures and infrastructure in the affected areas increases.

For the sake of clarity, we will also point out that, for communities with mapped erosion, surge, or wave action zones, the magnitude or severity will also increase with increasing degree of erosion, surge and/or wave action. However, there are no mapped erosion, surge or wave action hazard areas in Ulster County.

### **Previous Occurrences – Hurricane and Tropical Storm Events**

Hurricanes and tropical storms have impacted Ulster County and its participating jurisdictions in the past, and will continue to do so in the future.

Ulster County has an active history of hurricanes and tropical storms. According to NOAA historical records, 25 hurricane or tropical storm tracks have passed within 65 miles of Ulster County since 1861. This includes two Category 2 hurricanes; three Category 1 hurricanes; and 20 tropical storms. Of the 25 recorded storm events, three tracks traversed directly through Ulster County (one Category 1 hurricane in 1878 and two tropical storms in 1893 and 1949).

Ulster County was recently impacted by the remnants of both Hurricane Ivan in September 2004 and Hurricane Floyd in September 1999, both of which were Tropical Depressions by the time they reached Ulster County.

#### **September 1999**

Remnants of Hurricane Floyd impacted the western portions of Ulster County with high winds, heavy rains, and some flooding. Information received from local sources reports that this event caused significant property damage in the Town of Saugerties and left some residents without power for almost a week.

#### **September 2004**

Remnants of Hurricane Ivan impacted the County with high winds, heavy rains, and some flooding.

### **Probability of Occurrence – Hurricane and Tropical Storm Events**

Internet resources on NOAA's Atlantic Oceanographic and Meteorological Laboratory (AOML) web site were researched to gain an understanding of the relative likelihood of Ulster County being impacted by a coastal storm as compared to other locations in the Atlantic Basin (see Figure 3a.3). Based upon a review of this data, it was determined that Ulster County and its jurisdictions have roughly a six to 12 percent chance of being impacted by a named coastal storm in any given year.

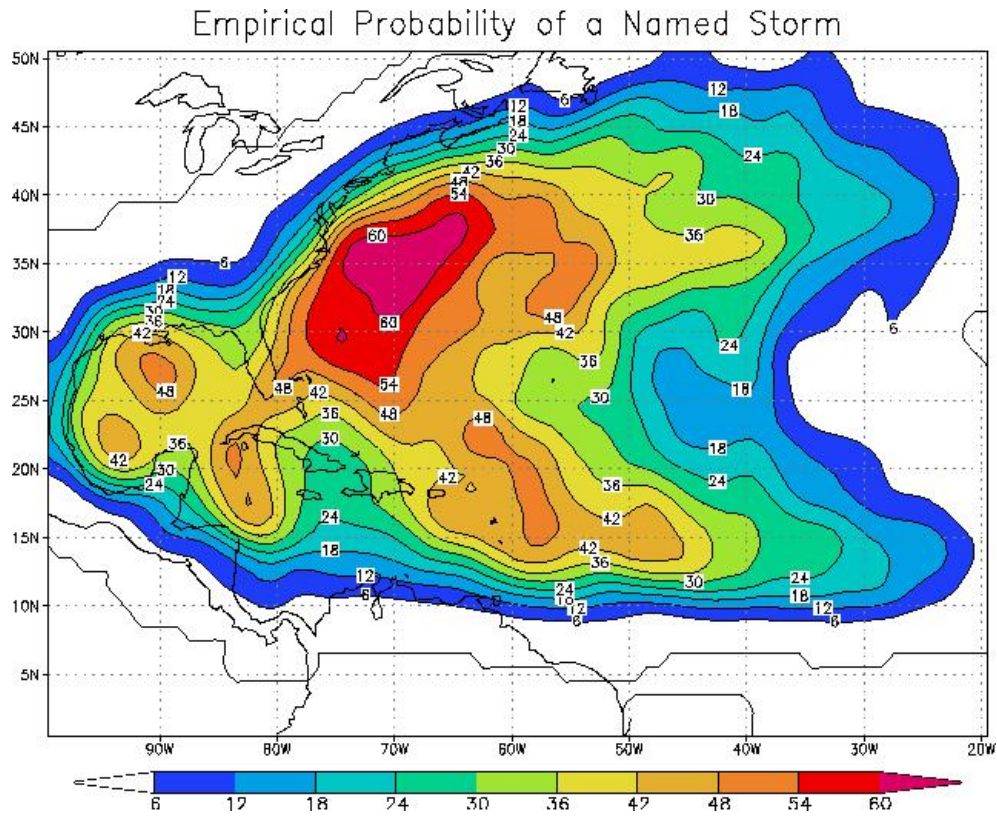


Figure 3a.3 - Empirical Probability of a Named Storm (Atlantic Basin)

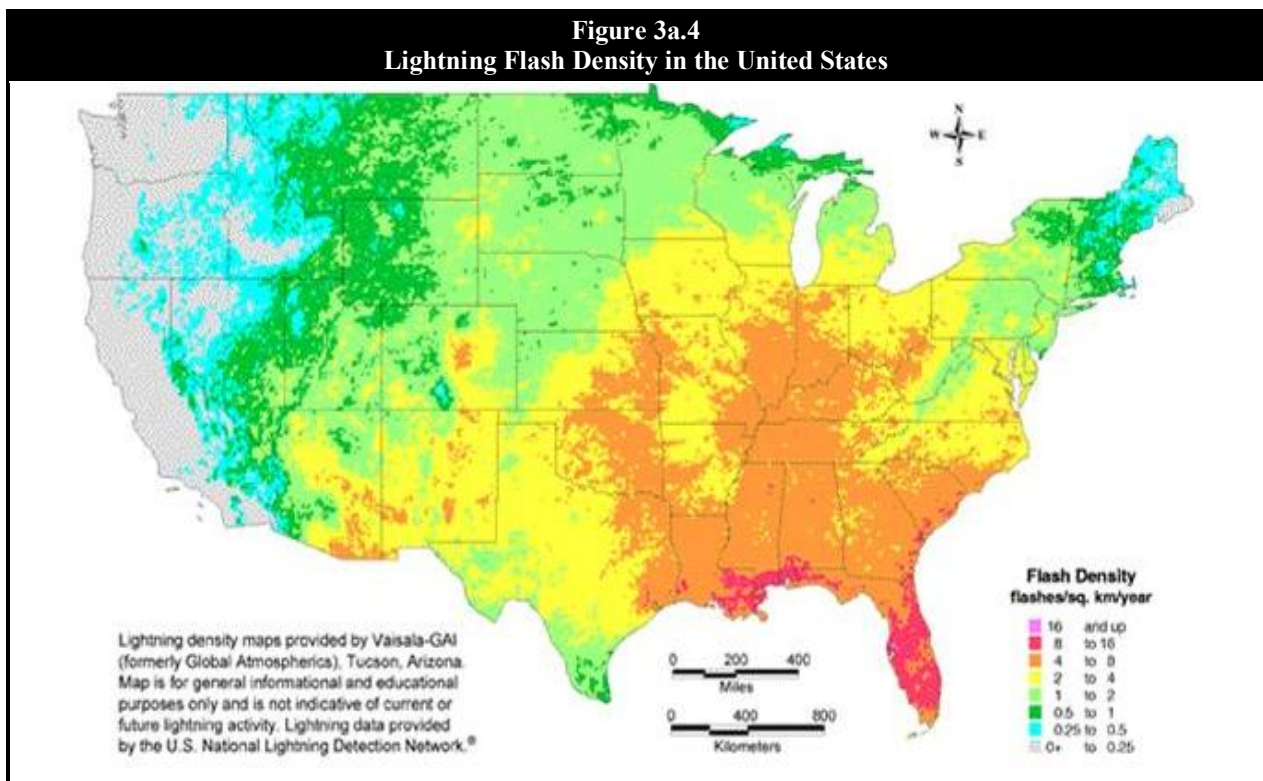
## Lightning

### Description – Lightning

Lightning is a discharge of electrical energy resulting from the buildup of positive and negative charges within a thunderstorm, creating a bolt when the buildup of charges becomes strong enough. This flash of light usually occurs within the clouds or between the clouds and the ground. A bolt of lightning can reach temperatures approaching 50,000 degrees Fahrenheit. Lightning rapidly heats the sky as it flashes, but the surrounding air cools following the bolt. This rapid heating and cooling of the surrounding air causes thunder. On average, 73 people are killed each year by lightning strikes in the United States.

### Location - Lightning

Ulster County is located in a region of the country that is susceptible to lightning strike, though not as susceptible as southeastern states. Figure 3a.4 shows a lightning flash density map for the years 1996-2000 based upon data provided by Vaisala's U.S. National Lightning Detection Network (NLDN®).



Source: Vaisala U.S. National Lightning Detection Network

### Extent - Lightning

All areas of Ulster County are equally susceptible to lightning strike. While lightning occurs randomly anywhere and anytime, the most common location for lightning fatalities and injuries to people is in open areas such as parks, beaches, golf courses and other recreational areas. Ulster County remains susceptible

to lightning deaths and injuries due to the large number of people who engage in outdoor activities, particularly more so along the shoreline of its coastal jurisdictions.

### **Previous Occurrences – Lightning**

NOAA records that New York State has experienced the fifth most deaths from lightning in the United States from 1959 to 1994.

NCDC reports 18 lightning events for Ulster County between August 1993 and January 2008. These events have resulted in two recorded injuries and \$703,000 in property damage. Some notable examples include:

#### **July 15, 1997**

At Highland in the Town of Lloyd, a 180 foot by 120 foot storage facility was burned to the ground following a lightning strike causing an estimated \$250,000 in damages.

#### **July 4, 1999**

Lightning from a thunderstorm struck two different houses, one in Ulster and another in Kingston. The first strike, at 119 Dewitt Street in Kingston ignited a fire that was contained to a storage room. The second lightning strike hit a tree, destroying it. The flames from the tree damaged a roof at 98 Katrine Lane, in the town of Ulster. In addition, the lightning resulted in as many as 3,500 residents without power in the Mid Hudson Valley.

#### **August 10, 2003**

Lightning from a thunderstorm struck a pole next to a house on Hardenburg Road in Rifton, in the Town of Esopus. The lightning was conducted through electrical wires and traveled into a nearby home striking a man in his basement. The man was not seriously injured. Another lightning strike from the same storm struck a house on Glasco Turnpike in Saugerties. The house was set ablaze, destroying the home and killing two dogs.

### **Probability of Future Occurrences – Lightning**

The probability of occurrence for future lightning events in Ulster County is certain. According to NOAA, Ulster County is located in an area of the country that experiences an average of one to three lightning flashes per square kilometer per year (in the order of 1,000 to 3,000 flashes countywide per year). Given this regular frequency of occurrence, it can be expected that future lightning events will continue to threaten life and cause minor property damages throughout Ulster County.

## Nor'easters

### Description – Nor'easters

Similar to hurricanes, nor'easters are ocean storms capable of causing substantial damage in the Eastern United States due to their associated strong winds and heavy precipitation. Nor'easters are named for the winds that blow in from the northeast and drive the storm up the East Coast along the Gulf Stream, a band of warm water that lies off the Atlantic coast. They are caused by the interaction of the jet stream with horizontal temperature gradients and generally occur during the fall and winter months when moisture and cold air are plentiful.

Nor'easters are known for dumping heavy amounts of rain and snow, producing hurricane-force winds, and creating high surf that causes severe beach erosion and coastal flooding. There are two main components to a nor'easter: (1) a Gulf Stream low-pressure system (counter-clockwise winds) generated off the southeastern U.S. coast, gathering warm air and moisture from the Atlantic, and pulled up the East Coast by strong northeasterly winds at the leading edge of the storm; and (2) an Arctic high-pressure system (clockwise winds) which meets the low-pressure system with cold, arctic air blowing down from Canada. When the two systems collide, the moisture and cold air produce a mix of precipitation and have the potential for creating dangerously high winds and heavy seas. As the low-pressure system deepens, the intensity of the winds and waves will increase and cause serious damage to coastal areas as the storm moves northeast. Nor'easters can be extremely large (up to 1,000 miles in diameter) and their duration can last for days and multiple tidal cycles, often causing major coastal flooding, erosion and damages that might even exceed the impacts of shorter-term hurricane events.

While there are a variety of indicators for nor'easter intensity, Table 3a.8 describes the Dolan-Davis Nor'easter Intensity Scale which is based on coastal storm erosion, degradation and property damage.

Storm Class	Beach Erosion	Dune Erosion	Overwash	Property Damage
1 WEAK	Minor changes	None	No	No
2 MODERATE	Modest; mostly to lower beach	Minor	No	Modest
3 SIGNIFICANT	Erosion extends across beach	Can be significant	No	Loss of many structures at local level
4 SEVERE	Severe beach erosion and recession	Severe dune erosion or destruction	On low beaches	Loss of structures at community-scale
5 EXTREME	Extreme beach erosion	Dunes destroyed over extensive areas	Massive in sheets and channels	Extensive at regional-scale; millions of dollars

Source: Federal Emergency Management Agency

### Location– Nor'easters

Nor'easters threaten the entire Atlantic Coast of the United States, and while coastal areas are most directly exposed to the damaging forces of such storm systems their impact is often felt far inland. Ulster County is located in an area that is extremely susceptible to nor'easters. No one jurisdiction within Ulster County is any more likely to have the path of such a system traverse within its borders than any other location.



### **Extent – Nor’easters**

All areas throughout Ulster County are susceptible to the nor’easter hazard effects of extreme wind, flooding and heavy snowfall. Nor’easters are most notable for snow accumulations in excess of nine inches, accompanied by high, sometimes gale force winds and storm surge in coastal areas. Major property damages and power outages are also common.

NYSEMO has classified nor’easters as a moderate hazard (second only to flooding) in the planning area covering Ulster County.

Although not specifically included in the Ulster County HAZNY, the county has been affected by numerous nor’easters, with the principal impacts being high winds, heavy snowfall and flooding, and the HAZNY ranks “Severe Storms” 4th out of 27 (“Moderately High Hazard”) among the list of all hazards.

### **Historical Occurrences – Nor’easters**

Ulster County has a lengthy history of devastating impacts wrought by nor’easters. This includes damages caused by the effects of extreme wind, heavy snowfall and flooding. Some notable examples include:

#### **Blizzard of 1993**

The Storm of the Century, also known as the ‘93 Superstorm, No-Name Hurricane, the White Hurricane, or the (Great) Blizzard of 1993, was a large cyclonic storm that occurred on March 12–March 15, 1993, on the East Coast of North America. It is unique for its intensity, massive size and wide-reaching effect. At its height the storm stretched from Canada to Central America, but its main impact was on the Eastern United States and Cuba. States of emergency were declared by local towns in Ulster County.

#### **February 23-25, 1998**

This nor’easter resulted in heavy snowfall across Ulster County, including a recorded 25 inches at Slide Mountain in western Ulster County.

#### **December 30, 2000**

Many areas received the most snow to fall in a single storm since January 1996, and one local death was blamed on the weather when a man blowing snow had a heart attack. Area police, utilities and public works crews reported few storm-related problems. During the mid-afternoon, snow was piling up at a rate of 2 inches per hour in Kingston, where a snow emergency was declared.

### **Probability of Future Occurrences**

Nor’easters will remain a very frequent occurrence for Ulster County, and the probability of future occurrences affecting all of Ulster County’s jurisdictions is certain.

## Tornado

### Hazards Associated with Tornado Events

Tornadoes are particular types of events. The hazard associated with a tornado event is high winds. The high wind hazard is addressed specifically elsewhere in the plan. Tornado events are discussed in the remainder of this section.

### Description – Tornado Events

The American Meteorological Society, "Glossary of Meteorology" defines a tornado as violently rotating column of air that has contact with the ground and extends downward from a cumulonimbus cloud. Tornado wind speeds can range from as low as 40 mph to as high as 318 mph. Tornadoes often accompany thunderstorms and hurricanes. Tornadoes can occur at any time of the year but are more prevalent during the spring and summer months.

### Location – Tornado Events

Tornadoes can occur anywhere in the US. They have struck in all 50 states, with the highest concentration on the central plains and in the southeastern states, such as Oklahoma, Texas, and Florida. No one jurisdiction within Ulster County is any more likely to have a tornado touch down within its borders than any other location. The hazard associated with tornado events (high winds) have distinct hazard area locations, discussed in other sections of this report.

### Extent – Tornado Events

The magnitude or severity of a tornado is dependent upon wind speed and is categorized by the Fujita Scale, presented in Table 3a.9. Tornadoes are typically considered to be "significant" for F2 or F3 on the Fujita Scale and "violent" for F4 and F5.

Scale	Wind Estimate (mph)	Damage Type	Damage Description
F0	< 73	Light	Some damage to chimneys; branches broken off trees; shallow-rooted trees pushed over; sign boards damaged.
F1	73 - 112	Moderate	Peels surface off roofs; mobile homes pushed off foundations or overturned; moving autos blown off roads.
F2	113 - 157	Considerable	Roofs torn off frame houses; mobile homes demolished; boxcars overturned; large trees snapped or uprooted; light-object missiles generated; cars lifted off ground.
F3	158 - 206	Severe	Roofs and some walls torn off well-constructed houses; trains overturned; most trees in forest uprooted; heavy cars lifted off the ground and thrown.
F4	207 - 260	Devastating	Well-constructed houses leveled; structures with weak foundations blown away some distance; cars thrown and large missiles generated.
F5	261 - 318	Incredible	Strong frame houses leveled off foundations and swept away; automobile-sized missiles fly through the air in excess of 100 meters (109 yards); trees debarked; incredible phenomena will occur.

## Previous Occurrences – Tornado Events

Tornadoes are a particular type of high wind event which have been recorded by NOAA's NCDC 11 times between September 1975 and February 2008. In total, the eleven tornadoes in Ulster County have reportedly caused \$3.13 million in property damages and three injuries (though no deaths or crop damages were reported). A summary of information available on all eleven events is presented in Table 3a.10.

Date	Affected Municipality	Deaths	Injuries	Property Damage	Crop Damage	Magnitude	Length	Width
09/20/75	Ulster (Town)	0	1	\$25,000	\$0	F1	7 miles	167 yards
03/21/76	Warwarsing	0	0	\$0	\$0	F2	0 miles	30 yards
03/21/76	Warwarsing	0	0	\$25,000	\$0	F1	0 miles	30 yards
06/30/76	Marbletown	0	0	\$25,000	\$0	F1	1 miles	100 yards
07/21/83	Denning	0	0	\$25,000	\$0	F0	1 miles	300 yards
5/12/84	Rochester	0	0	\$25,000	\$0	F0	unknown	unknown
10/5/85	Ulster (Town)	0	0	\$250,000	\$0	F1	0 miles	43 yards
7/26/86	Warwarsing/Shawangunk	0	2	\$2.5m*	\$0	F2	1 mile	100 yards
9/10/93	Saugerties (Town)	0	0	\$50,000	\$0	F1	0 miles	50 yards
6/26/98	Hardenburgh	0	0	\$150,000	\$0	F1	6 miles	200 yards
5/18/00	Esopus	0	0	\$50,000	\$0	F2	0 miles	50 yards

Source: NOAA's National Climatic Data Center

Notes: Casualty and damage information are the total reported for the event, not necessarily the total for the county.

Magnitude refers to the Fujita Scale. \*Includes damage in Sullivan County

The NCDC database includes descriptions of the three most recent tornadoes that have been recorded in the County:

- **September 9, 1993:** A small F1 tornado touched down in Saugerties tearing half the roof off a house and uprooting some trees.
- **June 26, 1998:** One thunderstorm in Ulster County spawned an F1 tornado in the vicinity of Mongaup Mountain, in the Town of Hardenburgh. This tornado had a non-continuous damage path that included massive tree damage.
- **May 18, 2000:** A strong cold front crossed eastern New York late on May 18. At the same time, very strong winds aloft moved over the area. The combination of the instability, and lift ahead of the front, spawned a line of thunderstorms. A series of microbursts began in Ulster County about a mile northwest of the center of Esopus. They knocked down several clusters of trees as they neared State Highway Route 9W, while moving in an easterly direction. Embedded within the

microburst, an F1 tornado, touched down briefly to the east of Black Creek and 9W, less than a tenth of a mile south of the center of Esopus. The track of the tornado was about a quarter mile long and 25 to 50 yards wide with numerous trees pushed about 70 degrees to the left of the storm track. There was little property damage due to the tornado, but it was sighted by nearby residents

### Probability of Occurrence – Tornado Events

For tornado events, this plan indicates the probability of future occurrences in terms of frequency based on historical events. According to the NOAA National Climatic Data Center, Ulster County has experienced 11 recorded tornadoes in the 32 year period between 1975 and 2008, or an average of 0.34 tornadoes per year in that period. When annualized over the full time period covered by the NOAA database, this annual occurrence falls to 0.19 tornadoes per year in the County. Table 3a.11 illustrates a comparative summary of tornado events in both New York State and Ulster County, and provides an associated average annual number of storms for each type.

<b>Table 3a.11</b>			
<b>Probability of Occurrence of Tornadoes</b>			
<i>(Source: NOAA's NCDC Storm Events Database for the period January 1, 1950 – February 28, 2008)</i>			
<b>Category</b>	<b>Total Number of Events</b>	<b>Probability of Occurrence*</b>	<b>Average Annual Number of Events</b>
<b>New York</b>			
F0	125	35.4%	2.2
F1	148	41.9%	2.6
F2	47	13.3%	0.8
F3	24	6.7%	0.4
F4	6	0.02%	0.1
F5	0	0%	0.0
Unable to Determine	13	0.04%	0.2
<i>Total, New York</i>	<i>353</i>		<i>6.3</i>
<b>Ulster County</b>			
F0	2	18.2%	0.03
F1	6	54.5%	0.55
F2	3	27.3%	0.27
F3	0	0%	0.00
F4	0	0%	0.00
F5	0	0%	0.00
Unable to Determine	0	0%	0.00
<i>Total, Ulster County</i>	<i>11</i>		<i>0.34</i>

\*The probability of occurrence is presented in terms of frequency within the set of recorded historical events. The probability of occurrence has been calculated by dividing the number of events of a given magnitude by the total number of events for all categories. e.g.: the probability of occurrence of a tornado of magnitude F1 in the State as a whole has been determined as  $148/353 = 0.419$ . i.e. if a tornado were to touch down in new York State, there is a 42% chance that it will be of magnitude F1.

## Winter Storm / Ice Storm

### Hazards Associated with Winter Storm / Ice Storm

Severe winter storms are particular types of events. They are characterized by the hazards of high winds, extreme cold, heavy precipitation (in the form of snow and/or ice), and sometimes wave action, coastal erosion and flooding. Ulster County has no identified areas of mapped coastal erosion or wave action hazards. Winter storm and ice storm events are discussed in general terms in this section of the document; their specific hazards are discussed elsewhere in the plan.

### Description – Winter Storms / Ice Storms

Winter storms consist of cold temperatures and heavy snow or ice. Because winter storms are regular, annual occurrences in Ulster County, they are considered hazards only when they result in damage to specific structures and/or overwhelm local capabilities to handle disruptions to traffic, communications, and electric power.

Winter storms and ice storms typically occur in New York from late October until mid-April. Peak months for these events for Ulster County and its jurisdictions would be December through March.

Northeasters are one type of winter storm that is common in Ulster County. These storms usually form off the US East Coast near the Carolinas then follow a track northward along the coast until they blow out to sea, hence the term "northeaster". Occasionally they are large enough to cover a majority of the state. Northeasters are most notable for snow accumulations in excess of nine inches accompanied by high winds (sometimes gale force) and storm surges.

Statewide, according to NOAA data average annual snowfall ranges from a low of approximately 10 to 20 inches in the New York City / Long Island area, to over 200 inches in the north of the State, in the Adirondack Mountains. For most of Ulster County, average annual snowfall ranges from 50 to 75 inches per year, although some areas in the western part of the County experience annual snowfalls of up to 100 inches. This can vary greatly from one year to the next, particularly if several major extended-period storms impact the area (during which snowfall totals can approach or exceed annual averages).

### Location – Winter Storms / Ice Storms

Severe winter storms and ice storms can occur anywhere in the County; generally no single jurisdiction within Ulster County is any more likely to be impacted by a severe winter storm or ice storm within its borders than any other location. The hazards associated with this event have distinct hazard area locations, discussed in other sections of this report.

### Extent – Winter Storms / Ice Storms

A severe winter storm can adversely affect roadways, utilities, business activities and can cause loss of life, frostbite, or freezing. The most common effect of winter storms and ice storms is traffic accidents, interruptions in power supply and communications; and the failure of inadequately designed and/or maintained roofing systems. Power outages and temperatures below freezing for extended periods of time can cause pipes to freeze and burst. Heavily populated areas tend to be significantly impacted by losses of power and communications systems due to downed lines. Distribution lines can be downed by

the weight of snow or ice, or heavy winds. When limbs and lines fall on roadways, transportation routes can be adversely affected and buildings, automobiles can be damaged. Heavy snow loads can cause roof collapse for residential, commercial, and industrial structures in cases of inadequate design and/or maintenance. Severe winter storms can also cause extensive coastal flooding, coastal erosion, and wave damage. If significant snowfall amounts melt quickly, inland flooding can occur as bankfull conditions are exceeded or in areas of poor roadway drainage.

The severity of the effects of winter storms and ice storms increases as the amount and rate of precipitation increase. In addition, storms with a low forward velocity are in an area for a longer duration and become more severe in their affects. Storms that are in full force during the morning or evening rush hours tend to have their affects magnified because more people are out on the roadways and directly exposed. Storms that arrive at high tide can also have exacerbated affects in coastal areas.

The magnitude of a severe winter storm or ice storm can be qualified into five main categories by event type, as shown below:

- **Heavy Snowstorm:** Accumulations of four inches or more of snow in a six-hour period, or six inches or more of snow in a twelve-hour period.
- **Sleet Storm:** Significant accumulations of solid pellets which form from the freezing of raindrops or partially melted snowflakes causing slippery surfaces posing hazards to pedestrians and motorists.
- **Ice Storm:** Significant accumulations of rain or drizzle freezing on objects (tress, power lines, roadways, etc.) as it strikes them, causing slippery surfaces and damage from the sheer weight of ice accumulation.
- **Blizzard:** Wind velocity of 35 miles per hour or more, temperatures below freezing, considerable blowing snow with visibility frequently below one-quarter mile prevailing over an extended period of time.
- **Severe Blizzard:** Wind velocity of 45 miles per hour, temperatures of 10 degrees Fahrenheit or lower, a high density of blowing snow with visibility frequently measured in feet prevailing over an extended period of time.

### **Previous Occurrences – Winter Storms / Ice Storms**

In Ulster County, severe winter snow and ice storms are normal and expected.

A review of the New York State Hazard Mitigation Plan in conjunction with data from NOAA and FEMA shows that Ulster County has been specifically included in one snow-related declared disaster in the last 30 years (DR-1083, 1/12/1996) and two snow-related emergency declarations (EM-3173, 12/26/2002, and EM-3184, 3/27/2003).

In addition to this information, a review of the NOAA National Climatic Data Center's database yielded more than 1,000 significant snow and ice events reported in the State of New York between 1996 and 2007. Of these, 77 are reported as having affected Ulster County. These events are reported as being responsible for property damage totaling more than \$16,900,000, although this includes damage reported in counties besides Ulster County that were affected by the same events. More recent winter storm events have been observed but not yet added to the NCDC database: for example, local sources have reported that a winter storm affecting the Town of Lloyd occurred on March 5, 2008, causing damage to structures, blocked roads, and downed power lines.

Event descriptions given by the NCDC for most of the 77 events recorded in the County are generic, but are summarized in Table 3a.12,

**Probability of Occurrence – Winter Storms / Ice Storms**

This plan indicates the probability of future occurrences in terms of frequency based on historical events. Using the historical data presented above, and the generic descriptions of the events recorded in Ulster County by the NCDC, Table 3a.12 summarizes the occurrence of winter storm events and their annual occurrence. , Ulster County and its participating jurisdictions have experienced 77 winter storms / ice storms between 1996 and 2007, ó an average of 7 events per year.

<b>Table 3a.12</b> <b>Occurrence of Winter Storms/Ice Storms, Ulster County (1996 – 2007)</b> <i>(Source: NOAA’s NCDC Storm Events Database)</i>		
Type	Total Number of Events	Average Annual Number of Events
Winter Storm	42	3.8
Heavy Snow	22	2.0
Snow/Freezing Rain	7	0.6
Freezing Rain	4	0.4
Blizzard	1	0.1
Ice Storm	1	0.1
Total	77	3.8

Winter storm events will remain a very frequent occurrence in Ulster County, and the probability of future occurrences in the County is certain, but the impacts of snow and ice storms are more likely to be major disruptions to transportation, commerce and electrical power as well as significant overtime work for government employees, rather than large scale property damages and/or threats to human life and safety.

## Dam Failure

### Description – Dam Failure

Dam failure is the breakdown, collapse or other failure of a dam structure characterized by the uncontrolled release of impounded water that results in downstream flooding. In the event of a dam failure, the energy of the water stored behind even a small dam is capable of causing loss of life and severe property damage if development exists downstream. There are varying degrees of failure, and an unexpected or unplanned dam breach is considered one type of failure. A breach is an opening through a dam which drains the water impounded behind it. A controlled breach is a planned, constructed opening and not considered a dam failure event, while an uncontrolled breach is the unintentional discharge from the impounded water body and considered a failure.

Dam failure can result from natural events, human-induced events or a combination of the two. Natural occurrences that may cause dam failure include hurricanes, floods, earthquakes and landslides; human-induced actions may include the deterioration of the foundation or the materials used in dam construction. In recent years, dams have also received considerably more attention in the emergency management community as potential targets for terrorist acts.

Dam failure presents a significant potential for disaster, in that significant loss of life and property would be expected in addition to the possible loss of power and water resources. The most common cause of dam failure is prolonged rainfall that produces flooding. Failures due to other natural events such as hurricanes, earthquakes or landslides are significant because there is generally little or no advance warning. The best way to mitigate dam failure is through the proper construction, inspection, maintenance and operation of dams, as well as maintaining and updating Emergency Action Plans for use in the event of a dam failure.

Federal guidelines for dam Safety issued by FEMA classify dams into three categories of Low, Significant, and High hazard potential, based on the probable loss of human life and the impacts on economic, environmental, and lifeline interests that would result from failure or misoperation of the dam. These categories are not intended to imply any judgment regarding the structural condition of the dam or the probability of failure.

*Low Hazard Potential:* Dams assigned the low hazard potential classification are those where failure or misoperation results in no probable loss of human life and low economic and/or environmental losses. Losses are principally limited to the owner's property.

*Significant Hazard Potential:* Dams assigned the significant hazard potential classification are those dams where failure or misoperation results in no probable loss of human life but can cause economic loss, environmental damage, disruption of lifeline facilities, or can impact other concerns. Significant hazard potential classification dams are often located in predominantly rural or agricultural areas but could be located in areas with population and significant infrastructure.

*High Hazard Potential:* Dams assigned the high hazard potential classification are those where failure or misoperation will probably cause loss of human life.



## Ulster County Dams

The National Inventory of Dams (NID) maintained by the U.S. Army Corps of Engineers (USACE) records 53 dams in Ulster County, of which nine are classified as High Hazard Potential, 26 are classified as Significant Hazard Potential, and the remainder Low Hazard Potential. The location of all 53 dams recorded in the USACE NID is presented in Figure 3a.5, and more detailed information for the 35 dams classified as having High and Significant Hazard Potential are presented in Table 3a.13. The database of the National Performance of Dams Program (NPDP), based at Stanford University, lists two additional dams in Ulster County, however, one is classified as Low Hazard Potential, and the other is unclassified. The New York State Department of Environmental Conservation also lists a number of small, low hazard dams in addition to those listed by USACE and the NPDP.

**Table 3a.13**  
**High/Significant Potential Hazard Dams, Ulster County**  
*(Source: USACE NID)*

Dam Name	Municipality	River/Stream	Owner	Storage (Acre-Feet)	Hazard Potential
Alder Lake Dam	Hardenburgh	Alder Creek	NYS DEC	480	S
Ashokan Dam	Olive	Esopus Creek	City of New York DEP Corona	512,500	H
Beecher Lake Dam	Hardenburgh	Beecher Brook	Zen Studies Society, Inc.	190	S
Binnewater Reservoir Dam & Dike	Ulster	Tr-Esopus	City of Kingston	50	S
Binnewater Road Dam	Rosendale	Tr-Rondout	Imar Records Center, Inc.	8	S
Bridgeview Plaza Dam	New Paltz Town	None	Bridgeview Builders of Highland, Inc.	75	S
Camino Lake Dam	New Paltz Town	Tr-Wallkill	James E Rappa	22	S
Cape Pond Dam	Wawarsing	Beer Kill	Cape Pond, Inc.	3,605	S
Cooper Lake Dam & West Dike	Woodstock	Saw Kill	City of Kingston	3,683	H
Covino Pond Dam	Shawangunk	Tomy Kill	A Covino	37	S
Day Pond Dam	Shandaken	Panther K	Rick Day	2	S
Diamond Mills Paper Company Dam	Saugerties	Esopus Creek	Saugerties Dam Property, Inc.	830	H
Forest Lake Dam	Hardenburgh	Tr-Beaver	Dungkar Gompa Society, Inc.	250	S
Highland Lower Reservoir Dam	New Paltz Town	Tr-Hudson	Town of Lloyd Highland Water District	27	S
Highland Water District Reservoir Dam & Dike	New Paltz Town	Tr-Hudson	Town of Lloyd Highland Water District	92	S
Honk Falls Dam	Wawarsing	Rondout Creek	Recycled Paper Corporation	1,504	H
Kingston Reservoir #2 Dam	Woodstock	Saw Kill	City of Kingston	125	H
Lake Maratanza Dam	Ellenville Village	Tr-Verkee	Village of Ellenville	323	S
Lyon Lodge Dam	Wawarsing	Lyon Creek	Litis Investment Corporation	224	S
Marlborough Water District Reservoir Dam & Dike	Marlborough	Tr-Hudson	Marlborough Water District	53	S
Merriman Dam	Wawarsing	Rondout	City of New York DEP Corona	202,800	H

**Table 3a.13**  
**High/Significant Potential Hazard Dams, Ulster County**  
*(Source: USACE NID)*

Dam Name	Municipality	River/Stream	Owner	Storage (Acre-Feet)	Hazard Potential
Mountain Reservoir Dam	Rosendale	Tr-Rondout	Town of Rosendale	11	S
Muddy Brook Pond Dam	Shandaken	Muddy Brook	Camp Woodland, Inc.	3	S
New Paltz Lower Reservoir Dam	New Paltz Town	Tr-Kleine	Village of New Paltz	2	S
New Paltz Middle Reservoir Dam	New Paltz Town	Tr-Kleine	Village of New Paltz	2	S
New Paltz Reservoir Dam	New Paltz Town	Tr-Kleine	Village of New Paltz	3	S
New Paltz Upper Reservoir Dam	New Paltz Town	Tr-Kleine	Village of New Paltz	8	S
Pecks Dam	Gardiner	Tr-Mara K	Gorden Peck	96	S
Pine Hill Lake Dam	Shandaken	Birch Creek	NYS DEC	116	H
Pinebush Lake Dam	Shawangunk	Tomy Kill	Pine Bush Lake Estate	38	S
Sturgeon Pool Dam	Esopus	Wallkill	CH Energy Group	10,894	H
Tillson Lake Dam	Gardiner	Palmaghat	U & U Realty, Inc.	394	H
Vincent Dunn Pond Dam	Rochester	Tr-Rondout	Vincent Dunn	15	S
Vrasidas Dam	Rochester	Mombaccus	Matthew Vrasidas	4	S
Winnisook Lake Dam	Shandaken	Esopus Creek	Winnisook, Inc.	135	S

TR- : Tributary of

Of the nine high hazard dams in Ulster County, there are three that have been classified by USGS as major dams and represent the most significant hazard risk based on the potential consequences of a dam failure. According to USGS, major dams are described as 50 feet or more in height, or with a normal storage capacity of 5,000 acre-feet or more, or with a maximum storage capacity of 25,000 acre-feet or more. In Ulster County, these include the Ashokan Reservoir Dam in Olive (water supply); the Rondout Reservoir Dam in Wawarsing (water supply); and the Sturgeon Pool Dam in Esopus (hydroelectric).

The most accurate method to estimate exposure to and potential losses from the dam failure hazard uses data produced through detailed dam failure inundation studies. These studies are often prepared by the owners of dam facilities as part of their own emergency action plans. Such plans have been previously completed for the three major high hazard dams in Ulster County mentioned above, and the corresponding inundation mapping is presented in Figures 3a.6 through 3a.8. These maps were developed by digitizing the inundation envelope resulting from dam failures under wet weather conditions from scanned hard copies of the original mapping, supplied by New York State Department of Environmental Conservation, who were unable to provide the original source GIS files. The areas shown as vulnerable to inundation in Figures 3a.6 through 3a.8 should be regarded as approximate indications of the possible consequences of events subject to a great deal of hydrologic uncertainty.

Figure 3a.5: Ulster County Dams

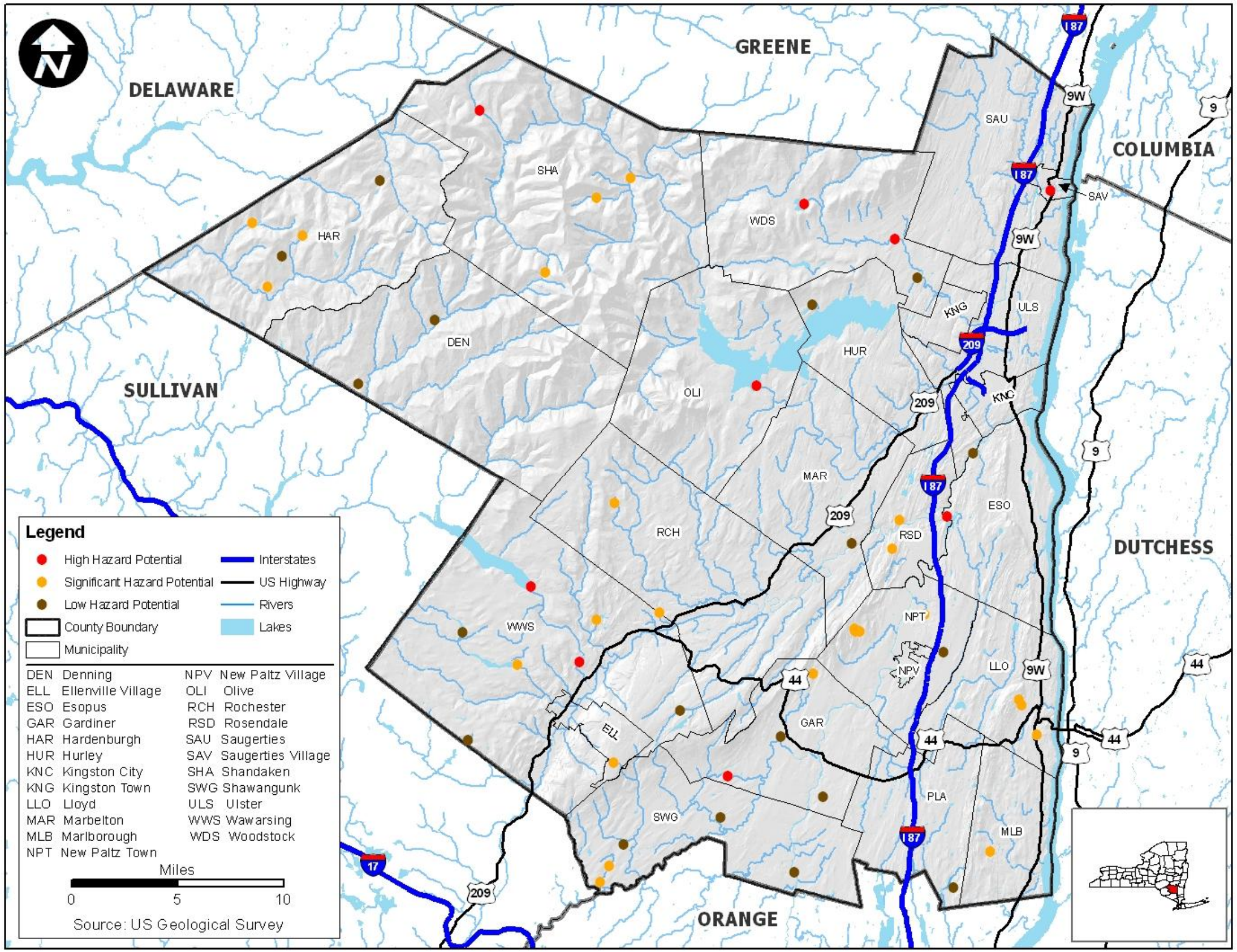


Figure 3a.6: Potential Area Affected by Failure of the Ashokan Reservoir Dam



Figure 3a.7: Potential Area Affected by Failure of the Rondout Reservoir Dam

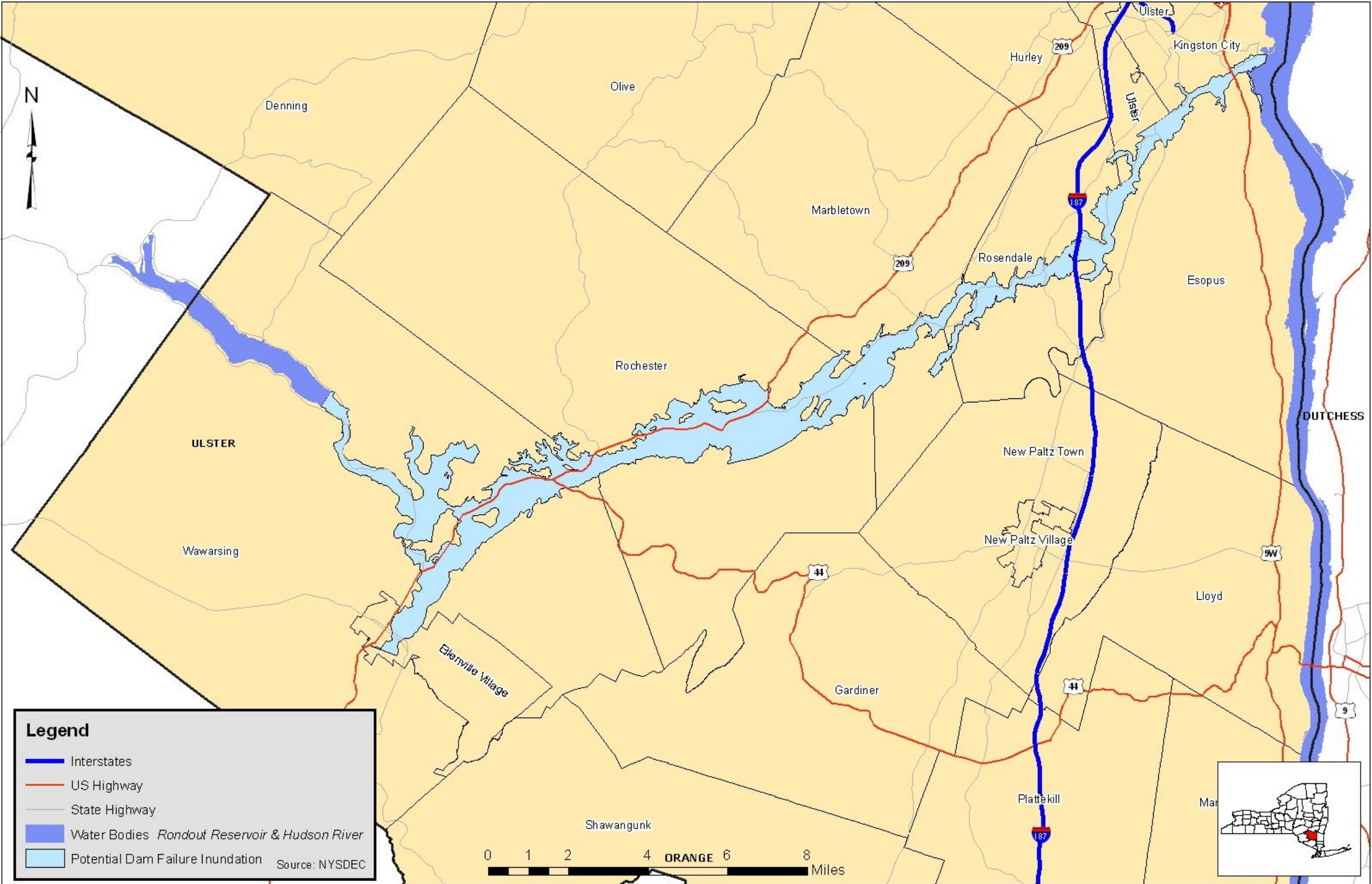
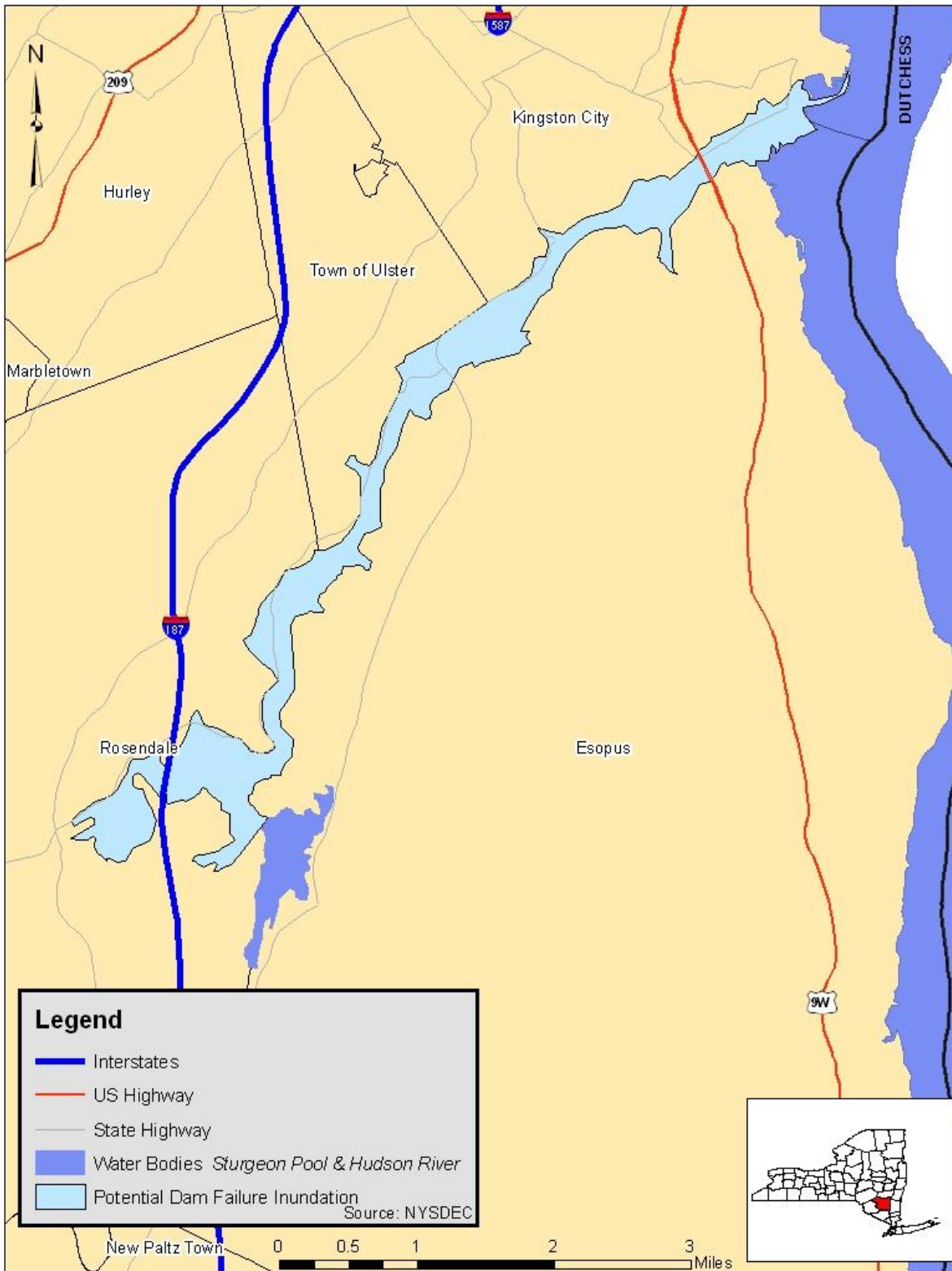


Figure 3a.8: Potential Area Affected by Failure of the Sturgeon Pool Dam



The potential exposure to damage or loss caused by failure of these three dams has been estimated using GIS to compute the value of improved property that is potentially affected by the dam failure inundation envelopes presented in Figures 3a.6 through 8. The potential exposures are presented by municipality in Table 3a.14. The proportion of structure values actually realized as damage following a dam failure will depend on the depth and velocity of the floodwaters, which in turn will depend on the hydrologic conditions leading up to the failure.

**Table 3a.14**  
**Estimated Potential Exposure of Improved Property to Dam Failure\***

<b>Ashokan Reservoir</b>			
<b>Municipality</b>	<b>Exposed Improved Value</b>	<b>Total Municipal Improved Value</b>	<b>Exposed Value as % of Municipal Total</b>
Esopus	\$9,075,666	\$823,898,937	1%
Hurley	\$88,714,554	\$682,669,402	13%
Kingston (City)	\$683,190,267	\$1,922,939,212	36%
Kingston (Town)	\$17,618,016	\$57,541,463	31%
Marbletown	\$50,141,875	\$1,023,631,875	5%
Olive	\$1,506,991	\$719,961,895	0.2%
Saugerties (Town)	\$27,825,641	\$1,217,383,571	2%
Saugerties (Village)	\$45,558,542	\$275,716,843	17%
Ulster (Town)	\$497,598,018	\$1,189,900,886	42%
Woodstock	\$55,234,884	\$1,253,634,748	4%
<i>Total</i>	<i>\$1,476,464,455</i>	<i>\$9,167,278,832</i>	<i>16%</i>
<b>Rondout Reservoir</b>			
<b>Municipality</b>	<b>Exposed Improved Value</b>	<b>Total Municipal Improved Value</b>	<b>Exposed Value as % of Municipal Total</b>
Ellenville	\$13,979,848	\$47,291,413	30%
Esopus	\$39,197,028	\$823,898,937	5%
Kingston City	\$90,978,885	\$1,922,939,212	5%
Marbletown	\$41,615,369	\$1,023,631,875	4%
Rochester	\$87,635,226	\$564,685,441	16%
Rosendale	\$97,006,175	\$469,479,238	21%
Ulster (Town)	\$7,170,716	\$1,189,900,886	1%
Wawarsing	\$92,723,100	\$776,636,457	12%
<i>Total</i>	<i>\$470,306,346</i>	<i>\$6,818,463,459</i>	<i>7%</i>
<b>Sturgeon Pool</b>			
<b>Municipality</b>	<b>Exposed Improved Value</b>	<b>Total Municipal Improved Value</b>	<b>Exposed Value as % of Municipal Total</b>
Esopus	\$16,421,040	\$823,898,937	2%
Kingston (City)	\$82,540,175	\$1,922,939,212	4%
Rosendale	\$13,852,702	\$469,479,238	3%
Ulster (Town)	\$5,469,549	\$1,189,900,886	0.5%
<i>Total</i>	<i>\$118,283,466</i>	<i>\$4,406,218,273</i>	<i>3%</i>

\*Exposure has been estimated only for the three major high hazard dams in Ulster County.

Table 3a.13 indicates that while there is comparatively little risk of economic damage from a failure of the Sturgeon Pool dam (only 3% of the improved value within the impacted municipalities would be affected), the risk of damage from failure of either the Ashokan or Rondout Reservoir dams is significant, with more than a third of all improved property in the Town of Ulster and the City of Kingston potentially affected by a failure of the Ashokan Reservoir dam. In terms of the percentage of values affected, the Village of Ellenville and the Town of Rosendale would be most affected by a failure of the Rondout Reservoir dam.

### **Historical Occurrences – Dam Failure**

According to NPDP records, there have been 43 dam failures in New York State since 1868, of which only one occurred in Ulster County: The NPDP records indicate that The Diamond Mills Paper Company Dam in the Village of Saugerties experienced a failure in 1978. Although detailed information related to the consequences of the recorded failure was not readily available, the NPDP event report mentions deterioration of spillways, inoperable outlets, and a general lack of maintenance as contributory causes. Further research reveals that this dam is currently one of 16 in New York State deemed unsafe by the New York State Department of Environmental Conservation, and that the owner has failed to carry out maintenance or provide emergency action plans. Investigations by NYDEC and USACE, most recently in 2005, have raised concerns regarding the safety of the dam, which is classified as a High Hazard Potential dam.

Local sources also report that the Tillson Lake Dam in the Town of Gardiner suffered a failure in the 1930s, although there are no definitive records regarding subsequent injuries or loss of life. Despite reports that the dam was drained for repairs in the 1990s, the safety of this dam remains a concern to the local community.

### **Probability of Occurrence – Dam Failure**

The probability of a dam failure occurrence in Ulster County is relatively low due to routine inspection, repair and maintenance programs carried out by the NYSDEC, which serves to ensure the safety and integrity of dams in New York and, thereby, protect people and property from the consequences of dam failures. However, the possibility of a future failure event is likely increasing due to aging dam structures that may be in need of repair or reconstruction, and occasional problems related to private dam owners' degree of cooperation with State regulatory agencies.



## Drought

### Description – Drought

The general term “drought” is defined by the US Geological Survey (USGS) as, “a prolonged period of less-than-normal precipitation such that the lack of water causes a serious hydrologic imbalance.” As stated in FEMA’s, “Multi-Hazard Identification and Risk Assessment” (1997), drought is the consequence of a natural reduction in the amount of precipitation expected over an extended period of time, usually a season or more in length.

According to the National Oceanic and Atmospheric Administration’s (NOAA’s) Drought Information Center, there are four types of drought:

- Meteorological Drought – A measure of precipitation departure from normal.
- Agricultural Drought – When the amount of moisture in soil does not meet the needs of a particular crop.
- Hydrological Drought – When both surface and subsurface water supplies are below normal.
- Socioeconomic Drought - When a water shortage begins to affect people.

Meteorological droughts are typically defined by the level of “dryness” when compared to an average, or normal amount of precipitation over a given period of time. Agricultural droughts relate common characteristics of drought to their specific agricultural-related impacts (when the amount of moisture in soil does not meet the needs of a particular crop). Hydrological drought is directly related to the effect of precipitation shortfalls on surface and groundwater supplies. Human factors, particularly changes in land use, can alter the hydrologic characteristics of a basin. Socio-economic drought is the result of water shortages that affect people and limit the ability to supply water-dependent products in the marketplace.

Drought conditions typically do not cause property damages or threaten lives, but rather drought effects are most directly felt by agricultural sectors. At times, drought may also cause community-wide impacts as a result of acute water shortages (regulatory use restrictions, drinking water supply and salt water intrusion). The magnitude of such impacts correlates directly with local groundwater supplies, reservoir storage and development densities. In general, impacts of drought can include significant adverse consequences to:

- Public water supplies for human consumption
- Rural water supplies for livestock consumption and agricultural operations
- Water quality
- Natural soil water or irrigation water for agriculture
- Water for forests and for fighting forest fires
- Water for navigation and recreation.

Another potential impact of local concern to some Ulster County municipalities is that some drought conditions cause salt water to migrate north up the Hudson River, impacting some local potable water sources, and requiring the issuing of notices alerting the public of the condition and of special measures to be followed.

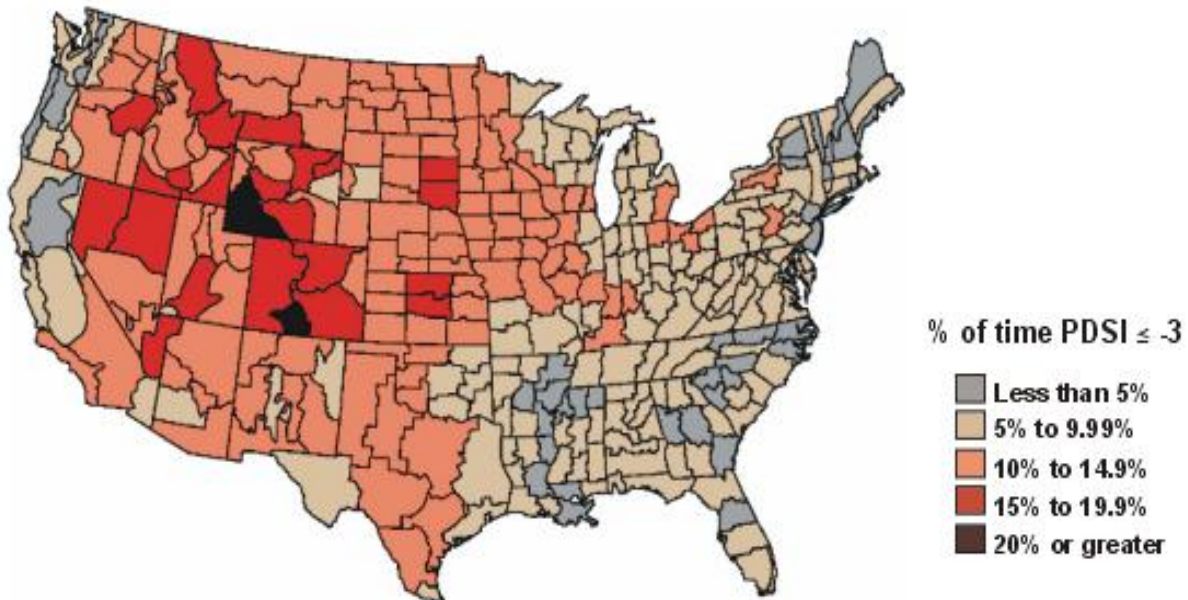
The severity of these impacts depends not only on the duration, intensity, and geographic extent of a specific drought event, but also on the demands made by human activities and vegetation on regional water supplies.

### Location and Extent – Drought

Droughts occur in all parts of the country and at any time of year, depending on temperature and precipitation over time. Arid regions are more susceptible to long-term or extreme drought conditions, while other areas (including Ulster County) tend to be more susceptible to short-term, less severe droughts.

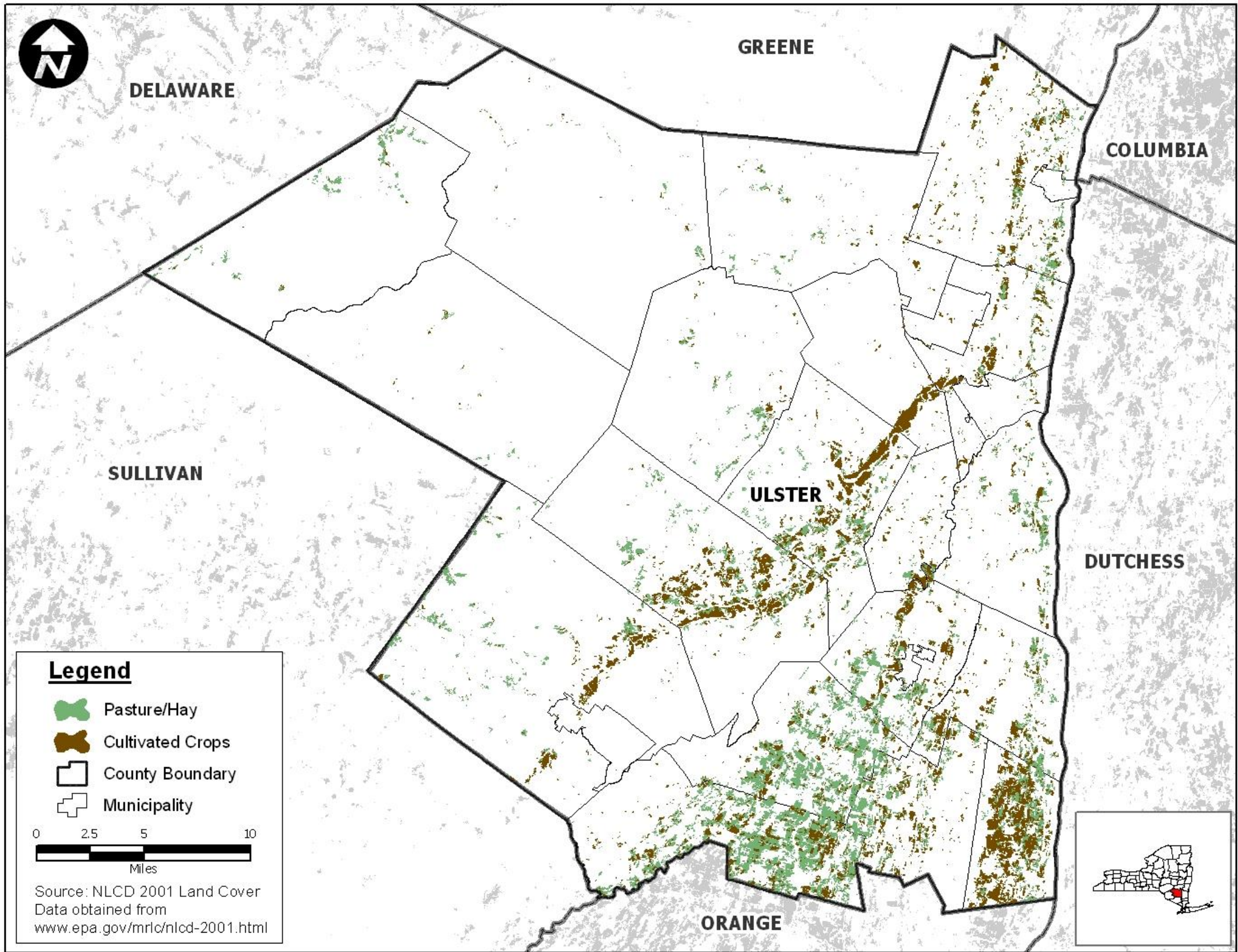
Figure 3a.9 shows the Palmer Drought Severity Index (PDSI) Summary Map for the United States from 1895 to 1995. PDSI drought classifications are based on observed drought conditions and will range from -0.5 (incipient dry spell) to -4.0 (extreme drought). According to the PDSI map, Ulster County is in a zone that experienced severe drought conditions between 5 and 10 percent of the 100-year period during 1895 to 1995, meaning that severe drought conditions are a relatively low risk for Ulster County. However, short term droughts of less severity are more common and may occur several times in a decade.

**Figure 3a.9:** Palmer Drought Severity Index Summary Map for the United States



While the extent of drought impacts for Ulster County may include all of the issues listed above, the most severe effects of drought in the County are likely to be experienced by farmers, who can suffer heavy financial losses due to crop damage or loss. Figure 3a.10 shows the extent, location and distribution of agricultural land across Ulster County, and Table 3a.15 presents a breakdown of agricultural land by municipality. It is evident from the figure and the table that municipalities in the south and central areas of the County are most at risk from agricultural losses due to drought, with the Town of Marlborough clearly the municipality most vulnerable to agricultural losses. Although at first glance the proportions of municipality areas devoted to agriculture may not appear to be significant, local sources regard agriculture as one of the most important sectors of the County economy.

Figure 3a.10: Ulster County Agricultural Land



**Table 3a.15**  
**Distribution of Agricultural Land in Ulster County**  
*(Source: Ulster County GIS)*

Municipality	Total Area (Acres)	Cultivated Cropland (Acres)	Cultivated Cropland (%)	Pasture Land (Acres)	Pasture Land (%)
Denning	64,658	54	0.1%	149	0.2%
Ellenville	5,350	38	0.7%	0	0.0%
Esopus	23,524	823	3.5%	1,117	4.7%
Gardiner	27,495	1,430	5.2%	5,866	21.3%
Hardenburgh	51,004	83	0.2%	914	1.8%
Hurley	21,993	932	4.2%	33	0.1%
Kingston City	4,681	90	1.9%	2	0.0%
Kingston Town	4,285	129	3.0%	74	1.7%
Lloyd	19,694	1,429	7.3%	1,381	7.0%
Marbletown	34,814	3,123	9.0%	1,985	5.7%
Marlborough	15,472	5,032	32.5%	1,806	11.7%
New Paltz	19,741	1,751	8.9%	1,865	9.4%
New Paltz Village	1,002	52	5.2%	40	4.0%
Olive	41,492	263	0.6%	652	1.6%
Plattekill	22,039	1,807	8.2%	2,219	10.1%
Rochester	56,085	3,890	6.9%	2,254	4.0%
Rosendale	11,972	432	3.6%	231	1.9%
Saugerties	38,731	2,289	5.9%	1,351	3.5%
Saugerties Village	1,050	20	1.9%	30	2.8%
Shandaken	78,924	92	0.1%	232	0.3%
Shawangunk	35,306	3,153	8.9%	7,637	21.6%
Ulster	16,159	1,351	8.4%	522	3.2%
Wawarsing	79,654	1,619	2.0%	1,729	2.2%
Woodstock	42,809	271	0.6%	471	1.1%
<i>Ulster County Total</i>	<i>717,936</i>	<i>30,153</i>	<i>4.2%</i>	<i>32,558</i>	<i>4.5%</i>

### Previous Occurrences – Drought

Historical occurrences of drought in Ulster County have been identified using the NOAA NCDC database, which records the following five significant drought events which specifically list Ulster County as an affected area since August 1993:

- *August 31, 1993:* A prolonged period of drought during the summer of 1993 decimated much of the agriculture in southeast New York. A drought alert advisory was issued on August 5, 1993 by the New York State Drought management Task Force for Delaware, Dutchess, Sullivan and Ulster Counties. Other counties hit hard by drought included Albany, Rensselaer, Columbia and Greene. Estimates of feed grain losses in these counties were well over 40 percent and in some cases nearly 100 percent. Especially hard hit were hay and corn crops as well as other fruits and vegetables. Some preliminary estimates of total crop damage were \$8 million in Columbia County and \$4 million in Greene County.
- *November 1, 1993:* The August 1993 drought alert advisory was upgraded to a drought warning by the New York State Drought Management Task Force for Delaware, Dutchess, Greene, Otsego, Schoharie, Sullivan, and Ulster Counties. Further, the Delaware River Basin Commission continued the drought warning for the basin which includes small sections of Broome, Chenango, Greene, Schoharie and Ulster Counties and much of Delaware and Sullivan Counties.

- *August 9, 1995:* the New York State Drought Task force declared a "Drought Watch" for the Catskills (Delaware, Greene, Otsego, Schoharie, Sullivan and Ulster counties), and the Hudson-Mohawk Region (Albany, Columbia, Dutchess, Fulton, Oneida, Herkimer, Montgomery, Rensselaer, Saratoga, Schenectady, and Washington Counties). The Hudson and Mohawk Valleys including the Catskills experienced extreme drought conditions while areas north of the Mohawk Valley and north of Saratoga County in the Hudson Valley saw severe drought conditions. At the end of August precipitation deficits of six to 12 inches were common in the extreme drought area. The drought produced a reduction in corn yield due to the shorter and slender ears. Hay yields were also down as many areas saw a very small second cutting or none at all. Wells ran dry in many communities and a Water Emergency was declared in Herkimer County and the Town of Deerfield in Oneida County.
- *April 1, 1999:* April 1999 was officially the second driest April on record in Albany and the driest of this century. Only 0.60 inches of rain fell at the Albany International Airport and only 0.56 inches at the N.W.S. office located on the University at Albany (SUNY) Campus. Rainfall amounts were a little bit higher to the south of Albany, but still fell well short of normal. The combination of low rainfall, along with frequent gusty winds, turned the underbrush into very dry tinder. This scenario led to numerous brush fires during the month across the Berkshires.
- *August 1, 1999:* August 1999 was the peak of the long term drought across Eastern New York that began in July of 98. The fourteen month stretch, ending in August, saw rainfall and melted snowfall throughout the region only tallying up to about 80 percent of normal. At the Albany International Airport 35.41 inches of water equivalent was recorded from July 98 through August 99, compared to the thirty year normal of 42.82 inches. The long term drought combined with the heat of the summer, resulted in a drought warning across much of the region as well as a declaration of agricultural disaster. The Mohawk Valley and Western Adirondacks were especially hard hit. The drought resulted in record low levels of the Mohawk River, numerous forest fires across the Adirondacks, and many wells going completely dry. Most communities implemented voluntary or mandatory water restrictions.

### **Probability of Occurrence – Drought**

If the occurrences mentioned above are considered to be separate events, Ulster County has experienced five droughts during the 14 year period from 1993 through early 2007, as reported in the NOAA NCDC database, or an average of 0.36 drought events per year.

Past drought occurrences can be expected to be a sound indicator of the probability of future drought occurrences for Ulster County. Certain parts of the country are more susceptible to being impacted by a drought than others are. Arid parts of the country tend to be at greater risk of experiencing long-term droughts, while more humid parts of the country tend to be more susceptible to short-term droughts. According to the USGS Division of Water Resources, Ulster County and its jurisdictions fall within what is described as a "humid region" and is more likely to experience a short-term drought.

## Floods

### Description – Floods

FEMA's NFIP defines the general term "flooding" as "a general and temporary condition of partial or complete inundation from overflow of inland or tidal waters, unusual and rapid accumulation or runoff of surface waters from any source, or a mudflow." According to FEMA's *NFIP Floodplain Management Requirements: a Study Guide and Desk Reference for Local Officials* (FEMA-480), most floods fall into the following three categories:

- **Riverine Flooding** – Flooding that occurs along a channel (where a "channel" is defined as a feature on the ground that carries water through and out of a watershed, whether natural channels such as rivers and streams, or man-made channels such as drainage ditches).
  - Overbank flooding occurs along a channel as excess flows overflow channel banks. Overbank flooding occurs when downstream channels receive more rain or snowmelt from their watershed than normal, or a channel is blocked by an ice jam or debris.
  - Flash floods are a type of riverine flooding typically caused when a significant amount of rainfall occurs in a very short duration. Flash flooding is characterized by a rapid rise in water level and high velocity flows. Flash floods can also be caused by ice jams (ice jam flooding, which can be upstream of an intact jam or downstream of a jam that has broken downstream) or dam breaks.
- **Coastal Flooding** – Flooding that occurs along the coasts of oceans, the Gulf of Mexico, and large lakes (i.e., the Great Lakes). Hurricanes and severe storms cause most coastal flooding, including "Nor'easters" which are severe storms that occur in the Atlantic basin that are extratropical in nature with winds out of the northeast.
  - Storm surge is one characteristic of coastal flooding caused as persistent high winds and changes in air pressure work to push water on shore, often on the order of several feet.
- **Shallow Flooding** – Flooding that occurs in flat areas where a lack of channels means water cannot drain away easily.
  - Sheet flow occurs when there are inadequate or no defined channels, and floodwaters spread out over a large area at a somewhat uniform depth. Sheet flow occurs after intense or prolonged rainfalls during which rain cannot soak into the ground.
  - Ponding occurs when runoff collects in a depression and cannot drain out. Ponding floodwaters do not move or flow away; they will remain until the water infiltrates into the soil, evaporates, or is pumped away.
  - Urban drainage flooding occurs when the capacity of an urban drainage system is exceeded. An urban drainage system comprises the ditches, storm sewers, retention ponds and other facilities constructed to store runoff or carry it to a receiving stream, lake or the ocean. Urban drainage flooding can also occur in areas protected by levees, as water collects on the protected side of the levee when pump capacities are exceeded during severe storms.

Floods are considered hazards when people and property are affected. Historically, development in floodplains was often a necessity, as water bodies provided a means of transportation, electricity, water supply, and often supported the livelihood of local residents (i.e., fishing, farming, etc.). Today, development in floodplains is more often spurred by the aesthetic and recreational value of the floodplain. Flooding is widely regarded as the most common major natural hazard in New York State.

The **National Flood Insurance Program (NFIP)** was established by Congress with the passage of the National Flood Insurance Reform Act of 1968. Through this program, Federally-backed flood insurance is made available to homeowners, renters, and businesses in a community if that community adopts and enforces a floodplain management ordinance to reduce future flood damages within its floodplains. This includes not only preventative measures for new development, but also corrective measures for existing development. FEMA also administers the Community Rating System (CRS), a program under which communities choosing to implement floodplain management actions that go beyond the minimum requirements of the NFIP become eligible for discounts on flood insurance premiums for properties within that community. At present, every individual municipality in Ulster County is an active member of the NFIP, although none have so far become eligible for the CRS.

In addition to providing flood insurance, the NFIP also studies and maps the nation's floodplains, preparing its findings in Flood Insurance Rate Maps (FIRMs) and Flood Insurance Studies (FISs). FEMA also prepares digital Q3 Flood Data files, which contain digital flood hazard mapping. Using GIS, these digital maps can be overlaid upon a community's existing GIS base map. FEMA Q3 Flood Data and the Ulster County GIS formed the basis of this analysis of the flood hazard for Ulster County.

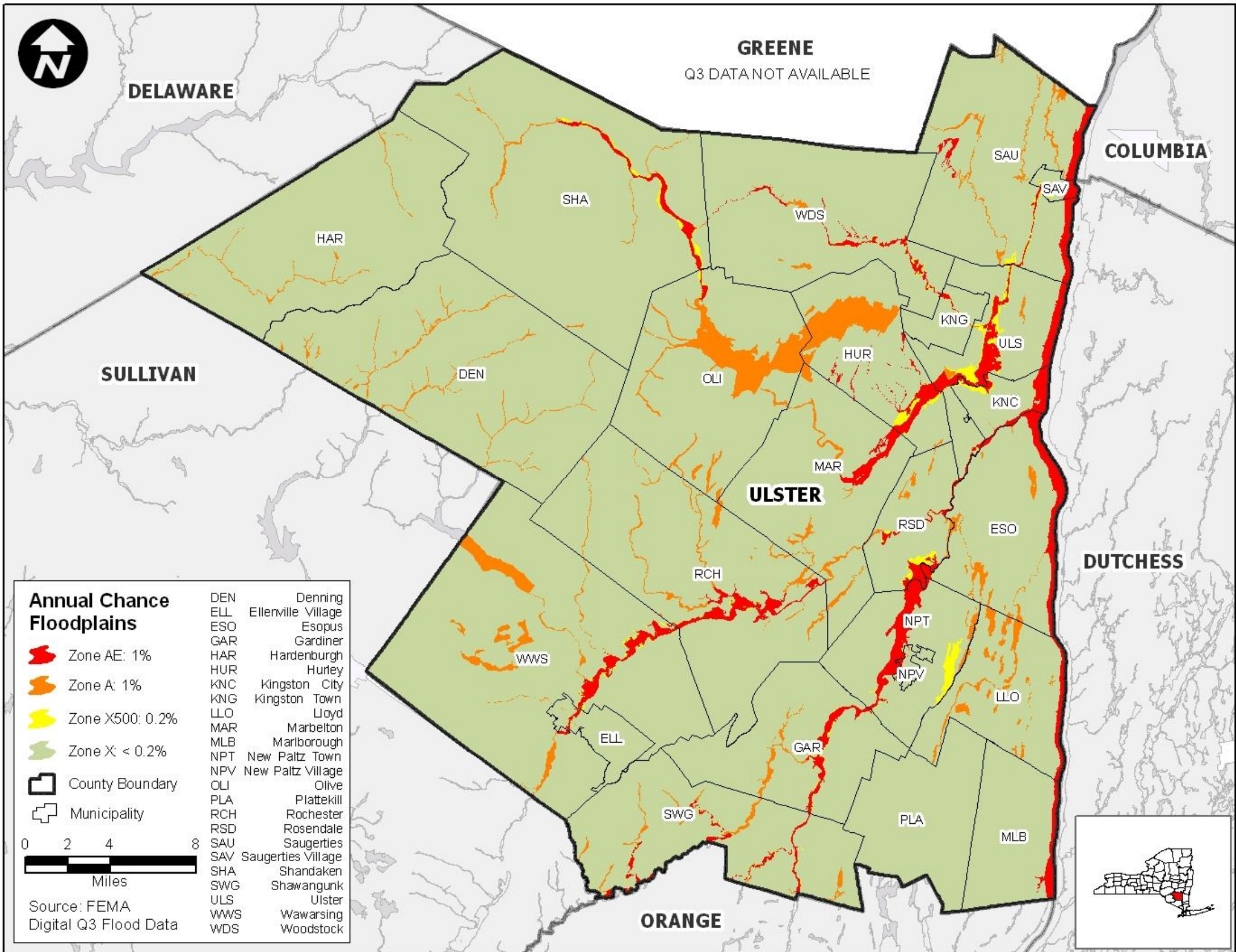
### Location and Extent – Floods

Ulster County and its jurisdictions experience several types of flooding. While the Hudson River is tidally influenced, Ulster County is sufficiently far from the open ocean to be essentially unaffected by coastal flooding. Basically, flooding in Ulster County is caused by riverine flooding, shallow flooding resulting from urban drainage issues, and ice jams. Flooding from ice jams is considered a separate hazard under this mitigation plan and is addressed in a separate plan section.

The extent of flooding associated with a 1 percent probability of occurrence of the 100-year flood or base flood is used as regulatory boundaries by a number of federal, state and local agencies. Also referred to as the special flood hazard area, this boundary is a convenient tool for assessing vulnerability and risk in flood prone areas. FEMA's Q3 Flood Data was used to identify the location of flood hazard areas in Ulster County. According to the Q3 data, high/moderate flood risk zones exist in all Ulster County communities except for the Town of Plattekill, as shown in Figure 3a.11. This Figure illustrates the mapped flood risk using FEMA zone designations, which are explained in more detail below:

- High Risk Areas** Zones A and AE: These are areas with a 1% chance of being flooded in any given year (the 100-year floodplain). AE zones are those areas where the Base Flood Elevation (BFE of the 100-year flood) has been determined analytically. A Zones are areas where the base floodplain has been mapped by approximate methods and the BFE has not been determined.
- Moderate Risk Areas** Zone X500: These are areas lying between the 100-year and 500-year (0.2% annual chance of flooding) floodplain limits. They also include areas of shallow flooding with average depths of less than one foot, or drainage areas less than one square mile.
- Low Risk Areas** Zone X: These are areas outside of the 500-year floodplain, where the flood hazard is minimal. They may include areas of ponding or with local drainage problems not significant enough to warrant detailed study or designation as base floodplain.
- Possible Risk Areas** Zone D: Areas where there are possible but undetermined flood hazards. There are no mapped D Zones in Ulster County.

Figure 3a.11: Ulster County Flood Hazard Areas





SECTION 3a - RISK ASSESSMENT: HAZARD PROFILES

The mapped Q3 flood data is not exact, and in some cases flood hazard area boundaries may not match landform boundaries. While limitations in the data should be recognized, this represents best readily available GIS data at the time of the study and is generally deemed suitable for mitigation planning purposes. Preliminary Digital Flood Insurance Rate Maps (DFIRMS) were released in late 2007 for a subset of Ulster County municipalities. Since the new DFIRMS are preliminary, not county-wide, and are being appealed in some locations for which they were available, the decision was made to use the Q3 data for this initial version of the plan. Final DFIRMS are targeted for release in spring 2009, and the sections of the plan dealing with flooding should be revised accordingly during the first plan update.

FEMA's Q3 flood mapping was overlaid upon the Ulster County GIS Base Map to summarize the Q3 flood mapping and flood risk areas for all municipalities in Ulster County, and the collated data is presented in Tables 3a.16 and 3a.17.

Municipality	Total Land Area (Acres)	High Flood Risk (Acres)	Moderate Flood Risk (Acres)	Low Flood Risk (Acres)	Land in High Flood Risk %	Land in Moderate Flood Risk %
Denning	64,652	1,502	0	63,151	2.3%	0.0%
Ellenville	5,351	112	26	5,214	2.1%	0.5%
Esopus	23,521	1,485	28	22,008	6.3%	0.1%
Gardiner	27,493	1,335	121	26,036	4.9%	0.4%
Hardenburgh	51,002	606	0	50,397	1.2%	0.0%
Hurley	21,985	5,071	382	16,532	23.1%	1.7%
Kingston City	4,284	491	196	3,596	11.5%	4.6%
Kingston Town	4,681	95	28	4,558	2.0%	0.6%
Lloyd	19,690	2,066	1	17,621	10.5%	0.0%
Marbletown	34,754	2,464	1	32,289	7.1%	0.0%
Marlborough	15,406	78	4	15,323	0.5%	0.0%
New Paltz Town	19,743	2,535	746	16,462	12.8%	3.8%
New Paltz Village	1,002	83	0	920	8.3%	0.0%
Olive	41,470	6,502	71	34,897	15.7%	0.2%
Plattekill	22,026	0	0	22,026	0.0%	0.0%
Rochester	56,085	3,355	85	52,644	6.0%	0.2%
Rosendale	11,972	1,169	380	10,422	9.8%	3.2%
Saugerties Town	38,716	1,924	193	36,589	5.0%	0.5%
Saugerties Village	1,040	209	34	796	20.1%	3.3%
Shandaken	78,947	1,756	485	76,705	2.2%	0.6%
Shawangunk	35,311	1,932	188	33,164	5.5%	0.5%
Ulster Town	16,165	1,955	682	13,526	12.1%	4.2%
Wawarsing	79,186	4,812	263	74,111	6.1%	0.3%
Woodstock	43,095	1,133	129	41,822	2.6%	0.3%
<i>Ulster County Total</i>	<i>717,577</i>	<i>42,672</i>	<i>4,042</i>	<i>670,810</i>	<i>6%</i>	<i>1%</i>

In total only 7% of the County area lies within high or moderate flood risk zones, according to current Q3 mapping data. The Town of Hurley has the highest proportion of its area within a high flood risk zone, of which a significant portion is accounted for by the Ashokan Reservoir. The Towns of New Paltz and Ulster and the Village of Saugerties have the highest proportions of land area within high flood risk zones (colored red and orange in Figure 3a.8).

**Table 3a.17**  
**Summary of FEMA Q3 Flood Data by Municipality: Improved Property Values in Hazard Areas**

Municipality	Total Value	Value in High Flood Risk Area	Value in Moderate Flood Risk Area	Value in Low Flood Risk Area	Value in High Flood Risk Area %	Value in Moderate Flood Risk Area %
Denning	\$51,126,978	\$21,617,425	\$0	\$29,509,553	42.3%	0.0%
Ellenville	\$47,291,413	\$9,359,267	\$61,729	\$37,870,417	19.8%	0.1%
Esopus	\$823,898,937	\$159,394,633	\$0	\$664,504,303	19.3%	0.0%
Gardiner	\$612,092,899	\$73,924,289	\$0	\$538,168,609	12.1%	0.0%
Hardenburgh	\$50,791,094	\$18,811,933	\$0	\$31,979,161	37.0%	0.0%
Hurley	\$639,336,069	\$28,215,156	\$1,851,007	\$609,269,905	4.4%	0.3%
Kingston City	\$1,922,939,212	\$120,587,695	\$23,790,321	\$1,778,561,196	6.3%	1.2%
Kingston Town	\$57,541,463	\$13,158,951	\$110,244	\$44,272,268	22.9%	0.2%
Lloyd	\$856,612,633	\$126,783,351	\$0	\$729,829,282	14.8%	0.0%
Marbletown	\$993,766,725	\$284,190,349	\$0	\$709,576,376	28.6%	0.0%
Marlborough	\$722,416,282	\$9,309,836	\$0	\$713,106,447	1.3%	0.0%
New Paltz Town	\$578,833,042	\$45,648,801	\$2,884,821	\$530,299,421	7.9%	0.5%
New Paltz Village	\$238,672,524	\$25,644,975	\$0	\$213,027,549	10.7%	0.0%
Olive	\$377,496,142	\$46,524,745	\$759,869	\$330,211,527	12.3%	0.2%
Plattekill	\$556,675,301	\$0	\$0	\$556,675,301	0.0%	0.0%
Rochester	\$564,685,441	\$88,234,903	\$207,779	\$476,242,760	15.6%	0.0%
Rosendale	\$469,479,238	\$59,624,007	\$4,081,968	\$405,773,263	12.7%	0.9%
Saugerties Town	\$1,217,383,571	\$154,365,881	\$1,854,880	\$1,061,162,810	12.7%	0.2%
Saugerties Village	\$275,716,843	\$29,352,730	\$1,345,693	\$245,018,420	10.6%	0.5%
Shandaken	\$402,760,909	\$158,294,060	\$10,585,951	\$233,880,898	39.3%	2.6%
Shawangunk	\$1,093,099,620	\$304,030,659	\$0	\$789,068,961	27.8%	0.0%
Ulster Town	\$1,189,900,886	\$108,283,423	\$32,342,013	\$1,049,275,449	9.1%	2.7%
Wawarsing	\$391,482,171	\$80,835,965	\$22,857	\$310,623,349	20.6%	0.0%
Woodstock	\$1,250,466,647	\$167,520,588	\$675,825	\$1,082,270,233	13.4%	0.1%
<i>Ulster County Total</i>	<i>\$15,384,466,039</i>	<i>\$2,133,713,622</i>	<i>\$80,574,959</i>	<i>\$13,170,177,459</i>	<i>13.9%</i>	<i>0.5%</i>

The GIS analysis indicates that the towns of Denning, Hardenburgh, and Shandaken have the greatest proportions of improvement property values in high flood risk zones, with significantly more than a third of all the total improved property value affected in each case. However, the towns of Shawangunk and Marbletown have the highest total dollar values of improved property within the high flood risk zone.

### Previous Occurrences – Floods

Floods have occurred in Ulster County's communities in the past, and will continue to do so in the future. Ulster County and its component municipalities have generally been impacted by riverine flooding and shallow flooding. A picture of the flooding history of Ulster County in terms of damage to private property over the last three decades or so can be derived from the recorded flood losses and payments data from the NFIP. This data is presented in Table 3a.18, along with the total number of current policies, the total coverage values, and key dates associated with the municipalities' participation in the NFIP. At the time of writing, none of the municipalities in Ulster County were eligible for participation in FEMA's Community Rating System (CRS), under which municipalities implementing and enforcing floodplain management measures above beyond the NFIP minimum requirements are rewarded with discounted flood insurance premiums. All data in Table 3a.18 is current as of June 30, 2008.

**SECTION 3a - RISK ASSESSMENT: HAZARD PROFILES**

The table shows that Ulster County NFIP insured flood losses have totaled more than \$9 million since 1978, or more than \$300,000 per year. Actual flood losses community-wide are likely to be higher, since this value only includes NFIP payouts and does not include losses incurred by non-policy holders, losses for which a claim was not submitted, or losses for which payment on a claim was denied.

<b>Table 3a.18</b>							
<b>FEMA NFIP Policy and Claim Information for Ulster County Jurisdictions</b>							
<i>Source: www.fema.gov / www.bsa.nfipstat.com</i>							
<b>NFIP Participating Communities in Ulster County, NY</b>	<b>Community Number</b>	<b>Date Entered NFIP</b>	<b>Current Effective FIRM Date</b>	<b>NFIP Policies In Force</b>	<b>Insurance in Force (\$)</b>	<b>Total Number of Losses</b>	<b>Total Payments (\$)</b>
Denning	361439	5/25/1984	5/25/1984	13	\$2,241,300	4	\$83,782
Ellenville	360975	7/5/1983	7/5/1983	22	\$4,566,600	21	\$300,246
Esopus	360855	7/5/1984	7/5/1984	18	\$5,360,100	8	\$54,166
Gardiner	360856	9/30/1982	7/16/1997	26	\$7,027,000	7	\$54,142
Hardenburgh	361578	7/20/1984	3/16/1989	1	\$350,000	0	\$0
Hurley	360857	7/3/1985	8/18/1992	35	\$6,442,000	24	\$637,051
Kingston City	360858	5/1/1985	5/1/1985	90	\$9,189,300	57	\$658,311
Kingston Town	361218	8/27/1982	4/5/1988	40	\$4,959,600	11	\$35,387
Lloyd	361012	9/17/1982	7/5/2000	25	\$5,320,000	19	\$438,226
Marbletown	361219	10/22/1982	8/5/1991	20	\$4,954,700	8	\$144,546
Marlborough	361220	12/5/1984	12/5/1984	8	\$1,639,300	5	\$89,047
New Paltz Town	360859	9/30/1982	11/1/1985	46	\$10,380,900	23	\$263,428
New Paltz Village	361544	4/15/1982	10/15/1985	42	\$5,605,000	8	\$352,096
Olive	360860	11/1/1984	11/1/1984	47	\$11,203,500	15	\$63,791
Plattekill	361221	9/29/1978	NSFHA*	5	\$3,912,500	3	\$55,593
Rochester	360861	3/16/1983	2/6/1991	33	\$7,787,400	29	\$82,653
Rosendale	360862	11/1/1985	11/1/1985	47	\$9,451,300	10	\$169,411
Saugerties Town	360863	8/19/1985	9/30/1992	73	\$14,536,300	19	\$231,843
Saugerties Village	361504	9/10/1982	8/5/1985	29	\$5,988,400	12	\$59,621
Shandaken	360864	1/17/1985	2/17/1989	176	\$30,533,700	142	\$978,802
Shawangunk	360865	9/30/1982	9/30/1982	29	\$6,134,100	4	\$34,204
Ulster Town	360866	5/1/1985	5/1/1985	125	\$20,025,700	154	\$3,402,723
Wawarsing	360867	9/15/1983	9/15/1983	61	\$11,779,900	50	\$903,155
Woodstock	360868	9/27/1991	9/27/1991	112	\$24,415,300	37	\$100,743
<i>Ulster County Totals</i>				<i>1,123</i>	<i>\$213,803,900</i>	<i>670</i>	<i>\$9,192,967</i>

\*NSFHA: No Special Flood Hazard Area ó all Zone C (determined to be outside the 500-year floodplain)

The average NFIP payment for the County overall was approximately \$13,700 per individual loss. Almost 50% of all NFIP losses in Ulster County (in terms both of actual losses and dollar loss amounts) have occurred in just two municipalities ó the Towns of Shandaken and Ulster. In the Town of Ulster, NFIP payments have averaged more than \$22,000 per loss, while average payments in Shandaken have been approximately \$6,900 per loss. The highest average is in the Village of New Paltz, where payments have been more than \$39,000 per loss. Only the Town of Hardenburgh has not experienced any flood damage resulting in NFIP payments. According to the current flood mapping, no areas within the town of Plattekill are identified as lying within any identified floodplain. However, there is at least one NFIP-

insured property within the Town which has suffered flood losses and which has received NFIP payments as a result. This property may lie within an area that experiences shallow flooding or local drainage problems that have yet to warrant detailed studies or designation as part of the base floodplain.

### **Repetitive Losses**

FEMA defines a repetitive loss property as any insurable building for which two or more claims of more than \$1,000 were paid by the NFIP within any rolling 10-year period, since 1978. A repetitive loss property may or may not be currently insured by the NFIP. Currently there are over 122,000 repetitive loss properties nationwide, and approximately 7,000 in New York State.

According to FEMA repetitive loss property records, there are currently 71 “non-mitigated” repetitive loss properties located in Ulster County as of August 27, 2008. These properties are associated with a total of 183 individual losses and more than \$4.5 million in claims payments under the NFIP since March 1980 (the earliest recorded date of loss), as shown in Table 3a.19, while Table 3a.20 identifies the number and type of repetitive loss properties that are located in each identified flood hazard zone for each municipality. The approximate areas where RL properties are clustered are plotted in Figures 3a.12 and 3a.13 in comparison with the extent of the mapped A/AE Zones (the Base/100-year floodplain). These figures do not show areas of the County where occasional RL properties are located in isolation or widely spaced and they show only the approximate areas covering clusters of RL properties, since the component data is subject to the 1974 Privacy Act. This legislation prohibits the public release of any information regarding individual NFIP claims or information which may lead to the identification of associated individual addresses and property owners. However, while this information is not available to the general public, the County may subsequently obtain comprehensive RL property data from FEMA for the purposes of targeted mitigation of RL areas or individual RL structures.

Two thirds (16 out of 24) of the municipalities in Ulster County are identified as having at least one Repetitive Loss (RL) property, with 28 (almost 40%) of these properties located in just one municipality, the Town of Ulster. The two municipalities with the next highest number of RL properties are the City of Kingston and the Town of Shandaken, with 12 each. Slightly more than three quarters of all RL properties are single-family residential buildings, while only 8% are non-residential. Data to permit a further breakdown of the non-residential structures into commercial, institutional, and so on was not readily available at the time of writing.

The average repetitive loss property in Ulster County has experienced 2.6 loss events: 69% have experienced two losses, 20% have experienced three, and 11% have experienced more than three, including two properties in the City of Kingston and the Town of Lloyd that are recorded as having experienced 8 losses each.

Table 3a.20 and Figures 3a.12 and 3a.13 indicate that the majority of RL properties (62%) are located in the 100-year floodplain, and the remainder are approximately equally distributed across the 500-year floodplain and areas of minimal or no identified flood risk. Of the RL properties which are single family residential structures, 70% are located in the 100-year floodplain.

To summarize, almost one third of all NFIP payments in Ulster County may be attributable to just 6% of insured properties in the County (depending on how many of these properties remain insured by the NFIP).

## SECTION 3a - RISK ASSESSMENT: HAZARD PROFILES

**Table 3a.19**  
**NFIP Repetitive Loss Property Statistics (as of August 27, 2008)**  
*(Source: FEMA Region 2)*

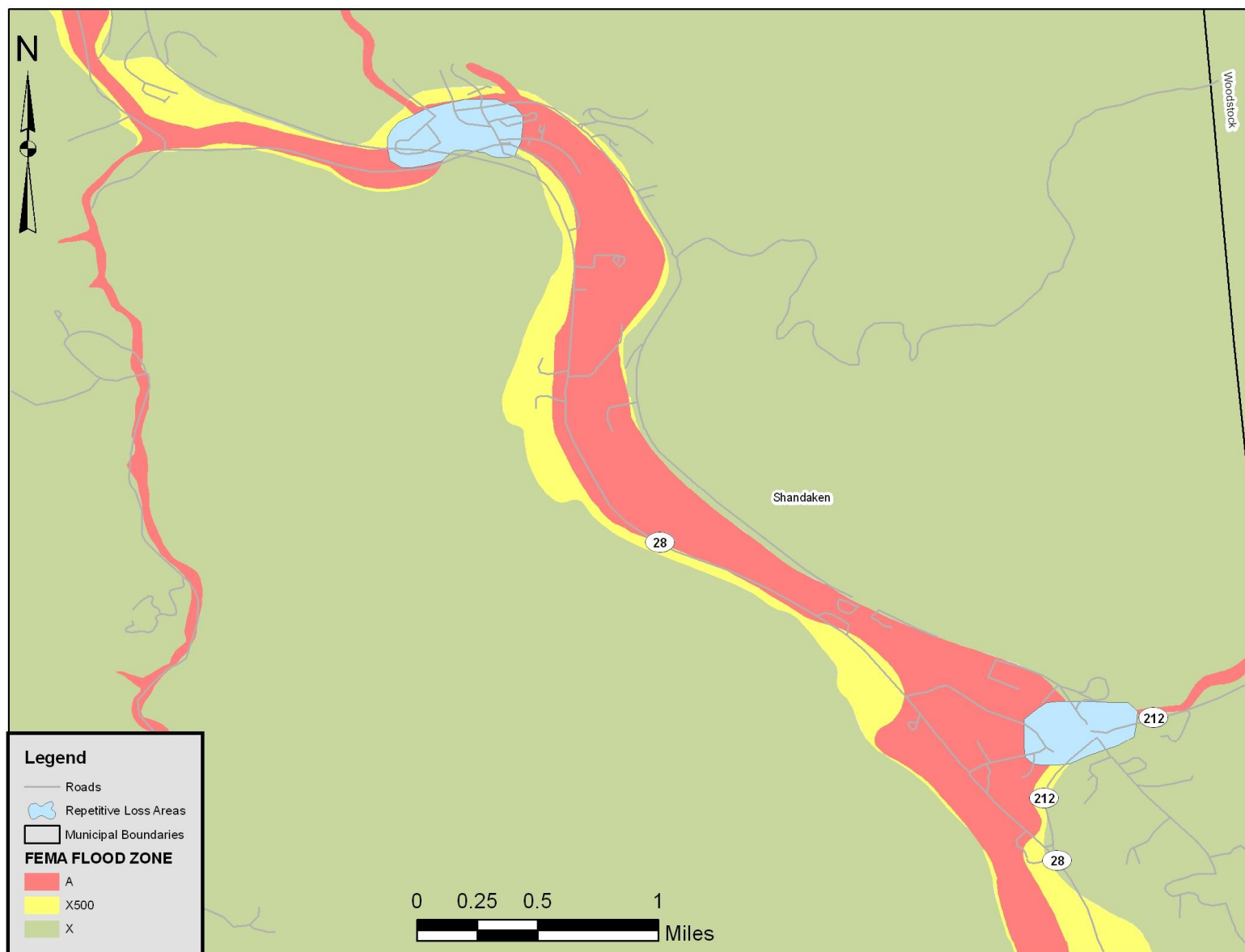
Jurisdiction	Single Family			Other Residential			Non-Residential			Total		
	Properties	Losses	Payments	Properties	Losses	Payments	Properties	Losses	Payments	Properties	Losses	Payments
Denning, Town of										0	0	\$0
Ellenville, Town of	1	2	\$40,864							1	2	\$40,864
Esopus, Town of										0	0	\$0
Gardiner, Town of				1	2	\$14,444				1	2	\$14,444
Hardenburgh, Town of										0	0	\$0
Hurley, Town of	1	2	26,289.48							1	2	\$26,289
Kingston, City of	10	27	\$380,666	1	2	\$55,584	1	2	\$39,950	12	31	\$476,199
Kingston, Town of										0	0	\$0
Lloyd, Town of				1	2	\$13,357	1	8	\$421,966	2	10	\$435,322
Marbletown, Town of										0	0	\$0
Marlborough, Town of										0	0	\$0
New Paltz, Town of	1	2	\$31,034							1	2	\$31,034
New Paltz, Village of				1	3	\$329,603				1	3	\$329,603
Olive, Town of										0	0	\$0
Plattekill, Town of	1	3	\$55,594							1	3	\$55,594
Rochester, Town of	1	2	\$2,211							1	2	\$2,211
Rosendale, Town of	1	2	\$62,281							1	2	\$62,281
Saugerties, Town of	2	4	\$127,490							2	4	\$127,490
Saugerties, Village of	1	2	\$3,968							1	2	\$3,968
Shandaken, Town of	10	24	\$480,591	1	2	\$7,369	1	2	\$5,135	12	28	\$493,095
Shawangunk, Town of										0	0	\$0
Ulster, Town of	22	65	\$1,961,274	3	7	\$193,150	3	6	\$127,779	28	78	\$2,282,204
Wawarsing, Town of	4	8	\$127,746				1	2	\$7,936	5	10	\$135,682
Woodstock, Town of							1	2	\$6,110	1	2	\$6,110
<b>Totals</b>	<b>55</b>	<b>143</b>	<b>\$3,300,010</b>	<b>8</b>	<b>18</b>	<b>\$613,506</b>	<b>8</b>	<b>22</b>	<b>\$608,874</b>	<b>71</b>	<b>183</b>	<b>\$4,522,390</b>

**Table 3a.20**  
**Repetitive Loss Properties by Municipality and Location in Mapped Flood Hazard Zones**  
*(Source: FEMA Region 2)*

Jurisdiction	A Zone (100-Year Floodplain)			X500 Zone (500-Year Floodplain)			Other Zone (>500-Year Floodplain)		
	Single-Family	Other Residential	Non-Residential	Single-Family	Other Residential	Non-Residential	Single-Family	Other Residential	Non-Residential
Denning, Town of							1		
Ellenville, Town of								1	
Esopus, Town of									
Gardiner, Town of									
Hardenburgh, Town of									
Hurley, Town of	1								
Kingston, City of	8	1	1				1		
Kingston, Town of				1					
Lloyd, Town of			1		1				
Marbletown, Town of									
Marlborough, Town of									
New Paltz, Town of	1								
New Paltz, Village of					1				
Olive, Town of									
Plattekill, Town of				1					
Rochester, Town of	1								
Rosendale, Town of				1					
Saugerties, Town of				2					
Saugerties, Village of	1								
Shandaken, Town of	5			4			1	1	1
Shawangunk, Town of									
Ulster, Town of	19	3	1				3		2
Wawarsing, Town of*	1			1		2	1		
Woodstock, Town of									
<b>Totals</b>	<b>37</b>	<b>4</b>	<b>3</b>	<b>10</b>	<b>2</b>	<b>2</b>	<b>7</b>	<b>2</b>	<b>3</b>

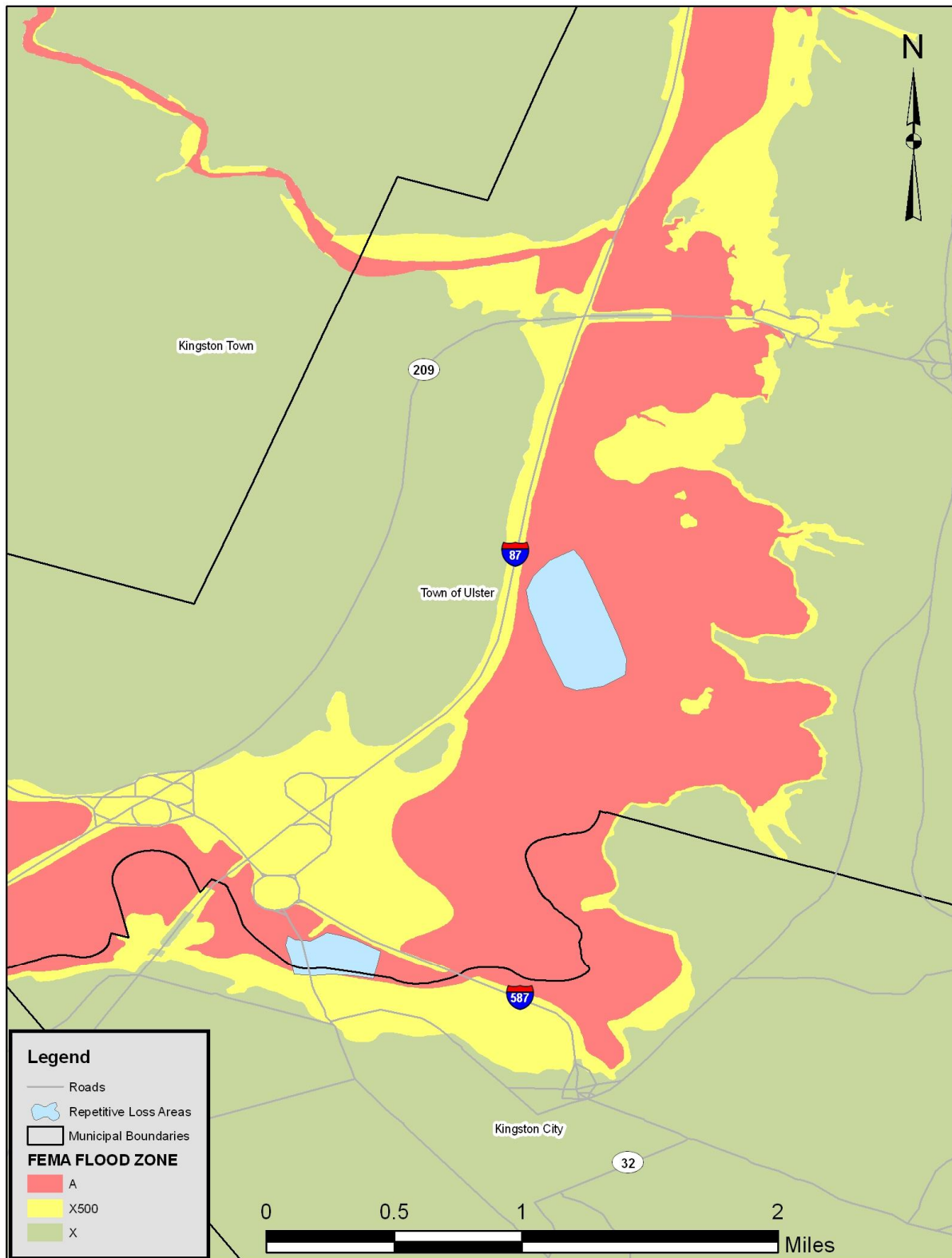
\*Totals do not exactly match those in Table 3a.18 since address details were incomplete

Figure 3a.12: NFIP Repetitive Loss Property Clusters ó Town of Shandaken



Source: Census Roads, New York State, 2001; Boundaries, NYSCSCIC, 1994; FEMA Q3 Data

Figure 3a.13: NFIP Repetitive Loss Property Clusters ó Town of Ulster/City of Kingston



Source: Census Roads, New York State, 2001; Boundaires NYS CSCIC, 1994; FEMA Q3 Data



### Flood Disaster Declarations

The New York State Hazard Mitigation Plan reports Ulster County as having been affected by 12 Presidential Disaster Declarations related to flooding from 1953 to August 2007. Only neighboring Delaware County has been subject to a greater number of disaster declarations in New York State. In recent years, Ulster County has been affected by six major flood disaster declarations, as summarized in Table 3a.21. The Table also indicates which form of post-disaster assistance the County became eligible for after the declaration.

Through the Public Assistance (PA) Program, FEMA provides supplemental Federal disaster grant assistance for debris removal, emergency protective measures, and the repair, replacement, or restoration of disaster-damaged, publicly owned facilities and the facilities of certain Private Non-Profit (PNP) organizations. The Individual Assistance Program (IA) provides money or direct assistance to individuals, families and businesses in an area whose property has been damaged or destroyed and whose losses are not covered by insurance. It is meant to assist with critical expenses that cannot be covered in other ways, rather than to restore damaged property to its condition before the disaster.

Disaster #	Description	Declared Date and Incident Period	Damages*
DR-1534	Severe storms and flooding: Ulster County: PA only	8/03/2004 (5/13/04 ó 6/17/04)	\$14m
DR-1564	Severe storms and flooding: Ulster County: PA & IA	10/01/2004 (8/29/04 ó 9/16/04)	\$18.03m
DR-1564	Tropical Depression Ivan: Ulster County: PA & IA	10/01/2004 (9/16/04 ó 9/24/04)	\$15.1m
DR-1589	Severe storms and flooding: Ulster County: PA & IA	4/9/2005 (4/2/05 ó 4/4/05)	\$66.21m
DR-1650	Severe storms and flooding: Ulster County: PA & IA	7/1/2006 (6/26/06 ó 7/10/06)	\$246.33m
DR-1710	Severe storms, inland and coastal and flooding: Ulster County: PA & IA	4/27/2007 (4/14/07 ó 4/18/07)	\$12.76m

\*Includes damages in areas outside Ulster County

According to data made available by the National Climatic Data Center (NCDC), there have been 100 recorded flood events affecting Ulster County between March 1993 and March 2008, causing reported damages totaling just under \$25 million, including damages incurred outside Ulster County. Table 3a.22 presents significant flood events recorded for Ulster County in the NCDC database for which some detailed information was available.

In addition to information from NCDC and NYSEMO, local sources have provided some further information about the significant flooding experienced by the Town of Ulster in 2005, 2006, and 2007. These events damaged approximately 150 residential structures in the town, most of which were mobile homes in parks adjacent to Rondout and Esopus Creeks, and caused several significant sewer breaks. In total the town received more than \$870,000 in Public Assistance funds from FEMA for these events. The areas in the Town of Ulster most affected by these events were in the vicinity of Orlando Street, Buckley Street, Sandy Road, Brabant Road, Creek Locks Road, Farm to Market Road, Parish Lane, and County Route 28. Local sources report that flooding along the Twaalfskill Creek near Highland in the Town of Lloyd in April 2007 and March 2008 caused serious damage to local roads, and estimate that flooding has caused nearly \$2 million in damages in the last three years alone.

Examples of the conditions during these floods and the resulting damage are presented in Figures 3a.14 and 3a.15.

**Figure 3a.14:** Flood Damage in Boiceø Mobile Home Park, Farm to Market Road, Town of Ulster, April 2005.



**Figure 3a.15:** Flooding in Orlando Street, Town of Ulster, April 2007.



## SECTION 3a - RISK ASSESSMENT: HAZARD PROFILES

**Table 3a.22**  
**Selected Recent Flood Events in Ulster County**  
*(Source: NOAA NCDC)*

<b>Date</b>	<b>Affected Municipalities</b>	<b>Description</b>	<b>Reported Property Damage*</b>
3/8/1995	New Paltz (Town), Rosendale	A combination of snowmelt and heavy rain resulted in flooding along the Rondout, Esopus and Wallkill Creeks in Ulster County. The Rondout Creek went half a foot over flood stage at Rosendale. Flooding along the Wallkill closed Springtown Rd. in New Paltz. Another creek caused flooding in the Town of Bloomington where Creek Locks Rd. was closed for a time.	\$50,000
11/11/1995	Shandaken, Saugerties (Town), Woodstock	An intense low pressure system produced three to four inches of rain across this region which resulted in flooding. In Saxton, the Kaaterskill Creek overflowed its banks which resulted in the closing of route 32A and the evacuation of six to ten families. In Phoenicia the Esopus Creek flooded and a state of emergency was declared at 1145PM EST on Saturday 11/12/95 . Several families were evacuated in Woodland Valley. In Woodstock minor flooding occurred as the Saw Kill Creek reached flood stage.	\$100,000
1/19/1996	Multiple	An intense area of low pressure which was located over the Mid-Atlantic region on Friday morning January 19th produced unseasonably warm temperatures, high dewpoints and strong winds. This resulted in rapid melting of one to three feet of snow. In addition to the rapid snowmelt one to three inches of rain fell as the system moved northeast along the coast. This resulted in widespread flooding across Ulster County. Federal Disaster Assistance was made available by presidential declaration. Small streams flooded across the entire county which resulted in many roads being washed out. Extensive flooding also occurred along the Hudson River and Esopus Creek. In the mountainous terrain of Ulster County road washouts were more numerous. In the Town of Shandaken five town roads were destroyed and several homes were damaged. In the Town of Hardenburgh three quarters of the roads were washed out. In New Paltz homes were flooded near the wetlands along route 299 due to the Wallkill Creek. Flooding also occurred in the Towns of Denning, Olive, Woodstock, Saugerties and Kingston. Evacuations occurred in the Phoenicia-Shandaken area and in the Town of Kingston.	\$10,000,000
1/24/1996	Esopus, Kingston (Town)	A low pressure system which tracked across the northern Great Lakes on the 24th of January produced addition rain across the already ground soaked region. Additional runoff along with high tides along the Hudson River created flooding over two days along the Rondout Creek between Eddyville and the Hudson River and along the Hudson River in Kingston.	\$60,000
1/27/96	Multiple	A low pressure system over the upper Great Lakes produced a general rainfall of one to two inches across eastern New York with up to three inches of rain across parts of the Catskills. This amount of rainfall on already saturated soil brought many small streams out of their banks across Ulster County. The Wallkill River, Rondout Creek and Esopus Creek also flooded in Ulster County. Evacuations occurred along the Esopus Creek and route 28 was closed between Phoenicia and Mount Tremper. Along the Rondout Creek at Eddyville flooding was widespread and severe. Numerous roads were washed out across the county and the Towns of Shandaken and Hardenburgh declared a local state of emergency.	\$400,000
7/13/1996	Rochester	Not available	\$70,000

## SECTION 3a - RISK ASSESSMENT: HAZARD PROFILES

**Table 3a.22**  
**Selected Recent Flood Events in Ulster County**  
*(Source: NOAA NCDG)*

Date	Affected Municipalities	Description	Reported Property Damage*
10/20/1996	Lloyd, Ellenville	Not available	\$12,000
11/9/1996	Hardenburgh	From Friday morning November 8 to Saturday morning November 9, a slow moving low pressure system tracked from northern Pennsylvania to northern New York. This system dumped 2 to 4 inches of rain across much of the Catskills, which produced flooding in parts of Ulster County. A state of emergency was declared in the Town of Hardenburgh from early Saturday morning through early afternoon. Many roads were closed and washed out across the town as the Dry Brook flowed well out of its banks.	\$40,000
2/12/1996	Countywide	Not available	\$300,000
1/9/1998	New Paltz (Town), Esopus	On January 8 and 9, mild weather along with significant rain and snowmelt resulted in small stream flooding across Ulster County. Small streams flooded roadways throughout the county, with the most significant flooding occurring in the New Paltz and Eddyville area.	
5/10/1998	Kingston (Town), Saugerties (Town)	Low pressure off the Mid-Atlantic coast produced 3 to 7 inches of rain across the Catskill Mountains in Greene County. The rain fell on fairly wet ground and forced the Esopus Creek to spill out of its banks both above and below the Ashokan Reservoir. The creek flooded above the dam on May 10 and crested just over flood stage at Mount Tremper during the evening hours. Below the Ashokan Reservoir the creek flooded from the early morning hours of May 11 to the early afternoon hours of May 13. The creek crested approximately three feet over flood stage at Mount Marion. The flood waters caused problems mainly between Kingston and Saugerties. Flooding occurred in a trailer park in the Town of Saugerties. Several trailers were surrounded by water but no evacuations were necessary. Minor flooding also occurred in the Kingston Plaza area.	\$10,000
6/14/1998	Shandaken, Kingston (Town)	Over the weekend of June 12 through 14, a slow moving low pressure system just off the southern New England coast produced very heavy rains across much of the Catskills and eastern Mohawk Valley. Three day precipitation totals reached 8 to 10 inches in some locations. In Ulster County, the Esopus Creek above the Ashokan Reservoir flooded. At Mount Tremper, the creek crested at 12.5 feet late Sunday afternoon June 14. Flood stage at Mount Tremper is 11 feet. In the Town of Kingston, the Saw Kill flooded several roads.	\$45,000
6/30/1998	Multiple	A cold front triggered severe thunderstorms and flash flooding across Dutchess and Ulster Counties. Severe thunderstorms downed trees and wires across several locations in both these counties. Approximately 2,000 customers were without power for several hours. A thunderstorm blew a tree down on a house at Gardiner in Ulster County. Severe thunderstorms also contained large hail. Torrential rains from the storms produced flash flooding across Ulster and Southern Dutchess Counties. In Ulster County, roads were flooded in Rosendale, New Paltz, Shawangunk, Marlboro and Ellenville. At Glasco, in Saugerties Town, four residents of an apartment building were evacuated due to a flooded stream that washed out part of the foundation.	\$16,000
7/14/2000	Denning	A very moist air mass moved over the Mohawk Valley and Southern Catskills during the afternoon on	\$27,000

## SECTION 3a - RISK ASSESSMENT: HAZARD PROFILES

**Table 3a.22**  
**Selected Recent Flood Events in Ulster County**  
*(Source: NOAA NCDG)*

Date	Affected Municipalities	Description	Reported Property Damage*
		July 14. A cold front stalled to the west of the region. This scenario allowed for a cluster of thunderstorms to develop. In Ulster county, Denning was especially hard hit. Doppler radar estimated between 8 and 10 inches of rain fell in a few hours during the late afternoon and evening hours as thunderstorms became virtually stationary over the area. Massive flooding caused almost every road in Denning to be washed out, including County Route 46 (Greenville Road). Five families had to be evacuated. Small bridges were also washed out. The hamlet of Sundown suffered the most damage with all but one road devastated. A trailer was destroyed while other houses had damage to their foundations. Other portions of homes were torn away.	
12/17/2000	Multiple	A complex storm system began to evolve on Saturday December 16 across the Mississippi Valley. A surface low tracked north into the Eastern Great Lakes by December 17. At the same time, the associated upper level trough became negatively tilted as it moved toward the northeast on Sunday. This allowed for rapid cyclogenesis. Unseasonably warm and moist air was transported northward from the Gulf of Mexico. This scenario brought a record breaking rainstorm to eastern New York. Six towns in Ulster County declared a local state of emergency, including Woodstock, Gardiner, Rosendale, Hardenburgh, Denning and Kingston, due to widespread flooding in these towns. In Shandaken a 15 year old boy drowned as he and four other boy scouts attempted to cross the swollen West Branch of the Neversink River while descending Slide Mountain. The remaining four boy scouts were rescued and treated for hypothermia, then released from a nearby hospital.	\$500,000
8/3/2001	Kingston (Town)	A cold front, moving into a warm humid airmass, produced scattered thunderstorms across eastern New York on the afternoon of August 3. A couple of the storms became severe. One produced torrential rainfall in Kingston, Ulster County. 1.82 inches of rain was reported in just 30 minutes. This rainfall resulted in the flooding and closure of several roadways in that town.	\$20,000
8/10/2003	New Paltz (Town)	Isolated thunderstorms developed during the evening hours of August 10 over Dutchess and Ulster counties. These storms were slow moving and prolific rainmakers. Heavy rains flooded Route 299 in Libertyville near New Paltz in Ulster County. Both roads were closed. Numerous basements were also flooded in that town.	\$10,000
9/23/2003	New Paltz (Town)	A strong cold front produced a line of showers and thunderstorms across eastern New York on the morning of September 23. Heavy rains resulted in flash flooding in the town of New Paltz in Ulster County. Route 32 flooded in that town submerging a taxi at the intersection of Route 32 and Sunset Ridge Road. The driver was not injured. By 4 pm, city firefighters in New Paltz had assisted in pumping 18 flooded basements out. The storms resulted in scattered power outages.	\$18,000
5/13/2004	Shandaken	On May 13th, a cold front propagated through New York State, touching off a line of strong to severe thunderstorms that brought significant damage to a portion of the area. Numerous roadside culverts were washed out, and roads were closed due to the heavy amounts of rain that fell in very short periods of time	\$500,000

## SECTION 3a - RISK ASSESSMENT: HAZARD PROFILES

**Table 3a.22**  
**Selected Recent Flood Events in Ulster County**  
*(Source: NOAA NCDC)*

Date	Affected Municipalities	Description	Reported Property Damage*
		in Greene, Warren, and Ulster Counties. Pine Hill, in Ulster County, reported the highest amount of loss, suffering approximately \$500,000 in damage to structures and roadways.	
8/30/2004	Kingston (City)	A series of slow moving thunderstorms produced at least two inches of rainfall in a short time in Ulster County. With an already saturated ground, extensive flash flooding resulted, as portions of Broadway, Washington Avenue and Elizabeth Street were closed in the city of Kingston. The worst of the flooding occurred along Main Street, where two-foot water depths were recorded. In addition, a large sinkhole appeared on Pearl Street between Green Street and Washington Avenue.	Not available
9/18/2004	Hardenburgh	All roads in Hardenburgh closed due to flooding. Town supervisor declared a state of emergency.	Not available
2/4/2005	Multiple	State of Emergency declared throughout entire county due to widespread flooding. Many roads reported to be closed throughout Ulster County.	\$275,000
10/14/2005	New Paltz (Town)	Law Enforcement official reported many roads in New Paltz are closed due to flooding.	Not available
4/15/2007	New Paltz (Town), Ulster (Town)	Heavy rainfall led to flooding of numerous creeks and streams throughout the county. The Verkeerderkill Creek exceeded bankfull around 1655 EST on the 15th, flooding adjacent portions of Ulsterville Road in Walker Valley. Additional flooding was reported around 2313 LST near New Paltz, where several roads were closed due to high water, including Route 299 to Mountain Rest Road, and from Dug Road to Kleinkill Drive. A state of emergency was declared by 0745 EST on the 16th due to the widespread flooding. Mandatory evacuations also occurred along the Esopus Creek in the town of Ulster around 1430 EST on the 16th.	\$3,200,000
6/19/2007	Hardenburgh	Several roads were washed out near Turnwood as a result of very heavy rainfall.	\$25,000
3/9/2008	New Paltz (Town), Shawangunk, Hurley	Heavy rainfall led to flooding across portions of Ulster county. Several roads were closed, including Route 213 and Mountain Road in Ulsterville, Ulsterville Road and Pirog Road in Ulsterville, several roads in downtown New Paltz, and Route 9 West between Saugerties and Ulster. The flooding of fields was also reported west of County Route 7 and State Route 52 near Ulsterville, where water approached houses. In addition, a mudslide occurred in Hurley, closing Hurley Mountain Road.	\$10,000

\*May include damage incurred outside Ulster County

### Probability of Occurrence – Floods

The probability of occurrence of a flood at a given location (the odds of being flooded) is expressed in percentages as the chance of a flood of a specific magnitude occurring in any given year. The 100-year flood has a 1% chance of occurring in any given year. The 100-year flood is often also referred to as the base flood. This probability of occurrence might imply that a 100-year flood would reoccur only once every 100 years; in reality, this is not the case. A 100-year flood can happen multiple times in a single year, or not at all for more than 100 years. Properties located in FEMA-mapped A- and V-Zones are within the footprint of the 100-year floodplain. FEMA A-Zones represent the 100-year floodplain

For all floodplains, there is an associated water surface elevation. This elevation is unique to any given location on the map (in other words, 100-year flood levels vary from one community to the next throughout Ulster County, and also within individual communities).

Within the 100-year floodplain, flooding can occur at less than the 100-year flood level, and also more than the 100-year flood level. The 100-year flood represents a flood of high magnitude – it is a deep and widespread event. The 500-year flood is of a greater magnitude, and would be deeper and more widespread than a 100-year event. However, it is not as likely to occur. Smaller floods, with magnitudes of 10-years or 50-years for example, are also possible within the 100-year floodplain. These are not as deep or as widespread as a 100-year flood would be, however, they are much more likely to occur.

The term “100-year flood” can often be confusing to someone not intimately familiar with flooding or statistics. FEMA’s *NFIP Floodplain Management Requirements: a Study Guide and Desk Reference for Local Officials* (FEMA-480), suggests that another way to look at flood risk is to think of the odds that a 100-year flood will happen some time during the life of a 30-year mortgage of a home in the floodplain. Figure 3a.16 illustrates these odds, over various time periods for different size floods. In any given year, a property in the 100-year floodplain has a 10 percent chance of being flooded by a 10-year flood, and a 1 percent chance of being flooded by a 100-year flood. This may not sound particularly risky at first glance. However, over a 30-year period, that same location has a 96 percent chance of being flooded by a 10-year flood and a 26 percent chance of being flooded by a 100-year flood.

Figure 3a.16: Odds of Being Flooded

<b>WHAT ARE THE ODDS OF BEING FLOODED?</b>				
The term "100-year flood" has caused much confusion for people not familiar with statistics. Another way to look at flood risk is to think of the odds that a 100-year flood will happen sometime during the life of a 30-year mortgage—a 26% chance for a structure located in the SFHA.				
<u>Chance of Flooding over a Period of Years</u>				
Time Period	10-year	Flood Size		100-year
		25-year	50-year	
1 year	10%	4%	2%	1%
10 years	65%	34%	18%	10%
20 years	88%	56%	33%	18%
30 years	96%	71%	45%	26%
50 years	99%	87%	64%	39%
Even these numbers do not convey the true flood risk because they focus on the larger, less frequent, floods. If a house is low enough, it may be subject to the 10- or 25-year flood. During a 30-year mortgage, it may have a 26% chance of being hit by the 100-year flood, but the odds are 96% (nearly guaranteed) that it will be hit by a 10-year flood. Compare those odds to the only 1-2% chance that the house will catch fire during the same 30-year mortgage.				



## Ice Jams

### Description – Ice Jam

Ice jams form when ice floating downstream in a river stalls and begins to build into a jam, forming a dam. The reservoir behind the dam quickly fills with water until out of bank flooding occurs. The observed effect can be very similar to flash flooding, and sudden flooding downstream may be caused by the sudden failure or release of the ice jam. Ice jams generally form at locations where the ice transport downstream is reduced by an obstruction or a significant hydrologic change. Natural obstructions in the river can include bends, intact sheet ice cover, or a decrease in channel slope. Man-made obstructions can include bridges, existing dams, waterline crossings, and other constructions in the channel.

Ice jams and resulting floods can occur during fall freeze-up from the formation of frazil ice (a collection of loose, randomly oriented needle-shaped ice crystals) during midwinter periods when stream channels freeze solid forming anchor ice, and during spring breakup when rising water levels from snowmelt or rainfall break existing ice cover into large floating masses that lodge at bridges or other constructions. Damage from ice jam flooding may exceed that caused by open water flooding if flood elevations are usually higher than predicted for free-flow conditions and water levels may change rapidly. During cold weather, there is a reduction in evapotranspiration, infiltration (due to frozen ground) and surface storage, (due to the filling of ground depressions with snow and ice), which result in more water being delivered to the channel. Therefore for equal amounts of total available water during cold and warm seasons, the amount of excess water available for runoff will be greater during the cold season. Additional damage may be caused by the force of floating ice colliding with buildings, other structures, and automobiles.

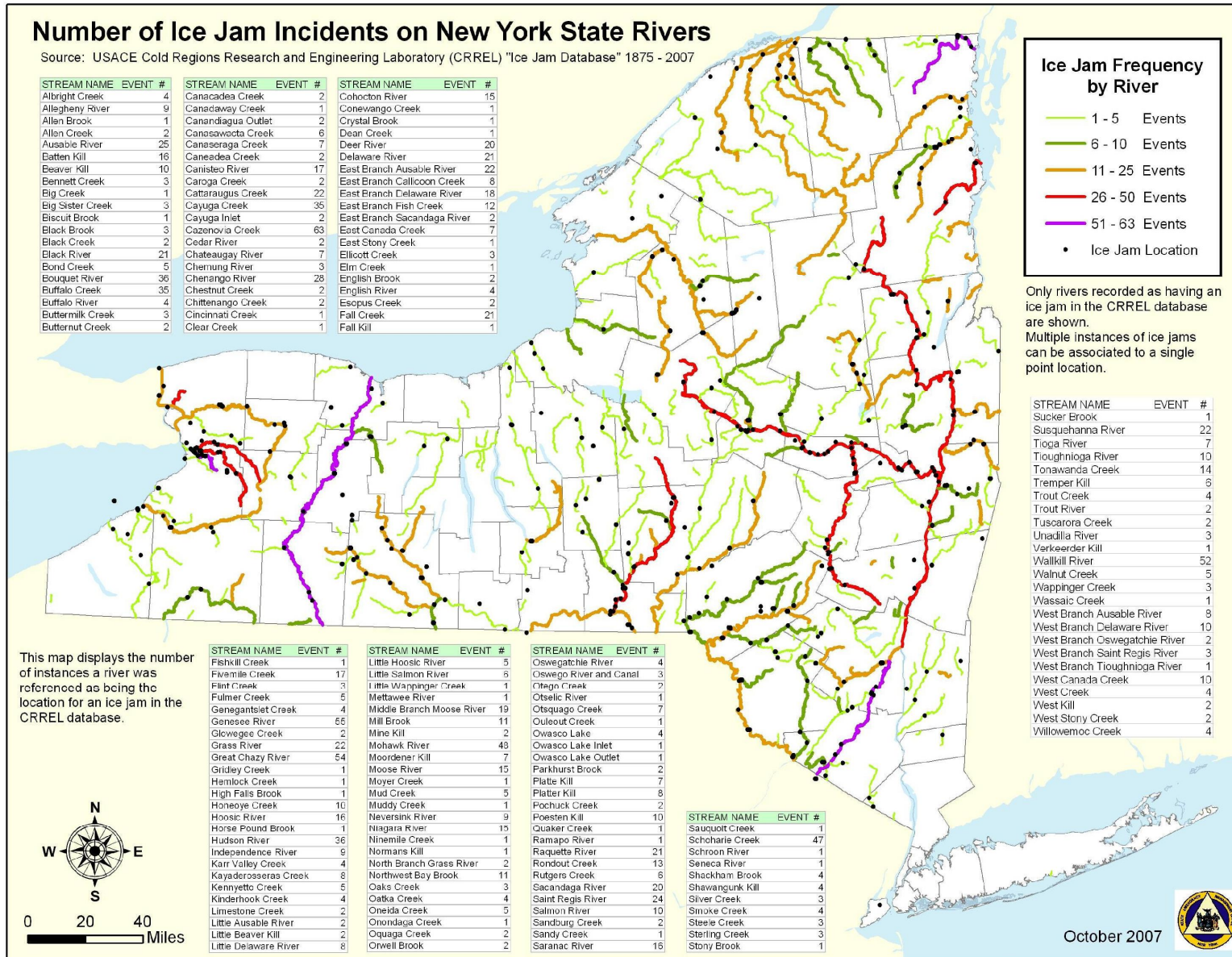
### Location – and Extent: Ice Jams

The identification of particular areas prone to ice jam flooding is difficult since the hazard can be extremely localized. However, available research and historic data suggests that ice jam flood hazard is most common in areas of flat terrain where the climate included extended periods of temperature below zero. Ice jams are very common in the north east United States, and according to data from the USACE Cold Region Research and Engineering Laboratory (USACE CRREL), 1,442 ice jam events have been recorded in New York State between 1867 and 2008, a number exceeded only by the State of Montana.

Figure 3a.17 shows the locations of ice jam incidents that have been recorded by the CRREL in New York State from 1875 to 2007. Multiple instances of ice jams may be associated with a single point location. Rivers and streams flowing through Ulster County on which more than one ice jam incident has been recorded by CRREL are presented in Table 3a.23.

River/Stream Name	Number of Recorded Ice Jam Incidents
Wallkill River	52
Rondout Creek	13
Mill Brook	11
Platte Kill	7
Shawangunk Kill	4
Esopus Creek	2

Figure 3a.17: Ice Jam Incidents in New York State



### Previous Occurrences – Ice Jams

The USACE CRREL mapping indicates that ice jam incidents for which some details are available have been recorded at 12 locations within Ulster County. Table 3a.24 presents details for those recorded ice jam events in Ulster County for which at least the date and location were available.

<b>Date</b>	<b>River/Stream</b>	<b>Municipality</b>	<b>Details/Description</b>
2/20/2008	Wallkill River	New Paltz	Flooding along Springtown Road between Kleine Kill Drive and Dug Road, and between Route 299 and Mountain West Road.
3/4/2007	Wallkill River	Gardiner	At junction of Wallkill River/Shawangunk Kill
2/23/2003	Wallkill River	Gardiner	Not available
2/23/2003	Rondout Creek	Rosendale	Not available
2/25/2000	Wallkill River	Gardiner	Flooding in vicinity of Route 44 bridge, some farm fields inundated
1/25/1999	Wallkill River	New Paltz	Springtown Road closed due to flooding between Dug Road and Mt. Rest
1/24/1999	Shawangunk Kill	Shawangunk	Road flooding, mainly in Orange County
1/29/1996	Wallkill River	New Paltz	Minor flooding for 1.5 miles between Tall Pines Lane and Ulster County Fairground
1/24/1996	Wallkill River	Gardiner	Minor flooding between Walden and Montgomery (Orange County) attributed to ice jam at Gardiner
3/16/1994	Wallkill River	Gardiner	Not available
3/10/1994	Rondout Creek	Rosendale	Not available
2/4/1982	Wallkill River	Gardiner	Not available
2/4/1982	Rondout Creek	Rosendale	Not available
2/11/1981	Esopus Creek	Shandaken	Not available
2/2/1981	Esopus Creek	Shandaken	Not available
1/25/1964	Shawangunk Kill	Shawangunk	Not available
3/18/1963	Shawangunk Kill	Shawangunk	Not available
3/13/1962	Rondout Creek	Rosendale	Not available
2/25/1961	Shawangunk Kill	Shawangunk	Not available
1/22/1959	Rondout Creek	Rosendale	Not available
3/16/1948	Rondout Creek	Rosendale	Not available
3/4/1945	Rondout Creek	Rosendale	Not available
2/8/1941	Rondout Creek	Rosendale	Not available
3/15/1940	Rondout Creek	Rosendale	Not available
3/12/1936	Rondout Creek	Kingston	"Portions of í Kingston, in New York state, was inundated, and a score of barges, tugs and other craft were swept down Rondout Creek until they were halted by an ice jam and removed. Three watermen were rescued. Nine Ulster county hamlets were abandoned due to rising waters on the Wallkill river. . . . Fog hitting from the Hudson River today disclosed a fleet of tugs and barges jammed in a huge ice pack where they were swept by raging Rondout Creek yesterday. No one was believed to be aboard. Watchers said they counted 20 or 30 vessels. In the group was a 100-foot steam yacht. This and others were torn away from dry docks a mile and a half up Rondout Creek when an ice jam broke*
3/4/1934	Rondout Creek	Rosendale	Not available
3/3/1926	Wallkill River	Gardiner	Not available

\*As reported by *The Caledonian-Record*, March 13, 1936

In addition to data sourced from USACE CRREL, local sources have indicated stormwater discharges are occasionally impeded by ice jams in the Town of Lloyd, most recently in March 2008.

A superseded version of the New York State Hazard Mitigation Plan (approved by FEMA in January 2005) mentions that an ice jam flooding event took place in Ulster County in January 1976, but gives no further details or description.

### **Probability of Occurrence – Ice Jams**

Due to the nature of the terrain and the climate in Ulster County, ice jam events are essentially certain to occur, although whether or not such events will cause significant damage is less easy to predict, since records of actual damage caused by ice jams are scarce. The available data also does not easily allow for an average number of occurrences per year to be computed, since location data is inexact in many cases. Using the total number of incidents presented in Table 3a.IJ1, the number of ice jam incidents affecting rivers and streams flowing through Ulster County can be approximately estimated as 0.67 per year.

## Earthquakes

### Description – Earthquakes

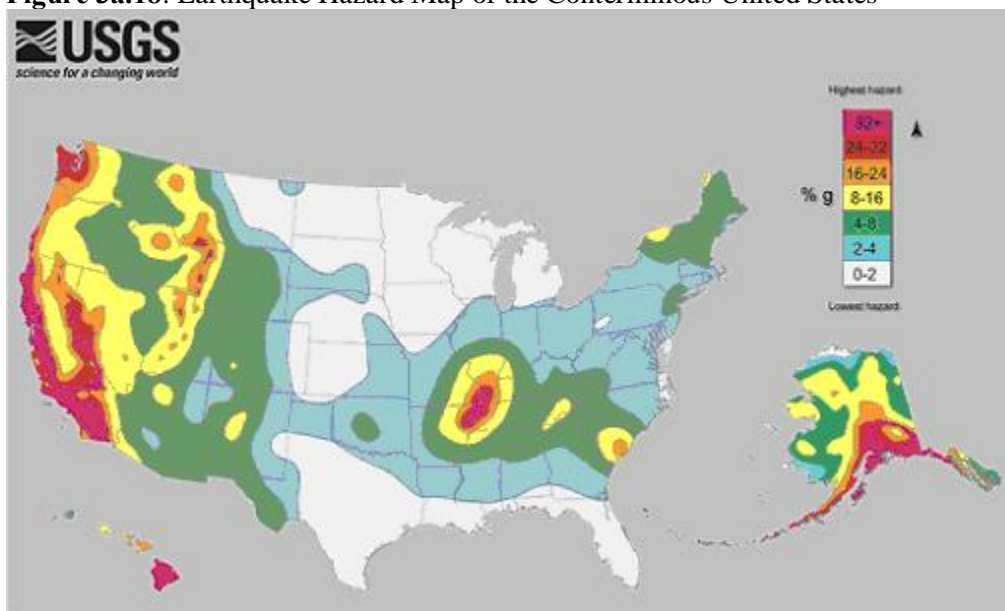
FEMA defines the term "earthquake" as a sudden, rapid shaking of the Earth caused by the breaking and shifting of rock beneath the Earth's surface. This movement forces the gradual buildup and accumulation of energy. Eventually, strain becomes so great that the energy is abruptly released, causing the shaking at the earth's surface which we know as an earthquake.

According to the USGS Earthquake Hazards Program, most earthquakes (approximately 90%) occur at the boundaries where the plates meet, although it is possible for earthquakes to occur entirely within plates. Ulster County is significantly distant from any plate boundaries. Regardless of where they are centered, earthquakes can impact locations at and well beyond their point of origin. They are often accompanied by "aftershocks" or secondary quakes in the earthquake sequence. Aftershocks are typically smaller than the main shock, and can continue over a period of weeks, months, or years from the main shock. In addition to the effects of ground shaking, earthquakes can also cause landslides and liquefaction under certain conditions. Liquefaction occurs when unconsolidated, saturated soils exhibit fluid-like properties due to intense shaking and vibrations experienced during an earthquake. Together, ground shaking, landslides, and liquefaction can damage or destroy buildings, disrupt utilities (i.e., gas, electric, phone, water), and sometimes trigger fires.

### Location – Earthquakes

Earthquakes are possible within any of Ulster County's communities. Figure 3a.18 shows an earthquake hazard map for the conterminous United States prepared by the USGS Earthquake Hazards Program. It shows that the earthquake hazard is low relative to other parts of the country (for example the west coast of the USA), but the possibility for noticeable earthquakes does exist in New York State.

**Figure 3a.18:** Earthquake Hazard Map of the Conterminous United States



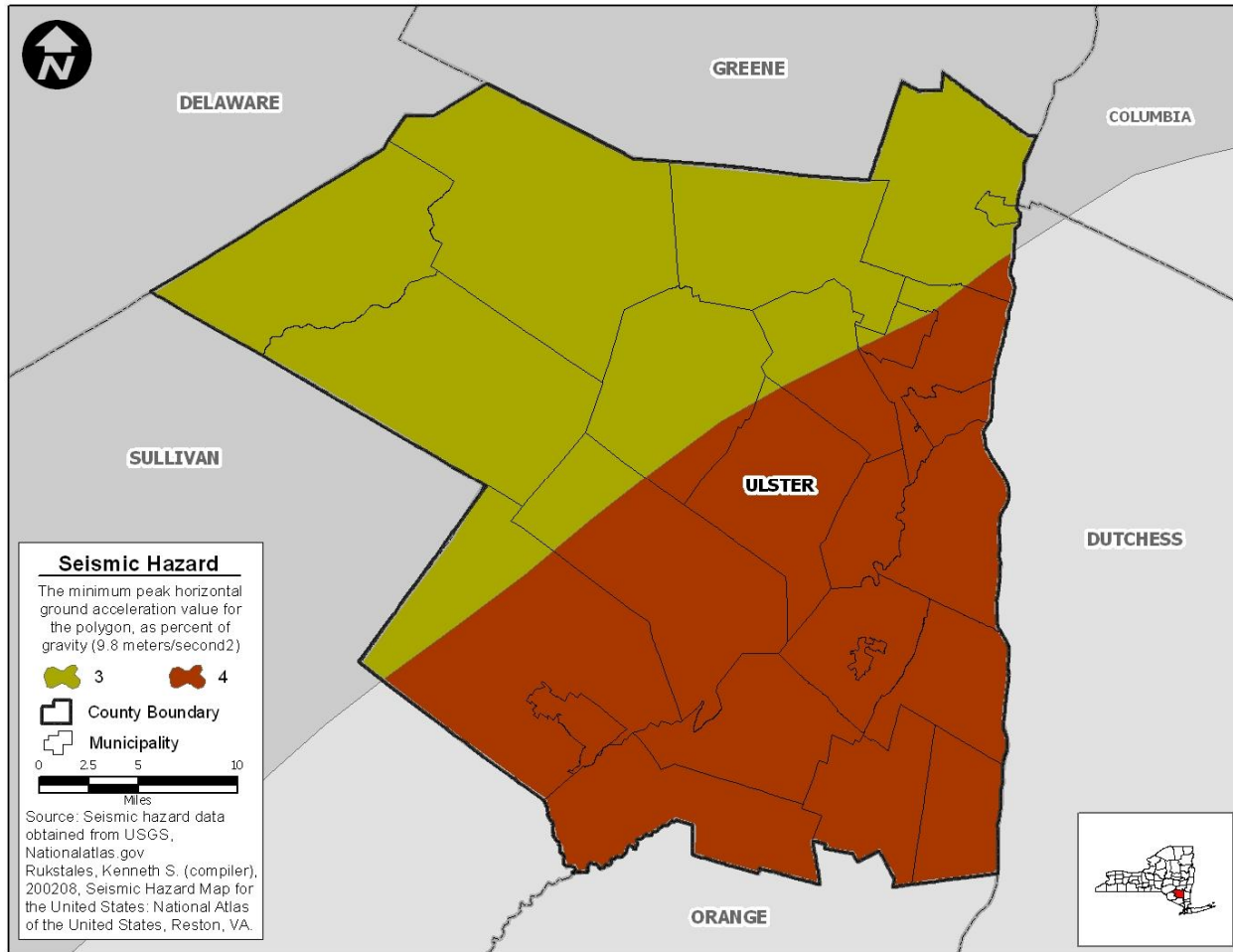
## Extent – Earthquakes

The severity of an earthquake at a given location depends on the amount of energy released at the epicenter, and the location's distance from the epicenter. The terms "magnitude" and "intensity" are two terms used to describe the severity of an earthquake. An earthquake's "magnitude" is a measurement of the total amount of energy released while its "intensity" is a measure of the effects of an earthquake at a particular place. Another way to express an earthquake's severity is to compare its acceleration to the normal acceleration due to gravity. Peak Ground Acceleration (PGA) measures the rate of change in motion of the earth's surface and expresses it as a percent of the established rate of acceleration due to gravity (9.8 m/sec<sup>2</sup>). Figure 3a.19 shows that, for Ulster County, PGA values of between 3 and 4%g have a 10 percent chance of being exceeded over 50 years. All of Ulster County has some degree of exposure to the earthquake hazard. While there are two mapped degrees of exposure, it is important to note that the effects at these low levels would be very similar. The GIS files used to generate Figure 3a.19 were used to estimate the extent of exposed land area in each municipality to the various degrees of earthquake hazard, as presented in Table 3a.25.

**Table 3a.25**  
**Extent of Earthquake Hazard Zones in Ulster County Municipalities**

Municipality	Total Area (Acres)	Zone 3 Area (Acres)	Zone 3 Area %	Zone 3 Area (Acres)	Zone 4 Area %
Denning	64,658	64,658	100%	0	0%
Ellenville	5,350	0	0%	5,350	100%
Esopus	23,524	0	0%	23,524	100%
Gardiner	27,495	0	0%	27,495	100%
Hardenburgh	51,004	51,004	100%	0	0%
Hurley	21,993	11,625	53%	10,368	47%
Kingston City	4,681	1,634	35%	3,047	65%
Kingston Town	4,285	0	0%	4,285	100%
Lloyd	19,694	0	0%	19,694	100%
Marbletown	34,814	436	1%	34,379	99%
Marlborough	15,472	0	0%	15,472	100%
New Paltz	19,741	0	0%	19,741	100%
New Paltz Village	1,002	0	0%	1,002	100%
Olive	41,492	35,894	87%	5,598	13%
Plattekill	22,039	0	0%	22,039	100%
Rochester	56,085	11,652	21%	44,433	79%
Rosendale	11,972	0	0%	11,972	100%
Saugerties	38,731	37,254	96%	1,477	4%
Saugerties Village	1,050	1,050	100%	0	0%
Shandaken	78,924	78,924	100%	0	0%
Shawangunk	35,306	0	0%	35,306	100%
Ulster	16,159	2,068	13%	14,091	87%
Warwarsing	79,654	21,571	27%	58,083	73%
Woodstock	42,809	42,809	100%	0	0%
<i>Ulster County Total</i>	<i>717,936</i>	<i>360,580</i>	<i>50%</i>	<i>357,356</i>	<i>50%</i>

Figure 3a.19: Ulster County Earthquake Hazard Zones



An approximate relationship between PGA, magnitude, and intensity is shown in Table 3a.26. Using Table 3a.DD, one can approximate that, for an earthquake of expected severity for Ulster County and its participating jurisdictions (PGA values of 3 to 4%g), perceived shaking would be light to moderate (depending upon the distance from the epicenter) and potential damage could range from none to very light (also depending upon the distance from the epicenter).

PGA	Magnitude	Intensity	Perceived Shaking	Potential Damage
< 0.17	1.0 - 3.0	I	Not Felt	None
0.17 ó 1.4	3.0 ó 3.9	II - III	Weak	None
1.4 - 9.2	4.0 - 4.9	IV - V	IV. Light V. Moderate	IV. None V. Very Light
9.2 - 34	5.0 ó 5.9	VI ó VII	VI. Strong VII. Very Strong	VI. Light VII. Moderate
34 - 124	6.0 ó 6.9	VIII - IX	VIII. Severe IX. Violent	VIII. Moderate/Heavy IX. Heavy
> 124	7.0 and higher	X and higher	Extreme	Very Heavy

Sources: (1) FEMA Mitigation Planning "How-To" Guide 386-2 (as reported in the New York State Hazard Mitigation Plan 2005); (2) Wald, D., et al., 1999, Relationship between Peak Ground Acceleration, Peak Ground Motion, and Modified Mercalli Intensity in California", Earthquake Spectra, V. 15, p. 557-564; (3) Community Internet Intensity, USGS Modified Mercalli Intensity, and Instrumental Intensity. 1999. <http://www-socal.wr.usgs.gov/ciim/pubs/ciim/node5.html> (July 27, 2003).

An earthquake with a 10 percent chance of exceedance over 50 years in Ulster County would have a PGA of 3 to 4%g and an intensity ranging from only IV to V, which would result in light to moderate perceived shaking, and damages ranging from none to very light. For comparison purposes, an earthquake of intensity IV on the Modified Mercalli Scale would most likely cause vibrations similar to heavy trucks driving over roads, or the sensation of a jolt. Hanging objects would swing; standing cars would rock; windows, dishes and doors would rattle; and, in the upper ranges of intensity IV, wooden walls and frames would creak. An earthquake of intensity V on the Modified Mercalli Scale would be felt outdoors, awaken sleepers, disturb or spill liquids, displace small unstable objects, swing doors, and cause shutters and pictures to move.

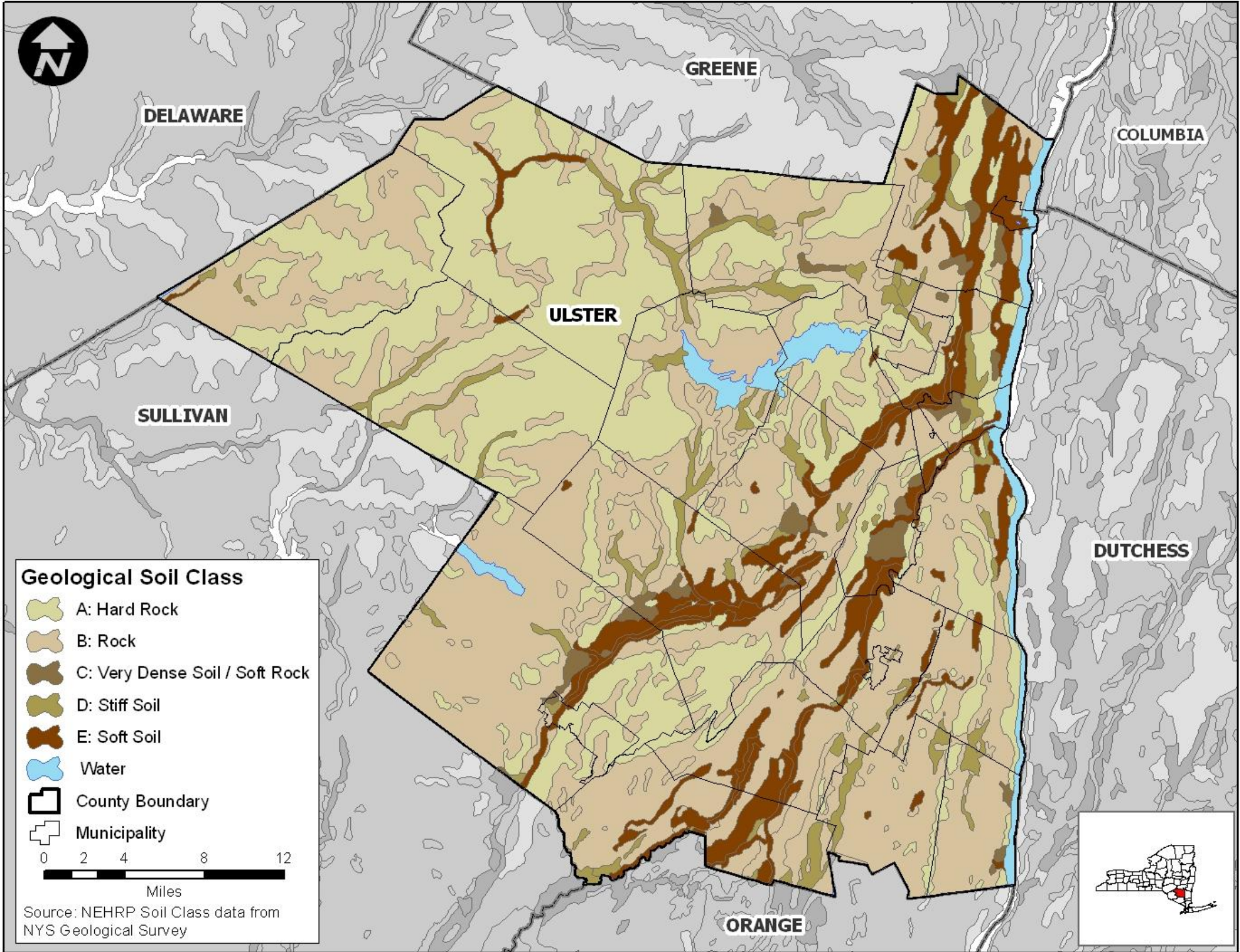
As noted in the New York State Hazard Mitigation Plan, soil type can have an impact on the severity of an earthquake at a given location. For example, soft soils (i.e., fill, sand) are more likely to amplify ground motion during an earthquake. Liquefaction is also more likely to occur in areas of soft soils. In contrast, harder soils (i.e., granite) tend to reduce ground motion during an earthquake. Figure 3a.20 shows soil types in five basic categories with varying degrees in likelihood of amplifying the affects of an earthquake, with Category A being far less likely to amplify the seismic motion than Category E.

Tables 3a.27 and 3a.28 presents the areas of each soil type quantified for each municipality and the improved values within those areas. This table indicates that the municipalities with the highest prevalence of soil types most likely to amplify the effects of seismic activity (Categories D and E) are Saugerties (both Town and Village), Ulster Town, Rosendale, and Shawangunk. Over the County as a whole, the most prevalent soil type is Category B (more than 50% of the County), indicating a generally low overall risk that the effects of earthquakes may be amplified by the soil type.

To clarify the data in Table 3a.28, percentages of improved values have only been presented for Categories D and E, which are the most likely to amplify the effects of seismic activity. The greatest concentrations of improved property value underlain by soil Category E are in the Towns of Saugerties and Ulster.



Figure 3a.20: Ulster County Geological Soil Classification



## SECTION 3a - RISK ASSESSMENT: HAZARD PROFILES

**Table 3a.27**  
**Ulster County Geological Soils Classification: Land Areas**  
*Source: NEHRP – NYS Geological Survey*

Municipality	Total Acres	A		B		C		D		E		Unclassified	
		Acres	%	Acres	%	Acres	%	Acres	%	Acres	%	Acres	%
Denning	64,658	40,161	62.1%	21,781	33.7%	0	0.0%	2,552	3.9%	165	0.3%	0	0.0%
Ellenville Village	5,350	2,795	52.2%	2,007	37.5%	140	2.6%	174	3.3%	235	4.4%	0	0.0%
Esopus	23,524	6,012	25.6%	13,074	55.6%	0	0.0%	1,042	4.4%	2,962	12.6%	435	1.8%
Gardiner	27,495	2,453	8.9%	18,872	68.6%	0	0.0%	707	2.6%	5,463	19.9%	0	0.0%
Hardenburgh	51,004	21,917	43.0%	28,410	55.7%	0	0.0%	399	0.8%	225	0.4%	53	0.1%
Hurley	21,993	9,163	41.7%	7,621	34.7%	0	0.0%	102	0.5%	1,871	8.5%	3,236	14.7%
Kingston City	4,681	1,515	32.4%	2,755	58.9%	0	0.0%	370	7.9%	41	0.9%	0	0.0%
Kingston Town	4,285	965	22.5%	1,044	24.4%	641	15.0%	503	11.7%	899	21.0%	233	5.4%
Lloyd	19,694	5,072	25.8%	12,803	65.0%	0	0.0%	703	3.6%	1,022	5.2%	94	0.5%
Marbletown	34,814	6,753	19.4%	19,492	56.0%	1,098	3.2%	1,977	5.7%	5,367	15.4%	128	0.4%
Marlborough	15,472	1,841	11.9%	11,818	76.4%	554	3.6%	923	6.0%	132	0.9%	204	1.3%
New Paltz	19,741	1,142	5.8%	13,551	68.6%	0	0.0%	604	3.1%	4,444	22.5%	0	0.0%
New Paltz Village	1,002	71	7.1%	850	84.9%	0	0.0%	57	5.6%	24	2.4%	0	0.0%
Olive	41,492	14,650	35.3%	19,996	48.2%	0	0.0%	3,061	7.4%	4	0.0%	3,781	9.1%
Plattekill	22,039	1,373	6.2%	18,320	83.1%	0	0.0%	2,047	9.3%	299	1.4%	0	0.0%
Rochester	56,085	13,850	24.7%	30,551	54.5%	1,318	2.4%	2,171	3.9%	8,195	14.6%	0	0.0%
Rosendale	11,972	3,496	29.2%	3,272	27.3%	2,028	16.9%	160	1.3%	3,015	25.2%	0	0.0%
Saugerties	38,731	7,255	18.7%	14,027	36.2%	1,691	4.4%	2,109	5.4%	13,103	33.8%	546	1.4%
Saugerties Village	1,050	0	0.0%	148	14.1%	0	0.0%		0.0%	794	75.6%	108	10.3%
Shandaken	78,924	59,230	75.0%	15,057	19.1%	0	0.0%	2,737	3.5%	1,900	2.4%	0	0.0%
Shawangunk	35,306	488	1.4%	24,306	68.8%	0	0.0%	3,317	9.4%	7,184	20.3%	11	0.0%
Ulster	16,159	4,879	30.2%	4,410	27.3%	446	2.8%	1,062	6.6%	5,012	31.0%	350	2.2%
Wawarsing	79,654	16,058	20.2%	55,165	69.3%	1,512	1.9%	983	1.2%	4,564	5.7%	1,373	1.7%
Woodstock	42,809	15,572	36.4%	21,355	49.9%	1,028	2.4%	4,854	11.3%	0	0.0%	0	0.0%
<i>County Total</i>	<i>717,936</i>	<i>236,713</i>	<i>33.0%</i>	<i>360,683</i>	<i>50.2%</i>	<i>10,455</i>	<i>1.5%</i>	<i>32,613</i>	<i>4.5%</i>	<i>66,921</i>	<i>9.3%</i>	<i>10,552</i>	<i>1.5%</i>

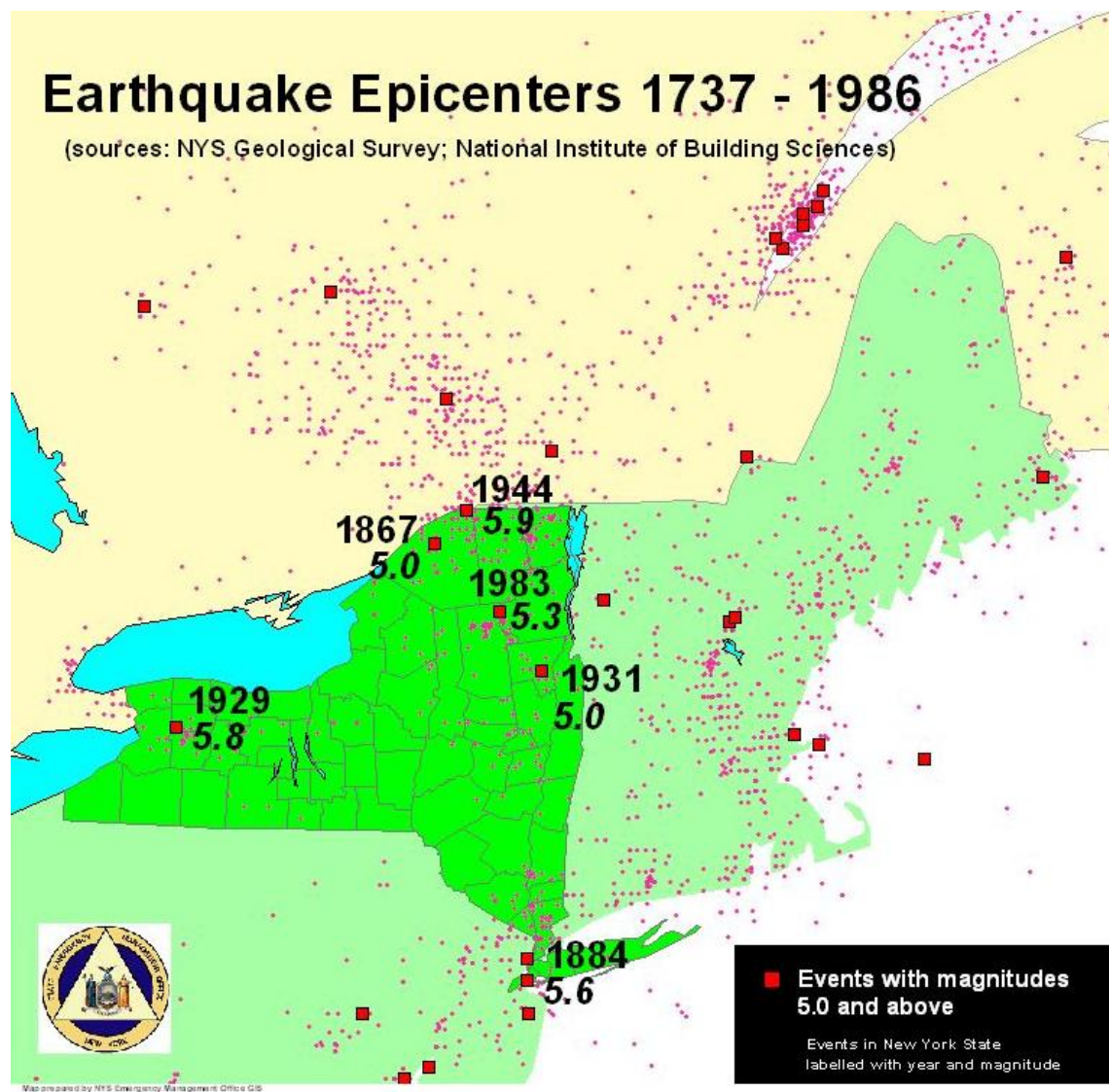
SECTION 3a - RISK ASSESSMENT: HAZARD PROFILES

**Table 3a.28**  
**Ulster County Geological Soils Classification: Improved Property Values**  
*Source: NEHRP – NYS Geological Survey*

Municipality	Total Value	A	B	C	D		E		Unclassified
		Value	Value	Value	Value	%	Values	%	Value
Denning	\$51,126,978	\$23,018,453	\$23,303,738	\$0	\$4,589,435	9.0%	\$215,556	0.4%	\$0
Ellenville Village	\$47,291,413	\$9,912,081	\$8,646,123	\$3,453,374	\$13,472,961	28.5%	\$11,523,366	24.4%	\$0
Esopus	\$823,898,937	\$195,874,692	\$319,672,737	\$0	\$114,227,210	13.9%	\$104,432,418	12.7%	\$89,695,175
Gardiner	\$612,092,899	\$16,977,802	\$520,885,499	\$0	\$5,076,020	0.8%	\$69,156,010	11.3%	\$0
Hardenburgh	\$50,791,094	\$6,107,368	\$43,538,299	\$0	\$427,033	0.8%	\$0	0.0%	\$718,597
Hurley	\$682,669,402	\$179,618,441	\$372,717,073	\$0	\$134,778	0.0%	\$86,868,321	13.6%	\$703,530
Kingston City	\$1,922,939,212	\$299,413,315	\$507,528,517	\$612,718,037	\$204,334,740	10.6%	\$287,347,173	14.9%	\$11,605,114
Kingston Town	\$57,541,463	\$24,197,537	\$20,430,691	\$0	\$12,913,466	22.4%	\$0	0.0%	\$0
Lloyd	\$856,612,633	\$145,346,548	\$617,733,927	\$0	\$46,010,184	5.4%	\$17,931,405	2.1%	\$29,594,008
Marbletown	\$1,023,631,875	\$342,262,434	\$500,852,185	\$60,980,029	\$24,850,422	2.5%	\$64,803,662	6.5%	\$264,405
Marlborough	\$722,416,282	\$55,497,399	\$552,532,722	\$65,984,495	\$13,630,952	1.9%	\$12,099,792	1.7%	\$22,673,809
New Paltz	\$578,833,042	\$27,386,806	\$470,658,124	\$0	\$23,315,793	4.0%	\$57,474,627	9.9%	\$0
New Paltz Village	\$238,672,524	\$29,347,046	\$208,222,754	\$0	\$0	0.0%	\$1,103,682	0.5%	\$0
Olive	\$719,961,895	\$47,685,070	\$289,597,400	\$0	\$40,215,180	10.7%	\$0	0.0%	\$0
Plattekill	\$556,675,301	\$26,463,439	\$489,154,185	\$0	\$38,629,255	6.9%	\$2,430,651	0.4%	\$0
Rochester	\$564,685,441	\$84,941,061	\$320,192,049	\$28,888,450	\$14,236,612	2.5%	\$116,429,519	20.6%	\$0
Rosendale	\$469,479,238	\$103,321,783	\$71,800,505	\$219,308,097	\$3,127,086	0.7%	\$71,923,639	15.3%	\$0
Saugerties	\$1,217,383,571	\$147,886,263	\$428,770,765	\$130,853,020	\$74,490,284	6.1%	\$389,504,712	32.0%	\$45,883,372
Saugerties Village	\$275,716,843	\$0	\$81,389,434	\$0	\$0	0.0%	\$182,303,144	66.1%	\$12,025,355
Shandaken	\$402,760,909	\$70,477,555	\$145,679,218	\$0	\$94,424,014	23.4%	\$92,181,732	22.9%	\$0
Shawangunk	\$1,093,099,620	\$1,120,004	\$912,713,739	\$0	\$95,516,015	8.7%	\$81,698,564	7.5%	\$2,055,675
Ulster	\$1,189,900,886	\$380,954,507	\$214,305,005	\$8,973,079	\$269,702,893	22.7%	\$299,777,782	25.2%	\$16,192,383
Wawarsing	\$391,482,171	\$59,097,376	\$229,733,084	\$24,038,668	\$6,534,312	1.7%	\$70,943,141	18.1%	\$317,144
Woodstock	\$1,250,466,647	\$202,541,226	\$845,257,210	\$75,097,579	\$127,575,624	10.2%	\$0	0.0%	\$0
<i>County Total</i>	<i>\$15,384,466,039</i>	<i>\$2,479,448,206</i>	<i>\$8,195,314,983</i>	<i>\$1,230,294,827</i>	<i>\$1,227,434,270</i>	<i>9.0%</i>	<i>\$215,556</i>	<i>0.4%</i>	<i>\$231,728,566</i>

### Previous Occurrences - Earthquakes

As noted in the New York State Mitigation Plan, although the probability of damaging earthquakes in New York State is low, earthquakes do occur on a regular basis in New York. Figure 3a.21 illustrates the location of significant (magnitude 5.0 or greater) earthquake epicenters in New York, as obtained from the New York State Hazard Mitigation Plan, for earthquakes that occurred between 1737 and May 1986. Table 3a.29 presents details for earthquakes recorded in New York State since 1737 that were recorded in the NYS statistical yearbook. The only recorded event which specifically mentions Ulster County was the February 1855 incident, which is listed as a cryoseismic event. Cryoseisms (also known as öfrost quakesö) are generally caused by a sudden cracking action in frozen soil or rock saturated with water or ice. As water seeps down into the rock, it freezes and expands, putting stress on surrounding rock. This builds up until it is relieved explosively in a cryoseism.



**Figure 3a.21:** Significant Earthquake Epicenters in New York State (1737-1986)

SECTION 3a - RISK ASSESSMENT: HAZARD PROFILES

**Table 3a.29**  
**Earthquake History Throughout New York State (1737 – 2005)**  
*Source: NYSEMO / NYS Statistical Yearbook 2006*

Date	Location	Size	Damage Description
December 18, 1737	New York City	5.2	Bells rang, several chimneys fell
January 16, 1840	Herkimer	3.7	No reference and/or No damage reported
September 2, 1847	Offshore NYC	3.5	No reference and/or No damage reported
September 9, 1848	Rockland Lake	V	Felt by many
March 12, 1853	Lowville	VI	Machinery knocked over
<b>February 7, 1855</b>	<b>Saugerties</b>	<b>VI</b>	<b>Cryoseism</b>
October 23, 1857	Buffalo (Lockport)	4.0	Bells rang, crocks fell from shelves
December 18, 1867	Canton	4.7	Sleepers awakened
December 11, 1874	Tarrytown	3.4	No reference and/or No damage reported
November 4, 1877	Lyon Mountain <sup>1</sup>	VII	Chimneys down, walls cracked, window damaged, crocks overturned
August 10, 1884	New York Bight (NYC)	5.2	Chimneys and bricks fell, walls cracked
May 28, 1897	Dannemora	4.5	No reference and/or No damage reported
February 3, 1916	Schenectady	3.8	Broke windows, people thrown out of bed
March 18, 1928	Saranac Lake	4.0	No reference and/or No damage reported
August 12, 1929	Attica	5.2	250 chimneys fell, brick buildings damaged, Attica prison walls, wells went dry
April 20, 1931	Warrensburg	4.8	Chimneys fell, church spire twisted
April 15, 1934	Dannemora	3.9	House shifted
July 9, 1937	Brooklyn	3.5	No reference and/or No damage reported
September 5, 1944	Corwall, Ontario/Massena, NY	5.8	Nearly all chimneys fell, buildings damaged, \$2 million damage
September 5, 1944	Corwall, Ontario/Massena, NY	4.5	Chimneys destroyed, houses damaged
September 3, 1951	Rockland County	3.6	No reference and/or No damage reported
January 1, 1966	Attica	4.7	Chimneys and walls damaged
June 13, 1967	Attica	3.9	Chimneys and walls damaged
May 23, 1971	Blue Mountain Lake	4.1	No reference and/or No damage reported
May 23, 1971	Blue Mountain Lake	3.5	No reference and/or No damage reported
June 7, 1974	Wappingers Falls	3.0	Windows broken
June 9, 1975	Plattsburgh (Altona)	3.5	Chimneys and fireplaces cracked
November 3, 1975	Raquette Lake	4.0	No reference and/or No damage reported
February 2, 1983	Scarsdale-Lagrangeville	3.0	Chimneys cracked

**Table 3a.29**  
**Earthquake History Throughout New York State (1737 – 2005)**  
*Source: NYSEMO / NYS Statistical Yearbook 2006*

Date	Location	Size	Damage Description
October 7, 1983	Goodnow, Adirondack Mountains	5.1	Tombstones rotated, some cracked chimneys, windows broken, walls damaged
October 19, 1985	Ardsey	4.0	Windows broken, walls damaged
June 17, 1991	Richmondville	4.0	No reference and/or No damage reported
March 10, 1992	East Hampton, Suffolk County	4.1	No reference and/or No damage reported <sup>2</sup>
April 20, 2000	Newcomb	3.8	Aftershock of the 1983 event. No damage reported
April 20, 2002	Au Sable Forks	5.1	Cracked walls, chimneys fell, road collapsed, power outages
May 24, 2002	Au Sable Forks	3.1	Aftershock of the April 20, 2002 event, no damage reported

### Probability of Occurrence – Earthquakes

Earthquakes cannot be predicted. They strike without warning, at any time of the year, and at any time of the day or night. Earthquake hazard maps (sometimes referred to as  $\delta$ PGA maps) are used as a tool to project the likelihood of a various intensity quake being exceeded at a certain location over a given period of time. They depict the Peak Ground Acceleration (PGA), expressed as a percentage of the force of gravity that can be expected to be exceeded at a given location for a particular probability of exceedance over a specific time frame. Figure 3a.15 is an example of an earthquake hazard map as prepared by the USGS Earthquake Hazards Program. It shows PGA values that have a 10 percent chance of being exceeded over 50 years.

As Figure 3a.AA shows, the earthquake hazard is relatively low but shows some degree of variation across the county, with higher hazard areas being in the southeastern half of the county and lower hazard areas being in the southwestern half of the county. Figure 3a.15 shows that, for Ulster County, PGA values of between 3%g and 4%g have a 10 percent chance of being exceeded over 50 years.

As stated above, according to the currently available earthquake hazard mapping of New York State, there is a 10 percent chance over 50 years that an earthquake with a PGA of greater than 3%g to 4%g will be centered within Ulster County and/or its participating jurisdictions. This earthquake, if it did occur, would likely have associated with it light to moderate perceived shaking and little to no damage.

## Landslides

### Description - Landslides

According to the USGS National Landslide Information Center (NLIC), the term "landslide" is defined as the movement of a mass of rock, debris, or earth down a slope. The force of gravity acting upon a steep (or sometimes, even a moderately steep) slope is the primary cause of a landslide. Slope failure occurs when the force of gravity pulling the slope downward exceeds the strength of the earth materials that comprise the slope to hold it in place. In addition to the force of gravity, other contributing factors to landslides can include rainfall and/or rapid snowmelt, earthquakes, volcanic activity, changes in groundwater, and human-induced modifications to existing slopes.

The potential for a landslide to occur exists in every state in the country wherever very weak or fractured materials are resting on a moderate to steep slope (typically, a slope steep enough to make walking difficult). However, not all moderate to steep slopes are prone to landslides. As slope stability increases, the susceptibility to landslides decreases. Key factors in slope stability are:

- **Soil Type.** Certain types of soil are more stable on slopes than others. For example, as noted in the New York State Hazard Mitigation Plan, glacial till is one type of soil that tends to stand up well to the landslide tendency while glacial lake clay soils tend to have a higher risk for landslides.
- **Terrain.** The degree of the slope and the height from top of the slope to its toe also affect slope stability. The New York State Hazard Mitigation Plan indicates that the steeper the slope the higher the risk for landslides to occur (all other things being equal). They note that minor landslides called "slumps" can occur with very minor slopes, and that landslides are most likely on slopes greater than or equal to 10 degrees. In terms of the height of the slope, the State Plan notes that relief greater than 40 feet is generally accepted to be the threshold where the potential becomes more significant.
- **Vegetative Cover.** Slopes with little or no vegetative cover are more prone to landslides than other more vegetated slopes.
- **Soil Water Content.** As soil water content increases, slope stability decreases. Periods of sustained above-average precipitation, short duration rainfall events with significant precipitation, and snowmelt events can all add to soil water content and increase susceptibility to landslides.

Landslides can be triggered by natural events or by humans. Natural events include erosion, decreases in vegetative cover to do natural causes and/or seasonal changes, and ground shaking from earthquakes. Human caused triggers include altering the slope gradient, increasing the soil water content, and removal of vegetative cover.

### Location and Extent - Landslides

Areas that are commonly considered to be safe from landslides include areas that have not experienced landslides in the past, areas of minimal slope, and areas set back from the tops of slopes. Conversely, areas that are commonly considered to be more prone to landslides tend to be areas where a landslide has occurred in the past, bases of steep slopes or drainage channels, and developed hillsides where leach field septic systems are used.

The potential for landslides exists across the whole of New York State, although according to USGS and NYGS the vast majority of the state (80%) has a low susceptibility to landslide hazard. Landslide hazard mapping has been completed for New York State. In general the highest potential for landslides can be found along major river and lake valleys that were formerly occupied by glacial lakes resulting in glacial lake deposits (glacial lake clays) and usually associated with steeper slopes, such as the Hudson River valley. USGS landslide susceptibility mapping uses three basic classifications to communicate the risk, in conjunction with three further classifications to communicate the combinations of susceptibility and incidence:

- High incidence (Greater than 15 % of the area involved)
- Moderate incidence (1.5% - 15% of the area involved)
- Low incidence (Less than 1.5% of the area involved)
- High susceptibility/moderate incidence
- High susceptibility/low incidence
- Moderate susceptibility/low incidence

The USGS provides the following supporting narrative for the landslide hazard classifications:

*“Susceptibility not indicated where same or lower than incidence. Susceptibility to land sliding was defined as the probably degree of response of [the areal] rocks and soils to natural or artificial cutting or loading of slopes, or to anomalously high precipitation. High, moderate, and low susceptibility are delimited by the same percentages used in classifying the incidence of land sliding. Some generalization was necessary at this scale, and several small areas of high incidence and susceptibility were slightly exaggerated.”*

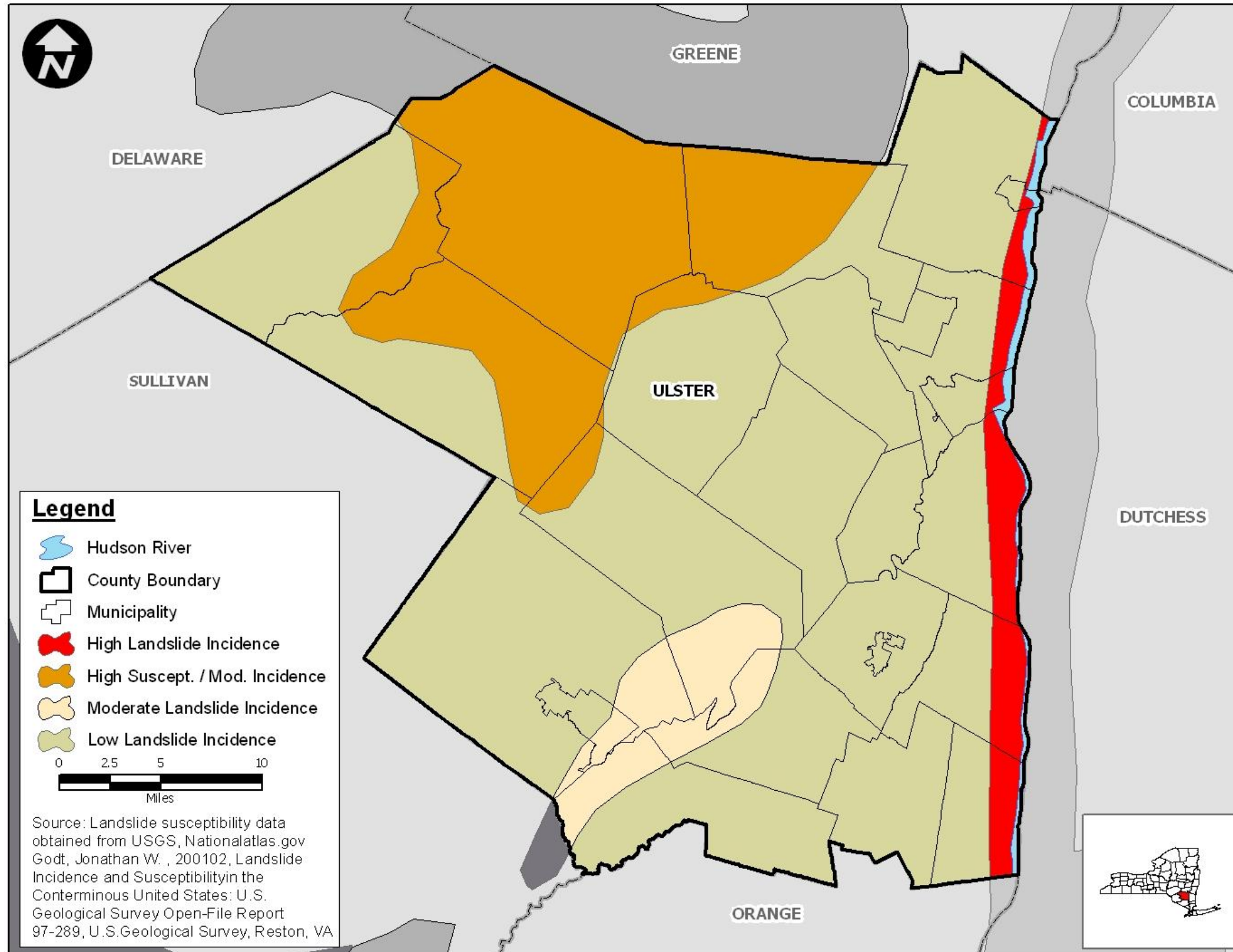
USGS landslide susceptibility mapping for Ulster County is presented in Figure 3a.20, which shows that the areas with the highest susceptibility to landslides are located in a narrow band adjacent to the Hudson River (high susceptibility), and in the northern part of the County (high susceptibility/low incidence). Of the six categories of incidence and susceptibility listed above, only four have been identified in Ulster County.

The severity of a landslide depends in large part on the degree of development in the area in which it occurs and the geographic area of slide itself. Generally speaking, landslides often result in devastating consequences, but in very localized areas. A landslide occurring in an undeveloped area would be less severe because lives and property would not be affected; the only impacts would be to land, vegetation, and possibly some wildlife. On the contrary, a landslide occurring in a developed area could have devastating affects, ranging from structure and infrastructure damage to injury and/or loss of life. Structures or infrastructure built on susceptible land would likely collapse as their footings slide downhill, while those below the land failure would likely be crushed. Landslides in the area of roadways could have the potential to fall and damage or destroy vehicles, and force other drivers to have accidents.

The GIS data used to generate Figure 3a.22 was used to estimate the extent of land areas vulnerable to landslides and the value of improved property within those areas in each municipality, as presented in Tables 3a.30 and 3a.31.



Figure 3a.22: Landslide Susceptibility in Ulster County



<b>Table 3a.30 Areas of Landslide Susceptibility by Municipality</b>									
<b>Municipality</b>	<b>Total Acres</b>	<b>High Susceptibility</b>		<b>High Susceptibility – Moderate Incidence</b>		<b>Moderate Susceptibility</b>		<b>Low Susceptibility</b>	
		<b>Acres</b>	<b>%</b>	<b>Acres</b>	<b>%</b>	<b>Acres</b>	<b>%</b>	<b>Acres</b>	<b>%</b>
Denning	64,658	0	0.0%	36,584	56.6%	0	0.0%	28,075	43.4%
Ellenville Village	5,350	0	0.0%	0	0.0%	2,047	38.3%	3,303	61.7%
Esopus	23,524	7,246	30.8%	0	0.0%	0	0.0%	16,278	69.2%
Gardiner	27,495	0	0.0%	0	0.0%	6,865	25.0%	20,630	75.0%
Hardenburgh	51,004	0	0.0%	10,412	20.4%	0	0.0%	40,592	79.6%
Hurley	21,993	0	0.0%	0	0.0%	0	0.0%	21,993	100.0%
Kingston City	4,681	0	0.0%	0	0.0%	0	0.0%	4,681	100.0%
Kingston Town	4,285	887	20.7%	0	0.0%	0	0.0%	3,397	79.3%
Lloyd	19,694	6,215	31.6%	0	0.0%	0	0.0%	13,479	68.4%
Marbletown	34,814	0	0.0%	0	0.0%	0	0.0%	34,814	100.0%
Marlborough	15,472	4,695	30.3%	0	0.0%	0	0.0%	10,777	69.7%
New Paltz	19,741	0	0.0%	0	0.0%	0	0.0%	19,741	100.0%
New Paltz Village	1,002	0	0.0%	0	0.0%	0	0.0%	1,002	100.0%
Olive	41,492	0	0.0%	3,903	9.4%	0	0.0%	37,590	90.6%
Plattekill	22,039	0	0.0%	0	0.0%	0	0.0%	22,039	100.0%
Rochester	56,085	0	0.0%	4,429	7.9%	11,625	20.7%	40,032	71.4%
Rosendale	11,972	0	0.0%	0	0.0%	0	0.0%	11,972	100.0%
Saugerties	38,731	2,801	7.2%	0	0.0%	0	0.0%	35,930	92.8%
Saugerties Village	1,050	311	29.7%	0	0.0%	0	0.0%	739	70.3%
Shandaken	78,924	0	0.0%	78,700	99.7%	0	0.0%	225	0.3%
Shawangunk	35,306	0	0.0%	0	0.0%	7,263	20.6%	28,044	79.4%
Ulster	16,159	2,667	16.5%	0	0.0%	0	0.0%	13,493	83.5%
Wawarsing	79,654	0	0.0%	221	0.3%	8,321	10.4%	71,111	89.3%
Woodstock	42,809	0	0.0%	29,164	68.1%	0	0.0%	13,646	31.9%
<b>County Totals</b>	<b>717,936</b>	<b>24,823</b>	<b>3.5%</b>	<b>163,411</b>	<b>22.8%</b>	<b>36,122</b>	<b>5.0%</b>	<b>493,581</b>	<b>68.7%</b>

\*Note: no areas of High susceptibility/low incidence or Moderate susceptibility/low incidence have been identified in Ulster County.

In terms of the land area covered by high landslide susceptibility zones, Table 3a.LS1 shows clearly that the municipalities most at risk from landslides are the Towns of Lloyd, Marlborough and Esopus, and the Village of Saugerties. The Town of Shandaken lies almost entirely within an area of high landslide susceptibility but moderate incidence.

The GIS analysis indicates that the Towns of Lloyd, Esopus and Marlborough are most vulnerable to losses and damage resulting from landslides, since in all three cases more than 50% of the Towns' improved property values lie within the high landslide susceptibility area adjacent to the Hudson River.

**Table 3a.31**  
**Improved Property Values in Landslide Susceptibility Areas by Municipality**

Municipality	Total Improved Value	High Susceptibility		High Susceptibility – Moderate Incidence		Moderate Susceptibility		Low Susceptibility	
		Value	%	Value	%	Value	%	Value	%
Denning	\$51,126,978	\$0	0.0%	\$19,789,690	38.7%	\$0	0.0%	\$31,337,287	61.3%
Ellenville Village	\$47,291,413	\$0	0.0%	\$0	0.0%	\$0	0.0%	\$47,291,413	100.0%
Esopus	\$823,898,937	\$472,141,638	57.3%	\$0	0.0%	\$0	0.0%	\$351,757,298	42.7%
Gardiner	\$612,092,899	\$0	0.0%	\$0	0.0%	\$38,152,748	6.2%	\$573,940,150	93.8%
Hardenburgh	\$50,791,094	\$0	0.0%	\$2,226,571	4.4%	\$0	0.0%	\$48,564,522	95.6%
Hurley	\$639,336,069	\$0	0.0%	\$0	0.0%	\$0	0.0%	\$639,336,069	100.0%
Kingston City	\$1,922,939,212	\$152,605,735	7.9%	\$0	0.0%	\$0	0.0%	\$1,770,333,477	92.1%
Kingston Town	\$57,541,463	\$0	0.0%	\$0	0.0%	\$0	0.0%	\$57,541,463	100.0%
Lloyd	\$856,612,633	\$553,045,623	64.6%	\$0	0.0%	\$0	0.0%	\$303,567,010	35.4%
Marbletown	\$993,766,725	\$0	0.0%	\$0	0.0%	\$0	0.0%	\$993,766,725	100.0%
Marlborough	\$722,416,282	\$378,987,157	52.5%	\$0	0.0%	\$0	0.0%	\$343,429,125	47.5%
New Paltz	\$578,833,042	\$0	0.0%	\$0	0.0%	\$0	0.0%	\$578,833,042	100.0%
New Paltz Village	\$238,672,524	\$0	0.0%	\$0	0.0%	\$0	0.0%	\$238,672,524	100.0%
Olive	\$377,496,142	\$0	0.0%	\$45,711,794	12.1%	\$0	0.0%	\$331,784,347	87.9%
Plattekill	\$556,675,301	\$0	0.0%	\$0	0.0%	\$0	0.0%	\$556,675,301	100.0%
Rochester	\$564,685,441	\$0	0.0%	\$2,361,565	0.4%	\$63,170,533	11.2%	\$499,153,343	88.4%
Rosendale	\$469,479,238	\$0	0.0%	\$0	0.0%	\$0	0.0%	\$469,479,238	100.0%
Saugerties	\$1,217,383,571	\$213,776,905	17.6%	\$0	0.0%	\$0	0.0%	\$1,003,606,665	82.4%
Saugerties Village	\$275,716,843	\$56,918,457	20.6%	\$0	0.0%	\$0	0.0%	\$218,798,386	79.4%
Shandaken	\$402,760,909	\$0	0.0%	\$402,544,791	99.9%	\$0	0.0%	\$216,118	0.1%
Shawangunk	\$1,093,099,620	\$0	0.0%	\$0	0.0%	\$138,115,217	12.6%	\$954,984,403	87.4%
Ulster	\$1,189,900,886	\$82,893,085	7.0%	\$0	0.0%	\$0	0.0%	\$1,107,007,800	93.0%
Wawarsing	\$391,482,171	\$0	0.0%	\$291,430	0.1%	\$9,522,897	2.4%	\$381,667,845	97.5%
Woodstock	\$1,250,466,647	\$0	0.0%	\$542,230,648	43.4%		0.0%	\$708,235,999	56.6%
<b>County Totals</b>	<b>\$15,384,466,039</b>	<b>\$1,910,368,602</b>	<b>12.4%</b>	<b>\$1,015,156,490</b>	<b>6.6%</b>	<b>\$248,961,394</b>	<b>1.6%</b>	<b>\$12,209,979,553</b>	<b>79.4%</b>

### **Previous Occurrences - Landslides**

The New York State Geological Survey records a total of 329 significant landslide events that have occurred in New York State between 1837 and 2007. Only one of these events is recorded as having occurred in Ulster County: On December 16 1921 two workers were killed when a wall in a clay bank failed in the village of Glasco, within the Town of Saugerties. In addition to the NYGS information, local sources report a number of flood-related landslide incidents in the Town of Lloyd involving embankment failures adjacent to roads and streams between 2001 and 2007.

### **Probability of Occurrence – Landslides**

While it is certainly possible for landslides to occur within Ulster County, available data regarding historic occurrences does not permit any estimation of the frequency of future occurrences. While the overall probability of future occurrence is assumed to be low for most of the County, there are significant portions (including developed areas) of the Towns of Saugerties, Ulster, Esopus, Lloyd and Marlborough, the Village of Saugerties, and the City of Kingston located within high landslide risk areas.

## Wildfires

### Description – Wildfires

A wildfire is an uncontrolled fire burning in an area of vegetative fuels such as grasslands, brush, or woodlands. Wildfires can occur in areas essentially void of development, or in areas where development intermingles with these natural areas (known as the urban-wildland interface). Many wildfires occur in locations that abound in dense forests, grasslands and shrubs. Heavier fuels with high continuity, steep slopes, high temperatures, low humidity, low rainfall, and high winds all work to increase risk.

Wildfires can occur at any time of the year, but will usually occur during warmer and dryer months. Wildfires are most commonly caused by people (i.e., arson, debris burns, and carelessness). Lightning is the next most common cause of wildfires. As reported by the Wildland Fire Assessment System (WFAS) wildfires resulting from a lightning strike largely depend on the duration of the current and the kind of fuel the lightning hits. Spread of the wildfire after ignition usually depends primarily on fuel moisture.

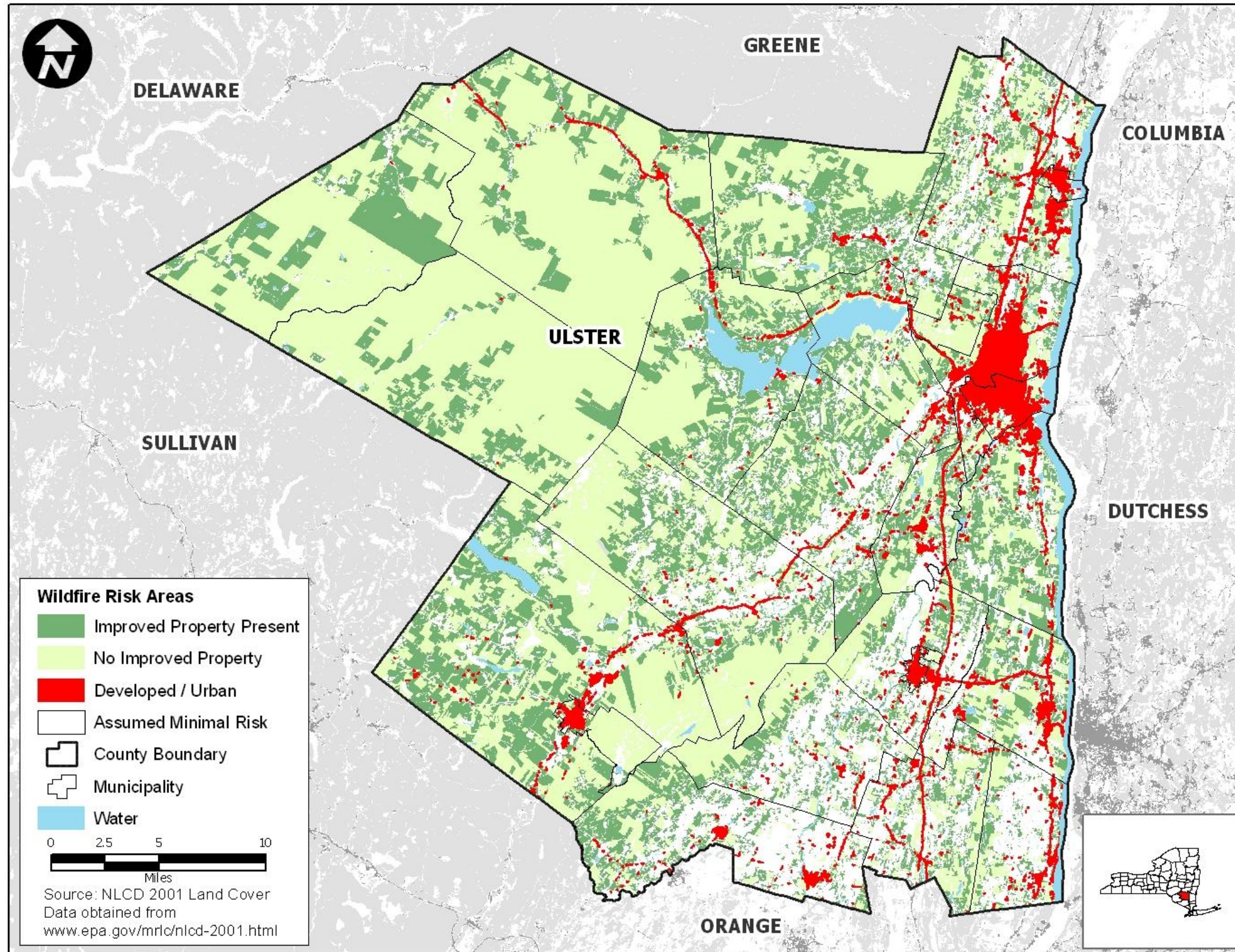
### Location and Extent – Wildfires

Areas that are typically considered to be safe from wildfires include highly urbanized, developed areas that are not contiguous with vast areas of wild lands. Areas typically considered to be prone to wildfires include large tracts of wild lands containing heavier fuels with high continuity, at steeper slopes.

Wildfires are a significant hazard in Ulster County, particularly in the forested areas in the south and west of the County, where past wildfires have destroyed thousands of acres of forest with property loss running into the thousands of dollars. Many of the areas at risk from wildfires are also popular with hikers and campers. Several major transportation routes such as the New York State Thruway and Routes 44 and 28, leaving them vulnerable to closure during forest fire due to smoke conditions. Areas in Ulster County where the magnitude and severity of the hazard are the greatest tend to exhibit the lowest population densities in the County; as a result, exposure of people living and working in the highest hazard areas is often relatively low.

Figure 3a.23 shows the areas of Ulster County that are considered to be at risk from wildfire colored green and urban/developed areas colored red. At-risk areas include deciduous, evergreen, and mixed forest, shrub land, and grassland. It should be noted that the vast majority of the wildfire risk areas consist of deciduous woodland (approximately 50% of the County land area and 70% of the wildfire risk area) while shrub and grassland areas are not present in significant quantities (together they make up less than 1% of the wildfire risk area). Cultivated agricultural land and pastureland are not considered to be at significant risk from wildfire for the purposes of this plan and its component risk assessment.

Figure 3a.23: Wildfire Risk Areas in Ulster County



The wildfire risk areas in Figure 3a.23 have been color-coded as follows:

- Dark green: those areas in which the component parcels include some improved value; i.e. structures present.
- Light green: those areas for which no improved value and hence no structures are associated with the component parcels.

This allows a general determination to be made regarding those areas at risk from wildfire in which there is a higher likelihood that such fires could also pose a threat to lives and structures, in addition to developed areas (colored red) which have a direct interface with the wildfire risk areas.

The wildfire risk for the individual municipalities within Ulster County has been quantified by measuring the length of the urban-wildland interface and the total value of improved property located in hazard areas within the county, and these estimations are presented in Table 3a.32. The urban-wildland interface measurements were estimated incorporating a 200 ft buffer extending from the urban/developed areas into the wildfire risk areas, to account for the likelihood that structures in the urban area are at risk of combustion before a wildfire reaches the exact interface.

It should be noted that almost three quarters of the County lies within in a wildfire hazard zone. Although the Towns of Denning, Shandaken, and Hardenburgh are almost entirely inside wildfire hazard zones, the Towns of Saugerties, Ulster, Lloyd and Wawarsing have the greatest actual lengths of urban-wildland interface. The Towns of Denning, Hardenburgh and Woodstock have the highest percentages of total improved property within the hazard zone. The town of Woodstock has the greatest dollar value of improved property within wildfire hazard zones, followed at some distance by the Towns of Shandaken, Marbletown and Olive.

### **Previous Occurrences – Wildfires**

On April 17, 2008 a fire began off Route 44/55 in the town of Rochester on lands managed by NYS Parks & Recreation. Before the fire was officially declared out on April 26 it had consumed 3,100 acres of land in both Rochester and Wawarsing. To extinguish this fire it took the combined resources of the NYS Department of Environmental Conservation, NYS Emergency Management Office, NYS Office of Fire Prevention & Control, NYS Parks & Recreation, NYS Division of Military & Naval Affairs, New York State Police, fire departments from Ulster, Sullivan, Orange, Dutchess, Putnam and Westchester counties and other entities too numerous to mention. In addition to ground crews, helicopters and bulldozers were instrumental in building the fireline and extinguishing the full canopy fire. An urban area interface in a portion of Wawarsing required extensive resources to protect. Homes were protected by literally placing a fire truck in every driveway. Ultimately there was only one serious injury to a first responder, and no homes were damaged. New York State officials consider it to be the largest forest fire in the State since 1995.

A fire in the Cherrytown area outside of the Town of Rochester in Ulster County which started on April 30, 2006 destroyed more than 900 acres of forest in the Catskill Park. The New York State Plan described it as the largest wildfire in the state since 2002.

**Table 3a.32**  
**Wildfire Risk in Ulster County**

<b>Municipality</b>	<b>Urban-Wildland Interface (feet)</b>	<b>Wildfire Risk Area – No Improved Property (Acres)</b>	<b>Wildfire Risk Area – With Improved Property (Acres)</b>	<b>Total Municipal Area (Acres)</b>	<b>Total Area Within Wildfire Risk Zones %</b>	<b>Total Value of Improvements in Municipal Areas</b>	<b>Improved Value Within Wildfire Risk Zones</b>	<b>Improved Value Within Wildfire Risk Zones %</b>
Denning	4,800	53,207	10,192	64,652	98.1%	\$51,126,978	\$15,621,285	30.6%
Ellenville Village	43,000	3,561	387	5,351	73.8%	\$47,291,413	\$940,676	2.0%
Esopus	311,300	6,941	8,555	23,521	65.9%	\$823,898,937	\$40,207,994	4.9%
Gardiner	135,400	8,115	6,173	27,493	52.0%	\$612,092,899	\$23,288,223	3.8%
Hardenburgh	2,900	33,998	15,090	51,002	96.2%	\$50,791,094	\$10,775,824	21.2%
Hurley	265,700	7,041	5,458	21,985	56.9%	\$639,336,069	\$51,246,762	8.0%
Kingston City	72,800	484	200	4,284	16.0%	\$1,922,939,212	\$980,551	0.1%
Kingston Town	132,400	2,791	836	4,681	77.5%	\$57,541,463	\$4,803,190	8.3%
Lloyd	344,800	5,587	5,040	19,690	54.0%	\$856,612,633	\$25,348,546	3.0%
Marbletown	193,500	7,897	14,249	34,754	63.7%	\$993,766,725	\$68,381,675	6.9%
Marlborough	254,000	2,881	2,430	15,406	34.5%	\$722,416,282	\$7,663,749	1.1%
New Paltz	304,200	4,735	3,992	19,743	44.2%	\$578,833,042	\$15,753,363	2.7%
New Paltz Village	35,500	223	25	1,002	24.8%	\$238,672,524	\$203,340	0.1%
Olive	134,200	18,033	13,861	41,470	76.9%	\$377,496,142	\$65,328,453	17.3%
Plattekill	316,700	5,270	5,040	22,026	46.8%	\$556,675,301	\$20,677,391	3.7%
Rochester	237,200	27,115	13,889	56,085	73.1%	\$564,685,441	\$58,385,721	10.3%
Rosendale	259,000	3,800	3,684	11,972	62.5%	\$469,479,238	\$21,461,671	4.6%
Saugerties	563,300	11,625	9,972	38,716	55.8%	\$1,217,383,571	\$52,189,460	4.3%
Saugerties Village	46,200	132	102	1,040	22.5%	\$275,716,843	\$162,529	0.1%
Shandaken	241,000	62,782	13,233	78,947	96.3%	\$402,760,909	\$69,293,686	17.2%
Shawangunk	279,800	6,530	9,623	35,311	45.7%	\$1,093,099,620	\$42,732,568	3.9%
Ulster	401,900	4,354	2,660	16,165	43.4%	\$1,189,900,886	\$24,157,633	2.0%
Wawarsing	344,300	39,233	26,305	79,186	82.8%	\$391,482,171	\$39,685,869	10.1%
Woodstock	91,800	21,515	15,426	43,095	85.7%	\$1,250,466,647	\$250,585,937	20.0%
<b>County Totals</b>	<b>5,015,700</b>	<b>337,852</b>	<b>186,423</b>	<b>717,577</b>	<b>73.1%</b>	<b>\$15,384,466,039</b>	<b>\$909,876,094</b>	<b>5.9%</b>



Local sources also report that the area over and around Illinois Mountain in the Town of Lloyd is subject to periodic brush and forest fires. The New York State Plan records an additional 12 significant wildfire events in the state since 1903, notably in the Adirondacks Mountains.

### **Probability of Occurrence - Wildfires**

Wildfire events will remain a frequent occurrence in Ulster County, and the probability of future occurrences in the County is certain. The likelihood of increased future development (particularly residential) can only result in an increase in the length of the urban-wildland interface, an increase in the improved value of property within wildfire hazard zones, and a greater risk of property damage and danger to the public in future years. However, most wildfire events in the County are typically contained and extinguished rather quickly and those events causing major property damage or life/safety threats are much less likely to occur.

#### ***A Distinction Between “Hazards” and “Events”***

*This section of the plan speaks to hurricanes and tropical storms, tornadoes, and winter storms/ice storms. These are severe weather events (not hazards themselves). Severe weather events have specific hazards associated with them. The unique hazards associated with the severe weather events discussed in this section are addressed specifically elsewhere in the plan; they are summarized briefly here. While HAZARDS are fully identified and profiled, with vulnerability assessments completed, EVENTS are merely summarized here for information only. EVENTS are not fully profiled and a vulnerability assessment has not been completed. The reader is, however, directed to the HAZARDS associated with these EVENTS (for profile/vulnerability assessment/etc.).*

**SECTION 3b - RISK ASSESSMENT: IDENTIFICATION AND CHARACTERIZATION OF ASSETS****Overview**

An inventory of geo-referenced assets in Ulster County has been created in order to identify and characterize property and persons potentially at risk from the identified hazards. Understanding the type and number of hazards that exist in relation to known hazard areas is an important step in the process of formulating the risk assessment and quantifying the vulnerability of the municipalities that make up Ulster County. For this plan, six key categories of assets have been mapped and analyzed using GIS data provided by Ulster County, with some additional data drawn from other public sources:

1. Improved property: This category includes all developed properties according to parcel data provided by Ulster County Department of Information Services. Impacts to improved properties are presented as a percentage of each community's total assessed value of improvements that may be exposed to the identified hazards.
2. Emergency facilities: This category covers all facilities dedicated to the management and response of emergency or disaster situations, and includes emergency operations centers (EOCs), fire stations, police stations, ambulance stations, and hospitals. Impacts to these assets are presented by tabulating the number of each type of facility present in areas that may be exposed to the identified hazards.
3. Critical infrastructure and utilities: This category covers facilities and structures vital to the maintenance of basic living conditions in the county, and includes power generating stations, potable water treatment plants, wastewater treatment plants, significant public works buildings, airports, and ferry ports. Impacts to these assets are presented by tabulating the number of each type of facility present in areas that may be exposed to the identified hazards.
4. Other key facilities: This category covers facilities which may be capable of providing refuge and limited medical care and hence may be utilized as emergency shelters, and those which routinely house more vulnerable sectors of the county population, making them potentially especially vulnerable to identified hazards. Included in this category are schools and senior care facilities and impacts to these assets are presented by tabulating the number of each type of facility present in areas that may be exposed to the identified hazards.
5. Historic and cultural resources: This category includes those historic structures, landmarks and sites that are included in the New York State or National Register of Historic Places. Impacts to these assets are presented by tabulating the number of each type of facility present in areas exposed to each identified hazard. Any other structure, landmark or asset identified during the course of general research for this section that has been judged to be potentially of local historical or cultural significance has also been included in this category.
6. Population: This category covers the number of people residing in Ulster County as measured by the 2000 U.S. Census. Impacts to population are presented as a percentage of each municipality's total population exposed to the identified hazards, with the exposed population collated by census block.

*There are no unincorporated areas within Ulster County; the 24 municipalities covered by this plan mentioned in this plan and all tables cover the entire county.*

### Improved Property

Improved property covers all development in the form of structures for residential, commercial, industrial, municipal, recreational, and utility uses. The total value of property improvements in the 24 Ulster County jurisdictions has been estimated at just over \$16.5 billion, based on assessed values updated to 2007 using state equalization rates supplied for each jurisdiction by Ulster County Department of Planning Services. Table 3b.1 summarizes the improved properties in each jurisdiction, in terms of total parcels, percentage of improved parcels, and the total value of improvements in each, based on GIS data provided by the Ulster County Department of Information Services.

<b>Jurisdiction</b>	<b>Total Number of Parcels</b>	<b>Number of Improved Parcels</b>	<b>Percentage of Improved Parcels</b>	<b>Total Value of Improvements*</b>
Denning, Town of	1,188	503	42.34%	\$51,126,978
Ellenville, Village of	1,527	1,287	84.28%	\$47,291,413
Esopus, Town of	4,328	3,153	72.85%	\$823,898,937
Gardiner, Town of	2,847	2,193	77.03%	\$612,092,899
Hardenburgh, Town of	775	336	43.35%	\$50,791,094
Hurley, Town of	3,551	2,831	79.72%	\$639,336,069
Kingston, City of	8,490	7,196	84.76%	\$1,922,939,212
Kingston, Town of	648	380	58.64%	\$57,541,463
Lloyd, Town of	4,204	3,359	79.90%	\$856,612,633
Marbletown, Town of	3,956	2,822	71.33%	\$993,766,725
Marlborough, Town of	3,698	2,854	77.18%	\$722,416,282
New Paltz, Town of	2,983	2,467	82.70%	\$578,833,042
New Paltz, Village of	939	808	86.05%	\$238,672,524
Olive, Town of	3,111	2,290	73.61%	\$377,496,142
Plattekill, Town of	3,465	2,617	75.53%	\$556,675,301
Rochester, Town of	4,799	3,068	63.93%	\$564,685,441
Rosendale, Town of	2,828	2,246	79.42%	\$469,479,238
Saugerties, Town of	7,976	5,868	73.57%	\$1,217,383,571
Saugerties, Village of	1,557	1,254	80.54%	\$275,716,843
Shandaken, Town of	3,575	2,262	63.27%	\$402,760,909
Shawangunk, Town of	4,553	3,759	82.56%	\$1,093,099,620
Ulster, Town of	5,374	4,214	78.41%	\$1,189,900,886
Wawarsing, Town of	4,801	3,220	67.07%	\$391,482,171
Woodstock, Town of	4,765	3,628	76.14%	\$1,250,466,647
<i>Ulster County Total</i>	<i>85,938</i>	<i>64,615</i>	<i>73.09%</i>	<i>\$15,384,466,039</i>

\*Not including public buildings and other tax-exempt structures, and reservoirs.

Detailed tables presenting the number of parcels wholly or partially within delineated hazard areas (and their associated improved property values) broken down by land use and development type are included in Appendix A.

### Emergency Facilities

Emergency facilities were included in the asset identification and characterization to determine jurisdictions with particularly high numbers of key facilities located in hazard areas, which may guide the focus of individual mitigation activities in the mitigation goals and strategy stage of the plan. Emergency facilities by jurisdiction are presented in Table 3b.2. According to County GIS records and databases embedded in HAZUS-MH, there are a total of 140 geo-referenced emergency facilities in Ulster County. The City of Kingston has more emergency facilities than any other jurisdiction (14), while the Towns of Esopus, Shandaken, and Ulster each contain nine such facilities. Of all the participating jurisdictions, only the Town of Hardenburgh does not contain any identified emergency facilities.

<b>Jurisdiction</b>	<b>Fire Stations</b>	<b>Police Stations</b>	<b>Ambulance Stations</b>	<b>Hospitals</b>
Denning, Town of	1	0	0	0
Ellenville, Village of	3	1	1	1
Esopus, Town of	7	1	1	0
Gardiner, Town of	2	0	1	0
Hardenburgh, Town of	0	0	0	0
Hurley, Town of	4	0	3	0
Kingston, City of	9	2	1	2
Kingston, Town of	1	0	0	0
Lloyd, Town of	2	2	1	0
Marbletown, Town of	6	0	1	0
Marlborough, Town of	2	1	1	0
New Paltz, Town of	1	0	1	0
New Paltz, Village of	1	2	0	0
Olive, Town of	5	1	2	0
Plattekill, Town of	4	1	2	0
Rochester, Town of	3	1	1	0
Rosendale, Town of	5	1	1	0
Saugerties, Town of	8	0	0	0
Saugerties, Village of	2	2	1	0
Shandaken, Town of	5	2	2	0
Shawangunk, Town of	3	2	2	0
Ulster, Town of	6	2	1	0
Wawarsing, Town of	5	1	0	1
Woodstock, Town of	4	1	1	0
<i>Total</i>	<i>89</i>	<i>23</i>	<i>24</i>	<i>4</i>

Note that some facilities in Table 3b.2 may be located in shared structures: for example, the ambulance station in the Town of Gardiner is located in one of the listed fire stations. While these facilities have been listed separately in Table 3b.2, subsequent tables/appendices presenting critical facilities in hazard areas consider shared structures as a single facility.

### Critical Infrastructure and Utilities

Critical infrastructure and utilities were included in the asset identification and characterization to determine jurisdictions with particularly high numbers of key facilities located in hazard areas, which may guide the focus of individual mitigation activities in the mitigation goals and strategy stage of the plan. Critical infrastructure and utilities by jurisdiction are presented in Table 3b.3. According to County GIS records, information from New York State Department of Environmental Conservation, and databases embedded in HAZUS-MH, there are a total of 151 identified critical infrastructure and utility facilities in Ulster County. According to the best readily available data, no power generating stations, ferry ports or passenger rail stations are located in Ulster County.

<b>Jurisdiction</b>	<b>Potable Water Treatment Facilities</b>	<b>Wastewater Treatment Facilities</b>	<b>Public Works Facilities</b>	<b>Airports</b>	<b>Waste Transfer Stations</b>
Denning, Town of	3	0	1	0	0
Ellenville, Village of	1	1	0	0	0
Esopus, Town of	7	0	0	0	0
Gardiner, Town of	5	1	0	0	0
Hardenburgh, Town of	0	0	0	0	0
Hurley, Town of	9	0	1	0	0
Kingston, City of	1	1	1	0	0
Kingston, Town of	1	0	1	0	0
Lloyd, Town of	6	2	1	0	0
Marbletown, Town of	2	0	0	0	0
Marlborough, Town of	1	2	0	0	0
New Paltz, Town of	4	1	1	0	1
New Paltz, Village of	0	1	0	0	0
Olive, Town of	2	0	1	0	0
Plattekill, Town of	11	0	1	0	0
Rochester, Town of	7	0	1	0	0
Rosendale, Town of	7	1	1	0	0
Saugerties, Town of	1	2	1	0	0
Saugerties, Village of	8	1	0	0	0
Shandaken, Town of	3	2	1	0	0
Shawangunk, Town of	3	2	1	1	0
Ulster, Town of	11	2	1	1	1
Wawarsing, Town of	12	2	1	1	0
Woodstock, Town of	3	2	0	0	0
<i>Total</i>	<i>108</i>	<i>23</i>	<i>15</i>	<i>3</i>	<i>2</i>

Potable water treatment facilities include any community water supply facility serving 15 or more properties and identified by the County as a treatment plant or as some other supply facility which incorporates at least one treatment process. Many of the facilities listed in the table serve small communities or groups of properties. For example, 28 are specifically identified as serving trailer/mobile home parks.

Public works facilities include buildings for the storage and maintenance of vehicles and other equipment used to respond to emergency situations, apart from police, fire and ambulance stations, such as municipal highway departments.

øAirportsö has been taken to mean substantial airfields with paved runways operating scheduled services or suitable for the operation of fixed-wing aircraft for the transporting of emergency response personnel and equipment.

The waste transfer stations listed in the table are the main facilities in Ulster County for the disposal of bulk (more than two cubic yards) solid waste by residents and commercial entities. In addition to these two principal facilities, there are 20 smaller municipal recycling centers in Ulster County.

**Other Key Facilities**

Other key facilities were included in the asset identification and characterization to determine jurisdictions with particularly high numbers of such facilities located in hazard areas, which may guide the focus of individual mitigation activities in the mitigation goals and strategy stage of the plan. Schools and senior care facilities by jurisdiction are presented in Table 3b.4.

Table 3b.4 Other Key Facilities by Jurisdiction		
Jurisdiction	Schools	Senior Care Facilities
Denning, Town of	0	0
Ellenville, Village of	1	0
Esopus, Town of	6	0
Gardiner, Town of	0	0
Hardenburgh, Town of	0	0
Hurley, Town of	2	0
Kingston, City of	15	3
Kingston, Town of	0	0
Lloyd, Town of	5	4
Marbletown, Town of	3	1
Marlborough, Town of	5	0
New Paltz, Town of	3	1
New Paltz, Village of	4	0
Olive, Town of	2	0
Plattekill, Town of	1	0
Rochester, Town of	4	0
Rosendale, Town of	3	4
Saugerties, Town of	6	0
Saugerties, Village of	3	0
Shandaken, Town of	1	0
Shawangunk, Town of	5	0
Ulster, Town of	6	2
Wawarsing, Town of	4	1
Woodstock, Town of	3	0
<i>Total</i>	82	16

According to County GIS records and databases embedded in HAZUS-MH, there are a total of 98 other such geo-referenced key facilities in Ulster County.

The exposure of identified emergency services, critical facilities, and infrastructure assets to hazards with discrete delineable impact areas is presented in Appendix B.

### **Historical and Cultural Resources**

Historical and cultural resources were included in the asset identification and characterization to determine jurisdictions with particularly high numbers of culturally or historically valuable assets located in hazard areas, which may influence the focus of individual mitigation activities in the mitigation goals and strategy stage of the plan. At the State and Federal levels, official listings of historic resources are established and maintained to foster the preservation of particular cultural resources. The State and National Registers of Historic Places are the official listings of buildings, structures, districts, objects, and sites significant in the history, architecture, archaeology, engineering, and culture of the State and the nation. Cultural and historic resources are defined as follows:

**Cultural Resources:** As defined by the National Park Service in its "Cultural Resources Management Guidelines," cultural resources are: *öThose tangible and intangible aspects of cultural systems, both living and dead, that are valued by or representative of a given culture or that contain information about a culture . . . and [they] include but are not limited to sites, structures, districts, objects and artifacts, and historic documents associated with or representative of peoples, cultures, and human activities and events, either in the present or in the past. Cultural resources also can include the primary written and verbal data for interpreting and understanding those tangible resources.ö*

**Historic Resources:** Historic resources are any cultural resource dating from the period between the onset of written records (which on Long Island is typically placed around the time of first European contact in the sixteenth century) and 50 years ago.

In the State of New York, the State Historic Preservation Office (SHPO) ó within the New York State Office of Parks, Recreation and Historic Preservation ó helps communities identify, evaluate, preserve, and revitalize their historic and cultural resources. New York SHPO maintains GIS databases of all historic and cultural assets listed on the State and National Registers. To identify the resources of this nature located in Ulster County, GIS files were downloaded from the New York SHPO website (<http://www.nysparks.state.ny.us/shpo/resources/index.htm>). This data includes only those cultural and historic properties and sites that are included in the New York State or National Registers of Historic Places, or that have been determined Eligible for inclusion through federal or state processes as administered by the New York SHPO. Inclusion in this data set does not preclude the existence of other historic properties or sites not within this category or as yet unidentified.

Historical and cultural assets located in Ulster County are presented in Table 3b.5. According to New York SHPO and National Register of Historic Places data there are more than 160 such assets

**SECTION 3b - RISK ASSESSMENT: IDENTIFICATION & CHARACTERIZATION**

registered in Ulster County. According to the available records, State and Federally listed historical assets are located in all of the 23 municipalities covered by this hazard mitigation plan. In addition to assets identified via the State and Federal registers of historic places, Table 3b.5 also includes other significant cultural and historical assets such as museums of local history, which have been identified via general internet research. The exposure of identified historical and cultural resources to hazards with discrete delineable impact areas is presented in Appendix C.

**Table 3b.5  
Historic and Cultural Resources by Jurisdiction**

<b>Jurisdiction</b>	<b>Asset Name/Description</b>	<b>Location</b>
Denning, Town of	Red Hill Fire Observation Tower	Red Hill
Ellenville	Hunt, George and John R., Memorial Building	2 Liberty St., corner of Liberty and Canal Streets
Esopus, Town of	Perrine's Bridge	Over Wallkill River, immediately east of I-87
Esopus, Town of	Klyne Esopus Reformed Dutch Church	764 US 9W
Esopus, Town of	Payne, Col. Oliver Hazard, Museum	US 9W
Esopus, Town of	Esopus Meadows Lighthouse	Spans Hudson River
Esopus, Town of	Poppletown Farmhouse	Jct. of Old Post Rd. and Swarte Kill Rd.
Esopus, Town of	Burroughs, John, Riverby Study	Between NY 9W and the Hudson River
Esopus, Town of	Burroughs, John, Cabin	W of West Park
Esopus, Town of	Holy Cross Monastery	US 9W, E side, West Park
Gardiner, Town of	Tuthilltown Gristmill	Albany Post Rd.
Gardiner, Town of	Trapps Mountain Hamlet Historic District	Trapps Road off NY 44/55
Gardiner, Town of	Jenkins-Du Bois Farm and Mill Site Historic district	Jenkinstown Road
Gardiner, Town of	LeFevre, Abraham and Maria, House	56 Forest Glen Road
Gardiner, Town of	Du Bois, Hendrikus, House	600 Albany Post Rd.
Gardiner, Town of	Guilford-Bower Farmhouse	Albany Post Road
Gardiner, Town of	Gardiner Schoolhouse	2340 US 44/NY 55
Gardiner, Town of	Locust Lawn Estate	NY 32, SE of Gardiner
Gardiner, Town of	Aldrich, Peter, Homestead	168 Decker Rd.
Gardiner, Town of	Bevier House	Bevier Rd.
Gardiner, Town of	Brykill	Bruynswick Rd.
Gardiner, Town of	Van Vleck House	Bruynswick Rd.
Gardiner, Town of	Decker, Johannes, Farm	SW of Gardiner on Red Mill Rd. and Shawangunk Kill
Hardenburgh, Town of	Beaverkill Valley Inn	Beaverkill Rd.
Hardenburgh, Town of	Balsam Lake Mountain Fire Observation Station	Balsam Lake Mountain
Hardenburgh, Town of	Grant Mills Covered Bridge	Mill Brook Road; North side; over Mill Brook
Hardenburgh, Town of	Coykendall, Samuel, Lodge	Alder Lake Road (CR 54)
Hurley, Town of	Maverick Concert Hall	Concert Road
Hurley, Town of	Hurley Historic District: Main St., Hurley Mountain Rd., and Schoonmaker Lane	Main St., Hurley Mountain Rd., and Schoonmaker Lane
Kingston, City of	Kingston-Port Ewen Suspension Bridge	U.S. 9W



**Table 3b.5  
Historic and Cultural Resources by Jurisdiction**

<b>Jurisdiction</b>	<b>Asset Name/Description</b>	<b>Location</b>
Kingston, Town of	Old Dutch Church Parsonage	109 Pearl Street
Kingston, City of	Second Reformed Dutch Church of Kingston	213-223 Fair Street
Kingston, City of	Kenyon House	104 Fair Street
Kingston, City of	Boice House	110 Fair Street
Kingston, City of	Burger-Matthews House	105-107 Henry Street
Kingston, City of	Chichester House	116 Fair Street
Kingston, City of	Cordts Mansion	82-152 Lindsley Avenue
Kingston, City of	First Reformed Protestant Dutch Church	272 Wall Street
Kingston, City of	Smith, John, House	103 Albany Avenue
Kingston, City of	Albany Avenue, House at 322	322 Albany Avenue
Kingston, City of	Ten Broeck, Jacob, Stone House	169 Albany Avenue
Kingston, City of	Albany Avenue, House at 313	313 Albany Avenue
Kingston, City of	Albany Avenue, House at 184	184 Albany Avenue
Kingston, City of	Sharp Burial Ground	Albany Avenue
Kingston, City of	Kirkland Hotel	2 Main Street
Kingston, City of	K. Whittelsey Tugboat	3 North Street at Rondout Creek
Kingston, City of	Forsyth, James and Mary, House	31 Albany Avenue
Kingston, City of	Palen, Frank A., House	74-76 St. James Street
Kingston, City of	Ponckhockie Union Chapel	91 Abruyt St.
Kingston, City of	Kingston/Rondout Lighthouse	Hudson River and Rondout Creek
Kingston, City of	Kingston Stockade District	Area bounded by both sides of Clinton Ave., Main, Green, and Front Sts.
Kingston, City of	West Strand Historic District	West Strand and Broadway
Kingston, City of	Community Theatre	601 Broadway
Kingston, City of	Senate House	NW side of Clinton Ave. near jct. with N. Front St.
Kingston, City of	Rondout-West Strand Historic District	Roughly bounded by Broadway, Rondout Creek, Ravine, Hone and McEntee Sts.
Kingston, City of	Chestnut Street Historic District	Roughly bounded by W. Chestnut St., Broadway, E. Chestnut, Livingston & Stuyvesant Sts.
Kingston, City of	Kingston City Hall	408 Broadway
Kingston, City of	Kingston City Library (Carnegie Library)	399 Broadway
Kingston, City of	Catawissa Coastal Tugboat	Hudson River
Kingston, City of	Van Steenburgh, Tobias, House	93-103 Wall Street
Kingston, City of	Albany Avenue, House at 356	356 Albany Avenue
Kingston, City of	Clinton Avenue Historic District	Clinton Ave. and Fair St.
Kingston, City of	Smith, George J., House	109 Albany
Kingston, City of	Friends of Historic Kingston/Fred J. Johnston Museums	Corner, Main and Wall Streets
Kingston, City of	Hudson River Maritime Museum	50 Rondout Landing
Lloyd, Town of	Poughkeepsie Railroad Bridge	Spans Hudson River

**Table 3b.5  
Historic and Cultural Resources by Jurisdiction**

<b>Jurisdiction</b>	<b>Asset Name/Description</b>	<b>Location</b>
Lloyd, Town of	Yelverton, Anthony, House	39 Maple Ave.
Marbletown, Town of	Delaware and Hudson Canal	High Falls
Marbletown, Town of	Main Street Historic District	US 209
Marbletown, Town of	Kripplebush Historic District	Kripplebush Road at intersections of Cooper and Pine Streets
Marbletown, Town of	Wyncoop, Cornelius, Stone House	Main Street (US 209)
Marbletown, Town of	High Falls Historic District	Not Provided
Marbletown, Town of	Lock Tender's House and Canal Store Ruin	40 Canal Road
Marbletown, Town of	Bevier Stone House	2687 US 209
Marbletown, Town of	Rest Plaus Historic District	Lucas Turnpike, Old Kings Road, Rest Place Road
Marbletown, Town of	Dubois-Sarles Octagon	17 South Street
Marlborough, Town of	Chapel Hill Bible Church	49 Bingham Road
Marlborough, Town of	Milton Railroad Station	41 Dock Road
New Paltz, Town of	Du Bois, Josiah, Farm	Libertyville Road
New Paltz, Town of	Lake Mohonk Mountain House Complex	NW of New Paltz, between Wallkill Valley on E and Rondout Valley on W
New Paltz, Town of	LaFevre, John A., House and School	NY 208, S of New Paltz
New Paltz, Village of	Elting Memorial Library	93 Main Street
New Paltz, Village of	Huguenot Street Historic District	Huguenot St.
New Paltz, Village of	Hasbrouck, Jean, House	Huguenot and N. Front Sts.
New Paltz, Town of	Locusts, The (Peter Eltinge House)	160 Plains Road
New Paltz, Village of	Hasbrouck, Major Jacob Jr., House	193 Huguenot Street
Olive, Town of	Ashokan-Turnwood Covered Bridge	Over Esopus Creek
Olive, Town of	Olive and Hurley Old School Baptist Church	NY 28 at Reservoir Road
Olive, Town of	Bruneul, Emile, Studio and Sculpture Garden	4008 NY 28
Plattekill, Town of	Cole--Hasbrouck Farm Historic District	NY 32, N of the jct. with US 44 and NY 55
Plattekill, Town of	Hait, Thaddeus, Farm	75 Allhusen Rd.
Plattekill, Town of	Shuart, Johannis, House	41 Alhusen Road
Rochester, Town of	Sahler, J., House	US 209
Rochester, Town of	Van Wagenen Stone House and Farm Complex	2732 Lucas Turnpike
Rochester, Town of	Winfield Corners Stone House	Winfield Road
Rochester, Town of	Sahler Stone House and Dutch Barn	Winfield Road
Rochester, Town of	Davis Stone House	Davis Stone House
Rochester, Town of	Sahler Stone House	CR 29A
Rochester, Town of	Stilwill Stone House	189 Old Kings Highway
Rochester, Town of	Stilwill-Westbrook Stone House	482 Old Kings Highway
Rochester, Town of	Jacobus Van Wagenen Stone House	2659 Lucas Turnpike
Rochester, Town of	Common School No. 10	North side of Upper Cherrytown Rd.
Rochester, Town of	Middaugh Stone House and Dutch Barn	476 Mill Road
Rochester, Town of	Westbrook, Dirck, Stone House	18 Old Whitfield Road

**Table 3b.5  
Historic and Cultural Resources by Jurisdiction**

<b>Jurisdiction</b>	<b>Asset Name/Description</b>	<b>Location</b>
Rochester, Town of	Krom House	45 Upper Whitfield Road
Rochester, Town of	Krom Stone House and Dutch Barn	Airport Road
Rochester, Town of	Rider, Johannes, Stone House	7 Upper Whitfield Road
Rochester, Town of	Barley, Zachariah, Stone House	90 Upper Whitfield Road
Rochester, Town of	Hornbeck Stone House	149 Whitfield Road
Rochester, Town of	DuPuy, Ephraim, Stone House	193 Whitfield Road
Rochester, Town of	Krom, Lucas, Stone House	286 Whitfield Road
Rochester, Town of	Krom Stone House	31 Upper Whitfield Road
Rochester, Town of	Markle, Jacob F., Stone House	Not Provided
Rochester, Town of	Baker, Sebastian, Stone House	10 Doug Road
Rochester, Town of	Schoonmaker, C. K., Stone House	294 Queens Highway
Rochester, Town of	DuPuy, J, Stone House	Krum Road
Rochester, Town of	Terwilliger-Smith Farm	160 Cherrytown Road
Rochester, Town of	Schoonmaker Stone House	Samsonville Road
Rochester, Town of	Hoornbeck, Jacob, Stone House	Boice Mill Road
Rosendale, Town of	Binnewater Historic District	Sawdust Ave., Breezy Hill and Binnewater Rds.
Rosendale, Town of	All Saints' Chapel	Main St.
Rosendale, Town of	Snyder Estate Natural Cement Historic District	NY 213, 1/2 mi. W of Rosendale
Rosendale, Town of	Du Bois-Deyo House	437 Springtown Road
Saugerties, Town of	Saugerties Lighthouse	Hudson River at Esopus Creek
Saugerties, Town of	Wynkoop House	NY 32
Saugerties, Town of	Trumbour Homestead Farm	1789 Old Kings Hwy.
Saugerties, Village of	Main-Partition Streets Historic District	Roughly bounded by Main, Partition, Market and Jane Sts.
Saugerties, Village of	Loerzel Beer Hall	213 Partition St.
Saugerties, Village of	Du Bois-Kierstede Stone House	119 Main Street
Saugerties, Village of	Trinity Episcopal Church Complex	Church Street
Saugerties, Village of	"Opus 40"	50 Fite Road
Saugerties, Town of	Savage, Augusta, House and Studio	189 Old NY 32
Shandaken, Town of	Ulster House Hotel	Main St. at Academy Rd.
Shandaken, Town of	Phoenicia Railroad Station	High Street
Shandaken, Town of	Camp Wapanachki / Zen Mountain Monastery	5312 CR 212
Shandaken, Town of	Mill Street Stone Arch Bridge	Mill Street over Alton Creek
Shandaken, Town of	Elm Street Stone Arch Bridge	Elm Street over Alton Creek
Shandaken, Town of	District School No. 14	Academy Street
Shandaken, Town of	Morton Memorial Library	Elm Street
Shandaken, Town of	Mount Tremper Fire Observation Tower	Mount Tremper
Shandaken, Town of	Town of Shandaken Historical Museum	26 Academy Street, Pine Hill
Shawangunk, Town of	Bruynswyck School No. 8	Bruynswyck Road
Shawangunk, Town of	Childs, Walstein, House	Sand Hill Rd., Wallkill Correctional Facility
Shawangunk, Town of	Reformed Dutch Church of New Hurley	N of Wallkill on NY 208
Shawangunk, Town of	Reformed Church of Shawangunk Complex	Hoagerburgh Rd.
Shawangunk, Town of	Crowell, J. B., and Son Brick Mould Mill	Lippencott Rd.

**Table 3b.5  
Historic and Cultural Resources by Jurisdiction**

<b>Jurisdiction</b>	<b>Asset Name/Description</b>	<b>Location</b>
	Complex	
Shawangunk, Town of	Du Bois, Andries, House	75 Wallkill Avenue
Shawangunk, Town of	Van Keuren, Benjamin, House Ruin	Off Bruyn Turnpike
Shawangunk, Town of	Decker, William, House	New Prospect Rd.
Shawangunk, Town of	Dill Farm	Off Goebel Rd.
Shawangunk, Town of	Jansen, Johannes, House and Dutch Barn	Decker Rd.
Shawangunk, Town of k	Jansen, Thomas, House	Jansen Rd.
Shawangunk, Town of	Miller's House at Red Mills	Red Mills Rd. and Wallkill Ave.
Shawangunk, Town of	Pearl Street Schoolhouse	Awosting and Decker Rds.
Shawangunk, Town of	Terwilliger House	Hoagerburgh Rd.
Ulster, Town of	Osterhoudt Stone House	1880 NY 32
Ulster, Town of	Ten Broeck, Benjamin, House	1019 Flatbush Road
Wawarsing, Town of	Cragsmoor Historic District	Roughly bounded by Henry, Cragsmoor and Sam's Point Roads
Wawarsing, Town of	Spring Glen Synagogue	Old US 209
Wawarsing, Town of	Ontario & Western Railroad Passenger Station	On grounds of NYS Eastern Correctional Facility
Wawarsing, Town of	Ulster Heights Synagogue	Ulster Heights Road and Beaver Dam Road
Wawarsing, Town of	O&W Railroad Station at Port Ben	Tow Path Road
Wawarsing, Town of	Hoornbeek Store Complex	Main St. between Clinton & Church Sts.
Wawarsing, Town of	Chetolah	S of Cragsmoor on Vista Maria Rd.
Woodstock, Town of	Church of the Holy Transfiguration of Christ-on-the-Mount	Meads Mountain Road
Woodstock, Town of	Vosburg Turning Mill Complex	52 Hutchin Hill Road
Woodstock, Town of	Byrdcliffe Historic District	W of Woodstock at Glasco Tpke. and Larks Nest Rd.
Woodstock, Town of	National Youth Administration Woodstock Resident Work Center	NY 212 N side, E of Woodstock

## Population

According to the U.S. Census Bureau 2000 Census, the total population of Ulster County as covered by this plan was 173,619, in 65,959 households. When the 2000 population of the Village of Ellenville is included, the total population rises to 177,749. Current projections by the U.S. Census estimate that the 2006 population including *all* component municipalities is 182,742, an increase of approximately 3% over the 2000 Census. More information regarding likely future population trends can be found in the discussion of Land Use and Development Trends in a later section of the Plan report. Table 3b.6 presents the breakdown of the county population and household totals in 2000 by participating jurisdiction, while Table 3b.7 presents a summary of vulnerable sectors of the population by participating jurisdiction.

**SECTION 3b - RISK ASSESSMENT: IDENTIFICATION & CHARACTERIZATION**

For the purposes of this plan, ðvulnerableö has been taken to mean residents of the county aged under five or over 65 years. Compared to the majority of the county population, people of these ages are assumed to require extra medical care and additional resources, particularly in the event of emergency evacuation. When viewed in combination with the data in Table 3b.4 and subsequent assessments of assets in individual hazard areas, this data may be used to highlight areas which may benefit from increased focus in the development of mitigation goals and strategies.

**Table 3b.6  
Population and Households by Jurisdiction (2000 Census)**

Jurisdiction	Population		Households	
	Total	% of County	Total	% of County
Denning, Town of	516	0.30%	215	0.33%
Ellenville, Village of	4,130	2.32%	1,540	2.28%
Esopus, Town of	9,331	5.37%	3,439	5.21%
Gardiner, Town of	5,238	3.02%	1,997	3.03%
Hardenburgh, Town of	208	0.12%	95	0.14%
Hurley, Town of	6,564	3.78%	2,694	4.08%
Kingston, City of	23,456	13.51%	9,871	14.97%
Kingston, Town of	908	0.52%	356	0.54%
Lloyd, Town of	9,941	5.73%	3,626	5.50%
Marbletown, Town of	5,854	3.37%	2,386	3.62%
Marlborough, Town of	8,263	4.76%	3,020	4.58%
New Paltz, Town of	6,796	3.91%	2,557	3.88%
New Paltz, Village of	6,034	3.48%	1,898	2.88%
Olive, Town of	4,579	2.64%	1,869	2.83%
Plattekill, Town of	9,892	5.70%	3,649	5.53%
Rochester, Town of	7,018	4.04%	2,688	4.08%
Rosendale, Town of	6,352	3.66%	2,587	3.92%
Saugerties, Town of	14,913	8.59%	5,815	8.82%
Saugerties, Village of	4,955	2.85%	1,663	2.52%
Shandaken, Town of	3,235	1.86%	1,463	2.22%
Shawangunk, Town of	12,022	6.92%	3,433	5.20%
Ulster, Town of	12,544	7.23%	4,850	7.35%
Wawarsing, Town of	8,759	5.04%	2,842	4.31%
Woodstock, Town of	6,241	3.59%	2,946	4.47%
<i>Total</i>	<i>177,749</i>	<i>100.00%</i>	<i>67,499</i>	<i>100.00%</i>

Note: similar breakdown data for years later than 2000 is not yet available.

SECTION 3b - RISK ASSESSMENT: IDENTIFICATION & CHARACTERIZATION

**Table 3b.7  
Vulnerable Sectors of the Population by Jurisdiction (2000 Census)**

Jurisdiction	Total Population	Under 5 Years	% of Total	65 Years and over	% of Total	Total Vulnerable Population	% of Total
Denning, Town of	516	19	3.7%	90	17.4%	109	21.1%
Ellenville, Village of	4,130	309	7.5%	509	12.3%	818	19.8%
Esopus, Town of	9,331	582	6.2%	1,176	12.6%	1,758	18.8%
Gardiner, Town of	5,238	308	5.9%	502	9.6%	810	15.5%
Hardenburgh, Town of	208	4	1.9%	41	19.7%	45	21.6%
Hurley, Town of	6,564	294	4.5%	1,156	17.6%	1,450	22.1%
Kingston, City of	23,456	1,510	6.4%	4,003	17.1%	5,513	23.5%
Kingston, Town of	908	39	4.3%	105	11.6%	144	15.9%
Lloyd, Town of	9,941	554	5.6%	1,452	14.6%	2,006	20.2%
Marbletown, Town of	5,854	277	4.7%	770	13.2%	1,047	17.9%
Marlborough, Town of	8,263	517	6.3%	964	11.7%	1,481	17.9%
New Paltz, Town of	6,796	501	7.4%	1,164	17.1%	1,665	24.5%
New Paltz, Village of	6,034	97	1.6%	321	5.3%	418	6.9%
Olive, Town of	4,579	212	4.6%	621	13.6%	833	18.2%
Plattekill, Town of	9,892	654	6.6%	1,133	11.5%	1,787	18.1%
Rochester, Town of	7,018	416	5.9%	804	11.5%	1,220	17.4%
Rosendale, Town of	6,352	399	6.3%	718	11.3%	1,117	17.6%
Saugerties, Town of	14,913	1,094	7.3%	2,546	17.1%	3,640	24.4%
Saugerties, Village of	4,955	244	4.9%	609	12.3%	853	17.2%
Shandaken, Town of	3,235	160	4.9%	564	17.4%	724	22.4%
Shawangunk, Town of	12,022	610	5.1%	1,040	8.7%	1,650	13.7%
Ulster, Town of	12,544	714	5.7%	2,224	17.7%	2,938	23.4%
Wawarsing, Town of	8,759	689	7.9%	1,557	17.8%	2,246	25.6%
Woodstock, Town of	6,241	205	3.3%	1,081	17.3%	1,286	20.6%
<i>Total</i>	<i>177,749</i>	<i>10,408</i>	<i>6%</i>	<i>25,150</i>	<i>14%</i>	<i>35,558</i>	<i>20%</i>

Note: similar breakdown data for years later than 2000 is not yet available.

**SECTION 3 - RISK ASSESSMENT**  
**3.C - ESTIMATED DAMAGES IN HAZARD AREAS**

44 CFR Part 201.6 (c)(2)(ii)(B) states, “[The plan should describe vulnerability in terms of an] estimate of the potential dollar losses to vulnerable structures identified in paragraph (c)(2)(i)(A) of this section and a description of the methodology used to prepare this estimate.” This section of the Plan is intended to satisfy this requirement.

**Methodology**

The team attempted to assess vulnerability to various hazards within the limitations of the available data, where generally accepted measures of vulnerability are established. Parcel data included assessed values for land and total assessed values; assessed values for improvements were calculated by subtracting the land value from the total value. Expanding upon the parcel data in the county’s GIS to include such information as building square footage, year built, type, foundation type, and condition, would allow for a more accurate assessment of vulnerability. Therefore, the Planning Committee has considered actions in this regard. Please see further sections of this plan for additional information on actions considered and ultimately selected.

**Estimated Damages – Extreme Temperatures**

While all of Ulster County is exposed to extreme temperatures, existing buildings, infrastructure and critical facilities are not considered vulnerable to significant damage caused by extreme heat or cold events. Therefore any estimated property losses associated with these hazards are anticipated to be minimal across the area. Extreme temperatures do however present a significant life and safety threat to Ulster County’s population.

Heat casualties are usually caused by lack of adequate air conditioning or heat exhaustion. The most vulnerable population to heat casualties are the elderly or infirmed, who frequently live on low fixed incomes and cannot afford to run air-conditioning on a regular basis. This population is sometimes isolated, with no immediate family or friends to look out for their well being.

Casualties resulting from extreme cold may result from a lack of adequate heat, carbon monoxide poisoning from unsafe heat sources and frostbite. The most vulnerable populations to cold casualties are the elderly or infirmed as well as low income households, as they may not be able to afford to operate a heat source on a regular basis and may not have immediate family or friends to look out for their well being.

Given the lack of historical data and limited likelihood for structural losses resulting from extreme heat or cold occurrences in Ulster County, annualizing potential structural losses over a long period of time would most likely yield a negligible annual loss estimate for the entire county.

**Estimated Damages – Extreme Winds**

Sufficient data was not available at the time of the study to undertake a detailed formal assessment of damages due to extreme winds. At this time, vulnerability is being expressed as the value of improvements exposed to the hazard. Because it cannot be predicted where extreme winds (as defined in the *Hazard Profiles* section) may occur, all existing and future buildings, facilities and populations are considered to be exposed to this hazard and could potentially be impacted.

**SECTION 3c - RISK ASSESSMENT: ESTIMATED DAMAGES IN HAZARD AREAS**

First, while FEMA methodologies do exist to estimate damages due to extreme wind, specific information is required for buildings in order to employ these methodologies, such as type of construction and details on any existing protective features. This data was not available as a part of the County GIS during this study.

Second, having even the year built data for each structure, one would be able to highlight structures built before codes and standards were adopted to make buildings more resistant to wind damage, thus being better candidates for mitigation. Without the year-built data, this can not be done.

For the purpose of estimating annual wind damages at this time, we have evaluated the NOAA NCDC database for wind events in the last ten years (1998-2008) and have determined that these events have caused approximately \$6,834,000 in property damages (or \$683,400 per year county-wide). The total value of all improvements in Ulster County is estimated to be \$15,384,466,069. Thus, based on recent historical data roughly 0.0044% of Ulster County's improved property has been damaged each year by extreme wind events. Applying this same percentage to each of the County's municipalities (since the wind hazard is uniform across the county) yields the following estimated annual damages to improved property for extreme wind events.

<b>Table 3c.1 Annual Loss Estimates – Extreme Wind</b>		
<b>Jurisdiction</b>	<b>Total Value of Improvements</b>	<b>Annual Loss Estimate, Extreme Wind</b>
Denning, Town of	\$51,126,978	\$2,271
Ellenville, Village of	\$47,291,413	\$2,100
Esopus, Town of	\$823,898,937	\$36,592
Gardiner, Town of	\$612,092,899	\$27,185
Hardenburgh, Town of	\$50,791,094	\$2,256
Hurley, Town of	\$639,336,069	\$28,395
Kingston, City of	\$1,922,939,212	\$85,403
Kingston, Town of	\$57,541,463	\$2,556
Lloyd, Town of	\$856,612,633	\$38,045
Marbletown, Town of	\$993,766,725	\$44,136
Marlborough, Town of	\$722,416,282	\$32,085
New Paltz, Town of	\$578,833,042	\$25,708
New Paltz, Village of	\$238,672,524	\$10,600
Olive, Town of	\$377,496,142	\$16,766
Plattekill, Town of	\$556,675,301	\$24,723
Rochester, Town of	\$564,685,441	\$25,079
Rosendale, Town of	\$469,479,238	\$20,851
Saugerties, Town of	\$1,217,383,571	\$54,067
Saugerties, Village of	\$275,716,843	\$12,245
Shandaken, Town of	\$402,760,909	\$17,888
Shawangunk, Town of	\$1,093,099,620	\$48,548
Ulster, Town of	\$1,189,900,886	\$52,847
Wawarsing, Town of	\$391,482,171	\$17,387
Woodstock, Town of	\$1,250,466,647	\$55,670
<i>Total, County-wide:</i>	<i>\$15,384,466,039</i>	<i>\$683,400</i>



**Estimated Damages – Earthquakes**

As stated previously in the plan in the Hazard Profile section, according to the Earthquake Hazard Map of Ulster County, there is a 10 percent chance over 50 years that an earthquake with a PGA of greater than 3 or 4%g will be centered within Ulster County and/or its participating jurisdictions. This earthquake, if it were to occur, would likely have associated with it light to moderate perceived shaking and little to no damage. PGA's of between 8 and 10%g would most often be required to cause appreciable damage, say, to unreinforced masonry buildings. While it is true that earthquakes are possible in this part of New York, they are not particularly likely, or likely to be particularly intense. Therefore, a full earthquake loss estimation was not conducted at this time for individual jurisdictions. However, countywide data included in the State Plan has been evaluated and is presented later in this section.

Examples of the types of damages that could be observed include:

- ⇒ Felt indoors by many, outdoors by few during the day
- ⇒ At night, some awakened.
- ⇒ Dishes, windows, doors disturbed and possibly broken
- ⇒ Walls make cracking sounds
- ⇒ Unstable objects could be overturned
- ⇒ Sensation like heavy truck striking building
- ⇒ Standing automobiles rocked noticeably

For earthquakes, the hazard area encompasses the entire county and therefore all assets could be impacted.

FEMA's How-To #2 suggests that for earthquake loss estimation, data regarding building type, type of foundation, building code design level, and date of construction, is required for a quality analysis. This is because certain structures are more susceptible to earthquake damage than others. In the State of New York, regulations accounting for earthquake risk exist for new construction. Older buildings, built before these standard building codes went into effect, are more susceptible to earthquake damage. Similarly, unreinforced masonry buildings are more likely to sustain earthquake damage. While extensive damage to even these structures is unlikely, based on the mapped hazard areas, identifying this subset of buildings is important, particularly with regard to critical facilities that may meet these criteria. This information was not readily available at the time of the study for Ulster County and its participating jurisdictions.

The New York State Hazard Mitigation Plan includes HAZUS-MH runs for earthquake losses in counties across New York State. The data prepared by the State estimates the following potential earthquake losses in Ulster County and includes; Total Exposure  $\sigma$  representing dollar value of all general building stock and calculated potential total losses (Capital Stock + Income Losses) for the four return periods of 2500, 1000, 500, & 250-years.

<b>Table 3c.2</b>			
<b>Total Earthquake Losses – Ulster County, NY</b>			
<b>For the Four Return Periods of 2500, 1000, 500 and 250 years</b>			
<b>2500-year</b>	<b>1000-year</b>	<b>500-year</b>	<b>250-year</b>
\$426,894,000	\$122,588,000	\$38,885,000	\$9,971,000

The State Plan goes on to show an estimated annualized total earthquake losses in Ulster County of \$495,000 which ranks 23<sup>rd</sup> as compared to all of New York State's 62 counties. For comparison purposes, the highest annualized losses were calculated in Kings County at \$10,093,000 and the lowest were calculated in Schuyler County at \$19,000.

For the purpose of estimating annual earthquake damages at this time, we have compared the State's estimated annual earthquake losses for Ulster County (\$495,000) to the total value of all improvements in Ulster County (\$15,384,466,069) and have determined that based on this, roughly 0.0032% of Ulster County's improved property could be damaged in any given year by an earthquake. Applying this same percentage to each of the County's municipalities (since the earthquake hazard is nearly uniform across the county) yields the following estimated annual damages to improved property for earthquakes. Note that these estimates do not incorporate any magnification of damages due to soil type.

**Table 3c.3**  
**Annual Loss Estimates – Earthquakes**

Jurisdiction	Total Value of Improvements	Annual Loss Estimate, Earthquakes
Denning, Town of	\$51,126,978	\$1,645
Ellenville, Village of	\$47,291,413	\$1,521
Esopus, Town of	\$823,898,937	\$26,504
Gardiner, Town of	\$612,092,899	\$19,690
Hardenburgh, Town of	\$50,791,094	\$1,634
Hurley, Town of	\$639,336,069	\$20,567
Kingston, City of	\$1,922,939,212	\$61,859
Kingston, Town of	\$57,541,463	\$1,851
Lloyd, Town of	\$856,612,633	\$27,556
Marbletown, Town of	\$993,766,725	\$31,969
Marlborough, Town of	\$722,416,282	\$23,239
New Paltz, Town of	\$578,833,042	\$18,621
New Paltz, Village of	\$238,672,524	\$7,678
Olive, Town of	\$377,496,142	\$12,144
Plattekill, Town of	\$556,675,301	\$17,908
Rochester, Town of	\$564,685,441	\$18,165
Rosendale, Town of	\$469,479,238	\$15,103
Saugerties, Town of	\$1,217,383,571	\$39,162
Saugerties, Village of	\$275,716,843	\$8,870
Shandaken, Town of	\$402,760,909	\$12,956
Shawangunk, Town of	\$1,093,099,620	\$35,164
Ulster, Town of	\$1,189,900,886	\$38,278
Wawarsing, Town of	\$391,482,171	\$12,594
Woodstock, Town of	\$1,250,466,647	\$40,323
<i>Total, County-wide:</i>	<i>\$15,384,466,039</i>	<i>\$495,000</i>

### Estimated Damages – Flood

Sufficient data was not available at the time of the study to estimate damages due to flooding. At this time, vulnerability is being expressed as the value of improvements in the current mapped flood hazard areas as presented in the "Identification and Characterization of Assets" section of this plan. First, while FEMA methodologies do exist to estimate damages due to flooding, specific information is required for buildings in order to employ these methodologies, such as first floor elevation, type of construction, foundation type, and details on any existing protective features. This data was not available as a part of the County GIS during this study.

Second, having even the year built data for each structure, one would be able to highlight structures built before codes and standards were adopted to make buildings more resistant to flood damage, thus being better candidates for mitigation. Without the year-built data, this can not be done. If this information

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should become available in the future, it could be incorporated into future updates of the plan. While one could make some blanket assumptions at this time to use various tools for loss estimation, this would likely yield erroneous data. Acting upon such rough estimates could result in an unwise use of limited resources.

For the purpose of estimating annual flood damages at this time, we have evaluated the NOAA NCDC database for flood events in the last ten years (1998-2008) and have determined that these events have caused approximately \$13,260,000 in property damages (or \$1,326,000 per year county-wide). Because the flood hazard is not uniform across the county, we applied this percentage to the subset of improved property in the flood hazard area in each municipality (Zones A, AE, and X500) to estimate annual flood losses presented in the table below. The total value of all improvements in flood hazard areas in Ulster County is estimated to be \$2,214,288,580. Thus, based on recent historical data roughly 0.06% of Ulster County's improved property in the floodplain has been damaged each year by flood events. (Note: NFIP losses were considered for use, but were not selected due to their limitations in not including: unpaid claims, damages to uninsured properties, crop losses, or damages to roads/bridges/etc.)

<b>Table 3c.4</b>			
<b>Annual Loss Estimates – Flood</b>			
<b>Jurisdiction</b>	<b>Total Value of Improvements</b>	<b>Total Value of Improvements in the Flood Hazard Area</b>	<b>Annual Loss Estimates, Flood</b>
Denning, Town of	\$51,126,978	\$21,617,425	\$12,945
Ellenville, Village of	\$47,291,413	\$9,420,995	\$5,642
Esopus, Town of	\$823,898,937	\$159,394,633	\$95,452
Gardiner, Town of	\$612,092,899	\$73,924,289	\$44,269
Hardenburgh, Town of	\$50,791,094	\$18,811,933	\$11,265
Hurley, Town of	\$639,336,069	\$30,066,164	\$18,005
Kingston, City of	\$1,922,939,212	\$144,378,016	\$86,459
Kingston, Town of	\$57,541,463	\$13,269,195	\$7,946
Lloyd, Town of	\$856,612,633	\$126,783,351	\$75,923
Marbletown, Town of	\$993,766,725	\$284,190,349	\$170,184
Marlborough, Town of	\$722,416,282	\$9,309,836	\$5,575
New Paltz, Town of	\$578,833,042	\$48,533,621	\$29,064
New Paltz, Village of	\$238,672,524	\$25,644,975	\$15,357
Olive, Town of	\$377,496,142	\$47,284,614	\$28,316
Plattekill, Town of	\$556,675,301	\$0	\$0
Rochester, Town of	\$564,685,441	\$88,442,681	\$52,963
Rosendale, Town of	\$469,479,238	\$63,705,975	\$38,150
Saugerties, Town of	\$1,217,383,571	\$156,220,761	\$93,551
Saugerties, Village of	\$275,716,843	\$30,698,423	\$18,383
Shandaken, Town of	\$402,760,909	\$168,880,011	\$101,132
Shawangunk, Town of	\$1,093,099,620	\$304,030,659	\$182,065
Ulster, Town of	\$1,189,900,886	\$140,625,437	\$84,212
Wawarsing, Town of	\$391,482,171	\$80,858,822	\$48,421
Woodstock, Town of	\$1,250,466,647	\$168,196,414	\$100,722
<i>Total, County-wide:</i>	<i>\$15,384,466,039</i>	<i>\$2,214,288,580</i>	<i>\$1,326,000</i>

### Estimated Damages – Ice Jams

Flooding caused by ice jams is similar to flash flooding. Ice jam formation causes a rapid rise of water at the jam and extending upstream. Failure or release of the jam causes sudden flooding downstream.

It is difficult to identify particular areas that are generally prone to ice jam flooding because the hazard can be very localized. The formation of ice jams depends on the weather and physical conditions in river channels. Unlike the typical violent flash flooding occurrences where steep terrain is present, ice jams are most likely to occur where the channel slope naturally decreases, where culverts freeze solid at headwaters of reservoirs, at natural channel restrictions such as bends and bridges, and along shallows where channels may freeze solid. Ice jams in Ulster County have historically occurred 28 times between 1925 and 2007. Most events have been either along the Wallkill River or Rondout Creek. Specifically:

- ✚ 12 events ó Rondout Creek (11 at Rosendale and 1 at Kingston)
- ✚ 10 events ó Wallkill River (8 at Gardiner and 2 at New Paltz)
- ✚ 4 events ó Shawangunk Kill at Shawangunk
- ✚ 2 events ó Esopus Creek at Shandaken

Damage from ice jam flooding usually exceeds that caused by open water flooding. Flood elevations are usually higher than predicted for free-flow conditions and water levels may change rapidly. Additional physical damage is caused by the force of ice impacting buildings and other structures. Because of the sometimes unpredictable nature of ice jam floods, FEMA's Flood Insurance Rate Maps often do not reflect ice jam flood threats.

Loss estimation methodologies are not currently available for estimating ice jam damages. Sufficient historical data regarding events and associated losses was not available to quantify here. For the purpose of this analysis, we have assumed that annual losses would be realized as an unquantifiable component within the flood damage estimate.

<b>Jurisdiction</b>	<b>Total Value of Improvements</b>	<b>Total Value of Improvements in the Flood Hazard Area</b>	<b>Annual Loss Estimates, Ice Jams</b>
Denning, Town of	\$51,126,978	\$21,617,425	unquantifiable
Ellenville, Village of	\$47,291,413	\$9,420,995	unquantifiable
Esopus, Town of	\$823,898,937	\$159,394,633	unquantifiable
Gardiner, Town of	\$612,092,899	\$73,924,289	unquantifiable - 8 historic events
Hardenburgh, Town of	\$50,791,094	\$18,811,933	unquantifiable
Hurley, Town of	\$639,336,069	\$30,066,164	unquantifiable
Kingston, City of	\$1,922,939,212	\$144,378,016	unquantifiable - 1 historic event
Kingston, Town of	\$57,541,463	\$13,269,195	unquantifiable
Lloyd, Town of	\$856,612,633	\$126,783,351	unquantifiable
Marbletown, Town of	\$993,766,725	\$284,190,349	unquantifiable
Marlborough, Town of	\$722,416,282	\$9,309,836	unquantifiable
New Paltz, Town of	\$578,833,042	\$48,533,621	unquantifiable - 2 historic events
New Paltz, Village of	\$238,672,524	\$25,644,975	unquantifiable
Olive, Town of	\$377,496,142	\$47,284,614	unquantifiable
Plattekill, Town of	\$556,675,301	\$0	unquantifiable

<b>Table 3c.5</b>			
<b>Annual Loss Estimates – Ice Jams</b>			
<b>Jurisdiction</b>	<b>Total Value of Improvements</b>	<b>Total Value of Improvements in the Flood Hazard Area</b>	<b>Annual Loss Estimates, Ice Jams</b>
Rochester, Town of	\$564,685,441	\$88,442,681	unquantifiable
Rosendale, Town of	\$469,479,238	\$63,705,975	unquantifiable - 11 historic events
Saugerties, Town of	\$1,217,383,571	\$156,220,761	unquantifiable
Saugerties, Village of	\$275,716,843	\$30,698,423	unquantifiable
Shandaken, Town of	\$402,760,909	\$168,880,011	unquantifiable - 2 historic events
Shawangunk, Town of	\$1,093,099,620	\$304,030,659	unquantifiable - 4 historic events
Ulster, Town of	\$1,189,900,886	\$140,625,437	unquantifiable
Wawarsing, Town of	\$391,482,171	\$80,858,822	unquantifiable
Woodstock, Town of	\$1,250,466,647	\$168,196,414	unquantifiable
<i>Total, County-wide:</i>	<i>\$15,384,466,039</i>	<i>\$2,214,288,580</i>	unquantifiable

### Estimated Damages – Dam Failure

Sufficient data was not available at the time of the study to estimate damages due to dam failure. At this time, vulnerability is being expressed as the value of improvements exposed to the hazard, as presented in Table 3a.13 in the Hazard Profiles section of this plan.

Given the lack of historical data for significant dam failure occurrences, and that it would be inappropriate to make assumptions regarding the effectiveness of future dam inspection and maintenance activities, it is assumed that major dam failures are a considerably rare event. Therefore, while one major event may result in significant losses, annualizing structural losses over a long period of time would most likely yield a negligible annual loss estimate for jurisdictions exposed to this hazard.

<b>Table 3c.6</b>		
<b>Annual Loss Estimates – Dam Failure</b>		
<b>Jurisdiction</b>	<b>Total Value of Improvements</b>	<b>Annual Loss Estimate, Dam Failure</b>
Denning, Town of	\$51,126,978	<i>negligible</i>
Ellenville, Village of	\$47,291,413	<i>negligible</i>
Esopus, Town of	\$823,898,937	<i>negligible</i>
Gardiner, Town of	\$612,092,899	<i>negligible</i>
Hardenburgh, Town of	\$50,791,094	<i>negligible</i>
Hurley, Town of	\$639,336,069	<i>negligible</i>
Kingston, City of	\$1,922,939,212	<i>negligible</i>
Kingston, Town of	\$57,541,463	<i>negligible</i>
Lloyd, Town of	\$856,612,633	<i>negligible</i>
Marbletown, Town of	\$993,766,725	<i>negligible</i>
Marlborough, Town of	\$722,416,282	<i>negligible</i>
New Paltz, Town of	\$578,833,042	<i>negligible</i>
New Paltz, Village of	\$238,672,524	<i>negligible</i>
Olive, Town of	\$377,496,142	<i>negligible</i>
Plattekill, Town of	\$556,675,301	<i>negligible</i>
Rochester, Town of	\$564,685,441	<i>negligible</i>

**Table 3c.6**  
**Annual Loss Estimates – Dam Failure**

<b>Jurisdiction</b>	<b>Total Value of Improvements</b>	<b>Annual Loss Estimate, Dam Failure</b>
Rosendale, Town of	\$469,479,238	<i>negligible</i>
Saugerties, Town of	\$1,217,383,571	<i>negligible</i>
Saugerties, Village of	\$275,716,843	<i>negligible</i>
Shandaken, Town of	\$402,760,909	<i>negligible</i>
Shawangunk, Town of	\$1,093,099,620	<i>negligible</i>
Ulster, Town of	\$1,189,900,886	<i>negligible</i>
Wawarsing, Town of	\$391,482,171	<i>negligible</i>
Woodstock, Town of	\$1,250,466,647	<i>negligible</i>
<i>Total, County-wide:</i>	<i>\$15,384,466,039</i>	<i>negligible</i>

### Estimated Damages – Lightning

Sufficient data was not available at the time of the study to estimate damages due to lightning. At this time, vulnerability is being expressed as the value of improvements exposed to the hazard, as presented in the Identification and Characterization of Assets section of this plan.

First, current loss estimation methodologies are not available for estimating lightning damages.

Second, having even the year built data for each structure, one would be able to highlight structures built before codes and standards were adopted to make buildings more resistant to lightning damage, thus being better candidates for mitigation. Without the year-built data, this can not be done.

If this information should become available in the future, it could be incorporated into future updates of the plan. While one could make some blanket assumptions at this time to use various tools for loss estimation, this would likely yield erroneous data given the high degree of variation in type and density of development in Ulster County. Acting upon such rough estimates could result in an unwise use of limited resources.

In general terms, estimated damages due to a single lightning event could be severe in any one location, however no one location or municipality in the county is any more vulnerable than another, and annual damages from lightning in Ulster County are estimated to be generally low.

For the purpose of estimating annual lightning damages at this time, we have evaluated the NOAA NCDC database for lightning events in the last ten years (1998-2008) and have determined that these events have caused approximately \$30,800 in property damages (or \$30,800 per year county-wide). The total value of all improvements in Ulster County is estimated to be \$15,384,466,039. Thus, based on recent historical data roughly 0.0002% of Ulster County's improved property has been damaged each year by lightning events. Applying this same percentage to each of the County's municipalities (since the lightning hazard is uniform across the county) yields the following estimated annual damages to improved property for lightning events.

**Table 3c.7**  
**Annual Loss Estimates – Lightning**

<b>Jurisdiction</b>	<b>Total Value of Improvements</b>	<b>Annual Loss Estimate, Lightning</b>
Denning, Town of	\$51,126,978	\$102
Ellenville, Village of	\$47,291,413	\$95
Esopus, Town of	\$823,898,937	\$1,649
Gardiner, Town of	\$612,092,899	\$1,225
Hardenburgh, Town of	\$50,791,094	\$102
Hurley, Town of	\$639,336,069	\$1,280
Kingston, City of	\$1,922,939,212	\$3,849
Kingston, Town of	\$57,541,463	\$115
Lloyd, Town of	\$856,612,633	\$1,715
Marbletown, Town of	\$993,766,725	\$1,989
Marlborough, Town of	\$722,416,282	\$1,446
New Paltz, Town of	\$578,833,042	\$1,159
New Paltz, Village of	\$238,672,524	\$478
Olive, Town of	\$377,496,142	\$756
Plattekill, Town of	\$556,675,301	\$1,114
Rochester, Town of	\$564,685,441	\$1,130
Rosendale, Town of	\$469,479,238	\$940
Saugerties, Town of	\$1,217,383,571	\$2,437
Saugerties, Village of	\$275,716,843	\$552
Shandaken, Town of	\$402,760,909	\$806
Shawangunk, Town of	\$1,093,099,620	\$2,188
Ulster, Town of	\$1,189,900,886	\$2,382
Wawarsing, Town of	\$391,482,171	\$784
Woodstock, Town of	\$1,250,466,647	\$2,509
<i>Total, County-wide:</i>	<i>\$15,384,466,039</i>	<i>\$30,800</i>

### Estimated Damages – Landslides

Sufficient data was not available at the time of the study to estimate damages due to landslides. At this time, vulnerability is being expressed as the value of improvements in the current mapped landslide hazard area (of high susceptibility, low incidence) presented in the Identification and Characterization of Assets section of this plan.

First, according to FEMA's How-To #2, current loss estimation methodologies are not available for estimating landslide damages. While the guide indicates that structures within a landslide hazard area could be assumed to be severely damaged and those outside could be assumed to be undamaged, applying this methodology would not be appropriate for Ulster County given the variations in susceptibility and incidence. Ulster County has within its boundaries four different zones of susceptibility; that is, areas of: high incidence, high susceptibility/moderate incidence, moderate incidence, and low incidence). Applying the How-To methodology would not account for different vulnerabilities associated with each zone. In addition, specific information would be required for buildings in order to employ these methodologies, such as type of construction, foundation type, and details on any existing protective features. This data was not available as a part of the County GIS during this study.

Second, having even the year built data for each structure, one would be able to highlight structures built before codes and standards (such as steep slope ordinances) were adopted to make buildings more

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resistant to landslide damage, thus being better candidates for mitigation. Without the year-built data, this can not be done.

If this information should become available in the future, it could be incorporated into future updates of the plan. While one could make some blanket assumptions at this time to use various tools for loss estimation, this would likely yield erroneous data given the high degree of variation in type and density of development. Acting upon such rough estimates could result in an unwise use of limited resources.

In general terms, estimated damages due to a single landslide event could be severe in any one location, but are most likely only in areas of high incidence and/or high susceptibility/moderate incidence (isolated portions of the seven communities with mapped areas of high incidence; five communities with mapped areas of high susceptibility/moderate incidence). Additional details can be found throughout the Asset Identification and Characterization section of this plan.

Given the lack of historical data on significant landslide occurrences (USGS notes only one event in Ulster County), it is assumed that while one major event may result in significant losses, annualizing structural losses over a long period of time would most likely yield a negligible annual loss estimate for jurisdictions exposed to this hazard.

Jurisdiction	Total Value of Improvements	Annual Loss Estimate, Landslides
Denning, Town of	\$51,126,978	<i>negligible</i>
Ellenville, Village of	\$47,291,413	<i>negligible</i>
Esopus, Town of	\$823,898,937	<i>negligible</i>
Gardiner, Town of	\$612,092,899	<i>negligible</i>
Hardenburgh, Town of	\$50,791,094	<i>negligible</i>
Hurley, Town of	\$639,336,069	<i>negligible</i>
Kingston, City of	\$1,922,939,212	<i>negligible</i>
Kingston, Town of	\$57,541,463	<i>negligible</i>
Lloyd, Town of	\$856,612,633	<i>negligible</i>
Marbletown, Town of	\$993,766,725	<i>negligible</i>
Marlborough, Town of	\$722,416,282	<i>negligible</i>
New Paltz, Town of	\$578,833,042	<i>negligible</i>
New Paltz, Village of	\$238,672,524	<i>negligible</i>
Olive, Town of	\$377,496,142	<i>negligible</i>
Plattekill, Town of	\$556,675,301	<i>negligible</i>
Rochester, Town of	\$564,685,441	<i>negligible</i>
Rosendale, Town of	\$469,479,238	<i>negligible</i>
Saugerties, Town of	\$1,217,383,571	<i>negligible</i>
Saugerties, Village of	\$275,716,843	<i>negligible</i>
Shandaken, Town of	\$402,760,909	<i>negligible</i>
Shawangunk, Town of	\$1,093,099,620	<i>negligible</i>
Ulster, Town of	\$1,189,900,886	<i>negligible</i>
Wawarsing, Town of	\$391,482,171	<i>negligible</i>
Woodstock, Town of	\$1,250,466,647	<i>negligible</i>
<i>Total, County-wide:</i>	<i>\$15,384,466,039</i>	<i>negligible</i>



### **Estimated Damages – Drought**

Sufficient data was not available at the time of the study to estimate damages due to drought. According to FEMA's How-To #2, current loss estimation methodologies are not available for estimating drought damages. If this information should become available in the future, it could be incorporated into future updates of the plan. While one could make some blanket assumptions at this time to use various tools for loss estimation, this would likely yield erroneous data given the high degree of variation in type and density of development. Acting upon such rough estimates could result in an unwise use of limited resources. At this time, vulnerability is being expressed in qualitative terms in terms of types of damages.

In general estimated damages due to future droughts in Ulster County could be high. Types of damages are discussed qualitatively below.

Because drought impacts large areas and crosses jurisdictional boundaries, all existing and future buildings, facilities and populations are considered to be exposed to this hazard and could potentially be impacted. However, drought impacts are mostly experienced in water shortages and crop losses on agricultural lands and have no impact on buildings.

Crop failure is one common affect of drought. According to the 2002 Agriculture Census, Ulster County has 532 farms totaling 83,418 acres. Farms in Ulster County are 47.18 percent cropland, 31.66 percent woodland, 11.33 percent pasture land, and 9.83 percent other uses. The market value of production on Ulster County farms in 2002 was \$34.5 million, with \$28.8 generated from crop sales and \$5.7 million generated from livestock sales. By far the largest commodity group was fruits, tree nuts and berries accounting for approximately half of all sales in 2002 at \$17 million, making Ulster County second in New York State in this category. Top crop items in terms of acreage: 17,581 acres forage (silage, haylage); 6,365 acres apples (number two in New York State); 3,381 acres harvested vegetables; 2,674 acres sweet corn; and 1,559 acres corn for grain. Agricultural losses, specifically losses to crops, in Ulster County could be significant during a drought. When drought begins, the agricultural sector is usually the first to be impacted because of its heavy reliance on stored soil water, which can rapidly be depleted during extended dry periods. When precipitation returns to normal, impacts on the agricultural sector are quick to diminish again due to the reliance on stored soil moisture.

Water supply shortages are a second affect of drought. Ulster County's total withdrawal of fresh water for public supply is 439.54 million gallons per day, with one percent from groundwater sources and 99 percent from surface water sources. Groundwater is fairly resistant to drought conditions (one percent of public supply). However, the remaining 99 percent is sourced from surface water, which is more susceptible to the effects of drought. The expected likelihood of future losses associated with reductions in water supply from underground aquifers would be low. However, the expected likelihood of future losses associated with reductions in water supply from surface water sources would be much higher because surface water sources (such as reservoirs and rivers) are much less resistant to periods of drought and are more susceptible to being impacted.

A third common affect of drought is fish and wildlife mortality. Ulster County is largely rural has diverse populations of fish and wildlife and abundant creeks, estuaries, aquifers and reservoirs provide essential water resources. Five different threatened and endangered species reside in Ulster County. Because so much of the land area in Ulster County is undeveloped, fish and wildlife habitat is fairly high and therefore losses to fish and wildlife could likely be high.

A fourth common affect of drought is wildfires. Due to Ulster County's largely undeveloped nature, fuel is plentiful for wildfires. In Ulster County, fuel tends to be most plentiful in areas where development

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densities are lowest; this works to reduce possible property damages and loss of life; however, the wildland-urban interface would be particularly vulnerable as well as transportation routes. Wildfires are a unique hazard addressed separately in this plan.

For the purpose of estimating annual drought damages at this time, we have evaluated the NOAA NCDC database for drought events in the last ten years (1998-2008) and have determined that these events have caused approximately \$50,000,000 in crop related damages (or \$5,000,000 per year county-wide). Using this historical data for estimated annual damages county-wide, annual losses on a municipal level were estimated by distributed the annual county-wide losses using a weighted percentage of crop land/pasture land. This methodology does not take into account the degree of variation in value of various crops/livestock, or the degree of drought resistance and should be used for mitigation planning purposes only.

<b>Table 3c.9 Annual Loss Estimates – Drought</b>			
<b>Jurisdiction</b>	<b>Total Acres Cultivated Crop Land / Pasture</b>	<b>Percent of Total Cultivated Crop Land / Pasture = Estimated Percent of Total Annual Losses</b>	<b>Annual Loss Estimate, Drought</b>
Denning, Town of	203	0.32%	\$16,185
Ellenville, Village of	38	0.06%	\$3,030
Esopus, Town of	1,940	3.09%	\$154,678
Gardiner, Town of	7,296	11.63%	\$581,716
Hardenburgh, Town of	997	1.59%	\$79,492
Hurley, Town of	965	1.54%	\$76,940
Kingston, City of	92	0.15%	\$7,335
Kingston, Town of	203	0.32%	\$16,185
Lloyd, Town of	2,810	4.48%	\$224,044
Marbletown, Town of	5,108	8.15%	\$407,265
Marlborough, Town of	6,838	10.90%	\$545,199
New Paltz, Town of	3,616	5.77%	\$288,307
New Paltz, Village of	92	0.15%	\$7,335
Olive, Town of	915	1.46%	\$72,954
Plattekill, Town of	4,026	6.42%	\$320,996
Rochester, Town of	6,144	9.80%	\$489,866
Rosendale, Town of	663	1.06%	\$52,862
Saugerties, Town of	3,640	5.80%	\$290,220
Saugerties, Village of	50	0.08%	\$3,987
Shandaken, Town of	324	0.52%	\$25,833
Shawangunk, Town of	10,790	17.21%	\$860,296
Ulster, Town of	1,873	2.99%	\$149,336
Wawarsing, Town of	3,348	5.34%	\$266,939
Woodstock, Town of	742	1.18%	\$59,160
<b>Total, County-wide:</b>	<b>62,711</b>	<b>100.00%</b>	<b>\$5,000,000</b>

### Estimated Damages – Wildfires

Sufficient data was not available at the time of the study to estimate damages due to wildfires. At this time, vulnerability is being expressed as the value of improvements exposed to the hazard, as presented in the Identification and Characterization of Assets section of this plan.

First, according to FEMA's How-To #2, current loss estimation methodologies are not available for estimating wildfire damages. In addition, specific information would be required for buildings in order to develop alternate methodologies, such as type of construction, and details on any existing protective features. This data was not available as a part of the County GIS during this study.

Second, having even the year built data for each structure, one would be able to highlight structures built before codes and standards were adopted to make buildings more resistant to wildfire damage, thus being better candidates for mitigation. Without the year-built data, this can not be done.

If this information should become available in the future, it could be incorporated into future updates of the plan. While one could make some blanket assumptions at this time to use various tools for loss estimation, this would likely yield erroneous data given the high degree of variation in type and density of development. Acting upon such rough estimates could result in an unwise use of limited resources.

Loss estimation methodologies are not currently available for estimating wildfire damages. Sufficient historical data regarding events and associated losses was not available to quantify here. For the purpose of this analysis, we have determined that annual losses are unquantifiable at this time.

<b>Jurisdiction</b>	<b>Total Value of Improvements</b>	<b>Annual Loss Estimate, Wildfires</b>
Denning, Town of	\$51,126,978	unquantifiable
Ellenville, Village of	\$47,291,413	unquantifiable
Esopus, Town of	\$823,898,937	unquantifiable
Gardiner, Town of	\$612,092,899	unquantifiable
Hardenburgh, Town of	\$50,791,094	unquantifiable
Hurley, Town of	\$639,336,069	unquantifiable
Kingston, City of	\$1,922,939,212	unquantifiable
Kingston, Town of	\$57,541,463	unquantifiable
Lloyd, Town of	\$856,612,633	unquantifiable
Marbletown, Town of	\$993,766,725	unquantifiable
Marlborough, Town of	\$722,416,282	unquantifiable
New Paltz, Town of	\$578,833,042	unquantifiable
New Paltz, Village of	\$238,672,524	unquantifiable
Olive, Town of	\$377,496,142	unquantifiable
Plattekill, Town of	\$556,675,301	unquantifiable
Rochester, Town of	\$564,685,441	unquantifiable
Rosendale, Town of	\$469,479,238	unquantifiable
Saugerties, Town of	\$1,217,383,571	unquantifiable
Saugerties, Village of	\$275,716,843	unquantifiable
Shandaken, Town of	\$402,760,909	unquantifiable

**Table 3c.10**  
**Annual Loss Estimates – Wildfires**

<b>Jurisdiction</b>	<b>Total Value of Improvements</b>	<b>Annual Loss Estimate, Wildfires</b>
Shawangunk, Town of	\$1,093,099,620	unquantifiable
Ulster, Town of	\$1,189,900,886	unquantifiable
Wawarsing, Town of	\$391,482,171	unquantifiable
Woodstock, Town of	\$1,250,466,647	unquantifiable
<i>Total, County-wide:</i>	<i>\$15,384,466,039</i>	unquantifiable

### **Estimated Damages – Severe Weather Events: Hurricanes/Tropical Storms, Tornadoes, Winter Storms/Ice Storms and Nor’easters**

Severe weather events have certain hazards associated with them, as discussed throughout the Hazard Profile section of this plan. Please see Estimated Damages for the specific hazards associated with a given event.

#### **Summary**

The following table is a useful tool to summarize vulnerability in terms of annual damages estimated for various hazards in communities across Ulster County. For mitigation planning purposes only, municipalities could use this information in their evaluation and prioritization of mitigation options, and development of a mitigation strategy, as municipalities may wish to stress mitigation of those hazards for which annual loss estimates are the highest. These estimated damages are not intended for use in any more formal benefit-cost analyses.

SECTION 3c - RISK ASSESSMENT: ESTIMATED DAMAGES IN HAZARD AREAS

Table 3c.11

Annual Loss Estimates – Summary, All Natural Hazards

Jurisdiction	Total Value of Improvements	Extreme Temperatures	Extreme Wind	Earthquake	Flood	Ice Jams	Dam Failure	Lightning	Landslides	Drought	Wildfires
Denning, Town of	\$51,126,978	<i>negligible</i>	\$2,271	\$1,645	\$12,945	unquantifiable	<i>negligible</i>	\$102	<i>negligible</i>	\$16,185	unquantifiable
Ellenville, Village of	\$47,291,413	<i>negligible</i>	\$2,100	\$1,521	\$5,642	unquantifiable	<i>negligible</i>	\$95	<i>negligible</i>	\$3,030	unquantifiable
Esopus, Town of	\$823,898,937	<i>negligible</i>	\$36,592	\$26,504	\$95,452	unquantifiable	<i>negligible</i>	\$1,649	<i>negligible</i>	\$154,678	unquantifiable
Gardiner, Town of	\$612,092,899	<i>negligible</i>	\$27,185	\$19,690	\$44,269	unquantifiable - 8 historic events	<i>negligible</i>	\$1,225	<i>negligible</i>	\$581,716	unquantifiable
Hardenburgh, Town of	\$50,791,094	<i>negligible</i>	\$2,256	\$1,634	\$11,265	unquantifiable	<i>negligible</i>	\$102	<i>negligible</i>	\$79,492	unquantifiable
Hurley, Town of	\$639,336,069	<i>negligible</i>	\$28,395	\$20,567	\$18,005	unquantifiable	<i>negligible</i>	\$1,280	<i>negligible</i>	\$76,940	unquantifiable
Kingston, City of	\$1,922,939,212	<i>negligible</i>	\$85,403	\$61,859	\$86,459	unquantifiable - 1 historic event	<i>negligible</i>	\$3,849	<i>negligible</i>	\$7,335	unquantifiable
Kingston, Town of	\$57,541,463	<i>negligible</i>	\$2,556	\$1,851	\$7,946	unquantifiable	<i>negligible</i>	\$115	<i>negligible</i>	\$16,185	unquantifiable
Lloyd, Town of	\$856,612,633	<i>negligible</i>	\$38,045	\$27,556	\$75,923	unquantifiable	<i>negligible</i>	\$1,715	<i>negligible</i>	\$224,044	unquantifiable
Marbletown, Town of	\$993,766,725	<i>negligible</i>	\$44,136	\$31,969	\$170,184	unquantifiable	<i>negligible</i>	\$1,989	<i>negligible</i>	\$407,265	unquantifiable
Marlborough, Town of	\$722,416,282	<i>negligible</i>	\$32,085	\$23,239	\$5,575	unquantifiable	<i>negligible</i>	\$1,446	<i>negligible</i>	\$545,199	unquantifiable
New Paltz, Town of	\$578,833,042	<i>negligible</i>	\$25,708	\$18,621	\$29,064	unquantifiable - 2 historic events	<i>negligible</i>	\$1,159	<i>negligible</i>	\$288,307	unquantifiable
New Paltz, Village of	\$238,672,524	<i>negligible</i>	\$10,600	\$7,678	\$15,357	unquantifiable	<i>negligible</i>	\$478	<i>negligible</i>	\$7,335	unquantifiable
Olive, Town of	\$377,496,142	<i>negligible</i>	\$16,766	\$12,144	\$28,316	unquantifiable	<i>negligible</i>	\$756	<i>negligible</i>	\$72,954	unquantifiable
Plattekill, Town of	\$556,675,301	<i>negligible</i>	\$24,723	\$17,908	\$0	unquantifiable	<i>negligible</i>	\$1,114	<i>negligible</i>	\$320,996	unquantifiable
Rochester, Town of	\$564,685,441	<i>negligible</i>	\$25,079	\$18,165	\$52,963	unquantifiable	<i>negligible</i>	\$1,130	<i>negligible</i>	\$489,866	unquantifiable
Rosendale, Town of	\$469,479,238	<i>negligible</i>	\$20,851	\$15,103	\$38,150	unquantifiable - 11 historic events	<i>negligible</i>	\$940	<i>negligible</i>	\$52,862	unquantifiable
Saugerties, Town of	\$1,217,383,571	<i>negligible</i>	\$54,067	\$39,162	\$93,551	unquantifiable	<i>negligible</i>	\$2,437	<i>negligible</i>	\$290,220	unquantifiable
Saugerties, Village of	\$275,716,843	<i>negligible</i>	\$12,245	\$8,870	\$18,383	unquantifiable	<i>negligible</i>	\$552	<i>negligible</i>	\$3,987	unquantifiable
Shandaken, Town of	\$402,760,909	<i>negligible</i>	\$17,888	\$12,956	\$101,132	unquantifiable - 2 historic events	<i>negligible</i>	\$806	<i>negligible</i>	\$25,833	unquantifiable
Shawangunk, Town of	\$1,093,099,620	<i>negligible</i>	\$48,548	\$35,164	\$182,065	unquantifiable - 4 historic events	<i>negligible</i>	\$2,188	<i>negligible</i>	\$860,296	unquantifiable
Ulster, Town of	\$1,189,900,886	<i>negligible</i>	\$52,847	\$38,278	\$84,212	unquantifiable	<i>negligible</i>	\$2,382	<i>negligible</i>	\$149,336	unquantifiable
Wawarsing, Town of	\$391,482,171	<i>negligible</i>	\$17,387	\$12,594	\$48,421	unquantifiable	<i>negligible</i>	\$784	<i>negligible</i>	\$266,939	unquantifiable
Woodstock, Town of	\$1,250,466,647	<i>negligible</i>	\$55,670	\$40,323	\$100,722	unquantifiable	<i>negligible</i>	\$2,509	<i>negligible</i>	\$59,160	unquantifiable
<b>Total, County-wide:</b>	<b>\$15,384,466,039</b>	<b><i>negligible</i></b>	<b>\$683,400</b>	<b>\$495,000</b>	<b>\$1,326,000</b>	<b>unquantifiable</b>	<b><i>negligible</i></b>	<b>\$30,800</b>	<b><i>negligible</i></b>	<b>\$5,000,000</b>	<b>unquantifiable</b>

## **SECTION 3d - RISK ASSESSMENT: EXISTING LAND USES AND FUTURE DEVELOPMENT TRENDS IN HAZARD AREAS**

### **Historic**

The Ulster County economic development plan "Ulster Tomorrow" begins by describing the County's rich history. It describes the County's agrarian beginning and then goes on to discuss the County's growth during the industrial revolution, the economic downturn of the 1990s, and its struggles to revitalize its manufacturing base, maintain its legacy in production agriculture, and continue to encourage its tourism-visitor industry without compromising its natural resources. This is not only a story of economic development in Ulster County, but also a story of how that development can be affected by the hazards which affect the County.

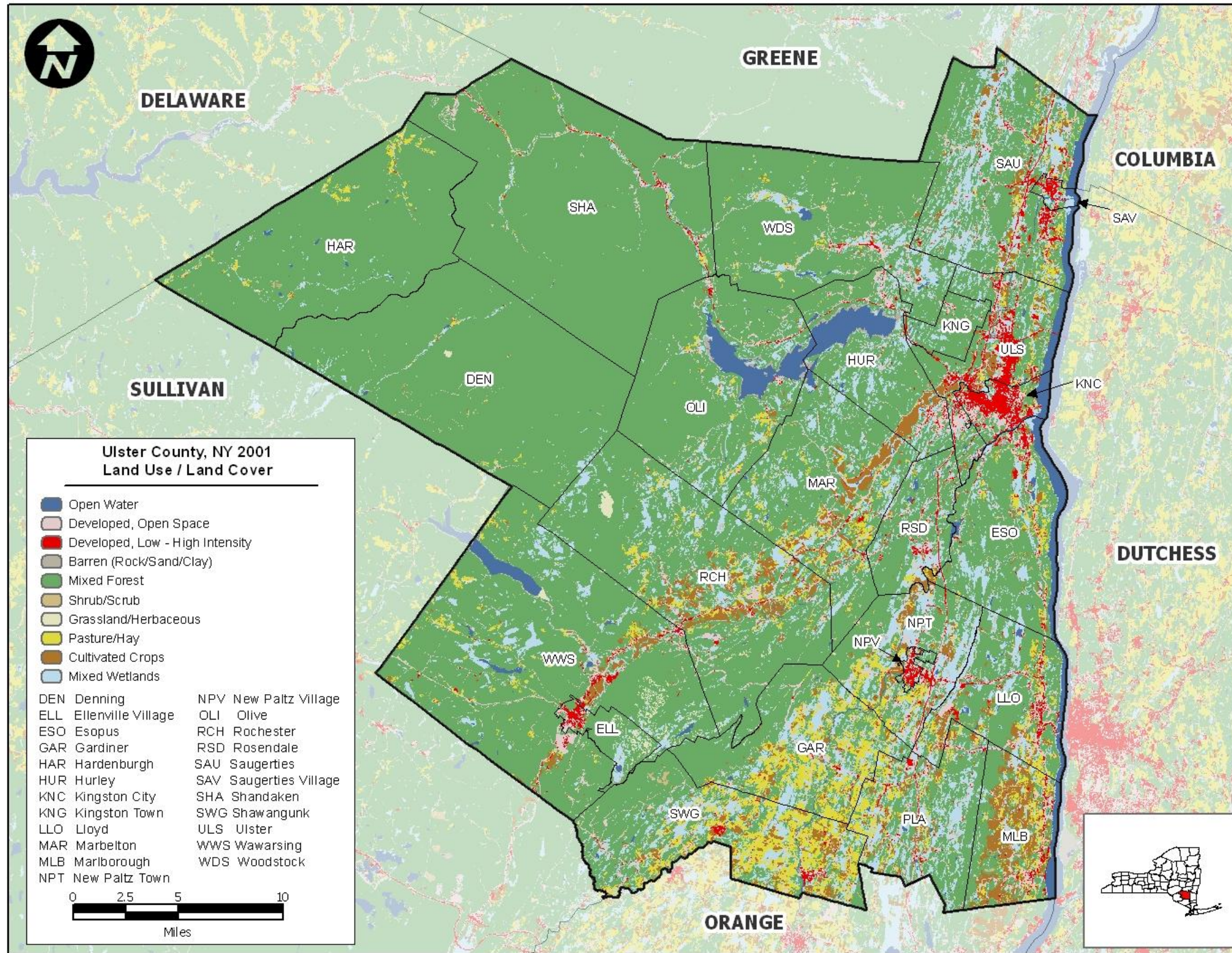
### **Existing Land Use**

Ulster County is located in the Catskill Mountains in the Hudson River Valley of southeastern New York State approximately 70 miles north of New York City and 45 miles south of Albany. It is 1,126 square miles in area. There are 24 municipal jurisdictions in addition to the County, with the City of Kingston as the County seat. The Countywide population as determined by the 2000 Census was 177,749 and NYSIS population projections estimate a 2020 population of 203,871. Figure 3.d.1 presents a graphical depiction of the land use/land cover in Ulster County, and the component data used to compile this figure is presented in Table 3d.1. The table and the figure show clearly that more than half the County land area is forested, with only a little under 7% of the County classified as developed. While cultivated land and other farmland accounts for less than 10% of the County's land area, agriculture/farming is locally considered to be of paramount importance to the economy and the character of the County.

Major areas of designated open space include:

- Catskill Forest Preserve with 160,000 acres
- Minnewaska State Park with 12,000 acres
- Mohonk Preserve with more than 6,500 acres
- Two County parks (one with over 3,000 feet of Hudson River Frontage and one with 150 acres)

Figure 3d.1: Ulster County Land Use / Land Cover



**Table 3d.1**  
**Ulster County Land Cover Estimates**

Description of Land Use	Acres	Percent of Land Use
Open Water	20,188.9	2.7
Developed, Open Space	35,467.4	4.8
Developed, Low Intensity	9,197.8	1.2
Developed, Medium Intensity	3,276.5	0.4
Developed, High Intensity	1,280.3	0.2
Barren Land (Rock/Sand/Clay)	1,374.8	0.2
Deciduous Forest	374,662.5	50.4
Evergreen Forest	38,447.9	5.2
Mixed Forest	118,234.8	15.9
Shrub/Scrub	1,479.8	0.2
Grassland/Herbaceous	2,938.3	0.4
Pasture/Hay	33,004.8	4.4
Cultivated Crops	30,609.3	4.1
Woody Wetlands	72,106.5	9.7
Emergent Herbaceous Wetlands	1,059.5	0.1
<b>Ulster County Total</b>	<b>743,329.3</b>	<b>100.0</b>

## Land Use Planning

Land use planning in the State of New York is primarily a function of local communities, with Ulster County serving a coordination function for those elements that are best served on a regional level. The County has completed or is working on an economic development strategy, a housing strategy, an open space plan, a stormwater management program and a long range transportation plan. At the local level, seven of the nine participating communities who returned the Land Use and Development Trends Questionnaire have zoning statutes, while only five of the communities have subdivision statutes and six have comprehensive plans. However, all nine have either combined planning and zoning boards or separate planning boards and zoning boards of appeals. No information was available regarding land use regulations for the Town of Kingston.

**Table 3d.2**  
**Communities with Land Use Regulations**  
(Source: Ulster County Planning Department and internet)

Zoning Statutes	Building Code	Subdivision Statutes	Comprehensive Plans
Town of Gardiner	Town of Gardiner	Town of Gardiner	Town of Gardiner
Town of Hurley	Town of Hurley		Town of Hurley
City of Kingston	City of Kingston		
Town of Lloyd	Town of Lloyd	Town of Lloyd	Town of Lloyd
Town of Marlborough	Town of Marlborough	Town of Marlborough	Town of Marlborough
Town of Rosendale	Town of Rosendale		Town of Rosendale
Town of Shandaken	Town of Shandaken	Town of Shandaken	Town of Shandaken
Town of Ulster	Town of Ulster	Town of Ulster	Town of Ulster



### **Existing Land Use – Town of Gardner**

The Town of Gardner had a population in 2000 of 5,283 people. The 2000 Census indicated that the Town of Gardner's average household size was 2.6 people per household resulting in the average number of housing units being 2032. The Town includes 5 hamlets which are developed along the highways of the town. Development in these hamlets is a mixture of residences and commercial activities. Recreational and open space uses cover much of the remainder of the Town. Approximately 5,200 acres, or 18%, of the town's 28,600 acres are considered protected open-space. A large area of the town is also working agricultural land.

### **Existing Land Use – Town of Hurley**

The Town of Hurley has very little open land (not forested) left for developing, and as such experiences single family home building on a moderate to low scale. Hurley has seen interest recently on developing a PRD, but this application was withdrawn. The Planning Board has approved a new subdivision recently which may result in a few new homes being built on Dug Hill Road.

### **Existing Land Use – City of Kingston**

Development trends in the City of Kingston are focused on the Rondout Creek - Hudson River area of the city. These proposed developments are of mixed use and density. While primarily condominium and single family homes there is a light industrial and commercial component as well. These proposals if developed fully would add as many as 2000 units of housing with a commensurate increase in population. These developments primarily involve the reuse of industrial areas that have been abandoned for many years. The city has developed a waterfront redevelopment plan and has established zoning requirements for development within the Hudson River and Rondout Creek areas.

### **Existing Land Use – Town of Kingston**

The Town of Kingston does not have any major construction going on at the present time. The building that is being done is scattered around the Town. There is a pre-existing seventy five lot subdivision located across the road from the Sawkill Creek. This neighborhood has the potential to flood. The developer removed six feet of soil before homes were built. Other areas of the Town of Kingston have steep slopes that front on Ulster County and New York State roads.

### **Existing Land Use – Town of Lloyd**

The Town of Lloyd had a population in 2000 of 9,941 people and 3,818 housing units. Most of Lloyd is characterized by severe or very severe limitations for development. Large portions of the town are constrained by steep slopes with greater than 15% gradient and the town has the greatest concentration of wetlands in the County. Development patterns include small rural communities with intervening open space. Active agriculture is an important part of the Town's economy. Finally, the Town includes large blocks of intact forests. The Town includes one hamlet that is located on the eastern side of the Town. The eastern side of the Town borders the Hudson River.

### **Existing Land Use – Town of Marlborough**

The Town of Marlborough has the most agricultural/farmland of any municipality in the County, most of which is under cultivation. It had a population in 2000 of 8,263 in 3,020 households. Although there has been substantial encroachment by new residential development in recent years, and several multi-dwelling residential developments are proposed, the Town has recently resisted any further efforts to increase single-family residential development. Commercial or industrial development has not been significant in recent years and this is unlikely to change in the foreseeable future.

### **Existing Land Use – Town of Rosendale**

The Town of Rosendale had a population in 2000 of 6,352 people and 2,851 housing units with 5% of the housing units being seasonal units. 72% of the units were single family detached. The Town includes 3 larger hamlets and several smaller ones. According to year 2000 data, the four leading local employment sectors in Rosendale were transportation, hospitality, retail, and health. The next three largest employers were manufacturing, construction, and education. Development constraints such as Federal and State regulated wetland, severe slopes and floodplains cover much of the Town.

### **Existing Land Use – Town of Shandaken**

The Town of Shandaken had a population in 2000 of 3,235 people and 2,668 housing units with a majority (80%) of the units being single-family detached structures. Only 55% of the structures are owner occupied. Also, 55 % of the residents are full-time residents. The Town includes 12 hamlets which are developed along the highways of the town. Development in these hamlets is a mixture of residences, tourist-oriented businesses, real-estate offices and service businesses and small pockets of resource related businesses, such as saw mills and bluestone industries. Recreational and open space uses cover much of the remainder of the Town.

Shandaken is comprised of 79,200 acres and has only limited development potential. The general breakdown of land use is:

- 66% of this land is currently under public ownership and designated as public open space;
- 14% comprises of residential land uses;
- 9% of private open space;
- 7% vacant land;
- 4% miscellaneous.

The majority of the Town's development is located in the valleys of Esopus Creek and its tributaries. As such, there is a high potential for significant flood impacts. There is also a potential for similar impacts during snowstorms, ice storms or other major weather events.

### **Existing Land Use – Town of Ulster**

The Town of Ulster had a population in 2000 of 12,544 people and 5,239 housing units with 61% of the units being single-family detached structures. 67.1% of the structures are owner occupied. 92.6 % of the residents are full-time residents. The Residential development in the Town is both Residential and rural.

Retail development has occurred along Ulster Avenue, US Route 9W, Washington Avenue and NYS Route 28. Farmlands tend to be concentrated within the floodplain of Esopus Creek. Development in the Town of Ulster is a mixture of residential, commercial, offices, warehouses, recreational, open space, institutional, government and manufacturing uses. Much of the developed areas lie between Interstate Highway 87 and Highway 9W.

The Town includes some areas with Slopes of 15% or greater that are subject to Landslides. The Town has developed a GIS based map that shows the location of these areas. Floodplains include land along the Hudson River and Esopus Creek. The Esopus Creek floodplain is generally along Interstate Highway 87. The majority of the Town's development is located in the valleys of Esopus Creek and its tributaries. As such, there is a high potential for significant flood impacts. There is also a potential for similar impacts during snowstorms, ice storms or other major weather events.

### **Future Development Trends – County Overview**

Ulster County lies approximately 70 miles north of New York City and 45 Miles south of Albany. This unique location makes the County a place that residents from New York City can go to escape the costs, pressures and densities of life in a major metropolis. It also makes the County a place where businesses want to located that serve the State of New York's two most important cities. At the same time, Ulster County's location between the Hudson River and the Catskill Mountains ensures that development can not get too intense, especially since the County, the State, the local jurisdictions and private organization have done an excellent job of ensuring that much of the County will remain in public open space.

Earlier in this chapter, eleven hazards were identified as having a significant impact on Ulster County and have been analyzed in detail in this plan. The

### **Future Development Trends – Extreme Wind**

The wind hazard area encompasses the entire County and is essentially uniform from one jurisdiction to the next. Therefore, future development trends for the wind hazard area would be the same as those county-wide. While an increased number of structures could be exposed in the future, all communities have adopted the New York State Building Code in addition to any local changes that they may have made, so that they will be constructed with a certain degree of protection from the most frequent high wind events.

### **Future Development Trends – Hurricanes and Tropical Storms, Nor'easters, and, Tornadoes**

Severe weather events such as hurricanes/tropical storms can occur anywhere in Ulster County. These events will not have the same affect on Ulster County as they would on a coastal county; however the rain and hurricane force winds can still have a major affect on the County. The hazards associated with them include:

- For hurricanes/tropical storms and nor'easters, see future development trends for flooding and extreme winds.
- For tornadoes, see future development trends for high winds.

### **Future Development Trends – Lightning**

The lightning hazard area encompasses the entire County and is uniform from one jurisdiction to the next. Therefore, future development trends for the lightning hazard area would be the same county-wide. It is anticipated that while an increasing number of structures will be present in the County, they will be constructed at least in accordance with currently adopted building codes which include basic measures to protect against lightning strikes.

### **Future Development Trends – Dam Failure**

The New York State Department of Environmental Conservation Dam Safety Program maintains an inventory of dams in the State and conducts safety inspections of dams, completes technical reviews of proposed dam construction or modification, monitoring of remedial work for dam safety compliance, and is involved in emergency preparedness activities. At the time of writing, research of readily available data sources did not reveal any dams proposed or under construction, in addition to those listed by the US Army Corps of Engineers National Inventory of Dams, or the Stanford University National Performance of Dams Program.

### **Future Development Trends – Drought**

The drought hazard area encompasses the entire County and is uniform from one jurisdiction to the next, although the local impact depends on the prevalence of agricultural land in individual municipalities. While the individual jurisdictions would like to focus on the preservation of farmland and other open space, possible pressures on agricultural land in Ulster County to be zoned for residential and other development, may reduce the economic effects of drought on agriculture, while the impact on potable water supplies may increase.

### **Future Development Trends – Flood**

Individuals and larger developers often look toward land along rivers, streams, canals, bays, and near the ocean for development because of the passive and active recreational opportunities that they offer. In turn, flood hazard areas (for flooding and storm surge) are often areas where development pressures are high due to the recreational value of these lands, particularly in communities where the amount of undeveloped land is small and the density of development is high.

Development within mapped flood hazard areas is currently regulated for communities participating in FEMA's National Flood Insurance Program (NFIP). All municipalities in the County participate in FEMA's National Flood Insurance Program, and thereby must have in place a floodplain management ordinance to regulate activities in the floodplain, as well as a designated floodplain manager/NFIP Coordinator to enforce the relevant ordinances. This will work to protect new development and substantial improvements in the County's floodplains. In addition, the Towns of Rosendale and Shandaken have included a discussion of floodplains in their comprehensive plan. The Town of Lloyd does not include floodplains, but does include a section on the restraints to development due to hydrologic considerations.

While an increased number of assets could be susceptible, it is assumed that they will be built to codes that will offer a certain degree of protection from the most frequent events.

### **Future Development Trends – Ice Jams**

The ice jam hazard is similar to the flood hazard in that ice jams may cause rivers and streams to overflow their banks. If a structure is near the banks of the rivers or streams, it may also be subject to structural damage from the impact of ice striking the structure. The jurisdictions' flood hazard ordinances are assumed to currently deal with the flooding aspect of the ice jam hazard, and future damages due to this hazard will depend on development within the floodplain and adherence to the relevant building codes.

### **Future Development Trends – Earthquake**

For Ulster County, PGA values of between 3 and 4%g have a 10 percent chance of being exceeded over 50 years. The earthquake hazard area encompasses the entire County and is nearly uniform from one jurisdiction to the next, although the effects of an earthquake may vary from one jurisdiction and across jurisdictions as the soil type varies. Therefore, future development trends for the earthquake hazard area would be the same as other county-wide hazards. All communities have adopted the New York State Building Code in addition to any local changes that they may have made.

### **Future Development Trends – Landslides**

Scattered areas of the County are susceptible to landslide activity as described in Section 3a. Although there are few recorded examples of significant landslide events in Ulster County, the future may bring an increased frequency of events if vacant parcels and wildland areas in the relevant areas continue to be built on. The Towns of Lloyd, Rosendale and Ulster have included mapping of potential landslide areas as part of their comprehensive plan. They had previously determined that those areas could be a risk and consider the areas a constraint to development.

### **Future Development Trends – Wildfires**

Areas that are typically considered to be safe from wildfires include highly urbanized, developed areas that are not contiguous with vast areas of wild lands. Areas typically considered to be prone to wildfires include large tracts of wild lands containing heavier fuels with high continuity such as those forested areas in many parts of the County. Pressure to develop some forested areas, especially for residential use, will generally result in increases to the urban-wildlife interface and the value of improved property within these areas in most jurisdictions, and hence an increased risk of future property damage and public danger due to wildfires.

### **Conclusion**

Ulster County is balancing the objectives of preserving natural, cultural and historic resources; facing the reality of an economy which is undergoing a big change as the nation moves into the post-industrial era; and, seeing development that is driven by agricultural and natural resources as well as the occurrences of the nation's largest urban area only 70 miles away. The County is involved in economic development, housing, open space, Stormwater and transportation planning, while six of the eight participating jurisdiction in this planning effort have prepared comprehensive plans in the past four years. This is an indication that they are concerned with their communities and want to ensure that they are safe, thriving

and appealing places to live work and play. The following recent development trends are expected to continue in the future:

- The County and its jurisdictions will continue to focus on preserving open space throughout the area;
- Most new development will continue to occur in the Hudson River Valley, especially along Interstate Highway 87 corridor;
- Additional development will take place along transportation corridors in the County, particularly in and around existing hamlets that have developed throughout the County;
- Redevelopment will take place throughout the County, as sites that were vacated due to changes in the economy are reused, modified or replaced;
- Agriculture and natural resources will continue to be a focus of the Ulster County economy;
- Ulster County will continue to be both recreational destination and drive both the commercial and industrial development in the County;
- Ulster County will continue to be a location where individuals that seek to leave the bustle of the New York City urban area seek to locate.

As such the County and its jurisdictions will continue to focus on:

1. Preserving open space throughout the County;
2. Ensuring that development within the County will meet the minimum requirements of the National Flood Insurance Program as well as meeting the County's minimum Stormwater Management requirements;
3. Enforcing minimum building codes meeting the requirements of New York State Building Code;
4. Ensuring that development is limited to areas that are not subject to high landslide potential.

*Note: All data was taken from websites of Ulster County or the participating jurisdictions. Of special significance were plans from Ulster County and the Towns of Gardiner, Hurley, Lloyd, Rosendale, Shandaken and Ulster.*

A full summary of all the completed Land Use and Development Questionnaires returned by individual jurisdictions is presented in Table 3.d.3.

Summary of Responses – Land Use and Development Trends Questionnaire

**Table 3d.3**  
**Summary of Responses**  
**Land Uses and Development Trends Questionnaire**  
*(Source: Core Planning Group Members)*

Community	Land Uses and Development Trends in Hazard Areas	Regulations/Codes/Ordinances To Protect New Development From Natural Hazards
Ulster, County of	<p>The County is making extensive efforts to support agriculture while at the same time encouraging industrial development in defined areas. Simultaneously, several large housing projects have been proposed for the area.</p> <p>&gt;Agriculture- Farming has a long rich history in Ulster County which is being threatened by residential development. Family farms that have for generations been the predominant land use within many communities are being replaced with housing developments. Ulster County is working to preserve several agriculture districts in the various fertile valleys of the County.</p> <p>&gt;Industrial development- Several areas of the County have been identified as potential "shovel-ready" candidates. The areas that are being touted as potential manufacturing/ industrial sites are the Tech City complex in the Town of Ulster, the Kingston Business Park in the City of Kingston and a few other (primarily existing) sites that have water, sewer and roadways that can support expanded business use. Since tourism has been identified as an extremely important industry in Ulster County, efforts are being made to protect open spaces, scenic vistas, historical areas and existing recreational/ tourist destinations.</p> <p>&gt;Housing- Several large housing projects have been proposed in the vicinity of the City of Kingston ó primarily along the Hudson River. The Crossroads Ventures resorts project in Shandaken also will result in significant changes in density and the landscape of the western portion of the county. While these mega projects have been held up in the regulatory/ SEQRA process (in some cases for years already), other major housing projects have been pulled from consideration in large part due to community opposition. Mid size projects and the proliferation of "McMansions" continues throughout the county, especially in southern areas.</p>	<p>Many of the land use regulations/ ordinances are implemented at the local level through Town Planning and Zoning Boards. In general, every municipality in the county does participate in the National Flood Insurance Protection Program, and every municipality honors the NYS Uniform Fire and Prevention &amp; Building Code. Additionally, seven towns have adopted steep slope ordinances for slopes greater than 15-20%. The Ulster County Planning Board is responsible for the review of local site plans, special permits, variances, comprehensive plans and zoning amendments. However, a local town planning board may take action contrary to the recommendations made by the County Planning Board by a majority plus one vote.</p>

SECTION 3d - RISK ASSESSMENT: LAND USES AND DEVELOPMENT TRENDS

**Table 3d.3**  
**Summary of Responses**  
**Land Uses and Development Trends Questionnaire**  
*(Source: Core Planning Group Members)*

Community	Land Uses and Development Trends in Hazard Areas	Regulations/Codes/Ordinances To Protect New Development From Natural Hazards
Gardiner, Town of	<p>The predominant type of development occurring in the Town is single family residential units, mostly built on 2 acre lots. Over the past 5-8 years there has been some commercial and light industrial development. Several years ago, the town enacted a building moratorium (which expired in November 2007), after it revised its master plan. Currently, the Town is in the final stage of the process of adopting a revised zoning law, and therefore some development activity is "on hold" as land owners and developers await the completion of that process. In the environmentally fragile "Shawangunk Ridge" area, significant zoning restrictions have already been adopted by the town. The Town is also attempting, through the use of open space conservation development, to preserve as much open space as possible, while permitting developers to maintain the density required to make development economically feasible. Traditional development is permitted under both the existing and the proposed zoning law.</p>	<p>Flooding: Chapter 121 of the Town Code, "Flood Damage Protection" addresses the issues of development on the floodplain, and is based on the FEMA Flood Insurance Rate Map (Index No. 360856 0005-0050) dated 7/16/97, and a scientific and engineering report entitled "Flood Insurance Study, Town of Gardiner, NY, Ulster County" dated 7/16/97. The proposed zoning law incorporates these provisions in creating a Floodplain Overlay District, defined as the one-hundred-year floodplain, based on FEMA maps.</p> <p>Section 220-13 (C) of the proposed zoning law reads: "In addition to any restrictions, requirements, or permits imposed or required by Chapter 121, no new structure intended for residential use and no new septic tank, leach field, or other sanitary sewage system shall be located within the Floodplain Overlay District. This shall not prevent the replacement of existing facilities." Steep Slope Development: The current zoning law addresses this issue in Chapter 220, Article V, Section 13.1 (F) (4) (b). Wildfire Hazard Areas: The current zoning law addresses this issue in Chapter 220, Article V, Section 13.1 (E). (N.B. While not enacted specifically to address the wildfire issue, the restrictions on lot size, etc. in the SP sections of the zoning law have the effect of reducing that risk.)</p>
Hurley, Town of	<p>Hurley has very little open land (not forested) left for developing, and as such experiences single family home building on a moderate to low scale. Hurley has seen interest recently on developing a PRD, but this application was withdrawn. The Planning Board has approved a new subdivision recently which may result in a few new homes being built on Dug Hill Road.</p>	<p>At this time the town of Hurley enforces the regular regulations and building codes, with no ordinances concerning only the effects of natural hazards. That being said, the regular Codes have the function of protecting the *burden* and the surrounding area from chemical hazards. Recent *MS4* regulations are in place</p>
Kingston, City of	<p>Development trends in the City of Kingston are focused on the Rondout Creek Hudson River area of the city. These proposed developments are of mixed use and density. While primarily condominium and single family homes there is a light industrial and commercial component as well. These proposals if developed fully would add as many as 2000 units of housing with a commensurate increase in population. These developments primarily involve the reuse of industrial areas that have been abandoned for many years. The city has developed a waterfront redevelopment plan and has established zoning requirements for development within the Hudson River and Rondout Creek areas. There has been acquisition of properties along the Rondout Creek</p>	<p>The City of Kingston does enforce regulations/ codes and local ordinance that regulate new development with regard to natural hazards. Applicable New York State Building and Fire Codes address wind and snow load design criteria for new construction. The city through its land use and site plan approval process regulates storm water runoff and control. The city floodplain coordinator and city engineer are part of the approval process in the development of site plan approvals and the issuance of building permits.</p>



SECTION 3d - RISK ASSESSMENT: LAND USES AND DEVELOPMENT TRENDS

**Table 3d.3**  
**Summary of Responses**  
**Land Uses and Development Trends Questionnaire**  
*(Source: Core Planning Group Members)*

Community	Land Uses and Development Trends in Hazard Areas	Regulations/Codes/Ordinances To Protect New Development From Natural Hazards
	<p>however no firm development plans for this area has been submitted to the city. It is anticipated that this will be an area of significant development in the near future. This is an area previously used for industrial applications, oil storage and junk yards. Most of these parcels have been cleared and are ready for reuse.</p> <p>Additionally the city continues to pursue development of its industrial park. There are presently two tenants Alcoa operating 70000 square foot manufacturing facility and Armor Dynamics a new tenant in a 10000 square foot building with a proposed 70000 square foot addition. There are three additional development sites in the complex which would support light industrial development.</p> <p>There have been several other residential projects proposed for other areas of the city which have not been pursued.</p>	
Kingston, Town of	<p>The Town of Kingston does not have any major construction going on at the present time. The building that is being done is scattered around the Town. There is a pre-existing seventy five lot subdivision located across the road from the Sawkill Creek. This neighborhood has the potential to flood. The developer removed six feet of soil before homes were built. Other areas of the Town of Kingston have steep slopes that front on Ulster County and New York State roads.</p>	<p>The Town of Kingston enforces current New York State building code regulations for development in the floodplain. Other hazards such as wind and landslides, the Town follows the New York State building code.</p>
Lloyd, Town of	<p>The Town of Lloyd is experiencing strong growth on the Eastern side of Illinois Mountain, which in effect splits the Town in its center, in the Route 9W and Route 44/55 corridor. There is a mix of commercial development and medium density residential development and medium density residential development. The Twalfskill Creek, one of our identified flood prone basins, sits between these two corridors. A large commercial project is being reviewed by our Planning Board for the Route 9W and Route 299 corner, which will impact the unnamed water course which joins the Twalfskill in the Hamlet of Highland. Further, light residential and some light commercial development continues in the Black Creek Basin, another identified flood prone watercourse.</p> <p>Other proposed projects include residential developments in the Lower Twalfskill basin (single family dwellings), further light residential developments along the Route 44/55 corridor.</p> <p>The Western side of Illinois Mountain is light residential and agricultural, with scattered commercial sites.</p>	<p>The Town of Lloyd Code includes regulations for flood plains, stormwater management, and our code on Zoning has language that encourages the Planning Board to review with water management in mind. We are also working on a new chapter for the regulation of construction near watercourses in the town, which would restrict construction in and near boundaries of watercourses in the town. We also work with the DEC for enforcement of SWPP (Lloyd is an MS4 community) through a municipal code officer.</p>

SECTION 3d - RISK ASSESSMENT: LAND USES AND DEVELOPMENT TRENDS

**Table 3d.3**  
**Summary of Responses**  
**Land Uses and Development Trends Questionnaire**  
*(Source: Core Planning Group Members)*

Community	Land Uses and Development Trends in Hazard Areas	Regulations/Codes/Ordinances To Protect New Development From Natural Hazards
Marlborough, Town of	<p>The predominant land use in Marlborough remains agricultural. There has been a substantial loss to single-family residential development in the rural areas. There has been some multi-family development in the hamlet areas of Milton &amp; Marlboro. There are two large multi-housing projects being proposed in Marlboro adjacent to Rt 9W. There has been little commercial or industrial growth. Most recently there has been a halt on single-family residential building.</p>	<p>The Town of Marlborough is in the process of updating the codes with the help of Behan Associates (Planning Consultants). Our existing code does have language to help guide development and protect for the effects of natural hazards:</p> <ul style="list-style-type: none"> <li>Chapter 8 ó Conservation Advisory Council</li> <li>Chapter 29 ó Exposure to Disease Control Plan</li> <li>Chapter 47 ó Building Construction</li> <li>Chapter 48 ó 911 Numbering of Buildings</li> <li>Chapter 75 ó Clearing &amp; Grading</li> <li>Chapter 89 ó SEQRA Review</li> <li>Chapter 93 ó Explosives &amp; Blasting</li> <li>Chapter 97 ó Flood Damage Protection</li> <li>Chapter 134 ó Subdivision of Land</li> <li>Chapter 135 Stormwater Management</li> <li>Chapter 155 ó Zoning (Steep Slope/Right to Farm)</li> </ul>
Rosendale, Town of	<p>Rosendale is an area with much land that is constrained either by slope, flood plain or wetland. By contrast, Rosendale has a topography that seems almost corrugated in character. This is particularly true in the glaciated areas in the northern part of Town, among Binnerwater lakes. Heading south, these steep slopes descend to Rondout Creek. The Shawangunk Ridge rises just south of the creek. The only extensive flat area in Town is in the vicinity of Tillson (an area once referred to as Rosendale Plains). However, much of the flatland is located in flood plain.</p> <p>Consequently, unlike neighboring towns, Rosendale has little land that is easily developed. This condition has influenced Rosendale's slow to moderate growth. The planning board has seen in the past several years mainly small subdivisions, including lot line adjustments and minor subdivisions. The planning board also has experienced various side plan approvals. These side plans have been primarily on existing commercial structures where businesses have been revitalized, renovated, changed used, expanded or created. Most of these activities have taken place on RT 32 corridor and our main street business district.</p> <p>Along with site plan approvals for small business and light industry the only other development trend that could be considered is there's been four petitions for rezoning in the past three years. These rezoning</p>	<p>The Town of Rosendale currently enforces regulations, ordinances, and Local codes including NYS rules and regulations and Federal requirements. These regulatory requirements are applied when applicable to protect and promote public health, safety, morals, comfort, convenience, economy, Town aesthetics and the general welfare of the public.</p> <p>The Town has adopted local codes that enforce zoning, they are found in chapter 75. Chapter 75 Article V has regulation 75-27 that specifically addresses flood damage prevention. The Town's Local Codes can be viewed at Town of Rosendale's Web site.</p> <p>These are some of the Codes and Regulations administered and enforced by the Town:</p> <p>(Town of Rosendale Local Town Codes, Rules and Regulations; Ulster County Health Department and Other County Rules and Regulations; NYS Environmental Quality Review óNYCRR Part 617; NYS Town Law; NYS Municipal Law; NYS Residential Code; NYS Uniform Fire Prevention and Building Code; NYS Vehicle and Traffic Law; NYS Wetlands; NYS Stormwater; NYS Parks, Recreation and Historic Preservation Law; Federal Wet Lands)</p>

SECTION 3d - RISK ASSESSMENT: LAND USES AND DEVELOPMENT TRENDS

**Table 3d.3**  
**Summary of Responses**  
**Land Uses and Development Trends Questionnaire**  
*(Source: Core Planning Group Members)*

Community	Land Uses and Development Trends in Hazard Areas	Regulations/Codes/Ordinances To Protect New Development From Natural Hazards
	<p>petitions have mostly included existing residential zoning that has been changed to business and light industrial zones. Two of which were on the RT 32 corridor and the other two were in the Binnerwater area.</p> <p>The Town is currently reviewing a petition for a zoning text change to permit the redevelopment of the Williams Lake Hotel site located in Binnerwater. The proposed project is located on a 779 site that has a long history of industrial and commercial use, most recently as an outdated 95 room hotel with amenities and an internal road and trail system. The concept plan anticipates a LEED Gold-certified 130-room hotel, 160 fro sale homes (101 attached townhouses and 59 detached single family homes), a spa a wellness center, and a welcoming/ arrival facility. Roughly 729 acres, or almost 95% or the project siteø 779 acres will remain open.</p>	<p>These Codes, Laws, Rules, and regulations are administered, regulated and enforced by various departments within the Town. Some Departments and Boards within the Town only regulate and apply codes as a requirement, such as The Town Board, Planning Board and Zoning Board of Appeals.</p> <p>Whereas other departments such as the Building Department, Code Enforcement Officer, Fire Marshal and Police department apply administer and enforce the Regulations and Laws when needed.</p>
Shandaken, Town of	Last year and this year, most of our developments are alterations and repairs to single family homes. We had four single family homes being built. We get a lot of sheds, garages, wood stove permits. 75 percent of our town is owned by the State. We do not have much land to develop.	The town of Shandaken has zoning codes and flood plain management ordinances for development near the Esopus Creek.
Ulster, Town of	The Town of Ulster is currently reviewing a twenty-five lot subdivision that fronts on the Esopus Creek. Six of the twenty-five lots are on the water front. A second one hundred-lot subdivision is proposed across the street from the Esopus Creek. Both projects are expected to be approved within the next six to twelve months.	The Town of Ulster enforces building code regulations for both new construction and renovation in the flood plain. Other hazards and wildfire buffer zones, the Town of Ulster defers to the currently New York State building code.

## SECTION 4 - CAPABILITIES AND RESOURCES

This capability assessment examines the ability of Ulster County and other participating jurisdictions to implement and manage a comprehensive mitigation strategy, which includes a range of mitigation actions. The strengths, weaknesses, and resources of participating jurisdictions are identified in this assessment as a means to develop an effective hazard mitigation program. Furthermore, the capabilities identified in this assessment are evaluated collectively to develop recommendations, which support the implementation of effective mitigation actions throughout the County.

URS Corporation distributed questionnaires to the Ulster County Office of Emergency Management and the Planning Group in order to initiate this capability assessment. The questionnaires requested information pertaining to existing plans, polices, and regulations that contribute to or hinder the ability to implement hazard mitigation actions. They also requested information pertaining to the legal and regulatory capability, technical and administrative capacity, and fiscal capability of each jurisdiction. Planning Group members were asked to submit completed questionnaires illustrating their capability to implement a mitigation strategy.

This section describes the activities currently underway which contribute to or can be utilized for hazard mitigation. Due to the limited number of responses received from participating jurisdictions (nine responses were received from the 25 jurisdictions, including the County), the capability assessment emphasizes the technical and financial resources available at the State and Federal levels, which the County can access to effectively implement a hazard mitigation program.

### Capabilities and Resources – Ulster County and Participating Jurisdictions

#### *Overview*

Table 4-1 provides a summary of the relevant plans, codes, and ordinances currently in place in each participating jurisdiction based upon Capability Assessments that were completed and returned to the UCOEM. The checkmark (ç) indicates that the jurisdiction reported having the authority to implement the specified regulatory tool and that the tool is currently in place. Additional details are provided throughout the remainder of this section.

#### *Legal and Regulatory Capability*

As indicated in Table 4-1, Ulster County and its incorporated jurisdictions have several policies, programs, and capabilities, which help to prevent and minimize future damages resulting from hazards. These tools are valuable instruments in pre and post disaster mitigation as they facilitate the implementation of mitigation activities through the current legal and regulatory framework. These policies, programs, and capabilities are described in greater detail for Ulster County and the participating jurisdictions, as well as the State and Federal levels.

**Table 4-1  
Legal and Regulatory Capability Inventory**

Jurisdiction	Building Code	Zoning Ordinance	Subdivision Ordinance	Special Purposes Ordinance	Growth Mgmt Ordinance	Site Plan Review Requirements	Comprehensive Plan	Capital Improvements Plan	Economic Development Plan	Emergency Response Plan	Post-Disaster Recovery Plan	Post-Disaster Recovery Ordinance	Real Estate Disclosure Ordinance
Ulster County	-	-	-	-	-	-	½	½	½	½	-	-	-
Gardiner, Town of	½	½	½	½	½	½	½	½	½	½	½	-	-
Hurley, Town of	½	½	½	½	-	½	½	-	-	½	½	-	-
Kingston, Town of	½	½	½	½	-	½	-	-	-	-	-	-	-
Kingston, City of,	½	½	½	½	-	½	½	½	½	½	½	-	-
Lloyd, Town of	½	½	½	½	½	½	½	-	-	½	-	-	-
Marlborough, Town of	½	½	½	½	½	½	½	½	½	½	½	½	-
New Paltz, Village of	½	½	½	-	-	½	½	-	-	½	-	-	-
Shandaken, Town of	½	½	½	½	-	½	½	-	-	½	-	-	-
Ulster, Town of	½	½	½	½	-	½	½	-	-	½	-	-	-

### ***Building Code***

Building codes regulate construction standards and are developed for specific geographic areas of the country. They consider the type, frequency, and intensity of hazards present in the region. Structures built to applicable building codes are inherently resistant to many hazards such as strong winds, floods, and earthquakes, up to certain levels of severity. Due to the location specific nature of the building codes, these are very valuable tools for mitigation.

The Towns of Gardiner, Hurley, Kingston, Lloyd, Marlborough, Shandaken and Ulster, The City of Kingston and the Village of New Paltz adhere to a building code through local authority. The Towns of Gardiner, Kingston, Marlborough and Ulster also adhere to a code administered by a higher authority. Ulster County does not have the authority to adopt building codes.

### ***Zoning Ordinance***

Zoning is a useful tool to consider when developing a mitigation strategy. It can be used to restrict new development, require low-density development, and designate specific uses (e.g. recreational) in the hazard prone areas. Private property rights must be considered, but enacting a zoning ordinance can reduce or potentially eliminate damages from future hazard events. According to the State Multi-Hazard Mitigation Plan, all local communities in the State of New York are encouraged to incorporate mitigation standards in zoning and land use ordinances.

All of the jurisdictions except Ulster County that completed the Capability Assessment Questionnaire have adopted a zoning ordinance. The Towns of Gardiner, Kingston and Ulster also adhere to a code administered by a higher authority. Ulster County has a planning board that reviews and makes recommendations based on the County's Comprehensive Plan, but does not have the authority to adopt a zoning ordinance.

### ***Subdivision Ordinance***

Subdivision ordinances offer an opportunity to account for natural hazards prior to the development of land as they formulate regulations when the land is subdivided. Subdivision design that incorporates mitigation principles can reduce the exposure of future development to hazard events.

All of the jurisdictions that completed the Capability Assessment Questionnaire have adopted a subdivision ordinance with the exception of Ulster County. The Towns of Gardiner, Kingston, Marlborough and Ulster also adhere to a code administered by a higher authority. Ulster County has a planning board that reviews and makes recommendations based on the County's Comprehensive Plan, but does not have the authority to adopt a subdivision ordinance.

### ***Special Purpose Ordinance***

A special purpose ordinance is a form of zoning in which specific standards dependent upon the special purpose or use must be met. For example, many special purpose ordinances include basic development requirements such as setbacks and elevations. The community's floodplain management ordinance may be a special purpose ordinance. The special purpose ordinance is a useful mitigation technique particularly when implemented to reduce damages associated with flooding. Similar ordinances (often referred to as "Steep Slope Ordinances") are also sometimes implemented to reduce damages associated with landslides.

All of the jurisdictions that completed the Capability Assessment Questionnaire have adopted a special purpose ordinance with the exception of the Village of New Paltz and Ulster County. The Towns of Gardiner and Marlborough and the Village of New Paltz adheres to a code administered by a higher authority.

### ***Growth Management Ordinance***

Growth management ordinances are enacted as a means to control the location, amount, and type of development in accordance with the larger planning goals of the jurisdiction. These ordinances often designate the areas in which certain types of development is limited and encourage the protection of open space for reasons such as environmental protection and limitation of sprawl.

The Towns of Gardiner, Lloyd and Marlborough have adopted growth management ordinances.

### ***Site Plan Review Requirements***

Site plan review requirements are used to evaluate proposed development prior to construction. An illustration of the proposed work, including its location, site elevations, exact dimensions, existing and proposed buildings, and many other elements are often included in the site plan review requirements. The site plan reviews offer an opportunity to incorporate mitigation principles, such as ensuring that the proposed development is not in an identified hazard area and that appropriate setbacks are included.

All of the jurisdictions that completed the Capability Assessment Questionnaire have adopted site plan review requirements except Ulster County. The Towns of Gardiner, Kingston and Ulster also adhere to a code administered by a higher authority.

### ***Comprehensive Plan***

A comprehensive plan is a document which illustrates the overall vision and goals of a community. It serves as a guide for the community's future and often includes anticipated demographics, land use, transportation, and actions to achieve desired goals. Integrating mitigation concepts and policies into a comprehensive plan provides a means for implementing initiatives through legal frameworks and enhances the opportunity to reduce the risk posed by hazard events.

Although the Capabilities Questionnaire completed by Ulster County indicates that all jurisdictions have adopted Comprehensive Plans, the questionnaire completed by the Town of Kingston states that they do not. The other jurisdictions which submitted questionnaires were all in concurrence with the County.

### ***Capital Improvement Plan***

Capital Improvement Plans schedule the capital spending and investments necessary for public improvements such as schools, roads, libraries, and fire services. These plans can serve as an important mechanism to manage development in identified hazard areas through limited public spending.

Of the jurisdictions that completed the Capability Assessment Questionnaire, only Ulster County, the City of Kingston, and the Towns of Gardiner and Marlborough have Capital Improvement Plans.

### ***Economic Development Plan***

Economic development plans offer a comprehensive overview of the local or regional economic state, establish policies to guide economic growth, and include strategies, projects, and initiatives to improve the economy in the future. Economic development plans, similar to capital improvement plans, offer an opportunity to reduce development in hazard prone areas by encouraging economic growth in areas less susceptible to hazard events.

Ulster County, the Town of Gardiner, and the City of Kingston have economic development plans.

### ***Emergency Response Plan***

Emergency response plans provide an opportunity for local governments to anticipate an emergency and plan the response accordingly. In the event of an emergency, a previously established emergency response plan can reduce negative effects as the responsibilities and means by which resources are deployed has been previously determined.

All of the jurisdictions that completed the Capability Assessment Questionnaire have adopted an emergency response plan with the exception of the Town of Kingston. Several responding jurisdictions noted that emergency response plans for individual jurisdictions require approval from the County before they can be adopted.

### ***Post-Disaster Recovery Plan***

A post disaster recovery plan guides the physical, social, environmental, and economic recovery and reconstruction procedures after a disaster. Hazard mitigation principles are often incorporated into post disaster recovery plans in order to reduce repetitive disaster losses. The post disaster recovery plan is included as a chapter of the comprehensive plan.

The Towns of Gardiner, Hurley and Marlborough, as well as the City of Kingston have developed post disaster recovery plans. Several responding jurisdictions noted that post-disaster recovery plans for individual jurisdictions require approval from the County before they can be adopted.

### ***Post-Disaster Recovery Ordinance***

Post disaster recovery ordinances are often produced in conjunction with post disaster recovery plans. The ordinances are enacted after a hazard event in order to reduce future damages and mitigate repetitive loss.

None of the jurisdictions in Ulster County except for the Town of Marlborough have reported that they have adopted post disaster recovery ordinances.

### ***Real Estate Disclosure Ordinance***

A real estate disclosure ordinance requires individuals selling real estate to inform potential buyers of the hazards to which the property and/or structure is vulnerable prior to the sale. Such a requirement ensures that the new property owner is aware of the hazards to which the property is at risk of damage.

None of the jurisdictions in Ulster County have reported that they have adopted real estate disclosure ordinances. The Town of Gardiner noted that State of New York Real Property laws include real estate disclosure requirements.

### ***Administrative and Technical Capability***

The ability of a local government to develop and implement mitigation projects, policies, and programs is contingent upon its staff and resources. Administrative capability is determined by evaluating whether there are an adequate number of personnel to complete mitigation activities. Similarly, technical capability can be evaluated by assessing the level of knowledge and technical expertise of local government employees, such as personnel skilled in surveying and Geographic Information Systems.

Table 4-2 provides a summary of the administrative and technical capabilities currently in place in each participating jurisdiction, as reported by Planning Group Members who submitted completed Capability Assessment Questionnaires. The checkmark (✓) indicates that the local government reported maintaining a staff member for the given function.



**Table 4-2  
Administrative and Technical Capability Inventory**

Jurisdiction	Planner(s) or Engineer(s) with knowledge of land development and management practices	Engineer(s) or professional(s) trained in construction practices related to buildings and/or infrastructure	Planner(s) or Engineer(s) with an understanding of natural and/or human caused hazards	Floodplain manager	Surveyors	Staff with education or expertise to assess the community's vulnerability to hazards	Personnel skilled in GIS and/or HAZUS	Scientists familiar with the hazards of the community	Emergency Manager	Grant writers
Ulster County	½	½	½		½	½	½		½	½
Gardiner, Town of	½	½	½	½		½			½	½
Hurley, Town of	½	½	½							
Kingston, Town of		½		½			½		½	½
Kingston, City of,	½	½	½	½		½			½	½
Lloyd, Town of	½		½	½		½	½			
Marlborough, Town of	½	½	½	½	½	½	½		½	½
New Paltz, Village of	½	½	½	½	½	½			½	½
Shandaken, Town of				½						
Ulster, Town of	½	½	½	½	½		½		½	½

The Administrative and Technical Capability Assessment indicates that the Towns of Gardiner and Ulster, the City of Kingston and the Village of New Paltz should be able to undertake mitigation projects with only minor supplements possibly needed to existing staffing or staff time. The remainder of the communities may have need to expand staff or seek outside help such as seeking assistance from other communities or hire contractors to complete the mitigation projects.

**Conclusion**

This capability assessment finds that Ulster County and the o participating jurisdictions collectively have a significant level of legal, technical, and fiscal tools and resources necessary to implement hazard mitigation strategies.

**Fiscal Capability**

The ability of a local government to implement mitigation activities is also associated with the funding available for policies and projects. Funding for such initiatives is often locally based revenue and financing, as well as outside grants. Costs associated with mitigation activities range from staffing and administrative costs to the actual cost of the mitigation project.

Table 4-3 provides a summary of the fiscal capabilities currently being utilized in each participating jurisdiction, as reported by Planning Group Members who submitted completed Capability Assessment

Questionnaires. The checkmark (✓) indicates that the financial resource was reported as available in the local jurisdiction for mitigation purposes.

Jurisdiction	Community Development Block Grants (CDBG)	Capital Improvements Project Funding	Authority to Levy Taxes for Specific Purposes	Fees for Water, Sewer, Gas, or Electric Service	Impact Fees for Homebuyers or Developers for New Developments/Homes	Incur Debt through General Obligation Funds	Incur Debt through Special Tax and Revenue Bonds	Incur Debt through Private Activity Bonds	Withhold Spending in Hazard-Prone Areas	Other
Ulster County	✓	✓				✓	✓			
Gardiner, Town of		✓	✓	✓		✓			✓	
Hurley, Town of			✓			✓	✓	✓		
Kingston, Town of	✓	✓	✓	✓		✓	✓			
Kingston, City of,	✓	✓	✓	✓	✓	✓				
Lloyd, Town of			✓	✓	✓	✓	✓		✓	
Marlborough, Town of	✓	✓	✓	✓	✓	✓	✓			
New Paltz, Village of		✓	✓	✓	✓	✓				
Shandaken, Town of				✓						
Ulster, Town of	✓	✓	✓	✓		✓	✓			

While many of the jurisdictions have multiple sources of funding that they may rely on to fund mitigation actions or supply the local match to Federal or State funds, the Town of Shandaken only has identified one source of funding.

### Capabilities and Resources – State of New York

The State of New York, through the New York State Consolidated Laws, Executive Law Article 2-B entitled *State and Local: Natural and Man-Made Disaster Preparedness* established the Disaster Preparedness Commission (DPC) to examine all aspects of natural and human induced disasters. While the law emphasized local authority and responsibility in the development and maintenance of plans and programs for natural and human induced disaster mitigation, DPC is tasked to examine all aspects of disaster prevention, response, and recovery, as well as prepare the state disaster preparedness plans.

The DPC consists of commissioners, directors, and chairs of State agencies and the American Red Cross. State agencies such as the New York State Emergency Management Office (SEMO), the Department of State (DOS), the Department of Environmental Conservation (DEC), and the Department of Transportation (DOT) are participants in the DPC. The DPC, with the support of the Mitigation Section of the SEMO, developed the New York State Multi-Hazard Mitigation Plan. The State Plan was not only

designed to fulfill the requirements of the Disaster Mitigation Act of 2000, but was also created to serve as a resource for local governments in the development of local hazard mitigation plans.

The State's Plan includes an evaluation of the State's pre and post hazard mitigation policies, programs, and capabilities; the policies related to development in hazard prone areas; and the State's funding capabilities. The Ulster County Multi-Jurisdictional Hazard Mitigation Plan incorporates many of the resources identified in the State Plan to demonstrate the capabilities present for local jurisdictions to consider in the development of local hazard mitigation. Many of these capabilities are described in further detail in this portion of the assessment.

### ***New York State Emergency Management Office (SEMO)***

In addition to facilitating the development of the New York State Multi-Hazard Mitigation Plan, SEMO offers a variety of assistance to local governments in the preparation and implementation of mitigation activities. For example, the SEMO Mitigation and Planning Sections recently coordinated to develop the "Empire Plan," a comprehensive emergency management plan which addresses the aspects of emergency management: readiness, mitigation, response, and recovery. SEMO developed the "Empire Plan" as a model for local governments to use in the creation of local comprehensive emergency management plans. In addition to the "Empire Plan" SEMO also offers direct funding support and technical assistance for the preparation of all-hazards mitigation plans for those communities to which funding for such assistance is not available. Beyond these activities, SEMO also coordinates with agencies such as the New York Department of State and the Department of Environmental Conservation to provide resources for hazard mitigation.

### ***New York State Department of State (DOS)***

DOS offers local governments many forms of assistance for preparing, implementing, and sustaining mitigation activities. The DOS Division of Coastal Resources, for example, provides local governments with technical assistance in the completion of Local Waterfront Revitalization Plans (LWRP). These plans are comprehensive land and water use plans which contain many components and address issues such as coastal erosion management and waterfront development. Upon completion of the LWRP, the plan is reviewed by the SEMO Mitigation Section to ensure that the policies and strategies outlined do not place people or property at undue risk to a hazard event. Approximately sixty-six local jurisdictions in the State have approved LWRPs, including Nassau County.

In addition to providing assistance for the LWRPs, the Division of Coastal Resources also provides technical, planning, and zoning assistance to local governments on coastal development and natural resource protection. Furthermore, in coordination with the U.S. Army Corps of Engineers, the Division of Coastal Resources tracks shoreline erosion conditions and warns local communities of areas highly susceptible to erosion. These resources, as well as other forms of assistance provided by DOS are valuable tools for preparing and implementing mitigation activities in local jurisdictions.

### ***New York State Department of Environmental Conservation (DEC)***

The DEC directs many programs and forms of assistance useful to local governments developing mitigation strategies. DEC administers the Coastal Erosion Hazard Areas Act which establishes requirements for activities undertaken in identified coastal erosion areas. The Act restricts and/or prohibits development in coastal hazard areas, requires permits for development in areas prone to coastal hazards, and establishes standards to minimize the impacts of new development. While these requirements place restrictions upon local governments, they are designed to protect natural features in

coastal hazard areas, prevent further damages from erosion, and minimize the undue risks of hazard events.

DEC also provides technical assistance to local governments through the Floodplain Management Program and the Flood Protection Bureau. The Floodplain Management Program provides assistance to local governments adopting and administering local floodplain management ordinances. Similarly, the Flood Protection Bureau provides technical assistance in eligibility requirements for the National Flood Insurance Program in order to qualify local governments for entrance into the program. Each of these forms of assistance aids local governments in the development and implementation of flood mitigation activities to eliminate or reduce future flood damages.

Further technical assistance in floodplain management is provided through Community Assistance Visits administered by the DEC in collaboration with the SEMO. These two agencies partner in this effort to provide technical assistance on floodplain management program development. The Visits are prioritized by an assessment of needs conducted by the DEC and the SEMO. In addition to the Community Assistance Visits, these agencies also coordinate to provide assistance for flood mitigation planning and sponsor technical assistance workshops for local governments interested in developing flood mitigation programs.

### ***New York State Department of Transportation (DOT)***

The Department of Transportation incorporates mitigation techniques into routine design, construction, and maintenance procedures throughout the State and also engages in mitigation projects, technical assistance activities, and training. For example, DOT provides guidance to local communities developing plans for the long-term re-routing of traffic due to a disaster. Furthermore, DOT engages in mitigation projects such as the elevation of roads in flood prone areas, cleaning of ditches and streams, management of stormwater erosion, tree pruning, and bi-annual inspection of bridges. DOT also develops and conducts training sessions on heavy snow removal and snow plowing for highway maintenance supervisors and equipment operators.

## **Capabilities and Resources – Federal**

The Federal government offers a wide range of funding and technical assistance programs to help make communities more disaster resistant and sustainable. Many of these are included in Table Z, the Federal Technical Assistance and Funding matrix. Programs associated with the construction or reconstruction of housing and businesses, public infrastructure (transportation, utilities, water, and sewer), and supporting overall hazard mitigation and community planning objectives are emphasized in the matrix. Some programs are disaster-specific, activated by a Presidential Disaster Declaration under the provisions of the Stafford Act. Also included are programs or grants that are not specifically disaster related.

### ***Federal Resources***

FEMA has developed a large number of documents that address implementing hazard mitigation at the local level. Five key resource documents are briefly described.

*How-to Guides.* Some communities in Ulster County have chosen not to participate in the planning process at this time, but could participate during future updates of the plan. Those communities can find additional information about the hazard mitigation planning process on the FEMA web site. FEMA has developed a series of nine "how-to guides" to assist States, communities, and tribes in enhancing their hazard mitigation planning capabilities. The first four guides mirror the four major phases of hazard

mitigation planning used in the development of the Ulster County Multi-Jurisdictional Hazard Mitigation Plan. The last five how-to guides address special topics that arise in hazard mitigation planning such as using benefit-cost analysis and integrating man-made hazards. The use of worksheets, checklists, and tables make these guides a practical source of guidance to address all stages of the hazard mitigation planning process. They also include special tips on meeting DMA 2000 requirements.

*Post-Disaster Hazard Mitigation Planning Guidance for State and Local Governments.* FEMA, DAP-12, September 1990. This handbook explains the basic concepts of hazard mitigation, and shows State and local governments how they can develop and achieve mitigation goals within the context of FEMA's post-disaster hazard mitigation planning requirements. The handbook focuses on approaches to mitigation, with an emphasis on multi-objective planning.

*Mitigation Resources for Success CD.* FEMA 372, September 2001. This CD contains a wealth of information about mitigation and is useful for State and local government planners and other stakeholders in the mitigation process. It provides mitigation case studies, success stories, information about Federal mitigation programs, suggestions for mitigation measures to homes and businesses, appropriate relevant mitigation publications, and contact information.

*A Guide to Federal Aid in Disasters.* FEMA 262, April 1995. When disasters exceed the capabilities of State and local governments, the President's disaster assistance program (administered by FEMA) is the primary source of Federal assistance. This handbook discusses the procedures and process for obtaining this assistance, and provides a brief overview of each program.

*The Emergency Management Guide for Business and Industry.* FEMA 141, October 1993. This guide provides a step-by-step approach to emergency management planning, response, and recovery. It also details a planning process that companies can follow to better prepare for a wide range of hazards and emergency events. This effort can enhance a company's ability to recover from financial losses, loss of market share, damages to equipment, and product or business interruptions. This guide could be of great assistance to Nassau County industries and businesses located in hazard prone areas.

### ***Important Websites***

The following are important websites that provide focused access to valuable planning resources for communities interested in sustainable development initiatives.

- <http://www.fema.gov> - Web site of the Federal Emergency Management Agency includes links to information, resources, and grants that communities can use in planning and implementation of sustainable measures.
- <http://www.planning.org> - Web site of the American Planning Association, a non-profit professional association that serves as a resource for planners, elected officials, and citizens concerned with planning and growth initiatives.
- <http://www.ibhs.org> - Web site of the Institute for Business and Home Safety, an initiative of the insurance industry to reduce deaths, injuries, property damage, economic losses, and human suffering caused by natural disasters. Online resources provide information on natural hazards, community land use, and ways you can protect your property from damage.

## **Federal Technical Assistance and Funding**

The Federal government offers a wide range of funding and technical assistance programs that communities can access to assist in their long-term recovery. Some of these programs are geared to disaster preparedness and mitigation planning, while the focus of others is the long-term vitality of the communities. To assist communities in their rebuilding efforts and to better prepare for the future, the information in Table 4-4 is divided under the headings of conservation and environment, economic development, emergency management, historic preservation, housing, infrastructure, and mitigation.

For further information on these and other Federal programs, see the Catalog of Federal Domestic Assistance (CFDA) available online at <http://12.46.245.173/cfda/cfda.html>.

<b>Table 4-4 – Federal Technical Assistance and Funding</b>								
<b>Agency</b>	<b>Program</b>	<b>Type of Assistance/ Projects Funded</b>	<b>Purpose</b>	<b>Eligible Applicants</b>	<b>Where To Obtain Application</b>	<b>Application Process</b>	<b>Application Deadline</b>	<b>For More Information</b>
<b>CONSERVATION &amp; ENVIRONMENT</b>								
DOC; NOAA	Habitat Conservation	Cooperative grants to support a wide variety of research, habitat restoration, construction, management and public education activities for marine and estuarine habitats.	To benefit US fisheries, conserve protected resources, and add to the economic and social well being of the nation.	Local governments, universities and colleges, Indian Tribes, private profit and non-profit research and conservation organizations and individuals.	State coordinating official.	Submit application through Grants.gov. Proposals are evaluated for technical merit, soundness of design, competency of applicant to perform the proposed work, potential contribution of the project to national goals and appropriateness and reasonableness of costs.	90 days prior to the start date of the project.	Regional or local office. <a href="http://www.nmfs.noaa.gov/regional.htm">http://www.nmfs.noaa.gov/regional.htm</a>
DOC; NOAA; Marine Fisheries Service	Unallied Management Costs	Cooperative grants to support management activities for high priority marine and estuarine resources.	To provide economic, sociological, public policy and other information needed by administrators for conserving and managing fishery resources and protected species in their environment.	Local governments, universities and colleges, Indian Tribes, private profit and non-profit research organizations and individuals.	State coordinating official.	Submit application through Grants.gov. Proposals are evaluated for technical merit, soundness of design, competency of applicant to perform the proposed work, potential contribution of the project to national goals and appropriateness and reasonableness of costs.	90 days prior to the start date of the project.	Southeast Federal Program Officer <a href="http://www.nmfs.noaa.gov/regional.htm">http://www.nmfs.noaa.gov/regional.htm</a> (727) 824-5304.
DOD; USACE	Beach Erosion Control Projects	Specialized services to design and construct projects under a cost share method.	To protect beach and shore erosion through projects not specifically authorized by Congress.	Political subdivisions of the state and other responsible local agencies.	Consult with the nearest District Engineer.	Formal letter to District Engineer. Approval is subject to the availability of funds.	None.	Corps of Engineers District Office. <a href="http://www.usace.army.mil/howdoi/where.html">http://www.usace.army.mil/howdoi/where.html</a>

Table 4-4 – Federal Technical Assistance and Funding

Agency	Program	Type of Assistance/ Projects Funded	Purpose	Eligible Applicants	Where To Obtain Application	Application Process	Application Deadline	For More Information
<b>CONSERVATION &amp; ENVIRONMENT</b>								
DOI; FWS	Conservation Grants Private Stewardship for Imperiled Species	Grants to fund voluntary restoration management, or enhancement of habitat on private lands for endangered, threatened, proposed, candidate or other at risk species.	To provide Federal financial and other assistance to individuals and groups engaged in local, private and voluntary conservation efforts to be carried out on private lands that benefit species listed or proposed as endangered or threatened.	Sponsored organization, individuals/families, specialized groups, public non-profit institutions/organizations, private non-profit institutions/organizations, small business, profit organizations and other private institutions/organizations.	See <a href="http://www.grants.gov">www.grants.gov</a> or <a href="http://endangered.fws.gov/grants/private_stewardship/index.html">http://endangered.fws.gov/grants/private_stewardship/index.html</a>	See <a href="http://www.grants.gov">www.grants.gov</a> or <a href="http://endangered.fws.gov/grants/private_stewardship/index.html">http://endangered.fws.gov/grants/private_stewardship/index.html</a>	See <a href="http://www.grants.gov">www.grants.gov</a> or <a href="http://endangered.fws.gov/grants/private_stewardship/index.html">http://endangered.fws.gov/grants/private_stewardship/index.html</a>	Regional or local office. <a href="http://endangered.fws.gov/grants/private_stewardship/index.html">http://endangered.fws.gov/grants/private_stewardship/index.html</a>
DOI; FWS	North American Wetland Conservation Fund	Grants to acquire real property interest in lands and water, including water rights, and to restore, manage, and/or enhance wetland ecosystems and other habitats for migratory birds, and other fish and wildlife.	To provide grant funds for wetland conservation projects.	Public or private organizations or to individuals who have developed partnerships to carry out our wetland conservation projects.	Grants.gov	Submit applications.	March and July of each year.	Regional or local office. <a href="http://www.fws.gov/birdhabitat/Grants/NAWCA/CouncilAct.shtm">http://www.fws.gov/birdhabitat/Grants/NAWCA/CouncilAct.shtm</a>
DOI; National Park Service	Save America's Treasures	Project Grants to protect and preserve nationally significant historical sites and wall as nationally significant collections of intellectual and cultural artifacts.	To provide matching grants for preservation and/or conservation work on nationally significant intellectual and cultural artifacts and nationally significant historical structures and sites.	Intrastate, interstate, local agencies, public or private non-profit organizations, public or private colleges and universities, including state colleges and universities and federally recognized Indian tribes.	Contact Save American Treasures at <a href="http://www.cr.nps.gov/hps/treasures/">http://www.cr.nps.gov/hps/treasures/</a> (202) 513-7270, ext. 6.	Contact Save American Treasures at <a href="http://www.cr.nps.gov/hps/treasures/">http://www.cr.nps.gov/hps/treasures/</a> (202) 513-7270, ext. 6.	Contact Save American Treasures at <a href="http://www.cr.nps.gov/hps/treasures/">http://www.cr.nps.gov/hps/treasures/</a> (202) 513-7270, ext. 6.	Contact Save American Treasures at <a href="http://www.cr.nps.gov/hps/treasures/">http://www.cr.nps.gov/hps/treasures/</a> or (202) 513-7270, ext. 6.
EPA; Office of Brownfields	Brownfields Assessment and Cleanup	A revolving loan fund and project grants to provide	To assist in the expansion, redevelopment, or reuse	A general purpose unit of local government, a land	EPA Regional Office. <a href="http://www.epa.gov/">http://www.epa.gov/</a>	Competitive grant program. See Grant Announcement available from EPA.	Contact Regional Office. <a href="http://www.epa.gov/epahome/locate2.htm">http://www.epa.gov/epahome/locate2.htm</a>	Brownfields Regional Office Coordinator, Dallas, Texas (214) 665-6737.

Table 4-4 – Federal Technical Assistance and Funding

Agency	Program	Type of Assistance/ Projects Funded	Purpose	Eligible Applicants	Where To Obtain Application	Application Process	Application Deadline	For More Information
<b>CONSERVATION &amp; ENVIRONMENT</b>								
Cleanup and Redevelopment, Office of Solid Waste and Emergency Response	Cooperative Agreements.	funding to inventory, characterize, assess and conduct planning and community involvement related to Brownfield sites; to capitalize a revolving loan fund and provide sub-grants to carry out cleanup activities at the sites; and, to carry out cleanup activities on land owned by the grant recipient.	of sites complicated by the presence of a hazardous substance, pollutant, or contaminant.	clearance authority or a quasi – government entity acting under the authority of the local government, a regional council or a group of general purpose units of government, a redevelopment agency, Indian Tribes, and non-profit organizations (subject to conditions).	<a href="http://epahome/locate2.htm">epahome/locate2.htm</a>			<a href="http://www.epa.gov/epahome/locate2.htm">http://www.epa.gov/epahome/locate2.htm</a>
EPA, Office of Water	Regional Wetland Program Development Grants	Project Grants to encourage wetland program development by promoting the coordination and acceleration of research, investigations, experiments, training, demonstration, survey and studies related to the causes, effects, extent, prevention, reduction and elimination of water pollution.	To assist State, Tribal, local government agencies and interstate/intertribal entities to build capacity to protect, manage and restore wetlands.	Tribes, local governments, interstate agencies and intertribal consortia.	EPA Regional Office.	EPA Regional Office will review grant application and any grants will be awarded by the regional Administrator.	Contact EPA Regional Office. <a href="http://www.epa.gov/epahome/locate2.htm">http://www.epa.gov/epahome/locate2.htm</a>	EPA Regional Office, Wetland Coordinator. <a href="http://www.epa.gov/epahome/locate2.htm">http://www.epa.gov/epahome/locate2.htm</a>



Table 4-4 – Federal Technical Assistance and Funding

Agency	Program	Type of Assistance/ Projects Funded	Purpose	Eligible Applicants	Where To Obtain Application	Application Process	Application Deadline	For More Information
<b>CONSERVATION &amp; ENVIRONMENT</b>								
USDA; Forest Service	Forest Land Enhancement Program	Project Grants for technical assistance to develop management plans, educational programs and assistance to increase awareness, and cost-share assistance to implement sustainable forestry practices on the ground.	Sustainable management of non-industrial private forests and other rural land suitable for sustainable forest management.	State Forestry Agencies and Landowners, managers of non-industrial private forests lands, nonprofit organization, consultant foresters, universities, other state, local and private organization and agencies.	State Forestry Agency. <a href="http://www.fs.fed.us/spf/coop/programs/loa/flep.shtml">http://www.fs.fed.us/spf/coop/programs/loa/flep.shtml</a>	The State must prepare a State Priority Plan that is approved by the Forest Service. After Approval a property owner is eligible for cost share assistance.	Deadlines are determined by State Forestry Agencies. <a href="http://www.fs.fed.us/spf/coop/programs/loa/flep.shtml">http://www.fs.fed.us/spf/coop/programs/loa/flep.shtml</a>	Regional or local office of US Forest Service. <a href="http://www.fs.fed.us/spf/coop/programs/loa/flep.shtml">http://www.fs.fed.us/spf/coop/programs/loa/flep.shtml</a>
USDA; Forest Service	Urban and Community Forestry Program	Project grants for assistance in urban forestry programs.	To plan for, establish, manage and protect trees, forests, green spaces and related resources in and adjacent to cities and towns.	State Forestry, interested members of the public, private nonprofit organizations in urban and community forestry programs in cities and communities.	Contact Regional Offices.	Contact Regional Offices.	Contact Regional Offices. <a href="http://www.fs.fed.us/ucf/">http://www.fs.fed.us/ucf/</a>	Regional or local office of US Forest Service. <a href="http://www.fs.fed.us/ucf/">http://www.fs.fed.us/ucf/</a>

Table 4-4 – Federal Technical Assistance and Funding

Agency	Program	Type of Assistance/ Projects Funded	Purpose	Eligible Applicants	Where To Obtain Application	Application Process	Application Deadline	For More Information
<b>ECONOMIC DEVELOPMENT</b>								
DOC; EDA	Economic Adjustment Assistance	Project Grants to help local interests design and implement strategies to adjust or bring about changes in the economy.	Aids the long-range economic development of areas with severe unemployment, and low family income problems, aids in the development of public facilities and private enterprises to create new, permanent jobs.	Economic Development Districts, cities or other political subdivisions of the state or a consortium of political subdivisions, Indian tribes or a consortium of Indian tribes, institutions of higher learning or a consortium of such institutions, or public or non-profit organizations or association acting in cooperation with the political subdivisions.	Meet with EDA's Economic Development Representative (EDR) to determine whether the preparation of a project proposal is appropriate.	After meeting with EDR the Regional Director will decide whether to invite an application. More information will be given at that time.	Continuing basis.	Regional or Local Office. <a href="http://www.eda.gov/Contacts.xml">http://www.eda.gov/Contacts.xml</a>
DOC; EDA	Economic Development Support for Planning Organizations	Project grants to establish economic development strategies designed to reduce unemployment and increase incomes.	To strengthen economic development planning capacity.	Economic Development Districts, Indian Tribes, units of local government, institutions of higher education and private non-profit organizations.	Submit a letter of interest, a statement of distress and a proposed work program not to exceed 10 pages and SF 424 to regional or Local Office.	Following invitation by agency a formal application is made to the regional office and to the EDA state representative.	None.	Regional or Local Office. <a href="http://www.eda.gov/Contacts.xml">http://www.eda.gov/Contacts.xml</a>
DOD; Office of Economic Adjustment	Growth Management Planning Assistance	To provide project grants to assist local governments to undertake community economic adjustment planning activities.	Planning in response to the establishment or expansion of Department of Defense military Installation.	Local governments or regional organizations.	<a href="http://www.oea.gov">http://www.oea.gov</a>	Application is reviewed and approved by the Department of Defense's Office of Economic Adjustment.	None.	Regional or Local Office. <a href="http://www.eda.gov/Contacts.xml">http://www.eda.gov/Contacts.xml</a>

Table 4-4 – Federal Technical Assistance and Funding

Agency	Program	Type of Assistance/ Projects Funded	Purpose	Eligible Applicants	Where To Obtain Application	Application Process	Application Deadline	For More Information
<b>ECONOMIC DEVELOPMENT</b>								
DOL	Disaster Unemployment Assistance	Direct Payments for Specified Use; Provision of Specialized Services.	Disaster Unemployment Assistance provides financial assistance to individuals whose employment or self-employment has been lost or interrupted as a direct result of a major disaster declared by the President of the United States. Before an individual can be determined eligible for Disaster Unemployment Assistance, it must be established that the individual is <u>not</u> eligible for regular unemployment insurance benefits (under any state or federal law). The program is administered by states as agents of the federal government.	In order to qualify for this benefit your employment or self-employment must have been lost or interrupted as a direct result of a major disaster and you must have been determined not eligible for regular state unemployment insurance. With exceptions for persons with an injury and for self-employed individuals performing activities to return to self-employment, individuals must be able to work and available for work, which are the same requirements to be eligible for state unemployment insurance benefits.	An applicant should consult the office or officials designated as the single point of contact in his or her State for more information on the process the State requires to be followed in applying for assistance, if the State has selected the program for review.	Claims should be filed in accordance with the state's instructions published in announcements about the availability of Disaster Unemployment Assistance, or contact the State Unemployment Insurance agency.	Applications for DUA must be filed within 30 days after the date of the SWA announcement regarding availability of DUA. When applicants have good cause, they may file claims after the 30-day deadline. However, no initial application will be considered if filed after the 26th week following the declaration date.	More information about this program and where to apply for benefits under this program is available at: <a href="http://workforcesecurity.dol.gov/unemploy/disaster.asp">http://workforcesecurity.dol.gov/unemploy/disaster.asp</a>  To determine your eligibility for unemployment insurance (UI) benefits, you should contact the state unemployment insurance agency in the state where you are located as soon as possible after becoming unemployed. In some states, you can now file a claim by telephone and the Internet.
EDA	Economic Development and Adjustment Program, Sudden and Severe Economic Dislocation (Title IX)	Grants	To help States and localities to develop and/or implement strategies that address adjustment problems resulting from sudden and severe economic dislocation.	States, Localities, Non-Profit Organizations, and Indian Tribes.	Information regarding EDA's program procedures, regulations, and other requirements are available at EDA's website, <a href="http://www.eda.gov">www.eda.gov</a>	Project grants can be funded in response to natural disasters including improvements and reconstruction of public facilities.	Contact the Disaster Recovery Coordinator, Economic Adjustment Division.	Disaster Recovery Coordinator, Economic Adjustment Division, EDA, DOC, Herbert C. Hoover Building, Washington, DC 20230. Telephone: 800.345.1222 or 202.482.6225. <a href="http://www.doc.gov/eda/html/prgtitle.htm">http://www.doc.gov/eda/html/prgtitle.htm</a>

Table 4-4 – Federal Technical Assistance and Funding

Agency	Program	Type of Assistance/ Projects Funded	Purpose	Eligible Applicants	Where To Obtain Application	Application Process	Application Deadline	For More Information
<b>ECONOMIC DEVELOPMENT</b>								
FHWA; Maritime Administration	Development and Promotion of Ports and Intermodal Transportation	Advisory Services and Counseling, Technical Information.	Promote and plan for the development and utilization of domestic waterways, ports and port facilities.	Local government Agencies, Metropolitan Planning Organizations, Public Port and Intermodal Authorities, Trade Associations and Private Intermodal and Terminal Operators.	Regional or Local Office.	Personal Conference or Explanation of Problem.	None.	Regional or Local Office. <a href="http://www.marad.dot.gov/welcome/regional%20off_directory.html">http://www.marad.dot.gov/welcome/regional%20off_directory.html</a>
HUD; Community Planning and Development	Community Development Block Grants / Brownfields Economic Development Initiative	Project Grants to carry out economic development projects on contaminated buildings or land.	To return Brownfields to productive economic use.	Units of local government.	Application Procedures will be published in Notice of Funding Availability in the Federal Register.	The Process will be published in Notice of Funding Availability in the Federal Register.	Deadline will be published in Notice of Funding Availability in the Federal Register.	Regional or local Office. <a href="http://www.hud.gov/offices/cpd/economicdevelopment/programs/bedi/index.cfm">http://www.hud.gov/offices/cpd/economicdevelopment/programs/bedi/index.cfm</a>
HUD; Office of Community Planning and Development	Community Development Block Grants Section 108 Loan Guarantees	Guaranteed/Insured Loans for financing of economic development, housing rehabilitation, public facilities, and large scale physical development projects.	To provide communities with a source of financing for economic development, housing rehabilitation, public facilities, and large scale physical development projects.	Metropolitan Cities and Urban Counties.	See 24 Code of Federal regulations, Section 570.704 for application requirements.	See 24 Code of Federal regulations, Section 570.704 for application process.	Continuing basis.	Regional or Local Office. <a href="http://www.hud.gov/offices/cpd/communitydevelopment/programs/108/index.cfm">http://www.hud.gov/offices/cpd/communitydevelopment/programs/108/index.cfm</a>
HUD; Office of Community Planning and Development	Community Development Block Grants / Technical Assistance Program	Project Grants (Cooperative Agreements) to transfer skills and knowledge of planning, developing and administering CDBG programs to eligible block grant entities.	To help units of local government, Indian tribes and area wide planning organizations to plan, develop and administer local CDBG programs.	Units of local government, national or regional non-profit organizations that have membership comprised predominantly of entities or officials of entities of CDBG recipients, professional and technical service companies, public	In answer to competitions and solicitations. They will be detailed in the Federal Register.	Applicants will be notified of acceptance or rejections.	Deadlines are in solicitation documents.	Regional or Local Office. <a href="http://www.hud.gov/offices/cpd/communitydevelopment/programs/index.cfm">http://www.hud.gov/offices/cpd/communitydevelopment/programs/index.cfm</a>

Table 4-4 – Federal Technical Assistance and Funding

Agency	Program	Type of Assistance/ Projects Funded	Purpose	Eligible Applicants	Where To Obtain Application	Application Process	Application Deadline	For More Information
<b>ECONOMIC DEVELOPMENT</b>								
				or private non-profit organizations including educational institutions and area-wide planning organizations.				
HUD; Policy Development and Research	Hispanic-Serving Institutions Assisting Communities	Project Grants for neighborhood revitalization, housing and economic development projects.	To assist Hispanic serving institutions of higher education to expand their role and effectiveness in addressing community development needs in their localities, consistent with the purposes of Title 1 of the housing and Community Development Act of 1974.	Nonprofit accredited Hispanic serving institutions of higher education that are on the US Dept. of Education's list of eligible HSI's or certify that they meet the statutory definition of an HIS.	Application Procedures will be published in Notice of Funding Availability in the Federal Register.	The Process will be published in Notice of Funding Availability in the Federal Register.	Deadline will be published in Notice of Funding Availability in the Federal Register.	HUD Office of University Partnerships <a href="http://www.oup.org/">http://www.oup.org/</a> (202) 708-3061.
HUD; Policy Development and Research	Historically Black Colleges and Universities Program	Project Grants for those activities that are eligible for CDBG funds as listed in 24 Code of Federal Regulations, part 570, subpart C, particularly paragraphs 570.201 through 570.206.	To assist historically black colleges and universities to expand their role and effectiveness in addressing community development needs in their localities, including neighborhood revitalization, housing, and economic development, principally for persons of low-moderate income.	Historically Black Colleges and Universities as determined by the U.S. Dept. of Education.	Application Procedures will be published in Notice of Funding Availability in the Federal Register.	The Process will be published in Notice of Funding Availability in the Federal Register.	Deadline will be published in Notice of Funding Availability in the Federal Register.	HUD Office of University Partnerships <a href="http://www.oup.org/">http://www.oup.org/</a> (202) 708-3061.
USDA; Rural Utilities Service	Assistance to High Energy Cost Rural Communities	Project Grants and Direct loans use to acquire, construct, extend, upgrade and improve energy generation, transmission, or distribution facilities	Assistance to rural communities with extremely high energy costs.	Political subdivisions of states, for-profit and non-profit businesses, cooperatives, association, organization, and	Application Procedures will be published in Notice of Funding Availability in the Federal Register.	Grants Awarded on a Competitive Basis.	Deadline will be published in Notice of Funding Availability in the Federal Register.	DOA Electric Program <a href="http://www.usda.gov/rus/electric/regs/fedreg.htm">http://www.usda.gov/rus/electric/regs/fedreg.htm</a> (202) 720-9545.

Table 4-4 – Federal Technical Assistance and Funding

Agency	Program	Type of Assistance/ Projects Funded	Purpose	Eligible Applicants	Where To Obtain Application	Application Process	Application Deadline	For More Information
<b>ECONOMIC DEVELOPMENT</b>								
		in rural communities where the average expenditure on home energy cost is at least 275% of the national average		other entities organized under the laws of States, Indian tribes, tribal entities, and individuals.				
USDA; Rural Business- Cooperative Service	Business and Industry Loans	Direct Loans and Guaranteed/Insured Loans. Direct Loans for modernization, development cost, purchasing and developing land, easements, rights-of-way, buildings, facilities, leases or materials, purchasing equipment, leasehold improvements, machinery and supplies, and pollution control and abatement equipment. Guaranteed Loans are for the same actions mentioned above plus for agricultural production, when not eligible for the Farm Service Agency farmer program assistance and when it is part of an integrated business also involved in the processing of agricultural products.	To assist public, private and cooperative organizations, Indian Tribes or individuals in rural areas to obtain quality loans for the purpose of improving, developing or financing business, industry, and employment and improving the economic and environmental climate in rural communities including pollution abatement controls.	A cooperative, corporation, partnership, trust or other legal entity organized and operated on a profit or nonprofit basis, an Indian tribe, a municipality, county or other subdivision of state or individuals in rural areas.	Rural Development State Office.	Contact the Rural Development State Office or the State Coordinating Agency. <a href="http://www.rurdev.usda.gov/recd_map.html">http://www.rurdev.usda.gov/recd_map.html</a>	Not Applicable.	Rural Development State Office. <a href="http://www.rurdev.usda.gov/recd_map.html">http://www.rurdev.usda.gov/recd_map.html</a>

Table 4-4 – Federal Technical Assistance and Funding

Agency	Program	Type of Assistance/ Projects Funded	Purpose	Eligible Applicants	Where To Obtain Application	Application Process	Application Deadline	For More Information
<b>ECONOMIC DEVELOPMENT</b>								
USDA; Rural Utilities Service	Community Connect Grant Program	Project grants for the deployment of broadband transmission services to critical community facilities, rural residents and rural businesses and for the construction, acquisition, expansion, and/or operation of a community center which would provide such services free to residents for at least 2 years.	To encourage community oriented connectivity in rural areas where such service does not currently exist.	Indian Tribe or tribal organization, local units of government or other legal entity, including cooperatives or private corporations of limited liability companies organized on a for profit or nonprofit basis, and have the legal authority to own and operate the broadband facilities as proposed in its application, to enter into contracts and to comply with federal statutes and regulations.	Application in accordance with 7 Code of Federal regulations, Section 1739.	Grants Awarded on a Competitive Basis.	Deadline will be published in Notice of Funding Availability in the Federal Register.	DOA Telecommunications Program <a href="http://www.usda.gov/rus/telecom/index.htm">http://www.usda.gov/rus/telecom/index.htm</a> (202) 720-9554.
USDA; Rural Housing Service	Community Facilities Loans and Grants	Guaranteed/Insured Loans, Direct Loans or Project Grants for community facilities such as child care facilities, food recovery and distribution centers, assisted living facilities, group homes, mental health clinics, shelters and education facilities. Projects comprise community, social, cultural,	To construct, enlarge, extend or otherwise improve community facilities providing essential service to rural residents.	City and County agencies, political and quasi-political subdivisions of the state, associations including corporations, Indian tribes and existing private corporations which are operated on a not-for-profit basis, have or will have the authority necessary for constructing operating and	Obtain SF-424 from the rural Development Area Office for a pre-application.	The pre-application is reviewed by the Rural Development area office and state office and the applicant is advised whether to file an application.	None.	Regional or local office. <a href="http://www.rurdev.usda.gov/rd/pubs/pa1557.htm">http://www.rurdev.usda.gov/rd/pubs/pa1557.htm</a>

Table 4-4 – Federal Technical Assistance and Funding

Agency	Program	Type of Assistance/ Projects Funded	Purpose	Eligible Applicants	Where To Obtain Application	Application Process	Application Deadline	For More Information
<b>ECONOMIC DEVELOPMENT</b>								
		transportation, industrial park sites, fire and rescue services, access ways, and utility extensions. All facilities must be for public use.		maintaining the proposed facility or service and for obtaining, giving security for and repaying the loans, and are unable to finance the project from its own resources or through commercial credit at a reasonable rate.				
USDA; Cooperative State Research, Education, and Extension Service	Community Food Projects	Project grants a comprehensive approach to develop long term solutions to help ensure food security in communities by linking the food sector to community development, economic opportunity, and environmental enhancement (50/50 program).	To support the development of community food projects designed to meet the food needs of low income people; increase the self-reliance of communities in providing their own needs; and promote comprehensive responses to local food, farm, and nutrition issues.	Private nonprofit entities.	Application Procedures will be published in Notice of Funding Availability in the Federal Register.	The Process will be published in Notice of Funding Availability in the Federal Register.	Deadline will be published in Proposal Solicitation in the Federal Register.	DOA Competitive Research Grants and Awards Management (202) 401-1761.
USDA	Livestock Assistance Program	Direct Payments.	To provide direct payments to eligible livestock producers who suffered grazing losses due to drought, hot weather, disease, insect infestation, fire, hurricane, flood, fire, earthquake, severe storm, or other disasters during the 2000 crop year. Benefits will be provided to eligible livestock producers only in those counties where a severe natural disaster	Citizens of, or legal resident alien in the United States; a farm cooperative, private domestic corporation, partnership, or joint operation in which a majority interest is held by the members, stockholders, or partners who are citizens of, or legal resident alien of		Applicants visit the county or parish Farm Service Agency (FSA) office in the eligible county or parish to make application, certify eligibility and report percent of grazing loss, number of grazing acres, and number of eligible livestock by type and weight on Form CCC-740.	Sign-up for assistance under the 2000 LAP began January 18, 2000. Date for ending the sign-up will be determined at a later date.	Regional or Local Office: Consult the local phone directory for location of the nearest county FSA office. If no listing, contact the appropriate State FSA office listed in the Farm Service Agency section of Appendix IV of the Catalog or on the WEB at <a href="http://www.fsa.usda.gov/edso/">http://www.fsa.usda.gov/edso/</a>  Headquarters Office: Department of Agriculture, Farm Service Agency,



Table 4-4 – Federal Technical Assistance and Funding

Agency	Program	Type of Assistance/ Projects Funded	Purpose	Eligible Applicants	Where To Obtain Application	Application Process	Application Deadline	For More Information
<b>ECONOMIC DEVELOPMENT</b>								
			occurred. A county must have been approved as a primary disaster area under a Secretarial disaster designation or Presidential disaster declaration after January 1, 2000, and subsequently approved for participation in the Livestock Assistance Program (LAP) by the Deputy Administrator for Farm Programs.	the United States; Indian tribe or tribal organization of the Indian Self-Determination and Education Assistance Act; any organization under the Indian Reorganization Act or Financing Act; and economic enterprise under the Indian Financing Act of 1974.				Production, Emergencies, and Compliance Division, Emergency Preparedness and Program Branch, Stop 0517, 1400 Independence Avenue SW., Washington, DC 20250-0517. Telephone: (202) 720-7641. <a href="http://www.fsa.usda.gov">http://www.fsa.usda.gov</a>
USDA; Rural Business-Cooperative Service	Renewable Energy Systems and Energy Efficient Improvements Program	To create a program to make direct loans, loan guarantees and grants to agricultural producers and rural businesses to help reduce energy costs and consumption.	To create a program to make direct loans, loan guarantees and grants to agricultural producers and rural businesses to help reduce energy costs and consumption and help meet the nation's critical energy needs.	Agricultural producer or rural small business.	Rural Energy Coordinator in the State.	Application must be submitted to the rural Energy Coordinator who will score it and submit to the National Office. The Highest scored application nationally will receive funding.	Continual sign-up process.	The Rural Business-Cooperative Service State Office.
USDA; Rural Business-Cooperative Service	Rural Business Enterprise Grants	Project Grants to create, expand or operate rural distance learning networks or programs for education, job training instruction related to potential employment, job advancement; development, construction, acquisition, land, buildings, plants, equipment, access streets and roads, parking areas, utility	To facilitate the development of small emerging business, industry and related employment for improving the economy of rural areas.	Public bodies and nonprofit corporations serving rural areas.	From the Rural Business Cooperative Service or the State Coordinating Agency.	The pre-application is filed with the local office. After review it will be reviewed and processed by the State office.	None.	Regional or local office.

Table 4-4 – Federal Technical Assistance and Funding

Agency	Program	Type of Assistance/ Projects Funded	Purpose	Eligible Applicants	Where To Obtain Application	Application Process	Application Deadline	For More Information
<b>ECONOMIC DEVELOPMENT</b>								
		extensions, water supply, waste water disposal facilities, refinancing, services and fees or to establish a revolving loan fund.						
USDA; Rural Business– Cooperative Service	Rural Business Opportunity Grants	Project grants to be used to assist in economic development of rural areas by providing technical assistance, training, and planning for business and economic development.	To promote sustainable economic development in rural communities with exceptional needs.	Public bodies, nonprofit corporations, Indian tribes and cooperatives with members that are primarily rural residents and that conduct activities for the mutual benefit of their members.	From the Rural Development State office or the State Coordinating Agency.	Applications will be scored and awards announce.	None.	Regional or local office.
USDA; Rural Business– Cooperative Service	Rural Cooperative Development Grants	Project Grants to facilitate the creation or retention of jobs in rural area through the development of new rural cooperative, value added processing and rural business.	To improve economic conditions in rural areas through cooperative development.	Nonprofit corporation and institutions of higher learning.	From the Rural Business Cooperative Service or the State Coordinating Agency.	The National Office reviews all applications, scores and ranks them.	Published in Federal Register.	Regional or local office.
USDA; Rural Business– Cooperative Service	Rural Economic Development Loans and Grants	Direct Loans and Project Grants for project feasibility studies, start-up costs, incubator projects and other reasonable costs for the purpose of fostering rural development.	For rural economic development and job creation projects.	Electric and telephone utilities that have current loans with the Rural Utilities Service or rural telephone Bank loans or guarantees outstanding.	Rural Development State Office.	See 7 Code of Federal Regulation, Section 1703.34.	None.	Regional or local office.
USDA; Farm Service Agency	Tree Assistance Program	Direct payments with unrestricted use to tree, bush and vine owners who have trees, bushes and vines lost to a natural disaster, to	To assist producers whose trees, bushes or vines are damaged or destroyed in natural disasters.	Individual owners.	A form provided by FSA; a written estimate of the number or trees, bushes or vines lost or damaged which is prepared by the owner or someone	The County Committee makes recommendations and eligibility determinations on those determinations that it wants to recommend to a higher approval official.	To be announced.	Regional or local office.

Table 4-4 – Federal Technical Assistance and Funding

Agency	Program	Type of Assistance/ Projects Funded	Purpose	Eligible Applicants	Where To Obtain Application	Application Process	Application Deadline	For More Information
<b>ECONOMIC DEVELOPMENT</b>								
		replant or rehabilitate said vegetation and produce annual crops for commercial.			who is a qualified expert, as determined by the county Committee; the number of acres on which the loss was suffered; and sufficient evidence of the loss to allow the County Committee to calculate whether an eligible loss occurred.			
USTREAS	Casualties, Disasters, and Theft	Tax relief.	The program offers tax relief for casualty losses that result from the destruction of, or damage to your property from any sudden, unexpected, or unusual event such as a flood, hurricane, tornado, fire, earthquake or even volcanic eruption.	A victim of a Presidentially declared disaster and you must be a taxpayer who is interested in receiving tax information and preparation assistance.	Contact IRS, <a href="http://www.irs.gov/taxtopics/tc515.html">http://www.irs.gov/taxtopics/tc515.html</a>	Casualty losses are claimed on Form 4684 (PDF), <i>Casualties and Thefts</i> . Section A is used for personal-use property and Section B is used for business or income-producing property. If personal-use property was destroyed or stolen, you may wish to refer to Publication 584, <i>Casualty, Disaster, and Theft Loss Workbook</i> , to help you catalog your property. If the property was business or income-producing property, refer to Publication 584B (PDF), <i>Business Casualty, Disaster, and Theft Loss Workbook</i> .	Check website, <a href="http://www.irs.gov/pub/irs-pdf/p547.pdf">http://www.irs.gov/pub/irs-pdf/p547.pdf</a>	For additional information contact: Internal Revenue Service Tax forms and Publications W:CAR:MP:FP 1111 Constitution Ave NW Washington, DC 20224. <a href="http://www.irs.gov/taxtopics/tc515.html">http://www.irs.gov/taxtopics/tc515.html</a>

Table 4-4 – Federal Technical Assistance and Funding

Agency	Program	Type of Assistance/ Projects Funded	Purpose	Eligible Applicants	Where To Obtain Application	Application Process	Application Deadline	For More Information
<b>EMERGENCY MANAGEMENT</b>								
DHS	Community Disaster Loans	Loan.	To provide loans subject to Congressional loan authority, to any local government that has suffered substantial loss of tax and other revenue in an area in which the President designates a major disaster exists. The funds can only be used to maintain existing functions of a municipal operating character and the local government must demonstrate a need for financial assistance	Applicants must be in a designated major disaster area and must demonstrate that they meet the specific conditions of FEMA Disaster Assistance Regulations 44 CFR Part 206, Subpart K, Community Disaster Loans.		Upon declaration of a major disaster, application for a Community Disaster Loan is made through the Governor's Authorized Representative to the Regional Director of FEMA. The Associate Director of the Response and Recovery Directorate approves or disapproves the loan. The Designated Loan Officer will execute a Promissory Note with the applicant. The promissory note must be co-signed by the State, or if the State cannot legally co-sign the note, the local government must pledge collateral security.	The loan must be approved in the fiscal year of the disaster or the fiscal year immediately following.	Regional or Local Office. <a href="http://www.dhs.gov">http://www.dhs.gov</a>
DHS	Disaster Legal Services	Legal assistance.	To provide legal assistance to individuals affected by a major Federal disaster.	Low-income individuals, families, and groups.	An applicant should consult the office / official designated as the single point of contact in his or her State for more information on the process the State requires to be followed in applying for assistance, if the State has selected the program for review.	Upon declaration of an emergency or major disaster, individuals and households may register an application for assistance with FEMA via a toll-free number or by visiting a Disaster Recovery Center.	Not applicable.	Regional or Local Office. <a href="http://www.dhs.gov">http://www.dhs.gov</a>

Table 4-4 – Federal Technical Assistance and Funding

Agency	Program	Type of Assistance/ Projects Funded	Purpose	Eligible Applicants	Where To Obtain Application	Application Process	Application Deadline	For More Information
<b>EMERGENCY MANAGEMENT</b>								
DHS	Disaster Unemployment Assistance	Direct Payments for Specified Use; Provision of Specialized Services.	To provide special federally funded weekly benefits to workers and self-employed individuals who are unemployed as a direct result of a Presidentially-declared major disaster, and who are not eligible for regular Unemployment Insurance benefits paid by States.	Disaster victims who have experienced direct loss of employment as a result of a Presidentially-declared major disaster designated for DUA.	From the local State Workforce Agency (SWA).	Upon declaration of a major disaster declaration designated for DUA, individuals may apply with their local State Workforce Agency (SWA).	Generally, applications for DUA must be filed within 30 days after the date of the SWA announcement regarding availability of DUA. When applicants have good cause, they may file claims after the 30-day deadline. However, no initial application will be considered if filed after the 26th week following the declaration date.	Regional or Local Office.
DOC; NOAA; Marine Fisheries Service	Fisheries Disaster relief	Cooperative Grants (75/25)	Assessment of the effects of Commercial Fishery failures, restoring fisheries, preventing future failures and assisting fishing communities affected by failures.	Fishing Communities.	National Marine Fisheries Service (NMFS).	Submit completed forms to NMFS through Grants.GOV	120 days before start of project.	National Marine Fisheries Service. <a href="http://www.nmfs.noaa.gov/">http://www.nmfs.noaa.gov/</a>
DOD	Emergency Rehabilitation of Flood Control Works or Federally Authorized Coastal Protection Works	Repair of Flood Control or Coastal Protection Works.	To assist in the repair and restoration of flood control works damaged by flood, or federally authorized hurricane flood and shore protection works damaged by extraordinary wind, wave, or water action.	Owners of damaged flood protective works, or State and local officials of public entities responsible for their maintenance, repair, and operation must meet current guidelines to become eligible for Public Law 84-99 assistance.	District Engineer or Corps of Engineers	Written application by letter or by form request if such form is locally used by the District Engineer of the Corps of Engineers.	Thirty days after a flood or unusual coastal storm.	Regional or Local Office: U.S. Army Corps of Engineers Division or District Engineers. Headquarters Office: Commander, U.S. Army Corps of Engineers, Attn: CECW-OE, Washington, DC 20314. Telephone: (202) 272-0251. FTS is not available. <a href="http://www.usace.army.mil/business.html">http://www.usace.army.mil/business.html</a>
SBA	Economic Injury Disaster Loans	Loans to businesses suffering economic injury from Presidential, SBA, or Agricultural Disaster.	To provide working capital to small business, small agricultural cooperatives or nurseries who have actual economic injury.	Business owners who have suffered economic injury.	SBA Disaster Office.	File with nearest SBA Disaster Office.	Deadline established after each declaration.	SBA Disaster Office.

Table 4-4 – Federal Technical Assistance and Funding

Agency	Program	Type of Assistance/ Projects Funded	Purpose	Eligible Applicants	Where To Obtain Application	Application Process	Application Deadline	For More Information
<b>EMERGENCY MANAGEMENT</b>								
SBA	Physical Disaster Loans	Loans to victims of declared disasters for uninsured or otherwise uncompensated physical damage.	To repair or replace damaged or destroyed real and/or personal property to its pre-damage condition. The loan limit may increase by 20% to provide protective measures.	Loans to homeowners, renters, business and non-profit organizations who have suffered physical loss do to a Presidential or SBA declared disaster.	SBA Disaster Office.	File with nearest SBA Disaster Office.	60 days from disaster declaration unless extended by SBA.	SBA Disaster Office.
USDA	Direct Housing, Natural Disaster Grants and Loans	Repair or replace damaged Property.	To meet emergency assistance needs not provided by FEMA Programs.	Very-Low income owner-occupants of rural housing in declared disaster areas. Must be 62 years or older.	Rural Development Field Office of the applicants County.	Complete Form 410-4 and return to field office.	From Date of Declaration until appropriated funds are exhausted.	U.S.D.A. Rural Development Field Office.
USDA	Disaster Reserve Assistance	Direct Payments for Specified Use.	To provide emergency assistance to eligible livestock owners, in a State, county, or area approved by the Secretary or designee, where because of disease, insect infestation, flood, drought, fire, hurricane, earthquake, hail storm, hot weather, cold weather, freeze, snow, ice, and winterkill, or other natural disaster, a livestock emergency has been determined to exist.	An established producer or husbandry of livestock or a dairy producer. a farm cooperative, private domestic corporation, partnership, or joint operation in which a majority interest is held by the members, stockholders, or partners who are citizens of, or legal resident aliens of the United States. Any Indian tribe or tribal organization of the Indian Self-Determination and Education Assistance Act. Any organization under the Indian Reorganization Act or Financing Act.	Visit the county FSA office in the eligible county.	Applicants visit the county FSA office in the eligible county to make application, certify eligibility and report feed loss, feed available, and eligible livestock related to the disaster occurrence; and (2) applicants also receive authority to participate in the program as provided by the approving official.	Feeding periods for the disaster reserve assistance program begin (a) the first day of the 1996 crop year in counties approved for 1995 or 1996 livestock feed programs; (b) the date the producer filed an application, if the natural disaster began after the beginning of the 1996 crop year; the date of the occurrence for sudden natural disasters that occurred after the beginning of the 1996 crop year.	Regional or Local Office <a href="http://www.fsa.usda.gov">http://www.fsa.usda.gov</a>
USDA	Emergency Loans	Direct Loans.	To assist established (owner or tenant) family farmers, ranchers and aquaculture operators with loans to cover losses resulting from major and/or natural	Be an established family farmer, rancher, or aquaculture operator (either tenant-operator or owner-operator), who was conducting a farming operation at the time of occurrence of the	Consult the appropriate FSA State office.	Application Form FSA 410-1 provided by the Farm Service Agency must be presented, with supporting information, to the FSA county office serving the applicant's county. FSA personnel	Deadline for filing applications for actual loss loans is 8 months from the date of declaration/designation for both physical and production losses. Applicants should consult the FSA county office serving their area for	Regional or Local Office <a href="http://www.fsa.usda.gov">http://www.fsa.usda.gov</a>

Table 4-4 – Federal Technical Assistance and Funding

Agency	Program	Type of Assistance/ Projects Funded	Purpose	Eligible Applicants	Where To Obtain Application	Application Process	Application Deadline	For More Information
<b>EMERGENCY MANAGEMENT</b>								
			<p>disasters, which can be used for annual farm operating expenses, and for other essential needs necessary to return disaster victims' farming operations to a financially sound basis in order that they will be able to return to private sources of credit as soon as possible.</p>	<p>disaster either as an individual proprietorship, a partnership, a cooperative, a corporation, or a joint operation. Have suffered qualifying crop loss and/or physical property damage caused by a designated natural disaster. Be a citizen of the United States or legal resident alien, or be operated by citizens and/or resident aliens owning over a 50 percent interest of the farming entity. Have sufficient training or farming experience in managing and operating a farm or ranch. Be a capable manager of the farming, ranching, or aquaculture operations.</p>		<p>assist applicants in completing their application forms. This program is excluded from coverage under OMB Circular No. A-110.</p>	<p>application deadlines.</p>	

Table 4-4 – Federal Technical Assistance and Funding

Agency	Program	Type of Assistance/ Projects Funded	Purpose	Eligible Applicants	Where To Obtain Application	Application Process	Application Deadline	For More Information
<b>HISTORIC PRESERVATION</b>								
DOI; National Park Service	Civil War Battlefield Land Acquisition Grants	Grants for Fee simple acquisition of land, or for the acquisition of permanent protective interests in land at Civil War Battlefields.	To preserve threatened civil war battlefields.	Local governments or private non-profit organization in partnership with local governments.	SF 424 and attached documents including hard copies of proposals. See application requirements for list of attachments.	File forms with National Park Service Office.	Ongoing.	National Park Service. <a href="http://www.nps.gov/">http://www.nps.gov/</a>
DOI; National Park Service	National Maritime Heritage Grants	Education activities and preservation activities or projects, such as: 1) activities associated with acquiring ownership of, or responsibility for, historic maritime properties for preservation purposes; 2) preservation planning; 3) documentation of historic maritime properties; 4) protection and stabilization of historic maritime properties; 5) preservation restoration, or rehabilitation of historic maritime properties; 6) maintenance of historic maritime properties; and 7) reconstruction or reproduction of well-documented historic maritime properties.	To preserve historic maritime resources and increase public awareness and appreciation.	Local governments and private non-profit organizations.	National Maritime Initiative.	State Historical Preservation Office or National Maritime Initiative.	Contact State Historical Preservation Office or National Maritime Initiative.	National Park Service Office, National Maritime Initiative. <a href="http://www.cr.nps.gov/Maritime/">http://www.cr.nps.gov/Maritime/</a>
DOI; National Park Service	Technical Preservation Service	Advisory services and counseling, dissemination of technical information, provision of specialized services.	To assist local governments and owners of certified historical structures to preserve and maintain properties.	Local governments and individuals.	Historic Preservation Certification Application through Appropriate State Official or NPS Office.	File through State Official or NPS Office.	None.	National Park Service Office. <a href="http://www.nps.gov/">http://www.nps.gov/</a>



Table 4-4 – Federal Technical Assistance and Funding

Agency	Program	Type of Assistance/ Projects Funded	Purpose	Eligible Applicants	Where To Obtain Application	Application Process	Application Deadline	For More Information
<b>HOUSING</b>								
DHS	Disaster Housing Assistance To Individuals And Households In Presidential Declared Disaster Zones	Direct Payments for Specified Use.	To provide assistance to affected individuals and households within Presidential-declared disaster zones to enable them to address disaster-related housing and other necessary expenses and serious needs, which cannot be met through other forms of disaster assistance, insurance, or through other means.	Individuals and households, in areas declared an emergency or major disaster by the President, whose primary residence has been damaged or destroyed and whose losses are not covered by insurance are eligible to apply for this program. Must be a citizen of the United States, a non-citizen national, or a qualified alien.	An applicant should consult the office or official designated as the single point of contact in his or her State for more information on the process the State requires to be followed in applying for assistance, if the State has selected the program for review.	A Presidential Disaster or Emergency Declaration must be issued, before individuals and households can register an application for assistance with FEMA via a toll-free number or by visiting a Disaster Recovery Center.	Generally, individual and household applications for disaster assistance must be filed within 60 days of the disaster declaration.	Regional or Local Office.
DHS	Disaster Housing Program	Grant.	The Disaster Housing Program provides housing assistance in the form of a grant to individuals whose homes sustained damage as a result of a Presidentially declared disaster. To qualify for assistance, the damaged home must be your primary residence, and be located in the disaster-declared area. If insured, a claim should be filed. This program provides grants for lodging expense reimbursement, minimal home repairs and rental assistance. A determination of the types of housing assistance you are eligible to receive will be made if you apply	Applicant must be a national, citizen or dual citizen of the US whose home was destroyed or damaged by a Presidentially declared major disaster.	Contact FEMA.	Individuals can apply for assistance by calling 1-800-621-FEMA. Insured homeowners should first file a claim with their home insurer before contacting FEMA. An inspection is performed and a determination is made on your eligibility for one of the following types of assistance: Lodging expense reimbursement, minimal home repairs, rental assistance and Mortgage and Rental Assistance.	Contact FEMA.	Additional general information can be found at: <a href="http://www.fema.gov/tabs_disaster_shtm">http://www.fema.gov/tabs_disaster_shtm</a>
DHS	Federal Assistance To	Direct Payments for Specified Use.	To address disaster-related housing needs	Individuals and households, in areas	An applicant should consult the office or official designated as the	Upon declaration of an emergency or	Generally, individual and household	Regional or Local Office.

Table 4-4 – Federal Technical Assistance and Funding

Agency	Program	Type of Assistance/ Projects Funded	Purpose	Eligible Applicants	Where To Obtain Application	Application Process	Application Deadline	For More Information
<b>HOUSING</b>								
	Individuals And Households- Disaster Housing Operations		of individuals and households suffering hardship who are within an area declared as a disaster zone, by the President.	declared an emergency or major disaster by the President, whose primary residence has been damaged or destroyed and whose losses are not covered by insurance are eligible to apply for this program. The individual or a member of the household must be a citizen of the United States, a non-citizen national, or a qualified alien.	single point of contact in his or her State for more information on the process the State requires to be followed in applying for assistance, if the State has selected the program for review.	major disaster, individuals and households may register an application for assistance with FEMA via a toll-free number or by visiting a Disaster Recovery Center.	applications for disaster assistance must be filed within 60 days of the disaster declaration.	
DOI, Bureau of Indian Affairs	Indian Housing Assistance	Construction of housing, technical assistance to establish housing plans and determine extent and use of the Bureau's housing Improvement Program.	To eliminate substantially substandard Indian owned to inhabited housing for very low income individuals living in tribal service areas.	Individual members of Federally recognized tribes or tribal governments or organizations.	An informal conference should be scheduled with Bureau of Indian Affairs. Applications for Tribes or Tribal organizations should be submitted to Bureau of Indian affairs local office. Individuals may submit applications to the Bureau or to the tribal Servicing Housing Office.	Process is determined through annual Tribal work plan.	For Tribes or Tribal Organizations there is no deadline. For individuals the deadline is set at the local office.	Regional or Local Office of the Bureau of Indian Affairs.
HUD	Community Development Block Grant (CDBG)	Grant.	To develop viable urban communities by providing decent housing and a suitable living environment. Principally for low-to moderate-income individuals.	Eligible CDBG grant recipients include States, units of general local government (city, county, town, township, parish, village or other general purpose political subdivision determined to be eligible for assistance by the Secretary), the District of Columbia, Puerto Rico, Guam, the Virgin Islands, American Samoa, the Commonwealth of the Northern Marianas, and recognized Native American tribes and Alaskan Native villages.	<a href="http://www.hud.gov/offices/cpd/about/cpd_programs.cfm">http://www.hud.gov/offices/cpd/about/cpd_programs.cfm</a>	Community Development activities that meet long-term needs. These activities can include acquisition, rehabilitation, reconstruction of properties and facilities damaged by a disaster, and redevelopment of disaster affected areas.	Consolidated Plans may be submitted between November 15 and August 16 of each fiscal year in which the State will administer funds.	State and Small Cities Division, Office of Block Grant Assistance, CPD, HUD, 451 7th Street, S.W., Washington, DC 20410-7000. Telephone: 202.708.3587. <a href="http://www.hud.gov/bdfy2000/summary/cpd/cdbg.html">http://www.hud.gov/bdfy2000/summary/cpd/cdbg.html</a>

Table 4-4 – Federal Technical Assistance and Funding

Agency	Program	Type of Assistance/ Projects Funded	Purpose	Eligible Applicants	Where To Obtain Application	Application Process	Application Deadline	For More Information
<b>HOUSING</b>								
HUD	Demolition and Revitalization of Severely Distressed Public Housing (HOPE VI)	Demolition of all or parts of severely distressed public housing projects, relocation cost of affected resident, disposition activities, rehabbing of units or community facilities, development of new units or community facilities, homeownership activities, acquisition activities, management improvements and administrative cost, community and supportive services.	To fund revitalization of severely distressed public housing developments.	Public housing authorities and Indian Housing Authorities, plus local governments for HOPE VI Main Street Grants.	Submission requirements and application are listed in Notice of Federal Assistance in the Federal Register.	HUD HQ reviews the application and rates them. Highest rated applications are funded.	As indicated in the Federal Register Notice.	HUD local or regional Office.
HUD	Mortgage insurance-Homes for Disaster Victims	Guaranteed / Insured Loans.	To insure lenders against losses on mortgage loans used to finance purchase or reconstruction of one-family home that will be the principal residence of a borrower that is a victim of a disaster.	Individuals and Families that are victims of a disaster designated by the President.	Mortgagee submits Application to HUD Field Office.	Mortgagee submits Application to HUD Field Office.	None.	HUD local or regional Office.
HUD	Rehabilitation Mortgage Insurance	Guaranteed / Insured Loans.	To insure lenders against losses on mortgage loans for 1 to 4 unit structures used to finance the purchase of a structure and land and rehabilitate the structure; the purchase, relocation and rehabilitation of a structure from another	Individual purchasers.	A HUD Approved Lending Institution	Review by Lending Institution.	None.	HUD local or regional Office.

Table 4-4 – Federal Technical Assistance and Funding

Agency	Program	Type of Assistance/ Projects Funded	Purpose	Eligible Applicants	Where To Obtain Application	Application Process	Application Deadline	For More Information
<b>HOUSING</b>								
			site; refinance existing debt and rehabilitating a structure; finance the rehabilitating of a structure.					
HUD	Rural housing and Economic Development	Grants for Capacity Building, Support of Innovative Housing and Economic Development Activities.	To build capacity for rural housing and economic development activities in rural areas.	Local Rural Non-Profit Organizations, Community Development Corporations, Indian Tribes, State agencies.	Submission requirements and application are listed in Notice of Federal Assistance in the Federal Register	As indicated in the Federal Register Notice.	As indicated in the Federal Register Notice.	HUD local or regional Office.
HUD	Self-Help Homeownership Opportunity Program (SHOP)	Land Acquisition and Infrastructure Improvements	To facilitate and encourage innovative homeownership opportunities were homeowner are low-income and contribute a significant amount of sweat equity.	National or regional non-Profit Organizations or Consortia.	Submission requirements and application are listed in SHOP Notice of Federal Assistance in the Federal Register.	As indicated in the Federal Register Notice.	As indicated in the Federal Register Notice.	HUD local or regional Office.
HUD	Supplemental Loan Insurance-Multifamily Rental Housing	Financing of repairs, additions and improvements to multifamily projects, group practice facilities, hospitals and nursing homes already insured by HUD.	To insure lenders against losses on loans to finance additions and improvements to eligible properties.	Owners of Multifamily projects or facilities subject to mortgage insured by HUD or individual s/families and owners of multifamily projects.	HUD Multifamily HUB and Program Center.	Pre-application conference and then submittal of formal application through HUD approved mortgage.	Case-by-case basis.	HUD local or regional Office.
USDA	Direct Housing-Natural Disaster	Direct loans.	To assist qualified lower income rural families to meet emergency assistance needs resulting from natural disaster to buy, build, rehabilitate, or improve dwellings in rural areas. Funds are only available to the extent that funds are not provided by the Federal Emergency Management Agency (FEMA). For the	Applicants must be without adequate resources to obtain housing or related facilities. Applicants must be unable to secure the necessary credit from other sources at prevailing terms and conditions for residential financing.	Rural Development Field office.	Applicants must file Form RD 410-4 at the Rural Development field office serving the county where the dwelling is located. This program is excluded from coverage under OMB Circular No. A-110.	Applicants must file applications from the date of declaration/designation and until supplemental appropriated funds are exhausted.	Regional or Local Office. Consult your local telephone directory under United States Department of Agriculture for Rural Development field office number. If no listing, contact appropriate Rural Development State Office at: <a href="http://www.rurdev.usda.gov/recd_map.html">http://www.rurdev.usda.gov/recd_map.html</a> .

Table 4-4 – Federal Technical Assistance and Funding

Agency	Program	Type of Assistance/ Projects Funded	Purpose	Eligible Applicants	Where To Obtain Application	Application Process	Application Deadline	For More Information
<b>HOUSING</b>								
			purpose of administering these funds, natural disaster will only include those areas identified by a Presidential declaration.					
USDA; Rural Housing Service	Farm Labor Housing Loans and Grants	Project grants and Guaranteed/insured Loans for the construction, repair or purchase of year-around or seasonal housing; acquiring land and making improvements for housing; developing related support facilities.	To provide decent, safe and sanitary low-rent housing and related facilities for domestic farm laborers.	Farmers, farm family partnerships, family farm corporations, or an association of farmers.	Applicant must furnish the following information: the number of farm laborers currently being used in the area; the kind of labor performed; the future need for labor; the kind, condition, and adequacy of current housing; the ownership of current housing; the ability of workers to pay rent; and information that it is unable to provide housing from its own resources or terms and conditions that would enable it to provide labor housing.	Applications will be scored and reviewed by State and National Offices.	None.	Regional or Local Office of Rural housing Service. <a href="http://www.rurdev.usda.gov/rhs/">http://www.rurdev.usda.gov/rhs/</a>
USDA; Rural Housing Service	Rural Housing Preservation Grants	Loans, grants or other assistance to individual homeowners, rental properties or coops to pay any part of the cost for repair and rehabilitation of structures.	To assist very low- and low-income residents individual homeowners, rental property owners (single/multi-unit and consumer cooperative housing projects to complete necessary repairs and rehabilitation of dwellings.	Political subdivision of state, public non-profit corporation, or Indian tribal Corporations authorized to receive and administer housing preservation grants, private nonprofit corporations, or consortia.	Contact your regional or local office.	Consult with Rural Development Office prior to application and submit pre-application. An Environmental Impact Assessment is required.	See Federal Register of Notice of Funds Availability.	Regional or Local Office of Rural housing Service. <a href="http://www.rurdev.usda.gov/rhs/">http://www.rurdev.usda.gov/rhs/</a>
USDA; Rural Housing Service	Section 538 Rural rental Housing Guaranteed Loans	Guaranteed/Insured Loans to supply affordable multi-family housing in rural areas.	To encourage private and public lenders to make loans for affordable rental properties.	Lenders.	Lender provides documentation required by RHS.	RHS will review applications for compliance and issue conditional Commitment of guarantee with conditions. Once Conditions are met the final Contract of guarantee will be issued.	See Federal Register of Notice of Funds Availability.	Regional or Local Office of Rural housing Service. <a href="http://www.rurdev.usda.gov/rhs/">http://www.rurdev.usda.gov/rhs/</a>
USDA; Rural	Very Low-Income housing	Direct Loans and Project Grants to	To make essential repairs to homes to	Applicant must own and occupy the home in a rural	Rural Development State or District Office.	The Loan must be submitted to RHS	None.	Regional or Local Office of Rural housing Service.

Table 4-4 – Federal Technical Assistance and Funding

Agency	Program	Type of Assistance/ Projects Funded	Purpose	Eligible Applicants	Where To Obtain Application	Application Process	Application Deadline	For More Information
<b>HOUSING</b>								
Housing Service	Repair Loans and Grants	Very-Low Income Homeowners in rural areas to repair, improve or modernize their dwellings or to remove health and safety hazards.	make them safe and remove health hazards.	area, have sufficient income to repay a loan, be 62 years of age or older and be unable to repay a loan for that part of the assistance that comes as a grant.		field office serving county where structure is located.		<a href="http://www.rurdev.usda.gov/rhs/">http://www.rurdev.usda.gov/rhs/</a>
USDA; Rural Housing Service	Very Low to Moderate Income Housing Loans	Direct and Guaranteed Loans to buy, build, or improve applicant's permanent residence. New manufactured loans on a permanent site may also be approved.	To assist very low, low-income, and moderate households to obtain modest, decent, safe, and sanitary housing for use as a permanent residence in a rural area.	Very low, low-income, and moderate households.	For Direct Loans the application is made to the local Rural Development Office. For Guaranteed Loans application is made to the lender.	For Direct Loans the Rural Development Office makes a decision within 30 – 60 days. For Guaranteed Loans the decision is made within 3 days.	None.	Regional or Local Office of Rural housing Service. <a href="http://www.rurdev.usda.gov/rhs/">http://www.rurdev.usda.gov/rhs/</a>

Table 4-4 – Federal Technical Assistance and Funding

Agency	Program	Type of Assistance/ Projects Funded	Purpose	Eligible Applicants	Where To Obtain Application	Application Process	Application Deadline	For More Information
<b>INFRASTRUCTURE</b>								
DHS	National Dam Safety Program	State grants distributed directly to State dam safety programs.	To reduce the risks to life and property from dam failure in the United States through the establishment and maintenance of an effective national dam safety program to bring together the expertise and resources of the Federal and non-Federal communities in achieving national dam safety hazard reduction.	For a State to be eligible for primary assistance under the National Dam Safety Program, the State dam safety program must be working toward meeting the following criteria: The authority to review and approve plans and specifications to construct, enlarge, modify, remove, and abandon dams; the authority to perform periodic inspections during dam construction to ensure compliance with approved plans and specifications. All inspections to be performed under the supervision of a State-registered professional engineer with experience in dam design and construction.	<a href="http://www.fema.gov/fima/damsafe">www.fema.gov/fima/damsafe</a>	States wishing to participate in the National Dam Safety Program must submit a proposal with their application package including a program narrative statement, goals and objectives, performance measures, travel budget and related activities.	Applications should be submitted to FEMA by November 30 of each fiscal year.	<i>Headquarters Office:</i> Director, National Dam Safety Program, Mitigation Directorate, FEMA, DHS, 500 C Street SW., Washington, DC 20472; Telephone: (202) 646-3885. Additional information is available on the National Dam Safety Program web site, <a href="http://www.fema.gov/fima/damsafe">www.fema.gov/fima/damsafe</a>
DOC; EDA	Grants for Public Works and Economic Development Facilities	Project grants for water and sewer improvements, industrial access roads, industrial and business parks, port facilities, railroad sidings, distance learning facilities, skill-training facilities, redevelopment of brown fields, eco-	To promote long-term economic development in areas experiencing substantial economic stress.	Cities, counties, institutions of higher education or a consortium of institutions of higher education, other political subdivision, Indian Tribes, Economic Development Districts and non-profit organizations.	The Economic Development Representative servicing the state or EDA.	Meet with EDR. If deemed appropriate the applicant will be invited to apply.	30 days after invitation.	Regional or Local Office. <a href="http://www.eda.gov/Contacts/Contacts.xml">http://www.eda.gov/Contacts/Contacts.xml</a>

Table 4-4 – Federal Technical Assistance and Funding

Agency	Program	Type of Assistance/ Projects Funded	Purpose	Eligible Applicants	Where To Obtain Application	Application Process	Application Deadline	For More Information
<b>INFRASTRUCTURE</b>								
		industrial facilities, business incubator facilities, and telecommunication infrastructure improvement needed for business retention and expansion.						
DOC; National Telecommunication and Information Administration	Public Telecommunications Facilities Planning and Construction	Grants for planning and construction of public telecommunications facilities.	To assist in the planning, acquisition, installation, and modernization of public telecommunications facilities through planning grants and matching construction grants.	Public or noncommercial educational broadcast station, noncommercial telecommunication entity, non-profit foundation, corporation, institution or association organized primarily for educational or cultural purposes, local government, tribal government or an agency thereof, or a political or special purpose subdivision of the state.	Request from agency or go to the web at: <a href="http://www.ntia.doc.gov/ptfp">www.ntia.doc.gov/ptfp</a> .	File application form, project narrative, project budget forms, relevant exhibits, CD-511, CD 346, SF 424B, and SF LLL. Contact State telecommunications agency where applicable.	See annual notification in the Federal Register.	Regional or Local Office. <a href="http://www.ntia.doc.gov/">http://www.ntia.doc.gov/</a>
DOD; USACE	Flood Control Works / Emergency Rehabilitation	Provision of Specialized Services.	To assist in the repair and restoration of public works damaged by flood, extraordinary wind, wave, or water action.	Owners of damaged flood protective works, or State and local officials of public entities responsible for their maintenance, repair, and operation.	Regional or Local Office: U.S. Army Corps of Engineers Division or District Engineers.	The Corps provides public works and engineering support to supplement State and local efforts toward the effective and immediate response to a natural disaster.	Thirty days after a flood or unusual coastal storm.	Program Manager PL 84-99 USACE, 20 Massachusetts Ave, N.W. Washington, DC 20314 Telephone: 202.761.0001. <a href="http://www.spd.usace.army.mil/hqam.html">http://www.spd.usace.army.mil/hqam.html</a>
DOD; USACE	Protection of Essential Highways, Highway Bridge Approaches and Public Works	Protection of highways, highway bridges, essential public works, churches, hospitals, schools and other non-profit public services.	To provide bank protection for locations endangered by flood-caused erosion.	Political subdivision of states and other responsible local agencies established under state law with full authority and ability to undertake legal and financial responsibilities.	Formal letter to District Engineer.	Consult with District Engineer.	None.	Regional or Local Office. <a href="http://www.usace.army.mil/business.html">http://www.usace.army.mil/business.html</a>



Table 4-4 – Federal Technical Assistance and Funding

Agency	Program	Type of Assistance/ Projects Funded	Purpose	Eligible Applicants	Where To Obtain Application	Application Process	Application Deadline	For More Information
<b>INFRASTRUCTURE</b>								
DOI; Bureau of Reclamation	Water Desalination Research and Development Program	Demonstration and development projects and related activities.	To develop cost-effective, technically efficient and implementable methods by which water can be produced.	Local entities, public/nonprofit institutions/organizations, other public institutions/organizations.	A proposal solicitation is announced by the Bureau of Reclamation.	There will be a general solicitation and one for pilot plants or demonstration projects, SF 424 and DI-2010 forms are required.	Varies, contact Bureau of Reclamation.	Bureau of Reclamation <a href="http://www.usbr.gov/">http://www.usbr.gov/</a> (303) 445-2432.
FHWA; FAA	Airport Improvement Program	Project Grants and advisory services and counseling.	Integrated airport system planning and airport master planning, construction and rehabilitation at public-use airports.	Counties, municipalities, other public agencies, Indian tribes, private owners of public-use reliever airports or airports having at least 2,500 passengers boarding annually and receiving scheduled passenger aircraft.	Contact the States single-point contact for aviation.	Pre-application is filed with the FAA office and reviewed regionally and/or in Washington D.C.	January 31 or another date specified in the Federal Register.	Regional or Local Office. <a href="http://www.faa.gov/about/office_org/">http://www.faa.gov/about/office_org/</a>
FHWA; FTA	Federal transit Capital Investment Grants	Formula Grants and Project Grants.	To assist in financing the acquisition, construction, reconstruction and improvement of facilities, rolling stock and equipment for use in public transportation service.	Municipalities and other subdivisions of the state, public agencies and instrumentalities of one or more states, public corporations. Boards and commissions.	Federal Transportation Authority or State single point of contact.	Applicant should contact the State single point of contact.	Contact FTA.	Regional or local office. <a href="http://www.fta.dot.gov/4_ENG_HTML.htm">http://www.fta.dot.gov/4_ENG_HTML.htm</a>
FHWA; FTA	Transit Planning and Research	Project Grants, Technical Information, and Training.	Increase public ridership, improve safety and emergency preparedness, improve capital operating efficiencies, protect the environment and promote energy independence.	Public bodies, non-profit institutions, local agencies, universities and legally constituted public agencies and operators of public transportation services, and non-profit organizations.	Federal Transportation Authority.	Pre-Application Coordination.	None.	Associate Administrator for Research, Demonstration and Innovation, FTA (202) 366-4209. <a href="http://www.fta.dot.gov/4_ENG_HTML.htm">http://www.fta.dot.gov/4_ENG_HTML.htm</a>

Table 4-4 – Federal Technical Assistance and Funding

Agency	Program	Type of Assistance/ Projects Funded	Purpose	Eligible Applicants	Where To Obtain Application	Application Process	Application Deadline	For More Information
<b>INFRASTRUCTURE</b>								
FHWA	Transportation: Emergency Relief Program	Special funding and technical assistance to States and Federal agencies.	To provide aid for repair of Federal-aid roads.	State highway/transportation agency or Federal agency.	www.fhwa.dot.gov	It is the responsibility of individual States to request ER funds for assistance in the cost of necessary repair of Federal-aid highways damaged by natural disasters or catastrophic failures. A notice of intent to request ER funds filed by the State Department of Transportation with the FHWA Division Office located in the State will initiate the ER application process.	Contact FHWA.	Director, Office of Engineering, FHWA, DOT, 400 7th Street, S.W., Washington, DC 20590. Telephone: 202.366.4655. <a href="http://www.fhwa.dot.gov/programadmin/erelif.html">http://www.fhwa.dot.gov/programadmin/erelif.html</a>
USDA; Rural Utilities Service	Water and Waste Disposal Systems for Rural Communities	Project Grant, Direct Loans, guaranteed/Insured Loans for the installation, repair, improvement or expansion of rural water facilities including distribution lines, well pumping facilities and cost related thereto, and the installation, repair, improvement, or expansion or rural waste disposal facilities including the collection, and treatment of sanitary, storm and solid wastes.	To provide basic human amenities, alleviate health hazards and promote orderly growth of rural area.	Municipalities, counties and other political subdivisions of a states, such as authorities, associations, cooperatives, corporations operated on a not for profit basis, and federally recognized tribes. Serving rural businesses and rural residents.	Local USDA Rural Development Office.	Application is reviewed at the local level and forwarded to Rural Development State Director for review.	None.	Regional or local office. <a href="http://www.rurdev.usda.gov/recd_map.html">http://www.rurdev.usda.gov/recd_map.html</a>

Table 4-4 – Federal Technical Assistance and Funding

Agency	Program	Type of Assistance/ Projects Funded	Purpose	Eligible Applicants	Where To Obtain Application	Application Process	Application Deadline	For More Information
<b>INFRASTRUCTURE</b>								
USDA; Rural Utilities Service	Water and Waste Disposal Loans and Grants (Section 306C)	Project Grants, Direct Loans to construct enlarge, extend or otherwise improve community water or waste systems; extend lines; and connect individual residences to the system.	Provide water and waste disposal facilities and services to low income rural communities whose residents face significant health risks.	Local levels of government, federally recognized tribes and non-profit associations. Per capita income may not exceed 70% of national average, unemployment rate is not less than 125% of national average, and residents must face significant health risks due to not having access to an affordable community water and/or waste disposal system.	Local USDA Rural Development Office.	Application is reviewed at the Rural Development State office and must compete on a national basis for review.	None.	Regional or local office. <a href="http://www.rurdev.usda.gov/recd_map.html">http://www.rurdev.usda.gov/recd_map.html</a>

Table 4-4 – Federal Technical Assistance and Funding

Agency	Program	Type of Assistance/ Projects Funded	Purpose	Eligible Applicants	Where To Obtain Application	Application Process	Application Deadline	For More Information
<b>MITIGATION</b>								
DHS	Emergency Management Performance Grants (EMPG)	Formula Grants.	To encourage the development of comprehensive emergency management, including for terrorism consequence management, at the State and local level and to improve emergency management planning, preparedness, mitigation, response, and recovery capabilities.	Funding provided to States, which can be used to educate people and protect lives and structures from natural and technological hazards.	An applicant should consult the office or official designated as the single point of contact in his or her State for more information on the process the State requires to be followed in applying for assistance, if the State has selected the program for review. Technical assistance is available for application preparation from the FEMA Regional Offices.	Applications must be submitted online using the OJP GMS and must contain information and meet the requirements outlined in the program guidelines and application kit.	Applications will be made available on December 2, 2004, and must be received by ODP no later than January 16, 2005.	Office of Financial Management, FEMA, 500 C Street, S.W., Washington, DC 20472 Telephone: 202.646.7057. <a href="http://www.fema.gov">http://www.fema.gov</a>
DHS	Flood Mitigation Assistance Program	Grants to States.	To help States and communities plan and carry out activities designed to reduce the risk of flood damage to structures covered under contracts for flood insurance.	The State or community must first develop (and have approved by FEMA) a flood mitigation plan that describes the activities to be carried out with assistance provided under this program. The plan must be consistent with a comprehensive strategy for mitigation activities, and be adopted by the State or community following a public hearing.	Applications can be obtained from the State Hazard Mitigation Officer.  Eligible projects include acquisition, elevation, or relocation of National Flood Insurance Program (NFIP)-insured structures, especially those that have been repetitively flooded or substantially damaged.	The State Hazard Mitigation Officer applied to the Federal Emergency Management Agency for annual funds.	Annual.	Risk Reduction Branch, Mitigation Division, FEMA, DHS 500 C Street SW., Washington, DC 20472; Telephone: (202) 646-2856. Additional information is available on FEMA's web site, <a href="http://www.fema.gov/fima/planfma.shtml">www.fema.gov/fima/planfma.shtml</a>
DHS	Hazard Mitigation Grant Program	Grants.	To prevent future losses of lives and property due to disasters; to implement State or	State and local governments; certain private and nonprofit organizations or institutions; Indian	For more information on where to obtain application go to website, <a href="http://www.fema.gov/fima/hmgrp/hmgrp_ref.shtml">http://www.fema.gov/fima/hmgrp/hmgrp_ref.shtml</a>	Eligible applicants apply for the program through the	The State will submit all selected local applications or summaries to the	Branch Chief, Risk Reduction Branch, Mitigation Division, FEMA, DHS, 500 C Street SW., Washington, DC 20472; Telephone: (202) 646-2856. Additional information is available on FEMA's web

Table 4-4 – Federal Technical Assistance and Funding

Agency	Program	Type of Assistance/ Projects Funded	Purpose	Eligible Applicants	Where To Obtain Application	Application Process	Application Deadline	For More Information
<b>MITIGATION</b>								
			local hazard mitigation plans; to enable mitigation measures to be implemented during immediate recovery from a disaster; and to provide funding for previously identified mitigation measures to benefit the disaster area.	tribes or authorized tribal organizations; and Alaska Native villages or organizations.		State, as the State administers the program. Applicants are encouraged to contact the State Hazard Mitigation Officer for details. Each State has a hazard mitigation administrative plan that explains procedures for administering the HMGP. When the State requests a disaster declaration, it must also request that HMGP funding be made available. Individuals applying for a Hazard mitigation Grant can do it through their communities.	Regional Director within 90 days after the State Hazard Mitigation Plan is approved. (Approximately 9-18 months after disaster declaration.)	site, www.fema.gov
DHS	National Flood Insurance Program	Formula grants to States.	To enable persons to purchase insurance against physical damage to or loss of buildings and/or contents therein caused by	Flood insurance can be made available in any community (a State or political subdivision thereof with authority to adopt and enforce floodplain	Contact State Hazard Mitigation Officer for details.	Community officials must submit an NFIP eligibility application form, which is available from the FEMA,	Communities with one or more identified special flood hazard areas must enter the program within 1 year after	Regional or Local Office. Contact the appropriate FEMA regional office, or the State office responsible for coordinating the program's activities.

Table 4-4 – Federal Technical Assistance and Funding

Agency	Program	Type of Assistance/ Projects Funded	Purpose	Eligible Applicants	Where To Obtain Application	Application Process	Application Deadline	For More Information
<b>MITIGATION</b>								
			floods, mudslide (i.e., mudflow), or flood-related erosion, thereby reducing Federal disaster assistance payments, and to promote wise floodplain management practices in the Nation's flood-prone and mudflow- prone areas.	management measures for the areas within its jurisdiction) that submits a properly completed application to FEMA.		together with: copies of adopted floodplain management measures meeting the minimum standards of 44 CFR Section 60.3(a), 60.3(b), 60.3(c), 60.3(d), and/or 60.3(e), as appropriate for the type of flood hazards identified; a list of any incorporated communities within the applicant's boundaries; and estimates of population and, by kind, of buildings situated in the known flood-prone areas of the community. Such Applications should be submitted to the Mitigation Directorate, FEMA, Washington, DC 20472. This program is excluded from coverage under OMB Circular No. A-110.	the identification of those areas or else prohibitions against Federally related financial assistance for acquisition or construction purposes in identified special flood hazard areas take force. Once the community does qualify, after the prescribed date, these prohibitions are removed. Adequate floodplain management measures must be in effect within 6 months of the date that the special flood hazard area is identified and within 6 months of the date flood water surface elevations are provided.	
DHS	Public Assistance Program	Grants to States and Communities.	To provide supplemental assistance to States, local governments, and certain private	State and local governments and any political subdivision of a State, Indian tribes, and Alaskan Native	An applicant should consult the office or official designated as the point-of-contact in the State for more information.	Application for Public Assistance (PA) is made through the Governor's	A Request for Public Assistance is normally submitted by the applicant within	Public Assistance Branch, Recovery Division, FEMA, DHS, 500 C Street SW., Washington, DC 20472; or the State Emergency office. Additional information is available on FEMA's web site,

Table 4-4 – Federal Technical Assistance and Funding

Agency	Program	Type of Assistance/ Projects Funded	Purpose	Eligible Applicants	Where To Obtain Application	Application Process	Application Deadline	For More Information
<b>MITIGATION</b>								
			nonprofit organizations to alleviate suffering and hardship resulting from major disasters or emergencies declared by the President.	villages are eligible. Also eligible are private nonprofit organizations that operate educational, utility, emergency, or medical facilities, or that provide custodial care or other essential services of governmental nature to the general public. As a condition of grants under the Stafford Act, applicants are encouraged to mitigate natural hazards.		Authorized Representative to the FEMA Regional Director in accordance with FEMA Disaster Assistance Regulations, 44 CFR 206, except as provided in Part 206.35(d) for emergency declarations involving primarily Federal responsibility.	30 days of a declaration.	<a href="http://www.fema.gov/rrrr/pa/">http://www.fema.gov/rrrr/pa/</a>
DOC; NOAA; NWS	Automated Flood Warning Systems	Funding for creating, renovating, or enhancing Automated Flood Warning Systems.	To provide funding to communities with flood or flash flood problems that affect safety of life and property for warning systems.	Counties, municipalities, educational institutions and non-profit organizations.	<a href="http://www.ofa.noaa.gov/%7Egrants/appkit.html">http://www.ofa.noaa.gov/%7Egrants/appkit.html</a> . Applicants must also provide statement of work, project description and detailed budget narrative and justification.	Submit to: NOAA/NWS, 1325 East-West Highway, AFWS Program Manager, W/OS31, Room 13396, Silver Spring, MD. 20910.	Check with local NWS Office.	AFWS Operations Manager (631) 224-0112.
DOC; Census Bureau	Census Geography	Provide Computer generated set of maps for use in conducting surveys.	Showing results of surveys geographically, determine names and current boundaries of selected statistical areas.	Interested persons, organizations and government agencies.	Written request.	None.	None.	Regional or Local Census Bureau Office <a href="http://www.census.gov/field/www/">http://www.census.gov/field/www/</a>
DOC; NOAA	Geodetic Surveys and Services	To provide national, coordinated spatial	To provide assistance to State local and regional agencies in the	Local, municipal, universities and regional agencies.	NOAA Grants Management Division (301) 713-3228.	45-90 day review time after submittal of all	Must be submitted at least 90 days in advance of desired effective	NOAA Grants Management Division <a href="http://www.ago.noaa.gov/grants/">http://www.ago.noaa.gov/grants/</a> (301) 713-3228.

Table 4-4 – Federal Technical Assistance and Funding

Agency	Program	Type of Assistance/ Projects Funded	Purpose	Eligible Applicants	Where To Obtain Application	Application Process	Application Deadline	For More Information
<b>MITIGATION</b>								
		reference system at various specified intervals which provide scale, orientation, coordinated positions and elevation of specific points for use in surveying, boundary delineations and demarcation, mapping, planning, and development.	development and implementation of Multipurpose Land Information Systems/Geographic Information Systems pilot projects and spatial reference system development and/or enhancement and height modernization.			documents.	date.	
DOD; USACE	Flood Control Projects	Design and construction of projects.	To reduce flood damages through projects not specifically authorized by Congress.	Political subdivisions of States, or other responsible agencies established under state law. Project must be engineering feasible, complete within itself and economically justified. Non-federal sponsor will share equally in feasibility study, project cost, provide a cash contribution for land enhancement benefits and for features other than flood control, prevent future encroachments which might interfere with function and maintain the project.	Formal Letter to District Engineer From A Prospective Sponsoring Agency.	Consult with the District Office.	None.	District Office. <a href="http://www.usace.army.mil/howdoi/where.html">http://www.usace.army.mil/howdoi/where.html</a>



Table 4-4 – Federal Technical Assistance and Funding

Agency	Program	Type of Assistance/ Projects Funded	Purpose	Eligible Applicants	Where To Obtain Application	Application Process	Application Deadline	For More Information
<b>MITIGATION</b>								
DOD; USACE	Flood Plain Management Services	Advisory Services and Counseling; Dissemination of Technical Information.	To promote appropriate recognition of flood hazards in land and water us planning and development through the provision of flood and floodplain related data, technical services and guidance.	Political subdivisions of States, other non-public organizations and the public.	None needed. A letter should be sent to the District Engineer of the Corps of Engineers.	Send letter of Request.	None.	District Office. <a href="http://www.usace.army.mil/howdoi/where.html">http://www.usace.army.mil/howdoi/where.html</a>
DOD; USACE	Snagging and Clearing for Flood Control	Design and construction of projects. Non-federal sponsor must provide land, easement, right-of-way; provide costs in excess of the Federal limit; maintain project; Hold US free from damages; cost share for land enhancement or special benefits; prevent future encroachments which will interfere with proper functioning of project.	To reduce flood damages.	Political subdivisions of States, or other responsible agencies established under state law.	Formal Letter to District Engineer From A Prospective Sponsoring Agency.	Consult with the District Office.	None.	District Office. <a href="http://www.usace.army.mil/howdoi/where.html">http://www.usace.army.mil/howdoi/where.html</a>
DOI	National Fire Plan - Wildland Urban Interface	Project Grants; Use of Property, Facilities, and Equipment;	To implement the National Fire Plan and assist communities at risk from catastrophic wildland fires by	States and local governments at risk as published in the Federal Register, Indian Tribes, public	Contact the appropriate State Office or the National Interagency Fire Center's web site at: <a href="http://www.nifc.gov">http://www.nifc.gov</a> .	Wildland Urban Interface Community Assistance is coordinated by	None.	Regional or Local Office. <a href="http://www.blm.gov/nhp/index.htm">http://www.blm.gov/nhp/index.htm</a> <a href="http://www.nifc.gov">http://www.nifc.gov</a>

Table 4-4 – Federal Technical Assistance and Funding

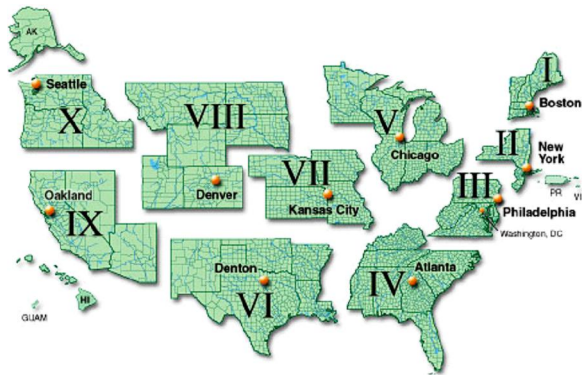
Agency	Program	Type of Assistance/ Projects Funded	Purpose	Eligible Applicants	Where To Obtain Application	Application Process	Application Deadline	For More Information
<b>MITIGATION</b>								
	Community Fire Assistance	Provision of Specialized Services; Advisory Services and Counseling; Dissemination of Technical Information; Training.	providing assistance in the following areas: Provide community programs that develop local capability including; assessment and planning, mitigation activities, and community and homeowner education and action; plan and implement hazardous fuels reduction activities, including the training, monitoring or maintenance associated with such hazardous fuels reduction activities, on federal land, or on adjacent nonfederal land for activities that mitigate the threat of catastrophic fire to communities and natural resources in high risk areas; enhance local and small business employment opportunities for rural communities; enhance the knowledge and fire protection capability of rural fire districts by providing assistance in education and training, protective clothing and equipment purchase, and mitigation methods on a cost share basis.	and private education institutions, nonprofit organizations, and rural fire departments serving a community with a population of 10,000 or less in the wildland/urban interface.		Bureau State and Field Offices. No specific application forms apply, except for grants awarded, the standard application forms furnished by the Federal agency and required by 43 CFR Part 12, Subpart C, "Uniform Administrative Requirements for Grants and Cooperative Agreements to State and Local Governments," and 43 CFR Part 12, Subpart F, "Uniform Administrative Requirements for Grants and Agreements With Institutions of Higher Education, Hospitals, and Other Nonprofit Organizations", must be used by this program.		
DOI; National	Technical Preservation	Advisory Services,	Technical information is	Local governments and individuals.	State historic Preservation Office.	Apply through appropriate	None.	Regional or local office.

Table 4-4 – Federal Technical Assistance and Funding

Agency	Program	Type of Assistance/ Projects Funded	Purpose	Eligible Applicants	Where To Obtain Application	Application Process	Application Deadline	For More Information
<b>MITIGATION</b>								
Park Service	Services	Technical Information, Specialized Services.	provided to assist local governments and owners to preserve and maintain historic properties.			state official or NPS Regional Office.		
USDA; Natural Resources Conservation Service	Soil Survey	Dissemination of Technical Information.	Soil surveys for planners, environmentalists, engineers, zoning commissions, tax commissions, homeowners, farmers, ranchers, developers, landowners and operators.	Individuals and Groups that have a need for soil survey.	Contact Natural Resources conservation Service Office.	Request from Natural Resources Conservation Service District Office	None	Natural Resources Conservation Service District Office <a href="http://www.nrcs.usda.gov/">http://www.nrcs.usda.gov/</a>
USDA; Natural Resources Conservation Service	Watershed Protection and Flood Prevention	Project Grants sharing the cost of watershed protection measures, flood prevention, agricultural water management, sediment control, wildlife, recreation and in extending long term credit for these projects. Advisory Services and Counseling in designing and installing watershed works of improvement.	Project Grants sharing the cost of watershed protection measures, flood prevention, agricultural water management, sediment control, wildlife, recreation and in extending long term credit for these projects. Advisory Services and Counseling in designing and installing watershed works of improvement.	Counties, groups of counties, municipalities, towns or townships, soil and water conservation districts, flood prevention or flood control districts, Indian tribes or tribal organizations, and non-profit agencies with authority under state law to carry out, maintain and operate watershed works of improvement.	Standard Application obtained from NRCS.	Details available in State and field offices of NRCS.	None.	Natural Resources Conservation Service District Office <a href="http://www.nrcs.usda.gov/">http://www.nrcs.usda.gov/</a>

**Table 4-4 – Federal Technical Assistance and Funding**

Agency	Program	Type of Assistance/ Projects Funded	Purpose	Eligible Applicants	Where To Obtain Application	Application Process	Application Deadline	For More Information
<b>MITIGATION</b>								
USDA; Natural Resources Conservation Service	Watershed Surveys and Planning	Technical assistance for planning activities to help solve water and land related resource problems.	To help solve problems of upstream rural community flooding, water quality improvement, wetland preservation and drought management.	Local water resource agency concerned with water and related land resource development, counties, municipalities, towns or townships, Indian Tribe and Tribal Organizations, and non-profit organizations.	NCRS Offices and Letter of request Addressed to State Conservationist.	NCRS Offices and Letter of request Addressed to State Conservationist.	None.	Natural Resources Conservation Service District Office <a href="http://www.nrcs.usda.gov/">http://www.nrcs.usda.gov/</a>



Headquarters (DC): Federal Center Plaza, 500 C Street, SW, Washington, DC. 20472  
(202) 566-1600

Region I (Boston): 442 J.W. McCormack POCH, Boston, MA 02109-4595  
(617) 223-9540

Region II (New York): 26 Federal Plaza, Room 1337, New York, NY 10278-0002  
(212) 225-7209

Region III (Philadelphia): 615 Chestnut Street, One Independence Mall, Sixth Floor, Philadelphia, PA 19106-4404  
(215) 931-5500

Region IV (Atlanta): 3003 Chamblee-Tucker Road, Atlanta, GA 30341  
(770) 220-5200

Region V (Chicago): 536 South Clark Street, Sixth Floor, Chicago, IL 60605  
(312) 408-5500

Region VI (Denton): Federal Regional Center, Room 206, 800 North Loop 288, Denton, TX 76201-3698  
(940) 898-5104

Region VII (Kansas City): 2323 Grand Boulevard, Suite 900, Kansas City, MO 64108-2670  
(816) 283-7061

Region VIII (Denver): Denver Federal Center, Bldg. 710, Box 25267, Denver, CO 80225-0267  
(303) 235-4811

Region IX (San Francisco): Presidio of San Francisco, Bldg. 105, San Francisco, CA 94129-1250  
(415) 923-7100

Region X (Bothell): Federal Regional Center, 130 228th Street, SW, Bothell, WA 98021-9796  
(425) 487-4604

## SECTION 5 - MITIGATION GOALS

Goals were developed by taking into consideration both state and jurisdictional goals for mitigation. The goals or actions in this County plan are broadly aligned with the goals of the State Hazard Mitigation Plan. In fact, the Ulster County Multi-Jurisdictional Hazard Mitigation Plan Goals are in support of furthering the State's goals in many ways.

### New York State Hazard Mitigation Plan Goals

New York State's Hazard Mitigation Vision Statement reads:

**“To create communities whose daily activities reflect a comprehensive commitment by government, business, non-profit organizations, and the public to eliminate or reduce risks and adverse impacts from natural, technological, and human-caused hazards.”**

As outlined in the New York State Hazard Mitigation Plan (approved by FEMA January 4<sup>th</sup>, 2008), the State's generic goals are:

- 1) Promote hazard mitigation awareness and education throughout the State.
- 2) Build a State and Local hazard mitigation infrastructure within the State and promote mitigation as the most effective means to reduce future disaster losses.
- 3) Implement, maintain, and update a comprehensive State Multi-Hazard Mitigation Plan.
- 4) Reduce risk to lives and property from frequent natural, technological and human caused disasters. Set priority on hazards that are repetitive and pose severe risk to life and property.
- 5) Promote the implementation of flood mitigation plans and projects in flood prone areas of the State, in accordance with the FMA program as well as the Severe Repetitive Loss (SRL) program.
- 6) Encourage the development and implementation of long-term, cost-effective and environmentally sound mitigation projects at the local level.
- 7) Promote Hazard Resistant Construction, especially in residential buildings throughout the State.

### Ulster County Multi-Jurisdictional Hazard Mitigation Plan Goals

The Ulster County Multi-Jurisdictional Hazard Mitigation Plan Goals are long-term statements of what the participating jurisdictions hope to achieve over time through implementation of the plan. They are based on the findings of the risk assessment, and will apply to each jurisdiction adopting this plan.

1. Promote disaster-resistant development.
2. Build and support local capacity to enable the public to prepare for, respond to, and recover from disasters.
3. Reduce the possibility of damage and losses due to drought.
4. Reduce the possibility of damage and losses due to flooding caused by floods, hurricanes and nor'easters.
5. Reduce the possibility of damage and losses due to earthquakes.

6. Reduce the possibility of damage and losses due to lightning strikes.
7. Reduce the possibility of damage and losses due to ice jams.
8. Reduce the possibility of damage and losses due to dam failure.
9. Reduce the possibility of damage and losses due to landslides.
10. Reduce the possibility of damage and losses due to wildfires.
11. Reduce the possibility of damage and losses due to winter storms.
12. Reduce the possibility of damage and losses due to extreme temperatures.
13. Reduce the possibility of damage and losses due to tornadoes and high winds caused by windstorms, hurricanes and nor'easters.
14. Reduce the possibility of damages to emergency and critical facilities from damage due to flooding, wildfires, and extreme winds.

## SECTION 6 - RANGE OF ALTERNATIVE MITIGATION ACTIONS CONSIDERED

The following table represents a full range of types of mitigation actions to address each of the hazards identified in this plan. At a working session of the Core Planning Group on August 7, 2008, participating jurisdictions considered this range of actions and identified a mitigation strategy for their jurisdiction. Mitigation actions will be identified and analyzed for a comprehensive range of mitigation actions and projects for each hazard, and address reducing the effects of hazards on both new and existing buildings and infrastructure.

*Note to FEMA reviewer: The next section of this plan, entitled, "Action Item Evaluation and Prioritization" will explain the criteria used by Planning Group members to evaluate and prioritize this range of actions.*

**Table 6-1**  
**Types of Actions Considered to Achieve Mitigation Goals**

Goals		Actions	
Goal Number	Description	Action Number	Description
1	Promote disaster-resistant development.	1.A	Join the National Flood Insurance Program (for non-participating or suspended communities).
		1.B	Ensure that local comprehensive plans incorporate natural disaster mitigation techniques by requiring a courtesy- review of draft plans by the County Emergency Management Agency.
		1.C	Explore the need for hazard zoning and high-risk hazard land use ordinances.
		1.D	Organize an annual event / fair for homeowners, builders and county and local jurisdictions that includes sale of NOAA weather radios, dissemination of information brochures about disasters and building retrofits, demonstration of "defensible-space" concept and fire resistant construction materials (for roofs/exterior finishes and inflammable coverings for openings like chimneys and attics) etc.
		1.E	Develop a stormwater management plan that includes subdivision regulations to control run-off; both for flood reduction and to minimize saturated soils on steep slopes that can cause landslides.
2	Build and support local capacity to enable the public to prepare for, respond to, and recover from disasters.	2.A	Expand and disseminate GIS and other hazard information on the internet.
		2.B	Develop a plan and seek funding for backup electric and telecommunications systems in local government-owned critical facilities.
		2.C	Support and fund Community Emergency Response Team (CERT) programs that also include a mitigation component.
		2.D	Create a virtual and physical library that contains all technical studies, particularly natural resources.
		2.E	Expand GIS to collect and develop more sophisticated hazard mapping. Use information to update plan. Ensure information will be available to the public and to relevant communities and agencies.
		2.F	Provide training for inspection and enforcement of adopted codes and ordinances.



**SECTION 6 - RANGE OF ALTERNATIVE MITIGATION ACTIONS CONSIDERED**

**Table 6-1  
Types of Actions Considered to Achieve Mitigation Goals**

Goals		Actions	
Goal Number	Description	Action Number	Description
3	Reduce the possibility of damage and losses due to drought.	3.A	Encourage citizens to implement water conservation measures by distributing water saving kits which include replacement shower heads, flow restrictors, and educational pamphlets which describe water saving techniques. Also encourage conservation by offering rebates for ultra-low-flow toilets.
		3.B	Modify rate structure to influence consumer water use including: increasing rates during summer months and imposing excess use charges during times of water shortage.
		3.C	Reduce water use for landscaping by imposing mandatory water-use restrictions during times of water shortage. Also, develop a demonstration garden to exhibit water conservation techniques.
		3.D	Publish and distribute pamphlets on water conservation techniques and drought management strategies.
		3.E	Develop and adopt an emergency water allocation strategy to be implemented during severe drought.
		3.F	Implement water metering and leak detection programs followed by water main repair/replacement to reduce losses.
		3.G	Encourage beneficial re-use of treated wastewater effluent through cooperative projects with dischargers, agriculture and other major water users to distribute or provide this alternative source of water.
4	Reduce the possibility of damage and losses due to flooding caused by floods, hurricanes, and nor'easters.	4.A	Join the National Flood Insurance Program. As a participant, floodplains within the participating community will be identified and mapped. In return, the participating community will become eligible for flood insurance as long as the local governing body adopts and enforces a floodplain ordinance.
		4.B	Limit uses in floodways to those tolerant of occasional flooding, including but not limited to agriculture, outdoor recreation, and natural resource areas.
		4.C	Develop a Countywide gauging and warning system for flash and riverine flooding.
		4.D	Continue to implement best management practices for floodplain areas.
		4.E	Identify and document repetitively flooded properties. Explore mitigation opportunities for repetitively flooded properties, and if necessary, carry out acquisition, relocation, elevation, and flood-proofing measures to protect these properties.
		4.F	Conduct a routine stream maintenance program (for currently non-participating communities) and seek financial assistance to clean-out stream segments with heavy sediment deposits.

**SECTION 6 - RANGE OF ALTERNATIVE MITIGATION ACTIONS CONSIDERED**

**Table 6-1  
Types of Actions Considered to Achieve Mitigation Goals**

Goals		Actions	
Goal Number	Description	Action Number	Description
		4.G	Develop specific mitigation solutions for flood-prone roadways and intersections under the leadership of State DOT. Develop a work plan for when sites will be surveyed and what role can the local government play in selection and implementation of mitigation activities (e.g. any monetary or contextual support through the local capital improvement plan).
		4.H	Implement identified stormwater recharge, rate or volume projects identified in Regional Stormwater Management Plans to decrease öflashö in streams during/after storm events.
		4.I	Implement specific actions to enhance/improve participation in/compliance with National Flood Insurance Program (NFIP)
5	Reduce the possibility of damage and losses due to earthquakes.	5.A	Retrofit old/dilapidated critical facilities.
		5.B	Public awareness through video/brochures about simple steps homeowners can take to mitigate damage.
		5.C	Examine provisions for earthquake resistant retrofits for existing structures and infrastructure, paying particular attention to unreinforced masonry structures built prior to the adoption of building codes requiring earthquake resistant design for new construction.
6	Reduce the possibility of damage due to lightning strikes	6.A	Carry out inventory of compliance with existing local codes/standards, especially for critical facilities.
		6.B	Adopt building safety codes such as National Fire Protection Association (NFPA) -780 Standard for the Installation of Lightning Protection Systems (1997).
		6.C	Public awareness/outreach regarding use of ground outlets and surge protectors in homes and businesses.
7	Reduce the possibility of damage and losses due to ice jams	7.A	Implement monitoring and early warning measures at key locations
		7.B	Investment in ice-clearing/breaking equipment and appropriate training for county personnel.
		7.C	Construction of ice control structures such as booms, tension weirs and sloped-block barriers.
8	Reduce the possibility of damage and losses due to dam failures.	8.A	Enforce participation in/compliance with National and NYSDEC / NYSEMO Dam Safety Programs.
		8.B	Investigate sources of funding to assist private dam owners to complete required repairs/maintenance. Investigate low interest loans to owners and/or jurisdiction acting as guarantor of private ownersøloans.
		8.C	Notify owners of property in dam break inundation areas of risks, implement restrictions for new development in these areas.
9	Reduce the possibility of damage and losses due to landslides.	9.A	Create comprehensive geological mapping to areas prone to landslides and rockslides.
		9.B	Locally identify and map specific areas of potential slope failure and limit future development in these areas.
		9.C	Develop a public outreach program that addresses the economic impacts of landslides on personal property.

**SECTION 6 - RANGE OF ALTERNATIVE MITIGATION ACTIONS CONSIDERED**

**Table 6-1  
Types of Actions Considered to Achieve Mitigation Goals**

Goals		Actions	
Goal Number	Description	Action Number	Description
		9.D	Consider adopting a steep slope ordinance, if one is not already in place, to regulate development on these higher risk areas.
		9.E	Develop a vegetation management plan. Proper vegetation can supply slope-stabilizing root strength, and facilitate in intercepting precipitation. Establishing and maintaining appropriate vegetation of areas above the bluff slope may be the single most important and cost-effective mitigation measure available.
10	Reduce the possibility of damage and losses due to wildfires	10.A	In consultation with NYSDEC Forest Protection & Fire Management and local forest rangers, develop mapping of wildland/urban interface areas.
		10.B	Develop inventory of addresses for route alerting during wildfire emergencies that require public warning and information.
		10.C	In consultation with NYSDEC Forest Protection & Fire Management and local forest rangers, review local EOPs for possible wildfire components regarding Fire-Rescue, Alert Warning Communications, and Evacuation.
		10.D	Prescribed burning for hazard reduction.
		10.E	Initiate a public outreach program for homeowners.
		10.F	Retrofit buildings with fire resistant materials, especially roofing.
		10.G	Community brush and debris removal and hazard fuels reduction.
		10.H	Firewise landscaping in higher risk areas.
		10.I	Mitigation for streets, highways, and roads that provide key fire access and fuelbreaks.
11	Reduce the possibility of damage and losses due to winter storms.	11.A	Promote (or purchase, for critical facilities) NOAA weather radios.
		11.B	Educate residents about driving in winter storms and handling winter-related health effects
		11.C	Ice and windstorm-resistant trees and landscaping practices to reduce tree-related hazards
		11.D	Bury utility lines to avoid power outage due to winter storms (if risk is very high then only this action might be cost-effective)
12	Reduce the possibility of damage and losses due to extreme temperatures.	12.A	Develop and distribute outreach tools for homeowners and building permit applicants on protection of structures against cold weather damage and proper maintenance of heating/cooling systems.
		12.B	Review existing emergency response plans for enhancement opportunities: work with social support agencies, homeowners associations and general public to develop and implement monitoring and warning systems focused on vulnerable populations and provision of adequate shelter facilities.
13	Reduce the possibility of damage and losses due to tornadoes and	13.A	Adopt an ordinance to require safe rooms in mobile home parks
		13.B	Provide low interest loans (or other form of financial assistance) for building safe rooms.
		13.C	Provide technical assistance for building safe rooms.

**Table 6-1  
Types of Actions Considered to Achieve Mitigation Goals**

Goals		Actions	
Goal Number	Description	Action Number	Description
	high winds caused by windstorms, hurricanes and nor'easters.	13.D	Adopt an ordinance to require hurricane clips on new construction.
		13.E	Install hurricane clips and wind shutters on existing development- particularly emergency facilities and shelters built before existing codes were adopted to offer some degree of wind protection.
14	<i>Reduce the possibility of damages to emergency facilities from flooding, wind damage and wildfire damage.</i>	14.A	<i>Conduct a study to determine the year-built and level of protection (flood, wind) for each emergency facility.</i>
		14.B	<i>On completion of 11.A, seek funding for mitigation projects for emergency facilities not currently designed for protection from flooding and high wind.</i>

In addition to these general types of mitigation actions, the Core Planning Group and JATs also considered a series of more specific mitigation actions that had been identified throughout the course of the planning process as specific problems and/or problem areas were brought to light.

During the planning process, the question arose as to how individual municipalities were to proceed with their development of mitigation strategies and actions in situations where other agencies such as the U.S. Army Corps of Engineers are known to be considering the implementation of (possibly large-scale) mitigation measures in the same area.

The Core Planning Group was advised that the full implementation of such proposed projects is not guaranteed, and that even if such projects are approved and funded, it can be many years before they are initiated. With that in mind, the communities were advised to decide whether they would be willing to risk the chance of damage over that interim period between the current planning process and the assumed completion of studies and subsequent projects that are not guaranteed to be implemented.

However, if the community decides to defer mitigation actions pending studies by other agencies, it is recommended that the study be revisited at the five year update to ensure that sufficient progress is being made towards completion of a project, or to determine if another strategy is needed. It is also recommended that each community include at least one mitigation project regardless of hazard or any other plans or proposals, in order to receive credit from FEMA for having a mitigation plan which may be used to aid applications for grants to reduce risks from hazards not affected by the proposed plans.

**SECTION 7 - ACTION ITEM EVALUATION AND PRIORITIZATION**

This section includes information regarding the methodology and process followed by participating jurisdictions to evaluate and prioritize unique hazard mitigation actions for their particular communities.

The action item evaluation and prioritization was undertaken during a working session of the Core Planning Group on August 7, 2008, and by individual JATs. After reviewing the many types of possible action items suggested in Section 6 and the "Tip Sheet" compiled specifically for this stage of the planning process, and adding any new items that might be unique for their community, each participant was asked to select a manageable number of action items which they felt their jurisdiction could reasonably commit to achieving in the next five years (the first plan maintenance cycle), and to evaluate these actions using worksheets developed specifically for this task. Ultimately, the County and 12 municipalities evaluated and identified at least one action item for the first plan maintenance cycle.

To initiate the evaluation and prioritization of potential mitigation actions, jurisdictional representatives who attended the working session on August 7 2008 were asked to complete a brief survey ranking six generic types of mitigation action according to how they perceived each type of action would be preferred or appropriate to their community. The overall results of this survey indicated that the most favored type of action was likely to be those associated with improvements to local emergency services, while the least favored type of action was likely to be those related to increasing public information and education:

Most preferred/appropriate:     *Emergency Services* (e.g. Communication systems, response resources)  
  *Preventive Measures* (e.g. Regulations and building codes)  
  *Structural Projects* (e.g. Levees, drainage, dams)  
  *Natural Resource Protection* (e.g. Open space, wetlands preservation)  
  *Asset Protection* (e.g. Structure retrofits for flood and fireproofing)

Least preferred/appropriate:     *Public Information* (e.g. education and outreach)

In addition to action items selected by the individual jurisdictions, each jurisdiction was required to evaluate a set of actions specifically aimed at continuing participation in and compliance with the National Flood Insurance Program. These actions include updating floodplain management ordinances to comply with the latest FEMA regulations and adopted flood maps, additional employment/training of staff to enforce the ordinances, and participation in FEMA's Community Rating System (CRS).

In order to evaluate and prioritize the mitigation actions, participants identified the *benefits* and *costs* of each action using a planning concept called "STAPLEE". Their evaluation methodology is presented below in Table 7-1.

Now using the STAPLEE factors discussed above for each action, each jurisdiction rated the overall benefits and costs of each action they had selected, and assigned priorities. To determine overall "benefits" for a certain action, each jurisdiction considered individual social, technical, administrative, political, legal, economic, and environmental benefits for the action and then indicated whether the net benefits, overall, could be characterized as high, medium, or low. To determine overall "costs" for a certain action, each jurisdiction considered individual social, technical, administrative, political, legal, economic, and environmental costs for that action and then indicated whether the net costs, overall, could be characterized as high, medium, or low. These overall "benefits" and "costs" were noted on the worksheet, and the jurisdictions prioritized each action based on its overall benefits and costs (i.e., an action with High benefits and Low costs should be High priority).

## SECTION 7 - ACTION ITEM EVALUATION AND PRIORITIZATION

Since a qualitative approach was taken for the evaluation and prioritization of mitigation actions, jurisdictions were permitted to apply their own internal weightings to the costs and benefits of actions under each category, hence on the completed worksheets the overall priority of an action may not reflect a straightforward arithmetic comparison of its total benefits and total costs.

<b>Table 7-1 STAPLEE Criteria</b>	
<b>S</b> <u>S</u> ocial	Is the action unfair to one section of the community over others? If yes, it is a social cost associated with the action. If the implementation of the action helps achieve a social goal of the community, it is a social <i>benefit</i> associated with the action.
<b>T</b> <u>T</u> echnical	Is the action a good technical solution to the problem? If yes, it is a <i>benefit</i> associated with the action. The better the solution, the higher the <i>benefits</i> .
<b>A</b> <u>A</u> dmistrative	Is the action difficult to implement because of the administrative problems associated? If yes, it is an administrative <i>cost</i> .
<b>P</b> <u>P</u> olitical	Is the action politically favored? If yes, it is a <i>benefit</i> . If the action is likely to be politically unacceptable, it is a <i>cost</i> associated with the action.
<b>L</b> <u>L</u> egal	Are there perceived legal problems in implementing the action? If yes, it is a <i>cost</i> associated with the action.
<b>E</b> <u>E</u> conomic	Does implementing the action make economic sense? Are the <i>costs</i> too prohibitive? If yes, it is a cost associated with the action.
<b>E</b> <u>E</u> nvironmental	Does the action have adverse environmental effects? If yes, it is a <i>cost</i> associated with the action.

All action items not selected for prioritization by a given community after considering the STAPLEE factors received a low priority. In the future, communities may still seek to pursue actions from Section 6 (and associated studies, funding, etc. for these actions) which they evaluated but did not select for prioritization at this time.

**Appendix D contains prioritization worksheets completed by each participant for their selected actions. Each participant identified at least one action item for implementation. Appendix F contains prioritization sheets for those actions specifically related to NFIP compliance.**

All participating jurisdictions who will be adopting this plan will undertake the following high priority public outreach actions at a minimum as part of their plan maintenance obligation:

- Each participating jurisdiction will add a link on their jurisdiction's web page to the County mitigation planning website, if they have not already done so as part of the plan development process.
- Participating jurisdictions will conduct annual interviews and/or smaller meetings with civic groups, the public and other stakeholders. This will be accomplished through incorporating discussion of the mitigation plan into other regularly attended meetings.
- Participating jurisdictions will consider annual flyers, newsletters, newspaper advertisements, and Radio/TV announcements, and will implement some or all of the above at the discretion of the jurisdiction.

## SECTION 7 - ACTION ITEM EVALUATION AND PRIORITIZATION

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*Note to the reviewer: The next section in this plan, entitled “Implementation Strategy,” will expand upon the prioritization step by identifying the hazard addressed, if the action applies to new and/or existing assets, the primary agency responsible for action item completion, any existing local planning mechanisms through which the action item will be implemented, target date for completion, estimated cost, and funding source.*

## SECTION 8 - IMPLEMENTATION STRATEGY

The implementation strategy developed by participants for selected and prioritized action items is community-specific for each participant. Participants were asked to identify an implementation strategy for the action items they selected and prioritized (in Section 7) for their respective communities using worksheets developed specifically for this task.

The implementation strategy developed by each participant was based on each participant's qualitative analysis of social, technical, administrative, political, legal, economic, and environmental benefits and costs associated with each selected action.

Each community addressed how the actions will be implemented and administered. For each selected and prioritized action item, participants identified the hazard addressed, if the action applies to new and/or existing assets, the primary agency responsible for action item completion, any existing local planning mechanisms through which the action item will be implemented, target date for completion, estimated cost, and funding source.

All action items not selected for prioritization by a given community after considering the STAPLEE factors received a low priority. In the future, communities may still seek to pursue actions from Section 6 (and associated studies, funding, etc. for these actions) which they evaluated but did not select for prioritization at this time.

All participating jurisdictions who will be adopting this plan will undertake the following high priority public outreach actions at a minimum, as part of their plan maintenance obligation:

- Each participating jurisdiction will add a link on their jurisdiction's web page to the County mitigation planning website, if they have not already done so as part of the plan development process.
- Participating jurisdictions will conduct annual interviews and/or smaller meetings with civic groups, the public and other stakeholders. This will be accomplished through incorporating discussion of the mitigation plan into other regularly attended meetings.
- Participating jurisdictions will consider annual flyers, newsletters, newspaper advertisements, and Radio/TV announcements, and will implement some or all of the above at the discretion of the jurisdiction.

**Appendix E contains completed worksheets for general community-specific implementation strategies.**

**Appendix F contains completed worksheets for community-specific implementation strategies associated with continued and/or enhanced compliance with the National Flood Insurance Program.**



## SECTION 9 - PLAN MAINTENANCE

It is required by FEMA (as per 44 CFR Part 201.6(c)(4)(i) that, “[The plan maintenance process shall include a section describing the] method and schedule of monitoring, evaluating, and updating the mitigation plan within a five-year cycle.” A formal plan maintenance process must take place to ensure that the Hazard Mitigation Plan remains an active and pertinent document. Regularly scheduled evaluations during the five-year cycle are important to assess the effectiveness of the program and to reflect changes that may affect mitigation priorities.

URS Corporation (URS), as the consulting company, was able to provide the Core Planning Group with guidance on potential means to satisfy the requirement for plan maintenance procedures. However, it was the members of the Core Planning Group who were in the best position to define the process. URS submitted a Guidance Memorandum (Guidance Memorandum #2 ó Plan Maintenance Procedures to summarize FEMA requirements for plan monitoring, evaluation, and updates) to Ulster County Department of Emergency Communications/Emergency Management (UCECEM) on June 3, 2008. It was also posted to the mitigation planning website for review by Core Planning Group members, the public, and other stakeholders.

Team members were asked to provide feedback regarding their desires for plan maintenance to UCECEM. UCECEM, in turn, worked with the Consultant to develop this strategy to best reflect expressed preferences. The information presented below represents these decisions, as provided to URS through UCECEM. These methods will ensure that regular review and updating of the Hazard Mitigation Plan will occur.

Mr. Art Snyder of the UCECEM, who was identified as Coordinator for this mitigation planning project, will oversee the overall plan maintenance process. UCECEM will take the lead on plan monitoring, evaluation steps, and any required plan updates, with help from the rest of the County Mitigation Planning Jurisdictional Assessment Team.

### Monitoring the Plan

An important step in any mitigation planning process is to document the method by which the Core Planning Group will monitor the Hazard Mitigation Plan throughout the five-year period of record.

To accomplish this objective, the Core Planning Group has elected to prepare **Annual Work Progress Monitoring Reports**, prepared by entities responsible for implementing mitigation actions (as identified in the Mitigation Strategy). Progress Monitoring Reports shall be submitted on an annual basis to UCECEM, beginning one year from the date of FEMA’s approval of the Final plan. Work progress reports shall be the FEMA How-To #4 (FEMA 386-4), Worksheet #1, Progress Report. Using the FEMA Progress Reports will answer the following questions:

- the hazard mitigation action(s) that the agency is responsible for
- the supporting agencies/entities responsible for implementation;
- a delineation of the various stages of work along with timelines (milestones should be included);
- whether the resources needed for implementation, funding, staff time and technical assistance are available, or if other arrangements must be made to obtain them;
- the types of permits or approvals necessary to implement the action;
- details on the ways the actions will be accomplished within the organization;

- whether the duties will be assigned to agency staff or contracted out;
- the current status of the project; and
- identifying any issues that may hinder implementation.

On a case-by-case basis, UCECEM will determine if site visits, phone calls, and/or meetings would be beneficial to supplement Annual Work Progress Monitoring Reports. If so, UCECEM will initiate the site visits/calls/meetings as applicable.

### Evaluating the Plan

Post adoption, a mitigation plan should be evaluated on a regular basis in order to assess the effectiveness of the plan's implementation and to reflect changes that may affect the mitigation priorities.

To accomplish this objective, the Steering Committee will convene once per year for an **Annual Plan Evaluation Meeting**. Plan Evaluation Meetings will be conducted within three months after each annual batch of Progress Reports are due (see "Monitoring", above). At each Plan Evaluation Meeting, the Steering Committee will review Progress Reports, and use the following criteria to evaluate the plan:

- do the goals and objectives address current and expected conditions?
- has the nature and magnitude of risks changed?
- are the current resources appropriate for implementing the plan?
- are there any implementation problems (such as technical, political and/or legal), or coordination issues with the other agencies and/or Committee members?
- have the outcomes occurred as expected?
- have the agencies and other Committee partners participated as proposed?; and
- where shortcomings are identified, what can be done to bring things back on track?

They will also discuss progress with regard to plan integration, and any comments received on the plan from municipalities, the public, and/or other stakeholders.

Following each Annual Plan Evaluation Meeting, the UCECEM will prepare meeting minutes summarizing the outcome of the evaluation meeting. UCECEM will distribute meeting minutes to all Steering Committee members via email, and will post meeting minutes on the web site.

### Updating the Plan

As part of the process to maintain FEMA mitigation funding eligibility, a plan update must always be submitted to NYSEMO/FEMA for their review. This must occur within five years of the plan's approval by FEMA (and during subsequent five-year cycles thereafter).

To accomplish this objective, the Steering Committee elected to have the UCECEM take the lead on Plan updates, with support from the Steering Committee members. UCECEM will conduct **Update Appraisals** with the Steering Committee. During the Update Appraisal, the Steering Committee will evaluate the current Plan, Annual Progress Reports, and Annual Plan Evaluation Meeting Minutes. UCECEM will conduct the Update Appraisals at 3.5 years from the date of FEMA's approval of the Final plan, and at the same point in time during subsequent five-year windows (i.e., from the date of FEMA's approval of the final plan, Update Appraisals will occur at Year 3.5, Year 8.5, Year 13.5, etc.). The Steering Committee has selected Year 3.5 as the point for the Update Appraisals to ensure that sufficient

time (18 months) will be available to update the document within the five year cycle, should an update be necessary.

The plan update will not only involve a comprehensive review and evaluation of each section of the plan, but also a discussion of the results of evaluation and monitoring activities detailed in the Plan Maintenance section of the previously approved plan. Plan updates may validate the information in the previously approved plan, or may involve a major plan rewrite. A plan update cannot be an annex referring to the previously approved plan; it must stand on its own as a complete and current plan.

Other criteria that will be considered during the update include:

- if changing situations have modified goals/objectives/actions and/or hazards;
- if additional information is available to perform more accurate vulnerability assessments;
- if it is determined that participating jurisdictions wish to be added to and/or removed from the Plan; or
- if it is determined that the Plan no longer addresses current and expected future conditions.

At the time of the update, UCECEM shall consult with FEMA for the latest Guidance in place regarding plan updates to ensure that the latest criteria are addressed in the update process.

UCECEM will prepare an updated plan, and circulate it to Core Planning Group members via email for their review and comment. Comments will be due back to UCECEM within 14 days; lack of response will be assumed to indicate concurrence with the UCECEM appraisal. Comments received which cannot be resolved remotely will trigger an Update Resolution Meeting of the Core Planning Group to resolve differences and develop a joint determination on how to modify the document.

Any plan updates will be released for public review and comment. The updated plan will be posted on the County web site, and made available in hard copy at the UCECEM offices. Notification to the public will also be issued to this same effect, and interested parties will be given 30 days to provide comments to UCECEM.

### **Public Participation in Plan Maintenance**

As per 44 CFR Part 201.6 (c)(4)(iii) states, “[The plan maintenance process shall include a] discussion on how the community will continue public participation in the plan maintenance process.” To meet this requirement, the new Hazard Mitigation Plan should describe what opportunities the public will have during the plan’s periodic review to comment on the progress made to date and on any proposed plan revisions.

The following array of activities was selected by selected by the Steering Committee during the March 19, 2008 meeting:

- UCECEM will continue to maintain the mitigation planning website and document repositories.
- Each participating jurisdiction will add a link on their jurisdiction’s web page to the County mitigation planning website, if they have not already done so as part of the plan development process.
- UCECEM will lead efforts to prepare an annual fact sheet on the plan. This fact sheet will be submitted via email to Planning Group members for posting on community notice boards, at a minimum, and preferable supplemented with distribution at meetings as applicable. UCECEM will post the fact sheet on the county mitigation plan web site.

- UCECEM will lead efforts to prepare a survey for the public and other stake holders which will be posted on the County mitigation planning web site and in document repositories. Survey forms will be shared with participating jurisdictions for their use, as well. All feedback will be directed to UCECEM as a central location. Survey feedback will be a topic of discussion at Annual Plan Evaluation Meetings
- Participating jurisdictions will conduct annual interviews and/or smaller meetings with civic groups, the public and other stakeholders. This will be accomplished through incorporating discussion of the mitigation plan into other regularly attended meetings.
- Participating jurisdictions will consider annual flyers, newsletters, newspaper advertisements, and Radio/TV announcements, and will implement some or all of the above at the discretion of the jurisdiction.
- UCECEM will accept telephone calls from interested parties to ask questions or submit feedback regarding the plan.
- Participating jurisdictions will consider offering working groups by topic area (such as land use, hazard, mitigation action, etc.) if deemed necessary based upon feedback obtained during the plan maintenance cycles.
- Participating jurisdictions will each conduct an annual town hall meeting on the progress of the mitigation plan.

### Plan Integration

As per 44 CFR Part 201.6(c)(4)(ii), “[The plan shall include a] process by which local governments incorporate the requirements of the mitigation plan into other planning mechanisms such as comprehensive or capital improvement plans, when appropriate.”

To meet this requirement, the new Hazard Mitigation Plan should indicate how mitigation recommendations will be integrated into job descriptions, or existing planning mechanisms such as comprehensive plans, capital improvement plans, zoning and building codes, site reviews, permitting and other planning tools, where such tools are appropriate. In other words, “plan integration” can be thought of as the process whereby each local government will incorporate the plan findings and projects into their governing systems.

URS Corporation (URS), as the consulting company, was able to provide the Planning Group with guidance on potential means to satisfy the requirement for plan integration procedures. However, it was the members of the Core Planning Group who were in the best position to define the process. URS submitted a Guidance Memorandum (Guidance Memorandum #3 ó Plan Integration) to UCECEM on June 3, 2008, to summarize FEMA requirements for integrating the plan into other local planning mechanisms. It was also posted to the mitigation planning web site soon after for review by Core Planning Group members, the public, and other stakeholders.

Team members were asked to provide feedback regarding their desires for plan integration to UCECEM. UCECEM, in turn, worked with the Consultant to develop this mitigation strategy to best reflect expressed preferences. The information presented below represents these decisions, as provided to URS through UCECEM. These methods will ensure that regular integration of the Hazard Mitigation Plan will occur.

UCECEM, with input from URS and the Core Planning Group member feedback, noted the following capabilities in relation to mitigation planning and opportunities to integrate the mitigation plan into daily

activities. Progress with regard to Plan Integration will be on the agenda for each Annual Plan Evaluation Meetings.

Participating jurisdictions currently use comprehensive land use planning, capital improvements planning and building codes to guide and control development. After the Hazard Mitigation Plan is formally adopted, these existing mechanisms will have hazard mitigation strategies integrated into them, as follows:

- Within six months after adoption of the Hazard Mitigation Plan, Core Planning Group members for each participating jurisdiction will issue a letter to each of its community's department heads to solicit their support and explore opportunities for integrating hazard mitigation planning objectives into their daily activities. Specifically, letters can include:
  - Many participating jurisdictions have Master Plans, General or Comprehensive Plans. In participating jurisdictions where Master Plans, General or Comprehensive Plans exist, Core Planning Group members will work with their respective planning departments to educate them on the Hazard Mitigation Plan and encourage that on the next updates of such plans, hazard mitigation for natural hazards is addressed.
  - Many participating jurisdictions have local building departments responsible for building code enforcement and review of site plans. Local jurisdictions enforce the state-adopted IBC. In these communities, Core Planning Group Members can coordinate with their respective building departments to ensure that they have adopted and are enforcing the minimum standards established in the State-adopted IBC.
  - Many participating jurisdictions participate in FEMA's National Flood Insurance Program and as such have local floodplain management ordinances. In these communities, Core Planning Group Members can coordinate with their respective Floodplain Administrator to determine if enforcement beyond FEMA minimum requirements would be prudent for the community.
  - In participating jurisdictions with local zoning ordinances, Core Planning Group members can work with their zoning boards to educate them on the Hazard Mitigation Plan and encourage consideration of low occupancy, low-density zoning in hazard areas, when practicable.

Participating jurisdictions will consider working with their department or agency heads to revise job descriptions of government staff to include mitigation-related duties could further institutionalize hazard mitigation. This change would not necessarily result in great financial expenditures or programmatic changes. For example, the How-To presents the following language which could be considered for adding into job descriptions for a community planner, floodplain manager, emergency manager, building code official, or water resources engineer in the Public Works Department, or Town Engineer:

### **Knowledge, Skills and Abilities**

**Knowledge.** Knowledge of the principles of emergency management, specifically hazard mitigation. Knowledge of the principles and practices of sustainable development and how it is incorporated into hazard mitigation planning. Knowledge of FEMA's pre- and post-disaster mitigation programs, as well as other federal agency programs (HUD, EPA, SBA) that provide technical and/or financial assistance for implementing pre- or post-disaster mitigation planning. Knowledge of private/non-governmental programs that can support reconstruction and mitigation strategies.

- Skills.** Consensus building and team building, communication (verbal and written), and interpersonal skills.
- Abilities.** Ability to apply planning principles and tools to the goals of hazard loss reduction.

Instead of solely relying on funding from hazard mitigation programs or other external sources of grant monies, participating jurisdictions may consider a line item for mitigation project funding in their capital or operational budgets. Having a line item in these budgets may not guarantee funding every year, but it is certainly easier to get the money allocated if it is already there. Examples include:

- A revolving fund to finance a buyout program.
- A low-interest loan program to fund retrofits.

Participating jurisdictions with comprehensive plans will add a hazard mitigation element to the comprehensive plan as one of the most effective mechanisms to institutionalize hazard mitigation for new construction. A primary benefit of combining these processes is that they both influence the location, type, and characteristics of physical growth, specifically buildings and infrastructure. While planning in and of itself may not be regulatory, it uses regulatory mechanisms (zoning, development ordinances, etc.) for implementing goals and objectives. Additionally, in many parts of the country, the comprehensive planning process is an established activity that is already familiar to the public, and it usually generates a great deal of interest and public participation.

Examples of using existing resources to accomplish mitigation include:

- Core Planning Group members will work with their local Department of Public Works to adopt more rigorous procedures for inspecting and cleaning debris from streams, ditches, and storm drain systems. For example, instead of cleaning only after storms or complaints from citizens, or on an annual basis, the Department could require inspections of streams and ditches at least twice per year and after a significant rain event.
- Participating jurisdictions will seek to add hazard vulnerability to subdivision and site plan review criteria and incorporate any necessary actions at the planning stage.
- UCECEM will seek to identify a community conservation society or other interested voluntary organization could perform inventories of historic sites in hazard areas that might require special treatment to protect them from specific hazards.
- Partners and nonprofit organizations and businesses can assist the planning team in a number of ways, by including lending expertise, discounted materials, staff or volunteer time, or meeting space. The planning team can in response offer these entities opportunities for greater public exposure and thus, greater recognition. The planning team can inform partners about the hazards they potentially face the ways they can mitigate these hazards and how their staff can mitigate hazards at home. Participating jurisdictions will reach out to partner groups in their communities to identify those who may be willing to donate goods or services and create a database of contact information and indicated goods/services.
- Citizens have an ongoing role to play in project implementation. The planning team should actively seek volunteers to help implement programs and activities. Knowledgeable citizens, including those from the emergency services, can also be recruited to provide expertise in specific subject areas. The more the team involves people in implementing the plan, the greater the support it will receive.
- State agencies can lend their time, expertise and funds to the implementation of hazard mitigation projects. UCECEM will make sure the planning team's list of state contacts is very broad, as the resources of one state agency may be unknown to another. UCECEM will assist participating jurisdictions in reaching out to state agencies for support.

- Colleges and universities can provide technical expertise to projects that may require Geographic Information System (GIS), engineering, planning or other technical assistance. They can also provide meeting space, laboratories and other logistical support. UCECEM will assist participating jurisdictions in reaching out to educational institutions for support.
- Community libraries are an excellent source of information and services, including volunteers. Participating jurisdictions will meet once each five years with their local library staff members to discuss the mitigation plan so they are well-versed in its purpose and understand where to direct interested parties for more information, to provide feedback, or to become involved.

**SECTION 10 - FOR MORE INFORMATION**

If you have any questions or comments on the Multi-Jurisdictional Hazard Mitigation Plan for Ulster County, New York, additional information can be obtained by contacting:

Arthur R. Snyder  
Director;  
Ulster County Department of Emergency Communications/Emergency Management  
238 Golden Hill Lane  
Kingston, New York 12401-6440  
Phone: 845-331-7000  
Fax: 845-331-1738  
E-Mail: [asny@co.ulster.ny.us](mailto:asny@co.ulster.ny.us)



**APPENDIX A –****DETAILED TABLES: ASSET VALUES IN IDENTIFIED HAZARD AREAS**

Appendix A contains detailed tables presenting the numbers of parcels wholly or partially within delineated hazard areas (i.e. for those identified hazards for which the occurrence or impact is not considered to apply uniformly across the whole county) and associated improved property values broken down by land use and development type.

Affected improvement values have been calculated on a pro-rata basis: the value of improvements exposed to a hazard on any parcel is assumed to be proportional to the percentage of the parcel area covered by the hazard zone.

Delineated hazards presented in this Appendix:

- Flood
- Earthquake (Seismic Risk)
- Earthquake (Effect of Soil Type)
- Landslide
- Wildfire

**Flooding**

A = "100-Year" or Base Floodplain mapped by approximate methods  
 AE = "100-Year" or Base Floodplain where Base Flood Elevations are provided

X 500 = "500-Year" Floodplain  
 X = Areas outside the "500-Year" Floodplain

Municipality	FEMA Flood Zone	Agriculture		Commercial		Community Services		Entertainment & Recreation		Industrial		Public Services	
		Assessed Improvements	Parcels by Category	Assessed Improvements	Parcels by Category	Assessed Improvements	Parcels by Category	Assessed Improvements	Parcels by Category	Assessed Improvements	Parcels by Category	Assessed Improvements	Parcels by Category
Denning	A					\$98,617	1	\$8,840,118	38				
	AE												
	X					\$244,057	5	\$380,974	28				
	X500												
Ellenville Village	A			\$488,343	9	\$4,344,733	2					\$0	1
	AE			\$1,488,253	20	\$29,728	2					\$123,457	1
	X			\$11,435,791	183	\$5,326,584	45	\$101,509	2	\$179,699	2	\$422,073	8
	X500			\$27,435	1								
Esopus	A	\$149,011	4	\$16,369,820	8	\$11,425,513	1	\$689,165	1			\$8,091,746	4
	AE	\$0	1	\$2,724,319	4	\$40,494,618	9	\$1,316,943	2	\$334,975	3	\$735,992	3
	X	\$1,668,840	15	\$50,704,869	111	\$76,577,973	56	\$1,624,506	5	\$19,402,744	10	\$1,925,594	31
	X500												
Gardiner	A	\$4,011,202	16	\$842,832	2								
	AE	\$1,504,645	9	\$763,101	2			\$1,904,439	1			\$20,145	3
	X	\$11,238,978	74	\$24,694,232	55	\$7,561,897	14	\$824,137	4	\$2,941,343	3	\$233,900	2
	X500												
Hardenburgh	A	\$1,168,734	9	\$2,234,851	2	\$1,731,617	5			\$0	1		
	AE												
	X	\$1,457,818	6	\$0	1	\$2,656,729	4	\$163,282	2				
	X500												
Hurley	A											\$5,177	1
	AE	\$1,057,969	16	\$1,944,701	4	\$863,464	1					\$18,406	1
	X			\$19,470,884	52	\$16,162,737	25	\$504,891	4	\$333,001	3	\$167,439	8
	X500			\$118,889	1	\$705,558	1						
Kingston City	A			\$233,140	2							\$465,968	1
	AE			\$37,618,996	36	\$6,502,396	7	\$1,155,721	10	\$403,220	7	\$61,744,723	4
	X	\$162,345	1	\$314,608,235	901	\$543,822,058	126	\$28,272,430	25	\$26,953,802	32	\$8,171,625	18
	X500			\$22,288,634	22					\$432,278	1	\$611,914	3
Kingston Town	A												
	AE					\$371,994	4						
	X			\$10,233,578	28	\$182,318	2	\$2,183,009	3	\$243,903	10	\$1,293,908	13
	X500												
Lloyd	A	\$4,689,305	21	\$6,460,043	14	\$8,783,293	7	\$2,907,646	2	\$2,927,856	1	\$3,963,474	5
	AE	\$2,221,692	1	\$2,017,190	6			\$8,333	1			\$16,129,259	4
	X	\$2,213,231	41	\$73,643,295	193	\$45,671,183	49	\$2,335,120	6	\$9,134,037	8	\$11,713,347	19
	X500												
Marbletown	A	\$31,505	15	\$212,837,921	4	\$0	1	\$1,223,831	2			\$1,571,681	3
	AE	\$132,389	12							\$126,569	1		
	X	\$147,205	24	\$24,935,358	76	\$36,445,522	33	\$78,710	2	\$5,169,698	7	\$417,716	12
	X500												
Marlborough	A			\$385,643	1								
	AE			\$1,259,108	1			\$605,246	2	\$0	1		
	X	\$13,644,414	178	\$58,265,874	169	\$40,621,573	43	\$0	2	\$4,502,582	4	\$2,244,368	16
	X500												
New Paltz Town	A					\$50,012	1					\$0	1
	AE	\$67,593	15	\$825,291	4	\$1,001,185	2	\$1,623,461	2	\$0	1	\$0	1
	X	\$820,347	11	\$47,922,703	73	\$35,943,844	16	\$518,002	3	\$789,508	1	\$2,404,310	11
	X500			\$261,501	2							\$1,881,317	3
New Paltz Village	A			\$2,718,475	6	\$3,705,636	2						
	AE	\$338,874	3			\$802,404	2					\$4,888,736	1
	X			\$73,222,839	172	\$8,031,537	21	\$0	1				
	X500												

**Flooding**

A = "100-Year" or Base Floodplain mapped by approximate methods  
 AE = "100-Year" or Base Floodplain where Base Flood Elevations are provided

X 500 = "500-Year" Floodplain  
 X = Areas outside the "500-Year" Floodplain

Municipality	FEMA Flood Zone	Agriculture		Commercial		Community Services		Entertainment & Recreation		Industrial		Public Services	
		Assessed Improvements	Parcels by Category	Assessed Improvements	Parcels by Category	Assessed Improvements	Parcels by Category	Assessed Improvements	Parcels by Category	Assessed Improvements	Parcels by Category	Assessed Improvements	Parcels by Category
Olive	A			\$904,630	4	\$2,073,834	5	\$1,203,837	1			\$20,050	1
	AE			\$3,404,276	8	\$627,936	2			\$641,229	2		
	X	\$0	4	\$12,348,882	47	\$5,968,958	25	\$788,897	6	\$2,829,268	3	\$197,245	5
	X500			\$253,752	1								
Plattekill	A												
	AE												
	X	\$10,445,683	84	\$43,188,506	119	\$7,302,076	34	\$6,475,666	7	\$0	1	\$5,487,246	5
Rochester	A	\$2,012,949	13	\$1,475,016	6	\$1,577,804	2	\$1,789,651	2	\$0	2		
	AE	\$1,017,633	22	\$4,714,288	16	\$856,556	3	\$1,270,979	1				
	X	\$2,050,008	35	\$26,606,145	104	\$21,936,227	26	\$65,222	2	\$0	5	\$66,375	2
	X500					\$0	1						
Rosendale	A							\$7,858,649	3	\$146,969	1	\$0	4
	AE	\$19,512	2	\$7,327,926	17			\$0	2			\$108,207	2
	X			\$24,351,853	65	\$13,687,616	26	\$1,480,494	3			\$988,382	16
	X500											\$0	1
Saugerties	A	\$0	1	\$4,671,983	15	\$17,875,040	2	\$10,614,975	4	\$358,326	1	\$260,500	9
	AE			\$505,557	3	\$8,981,285	6	\$89,996	2	\$1,354,606	4	\$643,034	4
	X	\$863,733	7	\$72,588,686	228	\$21,970,787	39	\$2,982,121	11	\$21,120,064	16	\$6,626,537	106
	X500												
Saugerties Village	A							\$0	1				
	AE			\$4,353,969	6	\$1,384,025	3	\$1,365,245	4			\$104,471	1
	X			\$50,235,615	175	\$26,229,324	25	\$418,857	3	\$2,299,877	5	\$8,697,288	5
	X500			\$1,001,923	7								
Shandaken	A			\$8,174,976	32	\$409,034	3	\$1,070,422	3			\$63,549,361	1
	AE			\$12,769,347	50	\$3,789,783	17	\$925,835	5	\$235,368	2		
	X			\$15,080,901	58	\$15,857,914	25	\$1,094,095	9	\$561,366	3	\$1,921,826	7
	X500			\$1,468,188	7	\$245,456	1						
Shawangunk	A	\$2,783,371	13	\$1,173,580	2	\$198,819,386	6	\$463,356	2			\$0	2
	AE	\$5,293,576	29	\$6,841,797	17	\$462,450	2	\$100,376	1	\$1,203,906	3	\$2,507,952	5
	X	\$8,443,791	73	\$26,401,374	83	\$41,098,964	43	\$0	1	\$4,723,572	7	\$1,648,673	10
	X500												
Ulster Town	A	\$150,726	3	\$2,765,654	6	\$1,014,196	1	\$604,205	1				
	AE	\$601,826	15	\$26,494,486	32	\$26,687,191	6	\$540,963	6	\$974,689	2	\$6,505,280	6
	X	\$771,018	2	\$415,802,874	324	\$89,378,378	38	\$8,591,773	8	\$25,073,325	18	\$27,303,875	28
	X500			\$17,280,794	14	\$2,905,229	1					\$41,305	2
Wawarsing	A	\$171,401	1	\$14,067,601	22	\$7,165,753	7	\$2,514,354	4			\$2,773,232	5
	AE	\$279,786	11	\$10,205,419	35	\$8,630,859	15	\$0	1	\$9,609,415	1	\$389,282	10
	X	\$320,001	9	\$44,997,628	134	\$22,424,257	54	\$1,340,005	10	\$8,555,651	3	\$2,829,554	66
	X500												
Woodstock	A			\$877,882	2							\$403	1
	AE	\$0	1	\$21,806,988	45	\$15,743,081	9	\$6,052,514	6			\$2,259,222	7
	X	\$3,671	1	\$37,191,601	91	\$21,361,558	32	\$5,923,695	10	\$8,109,020	5	\$987,884	4
	X500												
<b>Total, All Hazard Areas (Zones A/AE/X500)</b>		\$27,703,699	233	\$466,448,520	498	\$380,159,666	140	\$56,740,262	110	\$18,749,405	34	\$179,414,296	101
<b>Outside Flood Hazard Area (Zone X)</b>		\$54,251,082	565	\$1,477,931,724	3,442	\$1,106,464,070	806	\$66,147,397	157	\$142,322,460	146	\$85,749,164	392

\* Values rounded to nearest dollars

**Flooding**

A = "100-Year" or Base Floodplain mapped by approximate methods  
 AE = "100-Year" or Base Floodplain where Base Flood Elevations are provided

X 500 = "500-Year" Floodplain  
 X = Areas outside the "500-Year" Floodplain

Municipality	FEMA Flood Zone	Residential		Vacant Land		Wild, Forested, Conservation Lands & Public		Unclassified		Totals	
		Assessed Improvements	Parcels by Category	Assessed Improvements	Parcels by Category	Assessed Improvements	Parcels by Category	Assessed Improvements	Parcels by Category	Assessed Improvements	Parcels by Category
Denning	A	\$11,649,770	112	\$42,220	43	\$741,726	98	\$244,974	17	\$21,617,425	309
	AE									\$0	0
	X	\$28,221,980	340	\$257,779	190	\$405,002	285	\$0	30	\$29,509,790	878
	X500									\$0	0
Ellenville Village	A	\$705,712	47	\$0	5	\$0	1	\$308,810	9	\$5,847,597	74
	AE	\$1,863,362	77	\$6,869	13	\$0	8	\$0	8	\$3,511,669	121
	X	\$19,995,251	906	\$34,304	117	\$0	1	\$58,985	62	\$37,554,197	1,326
	X500	\$34,284	2					\$0	1	\$61,729	4
Esopus	A	\$29,247,067	113	\$442,330	81	\$314,511	7	\$0	7	\$66,729,164	226
	AE	\$45,785,678	106	\$920,909	58	\$352,035	4	\$0	13	\$92,665,470	203
	X	\$504,289,134	2,636	\$7,968,032	862	\$0	8	\$298,168	155	\$664,459,861	3,889
	X500									\$0	0
Gardiner	A	\$24,070,040	66	\$78,798	26	\$0	1	\$0	1	\$29,002,872	112
	AE	\$40,398,663	129	\$59,720	39	\$270,704	1	\$0	4	\$44,921,417	188
	X	\$485,343,525	1,826	\$1,675,073	454	\$0	21	\$4,206,417	87	\$538,119,501	2,540
	X500									\$0	0
Hardenburgh	A	\$12,813,739	62	\$2,969	22	\$860,023	16	\$0	33	\$18,811,933	150
	AE									\$0	0
	X	\$27,347,609	225	\$187,344	133	\$167,501	201	\$0	51	\$31,980,284	623
	X500									\$0	0
Hurley	A			\$47,778	2			\$0	7	\$52,955	10
	AE	\$24,137,926	117	\$113,623	50	\$0	17	\$26,112	9	\$28,162,202	215
	X	\$569,227,134	2,555	\$2,262,565	495	\$204,334	15	\$970,115	148	\$609,303,101	3,305
	X500	\$1,026,560	8	\$0	1			\$0	3	\$1,851,007	14
Kingston City	A	\$1,774,528	16	\$0	4	\$0	5	\$0	5	\$2,473,636	28
	AE	\$10,284,703	73	\$121,234	77	\$283,067	5	\$0	18	\$118,114,060	237
	X	\$855,365,134	5,849	\$894,937	748	\$168,108	8	\$333,815	391	\$1,778,752,489	8,099
	X500	\$457,495	2	\$0	8			\$0	7	\$23,790,321	43
Kingston Town	A	\$18,240	1	\$0	2	\$0	1	\$0	1	\$18,240	4
	AE	\$12,760,054	98	\$8,662	11	\$0	4	\$0	3	\$13,140,710	120
	X	\$29,745,337	228	\$70,610	129	\$27,439	84	\$288,416	22	\$44,268,518	519
	X500	\$110,244	1							\$110,244	1
Lloyd	A	\$60,824,396	271	\$17,109	120	\$0	1	\$418,733	29	\$90,991,854	471
	AE	\$14,714,166	42	\$700,856	27			\$0	6	\$35,791,497	87
	X	\$581,116,142	2,701	\$1,086,560	471	\$0	2	\$2,824,789	151	\$729,737,703	3,641
	X500									\$0	0
Marbletown	A	\$45,184,583	124	\$275,729	65	\$0	1	\$5,281,675	23	\$266,406,927	238
	AE	\$14,388,232	36	\$206,066	6	\$57,579	2	\$2,872,587	5	\$17,783,422	62
	X	\$592,866,094	2,244	\$1,778,717	858	\$0	5	\$47,731,696	304	\$709,570,715	3,565
	X500									\$0	0
Marlborough	A									\$385,643	1
	AE	\$7,059,839	15	\$0	13					\$8,924,193	32
	X	\$593,531,344	2,524	\$287,052	558	\$0	1	\$0	162	\$713,097,207	3,657
	X500									\$0	0
New Paltz Town	A	\$12,666,501	67	\$0	19	\$0	8	\$0	4	\$12,716,513	100
	AE	\$29,412,757	130	\$2,000	42	\$0	2	\$0	5	\$32,932,288	204
	X	\$440,566,144	2,138	\$195,806	319	\$50,000	19	\$1,024,604	58	\$530,235,268	2,649
	X500	\$742,003	5	\$0	7	\$0	9	\$0	1	\$2,884,821	27
New Paltz Village	A	\$7,384,933	20	\$25,207	2					\$13,834,252	30
	AE	\$5,780,710	18	\$0	5	\$0	1	\$0	4	\$11,810,723	34
	X	\$131,818,026	563	\$23,472	104			\$0	13	\$213,095,874	874
	X500									\$0	0

**Flooding**

A = "100-Year" or Base Floodplain mapped by approximate methods  
 AE = "100-Year" or Base Floodplain where Base Flood Elevations are provided

X 500 = "500-Year" Floodplain  
 X = Areas outside the "500-Year" Floodplain

Municipality	FEMA Flood Zone	Residential		Vacant Land		Wild, Forested, Conservation Lands & Parks		Unclassified		Totals	
		Assessed Improvements	Parcels by Category	Assessed Improvements	Parcels by Category	Assessed Improvements	Parcels by Category	Assessed Improvements	Parcels by Category	Assessed Improvements	Parcels by Category
Olive	A	\$31,001,940	213	\$74,293	56	\$0	35	\$3,019,157	20	\$38,297,741	335
	AE	\$3,397,459	25	\$7,583	9	\$0	1	\$148,521	3	\$8,227,003	50
	X	\$283,362,849	1,793	\$438,060	512	\$0	180	\$24,294,860	134	\$330,229,019	2,709
	X500	\$499,350	6	\$6,768	2			\$0	1	\$759,869	10
Plattekill	A									\$0	0
	AE									\$0	0
	X	\$480,302,311	2,389	\$831,286	709	\$0	21	\$2,644,754	92	\$556,677,528	3,461
Rochester	X500									\$0	0
	A	\$44,485,845	192	\$83,558	114	\$0	39	\$868,227	24	\$52,293,050	394
	AE	\$28,095,382	120	-\$12,986	78	\$0	3	\$0	32	\$35,941,852	275
	X	\$424,725,339	2,520	\$521,418	1,059	\$18,111	138	\$314,890	213	\$476,303,736	4,104
Rosendale	X500	\$207,779	2							\$207,779	3
	A	\$7,101,713	27	\$175,612	8	\$0	1	\$423,001	11	\$15,705,945	55
	AE	\$36,100,148	178	\$362,269	30	\$0		\$0	35	\$43,918,062	266
	X	\$361,715,449	1,849	\$523,661	289	\$0	5	\$2,943,183	234	\$405,690,637	2,467
Saugerties	X500	\$4,081,968	26	\$0	4			\$0	3	\$4,081,968	34
	A	\$57,021,016	238	\$9,259	77	\$0	1	\$459,587	44	\$91,270,685	392
	AE	\$51,380,429	218	\$140,288	86	\$0		\$0	58	\$63,095,195	381
	X	\$928,524,737	4,959	\$3,021,844	1,165	\$1,228,455	13	\$2,030,410	610	\$1,060,957,374	7,154
Saugerties Village	X500	\$1,854,880	15	\$0	2			\$0	3	\$1,854,880	20
	A					\$142,517	1			\$142,517	2
	AE	\$21,827,989	85	\$2,999	19	\$171,516	2	\$0	29	\$29,210,213	149
	X	\$156,467,749	926	\$102,392	112	\$335,614	2	\$184,240	141	\$244,970,956	1,394
Shandaken	X500	\$343,770	4							\$1,345,693	11
	A	\$39,044,864	293	\$161,402	102	\$235,030	27	\$161,300	24	\$112,806,389	485
	AE	\$27,708,410	220	\$43,908	124	\$9,110	18	\$5,909	34	\$45,487,671	470
	X	\$194,229,614	1,423	\$395,725	652	\$4,469,563	229	\$218,401	110	\$233,829,405	2,516
Shawangunk	X500	\$8,672,307	71	\$0	16			\$200,001	6	\$10,585,951	101
	A	\$40,703,499	165	\$0	48	\$1,667	12	\$1,195,294	6	\$245,140,152	256
	AE	\$41,693,382	178	\$70,019	41	\$329,542	4	\$387,506	5	\$68,890,507	285
	X	\$701,987,897	3,169	\$653,336	506	\$3,300	46	\$2,704,677	66	\$787,665,585	4,004
Ulster Town	X500									\$0	0
	A	\$4,168,694	21	\$0	38			\$0	7	\$8,703,475	77
	AE	\$35,913,074	265	\$72,260	96	\$1,790,178	5	\$0	34	\$99,579,948	467
	X	\$480,405,530	3,267	\$1,719,990	773	\$69,855	8	\$389,857	189	\$1,049,506,476	4,655
Wawarsing	X500	\$12,090,048	88	\$24,638	33			\$0	15	\$32,342,013	153
	A	\$11,203,042	134	\$11,429	50	\$0	17	\$0	19	\$37,906,811	259
	AE	\$13,808,731	162	\$5,662	72	\$0	1	\$0	21	\$42,929,153	329
	X	\$227,850,712	2,554	\$1,223,105	997	\$5,714	173	\$211,429	177	\$309,758,056	4,177
Woodstock	X500	\$22,857	1	\$0	1					\$22,857	2
	A	\$12,062,882	34	\$1,893	13	\$172,808	3	\$0	3	\$13,115,868	56
	AE	\$105,722,322	345	\$673,326	87			\$2,147,267	12	\$154,404,720	512
	X	\$998,800,388	2,946	\$4,814,450	898	\$92,026	89	\$4,926,222	112	\$1,082,210,513	4,188
<b>Total, All Hazard Areas (Zones A/AE/X500)</b>		\$1,056,185,802	5,087	\$4,986,257	1,955	\$5,732,012	349	\$18,168,662	671	\$2,214,288,580	9,178
<b>Outside Flood Hazard Area (Zone X)</b>		\$10,097,805,427	52,530	\$30,967,518	13,090	\$7,245,022	1,554	\$98,599,928	3,712	\$13,167,483,792	76,394

\* Values rounded to nearest dollars

**Earthquake Hazard**  
(Seismic)

Risk Type 3 = Earthquake of Peak Ground Acceleration **3%** of Gravity has a 10% chance of being equalled or exceeded in 50-year period  
 Risk Type 4 = Earthquake of Peak Ground Acceleration **4%** of Gravity has a 10% chance of being equalled or exceeded in 50-year period

Municipality	Risk Type	Agriculture		Commercial		Community Services		Entertainment & Recreation		Industrial	
		Assessed Improvements	Parcels by Category	Assessed Improvements	Parcels by Category	Assessed Improvements	Parcels by Category	Assessed Improvements	Parcels by Category	Assessed Improvements	Parcels by Category
Denning	3					\$342,668	6	\$9,221,092	66		
Denning	4										
Ellenville Village	3										
Ellenville Village	4			\$13,452,041	213	\$9,710,859	49	\$101,509	2	\$179,699	2
Esopus	3										
Esopus	4	\$1,817,841	20	\$69,795,279	123	\$128,534,347	66	\$3,620,181	8	\$19,737,579	13
Gardiner	3										
Gardiner	4	\$16,755,134	99	\$26,303,039	59	\$7,561,897	14	\$2,727,344	5	\$2,341,343	3
Hardenburgh	3	\$2,626,573	15	\$2,234,853	3	\$4,388,299	9	\$163,282	2	\$0	1
Hardenburgh	4										
Hurley	3			\$15,799,563	40	\$9,509,260	15	\$502,669	3	\$333,001	2
Hurley	4	\$1,057,671	16	\$5,727,245	17	\$8,217,366	12	\$2,222	1	\$0	1
Kingston City	3										
Kingston City	4	\$162,345	1	\$374,470,061	961	\$550,297,133	133	\$29,427,942	35	\$27,790,298	40
Kingston Town	3			\$9,215,282	24	\$0	1	\$2,024,398	1	\$0	3
Kingston Town	4			\$1,018,297	4	\$549,514	5	\$158,537	2	\$243,903	7
Lloyd	3										
Lloyd	4	\$9,124,703	63	\$82,127,329	213	\$54,454,551	56	\$5,251,021	9	\$12,062,937	9
Marbletown	3										
Marbletown	4	\$311,292	51	\$237,772,224	80	\$36,445,522	34	\$1,302,478	4	\$5,295,613	8
Marlborough	3										
Marlborough	4	\$13,644,414	178	\$59,910,625	171	\$40,621,573	43	\$607,695	4	\$4,502,582	5
New Paltz Town	3										
New Paltz Town	4	\$888,004	26	\$49,011,396	79	\$36,991,848	19	\$2,142,808	5	\$792,003	2
New Paltz Village	3										
New Paltz Village	4	\$338,899	3	\$75,940,058	178	\$12,528,229	25	\$0	1		
Olive	3	\$0	3	\$16,312,035	57	\$7,677,705	25	\$1,920,181	6	\$3,470,496	5
Olive	4	\$0	1	\$599,888	3	\$993,318	7	\$72,489	1		
Plattekill	3										
Plattekill	4	\$10,445,683	84	\$43,188,506	119	\$7,302,076	34	\$6,475,666	7	\$0	1
Rochester	3			\$251,001	1	\$50,222	3				
Rochester	4	\$5,082,131	70	\$32,533,908	125	\$24,302,319	29	\$3,127,013	5	\$0	7
Rosendale	3										
Rosendale	4	\$19,512	2	\$31,717,444	82	\$13,687,616	26	\$9,339,062	8	\$146,952	1
Saugerties	3	\$607,284	7	\$76,979,736	243	\$46,740,935	45	\$13,687,086	17	\$22,833,445	21
Saugerties	4	\$256,475	1	\$788,693	3	\$2,096,843	2				
Saugerties Village	3			\$55,597,561	188	\$27,605,964	28	\$1,784,102	8	\$2,299,877	5
Saugerties Village	4										
Shandaken	3			\$37,494,241	147	\$20,333,718	46	\$3,088,649	17	\$796,821	5
Shandaken	4										
Shawangunk	3										
Shawangunk	4	\$16,541,053	115	\$34,493,738	102	\$240,414,042	51	\$563,336	4	\$5,923,577	10
Ulster	3	\$327,972	2	\$1,346,672	9	\$1,542,180	3	\$116,232	2	\$86,957	1
Ulster	4	\$1,196,961	18	\$460,917,324	367	\$118,394,676	43	\$9,620,763	13	\$25,961,734	19
Wawarsing	3	\$40,000	6	\$4,000,016	21	\$2,388,581	5	\$51,429	3		
Wawarsing	4	\$731,431	15	\$65,274,546	170	\$35,857,286	71	\$3,802,872	12	\$18,217,217	4
Woodstock	3	\$3,671	2	\$59,865,031	138	\$37,041,414	41	\$11,990,807	16	\$8,109,020	5
Woodstock	4										
<b>Total All Categories</b>		<b>\$81,979,050</b>	<b>798</b>	<b>\$1,944,137,629</b>	<b>3,940</b>	<b>\$1,486,581,963</b>	<b>946</b>	<b>\$122,892,865</b>	<b>267</b>	<b>\$161,125,056</b>	<b>180</b>
<b>Total Risk Type 3</b>		<b>\$3,605,500</b>	<b>35</b>	<b>\$279,095,990</b>	<b>871</b>	<b>\$157,620,946</b>	<b>227</b>	<b>\$44,549,927</b>	<b>141</b>	<b>\$37,929,619</b>	<b>48</b>
<b>Total Risk Type 4</b>		<b>\$78,373,549</b>	<b>763</b>	<b>\$1,665,041,639</b>	<b>3,069</b>	<b>\$1,328,961,016</b>	<b>719</b>	<b>\$78,342,938</b>	<b>126</b>	<b>\$123,195,438</b>	<b>132</b>

\* Values rounded to nearest dollar

**Earthquake Hazard**  
(Seismic)

Risk Type 3 = Earthquake of Peak Ground Acceleration 3% of Gravity has a 10% chance of being equalled or exceeded in 50-year period  
 Risk Type 4 = Earthquake of Peak Ground Acceleration 4% of Gravity has a 10% chance of being equalled or exceeded in 50-year period

Municipality	Risk Type	Public Services		Residential		Vacant Land		Wild, Forested, Conservation Lands & Public		Unclassified		Totals	
		Assessed Improvements	Parcels by Category	Assessed Improvements	Parcels by Category	Assessed Improvements	Parcels by Category	Assessed Improvements	Parcels by Category	Assessed Improvements	Parcels by Category	Assessed Improvements	Parcels by Category
Denning	3			\$39,871,693	452	\$300,001	233	\$1,146,727	383	\$245,001	47	\$51,127,182	1,187
	4											\$0	0
Ellenville Village	3											\$0	0
	4	\$545,530	10	\$22,609,486	1,032	\$41,152	135	\$0	2	\$367,628	80	\$47,007,905	1,525
Esopus	3											\$0	0
	4	\$10,745,630	38	\$579,358,167	2,855	\$9,328,537	1,001	\$666,503	19	\$298,168	175	\$823,902,232	4,318
Gardiner	3											\$0	0
	4	\$254,033	5	\$549,861,851	2,021	\$1,813,874	519	\$270,401	23	\$4,206,417	92	\$612,095,332	2,840
Hardenburgh	3			\$40,160,473	287	\$190,313	155	\$1,027,504	217	\$0	84	\$50,791,297	773
	4											\$0	0
Hurley	3	\$44,809	3	\$314,401,923	1,340	\$934,115	289	\$69,445	4	\$0	74	\$341,594,785	1,770
	4	\$140,791	7	\$279,975,998	1,340	\$1,491,450	259	\$134,889	28	\$996,226	93	\$297,743,859	1,774
Kingston City	3											\$0	0
	4	\$70,994,163	26	\$868,002,233	5,940	\$1,017,416	837	\$451,491	13	\$333,815	421	\$1,922,946,896	8,407
Kingston Town	3	\$0	2	\$18,089,951	146	\$12,195	54	\$27,439	30	\$288,416	15	\$29,657,681	276
	4	\$1,293,908	11	\$24,552,781	182	\$67,073	88	\$0	59	\$0	10	\$27,884,014	368
Lloyd	3											\$0	0
	4	\$31,816,427	28	\$656,729,416	3,014	\$1,806,229	618	\$0	3	\$3,243,458	186	\$856,616,072	4,199
Marbletown	3	\$13,527,686	1	\$3,513,669	14	\$860	9			\$412,260	2	\$17,454,475	26
	4	\$1,987,292	14	\$648,915,888	2,390	\$2,258,826	920	\$57,420	8	\$55,475,383	330	\$989,821,937	3,839
Marlborough	3											\$0	0
	4	\$2,244,368	16	\$600,600,859	2,539	\$287,052	571	\$0	1	\$0	162	\$722,419,168	3,690
New Paltz Town	3											\$0	0
	4	\$4,285,626	16	\$483,451,260	2,340	\$197,801	387	\$50,000	38	\$1,024,604	68	\$578,835,351	2,980
New Paltz Village	3											\$0	0
	4	\$4,882,660	1	\$144,935,060	601	\$48,576	111	\$0	1	\$0	17	\$238,673,481	938
Olive	3	\$197,261	6	\$253,716,250	1,626	\$333,579	465	\$0	182	\$23,621,914	129	\$307,249,423	2,504
	4			\$64,548,204	411	\$193,168	114	\$0	34	\$3,841,177	29	\$70,248,243	600
Plattekill	3											\$0	0
	4	\$5,487,246	5	\$480,302,311	2,389	\$831,286	709	\$0	21	\$2,644,754	92	\$556,677,528	3,461
Rochester	3			\$40,700,162	322	\$145,667	187	\$5,333	47	\$0	26	\$41,152,386	586
	4	\$66,375	2	\$456,781,552	2,512	\$446,001	1,064	\$12,778	133	\$1,183,227	243	\$523,535,304	4,190
Rosendale	3											\$0	0
	4	\$1,098,474	23	\$409,044,227	2,080	\$1,061,468	311	\$0	6	\$3,366,355	283	\$469,481,109	2,822
Saugerties	3	\$7,533,585	119	\$1,006,703,668	5,293	\$3,075,641	1,280	\$1,228,455	14	\$2,490,452	691	\$1,181,880,286	7,730
	4			\$32,270,291	137	\$95,834	50			\$0	24	\$35,508,137	217
Saugerties Village	3	\$8,802,962	6	\$178,688,397	1,015	\$105,194	131	\$649,637	5	\$184,240	170	\$275,717,933	1,556
	4											\$0	0
Shandaken	3	\$65,467,535	8	\$289,679,259	2,007	\$601,821	894	\$4,713,655	274	\$586,821	174	\$402,762,519	3,572
	4											\$0	0
Shawangunk	3											\$0	0
	4	\$4,142,017	17	\$785,679,715	3,512	\$723,336	596	\$334,835	62	\$4,288,350	78	\$1,093,103,999	4,547
Ulster	3	\$171,740	3	\$56,237,472	414	\$29,275	118	\$62,029	1	\$0	23	\$59,920,530	576
	4	\$33,625,185	33	\$476,291,649	3,227	\$1,786,384	822	\$1,800,587	12	\$389,857	222	\$1,129,985,120	4,776
Wawarsing	3	\$0	54	\$48,624,480	584	\$240,001	285	\$0	54	\$0	42	\$55,344,507	1,054
	4	\$5,942,195	27	\$204,276,522	2,267	\$1,000,004	835	\$5,714	137	\$211,429	175	\$335,319,218	3,713
Woodstock	3	\$3,243,927	12	\$1,117,392,021	3,328	\$5,489,642	999	\$264,811	92	\$7,071,294	127	\$1,250,471,638	4,760
	4											\$0	0
Total All Categories		\$278,541,422	493	\$11,155,966,891	57,617	\$35,953,774	15,046	\$12,979,653	1,903	\$116,771,245	4,384	\$15,396,929,548	85,574
Total Risk Type 3		\$98,989,504	214	\$3,387,779,420	16,828	\$11,458,306	5,099	\$9,195,035	1,303	\$34,900,397	1,604	\$4,065,124,644	26,370
Total Risk Type 4		\$179,551,918	279	\$7,768,187,471	40,789	\$24,495,468	9,947	\$3,784,617	600	\$81,870,848	2,780	\$11,331,804,904	59,204

\* Values rounded to nearest dolla

**Earthquake Hazard**  
(Soil Type)

Type A = Hard Rock  
Type B = Rock

Type C = Very Dense Soil / Soft Rock  
Type D = Stiff Soil

Type E = Soft Soil

Municipality	Risk Type	Agriculture		Commercial		Community Services		Entertainment & Recreation		Industrial		Public Services	
		Assessed Improvements	Parcels by Category	Assessed Improvements	Parcels by Category	Assessed Improvements	Parcels by Category	Assessed Improvements	Parcels by Category	Assessed Improvements	Parcels by Category	Assessed Improvements	Parcels by Category
Denning	Type A					\$91,389	3	\$866,476	37				
	Type B							\$8,120,727	25				
	Type C												
	Type D					\$251,279	3	\$233,890	4				
	Type E												
	Uncategorized												
Ellenville Village	Type A			\$1,403,298	24	\$4,673,116	16			\$179,699	2	\$317,820	4
	Type B			\$1,627,577	15	\$34,294	2	\$32,922	1			\$76,818	2
	Type C			\$1,762,696	3							\$68,587	2
	Type D			\$5,281,914	118	\$4,439,661	18					\$82,305	1
	Type E			\$3,376,557	53	\$563,788	13	\$68,587	1			\$0	1
	Uncategorized												
Esopus	Type A	\$722,003	5	\$9,550,205	12	\$20,613,582	15	\$66,834	1	\$9,386,538	6	\$8,017,365	7
	Type B	\$1,095,838	14	\$41,774,000	47	\$19,496,578	25	\$839,670	1	\$7,965,532	5	\$1,993,508	22
	Type C												
	Type D	\$0	1	\$12,189,715	43	\$34,045,136	13	\$0	2	\$2,385,510	2	\$920	2
	Type E			\$4,474,351	18	\$1,471,506	5	\$2,169,675	3			\$733,836	7
	Uncategorized			\$1,807,007	3	\$52,907,545	8	\$544,002	1				
Gardiner	Type A	\$2,312,143	8	\$1,260,272	3					\$1,860,274	1	\$0	1
	Type B	\$13,501,254	79	\$22,518,623	54	\$7,561,897	14	\$2,727,344	5	\$481,069	2	\$254,033	4
	Type C												
	Type D	\$36,667	2										
	Type E	\$905,070	10	\$2,524,143	2								
	Uncategorized												
Hardenburgh	Type A	\$676,878	3			\$2,717,511	2						
	Type B	\$1,949,695	12	\$2,234,853	3	\$1,670,788	7	\$163,282	2	\$0	1		
	Type C												
	Type D												
	Type E												
	Uncategorized												
Hurley	Type A			\$7,881,643	29	\$6,146,025	7	\$502,669	3	\$333,001	2		
	Type B	\$72,223	1	\$11,422,379	23	\$10,004,151	17	\$2,222	1			\$102,809	6
	Type C												
	Type D												
	Type E	\$985,448	15	\$2,222,787	5	\$1,576,451	3			\$0	1	\$82,760	3
	Uncategorized											\$703,530	1
Kingston City	Type A			\$29,084,771	110	\$142,892,022	16	\$1,639,166	5	\$12,803,605	4	\$489,435	3
	Type B			\$64,517,549	199	\$148,630,397	33	\$19,212	6	\$797,313	3	\$5,273,799	7
	Type C			\$115,377,330	341	\$220,518,774	45	\$26,126,666	9	\$11,578,658	19	\$1,631,611	5
	Type D	\$162,345	1	\$53,873,054	99	\$13,299,309	11	\$0	1	\$813,884	4	\$1,108,194	3
	Type E			\$109,119,028	202	\$24,113,689	26	\$1,642,898	11	\$1,796,837	10	\$62,491,124	8
	Uncategorized			\$2,498,329	10	\$842,943	2	\$0	3				
Kingston Town	Type A			\$10,233,578	28	\$0	1	\$158,537	2	\$243,903	10	\$36,586	3
	Type B					\$0	2	\$2,024,398	1			\$1,257,322	10
	Type C												
	Type D					\$549,514	3						
	Type E												
	Uncategorized												



**Earthquake Hazard**  
(Soil Type)

Type A = Hard Rock  
Type B = Rock

Type C = Very Dense Soil / Soft Rock  
Type D = Stiff Soil

Type E = Soft Soil

Municipality	Risk Type	Agriculture		Commercial		Community Services		Entertainment & Recreation		Industrial		Public Services	
		Assessed Improvements	Parcels by Category	Assessed Improvements	Parcels by Category	Assessed Improvements	Parcels by Category	Assessed Improvements	Parcels by Category	Assessed Improvements	Parcels by Category	Assessed Improvements	Parcels by Category
Lloyd	Type A	\$1,247,227	14	\$15,978,175	17	\$6,440,359	6	\$294,112	4	\$1,017,337	1	\$15,698,585	9
	Type B	\$5,655,245	48	\$61,785,247	185	\$47,879,858	46	\$4,948,575	4	\$7,929,921	6	\$4,458,351	15
	Type C												
	Type D			\$1,612,451	5	\$0	2			\$186,779	1		
	Type E			\$1,191,560	3	\$134,334	2			\$2,928,901	1	\$13,444	1
	Uncategorized	\$2,222,231	1	\$1,559,895	3			\$8,333	1			\$11,646,047	3
Marbletown	Type A	\$19,247	6	\$214,510,968	8	\$0	1			\$0	2	\$1,093,015	4
	Type B	\$243,872	30	\$21,314,064	63	\$31,365,502	20	\$1,243,553	3	\$5,295,613	5	\$848,390	7
	Type C	\$0	2	\$307,743	1	\$3,277,540	6						
	Type D	\$1,828	2	\$52,366	1	\$267,205	2	\$58,925	1				
	Type E	\$46,344	11	\$1,587,092	7	\$1,535,275	5			\$0	1	\$45,886	3
		Uncategorized											\$264,405
Marlborough	Type A	\$1,378,595	14	\$5,044,123	13	\$423,207	5			\$4,150,145	2	\$739,362	2
	Type B	\$11,478,507	155	\$30,789,995	92	\$30,869,995	16	\$0	2			\$785,260	10
	Type C	\$0	3	\$15,282,882	31	\$8,810,292	19					\$139,231	2
	Type D	\$323,719	4	\$383,591	2	\$518,079	3						
	Type E			\$5,945,152	28					\$352,437	1	\$580,515	2
	Uncategorized	\$463,592	2	\$2,464,882	5			\$607,695	2	\$0	2		
New Paltz Town	Type A	\$370,401	3	\$246,501	1	\$998,004	1	\$90,000	1				
	Type B	\$502,602	18	\$46,834,688	72	\$35,993,844	15	\$2,052,808	4	\$792,003	1	\$4,285,626	16
	Type C												
	Type D			\$1,122,504	2								
	Type E	\$15,000	5	\$807,703	4	\$0	3			\$0	1		
	Uncategorized												
New Paltz Village	Type A	\$0	1	\$13,417,274	11	\$2,250,166	4					\$4,882,660	1
	Type B	\$338,899	2	\$62,522,784	167	\$10,278,063	20	\$0	1				
	Type C												
	Type D												
	Type E					\$0	1						
	Uncategorized												
Olive	Type A	\$0	1			\$1,654,035	1	\$221,217	1			\$2,609	2
	Type B	\$0	3	\$12,525,572	46	\$6,151,362	23	\$1,756,856	5	\$2,829,268	3	\$194,635	3
	Type C												
	Type D			\$4,386,352	14	\$865,626	8	\$14,596	1	\$641,229	2		
	Type E												
	Uncategorized											\$17	1
Plattekill	Type A	\$1,625,647	12	\$3,516,040	3	\$687,182	2	\$3,173,089	1				
	Type B	\$8,727,984	69	\$36,978,224	104	\$5,913,613	28	\$3,302,577	6			\$5,487,246	5
	Type C												
	Type D	\$92,052	3	\$2,694,242	12	\$701,281	4			\$0	1		
	Type E												
	Uncategorized												
Rochester	Type A	\$803,225	12	\$9,105,481	19	\$499,002	2	\$1,724,229	1				
	Type B	\$1,665,562	30	\$7,914,254	37	\$21,613,864	12	\$1,402,783	3	\$0	6	\$16,667	1
	Type C	\$675,225	4	\$1,367,783	5	\$50,889	2						
	Type D			\$111,445	2	\$0	1						
	Type E	\$1,938,119	24	\$14,285,946	63	\$2,188,787	15	\$0	1	\$0	1	\$49,708	1
		Uncategorized											

**Earthquake Hazard**  
(Soil Type)

Type A = Hard Rock  
Type B = Rock

Type C = Very Dense Soil / Soft Rock  
Type D = Stiff Soil

Type E = Soft Soil

Municipality	Risk Type	Agriculture		Commercial		Community Services		Entertainment & Recreation		Industrial		Public Services	
		Assessed Improvements	Parcels by Category	Assessed Improvements	Parcels by Category	Assessed Improvements	Parcels by Category	Assessed Improvements	Parcels by Category	Assessed Improvements	Parcels by Category	Assessed Improvements	Parcels by Category
Rosendale	Type A	\$19,512	2	\$7,050,882	8	\$1,181,285	3	\$7,858,568	3			\$147,897	9
	Type B			\$1,639,885	4	\$3,680,807	5	\$975,004	1	\$146,952	1	\$23,171	1
	Type C			\$19,908,372	64	\$8,337,716	16	\$505,490	4			\$927,406	11
	Type D					\$319,513	1						
	Type E			\$3,118,305	6	\$168,293	1					\$0	2
	Uncategorized												
Saugerties	Type A	\$495,811	5	\$16,003,167	40	\$789,069	4			\$1,355,066	4	\$1,490,095	36
	Type B	\$149,006	1	\$17,934,965	76	\$27,630,136	16	\$9,821,188	7	\$9,296,046	9	\$1,064,727	32
	Type C	\$218,942	1	\$8,979,602	27	\$5,000,145	5					\$61,929	18
	Type D			\$1,989,999	9	\$380,334	4	\$0	1	\$140,248	1	\$0	1
	Type E	\$0	1	\$30,483,232	88	\$6,046,565	12	\$3,863,396	8	\$12,042,085	7	\$4,270,265	29
	Uncategorized			\$2,377,465	6	\$8,991,529	6	\$2,502	1			\$646,568	3
Saugerties Village	Type A												
	Type B			\$9,826,116	33	\$17,187,786	11	\$0	2	\$134,941	1	\$8,162,441	1
	Type C												
	Type D												
	Type E			\$43,252,543	154	\$10,418,178	16	\$1,784,102	6	\$2,164,936	4	\$640,521	4
	Uncategorized			\$2,518,902	1	\$0	1					\$0	1
Shandaken	Type A			\$4,740,928	12	\$7,709,122	4	\$1,323,642	5				
	Type B			\$9,967,313	42	\$2,849,557	12	\$840,912	7	\$370,456	1	\$1,835,462	4
	Type C												
	Type D			\$16,052,791	66	\$7,768,213	24	\$924,095	5	\$426,365	4	\$86,364	3
	Type E			\$6,733,209	27	\$2,006,826	6					\$63,545,709	1
	Uncategorized												
Shawangunk	Type A												
	Type B	\$13,905,876	93	\$31,976,728	93	\$239,987,373	48	\$100,000	3	\$5,523,575	8	\$3,530,681	11
	Type C												
	Type D	\$1,440,339	7	\$1,184,005	5	\$426,668	3	\$463,335	1	\$166,667	1	\$611,336	6
	Type E	\$1,194,839	14	\$1,333,005	4					\$233,334	1		
	Uncategorized	\$0	1										
Ulster	Type A	\$756,090	8	\$250,791,547	88	\$6,265,242	10	\$618,843	2	\$1,983,341	3	\$7,464,210	11
	Type B	\$173,479	2	\$18,444,567	52	\$10,894,681	8	\$5,045,817	2	\$2,980,592	4	\$3,104,449	11
	Type C			\$418,697	4	\$1,588,412	2	\$93,044	1	\$4,058	1	\$620,292	1
	Type D			\$110,351,465	160	\$64,848,375	12	\$3,414,217	3	\$18,014,311	8	\$6,837,484	4
	Type E	\$595,365	10	\$81,498,297	70	\$36,340,145	13	\$487,538	6	\$3,066,389	4	\$13,832,076	8
	Uncategorized			\$759,423	2	\$0	1	\$77,537	1			\$1,938,414	1
Wawarsing	Type A	\$0	1	\$17,477,212	12	\$194,286	8	\$2,842,869	6	\$14,286	1	\$285,715	7
	Type B	\$640,003	14	\$34,497,280	92	\$28,831,544	39	\$800,003	5	\$10,040,040	2	\$3,606,472	60
	Type C	\$0	2	\$1,565,721	7	\$1,428,577	5					\$1,690,007	1
	Type D			\$1,780,007	11	\$85,715	3	\$211,429	1				
	Type E	\$131,429	4	\$13,954,342	69	\$7,705,745	21	\$0	3	\$8,162,891	1	\$360,001	11
	Uncategorized											\$0	2
Woodstock	Type A			\$2,302,162	5	\$5,339,388	1					\$1,162,495	5
	Type B	\$3,671	2	\$47,256,752	107	\$16,259,938	30	\$9,381,936	9	\$3,803,433	2	\$1,053,833	4
	Type C			\$6,768,888	19	\$4,652,297	3	\$725,193	3	\$4,305,587	3	\$251,393	1
	Type D			\$3,537,229	7	\$10,789,790	7	\$1,883,678	4			\$776,206	2
	Type E												
	Uncategorized												
<b>Total All Categories</b>		\$81,979,050	798	\$1,944,137,638	3,940	\$1,486,581,963	946	\$122,892,866	267	\$161,125,056	180	\$265,981,641	493
<b>Total Soil Type A</b>		\$10,426,780	95	\$619,598,224	443	\$211,563,993	112	\$21,380,251	72	\$33,327,196	38	\$41,827,849	104
<b>Total Soil Type B</b>		\$60,103,716	573	\$596,303,414	1,606	\$724,786,030	449	\$55,601,793	106	\$58,386,754	60	\$47,415,701	232
<b>Total Soil Type C</b>		\$894,167	12	\$171,739,713	502	\$253,664,642	103	\$27,450,392	17	\$15,888,303	23	\$5,390,458	41
<b>Total Soil Type D</b>		\$2,056,949	20	\$216,603,131	556	\$139,555,699	122	\$7,204,165	24	\$22,774,993	24	\$9,502,808	22
<b>Total Soil Type E</b>		\$5,811,614	94	\$325,907,253	803	\$94,269,582	142	\$10,016,197	39	\$30,747,810	33	\$146,645,846	81
<b>Total Uncategorized</b>		\$2,685,823	4	\$13,985,903	30	\$62,742,016	18	\$1,240,069	9	\$0	2	\$15,198,980	13

\* Values rounded to nearest dollar

**Earthquake Hazard**  
(Soil Type)

Type A = Hard Rock  
Type B = Rock

Type C = Very Dense Soil / Soft Rock  
Type D = Stiff Soil

Type E = Soft Soil

Municipality	Risk Type	Residential		Vacant Land		Wild, Forested, Conservation Lands & Public		Unclassified		Totals	
		Assessed Improvements	Parcels by Category	Assessed Improvements	Parcels by Category	Assessed Improvements	Parcels by Category	Assessed Improvements	Parcels by Category	Assessed Improvements	Parcels by Category
Denning	Type A	\$20,841,139	242	\$95,000	142	\$879,448	326	\$245,001	26	\$23,018,453	776
	Type B	\$14,862,398	162	\$53,334	74	\$267,279	56	\$0	21	\$23,303,738	338
	Type C									\$0	0
	Type D	\$3,952,599	45	\$151,667	14	\$0	1			\$4,589,435	67
	Type E	\$215,556	3	\$0	3					\$215,556	6
	Uncategorized									\$0	0
Ellenville Village	Type A	\$3,253,099	228	\$9,602	38	\$0	1	\$75,446	23	\$9,912,081	336
	Type B	\$6,869,026	252	\$5,487	28			\$0	16	\$8,646,123	316
	Type C	\$1,347,742	53	\$0	18			\$274,350	2	\$3,453,374	78
	Type D	\$3,625,186	181	\$26,063	25			\$17,833	17	\$13,472,961	360
	Type E	\$7,514,433	318	\$0	26	\$0	1	\$0	22	\$11,523,366	435
	Uncategorized									\$0	0
Esopus	Type A	\$145,695,491	689	\$1,508,173	288	\$314,501	8	\$0	43	\$195,874,692	1,074
	Type B	\$240,117,752	1,161	\$5,773,023	461	\$352,001	8	\$264,834	68	\$319,672,737	1,812
	Type C									\$0	0
	Type D	\$65,392,762	388	\$179,834	64			\$33,333	20	\$114,227,210	535
	Type E	\$93,715,542	530	\$1,867,507	162	\$0	2	\$0	36	\$104,432,418	763
	Uncategorized	\$34,436,621	87	\$0	26	\$0	1	\$0	8	\$89,695,175	134
Gardiner	Type A	\$11,544,847	40	\$267	15	\$0	6	\$0	6	\$16,977,802	80
	Type B	\$468,382,991	1,701	\$1,706,673	445	\$270,401	17	\$3,481,214	79	\$520,885,499	2,400
	Type C									\$0	0
	Type D	\$4,532,951	19	\$0	6			\$506,402	1	\$5,076,020	28
	Type E	\$65,401,062	261	\$106,934	53			\$218,801	6	\$69,156,010	332
	Uncategorized									\$0	0
Hardenburgh	Type A	\$1,667,194	29	\$83,438	28	\$962,348	179	\$0	9	\$6,107,368	250
	Type B	\$37,347,649	253	\$106,875	123	\$65,157	38	\$0	74	\$43,538,299	513
	Type C									\$0	0
	Type D	\$427,033	3	\$0	1			\$0	1	\$427,033	4
	Type E			\$0	1					\$0	1
	Uncategorized	\$718,597	2	\$0	3					\$718,597	5
Hurley	Type A	\$163,591,322	696	\$605,336	296	\$204,334	26	\$354,113	45	\$179,618,441	1,104
	Type B	\$349,430,060	1,576	\$1,395,783	206	\$0	6	\$287,446	96	\$372,717,073	1,932
	Type C									\$0	0
	Type D	\$43,445	1	\$91,334	2					\$134,778	3
	Type E	\$81,313,095	407	\$333,112	44			\$354,668	19	\$86,868,321	497
	Uncategorized							\$0	7	\$703,530	8
Kingston City	Type A	\$112,034,814	873	\$135,687	157			\$333,815	76	\$299,413,315	1,244
	Type B	\$287,639,426	1,809	\$482,711	213	\$168,108	4	\$0	89	\$507,528,517	2,363
	Type C	\$237,444,893	1,519	\$40,106	86	\$0	1	\$0	53	\$612,718,037	2,078
	Type D	\$134,915,490	952	\$162,465	97	\$0	2	\$0	78	\$204,334,740	1,248
	Type E	\$87,706,169	701	\$194,045	254	\$283,382	4	\$0	117	\$287,347,173	1,353
	Uncategorized	\$8,261,440	86	\$2,402	30	\$0	2	\$0	8	\$11,605,114	141
Kingston Town	Type A	\$13,524,932	113	\$0	64	\$0	37	\$0	13	\$24,197,537	271
	Type B	\$16,765,555	111	\$67,561	62	\$27,439	49	\$288,416	7	\$20,430,691	242
	Type C									\$0	0
	Type D	\$12,352,245	104	\$11,707	15	\$0	3	\$0	5	\$12,913,466	130
	Type E			\$0	1					\$0	1
	Uncategorized									\$0	0

**Earthquake Hazard**  
(Soil Type)

Type A = Hard Rock  
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Type C = Very Dense Soil / Soft Rock  
Type D = Stiff Soil

Type E = Soft Soil

Municipality	Risk Type	Residential		Vacant Land		Wild, Forested, Conservation Lands & Public		Unclassified		Totals	
		Assessed Improvements	Parcels by Category	Assessed Improvements	Parcels by Category	Assessed Improvements	Parcels by Category	Assessed Improvements	Parcels by Category	Assessed Improvements	Parcels by Category
Lloyd	Type A	\$103,063,857	465	\$960,448	152	\$0	2	\$646,447	40	\$145,346,548	710
	Type B	\$482,075,828	2,266	\$800,225	423	\$0	1	\$2,200,676	125	\$617,733,927	3,119
	Type C									\$0	0
	Type D	\$44,210,954	179	\$0	9			\$0	12	\$46,010,184	208
	Type E	\$13,254,609	67	\$12,222	15			\$396,335	6	\$17,931,405	95
Marbletown	Uncategorized	\$14,124,168	37	\$33,333	19			\$0	3	\$29,594,008	67
	Type A	\$118,824,011	407	\$808,175	249	\$0	1	\$7,007,017	45	\$342,262,434	723
	Type B	\$400,416,945	1,442	\$1,314,199	535	\$0	5	\$38,810,047	235	\$500,852,185	2,345
	Type C	\$56,111,622	211	\$16,344	36			\$1,266,779	9	\$60,980,029	265
	Type D	\$19,396,314	89	\$30,645	31			\$5,043,138	13	\$24,850,422	139
	Type E	\$57,680,661	255	\$90,323	78	\$57,420	2	\$3,760,660	30	\$64,803,662	392
Marlborough	Uncategorized									\$264,405	1
	Type A	\$43,721,710	177	\$40,257	125	\$0	1	\$0	9	\$55,497,399	348
	Type B	\$478,362,169	2,028	\$246,796	394			\$0	135	\$552,532,722	2,832
	Type C	\$41,752,090	213	\$0	22			\$0	14	\$65,984,495	304
	Type D	\$12,405,562	53	\$0	4			\$0	3	\$13,630,952	69
	Type E	\$5,221,688	24	\$0	7			\$0	1	\$12,099,792	63
New Paltz Town	Uncategorized	\$19,137,641	44	\$0	19					\$22,673,809	74
	Type A	\$25,341,998	112	\$35,000	15	\$0	7	\$304,901	11	\$27,386,806	151
	Type B	\$379,278,049	1,861	\$148,801	313	\$50,000	27	\$719,703	54	\$470,658,124	2,381
	Type C									\$0	0
	Type D	\$22,193,289	120	\$0	8					\$23,315,793	130
New Paltz Village	Type E	\$56,637,924	247	\$14,000	51	\$0	4	\$0	3	\$57,474,627	318
	Uncategorized									\$0	0
	Type A	\$8,796,946	31	\$0	11	\$0	1	\$0	4	\$29,347,046	64
	Type B	\$135,040,708	565	\$42,300	99			\$0	12	\$208,222,754	866
	Type C									\$0	0
Olive	Type D									\$0	0
	Type E	\$1,097,406	5	\$6,276	1			\$0	1	\$1,103,682	8
	Uncategorized									\$0	0
	Type A	\$42,050,670	214	\$29,681	95	\$0	129	\$3,726,858	32	\$47,685,070	475
	Type B	\$244,653,726	1,588	\$437,379	421	\$0	81	\$21,048,600	107	\$289,597,400	2,280
Plattekill	Type C									\$0	0
	Type D	\$31,560,058	235	\$59,687	63	\$0	6	\$2,687,633	19	\$40,215,180	348
	Type E									\$0	0
	Uncategorized									\$17	1
	Type A	\$17,423,147	95	\$38,333	86	\$0	13	\$0	9	\$26,463,439	221
Rochester	Type B	\$425,524,270	2,119	\$575,515	587	\$0	8	\$2,644,754	80	\$489,154,185	3,006
	Type C									\$0	0
	Type D	\$34,937,064	162	\$204,616	32			\$0	3	\$38,629,255	217
	Type E	\$2,417,830	13	\$12,821	4					\$2,430,651	17
	Uncategorized									\$0	0
Rochester	Type A	\$72,719,902	408	\$89,222	237	\$0	103	\$0	42	\$84,941,061	824
	Type B	\$286,656,137	1,665	\$446,446	748	\$18,111	73	\$458,224	142	\$320,192,049	2,717
	Type C	\$26,631,996	164	-\$3,000	72	\$0	1	\$165,556	11	\$28,888,450	259
	Type D	\$14,124,056	90	\$1,111	29			\$0	9	\$14,236,612	131
	Type E	\$97,349,624	507	\$57,889	165	\$0	3	\$559,447	65	\$116,429,519	845
	Uncategorized									\$0	0

**Earthquake Hazard**  
(Soil Type)

Type A = Hard Rock  
Type B = Rock

Type C = Very Dense Soil / Soft Rock  
Type D = Stiff Soil

Type E = Soft Soil

Municipality	Risk Type	Residential		Vacant Land		Wild, Forested, Conservation Lands & Public		Unclassified		Totals	
		Assessed Improvements	Parcels by Category	Assessed Improvements	Parcels by Category	Assessed Improvements	Parcels by Category	Assessed Improvements	Parcels by Category	Assessed Improvements	Parcels by Category
Rosendale	Type A	\$86,427,538	421	\$231,220	93	\$0	2	\$404,880	64	\$103,321,783	605
	Type B	\$64,023,462	343	\$13,171	76	\$0	3	\$1,298,054	62	\$71,800,505	496
	Type C	\$187,543,494	938	\$422,197	83	\$0	1	\$1,663,421	109	\$219,308,097	1,226
	Type D	\$2,807,572	14	\$0	1					\$3,127,086	16
	Type E	\$68,242,161	364	\$394,880	58			\$0	48	\$71,923,639	479
	Uncategorized									\$0	0
Saugerties	Type A	\$127,501,836	679	\$188,666	255	\$0	6	\$62,555	117	\$147,886,263	1,146
	Type B	\$361,014,787	1,770	\$957,116	571	\$93,457	4	\$809,336	280	\$428,770,765	2,766
	Type C	\$115,755,978	735	\$711,938	76	\$124,484	3	\$0	56	\$130,853,020	921
	Type D	\$71,936,164	344	\$43,538	85			\$0	41	\$74,490,284	486
	Type E	\$329,360,172	1,802	\$1,269,966	301	\$1,010,513	1	\$1,158,518	199	\$389,504,712	2,448
	Uncategorized	\$33,405,016	100	\$250	42			\$460,042	22	\$45,883,372	180
Saugerties Village	Type A									\$0	0
	Type B	\$45,935,652	284	\$0	20	\$142,498	1	\$0	34	\$81,389,434	367
	Type C									\$0	0
	Type D									\$0	0
	Type E	\$123,417,817	722	\$105,194	101	\$335,614	2	\$184,240	123	\$182,303,144	1,132
	Uncategorized	\$9,334,928	29	\$0	10	\$171,525	2	\$0	13	\$12,025,355	57
Shandaken	Type A	\$51,850,207	340	\$140,001	244	\$4,713,655	238	\$0	40	\$70,477,555	883
	Type B	\$129,161,425	907	\$273,183	411	\$0	27	\$380,911	74	\$145,679,218	1,485
	Type C									\$0	0
	Type D	\$68,792,093	573	\$168,182	179	\$0	4	\$205,910	49	\$94,424,014	907
	Type E	\$19,875,534	187	\$20,455	60	\$0	5	\$0	11	\$92,181,732	297
	Uncategorized									\$0	0
Shawangunk	Type A	\$1,118,338	5			\$1,667	7	\$0	1	\$1,120,004	13
	Type B	\$613,160,988	2,824	\$656,669	495	\$333,168	50	\$3,538,681	63	\$912,713,739	3,688
	Type C									\$0	0
	Type D	\$91,054,331	391	\$20,000	42			\$149,334	3	\$95,516,015	459
	Type E	\$78,290,383	287	\$46,667	53	\$0	5	\$600,336	10	\$81,698,564	374
	Uncategorized	\$2,055,675	5	\$0	6			\$0	1	\$2,055,675	13
Ulster	Type A	\$111,689,287	715	\$934,062	334	\$62,029	7	\$389,857	75	\$380,954,507	1,253
	Type B	\$173,123,592	1,058	\$530,002	272	\$7,826	2	\$0	58	\$214,305,005	1,469
	Type C	\$6,223,503	61	\$25,073	18			\$0	8	\$8,973,079	96
	Type D	\$66,201,098	524	\$35,942	68			\$0	19	\$269,702,893	798
	Type E	\$163,712,898	1,223	\$245,073	216	\$0	1	\$0	74	\$299,777,782	1,625
	Uncategorized	\$11,578,742	60	\$45,507	32	\$1,792,760	3	\$0	11	\$16,192,383	111
Wawarsing	Type A	\$38,197,293	347	\$80,000	137	\$5,714	81	\$0	54	\$59,097,376	654
	Type B	\$150,503,453	1,645	\$602,860	771	\$0	107	\$211,429	110	\$229,733,084	2,845
	Type C	\$18,877,218	255	\$477,145	67	\$0	3	\$0	15	\$24,038,668	355
	Type D	\$4,457,161	57	\$0	8					\$6,534,312	80
	Type E	\$40,548,733	544	\$80,000	137			\$0	38	\$70,943,141	828
	Uncategorized	\$317,144	3							\$317,144	5
Woodstock	Type A	\$191,215,905	432	\$2,429,250	278	\$92,026	68	\$0	26	\$202,541,226	815
	Type B	\$760,385,972	2,250	\$2,012,666	584	\$172,786	23	\$4,926,222	83	\$845,257,210	3,094
	Type C	\$56,204,212	276	\$44,937	32			\$2,145,072	5	\$75,097,579	342
	Type D	\$109,585,932	370	\$1,002,789	105	\$0	1	\$0	13	\$127,575,624	509
	Type E									\$0	0
	Uncategorized									\$0	0
<b>Total All Categories</b>		\$11,155,966,882	57,617	\$35,953,774	15,046	\$12,979,652	1,903	\$116,771,245	4,384	\$15,384,369,766	85,574
<b>Total Soil Type A</b>		\$1,512,095,483	7,758	\$8,441,819	3,339	\$7,235,722	1,249	\$13,550,889	810	\$2,479,448,206	14,020
<b>Total Soil Type B</b>		\$6,550,732,021	31,620	\$18,648,777	8,332	\$1,968,231	590	\$81,368,548	2,104	\$8,195,314,983	45,672
<b>Total Soil Type C</b>		\$747,892,750	4,425	\$1,734,739	510	\$124,484	9	\$5,515,178	282	\$1,230,294,827	5,924
<b>Total Soil Type D</b>		\$818,903,359	4,894	\$2,189,582	887	\$0	17	\$8,643,584	306	\$1,227,434,270	6,872
<b>Total Soil Type E</b>		\$1,392,973,297	8,467	\$4,857,365	1,791	\$1,686,929	30	\$7,233,005	809	\$2,020,148,897	12,289
<b>Total Uncategorized</b>		\$133,369,972	453	\$81,493	187	\$1,964,285	8	\$460,042	73	\$231,728,582	797

\* Values rounded to nearest dollar

**Landslide**

High = High incidence (Greater than 15% of the area involved)      High-Moderate = High susceptibility / Moderate incidence  
 Moderate = Moderate incidence (1.5 - 15% of the area involved)      Low = Low incidence (Less than 1.5% of the area involved)

Municipality	Land Susceptibility	Agriculture		Commercial		Community Services		Entertainment & Recreation		Industrial	
		Assessed Improvements	Parcels by Category	Assessed Improvements	Parcels by Category	Assessed Improvements	Parcels by Category	Assessed Improvements	Parcels by Category	Assessed Improvements	Parcels by Category
Denning	High										
	High - Moderate							\$8,237,200	36		
	Moderate										
	Low					\$342,668	6	\$983,893	30		
Ellenville Village	High										
	High - Moderate										
	Moderate										
	Low			\$13,452,041	213	\$9,710,859	49	\$101,509	2	\$179,699	2
Esopus	High	\$1,785,507	15	\$60,711,076	105	\$99,195,063	41	\$2,101,675	5	\$11,824,547	6
	High - Moderate										
	Moderate										
	Low	\$32,333	5	\$9,084,203	18	\$29,339,284	25	\$1,518,506	3	\$7,913,032	7
Gardiner	High										
	High - Moderate										
	Moderate			\$1,791,074	9	\$80,667	1				
	Low	\$16,755,134	99	\$24,511,965	50	\$7,481,230	13	\$2,727,344	5	\$2,341,343	3
Hardenburgh	High										
	High - Moderate	\$124,844	1					\$30,469	1		
	Moderate										
	Low	\$2,501,729	14	\$2,234,853	3	\$4,388,299	9	\$132,813	1	\$0	1
Hurley	High										
	High - Moderate										
	Moderate										
	Low	\$1,057,671	16	\$21,526,808	57	\$17,726,626	27	\$504,891	4	\$333,001	3
Kingston City	High			\$14,902,797	28	\$15,003,782	12	\$451,491	4	\$11,395,339	5
	High - Moderate										
	Moderate										
	Low	\$162,345	1	\$359,567,263	933	\$535,293,351	121	\$28,976,451	31	\$16,394,960	35
Kingston Town	High										
	High - Moderate										
	Moderate										
	Low			\$10,233,578	28	\$549,514	6	\$2,182,936	3	\$243,903	10
Lloyd	High	\$3,818,793	19	\$61,379,690	163	\$42,417,614	34	\$2,100,564	6	\$8,947,258	7
	High - Moderate										
	Moderate										
	Low	\$5,305,910	44	\$20,747,639	50	\$12,036,937	22	\$3,150,457	3	\$3,115,679	2
Marbletown	High										
	High - Moderate										
	Moderate										
	Low	\$311,292	51	\$237,772,224	80	\$36,445,522	34	\$1,302,478	4	\$5,295,613	8
Marlborough	High	\$2,765,780	63	\$50,943,537	140	\$25,916,514	36	\$607,695	3	\$4,502,582	5
	High - Moderate										
	Moderate										
	Low	\$10,878,633	115	\$8,967,087	31	\$14,705,059	7	\$0	1		
New Paltz Town	High										
	High - Moderate										
	Moderate										
	Low	\$888,004	26	\$49,011,396	79	\$36,991,848	19	\$2,142,808	5	\$792,003	2
New Paltz Village	High										
	High - Moderate										
	Moderate										
	Low	\$338,899	3	\$75,940,058	178	\$12,528,229	25	\$0	1		

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Municipality	Land Susceptibility	Agriculture		Commercial		Community Services		Entertainment & Recreation		Industrial	
		Assessed Improvements	Parcels by Category	Assessed Improvements	Parcels by Category	Assessed Improvements	Parcels by Category	Assessed Improvements	Parcels by Category	Assessed Improvements	Parcels by Category
Olive	High										
	High - Moderate			\$5,044,785	14	\$1,217,960	4			\$641,229	2
	Moderate										
Plattekill	Low	\$0	4	\$11,867,138	46	\$7,453,063	28	\$1,992,669	7	\$2,829,268	3
	High										
	High - Moderate										
Rochester	Moderate										
	Low	\$10,445,683	84	\$43,188,506	119	\$7,302,076	34	\$6,475,666	7	\$0	1
	High										
Rosendale	High - Moderate										
	Moderate	\$0	1	\$2,646,566	11	\$5,556	2				
	Low	\$5,082,131	69	\$30,138,343	115	\$24,346,986	30	\$3,127,013	5	\$0	7
Saugerties	High										
	High - Moderate										
	Moderate										
Saugerties Village	Low	\$19,512	2	\$31,717,444	82	\$13,687,616	26	\$9,339,062	8	\$146,952	1
	High			\$12,207,430	36	\$15,818,404	13	\$9,508	3	\$1,301,019	1
	High - Moderate										
Shandaken	Moderate										
	Low	\$863,759	8	\$65,560,999	210	\$33,019,373	34	\$13,677,577	14	\$21,532,427	20
	High			\$8,394,300	13	\$3,673,518	4	\$1,316,066	3		
Shawangunk	High - Moderate										
	Moderate										
	Low			\$47,203,260	175	\$23,932,445	24	\$468,036	5	\$2,299,877	5
Ulster	High			\$37,494,241	147	\$20,333,718	46	\$3,088,649	17	\$796,821	5
	High - Moderate										
	Moderate										
Wawarsing	Low										
	High										
	High - Moderate			\$3,106,679	12	\$1,033,337	7				
Woodstock	Moderate	\$16,541,053	115	\$31,387,059	90	\$239,380,704	44	\$563,336	4	\$5,923,577	10
	Low	\$597,539	1	\$4,163,930	17	\$4,994,223	9	\$93,044	2	\$2,105,806	3
	High - Moderate										
Wawarsing	Moderate										
	Low	\$927,395	19	\$458,100,066	359	\$114,942,634	37	\$9,643,952	13	\$23,942,886	17
	High										
Woodstock	High - Moderate	\$0	1								
	Moderate										
	Low	\$771,432	20	\$69,274,562	191	\$38,245,867	76	\$3,854,301	15	\$18,217,217	4
Woodstock	High										
	High - Moderate	\$3,671	1	\$8,296,869	22	\$18,130,326	13	\$1,911,020	4	\$5,439,389	4
	Moderate										
Total	Low	\$0	1	\$51,568,162	116	\$18,911,088	28	\$10,079,787	12	\$2,669,631	1
	Total All Categories	\$81,979,050	798	\$1,944,137,629	3,940	\$1,486,581,963	946	\$122,892,865	267	\$161,125,056	180
	Total High Hazard	\$8,967,619	98	\$212,702,761	502	\$207,019,119	149	\$6,680,043	26	\$40,076,550	27
	Total Combo-hi Hazard	\$128,515	3	\$50,835,895	183	\$39,682,003	63	\$13,267,338	58	\$6,877,439	11
	Total Moderate Hazard	\$0	1	\$7,544,319	32	\$1,119,560	10	\$0	0	\$0	0
Total Low Hazard	\$72,882,915	696	\$1,673,054,655	3,223	\$1,238,761,280	724	\$102,945,485	183	\$114,171,067	142	

\* Values rounded to nearest dollar

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Municipality	Land Susceptibility	Public Services		Residential		Vacant Land		Wild, Forested, Conservation Lands & Public		Unclassified		Totals	
		Assessed Improvements	Parcels by Category	Assessed Improvements	Parcels by Category	Assessed Improvements	Parcels by Category	Assessed Improvements	Parcels by Category	Assessed Improvements	Parcels by Category	Assessed Improvements	Parcels by Category
Denning	High											0	0
	High - Moderate			\$10,965,266	104	\$5,556	43	\$581,669	224	\$0	18	\$19,789,690	425
	Moderate											\$0	0
	Low			\$28,906,427	348	\$294,446	190	\$565,058	159	\$245,001	29	\$31,337,492	762
Ellenville Village	High											\$0	0
	High - Moderate											\$0	0
	Moderate											\$0	0
	Low	\$545,530	10	\$22,609,486	1,032	\$41,152	135	\$0	2	\$367,628	80	\$47,007,905	1,525
Esopus	High	\$2,082,675	21	\$286,595,230	1,437	\$7,233,196	403	\$314,501	5	\$298,168	95	\$472,141,638	2,133
	High - Moderate											\$0	0
	Moderate											\$0	0
	Low	\$8,662,955	17	\$292,762,938	1,418	\$2,095,342	598	\$352,001	14	\$0	80	\$351,760,593	2,185
Gardiner	High											\$0	0
	High - Moderate											\$0	0
	Moderate			\$36,044,340	150	\$36,533	76	\$0	15	\$200,134	9	\$38,152,748	260
	Low	\$254,033	5	\$513,817,511	1,871	\$1,777,340	443	\$270,401	8	\$4,006,283	83	\$573,942,583	2,580
Hardenburgh	High											\$0	0
	High - Moderate			\$1,898,133	37	\$92,969	11	\$80,157	56	\$0	13	\$2,226,571	119
	Moderate											\$0	0
	Low			\$38,262,341	250	\$97,344	144	\$947,348	161	\$0	71	\$48,564,726	654
Hurley	High											\$0	0
	High - Moderate											\$0	0
	Moderate											\$0	0
	Low	\$185,599	10	\$594,377,921	2,680	\$2,425,565	548	\$204,334	32	\$996,226	167	\$639,338,644	3,544
Kingston City	High	\$61,955,579	4	\$48,290,837	407	\$77,570	117	\$206,533	4	\$321,807	43	\$152,605,735	624
	High - Moderate											\$0	0
	Moderate											\$0	0
	Low	\$9,038,584	22	\$819,711,396	5,533	\$939,846	720	\$244,958	9	\$12,008	378	\$1,770,341,161	7,783
Kingston Town	High											\$0	0
	High - Moderate											\$0	0
	Moderate											\$0	0
	Low	\$1,293,908	13	\$42,642,732	328	\$79,269	142	\$27,439	89	\$288,416	25	\$57,541,695	644
Lloyd	High	\$26,924,074	16	\$405,207,843	1,845	\$1,077,338	322			\$1,172,449	84	\$553,045,623	2,496
	High - Moderate											\$0	0
	Moderate											\$0	0
	Low	\$4,892,353	12	\$251,521,573	1,169	\$728,892	296	\$0	3	\$2,071,009	102	\$303,570,448	1,703
Marbletown	High											\$0	0
	High - Moderate											\$0	0
	Moderate											\$0	0
	Low	\$1,987,444	15	\$652,429,557	2,404	\$2,259,686	929	\$57,420	8	\$55,887,642	332	\$993,748,878	3,865
Marlborough	High	\$1,326,287	7	\$292,808,479	1,246	\$116,283	212			\$0	67	\$378,987,157	1,779
	High - Moderate											\$0	0
	Moderate											\$0	0
	Low	\$918,081	9	\$307,792,381	1,293	\$170,770	359	\$0	1	\$0	95	\$343,432,011	1,911
New Paltz Town	High											\$0	0
	High - Moderate											\$0	0
	Moderate											\$0	0
	Low	\$4,285,626	16	\$483,451,260	2,340	\$197,801	387	\$50,000	38	\$1,024,604	68	\$578,835,351	2,980
New Paltz Village	High											\$0	0
	High - Moderate											\$0	0
	Moderate											\$0	0
	Low	\$4,882,660	1	\$144,935,060	601	\$48,576	111	\$0	1	\$0	17	\$238,673,481	938



**Landslide**

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Municipality	Land Susceptibility	Public Services		Residential		Vacant Land		Wild, Forested, Conservation Lands & Public		Unclassified		Totals	
		Assessed Improvements	Parcels by Category	Assessed Improvements	Parcels by Category	Assessed Improvements	Parcels by Category	Assessed Improvements	Parcels by Category	Assessed Improvements	Parcels by Category	Assessed Improvements	Parcels by Category
Olive	High											\$0	0
	High - Moderate	\$18,037	2	\$35,371,635	250	\$70,695	70	\$0	46	\$3,347,453	22	\$45,711,794	410
	Moderate											\$0	0
Plattekill	Low	\$179,224	4	\$282,892,819	1,787	\$456,052	509	\$0	170	\$24,115,638	136	\$331,785,872	2,694
	High											\$0	0
	High - Moderate											\$0	0
Rochester	Moderate											\$0	0
	Low	\$5,487,246	5	\$480,302,311	2,389	\$831,286	709	\$0	21	\$2,644,754	92	\$556,677,528	3,461
	High											\$0	0
Rosendale	High - Moderate			\$2,355,121	25	\$1,111	11	\$5,333	22	\$0	3	\$2,361,565	61
	Moderate			\$60,502,967	344	\$15,444	151	\$0	41	\$0	36	\$63,170,533	586
	Low	\$66,375	2	\$434,623,627	2,465	\$575,113	1,089	\$12,778	117	\$1,183,227	230	\$499,155,592	4,129
Saugerties	High											\$0	0
	High - Moderate											\$0	0
	Moderate											\$0	0
Saugerties Village	Low	\$1,098,474	23	\$409,044,227	2,080	\$1,061,468	311	\$0	6	\$3,366,355	283	\$469,481,109	2,822
	High	\$646,568	9	\$183,118,369	845	\$215,564	161			\$460,042	106	\$213,776,905	1,174
	High - Moderate											\$0	0
Shandaken	Moderate											\$0	0
	Low	\$6,887,016	110	\$855,855,591	4,585	\$2,955,911	1,169	\$1,228,455	14	\$2,030,410	609	\$1,003,611,518	6,773
	High	\$8,162,441	2	\$35,058,108	144	\$0	31	\$314,023	3	\$0	44	\$56,918,457	244
Shawangunk	High - Moderate											\$0	0
	Moderate											\$0	0
	Low	\$640,521	4	\$143,630,289	871	\$105,194	100	\$335,614	2	\$184,240	126	\$218,799,476	1,312
Ulster	High											\$0	0
	High - Moderate	\$65,467,535	8	\$269,461,531	2,004	\$601,821	890	\$4,713,655	274	\$586,821	174	\$402,544,791	3,565
	Moderate											\$0	0
Wawarsing	Low			\$217,728	3	\$0	4					\$217,728	7
	High											\$0	0
	High - Moderate											\$0	0
Woodstock	Moderate			\$133,688,532	647	\$16,667	107	\$1,667	29	\$268,334	8	\$138,115,217	810
	Low	\$4,142,017	17	\$651,991,183	2,865	\$706,669	489	\$333,168	33	\$4,020,016	70	\$954,988,782	3,737
	High	\$5,304,079	6	\$63,332,137	489	\$509,567	131	\$1,792,761	3	\$0	30	\$82,893,085	691
Wawarsing	High - Moderate											\$0	0
	Moderate											\$0	0
	Low	\$28,492,845	30	\$469,196,984	3,152	\$1,306,092	809	\$69,855	10	\$389,857	215	\$1,107,012,565	4,661
Woodstock	High											\$0	0
	High - Moderate	\$0	1	\$291,430	3	\$0	2					\$291,430	7
	Moderate	\$531,431	4	\$8,925,751	94	\$65,715	40	\$0	21	\$0	16	\$9,522,897	175
Woodstock	Low	\$5,410,764	76	\$243,683,821	2,754	\$1,174,290	1,078	\$5,714	170	\$211,429	201	\$380,849,399	4,585
	High											\$0	0
	High - Moderate	\$239,653	2	\$503,449,575	1,474	\$2,350,263	567	\$264,811	71	\$2,145,072	59	\$542,230,648	2,217
Totals	Moderate											\$0	0
	Low	\$3,004,274	10	\$613,942,446	1,854	\$3,139,380	432	\$0	21	\$4,926,222	68	\$708,240,991	2,543
	Total All Categories	\$265,013,889	493	\$11,155,966,891	57,617	\$35,953,774	15,046	\$12,979,653	1,903	\$116,771,245	4,384	\$15,383,402,014	85,574
	Total High Hazard	\$106,401,705	65	\$1,314,411,003	6,413	\$9,229,517	1,377	\$2,627,818	15	\$2,252,466	469	\$1,910,368,602	9,141
	Total Combo-hi Hazard	\$65,725,224	13	\$823,792,691	3,897	\$3,122,414	1,594	\$5,645,625	693	\$6,079,345	289	\$1,015,156,490	6,804
Totals	Total Moderate Hazard	\$531,431	4	\$239,161,591	1,235	\$134,359	374	\$1,667	106	\$468,469	69	\$248,961,394	1,831
	Total Low Hazard	\$92,355,529	411	\$8,778,601,607	46,072	\$23,467,484	11,701	\$4,704,543	1,089	\$107,970,965	3,557	\$12,208,915,528	67,798

\* Values rounded to nearest dollar

Wildfire

Hazard Areas by Predominant Vegetation Type

Municipality	Risk Type	Agriculture		Commercial		Community Services		Entertainment & Recreation		Industrial	
		Assessed Improvements	Parcels by Category	Assessed Improvements	Parcels by Category	Assessed Improvements	Parcels by Category	Assessed Improvements	Parcels by Category	Assessed Improvements	Parcels by Category
Denning	Forest					\$0	1	\$755,364	35		
	Shrub										
	Grassland										
	Unclassified					\$342,668	5	\$8,465,728	31		
Ellenville Village	Forest										
	Shrub										
	Grassland										
	Unclassified			\$13,452,041	213	\$9,710,859	49	\$101,509	2	\$179,699	2
Esopus	Forest			\$680,669	1	\$6,368,525	5				
	Shrub										
	Grassland										
	Unclassified	\$1,817,841	20	\$69,114,610	122	\$122,165,822	61	\$3,620,181	8	\$19,737,579	13
Gardiner	Forest	\$0	1								
	Shrub										
	Grassland										
	Unclassified	\$16,755,134	98	\$26,303,039	59	\$7,561,897	14	\$2,727,345	5	\$2,341,343	3
Hardenburgh	Forest			\$0	1	\$0	1				
	Shrub										
	Grassland										
	Unclassified	\$2,626,573	15	\$2,234,853	2	\$4,388,299	8	\$163,282	2	\$0	1
Hurley	Forest										
	Shrub										
	Grassland										
	Unclassified	\$1,057,671	16	\$21,526,808	57	\$17,726,626	27	\$504,891	4	\$333,001	3
Kingston City	Forest					\$0	1				
	Shrub										
	Grassland										
	Unclassified	\$162,345	1	\$374,470,061	961	\$550,297,133	132	\$29,427,942	35	\$27,790,298	40
Kingston Town	Forest										
	Shrub										
	Grassland										
	Unclassified			\$10,233,578	28	\$549,514	6	\$2,182,936	3	\$243,903	10
Lloyd	Forest					\$0	1				
	Shrub										
	Grassland										
	Unclassified	\$9,124,703	63	\$82,127,329	213	\$54,454,551	55	\$5,251,021	9	\$12,062,937	9
Marbletown	Forest	\$0	1	\$428,066	1	\$201,936	2				
	Shrub										
	Grassland										
	Unclassified	\$311,292	50	\$237,343,976	79	\$36,243,586	32	\$1,302,478	4	\$5,295,613	8
Marlborough	Forest									\$0	1
	Shrub										
	Grassland										
	Unclassified	\$13,644,414	178	\$59,910,625	171	\$40,621,573	43	\$607,695	4	\$4,502,582	4
New Paltz Town	Forest										
	Shrub										
	Grassland										
	Unclassified	\$888,004	26	\$49,011,396	79	\$36,991,848	19	\$2,142,808	5	\$792,003	2
New Paltz Village	Forest										
	Shrub										
	Grassland										
	Unclassified	\$338,899	3	\$75,940,058	178	\$12,528,229	25	\$0	1		

Wildfire

Hazard Areas by Predominant Vegetation Type

Municipality	Risk Type	Agriculture		Commercial		Community Services		Entertainment & Recreation		Industrial	
		Assessed Improvements	Parcels by Category	Assessed Improvements	Parcels by Category	Assessed Improvements	Parcels by Category	Assessed Improvements	Parcels by Category	Assessed Improvements	Parcels by Category
Olive	Forest			\$332,764	1	\$0	2				
	Shrub										
	Grassland										
	Unclassified	\$0	4	\$16,579,160	59	\$8,671,023	30	\$1,992,669	7	\$3,470,497	5
Plattekill	Forest	\$0	1	\$391,027	2	\$0	1				
	Shrub										
	Grassland										
	Unclassified	\$10,445,683	83	\$42,797,480	117	\$7,302,076	33	\$6,475,666	7	\$0	1
Rochester	Forest	\$0	1	\$273,446	1	\$50,222	3				
	Shrub										
	Grassland										
	Unclassified	\$5,082,131	69	\$32,511,463	125	\$24,302,319	29	\$3,127,013	5	\$0	7
Rosendale	Forest			\$613,417	2						
	Shrub										
	Grassland										
	Unclassified	\$19,512	2	\$31,104,027	80	\$13,687,616	26	\$9,339,062	8	\$146,952	1
Saugerties	Forest			\$275,993	2						
	Shrub										
	Grassland										
	Unclassified	\$863,759	8	\$77,492,437	244	\$48,837,778	47	\$13,687,086	17	\$22,833,445	21
Saugerties Village	Forest										
	Shrub										
	Grassland										
	Unclassified			\$55,597,561	188	\$27,605,964	28	\$1,784,102	8	\$2,299,877	5
Shandaken	Forest			\$513,638	2	\$0	1	\$0	3		
	Shrub										
	Grassland										
	Unclassified			\$36,980,602	145	\$20,333,718	45	\$3,088,649	14	\$796,821	5
Shawangunk	Forest					\$0	1				
	Shrub										
	Grassland										
	Unclassified	\$16,541,053	115	\$34,493,738	102	\$240,414,041	50	\$563,336	4	\$5,923,577	10
Ulster	Forest			\$156,522	1						
	Shrub										
	Grassland										
	Unclassified	\$1,524,934	20	\$462,107,473	375	\$119,936,857	46	\$9,736,995	15	\$26,048,691	20
Wawarsing	Forest	\$34,286	1	\$85,715	2	\$182,858	4	\$22,857	2		
	Shrub										
	Grassland										
	Unclassified	\$737,146	20	\$69,188,848	189	\$38,063,009	72	\$3,831,444	13	\$18,217,217	4
Woodstock	Forest			\$542,914	1	\$361,014	1	\$1,286,714	2		
	Shrub										
	Grassland										
	Unclassified	\$3,671	2	\$59,322,117	137	\$36,680,400	40	\$10,704,093	14	\$8,109,020	5
<b>Total All Categories</b>		\$81,979,050	798	\$1,944,137,449	3,940	\$1,486,581,962	946	\$122,892,866	267	\$161,125,056	180
<b>Total Forest Risk</b>		\$34,286	5	\$4,294,171	17	\$7,164,556	24	\$2,064,935	42	\$0	1
<b>Total Shrub Risk</b>		\$0	0	\$0	0	\$0	0	\$0	0	\$0	0
<b>Total Grassland Risk</b>		\$0	0	\$0	0	\$0	0	\$0	0	\$0	0
<b>Total Unclassified</b>		\$81,944,764	793	\$1,939,843,278	3,923	\$1,479,417,406	922	\$120,827,930	225	\$161,125,056	179

\* Values rounded to nearest dollar

Wildfire

Hazard Areas by Predominant Vegetation Type

Municipality	Risk Type	Public Services		Residential		Vacant Land		Wild, Forested, Conservation Lands & Public		Unclassified		Totals	
		Assessed Improvements	Parcels by Category	Assessed Improvements	Parcels by Category	Assessed Improvements	Parcels by Category	Assessed Improvements	Parcels by Category	Assessed Improvements	Parcels by Category	Assessed Improvements	Parcels by Category
Denning	Forest			\$14,231,474	197	\$71,667	130	\$562,780	269	\$0	23	\$15,621,285	655
	Shrub											\$0	0
	Grassland											\$0	0
	Unclassified			\$25,640,219	255	\$228,334	103	\$583,947	114	\$245,001	24	\$35,505,898	532
Ellenville Village	Forest	\$68,587	2	\$699,934	22	\$0	5			\$0	2	\$768,521	31
	Shrub			\$172,154	6							\$172,154	6
	Grassland											\$0	0
	Unclassified	\$476,943	8	\$21,737,398	1,004	\$41,152	130	\$0	2	\$367,628	78	\$46,067,230	1,488
Esopus	Forest	\$1,057,171	8	\$32,063,795	151	\$37,833	195	\$0	3	\$0	20	\$40,207,994	383
	Shrub											\$0	0
	Grassland											\$0	0
	Unclassified	\$9,688,459	30	\$547,294,372	2,704	\$9,290,704	806	\$666,503	16	\$298,168	155	\$783,694,238	3,935
Gardiner	Forest			\$23,235,689	90	\$52,533	69	\$0	8	\$0	5	\$23,288,223	173
	Shrub											\$0	0
	Grassland											\$0	0
	Unclassified	\$254,033	5	\$526,626,167	1,931	\$1,761,340	450	\$270,401	15	\$4,206,417	87	\$588,807,115	2,667
Hardenburgh	Forest			\$10,543,792	111	\$64,532	67	\$167,501	151	\$0	25	\$10,775,824	356
	Shrub											\$0	0
	Grassland											\$0	0
	Unclassified			\$29,616,680	176	\$125,782	88	\$860,003	66	\$0	59	\$40,015,472	417
Hurley	Forest			\$51,046,650	180	\$65,222	115	\$134,889	7	\$0	17	\$51,246,762	319
	Shrub									\$0	1	\$0	1
	Grassland											\$0	0
	Unclassified	\$807,337	10	\$543,331,274	2,500	\$2,360,343	433	\$69,445	25	\$996,226	149	\$588,713,622	3,224
Kingston City	Forest			\$978,150	7	\$2,402	16			\$0	1	\$980,551	25
	Shrub											\$0	0
	Grassland											\$0	0
	Unclassified	\$70,994,163	26	\$867,024,082	5,933	\$1,015,014	821	\$451,491	13	\$333,815	420	\$1,921,966,344	8,382
Kingston Town	Forest			\$4,508,676	26	\$6,098	23	\$0	21	\$288,416	3	\$4,803,190	73
	Shrub											\$0	0
	Grassland											\$0	0
	Unclassified	\$1,293,908	13	\$38,134,057	302	\$73,171	119	\$27,439	68	\$0	22	\$52,738,506	571
Lloyd	Forest	\$914,893	2	\$24,134,874	99	\$298,779	52	\$0	1	\$0	13	\$25,348,546	168
	Shrub											\$0	0
	Grassland											\$0	0
	Unclassified	\$30,901,535	26	\$632,594,542	2,915	\$1,507,450	566	\$0	2	\$3,243,458	173	\$831,267,526	4,031
Marbletown	Forest	\$0	2	\$64,449,401	245	\$243,549	186	\$0	1	\$3,058,722	42	\$68,381,675	480
	Shrub											\$0	0
	Grassland											\$0	0
	Unclassified	\$12,377,696	13	\$587,980,160	2,159	\$2,016,137	743	\$57,420	7	\$52,828,920	290	\$935,757,278	3,385
Marlborough	Forest	\$143,847	2	\$7,507,979	33	\$11,923	87	\$0	1	\$0	11	\$7,663,749	135
	Shrub											\$0	0
	Grassland											\$0	0
	Unclassified	\$2,100,521	14	\$593,092,880	2,506	\$275,129	484			\$0	151	\$714,755,419	3,555
New Paltz Town	Forest	\$25,000	1	\$15,728,363	74	\$0	33	\$0	4	\$0	3	\$15,753,363	115
	Shrub											\$0	0
	Grassland											\$0	0
	Unclassified	\$4,260,626	15	\$467,722,897	2,266	\$197,801	354	\$50,000	34	\$1,024,604	65	\$563,081,987	2,865
New Paltz Village	Forest			\$203,340	1	\$0	1					\$203,340	2
	Shrub											\$0	0
	Grassland											\$0	0
	Unclassified	\$4,882,660	1	\$144,731,721	600	\$48,576	110	\$0	1	\$0	17	\$238,470,143	936

Wildfire

Hazard Areas by Predominant Vegetation Type

Municipality	Risk Type	Public Services		Residential		Vacant Land		Wild, Forested, Conservation Lands & Public		Unclassified		Totals	
		Assessed Improvements	Parcels by Category	Assessed Improvements	Parcels by Category	Assessed Improvements	Parcels by Category	Assessed Improvements	Parcels by Category	Assessed Improvements	Parcels by Category	Assessed Improvements	Parcels by Category
Olive	Forest	\$2,609	1	\$61,048,266	367	\$95,646	190	\$0	103	\$3,705,739	33	\$65,185,024	697
	Shrub			\$143,428	1							\$143,428	1
	Grassland											\$0	0
	Unclassified	\$17,978,960	5	\$257,072,760	1,669	\$431,101	389	\$0	113	\$23,757,353	125	\$329,953,522	2,406
Plattekill	Forest	\$0	1	\$20,036,363	93	\$0	126	\$0	12	\$250,001	13	\$20,677,391	249
	Shrub											\$0	0
	Grassland											\$0	0
	Unclassified	\$5,487,246	4	\$460,265,947	2,296	\$831,286	583	\$0	9	\$2,394,753	79	\$536,000,138	3,212
Rochester	Forest			\$58,002,386	360	\$59,667	293	\$0	69	\$0	37	\$58,385,721	764
	Shrub											\$0	0
	Grassland											\$0	0
	Unclassified	\$66,375	2	\$439,479,330	2,474	\$532,002	958	\$18,111	111	\$1,183,227	232	\$506,301,971	4,012
Rosendale	Forest	\$0	3	\$20,845,815	93	\$2,439	43	\$0	1	\$0	32	\$21,461,671	174
	Shrub											\$0	0
	Grassland											\$0	0
	Unclassified	\$1,098,474	20	\$388,198,410	1,987	\$1,059,029	268	\$0	5	\$3,366,355	251	\$448,019,436	2,648
Saugerties	Forest	\$1,480,962	29	\$50,324,385	253	\$108,120	173	\$0	5	\$0	65	\$52,189,460	527
	Shrub											\$0	0
	Grassland											\$0	0
	Unclassified	\$6,052,623	90	\$988,649,571	5,177	\$3,063,355	1,157	\$1,228,455	9	\$2,490,452	650	\$1,165,198,960	7,420
Saugerties Village	Forest			\$162,529	1	\$0	3			\$0	3	\$162,529	7
	Shrub											\$0	0
	Grassland											\$0	0
	Unclassified	\$8,802,962	6	\$178,525,869	1,014	\$105,194	128	\$649,637	5	\$184,240	167	\$275,555,405	1,549
Shandaken	Forest	\$905,913	1	\$66,728,676	479	\$218,637	353	\$926,822	172	\$0	56	\$69,293,686	1,067
	Shrub											\$0	0
	Grassland											\$0	0
	Unclassified	\$64,561,622	7	\$202,950,583	1,528	\$383,183	541	\$3,786,833	102	\$586,821	118	\$333,468,833	2,505
Shawangunk	Forest			\$42,615,901	190	\$13,333	89	\$1,667	19	\$0	2	\$42,630,901	301
	Shrub											\$0	0
	Grassland			\$101,667	1							\$101,667	1
	Unclassified	\$4,142,017	17	\$742,962,145	3,321	\$710,003	507	\$333,168	43	\$4,288,350	76	\$1,050,371,428	4,245
Ulster	Forest	\$551,741	3	\$23,438,210	141	\$11,159	85			\$0	17	\$24,157,633	247
	Shrub											\$0	0
	Grassland											\$0	0
	Unclassified	\$33,245,183	33	\$509,090,911	3,500	\$1,804,500	855	\$1,862,616	13	\$389,857	228	\$1,165,748,017	5,105
Wawarsing	Forest	\$951,432	27	\$38,223,006	428	\$105,715	324	\$5,714	60	\$0	52	\$39,611,583	900
	Shrub											\$0	0
	Grassland			\$74,286	1							\$74,286	1
	Unclassified	\$13,854,331	54	\$214,603,712	2,422	\$1,134,290	796	\$0	131	\$211,429	165	\$359,841,426	3,866
Woodstock	Forest	\$11,519	1	\$246,633,516	641	\$1,494,057	383	\$0	61	\$0	38	\$250,329,734	1,128
	Shrub			\$256,204	1					\$0	1	\$256,204	2
	Grassland											\$0	0
	Unclassified	\$3,262,906	11	\$870,333,565	2,686	\$3,995,586	616	\$264,811	31	\$7,071,294	88	\$999,747,464	3,630
<b>Total All Categories</b>		\$302,704,252	493	\$11,155,798,163	57,617	\$35,953,774	15,046	\$12,979,652	1,903	\$116,771,245	4,384	\$15,420,923,469	85,574
<b>Total Forest Risk</b>		\$6,113,674	83	\$877,391,170	4,282	\$2,963,312	3,041	\$1,799,373	968	\$7,302,878	513	\$909,128,355	8,976
<b>Total Shrub Risk</b>		\$0	0	\$571,786	8	\$0	0	\$0	0	\$0	2	\$571,786	10
<b>Total Grassland Risk</b>		\$0	0	\$175,953	2	\$0	0	\$0	0	\$0	0	\$175,953	2
<b>Total Unclassified</b>		\$296,590,577	410	\$10,277,659,254	53,325	\$32,990,462	12,005	\$11,180,279	935	\$109,468,368	3,869	\$14,511,047,375	76,586

\* Values rounded to nearest dollar

**APPENDIX B –  
CRITICAL FACILITIES IN IDENTIFIED HAZARD AREAS**

**APPENDIX B: EMERGENCY/CRITICAL FACILITIES AND INFRASTRUCTURE IN HAZARD AREAS**

Note: This table considers only hazards with delineable areas that do not cover the entire extent of Ulster County: All critical facilities and infrastructure assets in the County are to a certain degree exposed to hazards such as hurricanes and other extreme wind events, lightning, winter storms, and extreme temperatures. Also, only identified assets exposed to at least one of the delineated hazards are included in the table.

<b>Exposed Emergency/Critical Facility and Infrastructure Assets by Hazard</b>									
<b>Municipality</b>	<b>Facility Type</b>	<b>Name/Location</b>	<b>Delineated Hazard Area</b>						
			<b>Flood (1% / 100-Yr)</b>	<b>Flood (0.2% / 500-Yr)</b>	<b>Wildfire</b>	<b>Earthquake (Soil Type E)</b>	<b>Earthquake (Soil Type D)</b>	<b>Landslides (High Incidence)</b>	<b>Landslides (High Susceptibility, Moderate Incidence)</b>
Denning	Water Treatment Facility	Frost Valley YMCA 1							
Denning	Water Treatment Facility	Frost Valley YMCA 2							
Denning	Water Treatment Facility	Renaissance Project Inc							
Denning	Fire/First Aid Station	Claryville Firehouse							
Ellenville	Wastewater Treatment Facility	Ellenville Sewage Treatment Plant							
Ellenville	Police Station	81 N Main St.							
Ellenville	School	Ellenville ES							
Ellenville	School	Ellenville HS							
Ellenville	School	Ellenville MS							
Ellenville	Fire/First Aid Station	Kimble							
Ellenville	Fire/First Aid Station	Pioneer							
Ellenville	Fire/First Aid Station	Scorsby							
Esopus	Wastewater Treatment Facility	Port Ewen Waste Treatment Plant							
Esopus	Water Treatment Facility	Black Creek Apts							

**APPENDIX B: EMERGENCY/CRITICAL FACILITIES AND INFRASTRUCTURE IN HAZARD AREAS**

<b>Exposed Emergency/Critical Facility and Infrastructure Assets by Hazard</b>									
<b>Municipality</b>	<b>Facility Type</b>	<b>Name/Location</b>	<b>Delineated Hazard Area</b>						
			<b>Flood (1% / 100-Yr)</b>	<b>Flood (0.2% / 500-Yr)</b>	<b>Wildfire</b>	<b>Earthquake (Soil Type E)</b>	<b>Earthquake (Soil Type D)</b>	<b>Landslides (High Incidence)</b>	<b>Landslides (High Susceptibility, Moderate Incidence)</b>
Esopus	Water Treatment Facility	Port Ewen Water District							
Esopus	Water Treatment Facility	St Cabrini							
Esopus	Water Treatment Facility	Mirror Lake Trailer Park							
Esopus	Water Treatment Facility	Rosemarie MHP							
Esopus	Water Treatment Facility	Woodcrest Community							
Esopus	School	Robert R. Graves School							
Esopus	School	J Watson Bailey MS							
Esopus	School	West Park School							
Esopus	Police Station	180 Broadway							
Esopus	Fire/First Aid Station	121 First Street							
Esopus	Fire/First Aid Station	161 Broadway							
Esopus	Fire/First Aid Station	550 Broadway							
Esopus	Fire/First Aid Station	258 Union Center Road							
Esopus	Fire/First Aid Station	1142 Route 9W							
Gardiner	Wastewater Treatment Facility	Gardiner (T) Sd#1							
Gardiner	Water Treatment	Deerhaven Mobile							



**APPENDIX B: EMERGENCY/CRITICAL FACILITIES AND INFRASTRUCTURE IN HAZARD AREAS**

<b>Exposed Emergency/Critical Facility and Infrastructure Assets by Hazard</b>									
<b>Municipality</b>	<b>Facility Type</b>	<b>Name/Location</b>	<b>Delineated Hazard Area</b>						
			<b>Flood (1% / 100-Yr)</b>	<b>Flood (0.2% / 500-Yr)</b>	<b>Wildfire</b>	<b>Earthquake (Soil Type E)</b>	<b>Earthquake (Soil Type D)</b>	<b>Landslides (High Incidence)</b>	<b>Landslides (High Susceptibility, Moderate Incidence)</b>
	Facility	Home Park							
Gardiner	Water Treatment Facility	Hidden Forest Estates MHP							
Gardiner	Water Treatment Facility	Watchtower Farms							
Hurley	Water Treatment Facility	Alpine Heights Trailer Park							
Hurley	Water Treatment Facility	Gallis Hill MHP/black Bear Hollow							
Hurley	Water Treatment Facility	Hudson Valley Water Co No 3							
Hurley	Water Treatment Facility	Hurley Water Co - Orchard Street							
Hurley	Water Treatment Facility	Hurley Water Co - Kent Street							
Hurley	Water Treatment Facility	Leewood Knolls Water Co							
Hurley	Fire/First Aid Station	751 Ohayo Mountain Rd							
Hurley	Fire/First Aid Station	135 Old Route 209							
Kingston City	Wastewater Treatment Facility	Kingston Wastewater Treatment Facility							
Kingston City	Police Station	1 Garraghan Dr							
Kingston City	Police Station	Ulster County Sheriff, Schwenk Dr							
Kingston City	Hospital	Benedictine Hospital							
Kingston City	School	John F. Kennedy							

**APPENDIX B: EMERGENCY/CRITICAL FACILITIES AND INFRASTRUCTURE IN HAZARD AREAS**

<b>Exposed Emergency/Critical Facility and Infrastructure Assets by Hazard</b>									
<b>Municipality</b>	<b>Facility Type</b>	<b>Name/Location</b>	<b>Delineated Hazard Area</b>						
			<b>Flood (1% / 100-Yr)</b>	<b>Flood (0.2% / 500-Yr)</b>	<b>Wildfire</b>	<b>Earthquake (Soil Type E)</b>	<b>Earthquake (Soil Type D)</b>	<b>Landslides (High Incidence)</b>	<b>Landslides (High Susceptibility, Moderate Incidence)</b>
		School							
Kingston City	School	Sophie Finn School							
Kingston City	School	Good Shepherd School							
Kingston City	School	Grove St. Childrens Home							
Kingston City	School	Arc-Ulster County-Brookside							
Kingston City	Fire/First Aid Station	207 Delaware Avenue.							
Kingston City	Fire/First Aid Station	218 East Union Street							
Kingston City	Fire/First Aid Station	16 Hurley Avenue							
Kingston City	Fire/First Aid Station	17 Wiltwyck Avenue							
Kingston City	Fire/First Aid Station	85 Hone Street							
Kingston City	Fire/First Aid Station	1 Garraghan Drive							
Kingston City	Fire/First Aid Station	26 Frog Alley							
Kingston City	Municipal Garage	Quarry (Main Facility)							
Kingston Town	Fire/First Aid Station	896 Sawkill Avenue							
Lloyd	Wastewater Treatment Facility	Highland Sewage Treatment Plant							
Lloyd	Wastewater Treatment Facility	Highland Sewer Extension #1							

**APPENDIX B: EMERGENCY/CRITICAL FACILITIES AND INFRASTRUCTURE IN HAZARD AREAS**

<b>Exposed Emergency/Critical Facility and Infrastructure Assets by Hazard</b>									
<b>Municipality</b>	<b>Facility Type</b>	<b>Name/Location</b>	<b>Delineated Hazard Area</b>						
			<b>Flood (1% / 100-Yr)</b>	<b>Flood (0.2% / 500-Yr)</b>	<b>Wildfire</b>	<b>Earthquake (Soil Type E)</b>	<b>Earthquake (Soil Type D)</b>	<b>Landslides (High Incidence)</b>	<b>Landslides (High Susceptibility, Moderate Incidence)</b>
Lloyd	Water Treatment Facility	Highland Water District							
Lloyd	Water Treatment Facility	Hudson Hills Water Corporation							
Lloyd	Water Treatment Facility	Heritage Estates Wt Co							
Lloyd	Water Treatment Facility	Highland Woods MHP							
Lloyd	Police/Fire/First Aid Station	25 Milton Avenue							
Lloyd	Fire/First Aid Station	570 New Paltz Avenue							
Lloyd	School	Highland ES							
Lloyd	School	Highland MS							
Lloyd	School	St. Augustine School							
Marbletown	Water Treatment Facility	High Ridge Water Company							
Marbletown	Water Treatment Facility	Woodland Country Apartments							
Marbletown	Fire/First Aid Station	Marbletown							
Marbletown	School	Rondout Valley HS							
Marbletown	School	Rondout Valley MS							
Marbletown	Fire/First Aid Station	2394 Hurley Mountain Road							
Marbletown	Fire/First Aid Station	16 Mohonk Road							
Marbletown	Fire/First Aid	519 Pine Bush Road							

**APPENDIX B: EMERGENCY/CRITICAL FACILITIES AND INFRASTRUCTURE IN HAZARD AREAS**

<b>Exposed Emergency/Critical Facility and Infrastructure Assets by Hazard</b>									
<b>Municipality</b>	<b>Facility Type</b>	<b>Name/Location</b>	<b>Delineated Hazard Area</b>						
			<b>Flood (1% / 100-Yr)</b>	<b>Flood (0.2% / 500-Yr)</b>	<b>Wildfire</b>	<b>Earthquake (Soil Type E)</b>	<b>Earthquake (Soil Type D)</b>	<b>Landslides (High Incidence)</b>	<b>Landslides (High Susceptibility, Moderate Incidence)</b>
	Station								
Marbletown	Fire/First Aid Station	172 Vly Atwood Road							
Marbletown	Historical Site	Bevier Stone House							
Marlborough	Wastewater Treatment Facility	Marlboro Sewage Treatment Plant							
Marlborough	Wastewater Treatment Facility	Milton Wastewater Treatment Plant							
Marlborough	Police Station	1650 US Highway 9W							
Marlborough	Fire/First Aid Station	1520 Route 9W							
Marlborough	Fire/First Aid Station	19 Main Street							
Marlborough	Fire/First Aid Station	14 Grand Street							
Marlborough	School	Marlborough ES							
Marlborough	School	Marlborough MS							
Marlborough	School	Milton ES							
New Paltz Town	Water Treatment Facility	Lake Mohonk Mountain House							
New Paltz Town	Water Treatment Facility	New Paltz (Village) Water Dist							
New Paltz Town	Municipal Garage	New Paltz Highways Garage							
New Paltz Village	Wastewater Treatment Facility	New Paltz Wastewater Treatment Plant							
New Paltz Village	School	Sunwise School							

**APPENDIX B: EMERGENCY/CRITICAL FACILITIES AND INFRASTRUCTURE IN HAZARD AREAS**

<b>Exposed Emergency/Critical Facility and Infrastructure Assets by Hazard</b>									
<b>Municipality</b>	<b>Facility Type</b>	<b>Name/Location</b>	<b>Delineated Hazard Area</b>						
			<b>Flood (1% / 100-Yr)</b>	<b>Flood (0.2% / 500-Yr)</b>	<b>Wildfire</b>	<b>Earthquake (Soil Type E)</b>	<b>Earthquake (Soil Type D)</b>	<b>Landslides (High Incidence)</b>	<b>Landslides (High Susceptibility, Moderate Incidence)</b>
Olive	Water Treatment Facility	Tongor Pines							
Olive	Fire/First Aid Station	45 Watson Hollow Rd							
Olive	Fire/First Aid Station	53 Watson Hollow Road							
Olive	Fire/First Aid Station	9 Mill Road							
Olive	Fire/First Aid Station	4067 Route 28							
Olive	Water Treatment Facility	Hudson Valley Water Company #5 (Mt Vly A)							
Plattekill	Water Treatment Facility	Forest Park Mobile Home Park							
Plattekill	Water Treatment Facility	Fox Run Estates							
Plattekill	Water Treatment Facility	Timberbrook MHP							
Plattekill	Water Treatment Facility	Trout Brook Trailer Park							
Plattekill	Fire/First Aid Station	1953 Route 44/55							
Plattekill	Municipal Garage	Plattekill							
Rochester	Water Treatment Facility	Hudson Valley Resort							
Rochester	Water Treatment Facility	Lucas Estates Water Company							

**APPENDIX B: EMERGENCY/CRITICAL FACILITIES AND INFRASTRUCTURE IN HAZARD AREAS**

<b>Exposed Emergency/Critical Facility and Infrastructure Assets by Hazard</b>									
<b>Municipality</b>	<b>Facility Type</b>	<b>Name/Location</b>	<b>Delineated Hazard Area</b>						
			<b>Flood (1% / 100-Yr)</b>	<b>Flood (0.2% / 500-Yr)</b>	<b>Wildfire</b>	<b>Earthquake (Soil Type E)</b>	<b>Earthquake (Soil Type D)</b>	<b>Landslides (High Incidence)</b>	<b>Landslides (High Susceptibility, Moderate Incidence)</b>
Rochester	Water Treatment Facility	Sylvan Glades W.C.							
Rochester	Water Treatment Facility	Zolota Osin Inc							
Rochester	Fire/First Aid Station	6055 Route 209							
Rochester	Police Station	Ulster County Sheriff Sub Station, Main St							
Rochester	Fire/First Aid Station	922 Samsonville Road							
Rochester	Fire/First Aid Station	22 Main Street							
Rochester	Fire/First Aid Station	4 Creek Road							
Rochester	Municipal Garage	Accord							
Rosendale	Water Treatment Facility	High Falls Water District							
Rosendale	Water Treatment Facility	Rosendale Plains Homeowners							
Rosendale	Water Treatment Facility	Rosendale Water District							
Rosendale	Water Treatment Facility	Tillson Estates Comm. Assoc.							
Rosendale	Fire/First Aid Station	1161 Route 32							
Rosendale	Police Station	520 Lefever Falls Rd							
Rosendale	Fire/First Aid Station	48 Sawdust Avenue							

**APPENDIX B: EMERGENCY/CRITICAL FACILITIES AND INFRASTRUCTURE IN HAZARD AREAS**

<b>Exposed Emergency/Critical Facility and Infrastructure Assets by Hazard</b>									
<b>Municipality</b>	<b>Facility Type</b>	<b>Name/Location</b>	<b>Delineated Hazard Area</b>						
			<b>Flood (1% / 100-Yr)</b>	<b>Flood (0.2% / 500-Yr)</b>	<b>Wildfire</b>	<b>Earthquake (Soil Type E)</b>	<b>Earthquake (Soil Type D)</b>	<b>Landslides (High Incidence)</b>	<b>Landslides (High Susceptibility, Moderate Incidence)</b>
Rosendale	Fire/First Aid Station	14 Taylor Street							
Rosendale	Assisted Care Facility	Island View Adult Family Care Facility							
Saugerties	Wastewater Treatment Facility	Malden-on-Hudson Wastewater Treatment Plant							
Saugerties	Wastewater Treatment Facility	Glasco Wastewater Treatment Plant							
Saugerties	Water Treatment Facility	Bluestone Park Water Company							
Saugerties	Water Treatment Facility	Hudson Valley Water Co No 1							
Saugerties	Water Treatment Facility	Malden Water District ó Washington Avenue							
Saugerties	Water Treatment Facility	Malden Water District ó Stroomzeit Lane							
Saugerties	Water Treatment Facility	Pine Grove Apartments							
Saugerties	Water Treatment Facility	Saugerties (Village) Water Dist							
Saugerties	Water Treatment Facility	Sunset Woods							
Saugerties	Water Treatment Facility	Willow Manor/1610 Glasco Turnpike Apts							
Saugerties	School	Riccardi ES							
Saugerties	School	Morse School							
Saugerties	School	Saugerties JHS/SHS							

**APPENDIX B: EMERGENCY/CRITICAL FACILITIES AND INFRASTRUCTURE IN HAZARD AREAS**

<b>Exposed Emergency/Critical Facility and Infrastructure Assets by Hazard</b>									
<b>Municipality</b>	<b>Facility Type</b>	<b>Name/Location</b>	<b>Delineated Hazard Area</b>						
			<b>Flood (1% / 100-Yr)</b>	<b>Flood (0.2% / 500-Yr)</b>	<b>Wildfire</b>	<b>Earthquake (Soil Type E)</b>	<b>Earthquake (Soil Type D)</b>	<b>Landslides (High Incidence)</b>	<b>Landslides (High Susceptibility, Moderate Incidence)</b>
Saugerties	School	Woodstock Day School							
Saugerties	Fire/First Aid Station	3853 Route 32							
Saugerties	Fire/First Aid Station	766 Old Kings Highway							
Saugerties	Fire/First Aid Station	139 Liberty St. Ext.							
Saugerties Village	Wastewater Treatment Facility	Dock Street Sewage Treatment Plant							
Saugerties Village	Police Station	312 Main St							
Saugerties Village	School	Saugerties Progressive School							
Saugerties Village	Police/Fire/First Aid Station	43 Partition St							
Saugerties Village	Fire/First Aid Station	3 Theodore Place							
Shandaken	Police Station	Ulster County Sheriff Sub Station, State R28							
Shandaken	Police Station	48 State Route 42							
Shandaken	Wastewater Treatment Facility	Pine Hill Wastewater Treatment Plant							
Shandaken	Water Treatment Facility	Elliott Mobile Home Park							
Shandaken	Water Treatment Facility	Phoenicia Water District							
Shandaken	Water Treatment Facility	Pine Hill Water Company							
Shandaken	Fire/First Aid	31 Church Street							



**APPENDIX B: EMERGENCY/CRITICAL FACILITIES AND INFRASTRUCTURE IN HAZARD AREAS**

<b>Exposed Emergency/Critical Facility and Infrastructure Assets by Hazard</b>									
<b>Municipality</b>	<b>Facility Type</b>	<b>Name/Location</b>	<b>Delineated Hazard Area</b>						
			<b>Flood (1% / 100-Yr)</b>	<b>Flood (0.2% / 500-Yr)</b>	<b>Wildfire</b>	<b>Earthquake (Soil Type E)</b>	<b>Earthquake (Soil Type D)</b>	<b>Landslides (High Incidence)</b>	<b>Landslides (High Susceptibility, Moderate Incidence)</b>
	Station								
Shandaken	Fire/First Aid Station	24 Ingersoll Road							
Shandaken	Fire/First Aid Station	7390 Route 28							
Shandaken	Fire/First Aid Station	58 Route 214							
Shandaken	Fire/First Aid Station	265 Main Street							
Shandaken	Fire/First Aid Station	8 Firehouse Road							
Shandaken	Municipal Garage	Shandaken							
Shawangunk	Water Treatment Facility	Wallkill Water District							
Shawangunk	Police Station	13 Bona Ventura Ave							
Ulster	Wastewater Treatment Facility	Ulster (t) SIA Treatment Plant							
Ulster	Wastewater Treatment Facility	Whittier Wastewater Treatment Plant							
Ulster	Water Treatment Facility	Brigham Lane Mobile Home Park							
Ulster	Water Treatment Facility	Bright Acres Water District							
Ulster	Water Treatment Facility	Creeklacks Mobile Home Park							
Ulster	Water Treatment Facility	Elliott Mobile Home Park							
Ulster	Water Treatment	Kingsvale Water Co							

**APPENDIX B: EMERGENCY/CRITICAL FACILITIES AND INFRASTRUCTURE IN HAZARD AREAS**

<b>Exposed Emergency/Critical Facility and Infrastructure Assets by Hazard</b>									
<b>Municipality</b>	<b>Facility Type</b>	<b>Name/Location</b>	<b>Delineated Hazard Area</b>						
			<b>Flood (1% / 100-Yr)</b>	<b>Flood (0.2% / 500-Yr)</b>	<b>Wildfire</b>	<b>Earthquake (Soil Type E)</b>	<b>Earthquake (Soil Type D)</b>	<b>Landslides (High Incidence)</b>	<b>Landslides (High Susceptibility, Moderate Incidence)</b>
	Facility								
Ulster	Water Treatment Facility	Ulster Landing Mobile Court							
Ulster	Water Treatment Facility	Sawkill Trailer Park							
Ulster	Water Treatment Facility	Skytop Apartments							
Ulster	Water Treatment Facility	Ulster Water District							
Ulster	Police Station	NYSP Kingston, US HWY 209							
Ulster	Police Station	1 Mulvin Dr.							
Ulster	School	Chambers School							
Ulster	School	E.R. Crosby ES							
Ulster	School	M. Clifford Miller MS							
Ulster	School	Childrens Annex Inc.							
Ulster	Fire/First Aid Station	Alamo							
Ulster	Fire/First Aid Station	885 Main Street							
Ulster	Fire/First Aid Station	1214 Main Street							
Ulster	Fire/First Aid Station	615 Ulster Landing Road							
Ulster	Fire/First Aid Station	830 Ulster Avenue							
Ulster	Waste Transfer Station	Ulster Waste Transfer Station							

**APPENDIX B: EMERGENCY/CRITICAL FACILITIES AND INFRASTRUCTURE IN HAZARD AREAS**

<b>Exposed Emergency/Critical Facility and Infrastructure Assets by Hazard</b>									
<b>Municipality</b>	<b>Facility Type</b>	<b>Name/Location</b>	<b>Delineated Hazard Area</b>						
			<b>Flood (1% / 100-Yr)</b>	<b>Flood (0.2% / 500-Yr)</b>	<b>Wildfire</b>	<b>Earthquake (Soil Type E)</b>	<b>Earthquake (Soil Type D)</b>	<b>Landslides (High Incidence)</b>	<b>Landslides (High Susceptibility, Moderate Incidence)</b>
Wawarsing	Wastewater Treatment Facility	Napanoch Sewer Imp Area							
Wawarsing	Wastewater Treatment Facility	Kerhonkson Sewer Improv. Area							
Wawarsing	Water Treatment Facility	Eastern Ulster Correctional Fac.							
Wawarsing	Water Treatment Facility	Fantinekill Mobile Home Park							
Wawarsing	Water Treatment Facility	Glen Mobile Home Park							
Wawarsing	Water Treatment Facility	Hudson Meadows							
Wawarsing	Water Treatment Facility	Kerhonkson Water District							
Wawarsing	Water Treatment Facility	Ogden Lane MHP (River St)							
Wawarsing	Water Treatment Facility	Old Homestead Trailer Park							
Wawarsing	Water Treatment Facility	Renaissance Project Inc							
Wawarsing	Water Treatment Facility	Samaritan Village							
Wawarsing	Water Treatment Facility	Shady Acres MHP							
Wawarsing	Water Treatment Facility	Streamside Estates							
Wawarsing	Police Station	NYSP Ellenville, US HWY 209							
Wawarsing	Hospital	Ellenville Community							

**APPENDIX B: EMERGENCY/CRITICAL FACILITIES AND INFRASTRUCTURE IN HAZARD AREAS**

<b>Exposed Emergency/Critical Facility and Infrastructure Assets by Hazard</b>									
<b>Municipality</b>	<b>Facility Type</b>	<b>Name/Location</b>	<b>Delineated Hazard Area</b>						
			<b>Flood (1% / 100-Yr)</b>	<b>Flood (0.2% / 500-Yr)</b>	<b>Wildfire</b>	<b>Earthquake (Soil Type E)</b>	<b>Earthquake (Soil Type D)</b>	<b>Landslides (High Incidence)</b>	<b>Landslides (High Susceptibility, Moderate Incidence)</b>
		Hospital							
Wawarsing	School	Ulster Corr. Facility							
Wawarsing	School	Wawarsing Christian Academy							
Wawarsing	School	Eastern Corr. Facility							
Wawarsing	School	Kerhonkson ES							
Wawarsing	Fire/First Aid Station	66 Sams Point Road							
Wawarsing	Fire/First Aid Station	25 Port Ben Road							
Wawarsing	Fire/First Aid Station	333 Main Street							
Wawarsing	Fire/First Aid Station	25 Plank Road							
Wawarsing	Municipal Garage	Ulster Heights							
Woodstock	Wastewater Treatment Facility	Woodstock Wastewater Treatment Plant							
Woodstock	Wastewater Treatment Facility	Kingston (C) Water Plant							
Woodstock	Water Treatment Facility	Woodstock Water District							
Woodstock	School	Zena ES							
Woodstock	Fire/First Aid Station	226 Tinker St.							
Woodstock	Fire/First Aid Station	242 Tinker St.							
Woodstock	Fire/First Aid Station	367 Wittenberg Road							

**APPENDIX B: EMERGENCY/CRITICAL FACILITIES AND INFRASTRUCTURE IN HAZARD AREAS**

<b>Exposed Emergency/Critical Facility and Infrastructure Assets by Hazard</b>									
<b>Municipality</b>	<b>Facility Type</b>	<b>Name/Location</b>	<b>Delineated Hazard Area</b>						
			<b>Flood (1% / 100-Yr)</b>	<b>Flood (0.2% / 500-Yr)</b>	<b>Wildfire</b>	<b>Earthquake (Soil Type E)</b>	<b>Earthquake (Soil Type D)</b>	<b>Landslides (High Incidence)</b>	<b>Landslides (High Susceptibility, Moderate Incidence)</b>
Woodstock	Fire/First Aid Station	4123 Route 212							
Woodstock	Fire/First Aid Station	367 Wittenberg Road							
Woodstock	Fire/First Aid Station	443 Zena Road							

**APPENDIX C –  
HISTORIC AND CULTURAL RESOURCES IN IDENTIFIED HAZARD  
AREAS**

**APPENDIX C: HISTORICAL AND CULTURAL RESOURCES IN HAZARD AREAS**

Note: This table considers only hazards with delineable areas that do not cover the entire extent of Ulster County: All historical and cultural resources in the County are exposed to hazards such as hurricanes and other extreme wind events, lightning, winter storms, and extreme temperatures. Also, only identified resources exposed to at least one of the delineated hazards are included in the table.

<b>Exposed Historical and Cultural Resources by Hazard</b>								
<b>Municipality</b>	<b>Resource</b>	<b>Delineated Hazard Area</b>						
		<b>Flood (1% / 100-Yr)</b>	<b>Flood (0.2% / 500- Yr)</b>	<b>Wildfire</b>	<b>Earthquake (Soil Type E)</b>	<b>Earthquake (Soil Type D)</b>	<b>Landslides (High Incidence)</b>	<b>Landslides (High Susceptibility, Moderate Incidence)</b>
Denning	Red Hill Fire Observation Tower							
Ellenville	US Post Office-Ellenville							
Ellenville	Hunt, George and John R., Memorial							
Esopus	Burroughs, John, Cabin							
Esopus	Burroughs, John, Riverby Study							
Esopus	Poppletown Farmhouse							
Esopus	Holy Cross Monastery							
Esopus	Klyne Esopus Reformed Dutch Church (Former)							
Esopus	Payne, Col. Oliver Hazard, Museum							
Gardiner	Tuthilltown Gristmill							
Gardiner	Brykill							
Gardiner	Locust Lawn Estate							
Gardiner	Lafevre, John A., House and School							
Gardiner	Aldrich, Peter, Homestead							
Gardiner	Bevier House							
Gardiner	Van Vleck House							

APPENDIX C: HISTORICAL AND CULTURAL RESOURCES IN HAZARD AREAS

Exposed Historical and Cultural Resources by Hazard								
Municipality	Resource	Delineated Hazard Area						
		Flood (1% / 100-Yr)	Flood (0.2% / 500- Yr)	Wildfire	Earthquake (Soil Type E)	Earthquake (Soil Type D)	Landslides (High Incidence)	Landslides (High Susceptibility, Moderate Incidence)
Gardiner	Guilford-Bower Farmhouse							
Gardiner	Trapps Mountain Hamlet Historic District							
Gardiner	Tuthilltown Gristmill							
Hardenburgh	Beaverkill Valley Inn							
Hardenburgh	Balsam Lake Mountain Fire Observation Station							
Hardenburgh	Coykendall, Samuel, Lodge							
Hurley	Hurley Historic District							
Hurley	Maverick Concert Hall							
Kingston City	Cordts Mansion							
Kingston City	Ponckhockie Union Chapel							
Kingston City	Smith House							
Kingston City	Ten Broeck, Jacob, Stone House							
Kingston City	Hudson R. Maritime Museum							
Kingston City	Catawissa (Coastal Tugboat)							
Kingston City	K. Whittlesey (Tugboat)							
Kingston City	Forsyth, James and Mary, House							
Kingston City	Hudson River Maritime Museum							
Lloyd	Yelverton, Anthony, House							
Marbletown	Rest Plaus Historic District							
Marbletown	Lake Mohonk Mountain House Complex							



APPENDIX C: HISTORICAL AND CULTURAL RESOURCES IN HAZARD AREAS

Exposed Historical and Cultural Resources by Hazard								
Municipality	Resource	Delineated Hazard Area						
		Flood (1% / 100-Yr)	Flood (0.2% / 500- Yr)	Wildfire	Earthquake (Soil Type E)	Earthquake (Soil Type D)	Landslides (High Incidence)	Landslides (High Susceptibility, Moderate Incidence)
Marlborough	Chapel Hill Bible Church							
Marlborough	Dubois-Sarles Octagon							
Marlborough	Milton Railroad Station							
New Paltz Town	DuBois, Josiah, Farm							
New Paltz Village	Hasbrouck, Major Jacob Jr., House							
Olive	Bruneul, Emile, Studio and Sculpture Garden							
Olive	Ashokan-Turnwood Covered Bridge							
Plattekill	Cole--Hasbrouck Farm Historic District							
Rochester	Markle, Jacob F., Stone House							
Rochester	Middaugh Stone House and Dutch Barn							
Rochester	Baker, Sebastian, Stone House							
Rochester	Hoorbeck, Jacob, Stone House							
Rochester	Sahler, J. House							
Rochester	Sahler Stone House and Dutch Barn							
Rochester	Stilwill Stone House							
Rochester	Van Wagenen Stone House and Farm Complex							
Rochester	Westbrook, Dirck, Stone							

APPENDIX C: HISTORICAL AND CULTURAL RESOURCES IN HAZARD AREAS

Exposed Historical and Cultural Resources by Hazard								
Municipality	Resource	Delineated Hazard Area						
		Flood (1% / 100-Yr)	Flood (0.2% / 500- Yr)	Wildfire	Earthquake (Soil Type E)	Earthquake (Soil Type D)	Landslides (High Incidence)	Landslides (High Susceptibility, Moderate Incidence)
	House							
Rochester	Krom House							
Rochester	DuPuy, Ephraim, Stone House							
Rochester	Krom Stone House							
Rochester	Schoonmaker, C. K., Stone House							
Rochester	Sahler, J., House							
Rochester	Winfield Corners Stone House							
Rochester	Jacobus Van Wagenen Stone House							
Rosendale	Snyder Estate Natural Cement Historic District							
Rosendale	DuBois-Deyo House							
Saugerties Town	Savage, Augusta, House and Studio							
Saugerties Town	"Opus 40"							
Saugerties Town	Osterhoudt Stone House							
Saugerties Village	Main-Partition Streets Historic District							
Saugerties Village	Trinity Episcopal Church Complex							
Shandaken	Camp Wapanachki							
Shandaken	Phoenicia Railroad Station							
Shandaken	Mount Tremper Fire Observation Tower							

APPENDIX C: HISTORICAL AND CULTURAL RESOURCES IN HAZARD AREAS

Exposed Historical and Cultural Resources by Hazard								
Municipality	Resource	Delineated Hazard Area						
		Flood (1% / 100-Yr)	Flood (0.2% / 500- Yr)	Wildfire	Earthquake (Soil Type E)	Earthquake (Soil Type D)	Landslides (High Incidence)	Landslides (High Susceptibility, Moderate Incidence)
Shandaken	Ulster House Hotel							
Shandaken	Elm Street Stone Arch Bridge							
Shandaken	Mill Street Stone Arch Bridge							
Shandaken	District School Number 14							
Shandaken	Morton Memorial Library							
Shandaken	Town of Shandaken Historical Museum							
Shawangunk	Decker, Johannes, Farm							
Shawangunk	Crowell, J. B., and Son Brick Mould Mill Complex							
Shawangunk	Dill Farm							
Shawangunk	Jansen, Johannes, House and Dutch Barn							
Shawangunk	Terwilliger House							
Shawangunk	Reformed Church of Shawangunk Complex							
Shawangunk	Miller's House at Red Mills							
Shawangunk	Pearl Street Schoolhouse							
Ulster	Ten Broeck, Benjamin, House							
Wawarsing	Cragmoor Historic District							
Wawarsing	Chetolah							
Wawarsing	Hoornbeek Store Complex							
Wawarsing	Spring Glen Synagogue							
Wawarsing	Ontario & Western Railroad Passenger Station							

APPENDIX C: HISTORICAL AND CULTURAL RESOURCES IN HAZARD AREAS

<b>Exposed Historical and Cultural Resources by Hazard</b>								
<b>Municipality</b>	<b>Resource</b>	<b>Delineated Hazard Area</b>						
		<b>Flood (1% / 100-Yr)</b>	<b>Flood (0.2% / 500- Yr)</b>	<b>Wildfire</b>	<b>Earthquake (Soil Type E)</b>	<b>Earthquake (Soil Type D)</b>	<b>Landslides (High Incidence)</b>	<b>Landslides (High Susceptibility, Moderate Incidence)</b>
Wawarsing	O&W Railroad Station at Port Ben							
Woodstock	Vosburg Turning Mill Complex							
Woodstock	Byrdcliffe Historic District							
Woodstock	Church of the Holy Transfiguration of Christ-on-the-Mount							

**APPENDIX D –**

**PARTICIPATING JURISDICTIONS MITIGATION ACTION  
EVALUATION AND PRIORITIZATION**

## ULSTER COUNTY MJHMP: PRIORITIZATION OF ACTIONS

(Name of Jurisdiction)       TOWN OF GARDINER      

Action	“-” = cost (unfavorable)			“0”=neutral or not applicable				“+” = benefit (favorable)			(high, medium, or low)		
	S	T	A	P	L	E	E	Can be implemented easily	Achieves multiple objectives	Can be implemented quickly	Overall Benefits	Overall Costs	Priority
<b>Your Jurisdiction’s Actions:</b>													
Replace culverts, raise road beds ro lessen flood damage risk	+	+	0	+	+	+	0	+	0	+	High	Low	High
Wildland/Urban interface plan for the Shawangunk Ridge	0	+	-	+	-	+	+	0	+	-	High	Low	High
Dev. of Wetlands & Water-course Law	+	+	0	-	0	0	+	-	+	0	Medium	Low	Medium
Dev. emergency shelter program	+	+	-	+	0	+	0	-	+	-	High	Medium	Medium
Revise õdriveway lawö & sections of Shaw. Ridge Prot. Dist.	+	+	-	-	-	+	+	+	+	+	High	Medium	High
Retrofit Town Hall w/back-up generator and commun. system.	+	+	+	+	+	-	0	+	+	+	High	Medium	Medium
Initiate õFirewiseö Program in W/UI areas	0	+	0	+	0	+	+	+	0	+	High	Low	High
Inc. Citizen preparedness via public dist. of NYSEMO preparedness pamphlet series	+	+	0	+	0	+	0	+	+	+	High	Low	Medium

## ULSTER COUNTY MJHMP: PRIORITIZATION OF ACTIONS

(Name of Jurisdiction)       TOWN OF GARDINER      

Action	“-” = cost (unfavorable)			“0”=neutral or not applicable				“+” = benefit (favorable)			(high, medium, or low)		
	S	T	A	P	L	E	E	Can be implemented easily	Achieves multiple objectives	Can be implemented quickly	Overall Benefits	Overall Costs	Priority
Encourage local businesses to create preparedness plans for their facilities & dist. same to employees & emerg. response agencies	+	+	0	+	0	+	0	+	+	+	High	Low	Medium
Retrofitting of homes on Farmers Tnpke. & Lower Forest Glen Road for flood damage prevention	+	+	-	-	-	-	0	-	-	-	Low	High	Low
Distribution of NOAA weather alerting radios to high risk facilities	+	+	0	+	0	+	0	+	+	+	High	Low	High
Plan for backup electric power at facilities that are part of town's emerg. shelter program	+	+	-	+	-	+	0	0	+	-	High	Medium	Medium

# ULSTER COUNTY MJHMP: PRIORITIZATION OF ACTIONS

Low - < \$100,000  
 Medium + \$100,000  
 High + 1 Mil

(Name of Jurisdiction) Town of Hurley

Action	“-” = cost (unfavorable)				“0” = neutral or not applicable				“+” = benefit (favorable)			(high, medium, or low)		
	S	T	A	P	L	E	E	Can be implemented easily	Achieves multiple objectives	Can be implemented quickly	Overall Benefits	Overall Costs	Priority	
EXAMPLE MITIGATION ACTION #1	+	+	0	-	-	-	+	-	+	+	High	Medium	Medium	
EXAMPLE MITIGATION ACTION #2	+	+	+	-	-	+	+	+	+	+	High	Low	High	
EXAMPLE MITIGATION ACTION #3	-	+	-	-	-	-	0	+	+	-	Medium	High	Low	
EXAMPLE MITIGATION ACTION #4	+	+	-	+	-	-	-	-	0	+	Medium	High	Medium	
EXAMPLE MITIGATION ACTION #5	+	+	+	+	+	+	+	+	+	+	High	Low	High	

**Your Jurisdiction's Actions:**

Redo Culverts + Ditches in Bristol Hill	+	+	0	+	0	+	0	+	+	+	Medium	Medium	Medium
Redo Drainage Culverts - Ditches Barton + Broad St	-	+	0	+	0	-	0	+	+	+	Low	Medium	Medium
Natural Resource Protection - Set Aside Flood Prone Land - Open Space	-	+	0	-	-	+	+	-	+	-	Medium	High	Medium
Channel Improvement Bopus Creek	+	+	-	+	-	+	-	-	+	-	High	High	High
Preventative Measure Against Building + zoning code to increase wind capacity	+	+	0	0	0	+	0	+	+	+	Low	Low	Low

FROM : TOWN OF HURLEY      FAX NO. : 331 0058      Aug. 15 2008 11:33AM P2



## ULSTER COUNTY MJHMP: PRIORITIZATION OF ACTIONS

(Name of Jurisdiction) CITY OF KINGSTON

Action	“-” = cost (unfavorable)			“0” = neutral or not applicable				“+” = benefit (favorable)			(high, medium, or low)		
	S	T	A	P	L	E	E	Can be implemented easily	Achieves multiple objectives	Can be implemented quickly	Overall Benefits	Overall Costs	Priority
EXAMPLE MITIGATION ACTION #1	+	+	0	-	-	-	+	-	+	+	High	Medium	Medium
EXAMPLE MITIGATION ACTION #2	+	+	+	-	-	+	+	+	+	+	High	Low	High
EXAMPLE MITIGATION ACTION #3	-	+	-	-	-	-	0	+	+	-	Medium	High	Low
EXAMPLE MITIGATION ACTION #4	+	+	-	+	-	-	-	-	0	+	Medium	High	Medium
EXAMPLE MITIGATION ACTION #5	+	+	+	+	+	+	+	+	+	+	High	Low	High

Your Jurisdiction's Actions: City of Kingston

Linderman Ave/Tannery Brook	+	+	-	+	-	+	+	0	+	-	High	Medium	High
Broadway/Jacobs Valley Flooding	+	+	+	+	+	-	+	+	+	0	High	High	High
Hurley/Fairview Aves. Storm Water Project	+	0	+	+	+	+	+	-	+	0	High	High	High
Main St Storm Water Culvert	+	+	+	+	0	+	0	+	+	+	High	Low	High
Wilbur Ave Stream Stabilization	+	+	+	+	+	+	+	+	+	+	High	Low	High

PRIORITIZATION OF ACTIONS

(Name of Jurisdiction) Town of Kingston, Ulster County, New York

Action	"-"= cost (unfavorable)				"0"= neutral or not applicable				"+ "= benefit (favorable)			(high, medium, or low)		Priority
	S	T	A	P	L	E	E	Can be implemented easily	Achieves multiple objectives	Can be implemented quickly	Overall Benefits	Overall Costs		
Mitigate stream corridor obstructions in the Sawkill Creek by Stream Corridor Restoration	0	+	0	+	0	0	0	+	+	+	High	Low	Medium	
Mitigate local road flooding on Sawkill Road with Storm Water Management Plan	0	+	0	+	0	0	0	+	+	+	High	Medium	High	
Construct Ring Levee or Flood Wall System around Town Hall, Highway Building, and Fire House	+	+	0	+	0	0	0	+	+	+	High	High	High	

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Town Of Ulster Assessor

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## ULSTER COUNTY MJHMP: PRIORITIZATION OF ACTIONS

(Name of Jurisdiction) **Town of Lloyd**

Action	“-” = cost (unfavorable)			“0”=neutral or not applicable				“+” = benefit (favorable)			(high, medium, or low)		
	S	T	A	P	L	E	E	Can be implemented easily	Achieves multiple objectives	Can be implemented quickly	Overall Benefits	Overall Costs	Priority
EXAMPLE MITIGATION ACTION #1	+	+	0	-	-	-	+	-	+	+	High	Medium	Medium
EXAMPLE MITIGATION ACTION #2	+	+	+	-	-	+	+	+	+	+	High	Low	High
EXAMPLE MITIGATION ACTION #3	-	+	-	-	-	-	0	+	+	-	Medium	High	Low
EXAMPLE MITIGATION ACTION #4	+	+	-	+	-	-	-	-	0	+	Medium	High	Medium
EXAMPLE MITIGATION ACTION #5	+	+	+	+	+	+	+	+	+	+	High	Low	High

**Your Jurisdiction’s Actions:**

Dredge and clean Shantzø Pond on the south branch of the Twaalfskill to increase storm water detention volume so as to reduce flooding along and over roadways in the area of the Hamlet of Highland and along River Road.	+	+	+	+	0	+	+	+	+	+	High	Medium	High
Dredge and clean ponds (Pratt Mill Pond and others) along the North Branch Twaalfskill to increase storm water detention volume so as to reduce flooding along and over roadways in the area of the Hamlet of Highland and along River Road.	+	+	+	+	0	+	+	+	+	+	High	Medium	High

## ULSTER COUNTY MJHMP: PRIORITIZATION OF ACTIONS

(Name of Jurisdiction) **Town of Lloyd**

Action	“-” = cost (unfavorable)			“0”=neutral or not applicable				“+” = benefit (favorable)			(high, medium, or low)		
	S	T	A	P	L	E	E	Can be implemented easily	Achieves multiple objectives	Can be implemented quickly	Overall Benefits	Overall Costs	Priority
Dredge and clean unnamed stream along Mile Hill Road and construct a detention pond on the Alfonso property to reduce flooding and washouts along Mile Hill Road, to protect regional high pressure gas main serving Dutchess County and to protect major water mains serving the Hamlet of Highland.	+	+	+	+	+	+	+	+	+	+	High	Medium	High
Dredge and remove the sediment in both branches of the Twaalfskill as well as removal of the alluvial deposit at the Twaalfskill outlet in the Hudson River to reduce flooding of adjoining properties.	+	+	+	+	+	+	+	+	+	+	High	Medium	High

## ULSTER COUNTY MJHMP: PRIORITIZATION OF ACTIONS

(Name of Jurisdiction) Town of Marbletown

Action	“-” = cost (unfavorable)							“0”=neutral or not applicable			“+” = benefit (favorable)			(high, medium, or low)		
	S	T	A	P	L	E	E	Can be implemented easily	Achieves multiple objectives	Can be implemented quickly	Overall Benefits	Overall Costs	Priority			
EXAMPLE MITIGATION ACTION #1	+	+	0	-	-	-	+	-	+	+	High	Medium	Medium			
EXAMPLE MITIGATION ACTION #2	+	+	+	-	-	+	+	+	+	+	High	Low	High			
EXAMPLE MITIGATION ACTION #3	-	+	-	-	-	-	0	+	+	-	Medium	High	Low			
EXAMPLE MITIGATION ACTION #4	+	+	-	+	-	-	-	-	0	+	Medium	High	Medium			
EXAMPLE MITIGATION ACTION #5	+	+	+	+	+	+	+	+	+	+	High	Low	High			

**Your Jurisdiction’s Actions:**

Localized minor flood reduction projects (upgrading of drainage systems in key, flood prone areas townwide.	+	+	+	+	+	+	+	-	+	-	High	Medium	High
Infrastructure protection measures grading, drainage upgrading, planting, use of geofabrics at recycling and community centers, town hall, highway fac, town park.	+	+	+	+	+	+	+	-	+	-	Medium	Medium	Medium
Channel maintenance, periodic cleaning out of drainage channels, plus continuous inspections.	+	+	+	+	+	+	+	+	+	+	High	High	High
Enhanced floodplain development regulations and zoning	+	+	-	-	0	+	0	-	+	+	Medium	Medium	Medium
Public awareness and information, including workshops, literature, dedicated web page	+	+	+	+	+	+	+	+	+	+	High	High	High

# ULSTER COUNTY MJHMP: PRIORITIZATION OF ACTIONS

(Name of Jurisdiction) Marlborough

Action	"-" = cost (unfavorable)				"0" = neutral or not applicable			"+" = benefit (favorable)			(high, medium, or low)		Priority
	S	T	A	P	L	R	E	Can be implemented easily	Achieves multiple objectives	Can be implemented quickly	Overall Benefits	Overall Costs	
EXAMPLE MITIGATION ACTION #1	+	+	0	-	-	-	+	-	+	+	High	Medium	Medium
EXAMPLE MITIGATION ACTION #2	+	+	+	-	-	+	+	+	+	+	High	Low	High
EXAMPLE MITIGATION ACTION #3	-	+	-	-	-	-	0	+	+	-	Medium	High	Low
EXAMPLE MITIGATION ACTION #4	+	+	-	+	-	-	-	-	0	+	Medium	High	Medium
EXAMPLE MITIGATION ACTION #5	+	+	+	+	+	+	+	+	+	+	High	Low	High

**Your Jurisdiction's Actions:**

Develop Fire Hazard Severity Overlay Zone	0	+	+	0	+	0	+	0	+	0	High	Medium	High
Institute education for Planning Bd. in mitigation methods for subdivision site plan review	0	+	+	0	+	+	+	+	+	+	High	Medium	High
Signage to identify Fire Hazard Risks	+	+	+	0	+	0	+	0	0	0	High	Medium	Medium

TOTAL P.03

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 ULSTER CO E911  
 PAGE 03

## ULSTER COUNTY MJHMP: PRIORITIZATION OF ACTIONS

(Name of Jurisdiction) Town of Rosendale

Action	“-” = cost (unfavorable)			“0”=neutral or not applicable				“+” = benefit (favorable)			(high, medium, or low)		
	S	T	A	P	L	E	E	Can be implemented easily	Achieves multiple objectives	Can be implemented quickly	Overall Benefits	Overall Costs	Priority
EXAMPLE MITIGATION ACTION #1	+	+	0	-	-	-	+	-	+	+	High	Medium	Medium
EXAMPLE MITIGATION ACTION #2	+	+	+	-	-	+	+	+	+	+	High	Low	High
EXAMPLE MITIGATION ACTION #3	-	+	-	-	-	-	0	+	+	-	Medium	High	Low
EXAMPLE MITIGATION ACTION #4	+	+	-	+	-	-	-	-	0	+	Medium	High	Medium
EXAMPLE MITIGATION ACTION #5	+	+	+	+	+	+	+	+	+	+	High	Low	High

**Your Jurisdiction’s Actions:**

Landslides: Various locations in the Town of Rosendale have been identified. Mitigation will include, bank stabilization, erosion control, culverts and ditches, removal of hazards through blasting and coordinating with Federal, State and County agencies to share mitigation tasks	+	+	-	+	0	-	-	-	+	-	High	High	High
Flood: Various locations in the Town of Rosendale have been identified. Mitigation will include revising zoning codes so issues will be addressed during site plan review, Rosendale Highway Department replacing storm water basins and culverts, and US Army Corps of Engineers updating flood control engineering and	+	+	0	+	0	-	-	-	+	-	High	High	High

## ULSTER COUNTY MJHMP: PRIORITIZATION OF ACTIONS

(Name of Jurisdiction)     **Town of Rosendale**    

Action	“-” = cost (unfavorable)			“0”=neutral or not applicable				“+” = benefit (favorable)			(high, medium, or low)		
	S	T	A	P	L	E	E	Can be implemented easily	Achieves multiple objectives	Can be implemented quickly	Overall Benefits	Overall Costs	Priority
mapping. Also public outreach and education, updating building codes, bank stabilization, erosion control and Emergency management coordination with Highway Department, Fire Departments, Police Departments, and EMS													
Dam Failure: Various locations in the Town of Rosendale have been identified. Mitigation will include coordinating with emergency action plans with Dam owners, requiring engineering reports and inspection, repair and maintenance programs or materials to property owners.	+	+	0	+	0	0	-	-	+	-	<b>High</b>	<b>High</b>	<b>High</b>
Wild Wires: Various locations in the Town of Rosendale have been identified. Mitigation will include creating fire lanes and bermes in the unbroken forested areas, using controlled burns, providing public education programs and materials to property owners.	+	+	0	+	0	-	-	0	+	-	<b>High</b>	<b>Medium</b>	<b>Medium</b>
Norøeaster, Tornadoes, Winter Storms, Hurricanes, and earthquakes: Mitigation will include coordinating	+	+	+	+	+	0	-	+	+	0	<b>High</b>	<b>High</b>	<b>High</b>



## ULSTER COUNTY MJHMP: PRIORITIZATION OF ACTIONS

(Name of Jurisdiction) Town of Rosendale

Action	“-” = cost (unfavorable)			“0”=neutral or not applicable				“+” = benefit (favorable)			(high, medium, or low)		
	S	T	A	P	L	E	E	Can be implemented easily	Achieves multiple objectives	Can be implemented quickly	Overall Benefits	Overall Costs	Priority
with Federal, State and County agencies including the local jurisdiction to implement a readiness plan to address the various hazards, support local highway department with training, equipment and technical information also offer public education and materials. Set up a information page on our Town web site for the public to access and monitor.													
Vulnerable Structures: The Former Wallkill Valley Railroad trestle and a communications tower located in Maple have been identified as being vulnerable to severe categories cited in the Plan, including extreme wind storm, tornadoes, lightning, winter storm and earthquake.	0	+	-	0	-	-	+	-	0	-	Medium	High	Low

**PRIORITIZATION OF ACTIONS**

(Name of Jurisdiction) Town of Saugerties

Action	“-” = cost (unfavorable)			“0”=neutral or not applicable				“+” = benefit (favorable)			(high, medium, or low)		
	S	T	A	P	L	E	E	Can be implemented easily	Achieves multiple objectives	Can be implemented quickly	Overall Benefits	Overall Costs	Priority
Increase Culvert Diameters in dense residential areas	+	+	0	0	+	+	+	+	+	+	Med	Med	High
Clean all cul-de-sacs and their drainage areas providing better runoff	+	0	+	0	-	+	0	0	+	-	High	Med	High
Raise State Route 9w (Evac Route)	+	0	-	-	0	-	+	-	+	-	High	High	Med
Designate more protected wetlands	0	+	-	-	-	+	+	+	+	-	High	Low	High

FEDERALIZATION OF METHODS

Shandaken

Action	"-" = cost (unfavorable)				"0" = neutral or not applicable			"+" = benefit (favorable)			(High, medium, or low)		
	S	T	A	P	L	E	E	Can be implemented easily	Achieves multiple objectives	Can be implemented quickly	Overall Benefits	Overall Costs	Priority
Relocation of town Garage and town hall or elevate above flood Plane	0	+	-	-	-	-	0	-	+	-	High	High	medium
Repair retaining wall on Woodland Valley 3 places	+	+	-	-	-	-	0	+	+	0	High	High	High
Repair retaining wall on Miller Road	+	+	-	-	-	-	0	+	+	0	High	High	High
Flood control wall on Brown Road	+	+	-	-	-	-	0	0	+	0	High	High	medium
Flood control for the Town of Phoenicia	+	+	-	-	-	-	0	-	+	-	High	High	medium

	“-” = cost (unfavorable)				“0”=neutral or not applicable				“+” = benefit (favorable)			(high, medium, or low)		
	S	T	A	P	L	E	E	Can be implemented easily	Achieves multiple objectives	Can be implemented quickly	Overall Benefits	Overall Costs	Priority	
EXAMPLE MITIGATION ACTION #1	+	+	0	-	-	-	+	-	+	+	High	Medium	Medium	
EXAMPLE MITIGATION ACTION #2	+	+	+	-	-	+	+	+	+	+	High	Low	High	
EXAMPLE MITIGATION ACTION #3	-	+	-	-	-	-	0	+	+	-	Medium	High	Low	
EXAMPLE MITIGATION ACTION #4	+	+	-	+	-	-	-	-	0	+	Medium	High	Medium	
EXAMPLE MITIGATION ACTION #5	+	+	+	+	+	+	+	+	+	+	High	Low	High	
<b>Your Jurisdiction’s Actions:</b>														
Wallkill Hamlet flooding	+	+	-	-	-	-	-	-	+	-	Medium	High	Medium	
Borden Dam Failure	+	+	-	-	-	-	-	-	+	-	High	High	Medium	
Educate Residents on Disaster preparedness	+	+	+	+	+	+	+	+	+	+	High	Low	Medium	

**Ulster Co PRIORITIZATION of MITIGATION ACTIONS 1.30.09PRIORITIZATION OF ACTIONS**

(Name of Jurisdiction) Ulster County

Action	“-” = cost (unfavorable)			“0”=neutral or not applicable				“+” = benefit (favorable)			(high, medium, or low)		
	S	T	A	P	L	E	E	Can be implemented easily	Achieves multiple objectives	Can be implemented quickly	Overall Benefits	Overall Costs	Priority
1.B. Ensure that local comprehensive plans incorporate natural disaster mitigation techniques by requiring a courtesy review of draft plans by the County Emergency Management Agency.	+	+	+	+	+	+	0	+	+	+	Medium	Low	Medium
2.A. Expand and disseminate GIS and other hazard information on the internet.	+	+	+	+	+	+	+	+	+	+	Medium	Low	Medium
4.D. Continue to implement best management practices for floodplain areas.	+	+	0	+	0	-	+	-	+	-	High	High	High
4.E. Identify and document repetitively flooded properties. Explore mitigation opportunities for repetitively flooded properties, and if necessary, carry out acquisition, relocation, elevation, and flood-proofing measures to protect these properties.	+	+	-	-	-	-	+	-	+	-	High	High	High
4.G Develop specific mitigation solutions for flood-prone road systems (roads, bridges, intersections, drainage, etc) under the leadership of County DPW.	+	+	0	0	-	-	0	-	+	-	High	High	High

**Ulster Co PRIORITIZATION of MITIGATION ACTIONS 1.30.09PRIORITIZATION OF ACTIONS**

(Name of Jurisdiction) Ulster County

Action	“-” = cost (unfavorable)			“0”=neutral or not applicable				“+” = benefit (favorable)			(high, medium, or low)		
	S	T	A	P	L	E	E	Can be implemented easily	Achieves multiple objectives	Can be implemented quickly	Overall Benefits	Overall Costs	Priority
7.C. Construction of ice control structures such as booms, tension weirs and sloped-block barriers.	+	+	-	0	-	-	+	-	0	-	Medium	High	Low
10.A. In consultation with NYSDEC Forest Protection & Fire Management and local forest rangers, develop mapping of wildland/urban interface areas.	+	+	+	+	+	0	+	0	0	0	Medium	Medium	Medium
10.D. Endorse and promote prescribed burning for hazard reduction.	+	+	-	-	-	-	+	0	0	-	Medium	Medium	Medium
12.B. Review existing emergency response plans for enhancement opportunities: work with social support agencies, homeowners associations and general public to develop and implement monitoring and warning systems focused on vulnerable populations and provision of adequate shelter facilities. .	+	+	+	+	+	0	0	+	+	+	High	Low	High
2.E. Expand GIS via acquisition of HAZUS-MH to collect and develop more sophisticated hazard mapping. Use information to update plan. Ensure information will be available to the public and to relevant communities and agencies.	+	+	-	+	+	-	0	0	0	-	Medium	Medium	Medium

PRIORITIZATION OF ACTIONS

(Name of Jurisdiction) Town of Ulster, Ulster County, New York (page 1)

Action	"-"= cost (unfavorable)					"0"= neutral or not applicable			"+" = benefit (favorable)			(high, medium, or low)		Priority
	S	T	A	P	L	E	E	Can be implemented easily	Achieves multiple objectives	Can be implemented quickly	Overall Benefits	Overall Costs		
Mitigate damage to homes on Orlando Street either by purchase and demolition or retrofitting by raising the homes.	0	+	0	+	0	+	0	-	+	-	High	Medium	High	
Mitigate damage to homes on Sandy Road either by purchase and demolition or retrofitting by raising the homes.	0	+	0	+	0	+	0	-	+	-	High	Medium	High	
Mitigate damage to homes on Lower Katrine Lane either by purchase and demolition or retrofitting by raising the homes.	0	+	0	+	0	+	0	-	+	-	High	Medium	High	
Mitigate soil erosion and undercutting of the Esopus Creek banks that threaten homes on Brigham Lane by vegetation management and soil stabilization.	0	+	0	+	0	+	0	-	+	-	High	Medium	High	
Construct Ring Levee or Flood Wall System around Town of Ulster Waste Water Treatment Plant off Dogwood Lane.	0	+	0	+	0	+	0	+	+	+	High	Medium	High	

PRIORITIZATION OF ACTIONS

(Name of Jurisdiction) Town of Ulster, Ulster County, New York (page 2)

Action	"- "= cost (unfavorable)			"0" = neutral or not applicable				"+ " = benefit (favorable)			(high, medium, or low)		Priority	
	S	T	A	P	L	E	E	Can be implemented easily	Achieves multiple objectives	Can be implemented quickly	Overall Benefits	Overall Costs		
Construct Ring Levee or Flood Wall System around Town of Ulster Water Treatment Plant on Fording Place Road.	0	+	0	+	0	+	0	+	+	+	High	Medium	High	
Mitigate stream obstructions in the Esopus Creek by stream corridor restoration.	0	+	0	+	0	+	0	+	+	+	High	Low	High	



**APPENDIX E –**

**PARTICIPATING JURISDICTIONS MITIGATION ACTION  
IMPLEMENTATION STRATEGY**

## ULSTER COUNTY MJHMP: IMPLEMENTATION STRATEGY

(Name of Jurisdiction) TOWN OF GARDINER, ULSTER COUNTY NY

Priority	Mitigation Action	Hazard(s) Addressed	Applies to Community Assets (Existing / New / Both)	Primary Department Responsible	Existing Local Planning Mechanism through which the action will be implemented	Target Date	Cost Estimate	Funding Source
HIGH	Replace existing culvert with larger diam., re-do ditches, and repave sections of Old Ford, Lower Forest Glen, Bridge Creek, & Guildford Roads. Raising of some road beds may be required.	Flooding	Both	Highway	Highway Dept. annual budget, Town Board approval	2010	\$18,000	Town Hiway Budget/ Grants
HIGH	W/NYSDEC and 6 other towns that border the N. Shawangunk Ridge, develop a wildland/urban interface plan, incl. mapping, water sources develop & annually update mapping of wildland/urban interface areas to include all potential alternative water sources for sources for drafting including swimming pools and identification of prescribed burn areas for hazard reduction.	Wildfires	Both	Planning Board and Office of Emergency Management	Planning Board (both local and County), and Town Board if zoning law changes are required	2009	<\$5,000	Town and matching funds, Grants
MEDIUM	Continue the development of the Town's Wetlands & Watercourse Law (220-35) to better manage storm water runoff.	Flooding	Both	Environmental Conservation Comm. & Town Board	Planning Board & Code Enforcement Officer	2009	<\$5,000	Town, Grant & Matching funds
MEDIUM	Seek partnerships with the UC Red Cross and private and non-profit orgs. w/ large buildings to participate in a town emergency shelter program, e.g. St. Charles Borromeo & Gardiner Reformed Churches, Kiss My Face Cosmetics, and businesses in the Steve's Lane business park.	Severe Storms	Both	Town Board (Dir. of Emerg. Management)	Town Board	2009	Nominal	Town Funds
HIGH	Rewrite Section 220-43 of the Town's Zoning law, and as needed those sections (F,g, 1-7) of the Shaw. Ridge Protection Law (220-16) to provide for adequate	Wildfires	Both	Town Board with Code Enforcement Officer & Dir. of	Planning Board and Town Board	2009	Nominal (legal review)	Town funds from annual

## ULSTER COUNTY MJHMP: IMPLEMENTATION STRATEGY

(Name of Jurisdiction) TOWN OF GARDINER, ULSTER COUNTY NY

Priority	Mitigation Action	Hazard(s) Addressed	Applies to Community Assets (Existing / New / Both)	Primary Department Responsible	Existing Local Planning Mechanism through which the action will be implemented	Target Date	Cost Estimate	Funding Source
	emergency apparatus access and water supply/fire suppression, and which will be acceptable to the NYS DOS Codes Council.			Emerg. Mngmnt.				budget
MEDIUM	Develop a plan and seek funding to retrofit the Town Hall with backup electric and communications systems so it can function as an EOC.	Severe storms, flooding, and wildfires	Existing	Town Board w/ Code Enfrcmnt. Officer & Dir. of Emerg. Mngmnt	Planning Board and Town Board	2009	Approx. \$10,000	Town, Grant & matching funds
HIGH	Once the wildland/urban interface zone has been established and mapped, initiate the "Firewise" program in those areas to reduce the risk to structures and emerg. responders.	Wildfires	Both	Two town fire departments w/ the Dir. of Emerg. Mngmnt	Planning Board, Code Enforcement Officer	2009	Nominal	Town funds
MEDIUM	Increase citizen awareness of natural hazards risks and mitigation steps they can take through public education and continued distribution of NYSEMO preparedness pamphlet series at public gatherings in the town	All	Both	Dir. of Emerg. Mngmnt	N/A	2009	Nominal	Town Funds
MEDIUM	Encourage local businesses to create a preparedness plan for their facilities & distribute same to employees and the emerg. response agencies	All	Both	Two town fire departments w/ the Dir. of Emerg. Mngmnt	N/A	2009	Nominal	Town Funds
LOW	Partner with homeowners on Farmers Turnpike and Lower Forest Glen Road to develop a plan for retrofitting homes which have been subject to flooding	Flooding	Existing	Planning Board, Code Enforcement Officer	Planning Board	2010	Not known	Homeowners, matching grant
HIGH	Obtain and Distribute at cost, or with a slight discount at Gardiner Day and other public events) NOAA weather alert radios w/a focus on e.g, day care centers	Severe Storms, Flooding, and Wildfires	Both	Town Board (Dir. of Emerg. Management) With cooperation	Town Board and Bldg. Insp./Code Enforcement Officer	2009	Approx. \$1,000	Town, Grant, & Matching Funds

## ULSTER COUNTY MJHMP: IMPLEMENTATION STRATEGY

(Name of Jurisdiction) TOWN OF GARDINER, ULSTER COUNTY NY

Priority	Mitigation Action	Hazard(s) Addressed	Applies to Community Assets (Existing / New / Both)	Primary Department Responsible	Existing Local Planning Mechanism through which the action will be implemented	Target Date	Cost Estimate	Funding Source
	churches, larger employers where there are a significant numbers of people and/or people who are part of vulnerable populations			of local fire depts..				
MEDIUM	Develop a plan and seek funding for backup electric power systems for those buildings which will become part of the Town's emergency shelter system	All	Both	Town Board, Code Enforcement officer, Dir. of Emerg. Mngmnt	Town Board and Planning Board	2010	Approx. \$15,000 per facility	Facility owner, Grant, & matching funds

# ULSTER COUNTY MJHMP: IMPLEMENTATION STRATEGY

(Name of Jurisdiction) Town of Hurley

Priority	Mitigation Action	Hazard(s) Addressed	Applies to Community Assets (Existing / New / Both)	Primary Department Responsible	Existing Local Planning Mechanism through which the action will be implemented	Target Date	Cost Estimate	Funding Source
High	CHANNEL IMPROVEMENT - ESOPUS CREEK THROUGH TOWN OF HURLEY	FLOOD	BOTH	TOWN BOARD ULSTER COUNTY DEC ALNY CORPS OF ENGINEERS	→	2010	\$ 1 MILE	GRANTS - NYS, DEC
MEDIUM	DRAINAGE IMPROVEMENT - REDD CULVERTS + DITCHES IN THE BRISTOL HALL DEVELOPMENT	FLOOD	BOTH	TOWN BOARD HIGHWAY DEPT	TOWN HIGHWAY DEPT. TOWN ENGINEERS	EARLY 2009	MEDIUM \$ 200,000	CATSKILL WATERSHED COALITION TOWN IHA FUND
MEDIUM	DRAINAGE IMPROVEMENT - REDD CULVERTS - DITCHES ALONG BROAD + BIRCH ST	FLOOD	EXISTING	TOWN BOARD HIGHWAY DEPT	TOWN HIGHWAY DEPT TOWN ENGINEERS	EARLY 2009	MEDIUM \$ 150,000	TOWN FUND IHA
MEDIUM	NATURAL RESOURCE PROTECTION ACQUIRE PROPERTY ON BANK'S LINE FOR TOWN PARK (9 HOMES)	FLOOD	EXISTING	TOWN BOARD	TOWN ENGINEERS	2012	HIGH \$ 1 MILE	TOWN FUND NY STATE DEC, DEP
Low	PREVENTATIVE MEASURE - ADJUST BUILDING - ZONING CODE TO INCREASE WIND CAPACITY FOR NEW STRUCTURES	HIGH WIND/ HURTSANE	BOTH	TOWN BOARD BUSINESS INSPECTOR ZONING BOARD	→	2009	LOW \$ 100,000	TOWN BUDGET

## IMPLEMENTATION STRATEGY

(Name of Jurisdiction) City of Kingston

<b>PRIORITY</b>	<b>Mitigation Action</b>	<b>Hazard(s) Addressed</b>	<b>Applies to Community Assets (Existing / New / Both)</b>	<b>Primary Department Responsible</b>	<b>Existing Local Planning Mechanism through which the action will be implemented</b>	<b>Target Date</b>	<b>Estimated Cost</b>	<b>Funding Source</b>
High	Drainage improvements on 3 sections of Linderman Ave (Tannery Brook) Replace culvert, stabilize Stream bank and work with Twin Ponds development to address issues and mitigate flooding downstream from the development	Flooding Road erosion	Existing	Public Works	City Engineer	09/01/2009	High	Local, State, Federal, Property owner
High	Replace existing storm water pipe and culvert along the Jacobs Valley storm sewer line near Wiltwyck Cemetary. Alleviate flooding at the Broadway underpass, Susan St area, that occurs during any significant rainfall.	Flooding Eliminate street closure, improve evacuation route and emergency response	Existing	City Engineer Public Works	City Engineer	ASAP	Very High	Local, State , Federal,
High	Drainage and Storm Sewer improvements in the Hurley Ave, Fairview Ave. Millers Lane area to Alleviate street and home flooding.	Flooding	Existing	City Engineer	City Engineer	ASAP	High	Local, State , Federal

<b>PRIORITY</b>	<b>Mitigation Action</b>	<b>Hazard(s) Addressed</b>	<b>Applies to Community Assets (Existing / New / Both)</b>	<b>Primary Department Responsible</b>	<b>Existing Local Planning Mechanism through which the action will be implemented</b>	<b>Target Date</b>	<b>Estimated Cost</b>	<b>Funding Source</b>
High	Replace four sections of culvert Main St., Mt View Lucas Ave. Area to Esopus Creek to eliminate flooding of Homes and business district	Flooding	Existing	City Engineer Public Works	City Engineer	ASAP	High	Local, State, Federal
High	Stream Stabilization at Twaffskill Creek adjacent To Wilbur Ave/ Chapel St. Prevent reoccurrence of erosion that causes road to slide into creek and Threatens water and sewer lines	Erosion/Road Collapse	Existing	City Engineer	City Engineer	ASAP	Complete	Local, State, Federal

### IMPLEMENTATION STRATEGY

(Name of Jurisdiction) Town of Kingston, Ulster County, New York

PRIORITY	Mitigation Action	Hazard(s) Addressed	Applies to Community Assets (Existing / New / Both)	Primary Department Responsible	Existing Local Planning Mechanism through which the action will be implemented	Target Date	Estimated Cost	Funding Source
Medium	Mitigate stream corridor obstructions in the Sawkill Creek by Stream Corridor Restoration	Yes	Both	Flood Coordinator and Highway Department	Ulster County Emergency Management	1 Year	Greater than 10,000	FEMA
High	Mitigate local road flooding on Sawkill Road with Storm Water Management Plan	Yes	Both	Flood Coordinator and Highway Department	Ulster County Emergency Management	1 Year	Greater than 150,000	FEMA
High	Construct Ring Levee or Flood Wall System around Town Hall, Highway Building, and Fire House	Yes	Both	Flood Coordinator and Highway Department	Ulster County Emergency Management	1 Year	Greater than 500,000	FEMA



## ULSTER COUNTY MJHMP: IMPLEMENTATION STRATEGY

(Name of Jurisdiction) Town of Lloyd

Dated August 12, 2008

Priority	Mitigation Action	Hazard(s) Addressed	Applies to Community Assets (Existing / New / Both)	Primary Department Responsible	Existing Local Planning Mechanism through which the action will be implemented	Target Date	Cost Estimate	Funding Source
1	Dredge and clean Shantzø's Pond on the south branch of the Twaalfskill to increase storm water detention volume so as to reduce flooding along and over roadways in the area of the Hamlet of Highland and along River Road.	Flooding of roadways and structures	Both	Highway and MS4	Highway Dept in Conjunction with Town Engineer	Summer 2009 at low flow conditions	\$850,000	FEMA
2	Dredge and clean ponds (Pratt Mill Pond and others) along the North Branch Twaalfskill to increase storm water detention volume so as to reduce flooding along and over roadways in the area of the Hamlet of Highland and along River Road.	Flooding of roadways and structures	Both	Highway and MS4	Highway Dept in Conjunction with Town Engineer	Summer 2009 at low flow conditions	\$750,000	FEMA
3	Dredge and clean unnamed stream along Mile Hill Road and construct a detention pond on the Alfonso property to reduce flooding and washouts along Mile Hill Road, to protect regional high pressure gas main serving Dutchess County and to protect major water mains serving the Hamlet of Highland.	Flooding of roadways, structures and critical utility lines	Both	Highway and MS4	Highway Dept in Conjunction with Town Engineer	Summer 2010 at low flow conditions	\$850,000	FEMA
4	Dredge and remove the sediment in both branches of the Twaalfskill as well as removal of the alluvial deposit at the Twaalfskill outlet in the Hudson River to reduce flooding of adjoining properties.	Flooding of roadways and structures	Both	Highway and MS4	Highway Dept in Conjunction with Town Engineer	Summer 2010 at low flow conditions	\$500,000	FEMA

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## ULSTER COUNTY MJHMP: IMPLEMENTATION STRATEGY

(Name of Jurisdiction) Town of Marbletown

Priority	Mitigation Action	Hazard(s) Addressed	Applies to Community Assets (Existing / New / Both)	Primary Department Responsible	Existing Local Planning Mechanism through which the action will be implemented	Target Date	Cost Estimate	Funding Source
High	Localized minor flood reduction projects (upgrading of drainage systems in key, flood prone areas)	Flooding	Both	Highway	Highway Dept Work Plan Process	2009-2010	125K	Local & Grants
Medium	Infrastructure protection measures grading, drainage upgrading, planting, use of geo- fabrics at recycling and community centers, town hall, highway facility, town park.	Flooding, Erosion/Sed. Control	Both	Highway	Highway Dept. Work Plan Process	2009-2010	75K	Local & Grants
High	Channel maintenance, periodic cleaning out of drainage channels, plus continuous inspections.	Flooding	Both	Highway	Highway Dept. Work Plan Process	2009	20K	Local
Medium	Enhanced floodplain development regulations and zoning	Flooding	Both	Town Board & Planning	Planning and Zoning Committee + Legislative	2010-2011	25K	Grants
High	Public awareness and information, including workshops, literature, dedicated web page	All	Both	Supervisor & Environment Comm.	ECC + Supervisor's Agenda	2009	3K	Local

## ULSTER COUNTY MJHMP: IMPLEMENTATION STRATEGY

(Name of Jurisdiction) Marlborough

Priority	Mitigation Action	Hazard(s) Addressed	Applies to Community Assets (Existing / New / Both)	Primary Department Responsible	Existing Local Planning Mechanism through which the action will be implemented	Target Date	Cost Estimate	Funding Source
1	Develop Fire Hazard Severity Overlay Zone	Wildfire	Both	Town Planning + GIS	Planners, Lawyers, GIS technicians	2009-2010	\$5,000.	Town
2	Institute education requirements for Planning Bd. in mitigation methods for subdivision/site plan review	Wildfire	Both	Town Planning	Planners, County Planning	2009-2010	\$1,000.	Town / County
3	Signage to identify Fire Hazard Risks	Wildfire	Both	Town Board / Building Dept.	Town Board	2010-2012	\$6,000.	Town

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## ULSTER COUNTY MJHMP: IMPLEMENTATION STRATEGY

Town of Rosendale

Priority	Mitigation Action	Hazard(s) Addressed	Applies to Community Assets (Existing / New / Both)	Primary Department Responsible	Existing Local Planning Mechanism through which the action will be implemented	Target Date	Cost Estimate	Funding Source
High	Various locations in the Town of Rosendale including but not limited to Rondout Creek, Wallkill River, Coxingkill Creek, Cottekill Brook, Dewitt Mill Stream, unnamed stream adjacent to River Road and River Road extension, Underground storm water drainage in High Falls Park, Tillson Estates and Clark Estates have been identified. Mitigation will include updating Comprehensive plan, revising zoning codes so issues will be addressed during site plan review, sub division approval, Rosendale Highway Department replacing storm water basins and culverts, and US Army Corps of Engineers updating flood control engineering and mapping. Also public outreach and education, updating building codes, bank stabilization, erosion control and Emergency management coordination with Highway Department, Fire Departments, Police Departments, and EMS	Flood	Both	Town Board, Planning Board, Zoning Board, Town Highway Department, Building Department	Planning and Zoning Board, and Building Department	2012	unknown	Federal, State, County, Local, Private
High	Various locations in the Town of Rosendale including but not limited to Joppenburgh Mountain, All Forming Minning areas, NYS RT 213 corridor from Lawrenceville Bridge to Keator Ave Bridge, Woodland Drive at terminus, Mountain Road, Shawangunk Ridge, Creek Locks Road, Bruceville Road, School lane, Spring Street, NYS Route 32 have been identified. Mitigation will include, bank	Landslides	Both	NYSDOT Ulster County Highway Department and Town Highway Department	Town Highway Department	2012	unknown	Federal, State, County, Local

Priority	Mitigation Action	Hazard(s) Addressed	Applies to Community Assets (Existing / New / Both)	Primary Department Responsible	Existing Local Planning Mechanism through which the action will be implemented	Target Date	Cost Estimate	Funding Source
	stabilization, erosion control, culverts and ditches, removal of hazards through blasting and coordinating with Federal, State and County agencies to share mitigation tasks management Coordination with Highway Department, Fire Departments, Police Departments, and EMS							
High	Various locations in the Town of Rosendale including but not limited to Sturgeon Pool, Iron Mountain Dam, Mountain Road Dam Adjacent to Binnewatter Road have been identified. Mitigation will include coordinating with emergency action plans with Dam owners, requiring engineering reports and inspection, repair and maintenance programs or materials to property owners.	Dam Failure	Existing	Town Board	Building Department	2012	Unknown	Federal, State, County, Local, Private
Medium	Various locations in the Town of Rosendale including but not limited to Joppenbugh Mountain, Shawangunk Ridge, Mohonk Persevere, Bloomington Forest, Binnewatter Forest, Burnt Swamp Preserve have been identified. Mitigation will include creating fire lanes and bermes in the unbroken forested areas, using controlled burns, providing public education programs and materials to property owners.	Wild Wires	Existing	Town Board	Building Department, Planning Board	2012	Unknown	Federal, State, County, Local, Private
High	Mitigation will include coordinating with Federal, State and County agencies including the local jurisdiction to implement a readiness plan to address the various hazards, support local highway department with training,	Norøaster, Tornadoes, Winter Storms, Hurricanes, and earthquakes	Existing	Town Board	Highway Department, Building Department	2012	Unknown	Federal, State, County, Local, Private

Priority	Mitigation Action	Hazard(s) Addressed	Applies to Community Assets (Existing / New / Both)	Primary Department Responsible	Existing Local Planning Mechanism through which the action will be implemented	Target Date	Cost Estimate	Funding Source
	equipment and technical information also offer public education and materials. Set up a information page on our Town web site for the public to access and monitor.							
Low	The Former Walkkill Valley Railroad trestle and a communications tower located in Maple have been identified as being vulnerable to severe categories cited in the Plan, including extreme wind storm, tornadoes, lightning, winter storm and earthquake.	Vulnerable Structures	Existing	Town Board	Building Department	2012	Unknown	Federal, State, County, Local, Private

**IMPLEMENTATION STRATEGY**

(Name of Jurisdiction)     Town of Saugerties    

<b>PRIORITY</b>	<b>Mitigation Action</b>	<b>Hazard(s) Addressed</b>	<b>Applies to Community Assets (Existing / New / Both)</b>	<b>Primary Department Responsible</b>	<b>Existing Local Planning Mechanism through which the action will be implemented</b>	<b>Target Date</b>	<b>Estimated Cost</b>	<b>Funding Source</b>
High	Increase culvert diameter size in Barclay Heights, Mt. Marion, Blue Mountain Park, Village of Saugerties	Flood	Both	DOT Local Government	Drainage study	2010	500,00	Local Funds State Funds
High	Barclay Heights has many cul-de-sacs, most property is held up, these areas are key drainage areas for runoff however years of debris have accumulated and need to be removed	Flood	Existing	Town DOT	None	2009	50,000	Local Funds Grants
Med	Raise State Route 9w in Glenerie a major evacuation route for the Township. This stretch of highway is located next to the Esopus Creek and has experienced flooding.	Flood	Both	State DOT	Esopus Creek Study, Ashokan Damm Failure Study	2012	300,000	State, Local and County funds
High	Designate more protected wetland areas with in the township, George Sickle Rd. and the area surrounding the Plattekill Creek.	50 Year Flood	Both	Town Government County Legislature	Ongoing flood studies and planning by DEC	ASAP	25,000	Local Funds and Grant options

IMPLEMENTATION STRATEGY

(Name of Jurisdiction) Shandaken

PRIORITY	Mitigation Action	Hazard(s) Addressed	Applies to Community Assets (Existing, New, Both)	Primary Department Responsible	Existing Local Planning Mechanism through which the action will be implemented	Target Date	Estimated Cost	Funding Source
medium	Relocation or Elevate	Flood	Existing	Town	Planning Community	Asap	High	Fema State Grants
High	Flood control	Flood	Existing	Highway	Planning Community	Asap	High	Fema State CWC
Medium	Flood control	Flood	Existing	Highway	Planning Community	ASAP	High	Fema State
High	Flood Control	Flood	Existing	Highway	Planning Community	ASAP	High	Fema State
High	Flood Control	Flood	Existing	Highway	Planning Community	ASAP	High	Fema State CWC



## ULSTER COUNTY MJHMP: IMPLEMENTATION STRATEGY

(Name of Jurisdiction) TOWN OF SHAWANGUNK

Priority	Mitigation Action	Hazard(s) Addressed	Applies to Community Assets (Existing / New / Both)	Primary Department Responsible	Existing Local Planning Mechanism through which the action will be implemented	Target Date	Cost Estimate	Funding Source
Medium	Educate Residents on disaster preparedness	Loss of life and property	Both	Town Board	Public Safety Committee as well as emergency services	2009	\$3,500	Town Funds
Medium	Wallkill Hamlet flooding	Flooding	New	Town Board	Town Engineer, already designed	unknown	\$250,000 plus	grants when available
Medium	Borden Dam Failure	flooding and property loss	Both	Town Board	Town engineer	unknown	\$1,250,000	grants and property owners assistance

## IMPLEMENTATION STRATEGY

(Name of Jurisdiction) Ulster County

PRIORITY	Mitigation Action	Hazard(s) Addressed	Applies to Community Assets (Existing / New / Both)	Primary Department Responsible	Existing Local Planning Mechanism through which the action will be implemented	Target Date	Estimated Cost <sup>1</sup>	Funding Source
Medium	1.B. Ensure that local comprehensive plans incorporate natural disaster mitigation techniques by requiring a courtesy review of draft plans by the County Emergency Management Agency.	All hazard	Both	EC/EM	Maintenance of CEMP	Fall 2008 and ongoing	Low	County
Medium	2.A. Expand and disseminate GIS and other hazard information on the internet.	All hazard	Both	EC/EM	Maintenance of CEMP and appendices	Winter 2008-2009 and ongoing	Low	County
High	4.D. Continue to implement best management practices for floodplain areas.	Flooding	Both	EC/EM	Hazard Mitigation Plan	Dependent on funding	High	State and federal grant programs
High	4.E. Identify and document repetitively flooded properties. Explore mitigation opportunities for repetitively flooded properties, and if necessary, carry out acquisition, relocation, elevation, and flood-proofing measures to protect these properties.	Flooding	Existing	EC/EM	Hazard Mitigation Plan	Dependent on funding	High	State and federal grant programs
High	4.G Develop specific mitigation solutions for flood-prone road systems (roads, bridges, intersections, drainage, etc) under the leadership of County DPW.	Flooding	Existing	DPW	Hazard Mitigation Plan	Dependent on funding	High	County, state and federal sources

<sup>1</sup> Ulster County has identified our cost structure as follows: Low cost = less than \$10,000; Medium = \$10,001-\$50,000; High = \$50,000 and above

Ulster County

<b>PRIORITY</b>	<b>Mitigation Action</b>	<b>Hazard(s) Addressed</b>	<b>Applies to Community Assets (Existing / New / Both)</b>	<b>Primary Department Responsible</b>	<b>Existing Local Planning Mechanism through which the action will be implemented</b>	<b>Target Date</b>	<b>Estimated Cost <sup>1</sup></b>	<b>Funding Source</b>
Low	7.C. Construction of ice control structures such as booms, tension weirs and sloped-block barriers.	Ice jams / flooding	Both	EC/EM	Hazard Mitigation Plan	Dependent on funding	High	State and federal grant programs
Medium	10.A. In consultation with NYSDEC Forest Protection & Fire Management and local forest rangers, develop mapping of wildland/urban interface areas.	Wildfires	Both	EC/EM	Fire mobilization and mutual aid plan	Winter 2009-2010	Medium	County and state funding
Medium	10.D. Endorse and promote prescribed burning for hazard reduction.	Wildfires	Both	Fire Coord	Fire mobilization and mutual aid plan	Spring 2009 and ongoing	Medium	County, state and local funding
High	12.B. Review existing emergency response plans for enhancement opportunities: work with social support agencies, homeowners associations and general public to develop and implement monitoring and warning systems focused on vulnerable populations and provision of adequate shelter facilities.	All hazard	Both	EC/EM	Maintenance of CEMP and appendices	Fall 2008	Low	County
Medium	2.E. Expand GIS via acquisition of HAZUS-MH to collect and develop more sophisticated hazard mapping. Use information to update plan. Ensure information will be available to the public and to relevant communities and agencies.	Earthquake, wind, and flood	Both	EC/EM	Utilize HAZUS in future updates of Hazard Mitigation Plan	Winter 2012	Medium	County and state funding

## IMPLEMENTATION STRATEGY

(Name of Jurisdiction) Town of Ulster, Ulster County, New York (page 1)

PRIORITY	Mitigation Action	Hazard(s) Addressed	Applies to Community Assets (Existing / New / Both)	Primary Department Responsible	Existing Local Planning Mechanism through which the action will be implemented	Target Date	Estimated Cost	Funding Source
High	Mitigate damage to homes on Orlando Street either by purchase and demolition or retrofitting by raising the homes.	Yes	Both	Flood Coordinator, Highway & Building Departments	Ulster County Emergency Management	1 Year	High, greater than 1 million	FEMA
High	Mitigate damage to homes on Sandy Road either by purchase and demolition or retrofitting by raising the homes.	Yes	Both	Flood Coordinator, Highway & Building Departments	Ulster County Emergency Management	1 Year	High, greater than 1 million	FEMA
High	Mitigate damage to homes on Lower Katrine Lane either by purchase and demolition or retrofitting by raising the homes.	Yes	Both	Flood Coordinator, Highway & Building Departments	Ulster County Emergency Management	1 Year	Medium, 250,000 - 500,000	FEMA
High	Mitigate soil erosion and undercutting of the Esopus Creek banks that threaten homes on Brigham Lane by vegetation management and soil stabilization.	Yes	Existing	Flood Coordinator, Highway & Building Departments	Ulster County Emergency Management	1 Year	Medium, 250,000 - 500,000	FEMA
High	Construct Ring Levee or Flood Wall System around Town of Ulster Waste Water Treatment Plant off Dogwood Lane.	Yes	Existing	Flood Coordinator, Highway & Building Departments	Ulster County Emergency Management	1 Year	High, greater than 1 million	FEMA

### IMPLEMENTATION STRATEGY

(Name of Jurisdiction) Town of Ulster, Ulster County, New York (page 2)

PRIORITY	Mitigation Action	Hazard(s) Addressed	Applies to Community Assets (Existing / New / Both)	Primary Department Responsible	Existing Local Planning Mechanism through which the action will be implemented	Target Date	Estimated Cost	Funding Source
High	Construct Ring Levee or Flood Wall System around Town of Ulster Water Treatment Plant off Forging Place Road.	Yes	Existing	Flood Coordinator, Highway & Building Departments	Ulster County Emergency Management	1 Year	Greater than 1 million	FEMA
High	Mitigate stream obstructions in the Esopus Creek by stream corridor restoration.	Yes	Existing	Flood Coordinator, Highway & Building Departments	Ulster County Emergency Management	1 Year	Less than 50,000	FEMA

**APPENDIX F –  
NATIONAL FLOOD INSURANCE PROGRAM COMPLIANCE ACTIONS**



## ULSTER COUNTY MJHMP: NFIP COMPLIANCE ACTIONS

(Name of Jurisdiction) Town of Gardiner

**Instructions:**

Please fill in the table on this page.

Then:

- If: 1. Your current floodplain management ordinance was adopted before 1996 and has not been subsequently revised;
- 2. You do not have a specific person designated to act as your local Floodplain Administrator;
- 3. You consider the present level of staffing insufficient to adequately enforce your floodplain management ordinance;

Then fill in the corresponding prioritization/implementation rows on pages 2 and 3 as you have for previously evaluated mitigation actions.

Please also fill in the prioritization/implementation sections (row 4) on pages 2 and 3 to evaluate how you plan to update your floodplain management ordinance to be consistent with revised Flood Insurance Rate Maps that may be adopted in the future in Ulster County.

If floodplain management staff in your municipality are not Certified Floodplain Managers, and if your municipality is not already a participant in FEMA's Community Rating System (CRS), please also complete rows 5 and 6 on pages 2 and 3.

If you consider there to be additional activities that could be undertaken to enforce your municipality's floodplain management ordinance, please fill in rows 7 and 8 (insert more rows if required) on pages 2 and 3.

Jurisdiction	Adoption Date of Current Floodplain Management Ordinance	Name of Designated Floodplain Administrator	Number of Municipal Staff with Roles in Enforcement of Floodplain Management Ordinance
Town of Gardiner, Ulster County, NY	July 8, 1997	Hank Vance ó Code Enforcement Officer & Building Inspector	One

**Please give a brief description of activities currently undertaken by your municipality to enforce your floodplain management ordinance:**

Floodplain Administrator grants or denies floodplain development permits; reviews FIRM for local area and other base flood elevation & floodway data available as criteria for requiring that new construction, substantial improvement or other proposed development meet the requirements of Chapter 121, Flood Damage Prevention, of the Gardiner Town Code; updates the local FIRM when new data is promulgated by FEMA; and in general administers the Flood Damage Prevention chapter of the Code.



## ULSTER COUNTY MJHMP: NFIP COMPLIANCE ACTIONS

(Name of Jurisdiction) Town of Gardiner

NFIP Compliance Action	“-” = cost (unfavorable)				“0”=neutral or not applicable				“+” = benefit (favorable)			(high, medium, or low)		
	S	T	A	P	L	E	E	Can be implemented easily	Achieves multiple objectives	Can be implemented quickly	Overall Benefits	Overall Costs	Priority	
1. Update/revise floodplain management ordinances to comply with latest FEMA regulations	0	+	0	-	-	0	+	+	+	0	High	Low	High	
2. Designate/install a specific person to be your municipality's Floodplain Administrator	0	0	0	0	0	0	0	+	+	+	High	Low	Low	
3. Add/train sufficient members of staff to adequately enforce NFIP regulations/floodplain management ordinances	0	0	0	0	0	0	0	0	0	0	Low	Low	Low	
4. Update/revise floodplain management ordinances to be consistent with new FIRMs	0	+	0	-	-	0	+	+	+	0	High	Low	High	
5. Require staff involved in Floodplain management and ordinance enforcement to become Certified Floodplain Managers (CFMs)	0	+	-	0	+	-	0	-	+	-	High	High	Low	
6. Join the Community Rating System (CRS)	0	-	-	0	+	-	+	-	0	-	Medium	High	Low	
7.														
8.														





## ULSTER COUNTY MJHMP: NFIP COMPLIANCE ACTIONS

(Name of Jurisdiction) Town of Gardiner

Priority	NFIP Compliance Action	Applies to Community Assets (Existing / New / Both)	Primary Department Responsible	Existing Local Planning Mechanism through which the action will be implemented	Target Date	Cost Estimate	Funding Source
High	1. Update/revise floodplain management ordinances to comply with latest FEMA regulations	Existing	Building Dept.	Building Dept/	6 mos. after new FIRM and/or FEMA regs. are posted	\$3,000.00	Town General Fund
Low	2. Designate/install a specific person to be your municipality's Floodplain Administrator	Existing	Building Insp.	Building Insp.	Already Existing	None	Budgeted item
Low	3. Add/train sufficient members of staff to adequately enforce NFIP regulations/floodplain management ordinances	N/A	N/A	N/A	N/A	N/A	N/A
High	4. Update/revise floodplain management ordinances to be consistent with new FIRMs	Both	Building Dept.	Building Dept.	6 mos. after new FIRM is posted	\$3,000	General Fund
Low	5. Require staff involved in Floodplain management and ordinance enforcement to become Certified Floodplain Managers (CFMs)	Both	Building Dept.	Building Dept.	N/A	N/A	N/A
Low	6. Join the Community Rating System (CRS)	Both	Building Dept.	Building Dept	12-18 mos.	Unknown	Unknown
	7.						



# ULSTER COUNTY MJHMP: NFIP COMPLIANCE ACTIONS

(Name of Jurisdiction) Town of Hurley

**Instructions:**

Please fill in the table on this page.

Then:

- If: 1. Your current floodplain management ordinance was adopted before 1996 and has not been subsequently revised;
- 2. You do not have a specific person designated to act as your local Floodplain Administrator;
- 3. You consider the present level of staffing insufficient to adequately enforce your floodplain management ordinance;

Then fill in the corresponding prioritization/implementation rows on pages 2 and 3 as you have for previously evaluated mitigation actions.

Please also fill in the prioritization/implementation sections (row 4) on pages 2 and 3 to evaluate how you plan to update your floodplain management ordinance to be consistent with revised Flood Insurance Rate Maps that may be adopted in the future in Ulster County.

If floodplain management staff in your municipality are not Certified Floodplain Managers, and if your municipality is not already a participant in FEMA's Community Rating System (CRS), please also complete rows 5 and 6 on pages 2 and 3.

If you consider there to be additional activities that could be undertaken to enforce your municipality's floodplain management ordinance, please fill in rows 7 and 8 (insert more rows if required) on pages 2 and 3.

Jurisdiction	Adoption Date of Current Floodplain Management Ordinance	Name of Designated Floodplain Administrator	Number of Municipal Staff with Roles in Enforcement of Floodplain Management Ordinance
Town of Hurley	FEB. 24, 1987	GLENN HOFFSTATTER BUILDING INSPECTOR	1

Please give a brief description of activities currently undertaken by your municipality to enforce your floodplain management ordinance:

WE REVIEW ALL BUILDING APPLICATIONS TO BE SURE THEY ARE IN COMPLIANCE  
WITH FEMA REGULATIONS (AND THE NATIONAL FLOOD INSURANCE PROGRAM).



# ULSTER COUNTY MJHMP: NFIP COMPLIANCE ACTIONS

(Name of Jurisdiction) Town of Hurley

NFIP Compliance Action	“-” = cost (unfavorable)			“0” = neutral or not applicable				“+” = benefit (favorable)			(high, medium, or low)		Priority
	S	T	A	P	L	E	E	Can be implemented easily	Achieves multiple objectives	Can be implemented quickly	Overall Benefits	Overall Costs	
1. Update/revise floodplain management ordinances to comply with latest FEMA regulations	+	+	+	0	+	+	+	+	+	+	Medium	Low	Medium
2. Designate/install a specific person to be your municipality's Floodplain Administrator	+	+	+	0	+	+	+	+	+	+	Medium	Low	Medium
3. Add/train sufficient members of staff to adequately enforce NFIP regulations/floodplain management ordinances	+	+	+	0	+	-	-	-	+	-	Low	Low	Low
4. Update/revise floodplain management ordinances to be consistent with new FIRMs	+	+	+	0	+	+	+	+	+	+	High	Low	High
5. Require staff involved in Floodplain management and ordinance enforcement to become Certified Floodplain Managers (CFMs)	+	+	+	0	+	+	+	+	+	-	Medium	Medium	Medium
6. Join the Community Rating System (CRS)	+	+	+	+	+	+	+	-	+	-	Medium	Medium	Medium
7.													
8.													

Sep. 22 2008 03:47PM P3

FAX NO. : 331 0058

FROM : TOWN OF HURLEY



# ULSTER COUNTY MJHMP: NFIP COMPLIANCE ACTIONS

(Name of Jurisdiction) Town of Hurley

Priority	NFIP Compliance Action	Applies to Community Assets (Existing / New / Both)	Primary Department Responsible	Existing Local Planning Mechanism through which the action will be implemented	Target Date	Cost Estimate	Funding Source
Medium	1. Update/revise floodplain management ordinances to comply with latest FEMA regulations	BOTH	BUILDING DEPT.	LOCAL LAW REVISION CODE BOOK	1/09	Low	GENERAL FUND
Medium	2. Designate/install a specific person to be your municipality's Floodplain Administrator	BOTH	TOWN BOARD	RESOLUTION	1/09	Low	GENERAL FUND
Low	3. Add/train sufficient members of staff to adequately enforce NFIP regulations/floodplain management ordinances	BOTH	TOWN BOARD	RESOLUTION	Don't Know	HIGH/ADDITIONAL SHARES	GENERAL FUND
High	4. Update/revise floodplain management ordinances to be consistent with new FIRMs	BOTH	BUILDING DEPT.	CODE REVISION	1/09	Low	GENERAL FUND
Medium	5. Require staff involved in Floodplain management and ordinance enforcement to become Certified Floodplain Managers (CFMs)	BOTH	TOWN BOARD + BUILDING DEPT.	SIGN UP FOR SEMINARS/COURSES	6/09	MEDIUM	GENERAL FUND
Medium	6. Join the Community Rating System (CRS)	BOTH	TOWN BOARD	RESOLUTION	6/09	Low	GENERAL FUND
	7.						
	8.						



# ULSTER COUNTY MJHMP: NFIP COMPLIANCE ACTIONS

(Name of Jurisdiction) City of Kingston

**Instructions:**

Please fill in the table on this page.

Then:

- If: 1. Your current floodplain management ordinance was adopted before 1996 and has not been subsequently revised;
- 2. You do not have a specific person designated to act as your local Floodplain Administrator;
- 3. You consider the present level of staffing insufficient to adequately enforce your floodplain management ordinance;

Then fill in the corresponding prioritization/implementation rows on pages 2 and 3 as you have for previously evaluated mitigation actions.

Please also fill in the prioritization/implementation sections (row 4) on pages 2 and 3 to evaluate how you plan to update your floodplain management ordinance to be consistent with revised Flood Insurance Rate Maps that may be adopted in the future in Ulster County.

If floodplain management staff in your municipality are not Certified Floodplain Managers, and if your municipality is not already a participant in FEMA's Community Rating System (CRS), please also complete rows 5 and 6 on pages 2 and 3.

If you consider there to be additional activities that could be undertaken to enforce your municipality's floodplain management ordinance, please fill in rows 7 and 8 (insert more rows if required) on pages 2 and 3.

Jurisdiction	Adoption Date of Current Floodplain Management Ordinance	Name of Designated Floodplain Administrator	Number of Municipal Staff with Roles in Enforcement of Floodplain Management Ordinance
City of Kingston	08/10/87 01/02/2000 Amend	Mike LeFevre	5

Please give a brief description of activities currently undertaken by your municipality to enforce your floodplain management ordinance:

Through cooperative effort of Planning, Engineering and Building Safety floodplain management is enforced through site plan approval and issuance of building permits. Planning and engineering reviews site plans and enforcement is done through the code enforcement process in Building Safety.



# ULSTER COUNTY MJHMP: NFIP COMPLIANCE ACTIONS

(Name of Jurisdiction) City of Kingston

No. 9425 P. 4

kingston fire dept 845.331.3252

Sep. 8. 2008 9:55AM

NFIP Compliance Action	“-” = cost (unfavorable)							“0” = neutral or not applicable			“+” = benefit (favorable)			(high, medium, or low)		
	S	T	A	P	L	E	E	Can be implemented easily	Achieves multiple objectives	Can be implemented quickly	Overall Benefits	Overall Costs	Priority			
1. Update/revise floodplain management ordinances to comply with latest FEMA regulations	+	+	+	0	+	+	+	+	+	0	Medium	Low	Medium			
2. Designate/install a specific person to be your municipality's Floodplain Administrator	-	+	-	0	+	-	+	-	+	-	High	High	Medium			
3. Add/train sufficient members of staff to adequately enforce NFIP regulations/floodplain management ordinances	-	+	-	0	+	-	+	-	+	-	High	High	Low			
4. Update/revise floodplain management ordinances to be consistent with new FIRMs	+	+	+	0	+	+	+	+	+	0	Medium	Low	Medium			
5. Require staff involved in Floodplain management and ordinance enforcement to become Certified Floodplain Managers (CFMs)	+	+	-	-	+	-	+	-	+	-	Medium	High	Medium			
6. Join the Community Rating System (CRS)	+	+	-	0	0	0	+	+	0	-	Medium	Low	Medium			
7.																
8.																



## ULSTER COUNTY MJHMP: NFIP COMPLIANCE ACTIONS

(Name of Jurisdiction) City of Kingston

Priority	NFIP Compliance Action	Applies to Community Assets (Existing / New / Both)	Primary Department Responsible	Existing Local Planning Mechanism through which the action will be implemented	Target Date	Cost Estimate	Funding Source
	1. Update/revise floodplain management ordinances to comply with latest FEMA regulations	Both	Engineering, City Attorney	City Council	01/01/2010	Unknown	unfunded
	2. Designate/install a specific person to be your municipality's Floodplain Administrator	Both	Building	Exists			
	3. Add/train sufficient members of staff to adequately enforce NFIP regulations/floodplain management ordinances	Both	Building, Engineering	Mayor	Unknown	125,000	unfunded
	4. Update/revise floodplain management ordinances to be consistent with new FIRMs	Both	Building Engineering	Planning	01/01/2010	Unknown	Unfunded
	5. Require staff involved in Floodplain management and ordinance enforcement to become Certified Floodplain Managers (CFMs)	Both	Building Engineering	Budget, Mayor Council	Unknown	50,000	Unfunded
	6. Join the Community Rating System (CRS)			Participate Now			
	7.						
	8.						

No. 9425 P. 5  
 Sep. 8. 2008 9:55AM  
 kingston fire dept 845.331.3252



# ULSTER COUNTY MJHMP: NFIP COMPLIANCE ACTIONS

(Name of Jurisdiction) Town of Kingston

Sep 25 08 01:50p

Town Of Ulster Assessor

18453380525

p 2

### Instructions:

Please fill in the table on this page.

When:

If: 1. Your current floodplain management ordinance was adopted before 1996 and has not been subsequently revised;

2. You do not have a specific person designated to act as your local Floodplain Administrator;

3. You consider the present level of staffing insufficient to adequately enforce your floodplain management ordinance;

When fill in the corresponding prioritization/implementation rows on pages 2 and 3 as you have for previously evaluated mitigation actions.

Please also fill in the prioritization/implementation sections (row 4) on pages 2 and 3 to evaluate how you plan to update your floodplain management ordinance to be consistent with revised Flood Insurance Rate Maps that may be adopted in the future in Ulster County.

If floodplain management staff in your municipality are not Certified Floodplain Managers, and if your municipality is not already a participant in FEMA's Community Rating System (CRS), please also complete rows 5 and 6 on pages 2 and 3.

If you consider there to be additional activities that could be undertaken to enforce your municipality's floodplain management ordinance, please fill in rows 7 and 8 (insert more rows if required) on pages 2 and 3.

Jurisdiction	Adoption Date of Current Floodplain Management Ordinance	Name of Designated Floodplain Administrator	Number of Municipal Staff with Roles in Enforcement of Floodplain Management Ordinance
Town of Kingston	Prior To 1996	CLARK Trimble Building Inspector	ONE

Please give a brief description of activities currently undertaken by your municipality to enforce your floodplain management ordinance:

The Town of Kingston Building Inspector reviews every Building Permit to ensure the property is in compliance with Flood Plain Regulations.





# ULSTER COUNTY MJHMP: NFIP COMPLIANCE ACTIONS

(Name of Jurisdiction) Town of Kingston

Sep 25 08 01:51p

Town Of Ulster Assessor

18453380525

p.3

NFIP Compliance Action	“-” = cost (unfavorable)						“0” = neutral or not applicable		“+” = benefit (favorable)		(high, medium, or low)		
	S	T	A	P	L	E	E	Can be implemented easily	Achieves multiple objectives	Can be implemented quickly	Overall Benefits	Overall Costs	Priority
1. Update/revise floodplain management ordinances to comply with latest FEMA regulations	+	+	0	+	0	0	0	0	+	+	High	Low	High
2. Designate/install a specific person to be your municipality's Floodplain Administrator													
3. Add/train sufficient members of staff to adequately enforce NFIP regulations/floodplain management ordinances	+	+	0	+	0	0	0	0	+	+	High	Low	High
4. Update/revise floodplain management ordinances to be consistent with new FIRMs	+	+	0	+	0	0	0	0	+	+	High	Low	High
5. Require staff involved in Floodplain management and ordinance enforcement to become Certified Floodplain Managers (CFMs)	+	+	0	+	0	0	0	0	+	+	High	Low	High
6. Join the Community Rating System (CRS)	+	+	0	+	0	0	0	+	+	+	High	Low	High
7.													
8.													



# ULSTER COUNTY MJHMP: NFIP COMPLIANCE ACTIONS

(Name of Jurisdiction) Town of Kingston

Priority	NFIP Compliance Action	Applies to Community Assets (Existing / New / Both)	Primary Department Responsible	Existing Local Planning Mechanism through which the action will be implemented	Target Date	Cost Estimate	Funding Source
High	1. Update/revise floodplain management ordinances to comply with latest FEMA regulations	Both	Building Department	Town Attorney Building Dept Assessor Office	1 YEAR	Low	Local
High	2. Designate/install a specific person to be your municipality's Floodplain Administrator	Both	Building Department	Town Attorney Building Dept Assessor	6 months	Low	Local
High	3. Add/train sufficient members of staff to adequately enforce NFIP regulations/floodplain management ordinances	Both	Building + Assessor	Town Board Building Dept Assessor	1 YEAR	Moderate	Local
High	4. Update/revise floodplain management ordinances to be consistent with new FIRMs	Both	Building Department	Town Board Building Dept.	1 YEAR	Moderate	Local
High	5. Require staff involved in Floodplain management and ordinance enforcement to become Certified Floodplain Managers (CFMs)	Both	Building Department	Town Board Building Dept Assessor	1 YEAR	Moderate	Local
High	6. Join the Community Rating System (CRS)	Both	Building Dept Assessor	Town Board Assessor Building Inspector	6 months	Low	Local
	7.						
	8.						



## ULSTER COUNTY MJHMP: NFIP COMPLIANCE ACTIONS

(Name of Jurisdiction) Town of Lloyd

### Instructions:

Please fill in the table on this page.

Then:

- If:
1. Your current floodplain management ordinance was adopted before 1996 and has not been subsequently revised;
  2. You do not have a specific person designated to act as your local Floodplain Administrator;
  3. You consider the present level of staffing insufficient to adequately enforce your floodplain management ordinance;

Then fill in the corresponding prioritization/implementation rows on pages 2 and 3 as you have for previously evaluated mitigation actions.

Please also fill in the prioritization/implementation sections (row 4) on pages 2 and 3 to evaluate how you plan to update your floodplain management ordinance to be consistent with revised Flood Insurance Rate Maps that may be adopted in the future in Ulster County.

If floodplain management staff in your municipality are not Certified Floodplain Managers, and if your municipality is not already a participant in FEMA's Community Rating System (CRS), please also complete rows 5 and 6 on pages 2 and 3.

If you consider there to be additional activities that could be undertaken to enforce your municipality's floodplain management ordinance, please fill in rows 7 and 8 (insert more rows if required) on pages 2 and 3.

<b>Jurisdiction</b>	<b>Adoption Date of Current Floodplain Management Ordinance</b>	<b>Name of Designated Floodplain Administrator</b>	<b>Number of Municipal Staff with Roles in Enforcement of Floodplain Management Ordinance</b>
Town of Lloyd	1999	David E. Barton, Building Inspector	4

**Please give a brief description of activities currently undertaken by your municipality to enforce your floodplain management ordinance:**

Permits are issued by the Building Department for structures or uses within the FIRM designated flood areas. Note that the Town of Lloyd is also rewriting Chapter 60 (Flood Damage Protection) currently and adding a new chapter to better manage freshwater wetlands.



## ULSTER COUNTY MJHMP: NFIP COMPLIANCE ACTIONS

(Name of Jurisdiction) Town of Llovd

NFIP Compliance Action	“-” = cost (unfavorable)			“0”=neutral or not applicable				“+” = benefit (favorable)			(high, medium, or low)		
	S	T	A	P	L	E	E	Can be implemented easily	Achieves multiple objectives	Can be implemented quickly	Overall Benefits	Overall Costs	Priority
1. Update/revise floodplain management ordinances to comply with latest FEMA regulations													
2. Designate/install a specific person to be your municipality's Floodplain Administrator													
3. Add/train sufficient members of staff to adequately enforce NFIP regulations/floodplain management ordinances													
4. Update/revise floodplain management ordinances to be consistent with new FIRMs													
5. Require staff involved in Floodplain management and ordinance enforcement to become Certified Floodplain Managers (CFMs)	0	0	0	0	0	0	0	0	0	0	Low	Low	low
6. Join the Community Rating System (CRS)	0	0	0	0	0	0	0	+	0	0	Low	Low	Medium
7.													
8.													



## ULSTER COUNTY MJHMP: NFIP COMPLIANCE ACTIONS

(Name of Jurisdiction) Town of Lloyd

Priority	NFIP Compliance Action	Applies to Community Assets (Existing / New / Both)	Primary Department Responsible	Existing Local Planning Mechanism through which the action will be implemented	Target Date	Cost Estimate	Funding Source
	1. Update/revise floodplain management ordinances to comply with latest FEMA regulations						
	2. Designate/install a specific person to be your municipality's Floodplain Administrator						
	3. Add/train sufficient members of staff to adequately enforce NFIP regulations/floodplain management ordinances						
	4. Update/revise floodplain management ordinances to be consistent with new FIRMs						
	5. Require staff involved in Floodplain management and ordinance enforcement to become Certified Floodplain Managers (CFMs)	Existing and new	Building Dept	None	No date set	Unsure	Dept. Budget.
	6. Join the Community Rating System (CRS)	New	Building Dept	Building Dept. Director	No date set	Unsure	Dept. Budget.
	7.						
	8.						



## ULSTER COUNTY MJHMP: NFIP COMPLIANCE ACTIONS

(Name of Jurisdiction) Town of Marbletown

**Instructions:**

Please fill in the table on this page.

Then:

- If: 1. Your current floodplain management ordinance was adopted before 1996 and has not been subsequently revised;
- 2. You do not have a specific person designated to act as your local Floodplain Administrator;
- 3. You consider the present level of staffing insufficient to adequately enforce your floodplain management ordinance;

Then fill in the corresponding prioritization/implementation rows on pages 2 and 3 as you have for previously evaluated mitigation actions.

Please also fill in the prioritization/implementation sections (row 4) on pages 2 and 3 to evaluate how you plan to update your floodplain management ordinance to be consistent with revised Flood Insurance Rate Maps that may be adopted in the future in Ulster County.

If floodplain management staff in your municipality are not Certified Floodplain Managers, and if your municipality is not already a participant in FEMA's Community Rating System (CRS), please also complete rows 5 and 6 on pages 2 and 3.

If you consider there to be additional activities that could be undertaken to enforce your municipality's floodplain management ordinance, please fill in rows 7 and 8 (insert more rows if required) on pages 2 and 3.

Jurisdiction	Adoption Date of Current Floodplain Management Ordinance	Name of Designated Floodplain Administrator	Number of Municipal Staff with Roles in Enforcement of Floodplain Management Ordinance
Town of Marbletown	1991	Bryant Arms	2

**Please give a brief description of activities currently undertaken by your municipality to enforce your floodplain management ordinance:**

Ordinance is enforced by the Town Planning Board, through the Site Plan approval process. Also enforced by our two Code Enforcement Officers/Building Inspectors.

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## ULSTER COUNTY MJHMP: NFIP COMPLIANCE ACTIONS

(Name of Jurisdiction) Town of Marbletown

NFIP Compliance Action	“-” = cost (unfavorable)			“0”=neutral or not applicable				“+” = benefit (favorable)			(high, medium, or low)		
	S	T	A	P	L	E	E	Can be implemented easily	Achieves multiple objectives	Can be implemented quickly	Overall Benefits	Overall Costs	Priority
1. Update/revise floodplain management ordinances to comply with latest FEMA regulations	+	-	-	0	-	-	+	-	0	-	Medium	Medium	Medium
2. Designate/install a specific person to be your municipality's Floodplain Administrator	0	0	0	0	0	0	0	-	0	-	Medium	Low	Medium
3. Add/train sufficient members of staff to adequately enforce NFIP regulations/floodplain management ordinances	-	-	-	-	-	-	-	-	-	-	Low	Low	Low
4. Update/revise floodplain management ordinances to be consistent with new FIRMs	+	-	-	0	-	+	+	-	-	-	Medium	Medium	Medium
5. Require staff involved in Floodplain management and ordinance enforcement to become Certified Floodplain Managers (CFMs)	0	+	+	0	0	-	+	0	0	0	Medium	Medium	Medium
6. Join the Community Rating System (CRS)	0	0	0	0	0	0	0	0	0	0	Medium	Medium	Medium
7.													
8.													



## ULSTER COUNTY MJHMP: NFIP COMPLIANCE ACTIONS

(Name of Jurisdiction) Town of Marbletown

Priority	NFIP Compliance Action	Applies to Community Assets (Existing / New / Both)	Primary Department Responsible	Existing Local Planning Mechanism through which the action will be implemented	Target Date	Cost Estimate	Funding Source
Medium	1. Update/revise floodplain management ordinances to comply with latest FEMA regulations	Both	Town Board	Legislative	2011	5K	None
Medium	2. Designate/install a specific person to be your municipality's Floodplain Administrator	Both	Building/Safety	Legislative	2011	10K	None
Low	3. Add/train sufficient members of staff to adequately enforce NFIP regulations/floodplain management ordinances	Both	Town Board	Town Board Resolution	2011	25K	None
Medium	4. Update/revise floodplain management ordinances to be consistent with new FIRMs	Both	Town Board	Legislative	2011	7-10K	None
Medium	5. Require staff involved in Floodplain management and ordinance enforcement to become Certified Floodplain Managers (CFMs)	Both	Town Board	Town Board Resolution	2011	7K	None
Medium	6. Join the Community Rating System (CRS)	Both	Town Board	Town Board Resolution	2011	0	None
	7.						
	8.						





# ULSTER COUNTY MJHMP: NFIP COMPLIANCE ACTIONS

(Name of Jurisdiction) Town of Marlborough

**Instructions:**

Please fill in the table on this page.

When:

- If: 1. Your current floodplain management ordinance was adopted before 1996 and has not been subsequently revised;
- 2. You do not have a specific person designated to act as your local Floodplain Administrator;
- 3. You consider the present level of staffing insufficient to adequately enforce your floodplain management ordinance;

then fill in the corresponding prioritization/implementation rows on pages 2 and 3 as you have for previously evaluated mitigation actions.

Please also fill in the prioritization/implementation sections (row 4) on pages 2 and 3 to evaluate how you plan to update your floodplain management ordinance to be consistent with revised Flood Insurance Rate Maps that may be adopted in the future in Ulster County.

If floodplain management staff in your municipality are not Certified Floodplain Managers, and if your municipality is not already a participant in FEMA's Community Rating System (CRS), please also complete rows 5 and 6 on pages 2 and 3.

If you consider there to be additional activities that could be undertaken to enforce your municipality's floodplain management ordinance, please fill in rows 7 and 8 (insert more rows if required) on pages 2 and 3.

Jurisdiction	Adoption Date of Current Floodplain Management Ordinance	Name of Designated Floodplain Administrator	Number of Municipal Staff with Roles in Enforcement of Floodplain Management Ordinance
Town of Marlborough	6/8/1987	Building Inspector - George Salinovich	3 - Building Inspector Assessor Town Clerk

Please give a brief description of activities currently undertaken by your municipality to enforce your floodplain management ordinance:

Town Clerk & Building Inspector maintain & update flood hazard maps. Permit applications are reviewed under chapter 97 provisions. Construction standards under chapter 97 followed. GIS mapping.

ULSTER CO E911

845-331-1738

09/09/2006 15:48



ULSTER COUNTY MJHMP: NFIP COMPLIANCE ACTIONS

(Name of Jurisdiction) Town of Marlborough

09/09/2006 15:48  
 845-331-1738  
 ULSTER CO E911  
 09/09/2006 15:33

NFIP Compliance Action	"0" = cost (unfavorable)							"0" = neutral or not applicable			"+/-" = benefit (favorable)			(high, medium, or low)		Priority
	S	T	A	P	L	E	E	Can be implemented easily	Achieves multiple objectives	Can be implemented quickly	Overall Benefits	Overall Costs				
1. Update/revise floodplain management ordinances to comply with latest FEMA regulations	0	-	+	0	+	-	0	-	0	-	medium	low	2			
2. Designate/install a specific person to be your municipality's Floodplain Administrator	+	+	+	+	+	0	0	+	0	+	medium	low	1			
3. Add/train sufficient members of staff to adequately enforce NFIP regulations/floodplain management ordinances	0	+	+	0	+	-	0	-	+	-	medium	high	5			
4. Update/revise floodplain management ordinances to be consistent with new FIRMs	0	-	+	0	+	-	0	-	0	-	medium	low	3			
5. Require staff involved in floodplain management and ordinance enforcement to become Certified Floodplain Managers (CFMs)	-	+	-	-	0	-	0	-	-	-	medium	high	6			
6. Join the Community Rating System (CRS)	0	+	+	+	+	-	0	-	+	-	medium	medium	4			



ULSTER COUNTY MJHMP: NFIP COMPLIANCE ACTIONS

(Name of Jurisdiction) Town of Marlborough

Priority	NFIP Compliance Action	Applies to Community Assets (Existing / New / Both)	Primary Department Responsible	Existing Local Planning Mechanism through which the action will be implemented	Target Date	Cost Estimate	Funding Source
2	1. Update/revise floodplain management ordinances to comply with latest FEMA regulations	Existing	Building	Building Dept.	As per FEMA regulations	negligible	Town + Federal
1	2. Designate/install a specific person to be your municipality's Floodplain Administrator	Existing	Building	Town Code	Done	NA	Town
5	3. Add/train sufficient members of staff to adequately enforce NFIP regulations/floodplain management ordinances	New	Building	Building Dept	As per NFIP regulations	too much	Town
3	4. Update/revise floodplain management ordinances to be consistent with new FIRMs	Existing	Building	Building Dept.	As per NFIP regulations	negligible	Town + Federal
6	5. Require staff involved in Floodplain management and ordinance enforcement to become Certified Floodplain Managers (CFMs)	New	Building	Revise Code	none	?	?
4	6. Join the Community Rating System (CRS)	New	Building	Revise Code	none	?	?
	7.						
	8.						



## ULSTER COUNTY MJHMP: NFIP COMPLIANCE ACTIONS

(Name of Jurisdiction) Town of Rosendale

**Instructions:**

Please fill in the table on this page.

Then:

- If:
1. Your current floodplain management ordinance was adopted before 1996 and has not been subsequently revised;
  2. You do not have a specific person designated to act as your local Floodplain Administrator;
  3. You consider the present level of staffing insufficient to adequately enforce your floodplain management ordinance;

Then fill in the corresponding prioritization/implementation rows on pages 2 and 3 as you have for previously evaluated mitigation actions.

Please also fill in the prioritization/implementation sections (row 4) on pages 2 and 3 to evaluate how you plan to update your floodplain management ordinance to be consistent with revised Flood Insurance Rate Maps that may be adopted in the future in Ulster County.

If floodplain management staff in your municipality are not Certified Floodplain Managers, and if your municipality is not already a participant in FEMA's Community Rating System (CRS), please also complete rows 5 and 6 on pages 2 and 3.

If you consider there to be additional activities that could be undertaken to enforce your municipality's floodplain management ordinance, please fill in rows 7 and 8 (insert more rows if required) on pages 2 and 3.

Jurisdiction	Adoption Date of Current Floodplain Management Ordinance	Name of Designated Floodplain Administrator	Number of Municipal Staff with Roles in Enforcement of Floodplain Management Ordinance
Town of Rosendale	2/14/1990	Building Inspector	Building Inspector Code enforcement officer Planning Board Zoning Board of Appeals Town Board

**Please give a brief description of activities currently undertaken by your municipality to enforce your floodplain management ordinance:**

Local Town Code 75-27. Implemented and applied during sub division, site plan, special use and construction permitting. The regulation is also enforced after said activities are completed or if a non-compliant activity identified in this section has been determined by the Building Inspector.



## ULSTER COUNTY MJHMP: NFIP COMPLIANCE ACTIONS

(Name of Jurisdiction) Town of Rosendale

NFIP Compliance Action	“-” = cost (unfavorable)			“0”=neutral or not applicable				“+” = benefit (favorable)			(high, medium, or low)		
	S	T	A	P	L	E	E	Can be implemented easily	Achieves multiple objectives	Can be implemented quickly	Overall Benefits	Overall Costs	Priority
1. Update/revise floodplain management ordinances to comply with latest FEMA regulations	+	+	-	+	-	-	+	-	+	-	high	high	high
2. Designate/install a specific person to be your municipality's Floodplain Administrator	+	+	-	+	-	-	+	-	+	-	high	medium	High
3. Add/train sufficient members of staff to adequately enforce NFIP regulations/floodplain management ordinances	0	0	-	-	-	-	-	-	+	-	high	high	low
4. Update/revise floodplain management ordinances to be consistent with new FIRMs	+	+	-	+	-	-	+	-	+	-	high	high	low
5. Require staff involved in Floodplain management and ordinance enforcement to become Certified Floodplain Managers (CFMs)	+	+	-	+	-	-	+	-	+	-	high	high	low
6. Join the Community Rating System (CRS)	0	0	-	-	-	-	0	-	+	-	medium	Medium	medium
7.													
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## ULSTER COUNTY MJHMP: NFIP COMPLIANCE ACTIONS

(Name of Jurisdiction) Town of Rosendale

Priority	NFIP Compliance Action	Applies to Community Assets (Existing / New / Both)	Primary Department Responsible	Existing Local Planning Mechanism through which the action will be implemented	Target Date	Cost Estimate	Funding Source
high	1. Update/revise floodplain management ordinances to comply with latest FEMA regulations	both	Building & Planning Department	Planning Board, Zoning Board of Appeals, Building permits, code enforcement	2013	unknown	Local, County, State, Federal
high	2. Designate/install a specific person to be your municipality's Floodplain Administrator	both	Building Inspector/Department	Planning Board, Zoning Board of Appeals, Building permits, code enforcement	2013	unknown	Local, County, State, Federal
low	3. Add/train sufficient members of staff to adequately enforce NFIP regulations/floodplain management ordinances	both	unknown	unknown	unknown	unknown	Local, County, State, Federal
low	4. Update/revise floodplain management ordinances to be consistent with new FIRMs	both	Building & Planning Department	Planning Board, Zoning Board of Appeals, Building permits, code enforcement	2013	unknown	Local, County, State, Federal
Low	5. Require staff involved in Floodplain management and ordinance enforcement to become Certified Floodplain Managers (CFMs)	both	Building Inspector/Department	Planning Board, Zoning Board of Appeals, Building permits, code enforcement	2013	unknown	Local, County, State, Federal
medium	6. Join the Community Rating System (CRS)	both	Building Inspector/Department	unknown	unknown	unknown	Local, County, State, Federal



## ULSTER COUNTY MJHMP: NFIP COMPLIANCE ACTIONS

(Name of Jurisdiction) Town of Saugerties

**Instructions:**

Please fill in the table on this page.

Then:

- If: 1. Your current floodplain management ordinance was adopted before 1996 and has not been subsequently revised;
- 2. You do not have a specific person designated to act as your local Floodplain Administrator;
- 3. You consider the present level of staffing insufficient to adequately enforce your floodplain management ordinance;

Then fill in the corresponding prioritization/implementation rows on pages 2 and 3 as you have for previously evaluated mitigation actions.

Please also fill in the prioritization/implementation sections (row 4) on pages 2 and 3 to evaluate how you plan to update your floodplain management ordinance to be consistent with revised Flood Insurance Rate Maps that may be adopted in the future in Ulster County.

If floodplain management staff in your municipality are not Certified Floodplain Managers, and if your municipality is not already a participant in FEMA's Community Rating System (CRS), please also complete rows 5 and 6 on pages 2 and 3.

If you consider there to be additional activities that could be undertaken to enforce your municipality's floodplain management ordinance, please fill in rows 7 and 8 (insert more rows if required) on pages 2 and 3.

Jurisdiction	Adoption Date of Current Floodplain Management Ordinance	Name of Designated Floodplain Administrator	Number of Municipal Staff with Roles in Enforcement of Floodplain Management Ordinance
Town of Saugerties	December 27, 1991	Alvah Weeks, Jr.	2

**Please give a brief description of activities currently undertaken by your municipality to enforce your floodplain management ordinance:**

Stormwater and floodplain ordinances are enforced through the local Planning Board's Site Plan review process, and by the Town's two building inspectors.

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## ULSTER COUNTY MJHMP: NFIP COMPLIANCE ACTIONS

(Name of Jurisdiction) Town of Saugerties

NFIP Compliance Action	“-” = cost (unfavorable)			“0”=neutral or not applicable				“+” = benefit (favorable)			(high, medium, or low)		
	S	T	A	P	L	E	E	Can be implemented easily	Achieves multiple objectives	Can be implemented quickly	Overall Benefits	Overall Costs	Priority
1. Update/revise floodplain management ordinances to comply with latest FEMA regulations	+	-	-	0	-	0	+	0	0	0	Medium	Medium	Medium
2. Designate/install a specific person to be your municipality's Floodplain Administrator	0	0	0	0	0	0	0	0	+	0	Medium	Low	Medium
3. Add/train sufficient members of staff to adequately enforce NFIP regulations/floodplain management ordinances	-	-	-	-	-	-	-	-	-	-	Low	Low	Low
4. Update/revise floodplain management ordinances to be consistent with new FIRMs	0	+	0	0	-	+	0	0	0	-	High	Medium	Medium
5. Require staff involved in Floodplain management and ordinance enforcement to become Certified Floodplain Managers (CFMs)	0	+	0	0	0	-	0	-	0	0	Medium	Medium	Low
6. Join the Community Rating System (CRS)	0	0	-	0	0	-	0	-	0	0	Medium	Medium	Low
7.													
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## ULSTER COUNTY MJHMP: NFIP COMPLIANCE ACTIONS

(Name of Jurisdiction) TOWN OF SAUGERTIES

Priority	NFIP Compliance Action	Applies to Community Assets (Existing / New / Both)	Primary Department Responsible	Existing Local Planning Mechanism through which the action will be implemented	Target Date	Cost Estimate	Funding Source
MEDIUM	1. Update/revise floodplain management ordinances to comply with latest FEMA regulations	BOTH	BUILDING DEPT.	BUILDING DEPT	2011	5,000	NONE
MEDIUM	2. Designate/install a specific person to be your municipality's Floodplain Administrator	BOTH	BUILDING DEPT.	BUILDING DEPT	2011	0	NONE
LOW	3. Add/train sufficient members of staff to adequately enforce NFIP regulations/floodplain management ordinances	BOTH	BUILDING DEPT	BUILDING DEPT	2011	N/A	NONE
HIGH	4. Update/revise floodplain management ordinances to be consistent with new FIRMs	BOTH	BUILDING DEPT	BUILDING DEPT	2011	N/A	NONE
LOW	5. Require staff involved in Floodplain management and ordinance enforcement to become Certified Floodplain Managers (CFMs)	BOTH	BUILDING DEPT	BUILDING DEPT	2011	N/A	NONE
LOW	6. Join the Community Rating System (CRS)	BOTH	BUILDING DEPT	BUILDING DEPT	2011	0	NONE
	7.						
	8.						



ULSTER COUNTY MJHMP: NFIP COMPLIANCE ACTIONS

(Name of Jurisdiction) Town of Shandaken

**Instructions:**

Please fill in the table on this page.

Then:

- If: 1. Your current floodplain management ordinance was adopted before 1996 and has not been subsequently revised;
- 2. You do not have a specific person designated to act as your local Floodplain Administrator;
- 3. You consider the present level of staffing insufficient to adequately enforce your floodplain management ordinance;

Then fill in the corresponding prioritization/implementation rows on pages 2 and 3 as you have for previously evaluated mitigation actions.

Please also fill in the prioritization/implementation sections (row 4) on pages 2 and 3 to evaluate how you plan to update your floodplain management ordinance to be consistent with revised Flood Insurance Rate Maps that may be adopted in the future in Ulster County.

If floodplain management staff in your municipality are not Certified Floodplain Managers, and if your municipality is not already a participant in FEMA's Community Rating System (CRS), please also complete rows 5 and 6 on pages 2 and 3.

If you consider there to be additional activities that could be undertaken to enforce your municipality's floodplain management ordinance, please fill in rows 7 and 8 (insert more rows if required) on pages 2 and 3.

Jurisdiction	Adoption Date of Current Floodplain Management Ordinance	Name of Designated Floodplain Administrator	Number of Municipal Staff with Roles in Enforcement of Floodplain Management Ordinance
Town of Shandaken	FLOOD DAMAGE Prevention 9/9/87	Gina Renny	1

Please give a brief description of activities currently undertaken by your municipality to enforce your floodplain management ordinance:

MUST apply for a Floodplain Development permit Before Building + zoning permits.



ULSTER COUNTY MJHMP: NFIP COMPLIANCE ACTIONS

(Name of Jurisdiction) Town of Shandaken

NFIP Compliance Action	“-” = cost (unfavorable)				“0” = neutral or not applicable				“+” = benefit (favorable)			(high, medium, or low)		
	S	T	A	P	L	E	E	Can be implemented easily	Achieves multiple objectives	Can be implemented quickly	Overall Benefits	Overall Costs	Priority	
1. Update/revise floodplain management ordinances to comply with latest FEMA regulations	+	+	+	0	0	0	0	0	+	0	High	High	High	
2. Designate/install a specific person to be your municipality's Floodplain Administrator	+	+	+	0	0	0	0	+	+	+	low	low	Low	
3. Add/train sufficient members of staff to adequately enforce NFIP regulations/floodplain management ordinances	0	0	0	0	0	0	0	+	+	+	medium	medium	medium	
4. Update/revise floodplain management ordinances to be consistent with new FIRMs	0	0	0	0	0	0	0	0	0	0	High	High	High	
5. Require staff involved in Floodplain management and ordinance enforcement to become Certified Floodplain Managers (CFMs)	+	0	0	0	0	-	0	0	0	0	High	High	High	
6. Join the Community Rating System (CRS)	0	0	0	0	0	0	0	0	0	0	low	low	Low	
7.														
8.														



ULSTER COUNTY MJHMP: NFIP COMPLIANCE ACTIONS

(Name of Jurisdiction) Town of Shandaken

Priority	NFIP Compliance Action	Applies to Community Assets (Existing / New / Both)	Primary Department Responsible	Existing Local Planning Mechanism through which the action will be implemented	Target Date	Cost Estimate	Funding Source
High	1. Update/revise floodplain management ordinances to comply with latest FEMA regulations	Existing	Zoning	Zoning Board	Asap	High	Fema State Grants
Low	2. Designate/install a specific person to be your municipality's Floodplain Administrator	Existing	Zoning	Zoning Board	Asap	medium	Fema State Grants
Medium	3. Add/train sufficient members of staff to adequately enforce NFIP regulations/floodplain management ordinances	New	Zoning	Zoning Board	Asap	medium	Fema State Grants
Medium	4. Update/revise floodplain management ordinances to be consistent with new FIRMs	New	Zoning	Zoning Board	Asap	High	Fema State Grants
Low	5. Require staff involved in Floodplain management and ordinance enforcement to become Certified Floodplain Managers (CFMs)	New	Zoning	Zoning Board	Asap	medium	Fema State Grants
Low	6. Join the Community Rating System (CRS)	New	Zoning	Zoning Board	2010	medium	Fema State Grants
	7.						
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SHANDAKEN - HWY\_DEPT: 8456882820 09/22/2008 14:05



## ULSTER COUNTY MJHMP: NFIP COMPLIANCE ACTIONS

(Name of Jurisdiction) Town of Shawangunk

**Instructions:**

Please fill in the table on this page.

Then:

- If: 1. Your current floodplain management ordinance was adopted before 1996 and has not been subsequently revised;
- 2. You do not have a specific person designated to act as your local Floodplain Administrator;
- 3. You consider the present level of staffing insufficient to adequately enforce your floodplain management ordinance;

Then fill in the corresponding prioritization/implementation rows on pages 2 and 3 as you have for previously evaluated mitigation actions.

Please also fill in the prioritization/implementation sections (row 4) on pages 2 and 3 to evaluate how you plan to update your floodplain management ordinance to be consistent with revised Flood Insurance Rate Maps that may be adopted in the future in Ulster County.

If floodplain management staff in your municipality are not Certified Floodplain Managers, and if your municipality is not already a participant in FEMA's Community Rating System (CRS), please also complete rows 5 and 6 on pages 2 and 3.

If you consider there to be additional activities that could be undertaken to enforce your municipality's floodplain management ordinance, please fill in rows 7 and 8 (insert more rows if required) on pages 2 and 3.

Jurisdiction	Adoption Date of Current Floodplain Management Ordinance	Name of Designated Floodplain Administrator	Number of Municipal Staff with Roles in Enforcement of Floodplain Management Ordinance
Shawangunk	Last update 12-21-1989	Building Inspector	1

**Please give a brief description of activities currently undertaken by your municipality to enforce your floodplain management ordinance:**

Building Inspector regulates new construction

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## ULSTER COUNTY MJHMP: NFIP COMPLIANCE ACTIONS

(Name of Jurisdiction) Shawangunk

NFIP Compliance Action	“-” = cost (unfavorable)			“0”=neutral or not applicable				“+” = benefit (favorable)			(high, medium, or low)		
	S	T	A	P	L	E	E	Can be implemented easily	Achieves multiple objectives	Can be implemented quickly	Overall Benefits	Overall Costs	Priority
1. Update/revise floodplain management ordinances to comply with latest FEMA regulations								0	-	-	h	m	l
2. Designate/install a specific person to be your municipality's Floodplain Administrator								+	-	0	l	l	m
3. Add/train sufficient members of staff to adequately enforce NFIP regulations/floodplain management ordinances								-	-	-	m	h	l
4. Update/revise floodplain management ordinances to be consistent with new FIRMs								-	-	-	l	h	l
5. Require staff involved in Floodplain management and ordinance enforcement to become Certified Floodplain Managers (CFMs)								-	-	-	l	h	l
6. Join the Community Rating System (CRS)											l	l	l
7.													
8.													



## ULSTER COUNTY MJHMP: NFIP COMPLIANCE ACTIONS

(Name of Jurisdiction) Shawangunk

Priority	NFIP Compliance Action	Applies to Community Assets (Existing / New / Both)	Primary Department Responsible	Existing Local Planning Mechanism through which the action will be implemented	Target Date	Cost Estimate	Funding Source
1	1. Update/revise floodplain management ordinances to comply with latest FEMA regulations		Town Board	Local Law		Unknown	grants
m	2. Designate/install a specific person to be your municipality's Floodplain Administrator		Town Board			Unknown	
1	3. Add/train sufficient members of staff to adequately enforce NFIP regulations/floodplain management ordinances		Town Board			Unknown	
1	4. Update/revise floodplain management ordinances to be consistent with new FIRMs		Town Board			Unknown	
1	5. Require staff involved in Floodplain management and ordinance enforcement to become Certified Floodplain Managers (CFMs)		Town Board			Unknown	
1	6. Join the Community Rating System (CRS)		Town Board			Unknown	
	7.						
	8.						



# ULSTER COUNTY MJHMP: NFIP COMPLIANCE ACTIONS

(Name of Jurisdiction) Town of Ulster

Sep 25 08 01:51p  
Town Of Ulster Assessor

**Instructions:**

Please fill in the table on this page.

When:

- If: 1. Your current floodplain management ordinance was adopted before 1996 and has not been subsequently revised;
- 2. You do not have a specific person designated to act as your local Floodplain Administrator;
- 3. You consider the present level of staffing insufficient to adequately enforce your floodplain management ordinance;

Then fill in the corresponding prioritization/implementation rows on pages 2 and 3 as you have for previously evaluated mitigation actions.

Please also fill in the prioritization/implementation sections (row 4) on pages 2 and 3 to evaluate how you plan to update your floodplain management ordinance to be consistent with revised Flood Insurance Rate Maps that may be adopted in the future in Ulster County.

If floodplain management staff in your municipality are not Certified Floodplain Managers, and if your municipality is not already a participant in FEMA's Community Rating System (CRS), please also complete rows 5 and 6 on pages 2 and 3.

If you consider there to be additional activities that could be undertaken to enforce your municipality's floodplain management ordinance, please fill in rows 7 and 8 (insert more rows if required) on pages 2 and 3.

Jurisdiction	Adoption Date of Current Floodplain Management Ordinance	Name of Designated Floodplain Administrator	Number of Municipal Staff with Roles in Enforcement of Floodplain Management Ordinance
Town of Ulster	Prior to 1996	PAUL Economos Building Inspector	THREE

Please give a brief description of activities currently undertaken by your municipality to enforce your floodplain management ordinance:

Flood Plain Ordinance is reviewed with each and every building permit that is issued by THE TOWN of Ulster Building Department. All current Flood Plain Regulations ARE Enforced.

18453380525

p.5





# ULSTER COUNTY MJHMP: NFIP COMPLIANCE ACTIONS

(Name of Jurisdiction) Town of Ulster

Sep 25 08 01:52p

Town Of Ulster Assessor

18453380525

p.6

NFIP Compliance Action	"-" = cost (unfavorable)							"0" = neutral or not applicable			"+" = benefit (favorable)			(high, medium, or low)		
	S	T	A	P	L	E	E	Can be implemented easily	Achieves multiple objectives	Can be implemented quickly	Overall Benefits	Overall Costs	Priority			
1. Update/revise floodplain management ordinances to comply with latest FEMA regulations	+	+	0	+	0	0	0	0	+	+	High	Low	High			
2. Designate/install a specific person to be your municipality's Floodplain Administrator																
3. Add/train sufficient members of staff to adequately enforce NFIP regulations/floodplain management ordinances	+	+	0	+	0	0	0	0	+	+	High	Low	High			
4. Update/revise floodplain management ordinances to be consistent with new FIRMs	+	+	0	+	0	0	0	0	+	+	High	Low	High			
5. Require staff involved in Floodplain management and ordinance enforcement to become Certified Floodplain Managers (CFMs)	+	+	0	+	0	0	0	0	+	+	High	Low	High			
6. Join the Community Rating System (CRS)	+	+	0	+	0	0	0	+	+	+	High	Low	High			
7.																
8.																



# ULSTER COUNTY MJHMP: NFIP COMPLIANCE ACTIONS

(Name of Jurisdiction) Town of Ulster

Priority	NFIP Compliance Action	Applies to Community Assets (Existing / New / Both)	Primary Department Responsible	Existing Local Planning Mechanism through which the action will be implemented	Target Date	Cost Estimate	Funding Source
High	1. Update/revise floodplain management ordinances to comply with latest FEMA regulations	Both	Building Department	Town Attorney Building Dept Assessor Office	1 YEAR	Low	Local
High	2. Designate/install a specific person to be your municipality's Floodplain Administrator	Both	Building Department	Town Attorney Building Dept Assessor	6 months	Low	Local
High	3. Add/train sufficient members of staff to adequately enforce NFIP regulations/floodplain management ordinances	Both	Building + Assessor	Town Board Building Dept Assessor	1 YEAR	Moderate	Local
High	4. Update/revise floodplain management ordinances to be consistent with new FIRMs	Both	Building Department	Town Board Building Dept.	1 YEAR	Moderate	Local
High	5. Require staff involved in Floodplain management and ordinance enforcement to become Certified Floodplain Managers (CFMs)	Both	Building Department	Town Board Building Dept Assessor	1 YEAR	Moderate	Local
High	6. Join the Community Rating System (CRS)	Both	Building Dept	Building Dept. Assessor's Office	6 months	Low	Local
	7.						
	8.						

**APPENDIX G –  
PLANNING COMMITTEE AND JURISDICTION REPRESENTATIVES**



## **Ulster County Department of Emergency Communication/Emergency Management**

Director: Art Snyder  
238 Golden Hill Lane  
Kingston, NY 12401

### **Emergency Planning Committee Members/Participants**

American Red Cross	Peggy Morache
Central Hudson Gas & Electric	Gail Duncan
Kingston Fire Department	Richard Salzmman
Kingston Hospital	Ritch Parrish
NYC Department of Environmental Protection	Paul Bennett
NYS Bridge Authority	Wayne Ferguson
NYS Emergency Management Office	Mark Ferrari
NY State Police	Pat Regan
NYS Thruway Authority	Seth Hendrich
SUNY New Paltz	Ray Bryant
SUNY Ulster	Claire Burlingham
Ulster BOCES	Michael O'Rourke
UC Ambulance Association	Vic Work
UC Department of Public Works	David Sheeley
UC Emergency Management	Art Snyder
UC Fire Coordinator	Charles Mutz
UC Health Department	Dean Palen
UC Legislature	Frank Dart
UC Planning Department	Dennis Doyle
UC Police Chiefs Association	Raymond Zappone
UC Sheriff's Office	Paul Van Blarcum
UC Soils & Water Conservation District	Gary Capella
UC Town Supervisors Association	John Valk
US Coast Guard	John Gagne

## **Core Planning Group – Jurisdictional Representatives**

<u>Municipality</u>	<u>Representative / Title</u>
Denning, Town of	Did not participate
Ellenville, Village of	Did not participate
Esopus, Town of	Did not participate
Gardiner, Town of	Greg Finger / Councilman
Hardenburgh, Town of	Did not participate
Hurley, Town of	Janet Briggs / Deputy Supervisor
Kingston, City of	Richard Salzman / Fire Chief
Kingston, Town of	James Maloney / Assessor
Lloyd, Town of	David Barton / Building Inspector
Marbletown, Town of	Vincent Martello / Supervisor
Marlborough, Town of	Cindy Lanzetta / Deputy Supervisor
New Paltz, Town of	Did not participate
New Paltz, Village of	Expressed interest but did not fully participate
Olive, Town of	Did not participate
Plattekill, Town of	Did not participate
Rochester, Town of	Expressed interest but did not participate
Rosendale, Town of	Joe Havranek / Co-Chair, Planning Board
Saugerties, Town of	John Scheffel / Sergeant, Town Police
Saugerties, Village of	Did not participate
Shandaken, Town of	Eric Hofmeister / Highway Superintendent
Shawangunk, Town of	John Valk / Supervisor
Ulster, Town of	James Maloney / Assessor
Wawarsing, Town of	Expressed interest but did not participate
Woodstock, Town of	Did not participate