Town of Deerpark, New York

Draft

Hazard Mitigation Plan

June 2010

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Prepared For:

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1.0 Introduction

1.1 Overview

The Disaster Mitigation Act of 2000 (DMA 2000) defines hazard mitigation as "any sustained action taken to reduce or eliminate the long-term risk to human life and property from hazards." The purpose of the DMA 2000 is to encourage and enhance hazard mitigation and to reinforce the importance of planning before disasters happen. The post-disaster Hazard Mitigation Grant Program (HMGP) establishes new requirements that will allow funds to be used for such mitigation planning. A comprehensive mitigation plan detailing risks, past hazards, probability of future incidents, and damages incurred must be approved by the Federal Emergency Management Agency (FEMA) for a community to be eligible to receive these HMGP funds.

DMA 2000 requests that local governmental agencies work closely with their respective state governmental agencies in developing a Local Multi-Hazard Mitigation Plan. The responsibilities of implementing Section 322 of DMA 2000 belong to the State governmental agencies. These obligations include:

- Arranging and proposing a standard or improved State Mitigation Plan
- Evaluating and revising the State Mitigation Plan every three years
- Aiding local governments in creating local mitigation plans and applying for HMGP grants by making technical support and training available; and
- Examining and authorizing local plans if the State has an approved Enhanced Plan and is specified as a managing state

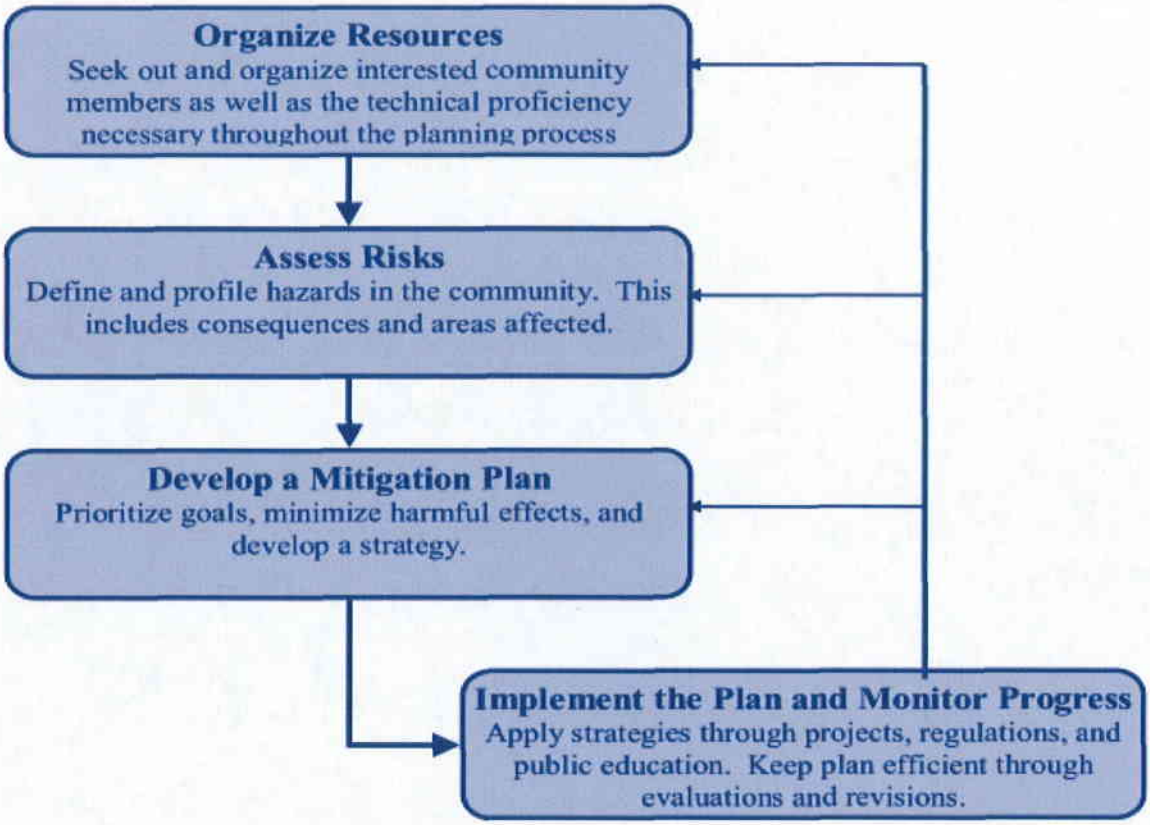
This collaborative planning effort enables all levels of government to react and perform more effectively, resulting in more efficient mitigation of and support during and in the aftermath of natural and human-caused disasters. In accordance with recommended

FEMA guidelines, the planning process and subsequent findings are to be documented in the local plan.

This Hazard Mitigation Plan (HMP), prepared by the Town of Deerpark Hazard Mitigation Plan Committee, focuses on mitigation measures that will minimize the community's vulnerability to the hazards identified by the HAZNY analysis. HAZNY is a hazard analysis software program that asks questions and bases assessments rankings on the provided responses. The HMP comprehensively evaluates a broad range of natural hazards and assesses cost-effective measures to minimize risk to life and property. The potential mitigation measures were developed within the existing physical and financial framework of the community and the recommendations of Committee members.

The HMP was formulated in accordance with the four-phase planning process noted on the flow chart below (Figure 1) and was developed using the HIRA-NY (Hazard Inventory and Risk Assessment – New York) methodology during the risk assessment evaluation.

Figure 1: Four Phase Planning Process



1.2 Participants in the Mitigation Planning Effort

The team established to participate in the drafting of this Hazard Mitigation Plan originated from the Town's previously established Emergency Management Team. The Hazard Mitigation Plan team included:

- John (Jack) Flynn – Director, Town of Deerpark Emergency Management
- Joyce Cirulli – Clerk/Secretary, Town of Deerpark Emergency Management
- Karl Brabenec – Supervisor, Town of Deerpark
- David Hoovler – Councilman, Town of Deerpark
- Gary Spears – Councilman, Town of Deerpark
- Arthur Trovei – Councilman, Town of Deerpark

- David Dean – Councilman, Town of Deerpark
- William Werner – Chief of Police, Town of Deerpark
- Ed Hughson – Highway Superintendent, Town of Deerpark
- Christopher Parliman – Chief, Cuddebackville Fire Department
- T.J. Kalin – Chief, Huguenot Fire Department
- Lee Hulbert – Representative the Red Cross
- Fred Ladika – Regional EMS Captain

In addition to these members, representatives from surrounding communities and governmental entities attended meetings when called upon to provide supplemental information. Some of these entities include Orange County, New York State Emergency Management Organization (NYSEMO) and the hired consultant, Barton & Loguidice, P.C.

1.3 Plan Document Organization

This plan was prepared in concert with the guidelines given in the Local Multi-Hazard Mitigation Planning Guidance Manual (FEMA Manual July 1, 2008). The Sections were developed in accord with the required and recommended plan contents, and follow closely the sequence of the guidance topics as they are presented in the manual (Figure 1 - Four Phase Planning Process).

The Introduction Section provides a brief overview of the basis for the Hazard Mitigation Plan. The General Description of the Town of Deerpark, Section II, includes socio-economic, historic and geographic information to provide a context for understanding the mitigation actions that will be implemented to reduce the Town's vulnerability. Most of this information was derived from the Town's *Comprehensive Plan.* The Planning Process, Section III, thoroughly documents how the plan was prepared, who was involved in the process, and how the public was involved. The Risk Assessment, Section IV, includes descriptions of all of the hazards that could affect the Town, along

with an analysis of the Town's vulnerability to those hazards. HIRA-NY, an automated program developed by the NYSEMO was used to analyze the risks of potential hazards. HAZUS, a national standardized geographic information system software package, was used to assess vulnerability by estimating losses form floods, earthquakes and hurricanes, and providing data for maps. A Mitigation Strategy, Section V, presents goals, objectives, and prioritized mitigation actions that will reduce the potential losses identified in the risk assessment. Finally, the Plan Maintenance Process, Section VI, includes a method and schedule for evaluating, and updating the plan every five years.

2.0 General Description of the Town of Deerpark

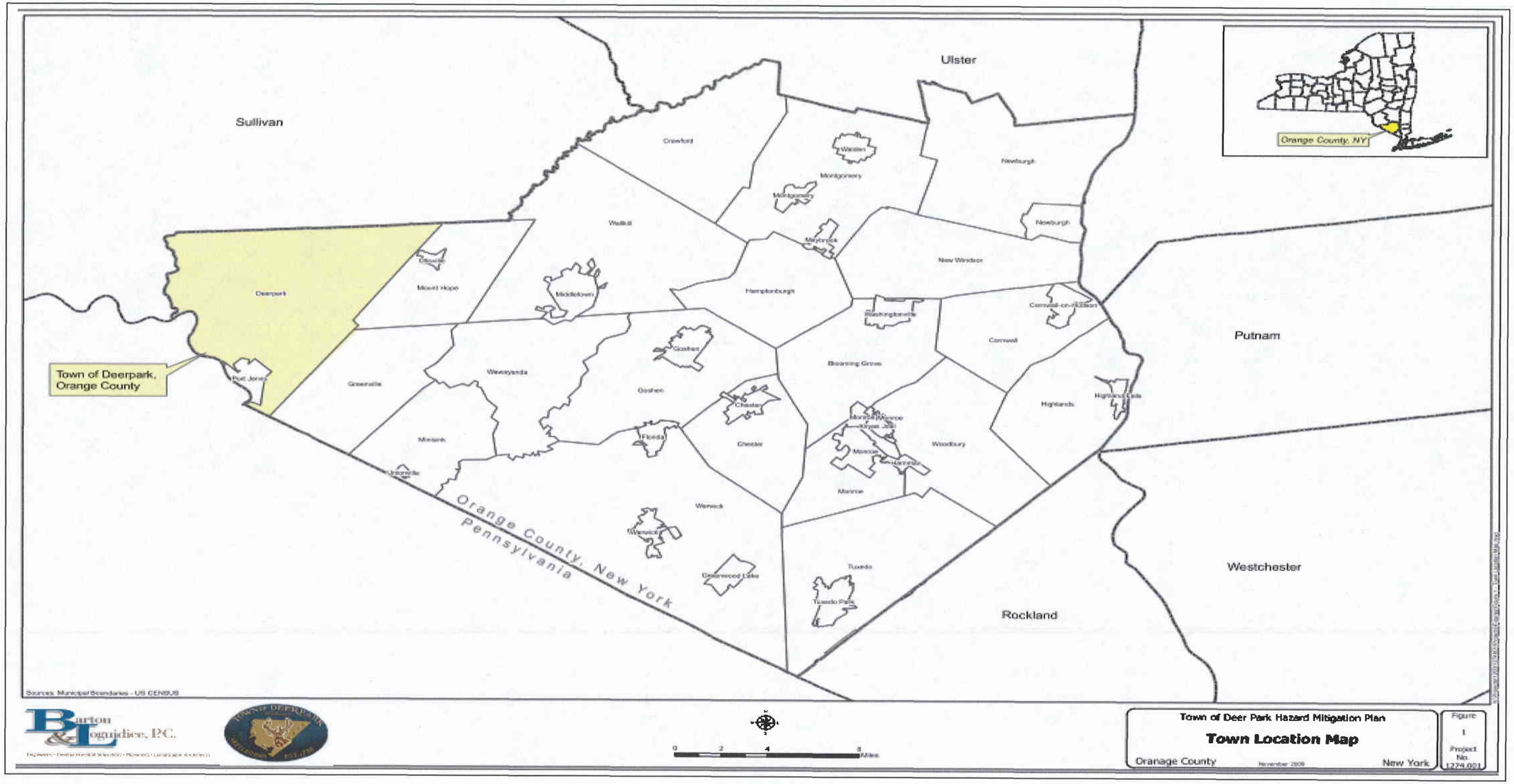
2.1 Regional Location

The Town of Deerpark is located in southeastern New York in the western corner of Orange County. The Town is bordered to the north by Sullivan County and to the southwest by the Delaware River, which separates it from the State of Pennsylvania. The City of Port Jervis is located southwest from the Town. Other municipalities bordering the Town include Mt. Hope to the northeast and Greenville to the east.

The Town of Deerpark is roughly triangular in shape, with two of its three sides shaped by natural landforms. The southeastern boundary, dividing the Town of Deerpark from the Towns of Greenville and Mount Hope, parallels the ridge line of the Shawangunk Mountains. The western boundary, dividing the Town from the Towns of Lumberland (NY) and Westfall (PA), is defined by the Mongaup and Delaware Rivers. The third side of the triangle, the northern boundary, is a straight line political boundary between Orange County and the Sullivan County Towns of Forestburgh and Mamakating. The Town has a total area of approximately 67.9 square miles, including approximately 66.4 square miles of land and 1.5 square miles of water.

The Town's geographic location contributes significantly to the concern for hazard mitigation as several of the rivers and waterways, particularly the Delaware and Neversink Rivers, are subject to annual flooding from run-off, ice jams, and flash flooding. Additionally, the New York State Department of Environmental Conservation (NYSDEC) Dam Inventory indicates that there are twenty-eight registered dams in or bordering the Town and five of these are Class C dams, the highest hazard classification issued by the Department.

Figure 2: Town of Deerpark Location Map



Major roadways that run through the Town include NYS Routes 209 and 42/97. Route 209 runs southwest to northeast within the Neversink-Basha Kill valley, providing access to Port Jervis and Interstate 84 to the south and NYS Route 17 (soon to be Interstate 86) to the north. Route 42/97 begins in Port Jervis and runs south to north along the western edge of the Town, paralleling the Delaware River valley. Routes 42/97 separate in the Deerpark hamlet of Sparrowbush, with Route 97 continuing northward to the Village of Hancock in Delaware County. Route 42 continues northeastward from Sparrowbush towards the Village of Monticello in Sullivan County. Seven hamlets -- Cahoonzie, Cuddebackville, Godeffroy, Huguenot, Rio, Sparrowbush and Westbrookville -- are located in the Town of Deerpark.

2.2 History and Historical Resources

The Town of Deerpark has a rich and colorful history well documented in several histories of the County and the region. Historical communities and sites abound. The following information is supplied by Town of Deerpark Historian Norma Schadt:

The peaceful Lenni Lenape Indians were the first inhabitants. Chief Penhorn and his tribe inhabited about 780 acres of fine natural meadow land on the east side of the Neversink River. In 1690, William Tietsoort, the first European inhabitant in the valley, was asked to move here by the Lenni Lenape to build a blacksmith shop to make much needed tools. Covered wagons carrying pioneer stock trundled westward from the Hudson River to settle here. A settler named McDaniel enclosed a small tract of land with a fence made of brush. Some of his neighbors called it McDaniel's "Deerpark" and soon the entire area was known by that name. A 1,200 acre patent of land was granted in 1697 to Jacques Caudebec, Thomas Swartwout, Anthony Swartwout, Bernardus Swartwout, Jan Tyse, Peter Germar (Gumaer) and David Jamison. They were sturdy Dutch and French Huguenot farming families and lived peacefully with the Lenni Lenape. With the early rumblings of the French and Indian War, the local residents

were asked to form a militia in preparation for the possibility of war. This broke the trust of the Lenni Lenape who subsequently moved west to the Ohio Territory.

Many families traveled along the Old Mine Road, America's oldest 100 mile road, to settle in this fertile valley watered by pristine rivers. They were not, however, to live in peace. The boundary line between New York and New Jersey was still undetermined. Both states wanted the best farm lands along the disputed boundary line, which at that time cut across the entire town. Residents on both sides fought and kidnapped each other and destroyed each other's homes and property during "The New Jersey-New York Border War." Finally, on September 1, 1773, the present boundary line was established by England.

The state legislature, in 1798, created Sullivan and Rockland Counties from the lands of Orange and Ulster Counties. Five towns from Ulster County were incorporated into Orange in order to maintain the size of Orange County. Deerpark was formed from the Town of Mamakating in Ulster County.

On October 13, 1778, during the American War of Independence, Colonel Joseph Brant and his raiders approached by way of an old trail from the Mongaup River to Huguenot. The order of attack went from south to north ending at Fort DeWitt in Cuddebackville. Brant returned again on July 20, 1779 bringing with him twenty-seven Tories and sixty Indians to fight against the settlers. It was this raid that lead to the major battle at Minisink Ford where many local militiamen lost their lives. It also was the source of "The Painted Apron Story" at the Black Rock School, a local folk tale, which has become a part of our history. When the War of Independence ended, the pioneer spirit took hold again and some residents left this valley to follow the westward dream. The abandoned land enabled those who remained to enlarge their holdings and build bigger farms and mills.

The construction of the D & H Canal (1828-1898) changed the Town of Deerpark. Primarily, it was constructed to provide much needed Pennsylvania anthracite coal to

New York City. Other goods, such as bluestone, cement and lumber, were shipped as well. The route of the canal through Deerpark was determined by the relative ease of construction through this valley. New industries were created and old ones expanded. Quarries, tanneries, lumber mills, boat yards, supply stores, blacksmith shops, carpenter shops were busy places along the canal. Homes were built -- making schools, churches and public buildings necessary. Many of these buildings remain throughout the Town.

The Town's make up changed once again with the advent of the railroad. In 1868, the Monticello & Port Jervis Railroad Company started to bring people to Deerpark for vacations and to enjoy the natural beauty of the rivers and mountains. A thriving resort industry arose. The railroad also was instrumental in making commercial dairying in the Neversink Valley a viable occupation. Each farm within a convenient distance of a railroad had a "milk stop" to pick up cans of milk to ship to New York City. Most of these farms began to disappear in the middle of the 20th century as it became necessary to increase farm sizes to be profitable.

The automobile brought even more people to the town. Among them was D. W. Griffith. Between 1909 and 1915, he made many films using the majestic mountains and flowing rivers as natural backdrops. The Neversink Valley Area Museum in Cuddebackville regularly shows the classic silent movies.

The recognition of our history is an ongoing part of our community. The Neversink Valley Area Museum has exhibits about life on the D & H Canal, including boat rides on the canal. School children visit the museum to learn about the Lenni Lenape. The town has restored an 1863 brick schoolhouse for community use. Other one room schools have been converted into private homes.

Geography remains an important part of the town's identity. Camps care for natural areas and teach environmental education courses. The Nature Conservancy has

extensive holdings of environmentally fragile sections of the Neversink River. The Orange County Land Trust and the Basherkill State Wildlife Management Area protect sections of the Basha Kill wetlands. The Orange County Parks Department has developed a lovely park to preserve one of the few sections of the D & H Canal which still holds water.

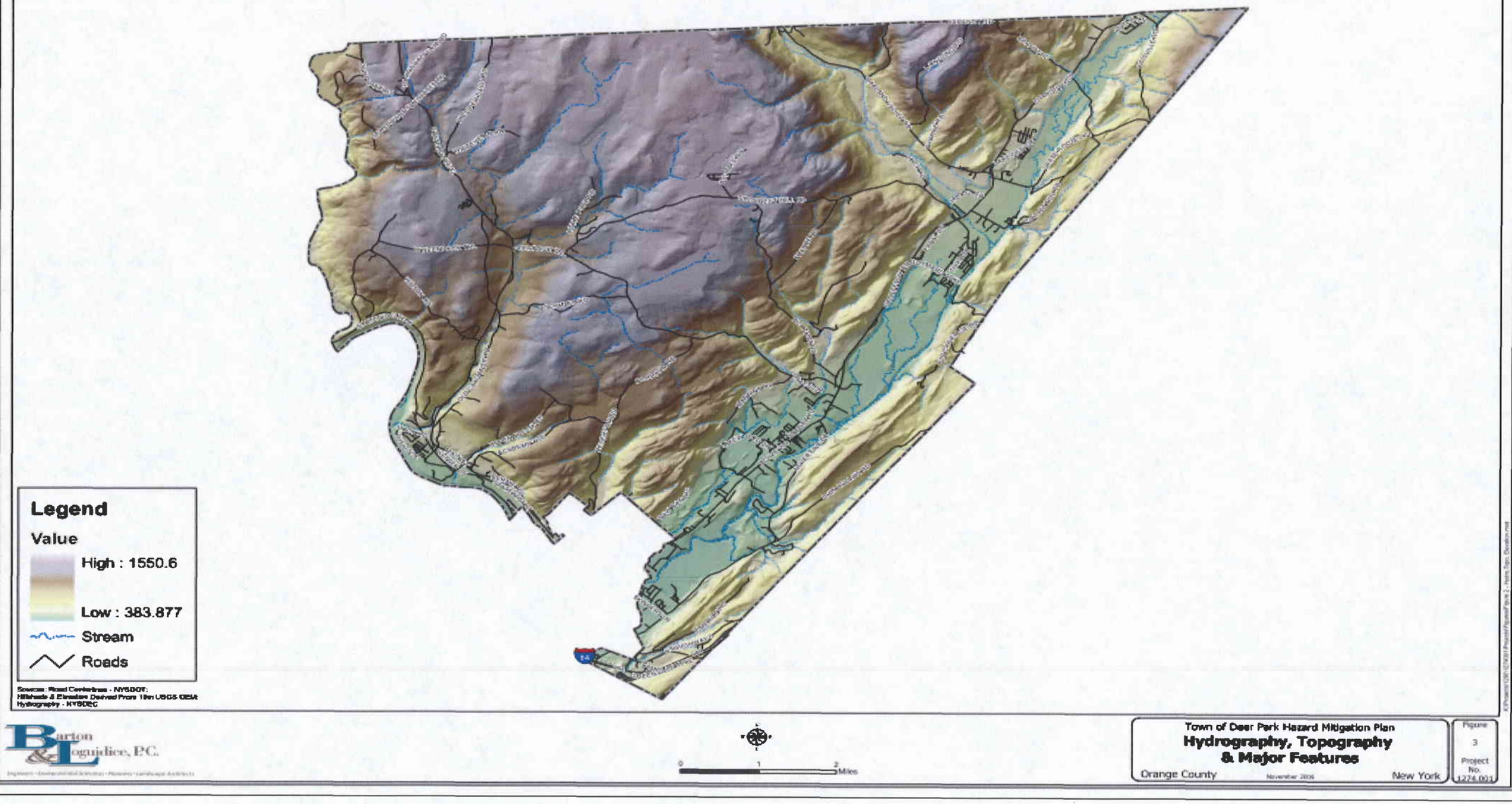
New York State has designated Route 97 and the Hawk's Nest as a scenic by-way along the Delaware River. The New York State Department of Environmental Conservation has set aside land as an eagle preserve. All of these places give visitors and residents the opportunity to enjoy activities such as fishing, hunting, canoeing, rafting, camping, hiking, and bird watching.

2.3 Natural Features

2.3.1 Terrain

The western and northern portions of the Town lie in within the southwestern Catskill Mountains, with elevations reaching over 1400 feet. The lowest elevations occur in the southwestern portion of the Town along the Delaware and Neversink Rivers, where elevations are less than 450 feet. Population density is greatest in the lower-lying valley areas of the Delaware and Neversink Rivers and their tributaries. These same areas tend also to be at greatest risk of flooding. Figure 3 below illustrates some of the main geographic features within the Town of Deerpark.

Figure 3 - Topography, Water Features and Major Thoroughfares



Buck Knoll, located west of Cahoonzie, forms a conspicuous elevation at 1,369 feet above sea level. However, the highest elevation within the Town is an unnamed promontory northwest of Big Pond that measures 1,448 feet above sea level, while the lowest is at the confluence of the Neversink River with the Delaware River, approximately 430 feet above sea level.

2.3.2 Water Resources

The Neversink River, which has its origins in the Slide Mountain area of the Catskill Mountains, is impounded to form the Neversink Reservoir upstream from the Town of Deerpark. The Neversink flows southeastward through the Town of Deerpark to the vicinity of Cuddebackville and Myers Grove, where it makes a sharp right-angle turn to flow southwest, paralleling the base of the Shawangunk Ridge. The Neversink joins the Delaware River at Tri-States Rock, where the States of New York, New Jersey and Pennsylvania meet.

The Mongaup River flows out of the Rio Reservoir in the Rio Hamlet on the north-western side of Town, forming the border with neighboring Sullivan County. South of the exit from the Rio Reservoir, the Bush Kill enters the Mongaup which flows into the Delaware at Route 97 west of Wilson Road.

Other waterways within the Town include the Basher Kill on the eastern side of Town and the Shingle Kill on the western. The Basher Kill meets the Neversink in the low-lying region known as Myers Grove. The Shingle Kill's major tributary system occurs in the Hamlet of Cahoonzie where the Shingle Kill is fed by the Steeny Kill and Big and Little Ponds. Cahoonzie Lake is a private lake formed by a privately placed earth dam on the western side.

Other streams within the Town, mostly tributaries either to the Neversink or the Delaware, are the Steeny Kill, the Bush Kill and the Sparrowbush Kill.
There are numerous natural and man-made lakes and ponds within the Town. These

include the following water bodies:

- Snyder Pond
- Heinlein Pond
- Martin Lake
- Marling Lake
- Sand Pond
- McAlister Pond
- Prospect Pond
- Boehmler Pond
- Big Pond
- Little Pond
- Cahoonzie Lake
- Beaverdam Pond
- Guymard Lake
- Walls Pond
- Lake Helen and
- Holley's Pond

The Town also includes the three reservoirs of the City of Port Jervis water supply. In addition, the Rio Reservoir in the northwestern portion of the Town on the Mongaup River is partially located within the Town of Deerpark.

Due to the large number of streams and tributaries that flow through the Town, there are a significant number of environmentally sensitive areas, including NYSDEC and Federally recognized wetlands. Wetlands and flood plains have been mapped by the State and Federal governments. New York State has formally recognized that the public interest is served through the preservation of major freshwater wetlands. These areas serve as the base of the terrestrial food chain, the habitat of many rare and endangered species and the absorption intakes for ground water reserves and aquifers on which so many public and private water supplies depend. NYSDEC bears the responsibility for protecting these areas, which they do by discouraging significant development within their mapped bounds, and by restricting the kinds of activities that can take place within a 100-foot buffer of such designated NYSDEC freshwater wetlands.

The wetlands of the Basha Kill and the Neversink River are prominent features located within or near the Town. The Town also has a number of areas that are located within designated 100- and 500-year flood zones. As the administrator of the National Flood Insurance Program (NFIP), FEMA identifies 100 and 500 year flood zones. The Town participates in the NFIP as Community 360612 and is currently recognized in good

standing. Many of the flood zones are primarily located adjacent to major waterways such as the Neversink, Delaware, Mongaup Rivers and the Basha Kill. Figure 4 (below) shows the 100 and 500 year Flood Zones located within the Town.

A sand and gravel aquifer in the valleys of the Neversink River and Basher Kill extends twenty-eight miles from Summitville in Sullivan County to Milford, Pennsylvania, including its twelve mile midsection in the Town of Deerpark. It averages one mile wide and stores about 11.3 billion cubic feet of water or about 84.4 billion gallons. A thin layer of fine sandy and silty soil overlies some of the surface of the aquifer. The fine sand is more than fifty feet thick near Port Jervis, north of the confluence of the Neversink and Delaware Rivers. The thickness of the aquifer ranges from less than 10 feet to more than 150 feet, but is variable because of the irregular surface of the underlying bedrock. The Frimpter Report, which addresses the groundwater resources of Orange County, estimated that the safe dependable daily yield of that aquifer is 100 million gallons.

Some of the unique natural resources within the Town of Deerpark are protected as state wildlife management areas, some as state designated wetlands, some through public or responsible institutional ownership, and still others through the Upper Delaware Scenic and Recreational River as part of the National Park Service (NPS).

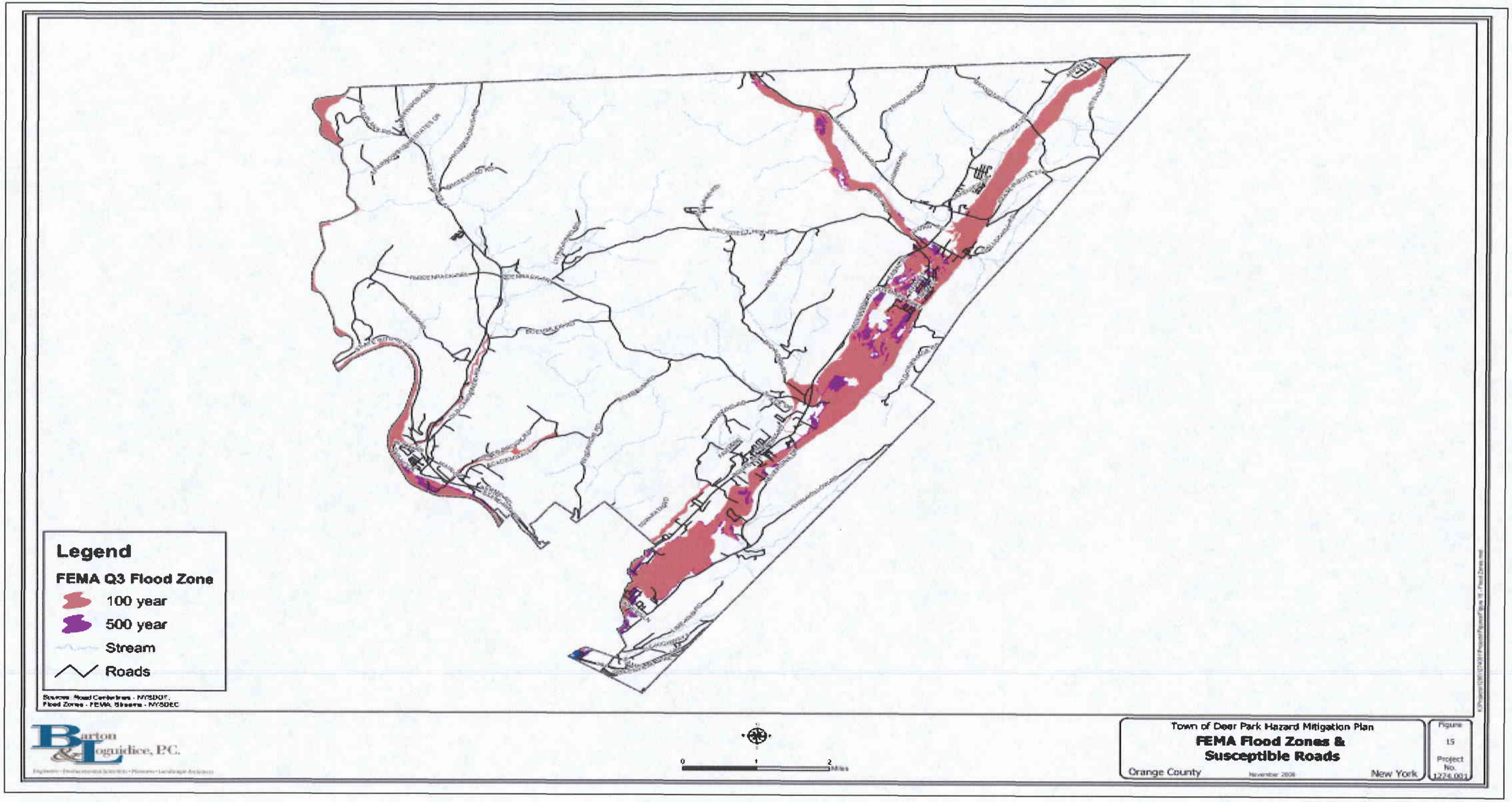


Figure 4: 100 and 500 Year Flood Zones

2.4 Population and Economic Base

2.4.1 Population Trends

Table 1 and Figure 5 illustrate overall population trends within the Town of Deerpark, its neighbors and the County as a whole. The Town is growing slowly at the present time although it experienced rapid growth over the decades preceding the 1990s

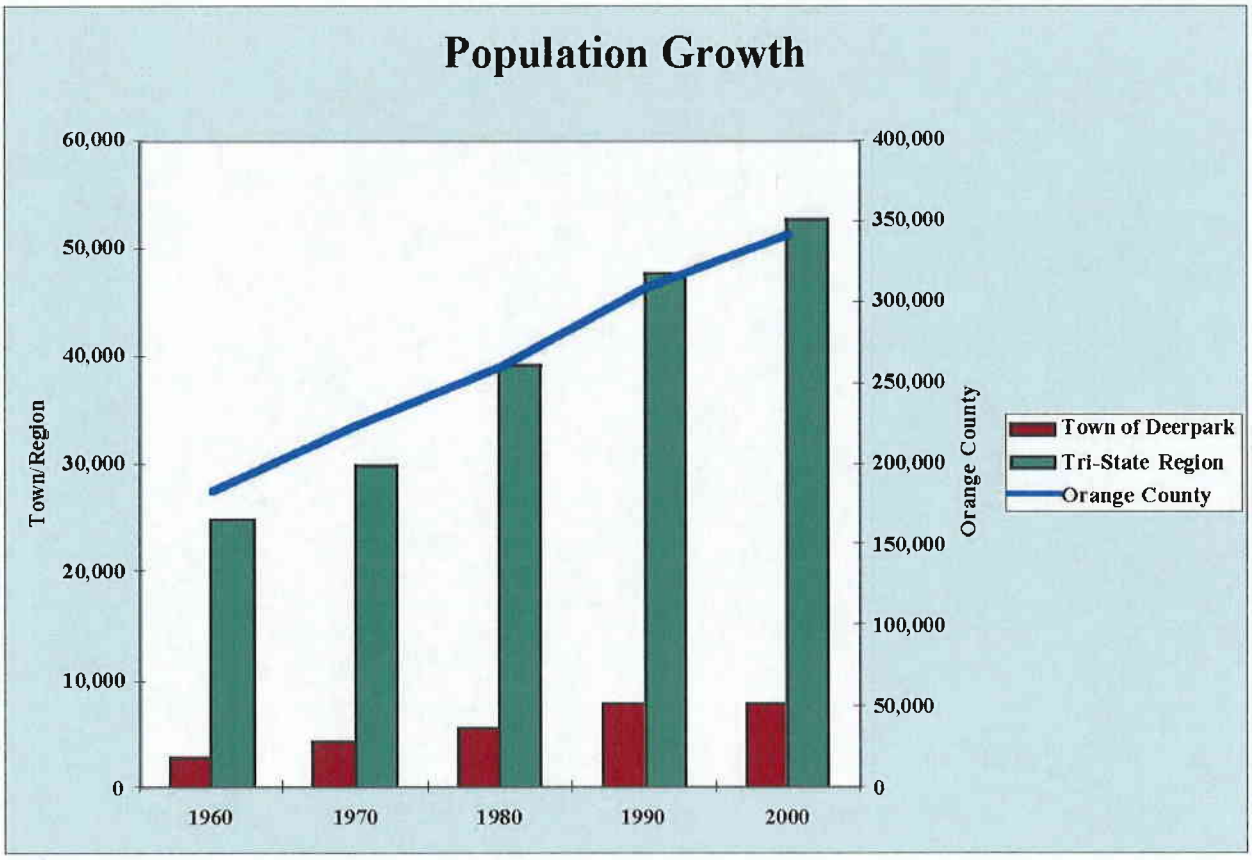
Table 1:
Tri-State Area Population Patterns (1970 – 2000)

Town of Deerpark	**2,777**	**4,370**	**57.40%**	**5,663**	**28.90%**	**7,832**	**39.00%**	**7,858**	**0.30%**
Orange County	**183,734**	**221,657**	**20.60%**	**259,603**	**17.10%**	**307,647**	**18.50%**	**341,367**	**11.00%**
Montague Township, NJ	880	1,131	28.50%	2,066	82.70%	2,832	37.10%	3,412	0.50%
Town of Deerpark	2,777	4,370	57.40%	5,633	28.90%	7,832	39.00%	7,858	0.30%
City of Port Jervis	9,268	8,852	-4.50%	8,699	-1.70%	9,060	4.10%	8,860	-2.20%
SUB-TOTAL	12,045	13,222	9.80%	14,332	8.40%	16,892	17.90%	16,718	-1.00%
Town of Forestburgh	356	474	24.90%	796	67%	614	29.60%	833	36.10%
Town of Lumberland	538	847	59.30%	1,210	41.20%	1,425	17.80%	1,939	36.10%
Town of Mamakating	3,356	4,319	28.70%	7,17	78.70%	9,792	26.90%	11,002	12.40%
Town of Greenville	890	1,379	54.90%	2,085	51.20%	3,120	49.60%	3,800	21.80%
Town of Minisink	1,433	1,942	35.50%	2,488	28.10%	2,981	19.80%	3,585	20.30%
Town of Mount Hope	2,292	2,966	29.40%	4,398	48.30%	5,971	35.80%	6,639	11.20%
SUB-TOTAL	8,865	11,937	34.70%	18,765	57.20%	23,903	27.40%	27,798	16.30%
Borough of Matamoras	2,087	2,244	7.50%	2,111	-5.90%	1,934	-8.40%	2,312	19.50%
Westfall Township	838	1,348	60.90%	1,825	35.40%	2,106	15.40%	2,430	15.40%
SUB-TOTAL	2,925	3,592	22.80%	3,936	9.60%	4,040	2.60%	4,714	16.70%
TOTAL	**24,715**	**29,882**	**20.90%**	**39,099**	**30.80%**	**47,667**	**21.90%**	**52,642**	**10.40%**

Note: Source of all data, including 1999 estimates, is U.S. Census.

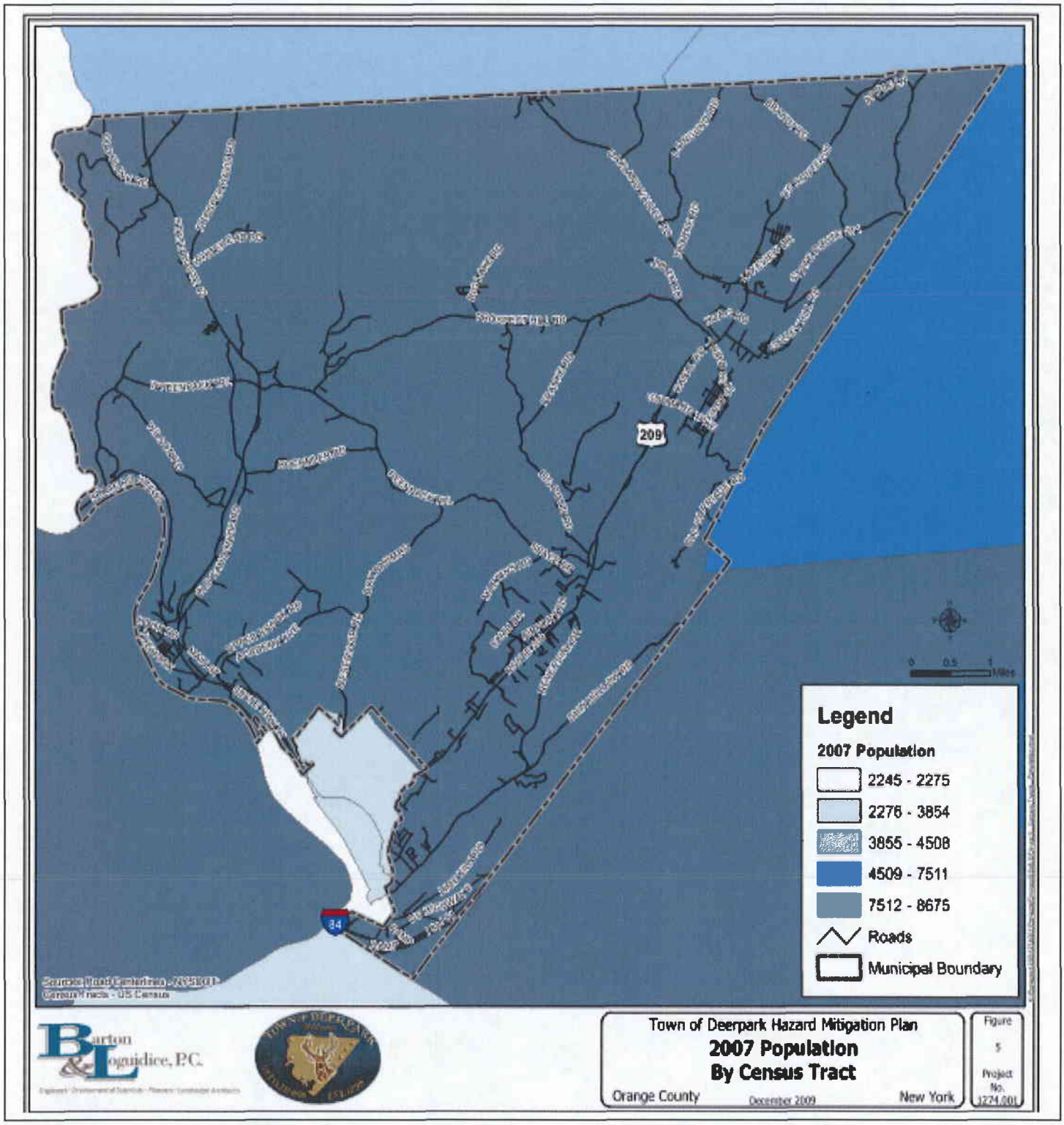
The population of the Town of Deerpark experienced less than 1% growth between the 1990 Census and the 2000 Census -- from 7,832 to 7,858. The low growth rate for the Town of Deerpark is somewhat surprising since the overall increase for Orange County was almost 11%. However, the growth rate during this period was similar to the growth experienced in the neighboring community of Montague, New Jersey and exceeded the growth rate in Port Jervis.

Figure 5 - Population Growth 1960 - 2000



A visualization of the Town's population can be seen using reported data from the United States Census. According to the 2000 Census, the Town had a population of 7,858 and the Town is only comprised of one census tract. Figure 6 (below) provides a representation of this census tract and the range in which the current population falls.

Figure 6: Deerpark Census Tract and Population Range



2.4.2 Age of Household Members

Residents of the Town of Deerpark are almost 9% older on average than Orange County as a whole, with a median age of 37.8 years in 2000 compared to 34.7 years for the County. Only 33.9% of the Town's population was under 25 years of age in 2000.

The County proportion under the age of 25, by contrast, was 37.7%. The 65 years and over age group, moreover, made up 11.0% of the Town of Deerpark residents compared with 10.3% for the County. Table 2 provides a breakdown of the population by age groups within the Town and County.

Table 2
Town of Deerpark Population by Age (2000)

0-17	**2,159**	**27.5 %**	**99,156**	**29.0 %**
18-64	**4,836**	**61.5 %**	**207,026**	**60.6 %**
65+	**863**	**11.0 %**	**35,185**	**10.4 %**
Total	**7,858**	**100 %**	**341, 367**	**100 %**

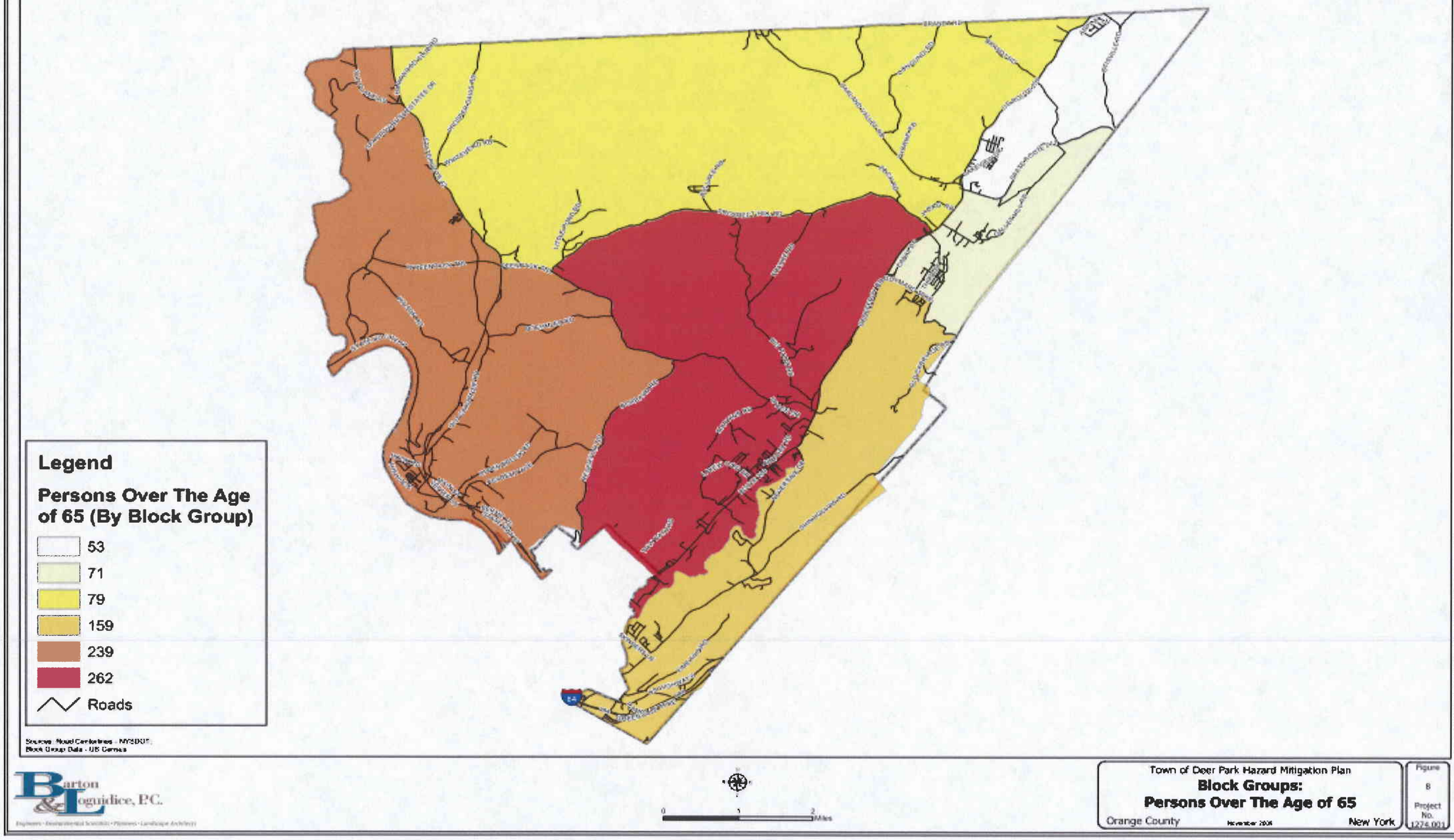
Source: 2000 Census

When considering Hazard Mitigation Planning one of the key elements is identifying those populations requiring immediate assistance because of their inability to care for themselves. For this consideration the Team identified by those residents in the Town age 65 and over via Census Block Group and looked for the largest grouping of seniors. The data was then mapped and provided in Figure 7.

2.4.3 Incomes

According to the 2000 Census, per capita income for the Town of Deerpark was $18,252 compared to $21,597 for the County as a whole. Median household income in the Town, moreover, was $45,000 compared to $52,058 for Orange County. Per capita income statewide was $23,389, indicating the need for economic development within the Town.

Figure 7: Persons Over the Age of 65 by Block Group



Median Family Income within the Town of Deerpark ($49,987) was less than one 1% less than the Federal average ($50,046). The Town trailed the State in two economic categories ; per capita income and Median Family income. The Town's per capita income was $18,252 while the State's average was $23,389, a difference of approximately 28% while the Median Family income for the Town trailed the State's average by a little more than 3%, this comparison is outlined in Table 3.

The poverty rate for individuals within the Town in 2000 was 9.6%, compared to a national poverty rate of 12.4%. The poverty rate for Deerpark families was 7.4% versus a national family poverty rate of 9.2%.

Table 3
Town of Deerpark Incomes, 1990 – 2000
(In Inflation Adjusted 2000 dollars)

Per Capita	$17,370	$18,252	$21,597	$23,389
Median HH	$43,927	$45,000	$52.058	$43,393
Median Family	$50,010	$49,987	$60,355	$51,691

Source: Census 2000

The Town of Deerpark made some economic progress over the period from 1990 to 2000, as the above numbers indicate. Per capita and median household incomes have both increased by about $1,000 in real terms, but median family income has declined slightly (reflecting smaller families).

A concern for the Team in the planning process was ensuring that all residents of the Town have access to adequate coverage in the case of the emergency. Here the Team felt it necessary to identify locations of those who might rely on others for transportation or not have access to the proper materials for hazard prevention or to deal with extreme circumstances. The Team identified through Census Blocks those individuals with incomes in the Low to Moderate Income range and then developed percentage groupings that were then mapped as illustrated in Figure 8.

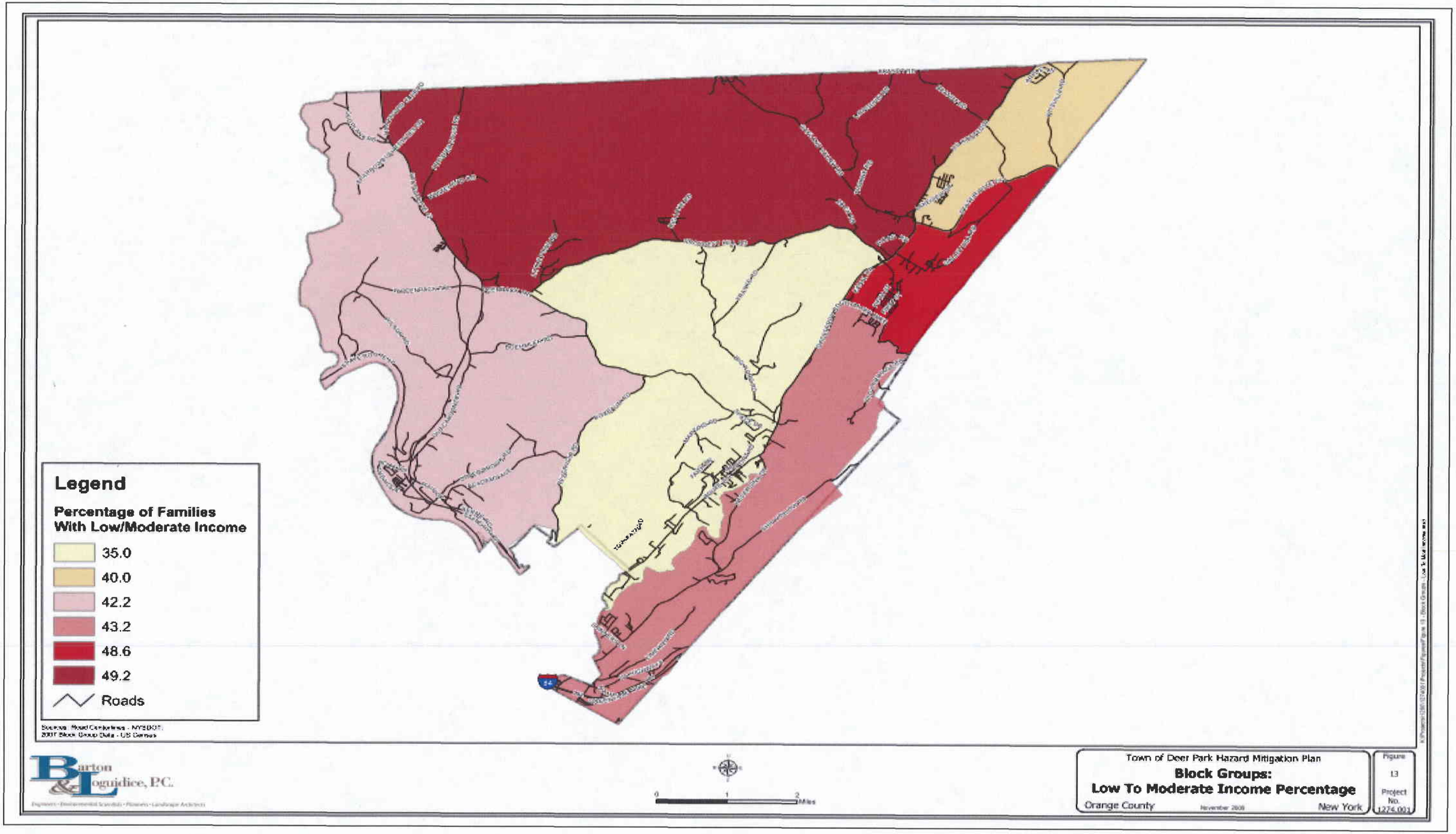


Figure 8 - Percentage of Families with Low/Moderate Incomes

2.4.4 Employment Status

According to the 2000 Census data, there were 3,583 employed persons over 16 years of age in the Town of Deerpark in 2000, of which 1,524 or 42.5% were female. The unemployment rate as a whole at that time was only 3.2%. The following is a breakdown of this labor force by class (private industry vs. governmental employment):

Table 4
Town of Deerpark Employed Persons by Class, 2000

Private for profit wage & salary workers	2,576
Self-employed workers	241
Government workers	766
Total (all workers)	**3,583**

Source: Census 2000

Government represented 21.4% of all employment for Deerpark workers in 2000. Self-employment was relatively limited with 241 persons (6.7%) engaged in home occupations or other local businesses of their own. Private wage and salary workers represented 71.9% of the Town's population in 2000.

2.4.5 Employment by Industry and Occupation

The tables below provide a breakdown of the employed Town population aged 16 years or more by industry and occupation in 2000.

Table 5 - Town of Deerpark Employment by Industry, 2000

Industry	Persons	%
Educational, Health, Social Services	800	22.3%
Retail Trade	623	17.4%
Manufacturing	517	14.4%
Public Administration	310	8.7%
Construction	292	8.1%
Other Services (Except Public Administration)	208	5.8%
Transportation, Warehousing, Utilities	181	5.1%
Arts, Entertainment, Recreation, Lodging, Food	173	4.8%
Professional, Management, Administrative	145	4.0%
Wholesale Trade	133	3.7%
Finance, Insurance, Real Estate	117	3.3%
Information	53	1.5%
Agriculture, Forestry, Mining	31	0.9%
Totals	**3,583**	**100.0%**

Source: Census 2000

There are relatively lower numbers of persons in higher paying professional occupations within the Town. Service and retail employment, typically lower-paying in nature, are higher by contrast.

Table 6

Town of Deerpark Employment by Occupation, 2000

Management, Professional and Related Occupations	693	19.3%
Sales and Office Occupations	856	23.9%
Construction, Extraction and Maintenance Occupations	599	16.7%
Service Occupations	728	20.3%
Production, Transportation and Material Moving	699	19.5%
Farming, Fishing, and Forestry Occupations	8	0.2%
Totals	**3,583**	**100.0%**

Source: Census 2000

A relatively low 76 persons, or 2.2% of the Deerpark labor force, worked from home in 2000. The average travel time to work was 32.9 minutes, reflecting the relationship of the Town to the New York City metropolitan area, to which many residents commute to

work. Some 2.5% of employed residents used public transportation to reach work in 2000, a relatively high figure for a rural community. This is likely related to the availability of commuter rail service in Port Jervis and Otisville.

The completion of the Secaucus connection to midtown Manhattan has shortened commuting time and increased convenience for rail users, making Deerpark more accessible as a place of residence for those with jobs in New York City. As a result it would be reasonable to suggest that the number of Deerpark commuters to the City can be expected to rise in the future. The Town should also become a much more appealing residential area and start to grow again as a result. Moreover, income levels and housing prices can be expected to increase because new migrants to the Town will be coming from the higher income metropolitan area.

These trends will also be supported by the proposed legalization of gaming at selected sites in nearby Sullivan and Ulster Counties. Video Lottery Terminals (VLTs) are already installed and operational at Monticello raceway and several Native American tribes are vying for the right to have gaming on their lands. These combining factors lead to the likelihood of a period of potential growth for the Town.

2.5 Housing Analysis

2.5.1 Housing Stock

The 2000 U.S. Census indicated the Town of Deerpark had 3,332 housing units, of which 2,906 were occupied. Some 2,363 of these were owner occupied and 543 were renter occupied. There was a total gain of 218 housing units or 7.0%, exceeding population growth for the decade (0.3%) by a wide margin and reflecting a significant drop in average household size (see Section 2.5.2 below). There were 186 vacant units in seasonal, recreational, or occasional use (second homes) in 2000, down from 235 in 1990. Experience from other second home communities suggests that conversions of second homes to primary residences will continue.

2.5.2 Number of Persons per Household.

The number of people living in each household was 2.7 persons in 2000 (down from

2.89 persons in 1990). This was significantly lower than the County average of 2.85 persons per household.

2.5.3 Housing Values

The 2000 Census revealed a median housing value of $103,900 for the Town. Countywide, the median value was $144,500, much higher than the Town. Growth pressures and the value of new housing being constructed appear to be driving values up as a whole in Orange County. The lack of such pressure in Deerpark is probably restraining prices. Also, the Deerpark market is more akin to that of neighboring Pike and Sullivan Counties (where somewhat lower-priced housing has sold better) than Orange County. There are at present, however, a number of changes taking place in real estate markets throughout the region with very high priced housing becoming more and more popular as metropolitan buyers find their way to the area.

2.5.4 Housing Type

According to the 2000 Census data 81% of the occupied housing is owner occupied and 18% renter-occupied. Single-family homes in 2000 (not including manufactured homes) accounted for 2,327 units and comprised 69.8% of the housing stock in Town of Deerpark. This was followed by two-family and multi-family units at 87 and 114 units, respectively, or a combined 8.6%.

2.5.5 Contract Rents

Rents within the Town were relatively high in 2000, the median rent being $680. The median rent Countywide in 2000 was $714, the variation in the cost of rental housing being much less than that for owner-occupied units.

2.5.6 Manufactured Housing

The following chart illustrates patterns with respect to manufactured housing in the Town. This subject merits special attention due to the significant proportion of Deerpark housing that consists of manufactured homes (not including prefabricated modular housing).

Table 7
Orange County Manufactured Home Stock, 1990 - 2000

Town/City	1990 Median Family Income*	1990 Total Housing Units	1990 Manufactured Homes	% of Total Housing Stock	2000 Median Family Income	2000 Total Housing Units	2000 Manufactured Homes	% of Total Housing Stock
Deerpark	***$50,010***	***3,114***	***1,043***	***33.0%***	***$49,987***	***3,332***	***804***	***24.1%***
Greenville	$60,116	1,160	143	12.0%	$65,257	1,365	133	9.1%
New Windsor	$58,964	8,596	649	8.0%	$58,292	8,759	628	7.2%
Highlands	$53,696	3,569	262	7.0%	$59,534	3,418	196	5.7%
Wawayanda	$57,502	1,872	120	6.0%	$67,479	2,174	120	5.5%
Mount Hope	$71,062	1,633	99	6.0%	$65,183	1,714	89	5.2%
Crawford	$61,620	2,246	196	9.0%	$63,722	2,851	124	4.3%
Montgomery	$60,619	6,803	402	6.0%	$56,736	7,643	319	4.2%
Blooming Grove	$56,401	5,908	252	4.0%	$74,428	6,559	244	3.7%
Minisink	$66,452	1,023	24	2.0%	$58,906	1,245	34	2.7%
Wallkill	$63,921	8,230	464	6.0%	$57,088	9,283	237	2.6%
Woodbury	$81,640	3,092	117	4.0%	$84,156	3,358	84	2.5%
Newburgh Town	$58,458	8,745	141	2.0%	$66,706	10,122	234	2.3%
Monroe	$66,740	7,030	162	2.0%	$54,315	8,517	172	2.0%
Chester	$68,731	3,236	32	1.0%	$75,222	3,984	39	1.0%
Cornwall	$74,192	4,409	41	1.0%	$74,195	4,852	40	0.8%
Goshen	$55,055	3,702	12	0.0%	$71,497	4,320	31	0.7%
Hamptonburgh	$34,698	1,270	9	1.0%	$82,561	1,532	8	0.5%
Warwick	$73,437	10,522	72	1.0%	$71,074	11,818	46	0.4%
Port Jervis	$76,072	3,870	0	0.0%	$35,481	3,851	7	0.2%
Newburgh City	$47,532	9,995	14	0.0%	$32,519	10,476	19	0.2%
Middletown	$40,496	9,475	0	0.0%	$47,760	10,124	0	0.0%
Tuxedo	$80,112	1,314	0	0.0%	$88,718	1,457	0	0.0%
Adjoining Communities								
Westfall	$48,211	1,039	178	0.0%	$51,065	1,097	183	16.7%
Mamakating	$54,951	5,391	1,001	19.0%	$49,615	5,629	810	14.4%
Forestburgh	$53,056	468	25	5.0%	$60,139	500	27	5.4%
Lumberland	$37,269	1,276	97	8.0%	$45,100	1,419	57	4.0%
Montague	$63,650	1,449	22	0.0%	$50,833	1,588	3	0.2%

*Note: Median Family Income Stated in 2000 Dollars

An important observation drawn from this data is that manufactured homes are declining in popularity in most of Orange County and throughout the region. They represent a shrinking, although still significant, proportion of Deerpark's housing units. Deerpark lost 237 manufactured homes between 1990 and 2000 as old units were replaced or removed. It now has fewer units than neighboring Mamakating, which also lost units over the decade.

2.6 Land Use Patterns and Public Assets

Land use in the community is dictated by topography, water courses and major thoroughfares. The Town's Land Use Map (Figure 9) indicates that the most of the land is currently vacant and land in use is mostly residential. No clear existence of clustering is apparent in the Town however there is intermixed use of residential, agricultural, parks, commercial, and industrial. Isolated community services are also included in the Town's land use. To the north and east of Route 42 there exists a considerable amount of vacant land. The map below shows the major land uses in the Town of Deerpark.

There is currently a great deal of acreage that is forested or vacant. However, it is anticipated that with population growth, there will be an increase in the number of housing units built in now vacant properties. The conversion of vacant lands to residential lands will be overseen by various Town departments such as the Town Building, Zoning and Planning Departments. The Building Department is responsible for reviewing Plans forwarded to their attention by Planning and Zoning Boards. The Planning Department is responsible for ensuring that any site Plans and subdivision application are completed in accordance with the Town's zoning laws. The Zoning Board of Appeals makes recommendation on conditions in which deviation from the established Zoning Law should take place.

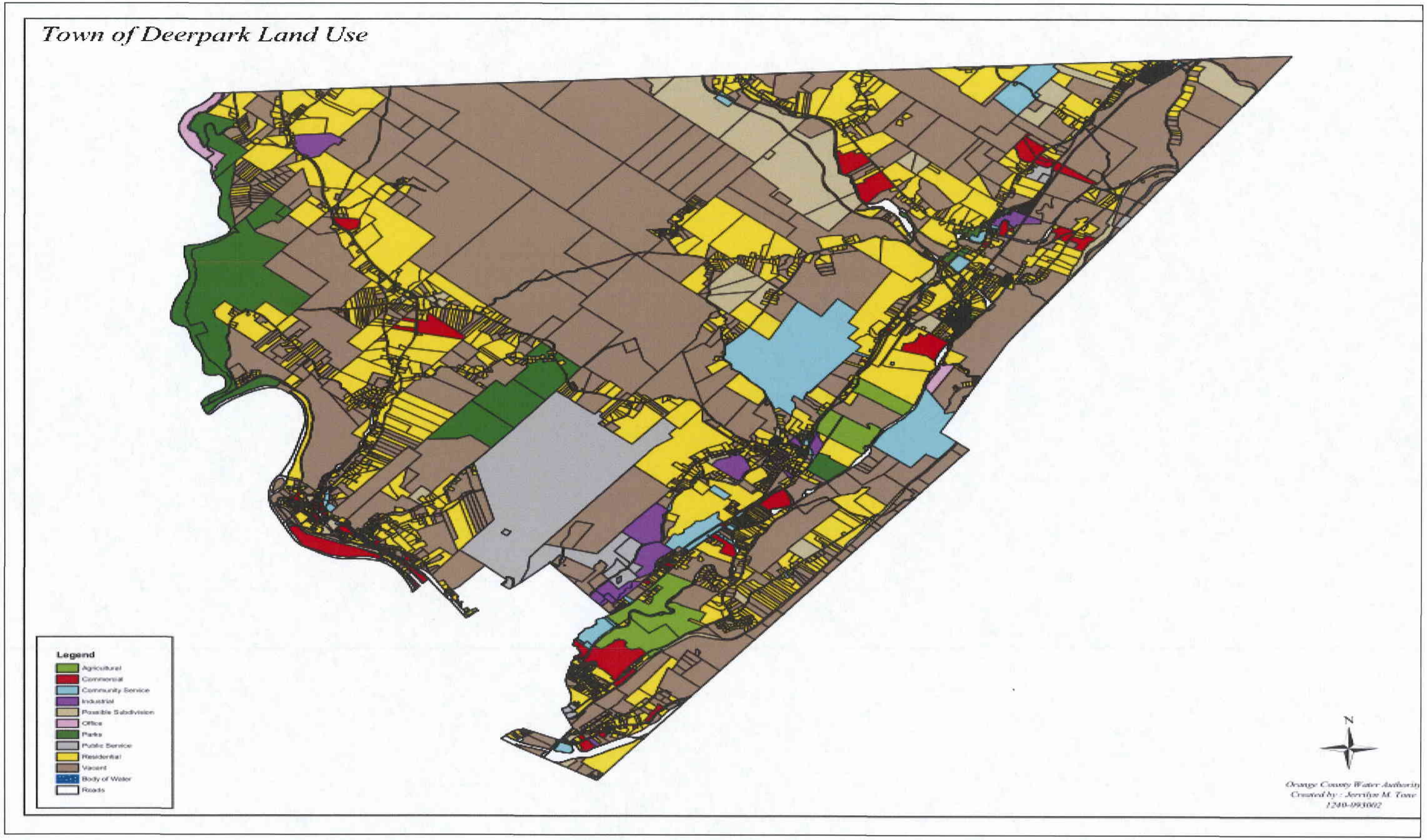
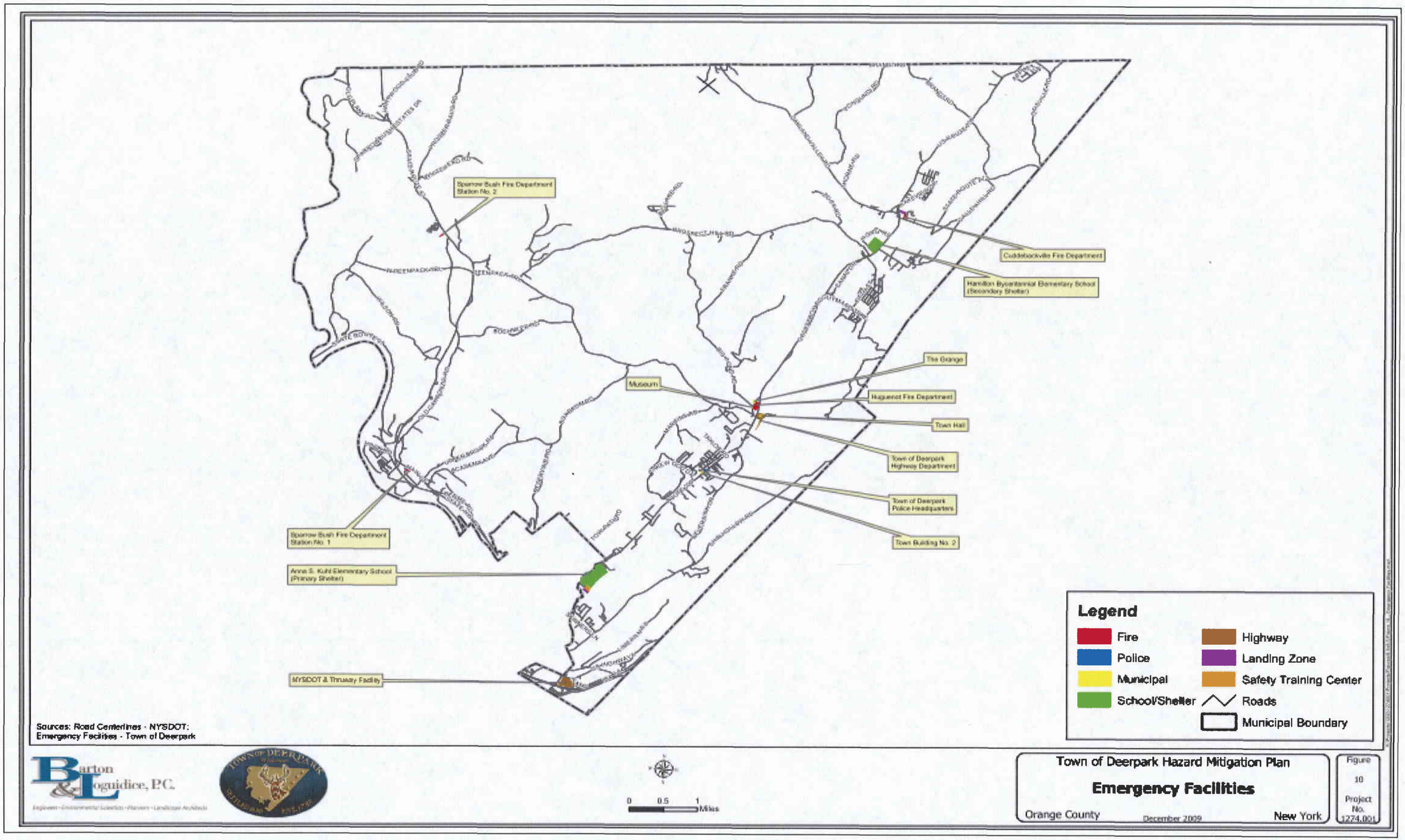


Figure 9: Town of Deerpark Land Use

The Town is in the process of identifying a number of assets that are critical to the support of major functions. Some of these assets include the Town Hall, which is located at 420 Route 209 and is also the location of the Town's Highway garage where the Town stores major equipment. The Port Jervis School System maintains three sites for the four school buildings in the District. While only one of the three sites is located within the Town boundary, school age students in Deerpark attend the Port Jervis school district. Two are located on Route 209 and one is located on East Main Street. The Port Jervis High School and Anna S. Kuhl Elementary School are located at 10 Route 209 in the City of Port Jervis. The Neil Hamilton Bi-Centennial Elementary School is located in the Hamlet of Cuddebackville at 929 Route 209 and the other middle school is located in Port Jervis at 118 East Main Street. In addition to the initial list provided above, the Team has identified and prioritized additional assets provided in Appendix A.

Facilities currently used for police/fire protection or providing shelter during emergency situations were identified and outline on the Emergency Facilities map (Figure 10).

Figure 10: Town of Deerpark Emergency Facilities



2.7 Weather

Seasonal temperatures in the Town of Deerpark are typical of the Northeastern U.S, characterized by cold winters, mild springs and falls, and warm summers. Average temperatures are about 26° F in January and 72° F in July. Average precipitation is on the order of 46 inches per year indicated on Figure 11. Average snowfall is on the order of 45 inches per year in the lower lying portions of the Town, with somewhat higher average annual snowfall at higher elevations. Deerpark experiences periodic seasonal flooding, particularly in the early spring due to run-off from winter thaw and seasonal heavy rain.

A variety of weather patterns derived from planetary atmospheric circulation impact New York State (Hammer, undated). Prevailing southerly and southwesterly winds deliver warm, humid air from the Gulf of Mexico and associated subtropical waters. Cold, dry air associated with high pressure systems frequently arrives from the Canadian north. These two weather patterns dominate, establishing the continental characteristics of the regional climate. In addition, a secondary weather pattern occasionally flows inland from the North Atlantic Ocean, producing cool, cloudy and damp weather conditions.

The majority of storms and frontal systems move eastward across the continent, passing through or in close proximity to New York State. Some of the most severe storms travel northward along the Atlantic coast in systems known as Nor'easters. Extended periods of abnormally cold or warm weather may result from the movement of high pressure (anticyclonic) systems into and through the eastern United States. Cold temperatures prevail when Arctic air masses, known as Canadian highs, flow southward from central Canada or from Hudson Bay. High-pressure systems frequently stagnate off the Atlantic coast, followed by a persistent airflow from the southwest or south that brings warm, often humid weather during the summer season and mild, more pleasant temperatures during the fall, winter and spring seasons (Hammer, undated).

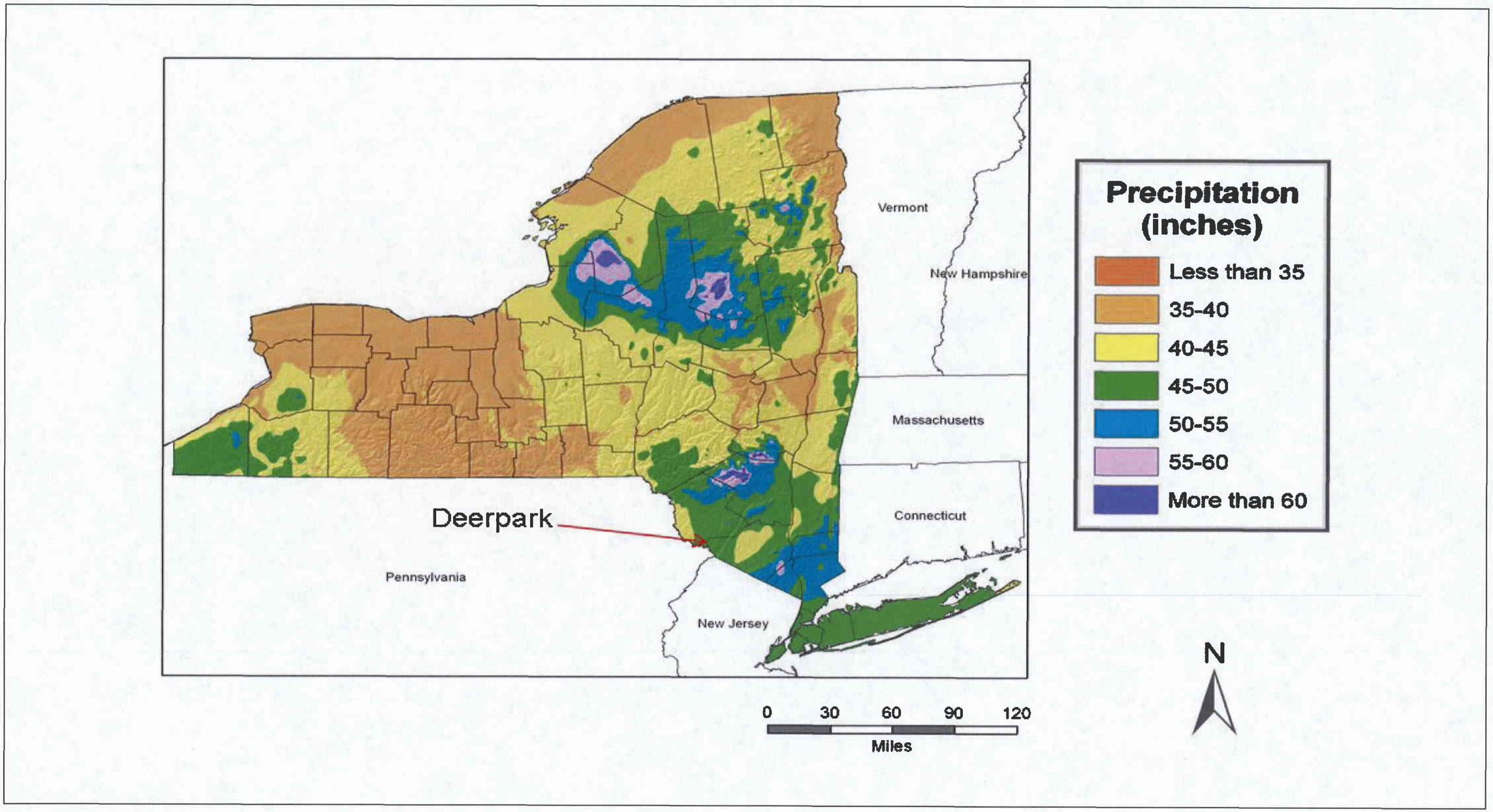


Figure 11: Average Annual Precipitation

3.0 Planning Process

3.1 Purpose of the Plan

The purpose of the Plan is to assist the Town government in assessing potential hazards and to develop a strategy for the mitigation of those identified hazards. Additionally, the Town seeks to maintain eligibility for FEMA funding under DMA 2000.

A significant number of natural disasters have historically affected both Orange County and the Town of Deerpark. As shown in the following able and figures, Deerpark is located in the highest category for Presidentially Declared Disasters between 1965 and 2000.

Table 8
Presidential Disaster Declarations for Orange County, New York

8/22/1955	Hurricane/Flooding	Hurricane Diane	Undetermined	Eisenhower
8/18/1965	Drought	Water Shortage	Undetermined	Johnson
9/13/1971	Flooding	Severe Storm & Flooding	$22,191,481	Nixon
6/23/1972	Flooding	Tropical Storm Agnes	$506,185,943	Nixon
4/17/1984	Flooding	Coastal Storms and Flooding	$22,195,715	Reagan
1/24/1996	Flooding	Severe Storm & Flooding	$196,139,901	Clinton
9/19/1999	Hurricane	Hurricane Floyd	$80,781,770	Clinton
9/11/2001	Human Cause	Fires and Explosion	Undetermined	G.W. Bush
10/01/2004	Severe Storm	Tropical Depression	$17,143,691	G.W. Bush
10/01/2004	Flooding	Severe Storm & Flooding	$26,038,173	G.W. Bush
4/19/2005	Flooding	Severe Storm & Flooding	$78,831,145	G.W. Bush
7/01/2006	Flooding	Severe Storm & Flooding	$315,129,770	G.W. Bush
4/24/2007	Flooding	Severe Storm & Flooding	$109,730,306	G.W. Bush

"The Disaster Mitigation Act of 2000" (DMA 2000) reinforces the importance of Mitigation Planning and emphasizes Planning for disasters before they occur. The President signed the Act (Public Law 106-390) into effect on October 10, 2000 to improve the Planning process and set standards for mitigation throughout the nation.

The Act requires a Pre-Disaster Hazard Mitigation Plan to access mitigation project funding and established new requirements for the national post-disaster Hazard Mitigation Grant Program (HMPG). The completion of this Hazard Mitigation Plan will enable the Town to compete for these additional mitigation funds. In 2009 Deerpark received a grant from New York State Emergency Management Office (NYSEMO) to assist in the completion of this plan.

Emphasizing the need for hazard mitigation and planning efforts is the number of presidentially declared disasters in the region. Figure 12 provides a visualization of the number of disaster declaration across the country while Figure 13 isolates the State of New York. It is important to note that in Figure 13, the Town of Deerpark is located in a county with 12-13 declared disasters and borders Sullivan County (with 14-18 declared disasters) resulting in the likelihood that the Town deals with effects of the its own disasters along with those from its neighbors.

Figure 12 - Nationwide Presidentially Declared Disasters

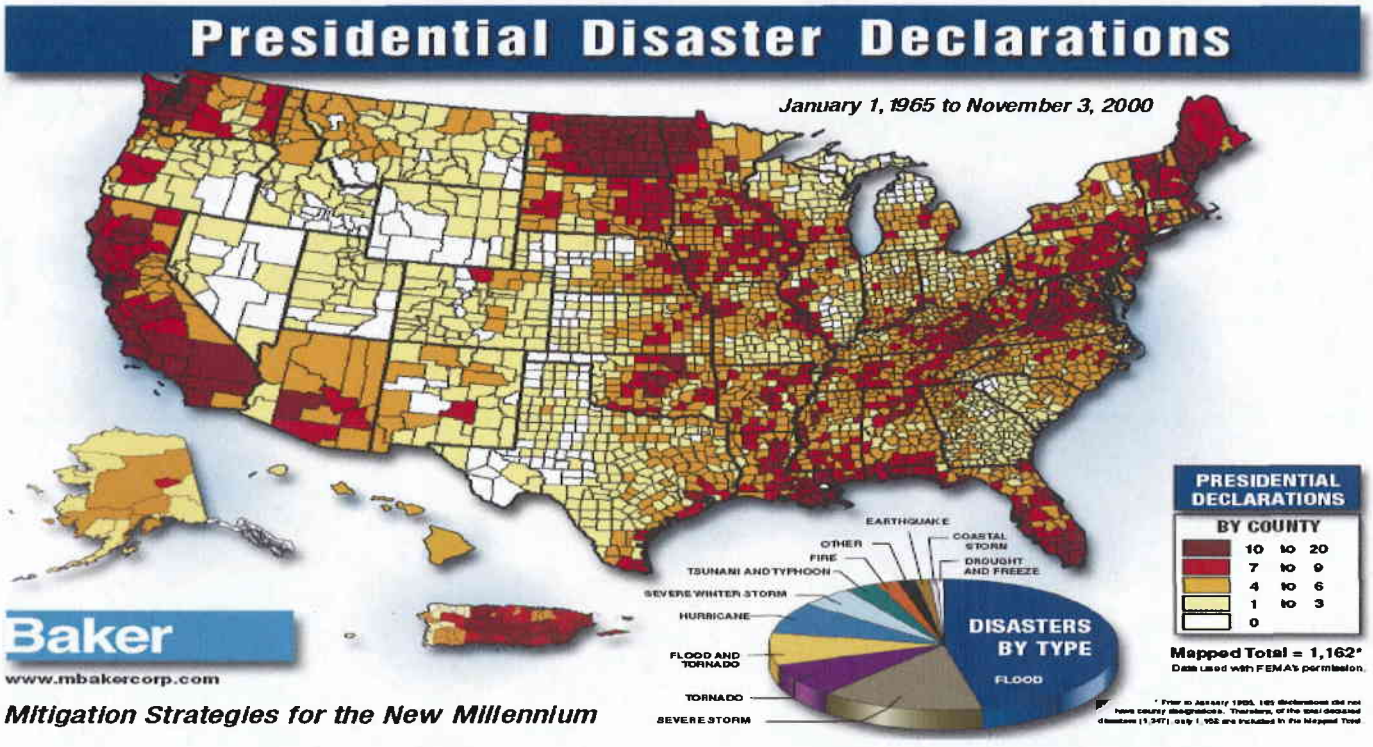
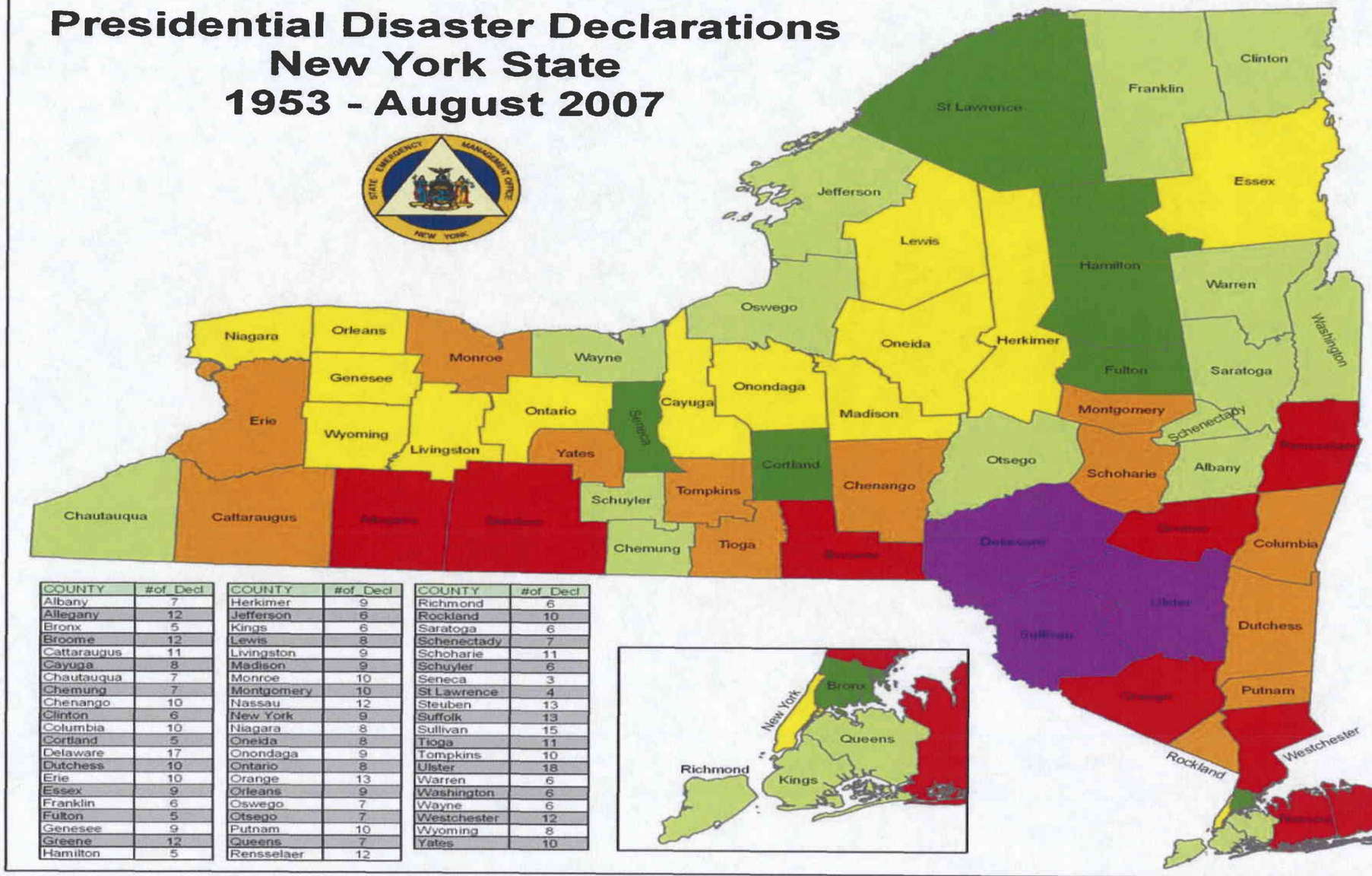


Figure 13: New York State Presidentially Declared Disaster Events (1953 -2007)

Presidential Disaster Declarations
New York State
1953 - August 2007



# of Declarations

- 3 - 5
- 6 - 7
- 8 - 9
- 10 - 11
- 12 - 13
- 14 - 18

Sources

Federal Emergency Management Agency
FEMA website, disaster pages
http://www.fema.gov/news/disasters_state.fema?id=36

New York State Emergency Management Office
NYSEMO 2004 New York State Standard Multi-Hazard Mitigation Plan

Public Entity Risk Institute
PERI Presidential Disaster Declarations website
http://peripresdecusa.org/mainframe.htm

US Dapartment of Labor
Individual Assistance Obligated Total Amounts

NYSEMO GIS
August 2007

COUNTY	#of_Decl
Albany	7
Allegany	12
Bronx	5
Broome	12
Cattaraugus	11
Cayuga	8
Chautauqua	7
Chemung	7
Chenango	10
Clinton	6
Columbia	10
Cortland	5
Delaware	17
Dutchess	10
Erie	10
Essex	9
Franklin	6
Fulton	5
Genesee	9
Greene	12
Hamilton	5

COUNTY	#of_Decl
Herkimer	9
Jefferson	6
Kings	6
Lewis	8
Livingston	9
Madison	9
Monroe	10
Montgomery	10
Nassau	12
New York	9
Niagara	8
Oneida	8
Onondaga	9
Ontario	8
Orange	13
Orleans	9
Oswego	7
Otsego	7
Putnam	10
Queens	7
Rensselaer	12

COUNTY	#of_Decl
Richmond	6
Rockland	10
Saratoga	6
Schenectady	7
Schoharie	11
Schuyler	6
Seneca	3
St Lawrence	4
Steuben	13
Suffolk	13
Sullivan	15
Tioga	11
Tompkins	10
Ulster	18
Warren	6
Washington	6
Wayne	6
Westchester	12
Wyoming	8
Yates	10

Mitigation is a cost-effective approach to assist a community in reducing the potential loss of life and property associated with hazards. This Plan provides a comprehensive focus on mitigation and attempts to identify strategies to reduce the Town's exposure and vulnerability to hazards. The Plan requires a long-term commitment, as many of the strategies will take months or years to implement. Deerpark has experienced the financial and emotional costs and impacts of many types of disasters. The Town understands that there are many policies and procedures that can be implemented to reduce their vulnerability to disasters, and this Plan helps to identify and document these policies and procedures.

While the Town can use previous disaster occurrences to anticipate the possibility of future events, it still remains impossible to forecast all events. For this reason, the Town feels that through the community-based process of completing a "Hazard Analysis" and reaching out to various sectors of the community, the Plan will meet all FEMA requirements. Once these requirements are met, adoption by the Town Board will ensure compliance.

3.2 Planning Team Composition and Meeting Schedule

The Town launched a process to develop this Plan in April 2009. The Town appointed an initial Plan Team with subsequent participation from a wide cross-section of the community, including representatives from state and local governments, health care agencies, local schools, local businesses, the local police department, the Volunteer Fire/Rescue Departments, the local Planning Board, and the building inspector. Additionally, the Town hired a professional engineering and planning firm, Barton & Loguidice, P.C. (B&L) to provide technical expertise and coordination of the planning process.

During the summer and fall of 2009 and into the spring of 2010 The Plan Team conducted a series of meetings to coordinate the plan, and obtain input from a wide

range of stakeholders. The meetings were open to the public and comments from the public were welcomed. Minutes from these meetings are summarized in Table 9 and copies of the minutes provided in Appendix B.

Table 9
Deerpark Hazard Mitigation Team Meeting Minutes Summary

July 1, 2009	• To review the Town's Critical asset inventory that was prepared by B&L and rank them in importance and make recommendations for additional information. • To obtain information from those present concerning community assets and photos • To present the maps prepared to date, and solicit feedback on needed revisions: flood map, emergency facility map and others.
August 5, 2009	• Hazard Information Ranking & Assessment process (HIRA-NY) • Natural Disasters Identified
September 10, 2009	• Background information on the goals and objectives of Hazard Mitigation Planning, • The process the Town will be using to develop the Plan, • A summary of work that completed to date, • An overview of the Hazard Analysis that was completed with SEMO, and Information regarding work tasks that remain to be completed
December 2, 2009	• Historical data regarding 2005 flooding was discussed • Discussed DEC role in dam studies • Outreach to surrounding communities discussed and method of inclusion
January 13, 2010	• Historical snow storms were discussed including April 1, 1997 storm prohibiting road travel • Regulatory responsibility of Delaware River vs. NYC drinking needs discussed - issue regarding regular releases
February 3, 2010	• Public Information on Hazard Mitigation Plan Held • Phone operation at the Emergency Operation Center was discussed as review of previous discussion • Levels of snow emergency discussed
March 3, 2010	• National Incident Monitoring System compliance discussed • Use of website as communication tool discussed
April 7, 2010	• Hazard Mitigation Plan Goals were discussed and adaptations to those goals to ensure Town's achievement • Locations previously not included in Plan discussions were added
May 6, 2010	• Generator function was checked and found not operational; bids sent out for repair • Emergency radios updated to include police channels • Announcement of cell tower to be built which will upgrade announcement capabilities

3.3 Public Involvement

The Planning Team Meetings summarized in the previous section were scheduled in advance, held in public venues, and were open to the public. Notices regarding upcoming meetings were posted on the Town's website (which was also used to disseminate versions of the plan) and placed in local newspapers, delis, and the Town Hall, an example posting is provided in Appendix B. In addition, the Team and interested residents were notified by e-mail regarding the scheduled monthly Plan Team meetings. The Town's email list included a number of people, including residents, businesses, local houses of worship, not-for-profit organizations and media outlets.

In addition the community outreach for developing this Plan, the Town's membership on regional planning organizations and relationship with other governmental and quasi governmental entities proved helpful. An example of the Town's ability to partner can be seen with the Port Jervis School District which previously assisted the Town during disasters, including 2005 flooding when the Anna S. Kuhl School was used as an evacuation site for displaced residents. The School District's participation in the development of a Hazard Mitigation Plan is critical as the schools are the largest buildings in the Town that can house residents and also include necessary amenities such as bathrooms, showers and a kitchen.

3.4 Incorporation of Plans and Other Information

To create the most informative and comprehensible Plan, other municipalities' Hazard Mitigation Plans were reviewed along with the New York State Standard Multi-Hazard Mitigation Plan. These Plans, paired with the FEMA's "Developing the Mitigation Plan" document, helped to guide and shape Deerpark's Plan.

Other Hazard Mitigation Plans referenced during preparation of the Deerpark Hazard Mitigation Plan include:

- Village of Ellenville Hazard Mitigation Plan,
- City of Port Jervis Hazard Mitigation Plan,
- Sullivan County Hazard Mitigation Plan,
- Orange County Emergency Management Plan,
- Oswego County's Draft Hazard Mitigation Plan, and;
- "Ready Rockland" a Plan for Seniors.

Resources used to formulate the Hazard Mitigation Plan included:

- **The Town's Emergency Operation Plan** which serves as the procedural documentation for the Town in the event a disaster whether natural or man made affects the Town.
- **HAZNY (Hazard New York)**, sponsored by NYSEMO, produced a Hazard Analysis Report of the community. HAZNY is an automated interactive spreadsheet that asks specific questions on potential hazards in a community. The program also records and evaluates the responses to these questions. HAZNY also includes historical data regarding previous disasters.
- **The Town of Deerpark Comprehensive Plan** was used to identify areas where potential growth could occur and where previous disasters have occurred. Most of the information presented in Section II was derived from the Comprehensive Plan.

State and Federal Policies used in writing the Hazard Mitigation Plan:

- **New York State Building Code is enforced by the Building Department. It establishes minimum guidelines for building construction and fire prevention that safeguard life and property.**
- **Federal Disaster Mitigation Act**

In October 2000, the Disaster Mitigation Act of 2000 (Public Law 106-390) was signed into law, amending the Robert T. Stafford Disaster Relief and Emergency Assistance

Act of 1988. The amended legislation stressed the importance of pre-disaster mitigation planning to minimize the Nation's disaster losses and to more effectively administer federal disaster relief and mitigation programs.

Section 203 established a "National Pre-disaster Mitigation Fund" to "provide technical and financial assistance to States and local governments to assist in the implementation of pre-disaster hazard mitigation measures that are cost-effective and designed to reduce injuries, loss of life, and damage to property, including damage to critical services and facilities under the jurisdiction of the States or local governments." Section 322 provides an expanded approach to mitigation planning as follows:

- Establishes a new requirement for State/local/tribal Hazard Mitigation Plans,
- Authorizes up to seven percent of the Hazard Mitigation Grant Program (HMGP) funds available to a State to be used for development of State, local, and tribal hazard mitigation Plans, and planning activities.
- Provides for States to receive an increased percentage of HMGP funds (from 15 to 20 percent) provided that they have an approved State Mitigation Plan in effect at the time a major disaster is declared.

Web sites that were helpful included:

www.fema.gov	Federal Emergency Management Agency
www.semo.state.ny.us	New York State Emergency Management
www.ncdc.noaa.gov	NOAA National Climatic Data Center
http://www.nrcc.cornell.edu/	Northeast Regional Climate Center
www.ncem.org/	N. Carolina Division of Emergency Mgmt
www.weather.unisys.com	Hurricane History Information

www.co.orange.ny.us	Orange County Government
http://www.usgs.gov/hazards/	USGS Natural Hazards Gateway

3.5 Implementation of the Mitigation Plan through Existing Programs

Table 10 (below) illustrates the pre-existing mitigation areas, which the Town has already identified and addressed. These not only demonstrate the Town's commitment to the mitigation process, but can serve as a building block for future suggestions generated by the public.

Table 10
Existing Processes and Programs for Implementation of Town of Deerpark's Mitigation Plan

Communication	The Town has worked out an arrangement with Frontier Communication to have twelve (12) dedicated phone lines at the Town's Emergency Management Center housed at the Town Hall. The Town also maintains use of the Police, Fire and EMS radios and the dedicated frequencies they operate on.
Flooding	The Town has enacted local laws in response to "Flood Insurance Study, Orange County, New York, All Jurisdictions" requiring additional anchoring of new structures or substantial additions.
Emergency Preparedness	Establishes a local Emergency Preparedness Plan and develops a sequence response for manmade and natural hazards.

3.6 Hazard Plan Adoption

The Deerpark Town Board is responsible for adopting the Hazard Mitigation Plan. This legislative body is responsible for establishing policies and procedures for the Town. The Town Board has the authority to implement the strategies in this Plan, provide

policy direction for staff, allocate the necessary funds, and modify various laws or ordinances as may be required to support implementation of the Plan.

This Plan will be reviewed by the New York State Emergency Management Office and FEMA prior to FEMA's formal approval and the Town's formal adoption of the Plan. Upon notification that FEMA has tentatively approved the Plan, the Town Board will move to formally adopt the Plan at a Town Board meeting in public session. The Plan will then be submitted to FEMA for final review. A copy of the resolution to be adopted by the Town Board is provided in the Appendix C.

4.0 Hazard Ranking

The Town of Deerpark is vulnerable to numerous natural and technological hazards. These hazards were ranked using the automated program HIRA-NY. The selections made in HIRA-NY are based on information entered into preformatted Microsoft Excel spreadsheets recommended by FEMA and NYSEMO. The HIRA-NY risk assessment process identified all hazards that may potentially impact the Town of Deerpark and detailed a handful of the most prevalent and higher ranking hazards. In order to complete the risk assessment, consideration was given to details like location or geographic area that could be affected, extent or magnitude of each hazard, previous occurrences, and probability of future occurrences.

Within the HAZNY program, there are 5 factor areas where the answers provided during the risk assessment directly impact the ultimate hazard rankings. These 5 factor areas are denoted and detailed below (HIRA-NY).

Scope

This factor looks at two aspects of hazard scope: what area or areas in your jurisdiction could be impacted by the hazard and what are the chances of the hazard triggering another hazard causing a cascade effect. A cascade effect is when the onset of one hazard triggers the effects of another, or multiple, hazard(s). Once the potential area of impact is determined, one of the following options is selected in the HIRA-NY program:

- *A single location* – several hazards can impact a single location.
- *Several individual locations* – many hazards are capable of impacting several individual locations. This does not mean that the hazards occur simultaneously at these locations, but that they could occur at one or several locations at the same time.
- *Throughout a small region* – where a single location or several individual locations actually comprise a significant area, the impact area should be classified as throughout a small region.

- *Throughout a large region* – a larger region would extend for miles and comprise a significant portion of the community begin assessed.

The next part of the scope factor is to determine whether the hazard could potentially trigger another hazard. There are many hazards that trigger the occurrence of additional hazards. When assessing this factor, various severity levels are evaluated, including a credible worst-case scenario. The options for the cascading effect potential of a hazard are as follows:

- *No, highly unlikely.*
- *Yes, some potential.*
- *Yes, highly likely.*

Frequency

Frequency indicates how often a hazard has resulted in an emergency or disaster, or can be a prediction of how often a hazard may occur in the future. The frequency of a hazard should not be based on the worst-case scenario, but rather how often an event would cause various types of damage to the community that would require activation of the emergency response forces. History is a good indicator of the potential for future events and should be reviewed before determining the frequency of a hazard. The HIRA-NY program provides the following options when deciding the frequency of a hazard event:

- *A rare event* – occurs less than once every 50 years.
- *An infrequent event* – occurs between once every 8 years and once every 50 years (inclusive).
- *A regular event* – occurs between once a year and once every 7 years (inclusive).
- *A frequent event* – occurs more than once a year.

Impact

The impact of a hazard should be assessed on various severity levels, including a credible worst-case scenario. There are three types of impacts that are included in the HIRA-NY program: impacts on the population, impacts on private property, and impacts on community infrastructure.

The first impact type concerns the ability of a hazard to seriously injure or kill people. How might this hazard impact the population?

- *Serious injury or death is unlikely* – a serious injury is one that would require immediate medical attention, without which the injured person's life or limb is threatened.
- *Serious injury or death is likely, but not in large numbers* – this determination should apply when the casualties of a hazard can be adequately treated through the normal operation of a community's emergency medical system.
- *Serious injury or death is likely in large numbers* – this determination should apply when the number of casualties requires a full or near full activation of a community's medical facilities' disaster plans.
- *Serious injury or death is likely in extremely large numbers* – this option denotes a catastrophe and applies when the numbers of casualties overwhelms the local emergency medical system and substantial outside assistance is required.

The second impact type concerns the potential for a hazard to physically or economically damage private property, including industrial structures, homes and contents, commercial businesses, belongings, and income in a community. The list and type of private property that may be impacted will vary based on the characteristics of the community. The HIRA-NY options to denote a hazard's impact on private property include:

- *Little or no damage*
- *Moderate damage*
- *Severe damage*

Beyond the actual classification of the impact on private property as little or none, moderate, or severe, the risk assessment process requires the identification of precise types and numbers of properties and structures that have the potential to be impacted.

The third impact type is related to the potential for a hazard to specifically cause structural damage to the infrastructure that serves the community, including government buildings, roads, bridges, and public utility lines, plants, and substations. The options provided in HIRA-NY to indicate a hazards impact on the community infrastructure include:

- *Little or no structural damage*
- *Moderate structural damage*
- *Severe structural damage*

As with private property, the above classification of damage should be supported by detailed information regarding the type of public property likely to be impacted.

Onset

The onset factor is related to the amount of time between the initial recognition of an approaching hazard and when the hazard begins to impact the community. This is a very important factor because for some hazards ample warning time is available so that if plans and procedures have not been developed, there is still time to accomplish such tasks. Other hazards provide little or no warning, so the response to a hazard event depends on existing plans, if any. The choices for time of onset are:

- *No warning*
- *Several hours warning*
- *One day warning*

- *Several days warning*
- *A week or more warning*

For a few hazards there may be different warning times depending on location. In this case, use the shortest warning time that is credible and associated with a credible worst-case event.

Duration

There are two types of duration analyzed in the HIRA-NY program: how long does the hazard remain active and how long do emergency operations continue after the hazard event has ended. A third duration addressed in HIRA-NY, but not included in a community's hazard analysis report, is how long it takes the community to fully recover from the hazard event. The recovery process continues until the community returns to normal. The options provided by HIRA-NY for the duration of the hazard are:

- *Less than one day*
- *One day*
- *Two to three days*
- *Four days to a week*
- *More than one week*

The HIRA-NY program offers the following options for recovery time of a community after a hazard event:

- *Less than one day*
- *One to two days*
- *Three days to one week*
- *One week to two weeks*

4.1 Hazard Assessment

The Deerpark Hazard Mitigation Team screened relevant natural hazards and, based on the Town's geographic location and historical climate records, developed a list of potential hazards of primary concern to the community. As a result of this initial screening, several possible natural hazards were withheld from further analysis based on their low probability of occurrence. Resources from several agencies, including FEMA, NOAA, USDA, USGS, and other climate and storm databases, were reviewed during the initial screening process.

Once the potential hazards of interest were identified, the Team met with representatives from the NYSEMO on August 8, 2009 to analyze the risks posed by the potential hazards of interest using the HIRA-NY program. HIRA-NY was developed by the American Red Cross and NYSEMO. This hazard analysis document is a key component in the process of creating a multi-hazard plan and forms the basis for the risk and vulnerability assessment. Resources from several agencies, including FEMA, NOAA, USDA, USGS, and other climate and storm databases, were referenced during the HIRA-NY analysis.

HIRA-NY is an automated interactive spreadsheet that requires input, asks specific questions on potential hazards in a community, and records and evaluates the responses to these questions. The selections made in HIRA-NY are based on information entered into preformatted Microsoft Excel worksheets recommended by FEMA and NYSEMO. HIRA-NY also includes historical and expert data on selected hazards. The program is designed specifically for collaborative input. Therefore, Deerpark assembled a group of local officials to consider and discuss the questions and issues prompted by the HIRA-NY program. Representatives from the Town along with NYSEMO personnel facilitated the meeting and recorded the results.

4.2 HIRA-NY Analysis

The HIRA-NY analysis was conducted on August 5, 2009 with the assistance of NYSEMO. Detailed results are presented in Table 10. Based on the professional knowledge of those present, historical data, and discussions that occurred amongst the group, 17 hazards were assessed and ranked using the HIRA-NY program. The Town's top four rated hazards are flooding, dam failure, severe winter storm, and fire.

The individuals present for the HIRA-NY process determined the severity of impacts for the 17 selected hazards based on the five factors discussed in Section 4.0: scope, frequency, impact, onset, and duration. Table 11 details the selections that were made for these five factors in relation to each of the 17 analyzed hazards.

4.2.1 Omitted Hazards

Avalanche, coastal erosion, costal storm, expansive soil, land subsidence, tsunami, and volcano, designated as applicable to our region by FEMA, were excluded because they have never occurred in the Town. The Plan Team considered these hazards to present either a minor or insignificant threat. In addition, the Hazard Mitigation Team did not develop mitigation strategies for the man-made hazards. Mitigation strategies for these events may have been discussed during strategy development for other hazards, but they were not included individually in the plan at this time. In the future when the plan is revised, mitigation strategies for man-made hazards may be included at that time. Some hazards are not listed separately in the vulnerability assessment because the strategies were too closely associated or similar to another hazard. In those instances the hazards are grouped together. As mentioned above, several natural hazards were screened and withheld from further analysis based on their low probability of occurrence. The omitted hazards and the reason(s) they were omitted are summarized in Table 12.

Table 11
HIRA-NY Hazard Ranking Analysis

Hazard	Flood	Dam Failure	Severe Winter Storm	Fire
Ranking	Moderately High	Moderately High	Moderately High	Moderately High
Ranking Score	313	267	252	247
Potential Impact	Large Region	Several Individual Locations	Large Region	Single Location
Cascade Effects	**Highly Likely** - Infestation; Structural Collapse; Utility Failure Water Supply Contamination	**Highly Likely** - Flood; Infestation; Landslide; Structural Collapse; Utility Failure; Water Supply Contamination	**Highly Likely** - Extreme Temps; Ice Storm; Utility Failure	**Some Potential** - Explosion; Wildfire
Frequency	Frequent Event	Infrequent Event	Frequent Event	Frequent Event
Onset	Several Hours Warning	No Warning	Several Hours Warning	No Warning
Hazard Duration	Two or Three Days	Two or Three Days	< 1 Day	< 1 Day
Recovery Time	> 2 Weeks	> 2 Weeks	One or Two Days	< 1 Day
Impact on Public Health	Serious Injury or Death	Serious Injury or Death, but not in Large Numbers	Serious Injury or Death, but not in Large Numbers	Serious Injury or Death Unlikely
Impact on Private Property	Severe Damage to Private Property	Severe Damage to Private Property	Little or No Damage to Private Property	Severe Damage to Private Property
Impact on Public Facilities	Moderate Structural Damage to Public Facilities	Moderate Structural Damage to Public Facilities	Little to No Structural Damage to Public Facilities	Little to No Structural Damage to Public Facilities

Table 11
HIRA-NY Hazard Ranking Analysis
(continued)

Hazard	Wildfire	Severe Storm	Hazmat (In Transit)	Ice Storm	Hazmat (Fixed Site)
Ranking	Moderately High	Moderatel y Low	Moderately Low	Moderately Low	Moderately Low
Ranking Score	245	231	224	209	204
Potential Impact	Large Region	Large Region	Large Region	Large Region	Large Region
Cascade Effects	**Highly Likely** - Air Contaminatio n; Civil Unrest; Explosion	**Some Potential** - Flood; Utility Failure; Water Supply Contamina tion	**Some Potential** - Explosion; Fire	**Highly Likely** - Fire; Flood; Ice Jam; Structural Collapse; Utility Failure	**Highly Likely** - Fire; Flood; Ice Jam; Structural Collapse; Utility Failure
Frequency	Regular Event	Frequent Event	Regular Event	Infrequent Event	Infrequent Event
Onset	Several Hours Warning	Several Hours Warning	No Warning	Several Hours Warning	Several Hours Warning
Hazard Duration	Two or Three Days	< 1 Day	< 1 Day	2 or 3 Days	2 or 3 Days
Recovery Time	Three Days to One Week	< 1 Day	< 1 Day	3 Days to A Week	3 Days to A Week
Impact on Public Health	Serious Injury or Death, but not in Large Numbers	Serious Injury or Death Unlikely	Serious Injury or Death is Likely, but not in Large Numbers	Serious Injury or Death Unlikely	Serious Injury or Death Unlikely
Impact on Private Property	Moderate Damage to Private Property	Little or No Damage to Private Property	Little or No Damage to Private Property	Moderate Damage to Private Property	Moderate Damage to Private Property
Impact on Public Facilities	Little or No Structural Damage to Public Facilities	Little or No Structural Damage to Public Facilities	Little or No Damage to Public Facilities	Moderate Structural Damage to Public Facilities	Moderate Structural Damage to Public Facilities

Table 11
HIRA-NY Hazard Ranking Analysis
(continued)

Hazard	Hurricane	Utility Failure	Terrorism	Trans Accident
Ranking	Moderately Low	Moderately Low	Moderately Low	Moderately Low
Ranking Score	200	186	181	169
Potential Impact	Large Region	Large Region	Several Locations	Several Locations
Cascade Effects	**Highly Likely** - Dam Failure; Fire; Flood; Hazmat	**Some Potential** - Civil Unrest; Extreme Temps	**Some Potential** - Civil Unrest; Epidemic; Explosion; Fire; Hazmat (Fixed Site); Utility Failure; Water Supply Contamination	**Some Potential** - Explosion; Fire
Frequency	Infrequent Event	Infrequent Event	Rare Event	Rare Event
Onset	1 Day Warning	No Warning	No Warning	No Warning
Hazard Duration	1 Day	1 Day	1 Day	< 1 Day
Recovery Time	One to Two Weeks	< 1 Day	One to Two Weeks	3 Days to A Week
Impact on Public Health	Serious Injury or Death is Likely, but not in Large Numbers	Serious Injury or Death Unlikely	Serious Injury or Death to Large Numbers	Serious Injury or Death to Large Numbers
Impact on Private Property	Moderate Damage to Private Property	Little or No Damage to Private Property	Little or No Damage to Private Property	Little or No Damage to Private Property
Impact on Public Facilities	Moderate Structural Damage to Public Facilities	Little or No Structural Damage to Public Facilities	Moderate Structural Damage to Public Facilities	Moderate Structural Damage to Public Facilities

Table 11
HIRA-NY Hazard Ranking Analysis
(continued)

Hazard	Ice Jam	Earthquake	Tornado	Drought
Ranking	Moderately Low	Low	Low	Low
Ranking Score	168	152	151	144
Potential Impact	Several Locations	Large Region	Single Location	Large Region
Cascade Effects	**Some Potential** - Dam Failure; Flood; Water Supply Contamination	**Some Potential** - Dam Failure; Explosion; Fire; Flood; Hazmat (Fixed Site); Utility Failure; Water Supply Contamination	**Some Potential** - Dam Failure; Explosion; Fire; Flood; Hazmat (Fixed Site); Structural Collapse; Utility Failure	**Some Potential** - Fire; Water Supply Contamination; Wildfire
Frequency	Infrequent Event	Rare Event	**Rare Event**	Infrequent Event
Onset	Several Hours Warning	No Warning	No Warning	> 1 Week Warning
Hazard Duration	2 or 3 Days	< 1 Day	< 1 Day	> 1 Week
Recovery Time	One to Two Days	< 1 Day	< 1 Day	< 1 Day
Impact on Public Health	Serious Injury or Death Unlikely	Serious Injury or Death is Likely, but not in Large Numbers	Serious Injury or Death is Likely, but not in Large Numbers	Serious Injury or Death Unlikely
Impact on Private Property	Moderate Damage to Private Property	Little or No Damage to Private Property	Moderate Damage to Private Property	Little or No Damage to Private Property
Impact on Public Facilities	Little or No Structural Damage to Public Facilities	Little or No Structural Damage to Public Facilities	Moderate Structural Damage to Public Facilities	Little or No Structural Damage to Public Facilities

Table 12
Omitted Hazards

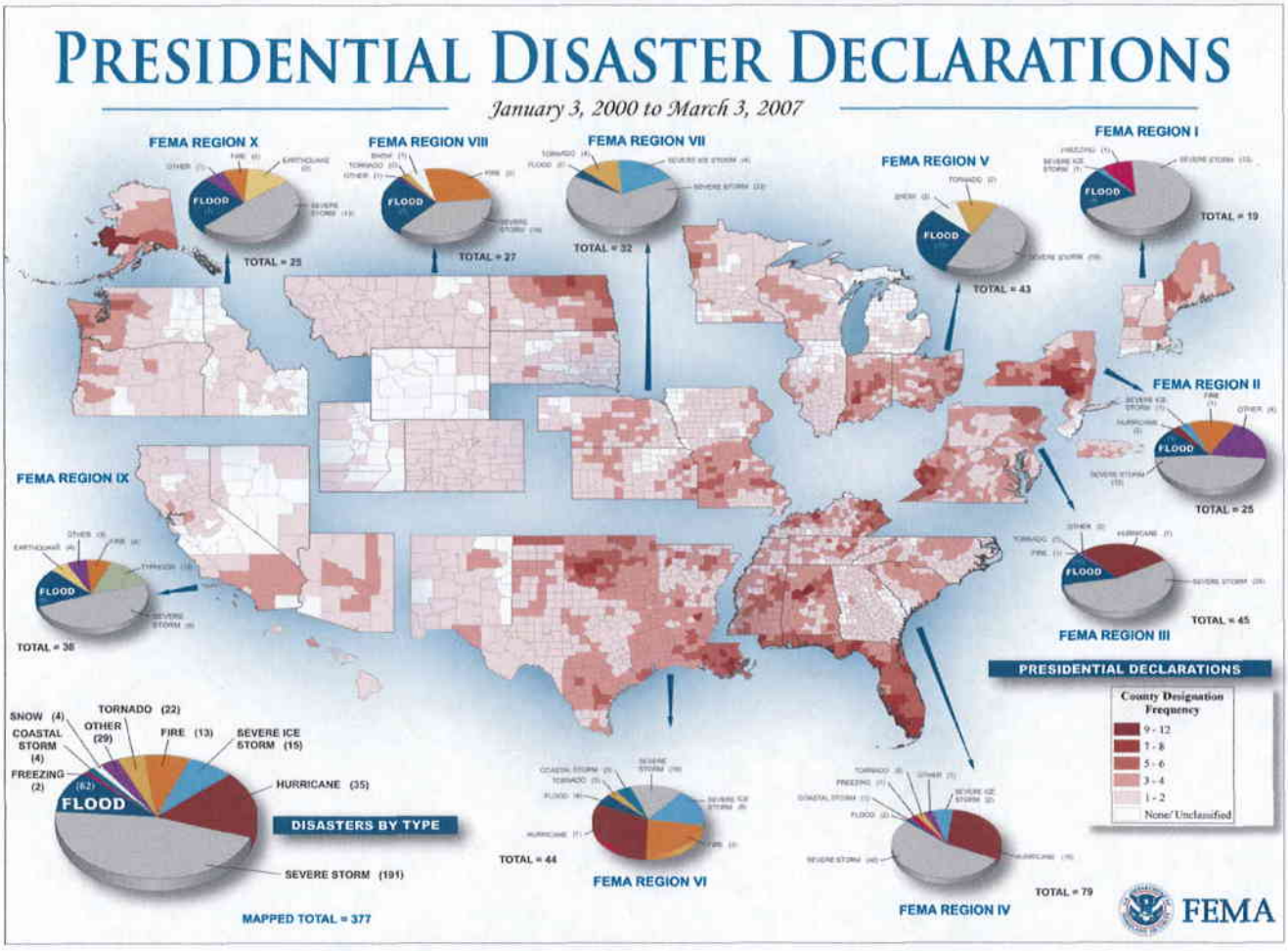
Coastal Erosion	Very Low	Mapping	Distance from Coastline Precluded Examination
Flood – Coastal	Very Low	Historical Climate Records	Distance from Coastline Precluded Examination
Landslide	Low	Historical Records Rock Type	Committee Acknowledged Grade in Certain Areas
Tsunami	Very Low	NOAA's National Data Buoy Center	Hazard not analyzed based on geographic location and elevation. The Town of Deerpark is 1,401 feet above sea level. Tsunamis are not discussed in the state plan and Deerpark is at least 80 miles from open ocean and no record exists of a catastrophic Atlantic tsunami impacting the mid-Atlantic coast of the United States.
Volcano	Very Low	USGS Volcano Hazards Program	Hazard not analyzed based on geographic location.

4.3 Presidential Disaster Declarations

After a state has declared a State of Emergency as the result of a particular disaster event, that state and its local governments will evaluate recovery options, capabilities, and costs. If the damage from the disaster event is beyond the recovery capabilities of the state, the governor will send a letter to the President, through FEMA, detailing the situation. The president then makes the decision whether to declare a major disaster or emergency. After a presidential declaration is made, FEMA designates the impacted area eligible for assistance and announces the types of assistance available. FEMA provides supplemented assistance for the recovery of state and local governments; the federal share will always be at least 75 percent of the total eligible costs (FEMA, Presidential Disaster Declarations, 2009). Figure 14 (below) shows the different FEMA

regions within the United States and the total presidential declarations that have been issued for each Region between January 3, 2000 and March 3, 2007.

Figure 14 - Presidentially Declared Disaster by FEMA Region



5.0 Risk Assessment

The most important step in the process of risk management is risk assessment. Risk assessment is a tool that can be used to gauge the probability that loss will occur and to estimate the magnitude of the potential loss. The measurement of these quantities is often variable and can thereby make risk assessment extremely difficult. Mathematically speaking, the total risk of an incident is equal to the magnitude of the potential loss of the incident multiplied by the probability the incident will occur. A risk assessment usually includes assets, weaknesses, probability of damage, estimates of recovery expenses, outlines of potential defensive procedures and their costs, and anticipated likely savings from improved protection. This section of the plan will identify hazards and assess vulnerability.

5.1 Past Occurrence of Hazard Events

A significant number of natural disasters have historically affected both Orange County and the Town of Deerpark. As previously shown in Figure 8, Deerpark is located in the highest category for Presidentially Declared Disasters between 1965 and 2000, Table 13 outlines the disasters that have been declared in the Town. Past disasters in the Town have mirrored those identified as potential hazards by the New York State Multi-hazard Mitigation Plan (2004) and the Town's Emergency Operation Plan. As previously mentioned, the most common type of natural hazard in the Town is flooding. Flooding occurs most often in the spring as a result of snowmelt and in the late summer/autumn due to the passage of tropical storms and significant storm activity. There have been many flooding and storm-related declared disasters and undeclared events in the past that have affected Deerpark.

Table 13
Presidential Disaster Declarations for Orange County, New York

8/22/1955	Hurricane/Flooding	Hurricane Diane	Undetermined	Eisenhower
8/18/1965	Drought	Water Shortage	Undetermined	Johnson
9/13/1971	Flooding	Severe Storm & Flooding	$22,191,481	Nixon
6/23/1972	Flooding	Tropical Storm Agnes	$506,185,943	Nixon
4/17/1984	Flooding	Coastal Storms and Flooding	$22,195,715	Reagan
1/24/1996	Flooding	Severe Storm & Flooding	$196,139,901	Clinton
9/19/1999	Hurricane	Hurricane Floyd	$80,781,770	Clinton
9/11/2001	Human Cause	Fires and Explosion	Undetermined	G.W. Bush
10/01/2004	Severe Storm	Tropical Depression	$17,143,691	G.W. Bush
10/01/2004	Flooding	Severe Storm & Flooding	$26,038,173	G.W. Bush
4/19/2005	Flooding	Severe Storm & Flooding	$78,831,145	G.W. Bush
7/01/2006	Flooding	Severe Storm & Flooding	$315,129,770	G.W. Bush
4/24/2007	Flooding	Severe Storm & Flooding	$109,730,306	G.W. Bush

Listed below is a representative sample of declared disasters in the Deerpark vicinity with declaration dates. All associated costs are provided in constant 2008 dollars:

5.1.1 Severe Storm and Flooding 8/22/1971 - Declaration 45

Costs were not determined for damage associated with flooding from Hurricane Diane.

5.1.2 Severe Storm and Flooding Declaration 9/13/1971 - Declaration 311

There were $22,191,481 in damages associated with severe weather.

5.1.3 Tropical Storm Agnes 6/23/1972 - Declaration 338

There were $506,185,943 in damages associated with this tropical storm (remnants of Hurricane Agnes) which resulted in severe flooding. Agnes was the largest Category 1 Hurricane in the registry until 1979's hurricane seasons. The overall cost of Agnes' associated damages totaled $13 billion.

5.1.4 Coastal Storms and Flooding 4/17/1984 - Declaration 702

There were $22,195,715 in damages associated with severe storms.

5.1.5 Severe Storm and Flooding 1/24/1996 - Declaration 1095

There were $196,139,901 in damages associated with a storm that claimed ten (10) lives across the region. Unseasonably warm weather led to rapid snowmelt of up to forty-five (45) inches combined with four and a half (4.5) inches of rain that caused severe flooding across New York. The impacts were particularly devastating in the lower lying regions of the Catskill Mountains. Flooding across the Delaware River Basin exceeded one-hundred (100) year recurrence rates.

5.1.6 Hurricane Floyd 9/19/1999 - Declaration 1296

Flooding associated with heavy rains as a result of Hurricane Floyd placed southeastern New York in the 4-½ inch category depending on location. A record rainfall of 6.63 inches was seen in Philadelphia and two deaths occurred in New York. Nationally, Floyd caused between $4.5 and $6 billion in damages, with statewide damages totaling $80,781,770.

5.1.7 Tropical Depression 10/01/2004 - Declaration 1564

Declaration 1564 was issued in regard to flooding that occurred in the area from August 29 through September 16th. The statewide award for this declaration was $26,038,173. This award came on the same day that the award for costs associated with Tropical Depression Ivan was announced.

5.1.8 Severe Storm and Flooding 10/01/2004 - Declaration 1565

Tropical Depression Ivan, the resulting storm associated with Hurricane Ivan, was one of the strongest storms in Atlantic hurricane history. Because Ivan's path entered the US, traveled across portions of the mainland and had an associated tropical depression, overall damages ran to approximately $57 billion, with statewide damages totaling $17,143,691.

5.1.9 Severe Storm and Flooding 4/19/2005 - Declaration 1589

A series of wet weather events passed through the area. In some parts of the state up to 26 inches of snow fell, causing catastrophic flooding and two deaths. In Orange County, the combination of rain and snow led to severe flooding that caused some houses to be declared uninhabitable. Damages totaled $78,831,145.

5.1.10 Severe Storm and Flooding 7/01/2006 - Declaration 1650

Originally a declaration for seven (7) upstate counties was made on July 1, 2006 and an additional five (5) counties were added on July 3, 2006, bringing the total to twelve (12) counties. Total statewide damage awards totaled $315,229,770.

5.1.11 Severe Storm and Flooding 4/24/2007 - Declaration 1692

Severe storms and periods of inland coastal flooding took place from April 14-18, 2007, causing detrimental flooding across portions of southeastern New York. In total, $109,730,306 worth of damage took place in New York.

5.2 Profiles of Hazards Identified

The natural hazards that were evaluated as part of the County's HIRA-NY analysis are further detailed below. This information includes a risk assessment of the hazard, a

description of the hazard, historical occurrences of each hazard within Orange County, and the probability of future hazard events and associated losses. During the HIRA-NY analysis, the participants rated each hazard based on the group's assessment and assigned numerical values associated with the significance of each hazard. These hazards are discussed in the order that they were categorized, from high hazard events to low hazard events.

5.2.1 Flood Hazard Profile Ranking:

Hazard Risk Gauge

Background and Local Conditions

FEMA (2010a) defines flooding as follows:

A general and temporary condition of partial or complete inundation of normally dry land areas from:

(1) The overflow of inland or tidal waters;

(2) The unusual and rapid accumulation or runoff of surface waters from any source;

(3) Mudslides (i.e., mudflows) which are proximately caused by flooding and are akin to a river of liquid and flowing mud on the surfaces of normally dry land areas, as when earth is carried by a current of water and deposited along the path of the current.

A flood inundates a floodplain. Most floods fall into three major categories: riverine flooding, coastal flooding, and shallow flooding. Alluvial fan flooding is another type of flooding more common in the mountainous western states.

Riverine flooding occurs when a water body overflows its normal banks, causing water to flow into low-lying areas and is the most common type of flooding that occurs with the Town of Deerpark. Floods often result in water-related damage to the interior and exterior of homes and commercial buildings, as well as the destruction of facilities,

equipment, agricultural crops, and livestock. Flooding can disrupt utilities such as water, sewer, electricity, transportation, and communications, and it is not uncommon for flooding to result in human casualties and fatalities. Flooding can result from severe storms, snowmelt, extended wet periods, or by a combination of events. The most historically significant floods within the Town of Deerpark have been associated with the remnants of tropical storms, rapid snowmelt in combination with significant rainfall events, and severe thunderstorms. Local conditions such as moderately high topographic relief and steep slopes, as well as impermeable ground conditions (shallow bedrock, frozen ground surface) can contribute to flash flooding.

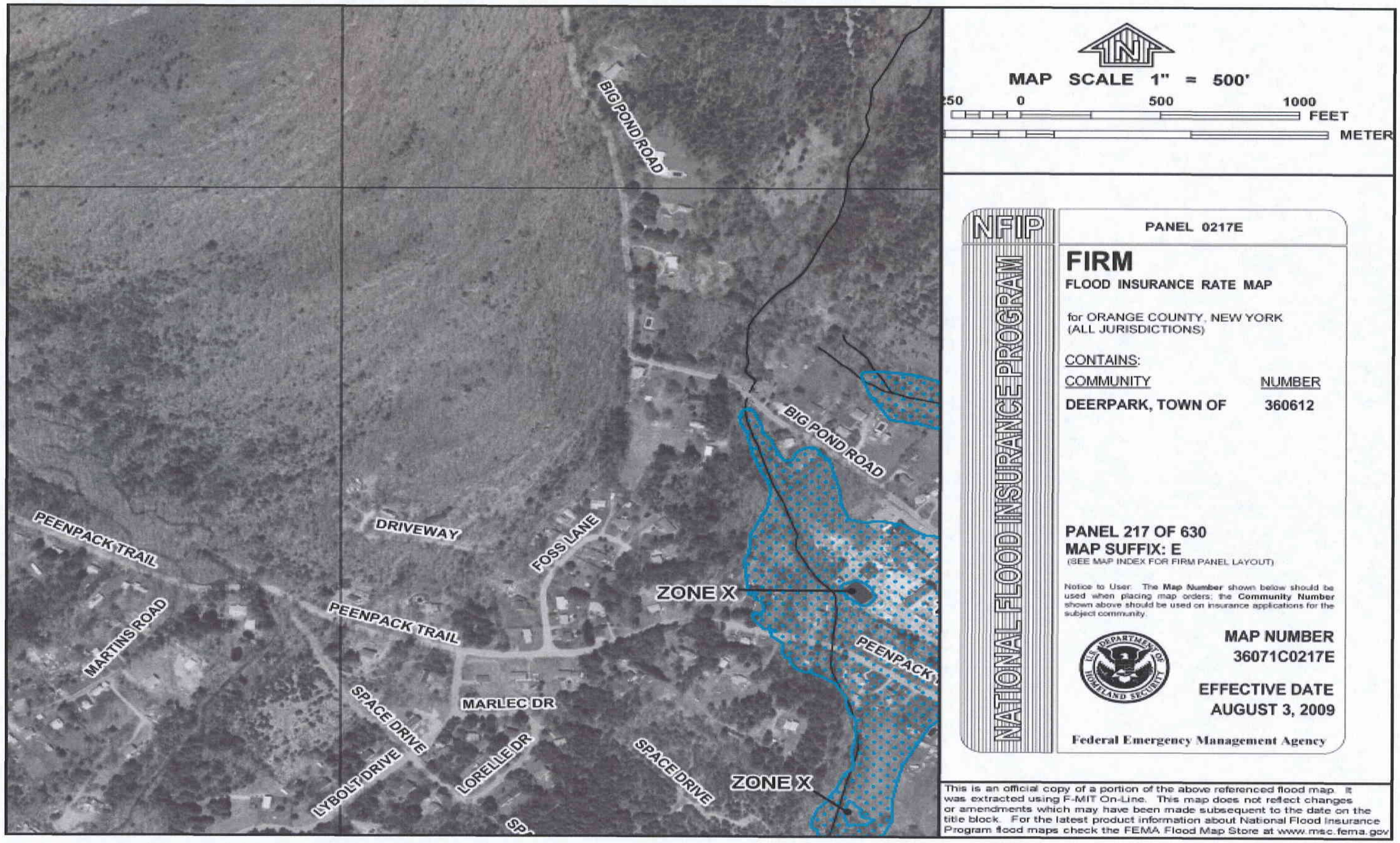
Flash floods are a special case of riverine flooding defined as "a rapid and extreme flow of high water into a normally dry area, or a rapid water level rise in a stream or creek above a predetermined flood level, beginning within six hours of the causative event (e.g., intense rainfall, dam failure, ice jam). However, the actual time threshold may vary in different parts of the country. Ongoing flooding can intensify to flash flooding in cases where intense rainfall results in a rapid surge of rising flood waters. Flash floods can be particularly hazardous since there will not always be adequate warning that these potentially deadly, sudden floods are coming (National Weather Service, 2010). Flash floods are most frequently associated with intense thunderstorms that occur predominantly during the summer months.

National Flood Insurance Program

FEMA, which administers the National Flood Insurance Program (NFIP), has mapped the known floodplains within much of the United States. When a flood study is completed for the NFIP, the information and maps are assembled into a Flood Insurance Study (FIS). A FIS compiles flood risk data for specific waters or hazard areas within specific communities and includes the main causes of flooding in these areas. The FIS reports delineate Special Flood Hazard Areas (SFHAs), designate flood risk zones, and establish Base Flood Elevations (BFEs) within certain areas. BFEs are based on the flood event that has a 1-percent (1%) chance of occurring annually, or the 100-year flood (HIRA-NY, Definitions of Hazards). An additional component of the NFIP

is the mapping for flood insurance rates, and whether insurance would be required by a lending institution or government grant providing agency, Figure 16 provides the Flood Insurance Rate Map (FIRM) for the Town of Deerpark.

Figure 15: Flood Insurance Rate Map



100-Year Floodplain

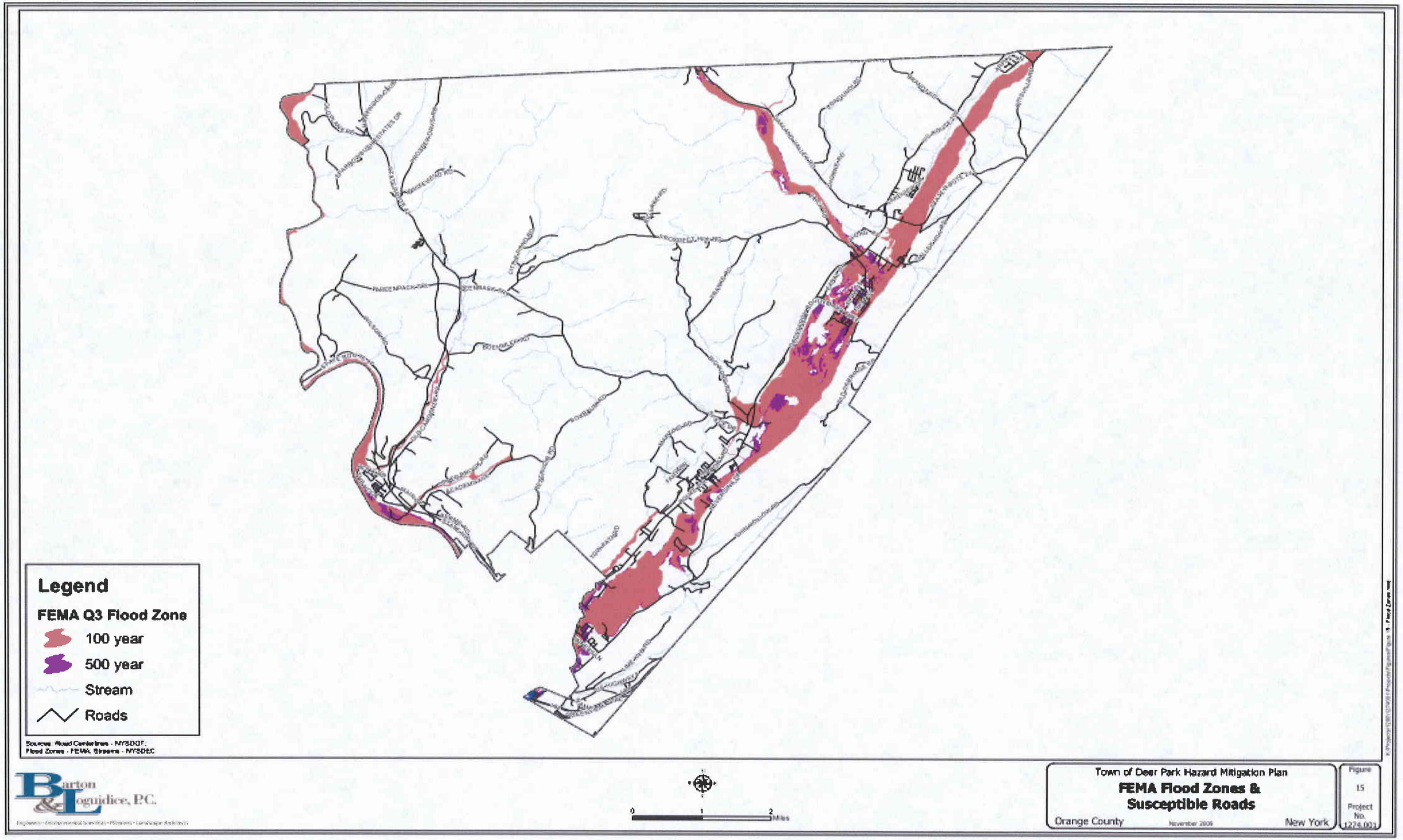
The 100-year floodplain designates an area that has, on average, a 1-percent chance of flooding in any given year. It is important to note that a 100-year flood could occur during subsequent years or once every 10 years. The 100-year flood, or base flood, is the standard that has been adopted for use in the NFIP. As indicated on Federal Insurance Rate Maps (FIRMs), base flood elevations indicate the elevation of surface water resulting from a flood that has a 1-percent chance of occurring in any given year. The BFE is the height of the base flood, normally in feet, relation to the geographic datum referenced in the FIS report (i.e. National Geodetic Vertical Datum (NGVD) of 1929, North American Vertical Datum (NAVD) of 1988, etc.) (HIRA-HY, Definitions of Hazards). FEMA mapped flood zones are depicted in Figure 17.

Historic Frequency and Probability of Occurrence

Flooding outranked other hazards as the one with the most potential for widespread, major damage. Flooding is a frequent event in the Town with historic floods occurring in 1948, 1955, 1971, 1981, 1984, 1996, 2004, 2005, 2006 and 2007. Significant flooding occurs in the Town because of its location at the confluence of the Neversink and Delaware Rivers. Upstream from this juncture, the Mongaup River joins the Delaware adding to the River's flow. While the rivers flowing through/around the Town play the most significant role in the amount of water present, a number of tributaries to these rivers flow through the Town. With the Town's location in the valley formed by the Shawangunk Mountains, water travels to low points and occasionally over the banks for these streams and creeks. Figure 17 shows the watercourses that traverse the Town and the associated wetland and floodplains. With the Town's geographic position, it is likely that flooding will continue with no foreseeable decrease in sight.

The 1981 flooding in February was caused by severe snow and ice followed by ice jams in the river. Figures 19-A and B show the devastation caused by flooding which was covered in the Union Gazette's Special Flooding Edition February 13, 1981.

Figure 16: 100 and 500 Year Flood Zones



Designated Hazard Areas and Impacts

Typically, flooding events affect small regions located within 100- and 500-year flood plains. While Figure 17 indicates the 100 and 500 year flood plains located within the Town. Figure 18 provides a graphical description of the properties across Orange County that are located in 100 Year Flood Plains. This depiction indicates that within the Town of Deerpark, there is $37,128,223 worth of real property in declared 100 – Year Flood Plains.

When flooding does occur, there is typically warning period of two to three days. In periods of extreme flooding, drastic results such as severe injuries or death could be sustained. This can be associated directly or indirectly with the damage water has done on existing structures both public and private. In the past, recovery time from extreme flooding has taken several weeks for recovery. This is compounded by the displacement of people from their homes and the ultimate destruction of those structures.

Specific Areas of Flooding Concern:

Neversink River Corridor: Extending from Oakland Valley to the confluence of the Basha Kill and Neversink Rivers, and thence to the confluence of the Neversink and Delaware Rivers.

Delaware River Valley: Extending from the Sullivan County line at the Delaware River and extending thence to the confluence of the Delaware and Neversink Rivers.

Myer's Grove portion of Godeffroy: Located near the Basher Kill's entrance in to the Neversink, the area is characterized by low river banks and houses in designated floodplains. Originally constructed as seasonal homes, this area has become populated with full-time residents as the Town's population transitioned from seasonal to full-time.

Anna S. Kuhl School: Behind the Anna S. Kuhl School, the Neversink backs up from its confluence with the Delaware downstream. The area has been the site of repeated flooding and was the former location of the Port Jervis School District bus garage.

Peenpack Trail: One of the only east-west traveling roads in the Town, the Peenpack Trail is an area of concern as many of the Town's creeks, streams and ponds are located north of the road. There is additional concern as there are a number of dams in this region including the Cahoonzie Lake Dam and the Big Pond Dike (Dam Failure Covered in following section).

Rte 42 in Cahoonzie: Rte 42 in Cahoonzie experiences flooding as bank erosion leads to debris entering the Steeny Kill. The intersection of the Steeny Kill and Shingle Kill Creeks is just north of the Peenpack Trail and Route 42 intersection.

Orange County, NY Residential Property Exposure in 100-Year Floodplains

Property Exposure

- $0.01 - $100
- $100 - $500
- $500 - $1,000
- $1,000 - $5,000
- $5,000 - $10,000
- $10,000 - $25,000
- $25,000 - $50,000
- $50,000 or greater

This map shows the location and combined value of property in a 100-year flood zone based on a GIS overlay of NYS Real Property System (RPS) parcel center points with the FEMA Q3 Digital Flood Map. A point density mapping technique has been applied to help visualize property exposure "hot spots" as the individual parcel center points are too numerous to be properly displayed at this map scale. The estimated dollar value of each property has been spread over a surface 1KM in diameter and summed with values from overlapping parcel surfaces. The legend scheme reflects the associated per acre dollar value of the resulting surface.

* Municipality not analyzed due to availability of RPS or Q3 data.

MUNICIPALITIES	Res Prop#	Residential Prop Value
BLOOMING GROVE, TOWN OF	160	$49,826,609
CHESTER, TOWN OF	306	$90,383,400
CHESTER, VILLAGE OF	28	$6,679,200
CORNWALL, TOWN OF	28	$9,049,246
CORNWALL-ON-HUDSON, VILLAGE OF	17	$5,020,770
CRAWFORD, TOWN OF	46	$7,094,827
DEERPARK, TOWN OF	251	$37,128,223
FLORIDA, VILLAGE OF	21	$5,318,446
GOSHEN, TOWN OF	60	$17,767,998
GOSHEN, VILLAGE OF	84	$19,715,452
GREENVILLE, TOWN OF	23	$7,553,600
GREENWOOD LAKE, VILLAGE OF	91	$29,055,086
HAMPTONBURGH, TOWN OF	79	$31,661,820
HARRIMAN, VILLAGE OF	1	$170,667
HIGHLAND FALLS, VILLAGE OF	*	*
HIGHLANDS, TOWN OF	2	$476,314
KIRYAS JOEL, VILLAGE OF	98	$16,655,312
MAYBROOK, VILLAGE OF	*	*
MIDDLETOWN, CITY OF	32	$4,772,612
MINISINK, TOWN OF	39	$26,380,493
MONROE, TOWN OF	12	$4,879,999
MONROE, VILLAGE OF	62	$22,147,334
MONTGOMERY, TOWN OF	59	$19,267,158
MONTGOMERY, VILLAGE OF	34	$8,208,546
MOUNT HOPE, TOWN OF	15	$4,604,693
NEW WINDSOR, TOWN OF	35	$11,465,793
NEWBURGH, CITY OF	23	$3,592,085
NEWBURGH, TOWN OF	183	$46,028,112
OTISVILLE, VILLAGE OF	*	*
PORT JERVIS, CITY OF	374	$50,781,147
TUXEDO PARK, VILLAGE OF	*	*
TUXEDO, TOWN OF	22	$8,680,712
UNIONVILLE, VILLAGE OF	7	$1,204,984
WALDEN, VILLAGE OF	14	$4,200,909
WALLKILL, TOWN OF	52	$13,044,441
WARWICK, TOWN OF	201	$70,980,850
WARWICK, VILLAGE OF	35	$9,323,872
WASHINGTONVILLE, VILLAGE OF	96	$25,131,164
WAWAYANDA, TOWN OF	23	$9,560,372
WOODBURY, TOWN OF	31	$12,052,219
ORANGE COUNTY	2,644	689,864,465

Rivers
Water Bodies
Municipal Boundaries
Watershed
Watersheds vary in color. The names are in italics.

0 2.5 5 10 Miles

NYSEMO GIS
December 2007

Figure 17 - Residential Property Exposure in 100-Year Floodplains

Figure 18 - Photos of Stream Erosion
¾ Miles North of the 42/97 Junction

Bank Erosion on the Shingle Kill

Trees Clogging Shingle Kill Causing Backup

Figure 19-A: Union Gazette Special Flooding Edition

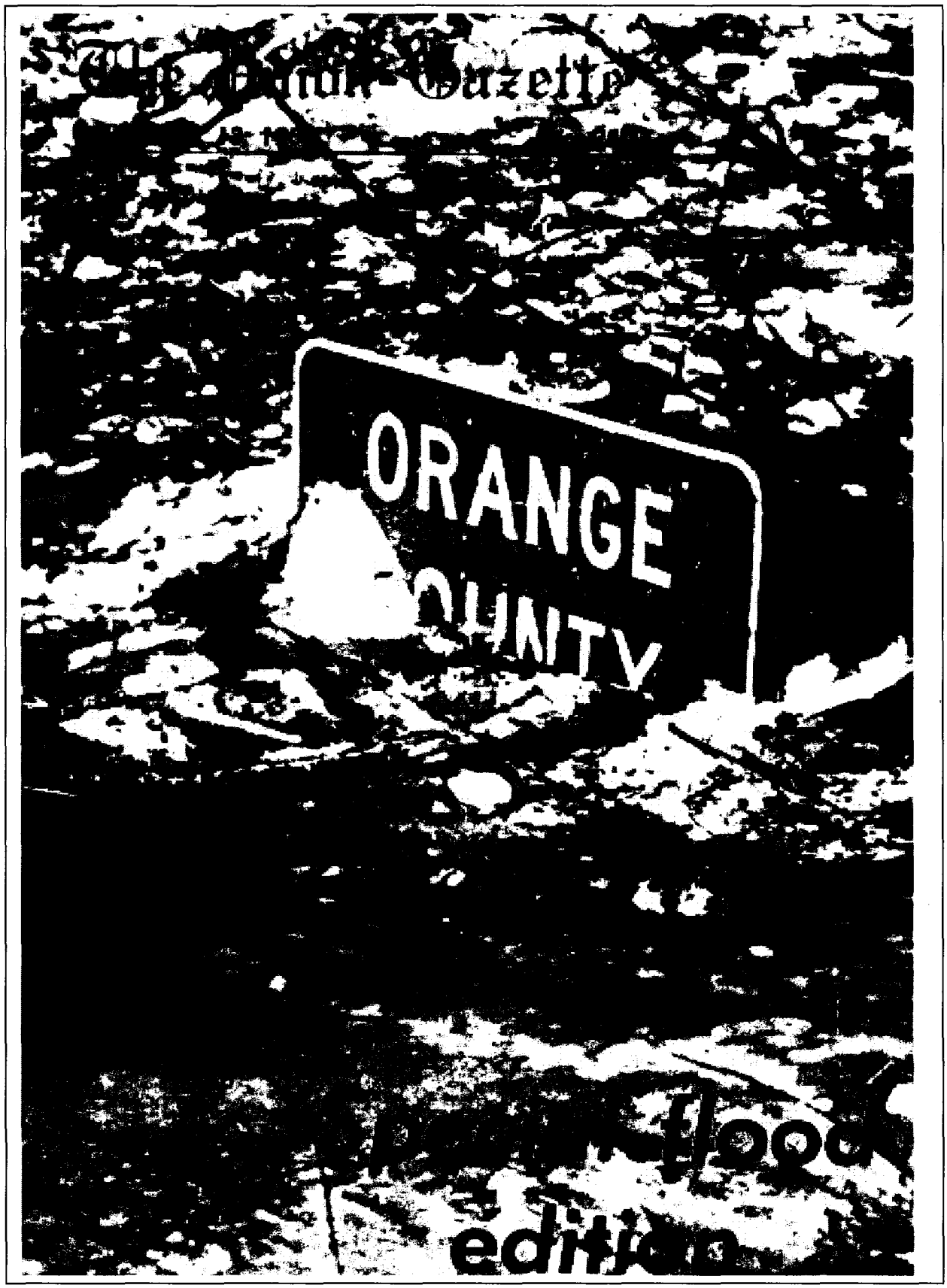
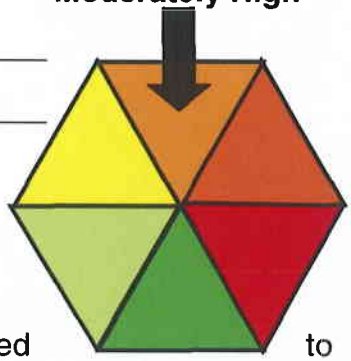


Figure 19-B: Union Gazette Special Flood Edition

5.2.2 Dam Failure Hazard Profile Ranking:

Moderately High



Hazard Risk Gauge

Background and Local Conditions

FEMA (2008) defines a "dam" as an artificial barrier that has the ability to impound water, wastewater, or any liquid-borne material for the purpose of storage or control of water. In the context of this Hazard Mitigation Plan, the definition will be limited to those structures used for the impoundment of surface water for water supply, recreation, or energy production purposes.

Dams can fail for one or a combination of the following reasons:

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

Dam failure or levee breeches occur when the designed retaining structure is unable to withhold the upstream water. This failure can occur when an over-abundant amount of water is present upstream or when there is a structural failure in the dam. Dams in the Town are designed for different reasons including flood control, recreation, and drinking water supply.

Second to flooding, dam failure was ranked as the highest concern for hazard mitigation purposes in the Town of Deerpark.

NYSDEC Hazard Classifications for dams are assigned based on the particular physical characteristics of a dam and its location, may be assigned irrespective of the size of the dam, as appropriate, and are defined as follows (NYSDEC, 2010):

(1) Class "A" or "Low Hazard" dam: A dam failure is unlikely to result in damage to anything more than isolated or unoccupied buildings, undeveloped lands, minor roads such as town or county roads; is unlikely to result in the interruption of important utilities, including water supply, sewage treatment, fuel, power, cable or telephone infrastructure; and/or is otherwise unlikely to pose the threat of personal injury, substantial economic loss or substantial environmental damage.

(2) Class "B" or "Intermediate Hazard" dam: A dam failure may result in damage to isolated homes, main highways, and minor railroads; may result in the interruption of important utilities, including water supply, sewage treatment, fuel, power, cable or telephone infrastructure; and/or is otherwise likely to pose the threat of personal injury and/or substantial economic loss or substantial environmental damage. Loss of human life is not expected.

(3) Class "C" or "High Hazard" dam: A dam failure may result in widespread or serious damage to home(s); damage to main highways, industrial or commercial buildings, railroads, and/or important utilities, including water supply, sewage treatment, fuel, power, cable or telephone infrastructure; or substantial environmental damage; such that the loss of human life or widespread substantial economic loss is likely.

(4) Class "D" or "Negligible or No Hazard" dam: A dam that has been breached or removed, or has failed or otherwise no longer materially impounds waters, or a dam that was planned but never constructed. Class "D" dams are considered to be defunct dams posing negligible or no hazard. The department may retain pertinent records regarding such dams.

Historic Frequency and Probability of Occurrence

There are no known historic failures of dams in the Town but the probability of future failure is a significant concern. Uses for dams in the region vary as do the construction of each dam. In maintaining the inventory of existing dams, DEC provides online

access through a Google Earth Virtual Globe to provide an interactive mechanism for locating dams across the State. A user has the ability to click on each icon and find a report indicating the construction, use and each dam's date of last inspection. Table 14 outlines the information provided in each report.

Designated Hazard Areas and Impacts

There are twenty-eight (28) dams registered with the New York State Department of Environmental Conservation in the Town of Deerpark, including five (5) dams that are categorized as high hazard dams (Table 14). Four of the five "high hazard" dams are owned by the City of Port Jervis (Figure 20); the remaining "high hazard" dam is the Rio Reservoir, owned by Alliance Energy.

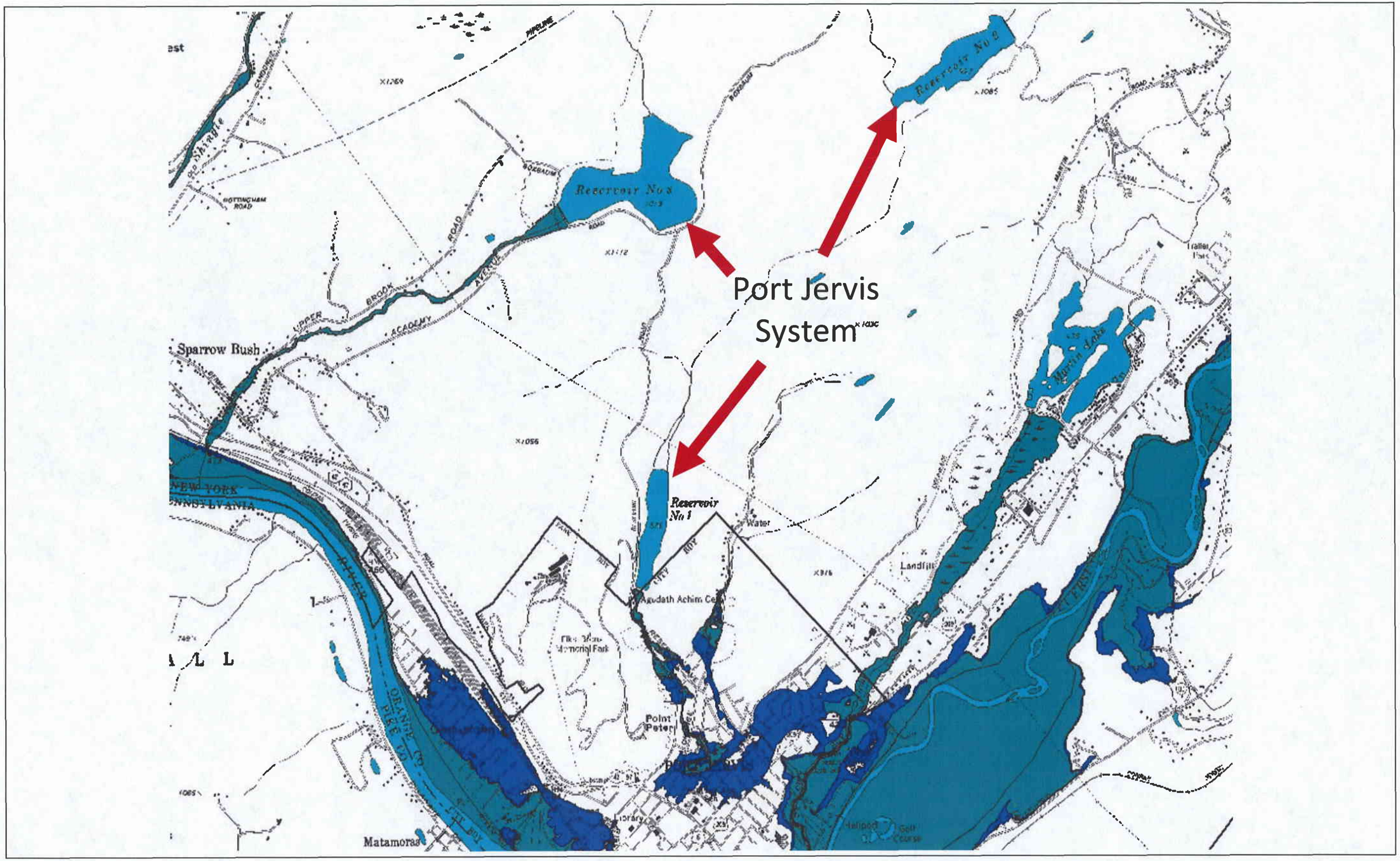


Figure 20: Port Jervis Reservoir System

Table 14
Dams Classified as "High Hazard"

Name	State ID	Construction Type	Owner	Build Date	Last Inspection
Port Jervis Reservoir #1 Dam	146-0022	Earth	City of Port Jervis	1869	7/11/06
Port Jervis Reservoir #2 Dam	164-0048	Earth	City of Port Jervis	1880	7/11/06
Port Jervis Reservoir #3 Dam	164-0038	Earth	City of Port Jervis	1910	7/11/06
Port Jervis Reservoir #3 Dike	164-0039	Earth	City of Port Jervis	1912	7/11/06
Rio Dam	149-0086	Earth	Alliance Energy	1927	10/22/1991

Figure 21 – Rio Reservoir

The Rio Reservoir is the lowermost of three (3) reservoirs on the Mongaup River. The reservoir provides 3,650 ac-ft of storage capacity that is used by Alliance Energy as an immediate source of water for hydro-electric power production through two generating units. Water flows into the Rio Reservoir primarily via two separate inputs, namely the Mongaup River and Black Brook. Outflows from the Rio Reservoir are primarily through the tailrace of the power generation units when they are in service, with a small amount released through a regulated outflow point directly into the bypass reach to protect the ecosystem (Alliance Energy, 2010).

Dams upstream of the Rio Reservoir include the Swinging Bridge Reservoir (which is fed by two smaller reservoirs, known as the Toronto and Cliff Lake Reservoirs), and the Mongaup Falls Reservoir. All of the reservoirs in the Mongaup River System are owned and operated by Alliance Energy, principally for hydroelectric production.

In addition to the dams located within the Town of Deerpark, the Town is also located downstream of the Neversink Reservoir, which is operated by the New York City Department of Environmental Protection (NYCDEP). Located in Sullivan County, approximately five (5) miles northeast of the Village of Liberty and more than 75 miles from New York City, the Neversink Reservoir holds 34.9 billion gallons at full capacity. The reservoir was placed into service in 1954.

Figure 22 - Neversink Reservoir

A potential failure of the Neversink Reservoir (Figure 22) would cause significant flooding within portions of the Town of Deerpark, including the Neversink River valley hamlets of Cuddebackville, Godeffroy, and Huguenot, as shown on Figure 20-22. Flooding associated with a failure of the Neversink Reservoir would exceed 500-year flood elevations, potentially leading to catastrophic loss of life and property. While the damage from such a failure would be significant, there would likely be at least several hours warning before the arrival of flood waters within the Town of Deerpark.

The Neversink is one of four reservoirs in the Delaware Water Supply System, with the Cannonsville and Pepacton Reservoirs also being located in the Delaware River watershed. The fourth reservoir considered a part of the Delaware Water Supply

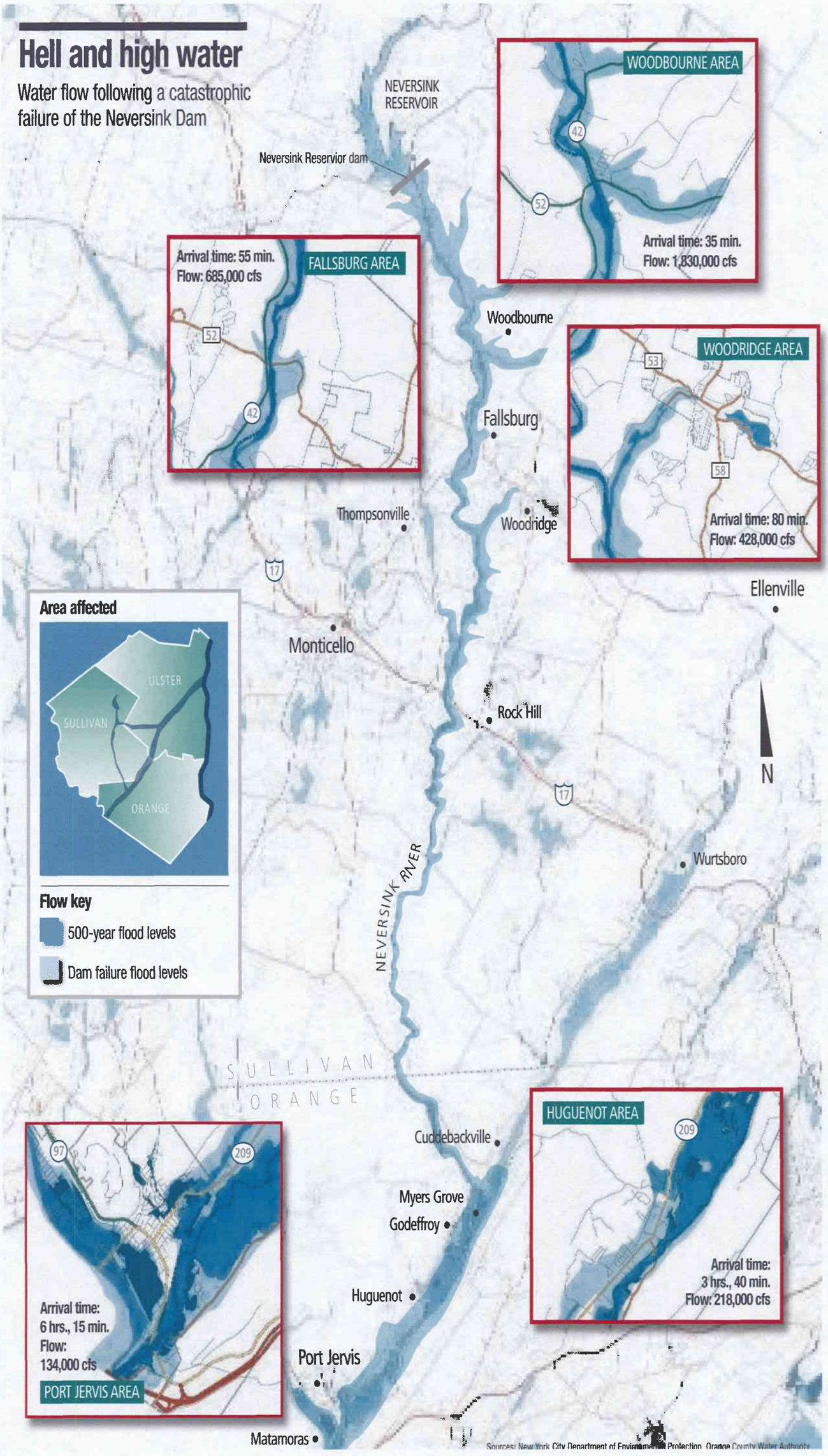
System is the Roundout Reservoir located in Sullivan and Ulster Counties. Although classified by NYCDEP as part of the Delaware system, this reservoir actually drains to the Hudson River via Roundout Creek in Ulster County.

Portions of the Town of Deerpark could be impacted by dam failures in the Mongaup System, the Cannonsville and Pepacton Reservoirs operated by NYCDEP, and Lake Wallenpaupack, located in Pike County, Pennsylvania. Failures in these systems would principally impact low-lying areas along the Delaware River; however, backwater flooding along the lower reaches of the Neversink River could also occur. Backwater effects on the Neversink River due to a failure of the Lake Wallenpaupack reservoir could extend as far upstream as the Hamlet of Huguenot (PPL Generation, LLC, 2002). Flood arrival times along the Delaware at Port Jervis are on the order of three hours for a failure of the Lake Wallenpaupack dam (PPL Generation, LLC, 2002). Flood arrival times for the Mongaup River system reservoirs could be less than an hour (TetraTech, 2009).

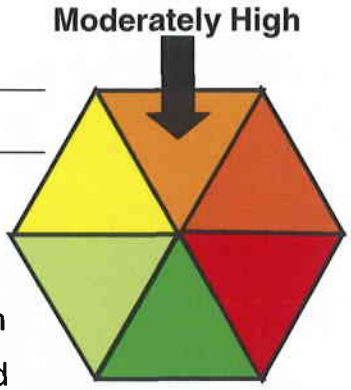
Because of the placement throughout the Town, in the instance where there was a dam failure, several individual locations could be affected. In each affected area there could be cascading effects, including flooding, landslides and structural failures. Additionally, portions of the City of Port Jervis' drinking water reservoir system are located within the Town. Effects of this type of failure could include serious injury or death.

Figure 23: Major Delaware River Basin Reservoirs

Figure 24 - Neversink Reservoir Failure Scenario



5.2.3 Severe Winter Storm Hazard Profile Ranking:



Hazard Risk Gauge

Background and Local Conditions

A severe winter storm system typically develops in late fall to early spring and deposits wintry precipitation, such as snow, sleet, or freezing rain, with a significant impact on transportation systems and public safety. For this analysis, the following could meet this definition:

Heavy Snow: Six inches in 12 hours or less.

Blizzard: Characterized by low temperatures, winds 35 mph or greater and sufficient falling and/or blowing snow in the air to frequently reduce visibility to 1/4 mile or less for duration of at least three hours.

Severe Blizzard: Characterized by temperatures near or below 10 degrees F, winds exceeding 45 mph, and visibility reduced by snow to near zero for duration of at least three hours. NOTE: Ice Storm should be analyzed as a separate hazard.

Table 15 illustrates several of the severe winter storms that have taken the biggest toll on Orange County. Note the average minimum cost of a heavy snow condition is approximately $500,000 dollars of property damage per instance. The fatalities and massive power outages that are often associated with the larger, blizzard-like storms can cost in excess of a million dollars.

Table 15 - History of Sever Winter Storms

2/1981		Heavy Snow/Freezing Rain/ Flooding	Undetermined	Several People Killed
12/19/1993	3 to 6	Snow	$50K	
2/8/1994	6 to 9	Heavy Snow	$500K	
2/11/1994	10 to 12	Heavy Snow	$50K	
2/23/1994	No data	Heavy Snow	$500K	
3/2/1994	12 to24	Heavy Snow	$500K	
12/9/1994	Light snow	Snow/Sleet/ Freezing rain	$500K	
12/10/1994	4 to 6	Snow/sleet	$500K	
12/31/1994	No Data	Snow/Freezing Rain	$1.0 Million	Several Fatalities (car accidents)
1/1/1995	No Data	Snow Freezing Rain	$50K	
1/6/1995	2 to 6	Snow Freezing Rain	$75K	
1/11/1995	1 to 3	Snow Freezing Rain	$50K	
2/4/1995	No Data	Heavy Snow	$500K	
2/15/1995	.25 to 1	Snow Freezing Rain	$500K	
2/26/1995	No Data	Snow Freezing Rain	$500K	
3/8/1995	No Data	Snow	$50K	
4/8/1995	3 to 6	Snow/Sleet/ Freezing Rain	$50K	
11/14/1995	8 to 14	Heavy Snow	$180K	60,000 People in NYS w/o Power
1/7/1996	21 to 36	Blizzard Conditions/ Heavy Snow	$640K	Pres. Clinton Declares Federal Disaster Area
3/7/1996	10 to 16	Heavy Snow	No Data	12,000 w/o power in Ulster and Dutchess Counties

Table 15 - History of Sever Winter Storms
- Continued -

12/7/1996	9 to 12	Winter Storm	$200K	
3/14/1997	2 to 5	Winter Storm	$80K	
3/31/1997	12 to 23	Winter Storm	$7.8 Million	50,000 in NYS w/o Power State of Emergency Declared
11/14/1997	9 to 11	Winter Storm	$44K	
12/29/1997	5 to 9	Winter Storm	$155K	
1/15/1998	3 to 6	Winter Storm	$80K	6,000 w/o Power
1/23/1998	10 to 12	Winter Storm	$6K	
1/14/1999	9 to 15	Winter Storm	$174K	Northway Closed
1/25/2000	6 to 12	Winter Storm	$557K	Blizzard Conditions
1/31/2000	3 to 7	Winter Storm	$363K	
2/18/2000	8 to 14	Winter Storm	$111K	2 Deaths in car accident from weather conditions
4/9/2000	8 to 16	Winter Storm	$375K	Blizzard Conditions, 35,000 w/o power
3/9/2001	6 to 12	Winter Storm	$50K	
3/21/2001	5 to 10	Winter Storm	$60K	1,500 w/o power
11/17/2002	3 to 6	Winter Storm	$270K	58,000 w/o power
1/3/2003	17 to 20	Winter Storm	$430K	
2/3/2004	7 to 10	Winter Storm	No Data	1,000 in Ulster County w/o Power
1/3/2006	8 to 9	Heavy Snow	No Data	

Historical Frequency and Probability of Occurrence

The National Weather Service reports a significant storm occurs in this area averaging 2-4 times per year with a high of 6-7 storms occasionally. NCDC has 79 winter storms on record from 1950 until 2006 for the Deerpark vicinity. These storms include snow, freezing rain, sleet, and ice. While there were no directly related deaths, injuries, or crop damage on record, total property damage during this time period was $17.07

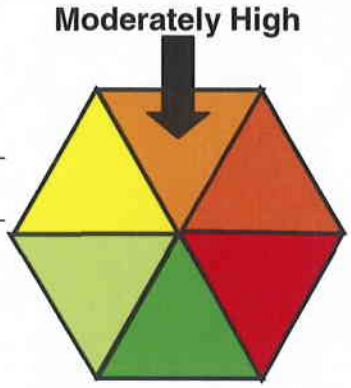
million. Also, many accidents and injuries occur because of wintry road and terrain conditions associated with storms.

Winter storms in this area can begin as rain, freezing rain or snow and change between the three throughout the event. These storms can include strong winds and can force the Town to shut down. Under New York State Executive Law, Article 2-B, Deerpark can declare a State of Emergency if the area is not safe for residents of the Town and certain local laws may need to be suspended or set aside for a specific amount of time. Deerpark has had to close schools, offices, public buildings, retail stores, and restaurants due to effects of the storms, including shutting down public transportation. These closures have a detrimental effect on the economy of the Town. These storms can be severe enough to declare a state of emergency and impose strict regulations on driving on the roads and where people park their vehicles. Based on historic climate records, there is a medium to high probability for the reoccurrence of severe winter storm events. There is typically at least 24-hours warning of severe winter storm events. Most storms have durations of a two to three days or less, and recovery times can range from days to a week or more.

Designated Hazard Areas and Impacts

Severe winter storms typically result in Town-wide impacts. The buildings and critical facilities would not be affected unless there was a loss of utility or structural collapse. Roads and bridges would need to be cleared to provide safe passage.

Winter storm hazards are regularly-occurring events that affect a large region. Serious injury or death is likely, however not in large numbers. Little or no damage to private property or structural damage to public facilities is typically encountered.

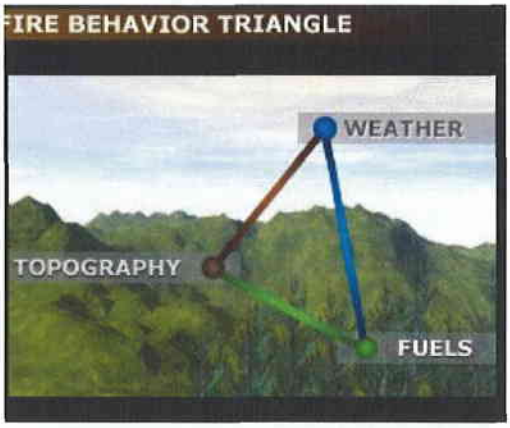


Hazard Risk Gauge

5.2.4 Wildfire Hazard Profile Ranking:

Background and Local Conditions

A highly destructive fire or any instance of uncontrolled burning in grasslands, brush, or woodlands represents a significant hazard. High temperatures and low humidity are ideal conditions for wildfires. High winds and wind gusts along with lightning can spark a fire. It is important to also define urban fires, which are located in cities, towns, and villages. They involve buildings and have the potential to spread to neighboring structures. Wild and urban fires are not completely separate from one another; when communities are located in close proximity to rural landscapes, an urban fire can spread to wooded areas and vice versa. The dynamics of the area influence whether or not an area might be at risk for a mild or severe wildfire incident.



Three components form the fire behavior triangle, namely fuels, topography, and weather. The first component is the presence of fuels. Generally tall grass, shrubs, trees, and structures can serve as fuel in an urban environment. Secondly, the topography of the area can provide an additional catalyst for a wildfire. Areas that are predominately hilly can increase the pace of a fire's progression. The faster moving flames are a result of hot gas rising, pre-heating a path for the fire, which then sweep up the incline. Wind is the major weather-related factor; it can feed and accelerate a wildfire, causing it to grow as well as allowing it to jump and change direction to a new location. Sometimes winds can even cause a fire to jump over fire breaks, both natural and man-made. These key areas are illustrated in the adjacent image and serve to start, provide a catalyst for, and spread wildfires, causing extensive damage. By recognizing this combination of conditions and working to reduce wildfire risk in sensitive areas, the frequency and severity of wildfires can be minimized.

Table 16 illustrates the main types of wildfires that occur. By understanding and being able to recognize these types of fires we can work to prevent them. By noticing a small, seemingly insignificant ground or surface fire and extinguishing it early, a more massive fire can be prevented. Much of the area surrounding population centers in the Town of Deerpark contains ample ladder fuels that enhance the likelihood that a fire will spread from soil to tall grass and shrubs, and nearby trees, creating more serious crowning and spotting conditions. The information in the table below is from the Firewise community web site (www.firewise.org) and explains the type and severity of each occurrence.

Table 16

Potential Fire Scenarios

Fire Types:	**There are four main types of wildfire events which can occur**
	Crown fires are very intense burning fires that occur in the tops of trees and are difficult to control
	Surface fires travel along the ground and spread rapidly in tall grass and lower branches of trees
	Ground fires are often difficult to detect because they burn in organic soil, roots, and natural litter
	Spotting occurs as a combination of crown fires and proper wind conditions causing fire bands to be blown ahead of the main fire, making the situation very difficult to control

Assessing Property Risk

In rural areas where homes are built within a predominantly wooded area such as portions of Deerpark, the risk for wildfire to these homes is of concern. The information presented in Table 17 can be used to gauge the amount of risk associated around the average resident's home.

Table 17
Assessing Your Property's Wildfire Risk

Low Risk Areas	
Little or no history of nearby wildfires Humid climate, short dry season Flat Terrain (no grades greater than 9%) Limited wild land Home not crowded by trees	Landscape includes native vegetation Manmade fuels at least 50 feet from your home Fire Hydrant within 300 feet Easy access for fire trucks
Moderate Risk Areas	
History of wildfires Climate includes a dry season less than 3 months Hilly terrain (grades between 10% and 20%) Bordering a wild land with light brush, small trees or grass Trees are located in close proximity to your home	Native vegetation has or has not been incorporated into landscaping Manmade fuels are within 50 feet of your home Fire hydrant within 500 feet Access for fire trucks Dying Trees and vegetation Tree limbs extend near home Piles of wood near home
High Risk Areas	
History of nearby wildfires Dry climate with a dry season more than 3 months Steep terrain (grade over 20%) Forested wild land within 100 feet of your home Numerous dead trees and vegetation Tree limbs extend over home Piles of wood stacked against home	Native vegetation has not been incorporated into your landscape Trees are crowded within 30 feet of your home Manmade fuels within 30 feet of your home No fire Hydrants Limited access for trucks

Historic Frequency and Probability of Occurrence

Between 1950 and 2009 no major wildfires were reported for Orange County according to the NCDC database. However, numerous smaller wildfires often go unreported in the national databases. As such, this hazard was assigned a medium to low probability for the occurrence of wildfire events.

The existence of fuel (ground vegetation, brush, and tree canopies), as well as the region's topography and prevailing air masses are the main factors that impact the potential for wildfire. Besides lightning, human activities such as smoking, campfires,

equipment use, and arson can ignite a wildfire. Wildfires are listed as infrequent by HAZNY, which denotes the occurrence once every 8 to 50 years. The steep slopes that bound the Basker Kill/Neversink Valley have the potential to contribute to the rapid spread of wildfires that originate in the lowland areas.

Wildfires occur without warning and can occur in every season, although winter wildfires are exceedingly rare. Wildfire durations may range from hours to days or even weeks under unfavorable climatic conditions. Recovery times may range from days to weeks, depending upon the severity of the fire and extent of property damage.

Designated Hazard Areas and Impacts

Wildfires are an infrequent event affecting small regions. Serious injury or death is unlikely and little or no structural damage to public facilities is typically encountered; however, moderate damage to private property can result from this hazard. Although the impact of wildfires is generally localized, wildfires have the potential of rapidly spreading, destroying assets, property, and natural resources, and pose a potential threat to human safety. Because of the rural nature of the community, community-wide impacts can be significant as for example, when a local business has to close due to fire damage. Areas most susceptible to wildfire are wooded and forested regions; while more urbanized areas can experience great damage to infrastructure.

5.2.5 Severe Storm Hazard Profile Ranking: Moderately Low

Background and Local Conditions

This category includes windstorms and severe thunderstorms. Severe wind events are defined as follows:

Derechos: Strong, damaging, straight-line winds associated with a cluster of severe thunderstorms that most often form in the evening or at night.

Hazard Risk Gauge

Gustnados: A relatively weak tornado associated with a thunderstorm's outflow. It mostly forms along the gust front, which is a boundary that separates a cold downdraft of a thunderstorm from warm, humid air surface.

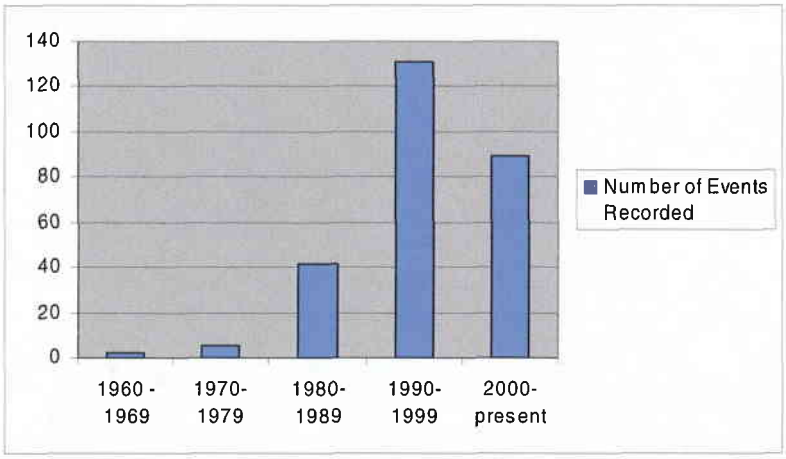
Downburst: A severe localized downdraft that can be experienced beneath a severe thunderstorm.

Historic Frequency and Probability of Occurrence

The National Weather Service indicates twenty-five to thirty thunderstorms annually in the vicinity of Deerpark. Five to seven of these storms have wind gusts over 57 mph and/or large diameter hail in some locations.

NCDC has 235 events listed for thunderstorms and/or high winds in Orange County between the years of 1950-2009. The total damages were reported at $56,000 which likely underestimates the actual damages during this period.
Figure 25 illustrates the number of events recorded during each decade in the Town of Deerpark starting in 1960 to the present.

Figure 25
Historical Disaster Events by Decade Since 1960



As suggested by the historic records, there is a high probability of occurrence. There is typically warning of at least several hours that severe storms are likely to affect a region. Severe storms of this type may last for hours. Recovery times may be measured in hours to days, depending upon storm severity. Recovery for most storms occurs within one day or less.

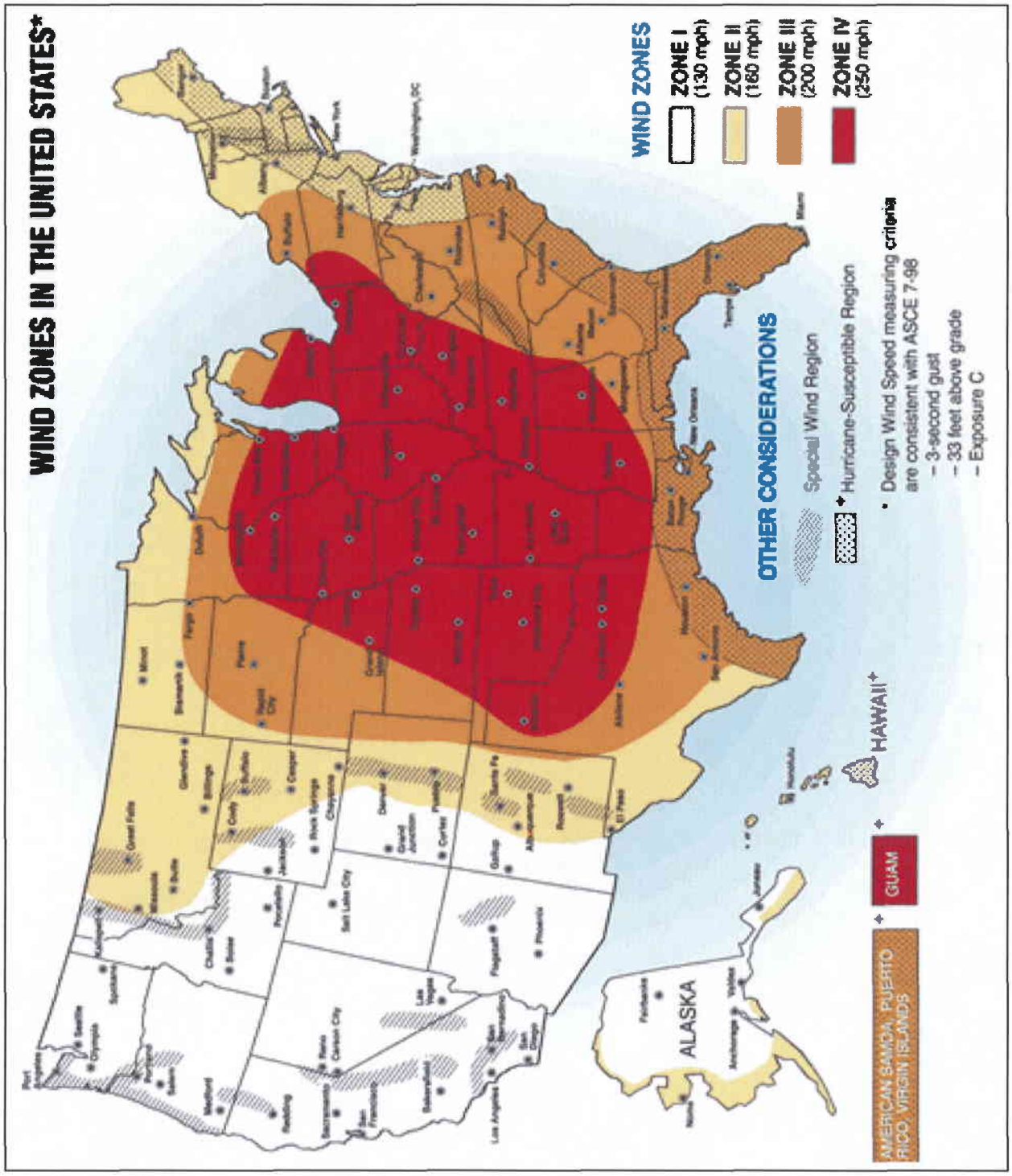
Designated Hazard Areas and Impacts

The entire Town is expected to experience severe storms on a regular basis. The number of buildings at risk, including critical facilities, would be based on the severity of the storm. Infrastructure including roads, bridges and utilities, could be notably by cascading impacts such as flash flooding. While HIRA output indicates that severe storm hazards are a frequent event affecting large regions. Serious injury or death is unlikely and little or no damage to private property and public facilities is typically encountered.

The Town sits in the area between Zones II and III for FEMA Wind Zones (Figure 26 – below) and in the past severe storms have cut portions of the Town off from other communities in terms of flooding on Rte 209 and the Guymard Turnpike. When this

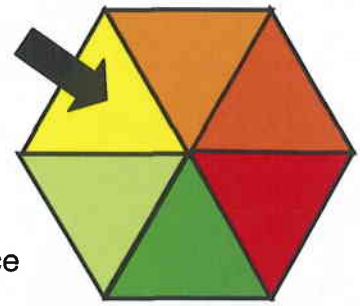
occurs, the risk to the public may increase as a result of the inability of fire fighting and emergency vehicles to efficiently access the isolated areas. Figure 26 geographically represents wind zones in the United States.

Figure 26: Wind Zones in the United States



5.2.6 Hurricane Hazard Profile Ranking:

Moderately Low



Hazard Risk Gauge

Background and Local Conditions

Counterclockwise circulating weather systems over tropical areas in the Northern Hemisphere are called tropical cyclones. These are classified by NOAA and the National Weather service as follows:

Tropical Depression: An organized system of clouds and thunderstorms with a defined circulation and maximum sustained winds of 38 mph or less.

Tropical Storm: An organized system of strong thunderstorms with a defined circulation and maximum sustained winds of 39 to 73 mph.

Hurricane: An intense tropical weather system with a well-defined circulation and maximum sustained winds of 74 mph or higher. In the western Pacific, hurricanes are called "typhoons," and similar storms in the Indian Ocean are called "cyclones."

Hurricanes are powered by heat from the sea. Their direction is determined by the easterly trade winds and the temperate westerly winds. Violent seas are generated from the high velocity of the winds around their core. Once the hurricane travels on shore, the ocean is swept inward, tornadoes are set in motion, and torrential rains and flooding are prevalent.

Historic Frequency and Probability of Occurrence

The major hazards associated with hurricanes and tropical storms include excess wind speed and the typically large amounts of precipitation. The wind speed can cause a significant amount of debris as well as loss of utilities. Large amounts of precipitation can result in the destruction of property and flooding, which may result in the need to evacuate people. According to the NCDC records, there are no past hurricanes or

tropical storms on record specifically for the Town of Deerpark. The NCDC database reports a single tropical storm for Orange County in the period from 1950 through 2009. Tropical Storm Hanna, occurring in September 2008, caused estimated $70,000 in property damage in New York. Despite the apparent absence of tropical storm/hurricane events in the NCDC database, the record on impacts from such events in Orange County is extensive. However in 1999, Hurricane Floyd did extensive damage to Ulster County. Other hurricanes to affect the county were Hurricane Katrina (2005) and Tropical Depression Ivan (2004). Figure 27 shows tropical cyclone tracks that have passed by the Town of Deerpark close enough to significantly impact the area. The hazard event in the area can also result in many cascading effects such as flooding, structural collapse, utility failure, and water supply contamination.

There have been numerous hurricanes in the past and there is a medium to high probability of occurrence. Some buildings, including critical structures, could be impacted significantly if there was a category 4 or 5 Hurricane coming inland close to New York (see table 18). The percentage of buildings affected would range from 1% to 100%. The infrastructure could also be impacted extensively with power outages, phone loss, and road and bridge problems. Warnings of several days are typical for hurricanes. Hurricane durations rarely exceed one day, and recovery times may range from several days to a week.

Figure 27: Tropical Cyclone Tracks

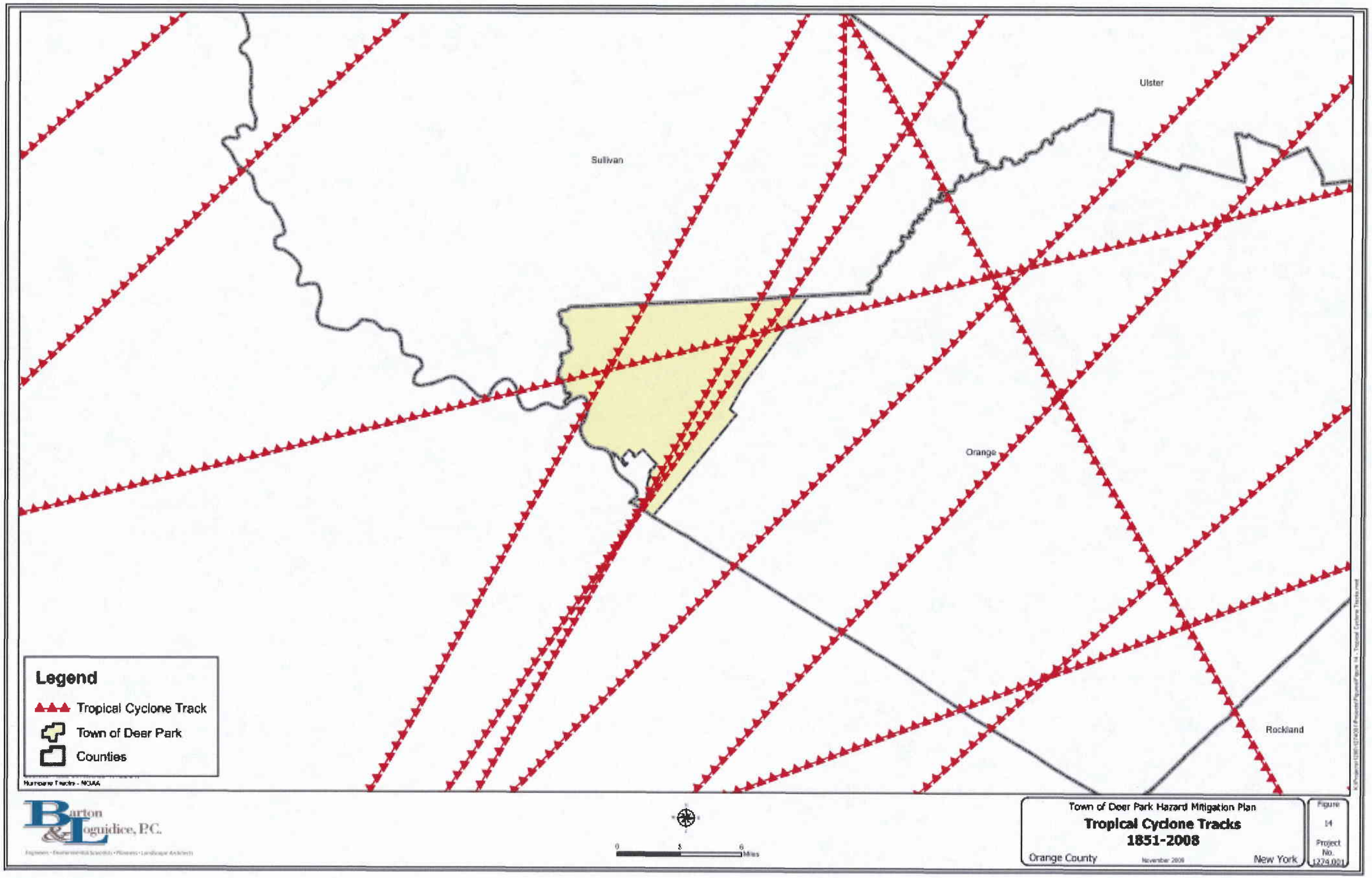


Table 18
Hurricane Categories with Damage Description

1	74 - 95	4 - 5	• Damage primarily to shrubbery, tree foliage and unanchored mobile homes • Some damage to poorly constructed signs • Low lying coastal roads inundated • Minor pier damage
2	96 - 110	6 - 8	• Considerable damage to shrubbery and tree foliage, some trees down • Major damage to exposed mobile homes • Extensive damage to poorly constructed signs • Some damage to roofing • Considerable damage to piers, marinas flooded
3	111 - 130	9 - 12	• Foliage torn from trees, large trees blown over • Almost all poorly constructed signs down • Some damage to roofing, windows and doors; some structural damage to small buildings • Mobile homes destroyed • Serious flooding at coast and many smaller structures near coast destroyed • Flat terrain five feet or less above sea level flooded inland eight miles or more
4	131 - 155	13 - 18	• Shrubs and trees down, all signs down • Extensive damage to roofing, windows and doors; roof collapse • Complete destruction of mobile homes • Flat terrain 10 feet or less above sea level flooded inland as far as six miles • Major damage to lower floors of structure near shore (flooding, waves and floating debris) • Major erosion of beaches
5	> 155	> 18	• Shrubs and trees down; all signs down • Severe and extensive damage to windows and doors; complete roof collapse • Destruction of glass in windows and doors. Some complete building failures • Small buildings overturned or blown away • Complete destruction of mobile homes • Major damage to lower floors of all structures < 15 ft above sea level within 500 yds of shore

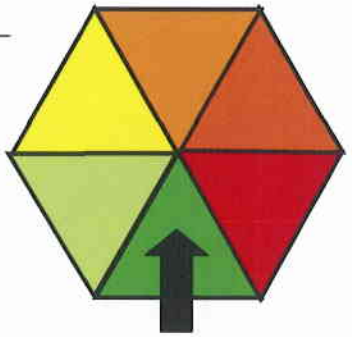
Designated Hazard Areas and Impacts

The entire Town would likely be influenced by a hurricane with some variation in strength possible. Flooding would most affect the areas mentioned above in the Flooding Section. Unstable structures, small trees and shrubbery, and poorly constructed signs would be the most easily damaged by strong winds; the locations of these vary within the Town.

A significant hurricane could have a major impact in the Town in terms of flooding, power outages, property damage, and potential loss of life. Hurricane hazards are a regular event affecting large regions. Serious injury or death is unlikely; however, severe damage to private property and public facilities is typically encountered.

5.2.7 Earthquake Hazard Profile Ranking: Low

Background and Local Conditions



Hazard Risk Gauge

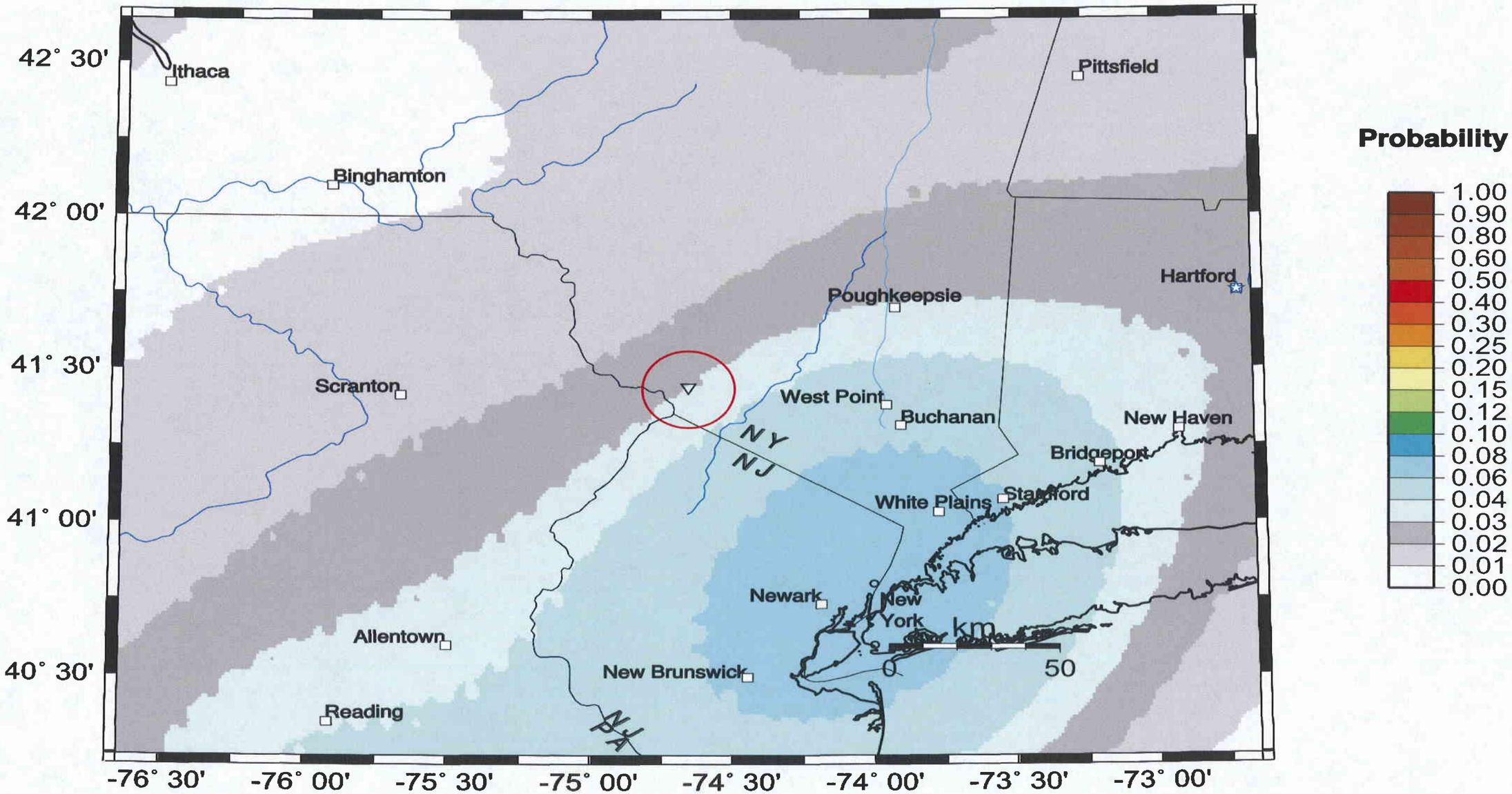
An earthquake is a sudden motion or trembling that is caused by a release of strain accumulated within or along the edge of earth's tectonic plates. While the Committee considered Earthquakes as a low-ranked potential natural hazard. NYSEMO has made clear that all parts of New York State are now considered vulnerable to earthquake activity. This renewed focus on potential earthquake hazards is a result of the 2002 Ausable Forks quake, a magnitude 5.1 temblor that resulted in damages in excess of $8,000,000.

Historic Frequency and Probability of Occurrence

Although earthquakes of modest magnitude are not infrequent in New York State, the probability of a significant earthquake in the Deerpark vicinity is very low. The probability of a quake with a magnitude greater than 5.0 occurring within a 50 kilometer radius of Deerpark within a period of 100 years is only slightly more than 1% based on USGS methods (Figure 28). Figure 28 indicates that the peak ground acceleration (PGA) to be expected with a 10% probability of exceedance in a 50-year period is only 4% to 5% in the Deerpark vicinity (Figure 30).

U.S. Geological Survey 2009 PSHA Model

Site: HUGUENOT NY . .



Probability

1.00
0.90
0.80
0.60
0.50
0.40
0.30
0.25
0.20
0.15
0.12
0.10
0.08
0.06
0.04
0.03
0.02
0.01
0.00

Figure 28: Probability of Earthquake with M > 5.0 Within 100 years & 50 KM

According to the NYS Geological Survey there have been only 18 significant earthquakes recorded in New York State since 1737. Just five of those quakes exceeded a magnitude of 5.0 on the Richter scale. The nearest recorded earthquakes to Deerpark were more than 18 miles away, and none exceeded a magnitude of 3.0. Quakes of this magnitude are unlikely to be felt and would be very unlikely to cause measurable damage.

If a significant earthquake were to occur in the vicinity of Deerpark, it would likely affect the entire Town, rather any defined hazard area. However, there are mapped soils within the Town, particularly within the Neversink River valley, that would be expected to amplify the effects of an earthquake. In the unlikely event of such an event, it could take days to weeks to recover but the likelihood is considered rare. There would be no warning.

Earthquakes are very short term events, with the actual ground shaking measured in seconds. Recovery times can range from hours to weeks depending upon the severity of the quake. Recovery times for the magnitude of earthquake most likely to strike the Town would likely be one day or less.

Designated Hazard Areas

An earthquake would impact the entire Town, with the potential for somewhat more severe impacts in the Neversink River valley where overburden soil types have the potential to amplify the effects of an earthquake. The Town's infrastructure (such as bridges and roadways) is not designed to withstand serious earthquakes and could be seriously damaged in the unlikely event of a significant earthquake. For the magnitude of earthquake that most likely would impact the Town, little or no damage to private property or public facilities would be expected.

Figure 29 - Earthquake Hazard

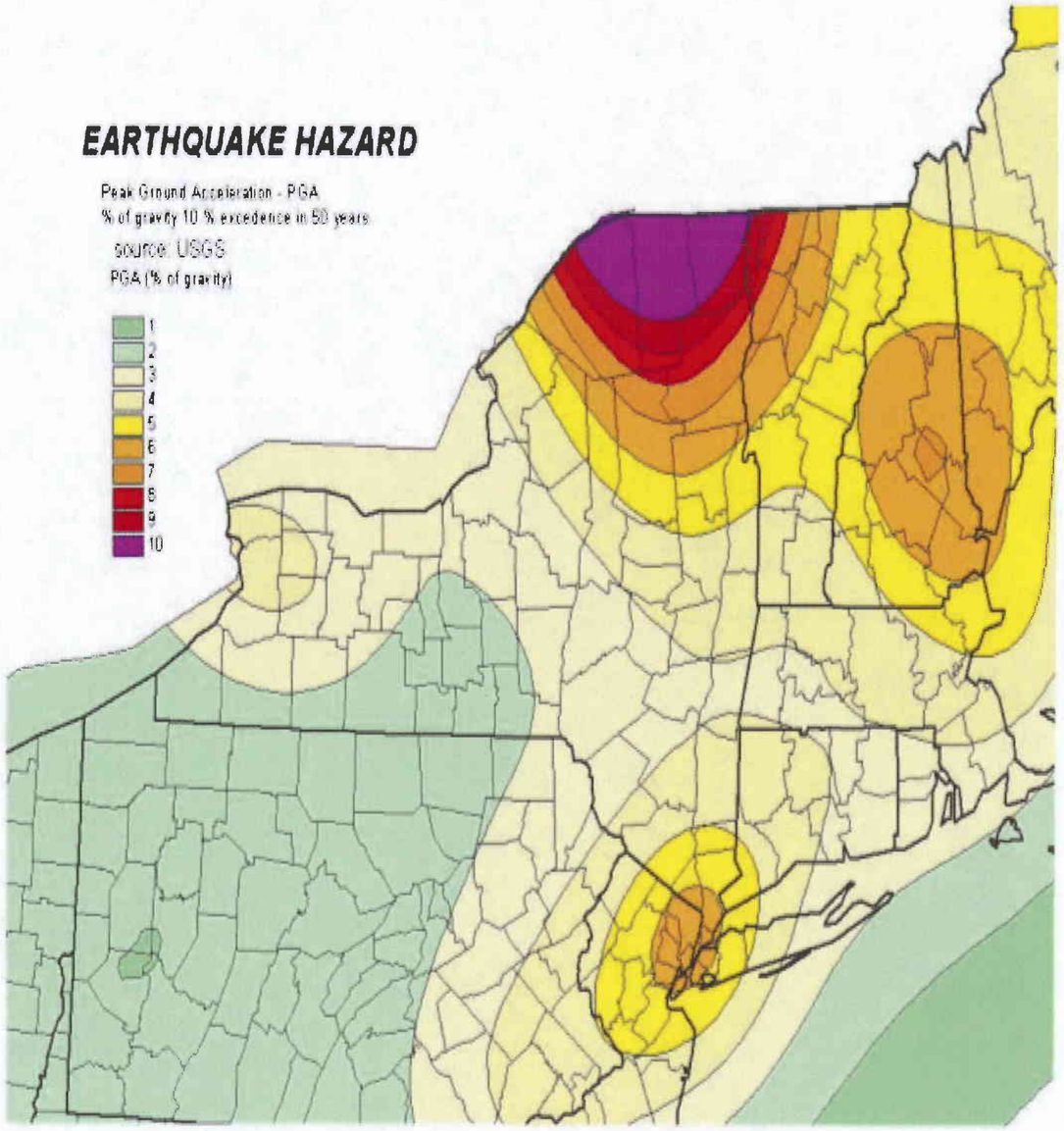
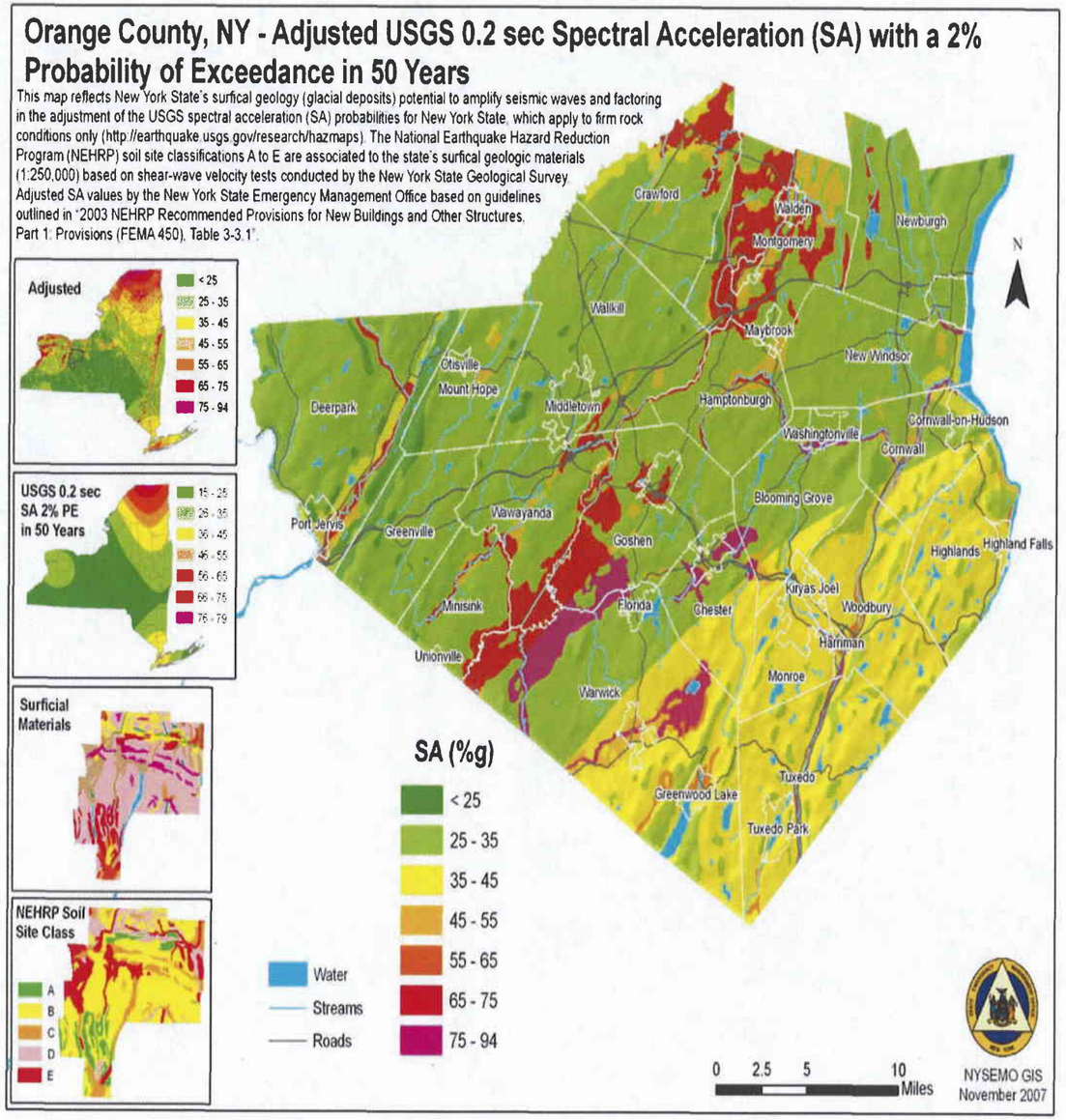


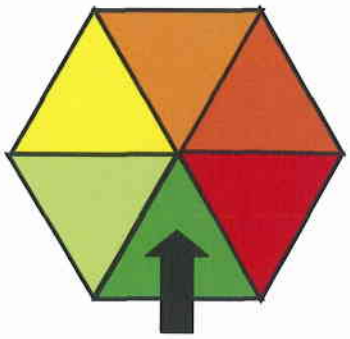
Figure 30 - Probability of Exceedance in 50 Years



5.2.8 Tornado Hazard Profile Ranking:

Low

Background and Local Conditions



Hazard Risk Gauge

The Town of Deerpark is located in Wind Zone II and is subject to winds up to 160 mph (Figure 31). Based on NOAA Storm Prediction Center Statistics, Orange County lies within a zone of 1 to 5 recorded tornadoes per 1,000 square miles (Figure 32).

Tornadoes are typically associated with a local atmospheric storm, generally of short duration, and are formed by winds rotating at very high speeds, usually in a counterclockwise direction penetrating from a thunderstorm and in contact with the ground. The vortex, up to several hundred yards wide, is visible to the observer as a whirlpool-like column of winds rotating about a hollow cavity or funnel. Winds have been estimated to be as high as 400 miles per hour in the center of the vortex.

Tornadoes are formed when cold air rises above warm air causing the warm air to rise at increasingly high speeds. Thunderstorms and hurricanes are the normal predictor of potential tornadoes. There is usually minimal warning of a tornado and they can be one of the most dangerous storms due to the high amount of wind and irregularity. Figure 33 shows the development stages of a tornado event. There are some warning signs of a tornado including a dark, often greenish sky, a wall cloud, large hail, and a loud roar similar to a freight train.

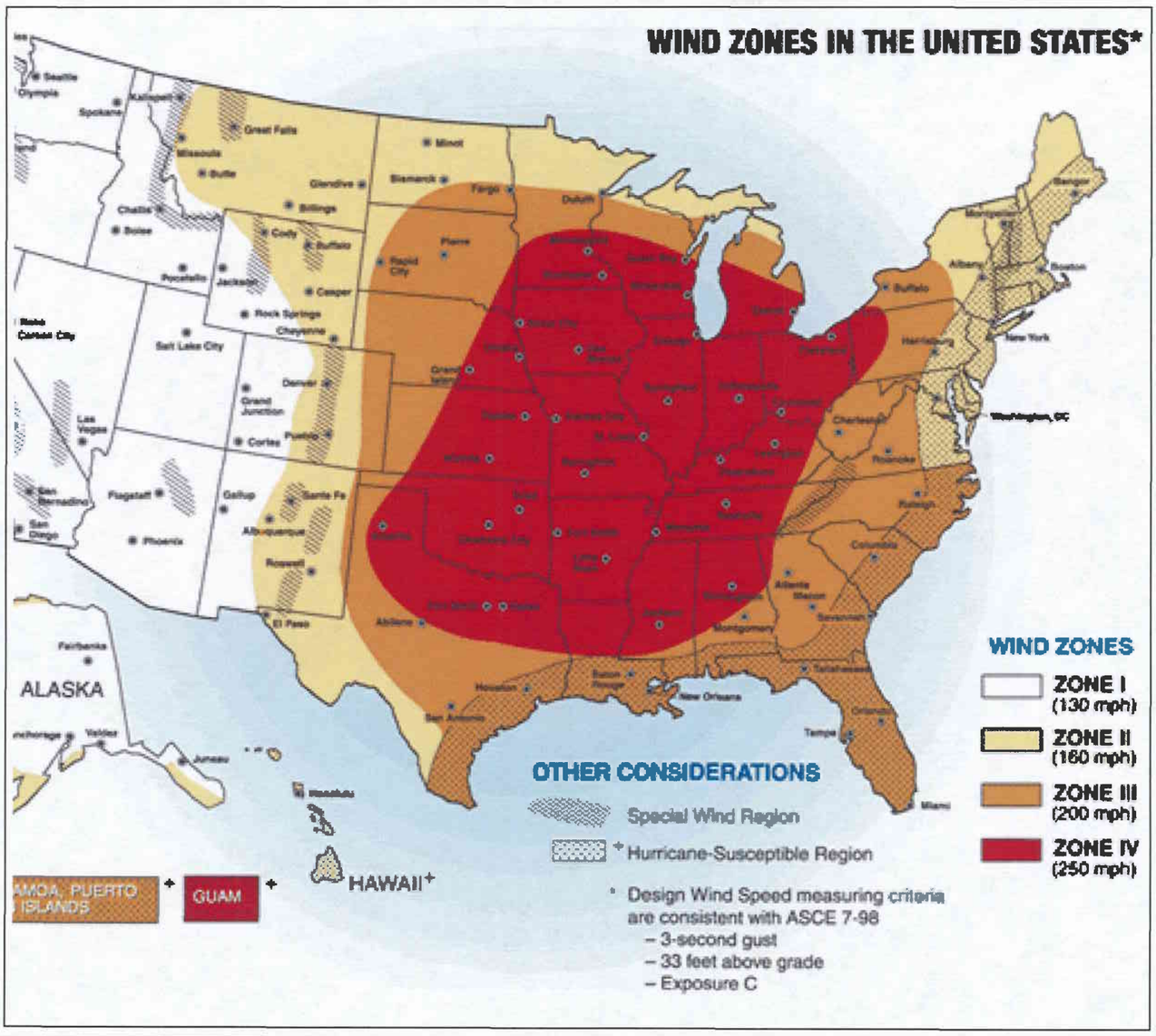


Figure 31: Wind Zones in the United States

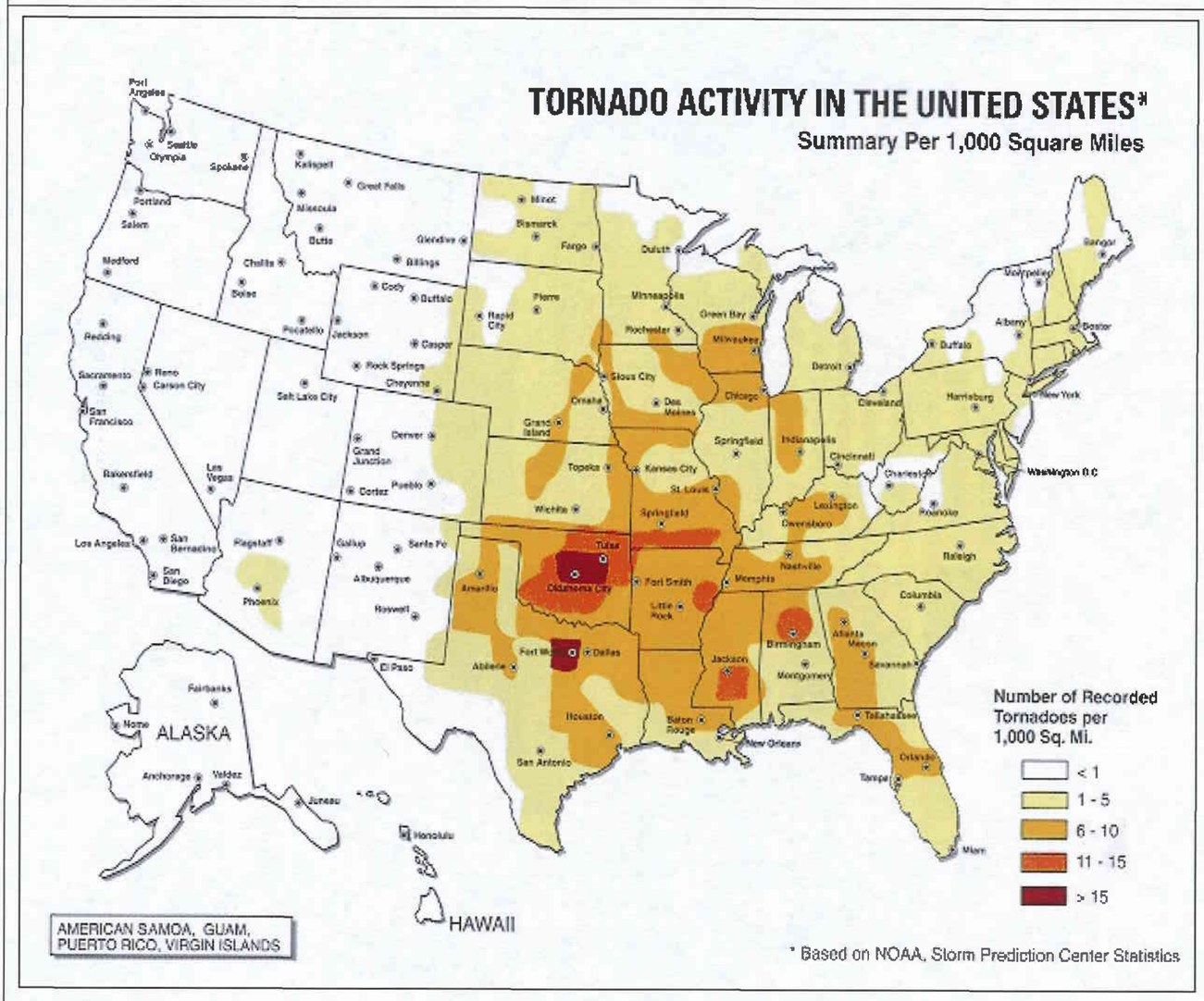
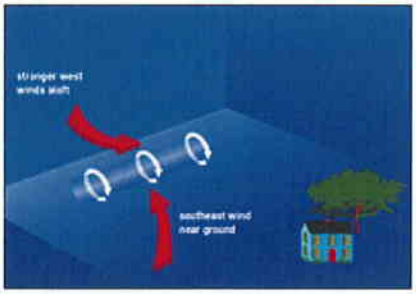
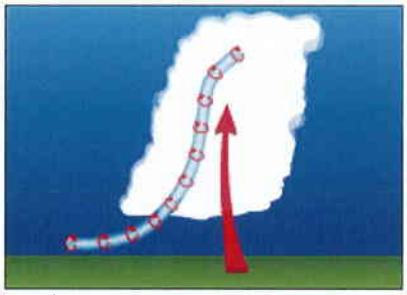


Figure 32: Tornadoes Per 1,000 Square Miles

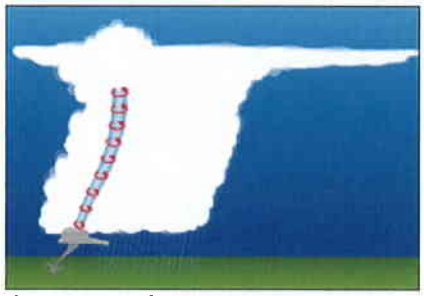
Figure 33: How Tornadoes Form (NOAA web site)



Before thunderstorms develop, a change in wind direction and an increase in wind speed with increasing height create an invisible, horizontal spinning effect in the lower atmosphere.



Rising air within the thunderstorm updraft tilts the rotating air from horizontal to vertical.



An area of rotation, 2-6 miles wide, now extends through much of the storm. Most strong and violent tornadoes form within this area of strong rotation.

Historical Frequency and Probability of Occurrence

According to the NCDC database, there have been 10 reported tornadoes in Orange County from 1950 through 2009. Five were classified as F0, one was classified as F1, two were F2 in magnitude, and one was classified as F3. One tornado was unclassified (see Table 19 below). There were nine deaths and eighteen injuries associated with the November 1989 tornado that struck east-central Orange County, principally at Berea Elementary School in the Town of Montgomery. Property damages totaled $25 million for this event; a total of $28 million dollars in damages have been reported for Orange County during the period from 1950 through 2009.

Tornadoes are relatively infrequent in the Northeast, as shown on Figure 34.

Figure 34: Tornado Days Per Year

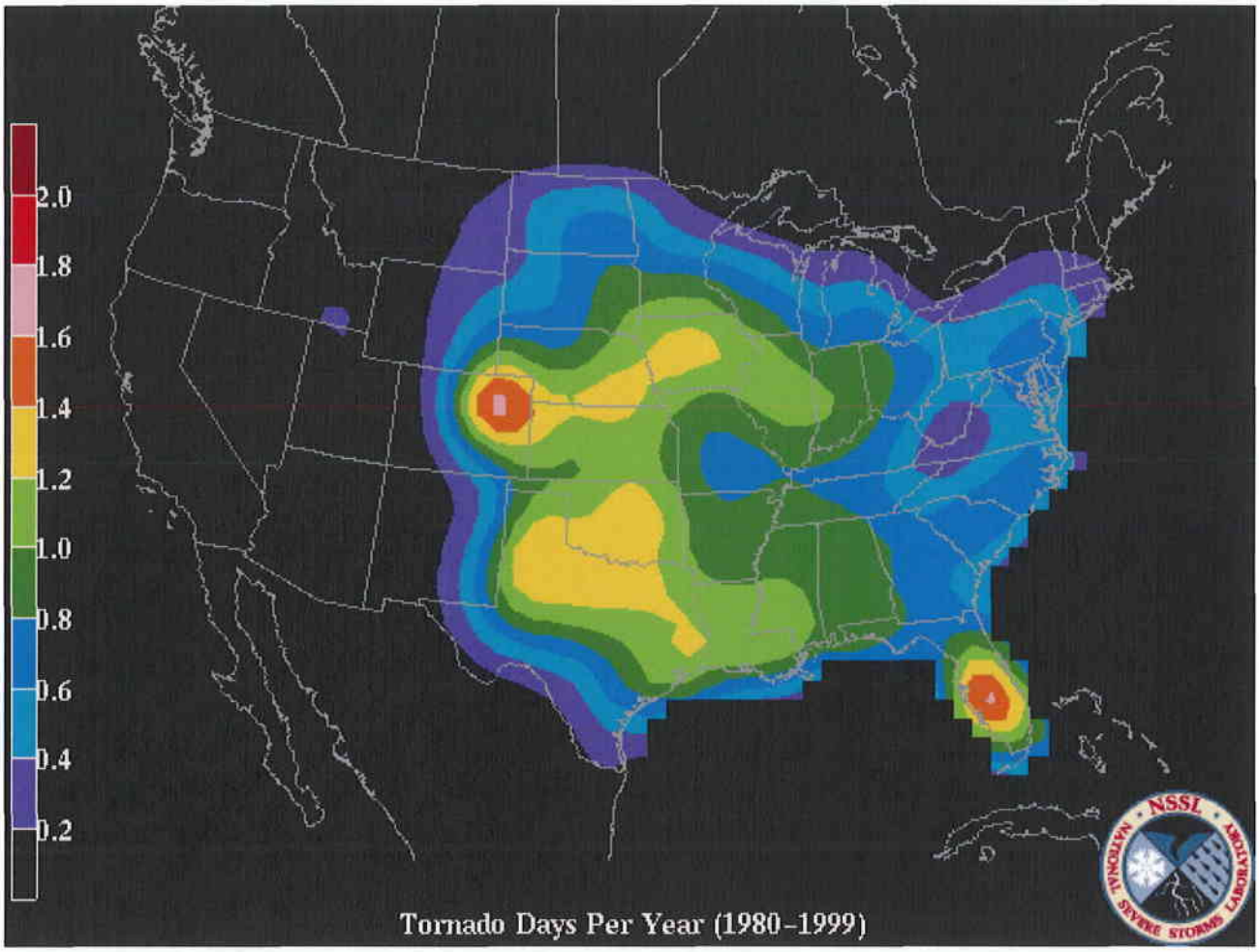


Table 19

Tornado Ranking Scale with Range of Loss Incurred

Strength	Fujita Scale Rankings	Percentage of All Tornadoes	Percentage of Deaths	Wind Speeds (mph)	Duration (min)
Weak	F0	69	< 5	40 - 72	1 – 10+
	F1			73 - 1112	
Strong	F2	29	30	13 - 157	20 +
	F3			158 - 206	
Violent	F4	2	70	207-260	60 +
	F5			261-318	

Tornadoes have occurred approximately once every five years in the past. Based on the historic records, there is a low probability of reoccurrence. New York State averages 5 tornadoes a year for the entire state; however, this is attributable to other counties that are historically more prone to tornado activity. The potential damage to structures could range realistically from 1% to 100% with an F5 tornado.
Figure 34 geographically summarizes tornado activity in the United States. Being located in a zone that can have winds of up to 160 mph (Figure 31), the Town of Deerpark can be significantly impacted by a tornado, such as the event described above in 1989. The affected geographic extent of this hazard within the Town could range depending on the severity and size of the tornado. Historical tornado tracks in New York State are shown on Figure 35. This figure indicates that while a tornado has never passed through the Town, tornadoes of the second highest intensity have passed through neighboring Towns and increase the likelihood of high winds.

Tornadoes typically occur with very little warning, typically measured in minutes. Tornado durations are also typically measured in minutes for an area the size of Deerpark. Recovery times can range from days to weeks (and even months) depending upon the severity of the tornado. The period from June through August is typically the most active period for the formation of tornadoes.

Designated Hazard Areas and Impacts

The Town of Deerpark could have a widespread area impacted by a tornado event or a small concentrated area depending upon the magnitude of the tornado. The funnel of a tornado upon touchdown is very concentrated and may destroy all the homes on one side of a street, while leaving the other side relatively intact. Larger areas are often impacted when other hazards arise as a result of a tornado event. Tornado events are often accompanied by flash-flooding, lightning, damaging straight-line winds, and large hail. Tornadoes are most likely to touch down in flat grassy areas, but then may travel at fast speeds.
Tornado hazards are a rare event affecting small regions. Serious injury or death is likely, though not in large numbers, and severe damage to private property and public

facilities is typically encountered. Infrastructure, such as roads, bridges, and utilities, can be severely damaged. Tornadoes also present a high potential risk for cascade effects such as fire, flood, hazardous material releases, and severe storm hazards.

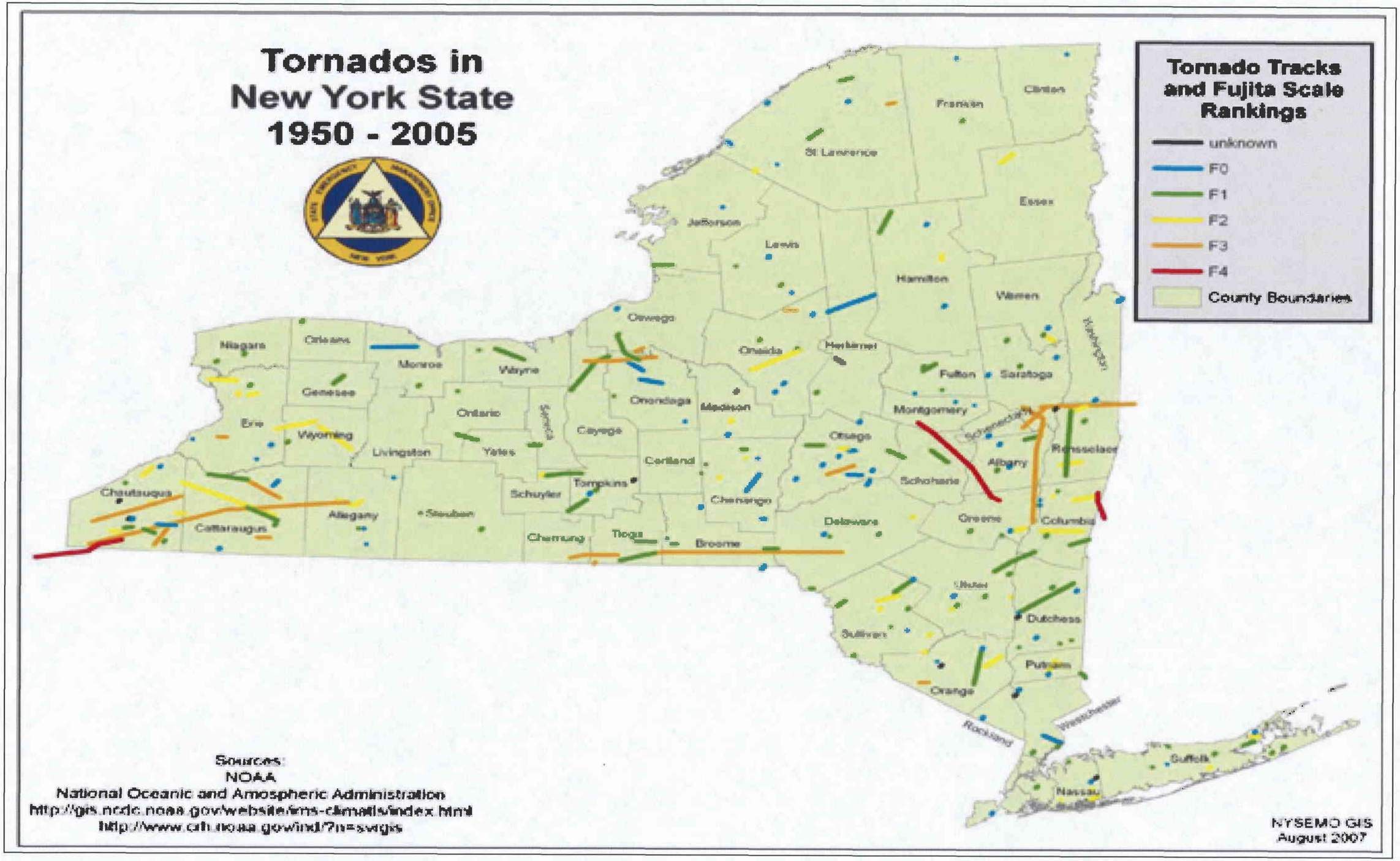
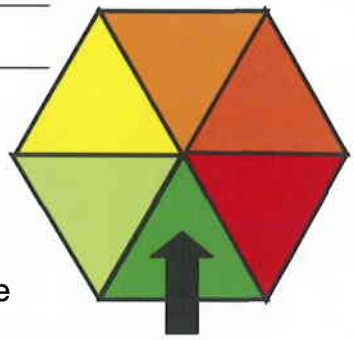


Figure 35: Tornadoes in New York State 1950-2005

5.2.9 Drought Hazard Profile Ranking: *Low*



Hazard Risk Gauge

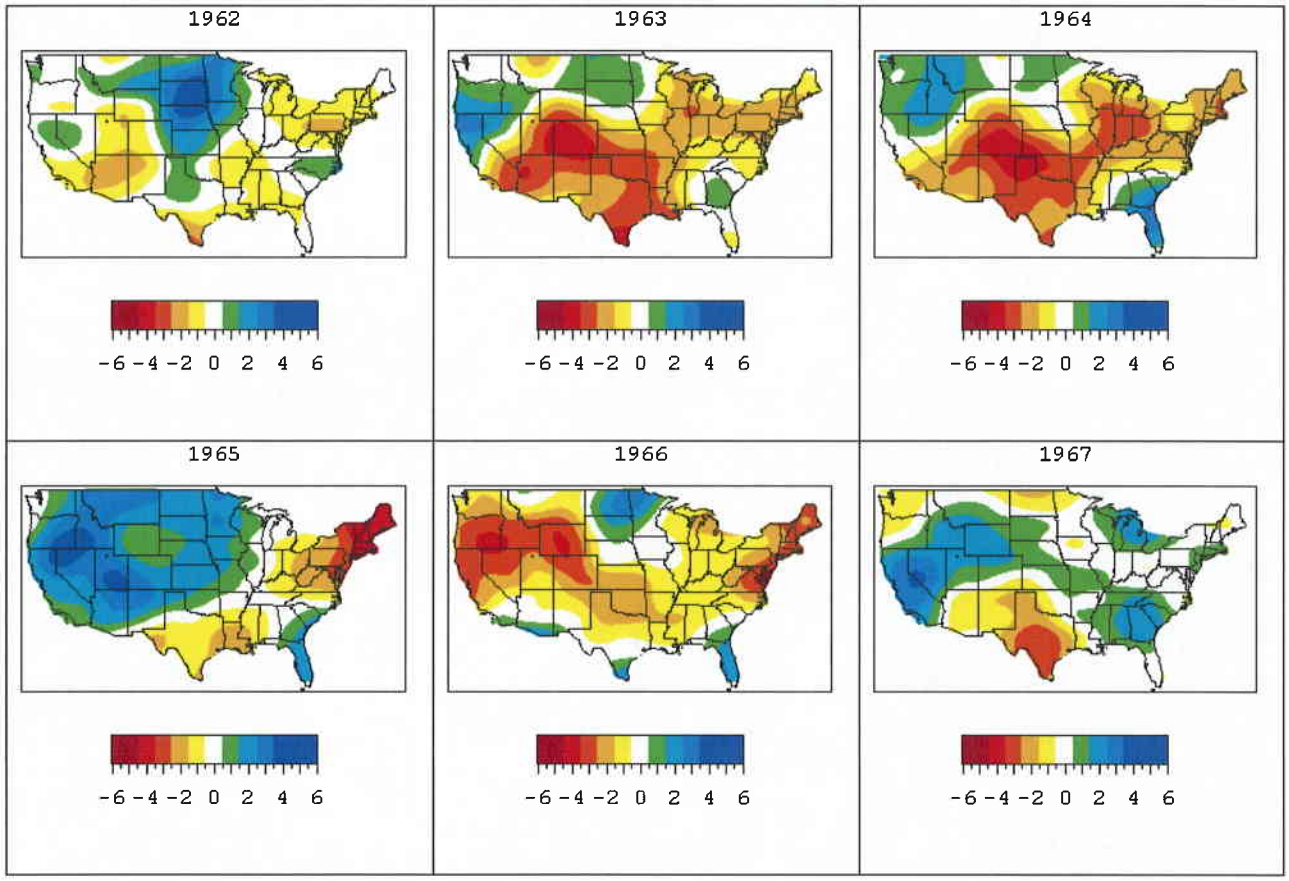
Background and Local Conditions

A drought is defined as a prolonged period of limited precipitation affecting the supply and quality of water available to the Village. Droughts can carry on for several years, causing severe damage. Nevertheless, a brief, intense drought can produce considerable damage. The immediate cause of drought is the predominant sinking motion of air resulting in compression and warming or high pressure, which inhibits cloud formation and results in lower relative humidity causing less precipitation. "Most climatic regions experience varying degrees of dominance by high pressure, often depending on the season. Prolonged droughts occur when large-scale anomalies in atmospheric circulation patterns persist for months or seasons" (NDMC web site).

Historical Frequency and Probability of Occurrence

A drought is an occurrence that affects the entire county. Droughts occur frequently in Orange County and have their greatest effect during the spring and summer months. Heat waves can last from days to weeks before returning to normal seasonal temperatures, leading to a drought. During the period from 1950 through 2009, Orange County has been affected by drought at least 15 times according to the National Climatic Data Center database, including the drought of 1993 that was associated with damages of $50 million dollars in the affected area. The most significant drought on record is known as the Drought of 1964, which affected the entire Northeast region over an extend period of time between 1961 and 1966 (Figure 36).

Figure 36
Annual Moisture Surplus/Deficit (in inches)
1962-1967



The Palmer Drought Severity Index (PDSI) provides a measure of the duration and intensity of long-term drought-inducing circulation patterns. Long-term drought develops over time, so the intensity of drought during the current month is dependent on the current weather patterns plus the cumulative patterns of previous months. Since weather patterns can change very quickly from a long-term drought conditions to long-term wet conditions, the PDSI (PDI) can respond fairly rapidly (NCDC, 2010). The Hudson Valley region faces at least incipient drought conditions nearly 45 per cent of the time, while near normal to wet conditions prevail approximately 55 per cent of the time (Table 20).

Table 20
Frequency of Drought
Hudson Valley Climate Division

Extreme	1.9	1.9
Severe	3.7	5.5
Moderate	10.7	16.3
Mild	17.4	33.6
Incipient	10.9	44.6
Near Normal	12.8	57.4
Wet	42.6	100.0
Lowest PDSI in 1335 months:	-6.66 in 11/1964	

The Town of Deerpark has a population that could easily be effected by drought. Since the majority of the residents rely upon private water wells for their drinking water, however, they are, to a degree, self-sufficient with respect to water needs. Residences located at higher elevations are more likely to be impacted by falling water levels than those located along the valley bottoms.

Although droughts can happen at any point in the year, they are most prevalent in the summer seasons because of the higher temperatures. Based on historic climate records, there is a medium to low probability for the occurrence of drought conditions. Since droughts develop over a period of time, there is typically ample warning of the developing condition. Drought durations range from months to years and recovery times measured in months are not uncommon.

Designated Hazard Areas and Impacts

All residents or citizens of Deerpark would likely be impacted by drought conditions. Town buildings and infrastructure would not be affected by drought. Crops, vegetation and animals would experience adverse outcomes most directly.

Drought hazards are infrequent events affecting large regions. Serious injury or death is unlikely and little or no long-term damage to private property and public facilities is typically encountered.

6.0 Mitigation Strategy

Hazard mitigation helps to decrease the potential consequences of emergency and disaster-related events and their associated costs. Mitigation activities can encompass adjustments to and enforcement of building codes, revisions to land-use development, training and education, and structural and nonstructural safety procedures.

6.1 Mitigation Planning Approach

In order for the Town of Deerpark to establish and maintain eligibility for FEMA mitigation funding, the content of the mitigation plan must meet the planning requirements set forth in 44 CFR Part 201. This regulation states that the plan should include:

- Goals aimed at reducing or avoiding losses from the indentified hazards;
- Mitigation actions that will help accomplish the established goals;
- Strategies that detail how the mitigation actions will be implemented and administered; and
- Description of how and when the plan will be updated.

This content is included and detailed by the planning approach established in *Developing the Mitigation Plan: identifying mitigation actions and implementing strategies* (FEMA 386-3, 2003). This approach was used to guide the formulation of goals and objectives and prepare associated mitigation strategies for the Town of Deerpark's hazard mitigation plan. FEMA's guide detailed a four step approach to complete the mitigation process:

1. *Develop Mitigation Goals and Objectives:* Mitigation goals and objectives were developed using information from the hazard profiles, loss estimation findings, critical facilities mapping, vulnerability assessments, existing regulations, reviews, and documents related to hazard events, and the hazard analyses. These goals are recognized as general guidelines, detailing what the Town hopes to achieve as a result of this process.

2. *Identify and Prioritize Mitigation Actions:* Through the identification and prioritization of mitigation actions, a list of projects to reduce future hazard vulnerabilities was formed. This list of mitigation strategies/actions was identified in order to support the mitigation goals and objectives that were identified during the mitigation planning process.

3. *Prepare an Implementation Strategy:* For each mitigation action, a responsible agency or organization, a potential funding source, and realistic time frame for completing each project were identified. An implementation strategy helps to identify the resources and steps necessary to execute mitigation projects.

4. *Document the Mitigation Planning Process:* Documentation and details of all steps completed throughout the mitigation planning process are recorded in the Town's hazard mitigation plan.

6.2 Goals and Objectives

The Town of Deerpark developed the following goals and strategies based on the risk assessment results, Town vulnerabilities, and Town capabilities. Goals are general guidelines that explain what you want to achieve. They are usually broad policy-type statements, long term, and represent global visions (FEMA 386-3, 2003). The goals and objectives identified by this process represent what the participants were hoping to achieve through the implementation of this hazard mitigation plan. Specific mitigation strategies were identified that support the goals and objectives of this plan. These strategies were adjusted as a result of hazard research, working group member input,

Town personnel input, and comments received during the public meetings hosted during the mitigation planning process.

Each identified goal includes a list of associated objectives that further delineate the specific strategies or implementation steps associated with that goal. Unlike goals, objectives are specific and measurable (FEMA, 386-3, 2003). The objectives were based on generally grouping common mitigation strategy themes that were identified during plan team meetings.

The four mitigation goals and their associated objectives are detailed as follows:

Goal 1: Protect Life and Property

Objectives

a. Protect critical facilities and infrastructure.
b. Address repetitive and severe repetitive loss properties in the Town.
c. Develop, maintain, and implement ordinances, regulations, and other policies that support hazard mitigation.
d. Integrate the recommendations of this plan into existing local programs.
e. Ensure that development is done according to appropriate standards, including the consideration of natural hazard risk management.
f. Identify and pursue funding opportunities to develop and implement local mitigation activities.

Goal 2: Increase Community Education and Disaster Preparedness

Objectives:

a. Educate the public regarding how to prepare for hazard events and the course of action to follow when hazards occur
b. Educate the public on how to minimize impacts from hazard events
c. Improve public outreach to vulnerable community members
d. Alert community of emergency shelter locations and procedures in case of an emergency – establish shelter locations if necessary

Goal 3: Protect the Environment, Private Property, and Community Facilities

Objectives:

a. Promote smart development within the Town using existing regulations and planning documents
b. Encourage the protection of natural lands and features that serve to mitigate losses.
c. Protect open space, particularly in high hazard areas.
d. Maintain critical facilities
e. Utilize voluntary arrangements between willing sellers and buyers to achieve established goals

Goal 4: Provide for Public Health and Safety

Objectives:

a. Ensure continuity of Town governmental operations, emergency services, and essential facilities during and immediately after disaster and hazard events.
b. Review emergency traffic routes; communicate such routes to the public
c. Integrate hazard mitigation actions with existing local emergency operations plans and laws.
d. Assess the need for emergency services training, equipment, facilities and infrastructure to enhance response capabilities for specific hazards.

6.3 Background and Past Accomplishments

The Town has embarked on several projects, partnerships, and understandings with local public works and towns prior to the development of this Plan. These accomplishments provide an excellent starting point for much of the strategies created for the mitigation methods.

The Town has set up several partnerships with the Orange County in order to improve infrastructure as well as coordinate emergency response systems. The area fire departments have an understanding for mutual aid; when additional calls go out for support, other departments in the area assist the Deerpark fire companies in response.

6.4 Identification, Analysis, and Implementation of Mitigation Actions

This section identifies the mitigation actions of the Hazard Mitigation Plan and provides an evaluation of the strategies that support the goals of this Plan, these actions are outlined in Table 22. Other implementation considerations include the amount of time necessary for implementation, which parties would be responsible for implementation, and what funding is available to implement the strategy and are provided in Table 23. In identifying Mitigation Actions, the used the following scales to rank the cost and timeframe establishing a basis for comparison. The determined scaling is

Table 21
Scaling Used

Cost Range	
Ranking	Cost Range
Low	< $10,000
Medium	$10,000 - $100,000
High	> $100,000

Project Duration	
Ranking	Duration
Short-Term	1 to 2 years
Medium-Term	2 to 5 years
Long-Term	> 5 years

Table 22
Proposed Mitigation Actions

1	Where appropriate, promote retrofitting of structures located in hazard-prone areas to protect structures from future damage, esp. repetitive loss and severe repetitive loss properties. Identify facilities that are viable candidates for retrofitting based on cost-effectiveness versus relocation.	Existing	Flooding, severe storm	1,3	1a, 1b, 1c, 3b, 3c, 3d	Town	SEMO, FEMA	High	FEMA Mitigation Grant Programs	Long-term, dependent upon funding and cooperation of community
2	Where appropriate, encourage purchase or relocation of structures located in hazard-prone areas to protect structures from future damage, esp. repetitive loss and severe repetitive loss properties. Identify facilities that are viable candidates for *relocation based on cost-effectiveness versus retrofitting.*	Existing	Flooding, severe storm	1,3	1a, 1b, 1c, 3b, 3c, 3d	Town	SEMO, FEMA	High	FEMA Mitigation Grant Programs	Long-term, dependent upon funding and cooperation of community
3	Promote participation in the Community Rating System	New and Existing	Flooding, severe storm	1,3	1a, 1b, 3b	Town	SEMO, ISO FEMA	Low to Moderate	Local	Short- to medium-term
4	Maintain compliance with NFIP	New and Existing	Flooding, severe storm	1,3	1a, 1b, 3b	Town	SEMO, ISO FEMA	Low to Moderate	Local	Ongoing
5	Review, improve, and support implementation of existing *emergency plans and laws.*	NA	All hazards	1,4	1a, 1b, 1d, 4a, 4b, 4c, 4d	Emergency Mgmt	Orange County EM, SEMO	Low to moderate	Local	Ongoing
6	Increase public awareness of hazard mitigation programs, including flood mitigation programs. Provide public outreach to educate the public on HM opportunities.	Existing	All	2	2a, 2b, 2c, 2d	Town	Emergency Mgmt	Low	Local, FEMA Mitigation Grant Programs	Short-term
7	Identify vulnerable community members (e.g., elderly, disabled) and establish targeted outreach programs to communicate hazard preparedness information	Existing	All	2	2c	Town	Emergency Mgmt	Low	Local, FEMA Mitigation Grant Programs	Short-term
8	Develop / maintain web presence dedicated to hazard mitigation communication; consider Town website and/or Facebook	Existing	All	2	2a, 2b, 2c, 2d	Town	Emergency Mgmt	Low	Local, FEMA Mitigation Grant Programs	Short-term
9	Develop hazard mitigation / emergency preparedness pamphlet for distribution to Town residents via website, mailing with tax bills, etc.	Existing	All	2	2a, 2b, 2c, 2d	Town	Emergency Mgmt	Low	Local, FEMA Mitigation Grant Programs	Short-term
12	Maintain communication with Orange & Rockland re: continuity of service and preventive maintenance programs	Existing	Severe storm, severe winter storm	1, 2, 4	1a, 2a, 4a	Town	Highway Dept	Low to moderate	Local	Short- to medium term

13	Monitor O&R tree-trimming program and alert utility if high hazard areas are not being addressed	Existing	Severe storm, severe winter storm	1, 2, 4	1a, 2a, 4a	Town	Highway Dept	Low to moderate	Local	Short- to medium term
14	Develop list of critical drainage facilities that may contribute to localized flooding	Existing	Flooding, severe storm	1,3	1a, 1c, 3d	Town	Highway Dept	Low to moderate	Local, FEMA Mitigation Grant Programs	Short- to medium term
15	Develop program to inspect critical drainage facilities in advance of forecasted storms	Existing	Flooding, severe storm	1,3	1a, 1c, 3d	Town	Highway Dept	Low to moderate	Local, FEMA Mitigation Grant Programs	Short- to medium term
16	Shin Hollow Road; concrete culvert requires rehabilitation	Existing	Flooding, severe storm	1,3	1a, 3d	Town	Highway Dept	Low to moderate	Local, FEMA Mitigation Grant Programs	Short- to medium term
17	Old Greenville Turnpike: This location requires a new box culvert; 35'	Existing	Flooding, severe storm	1,3	1a, 3d	Town	Highway Dept	Moderate to high	Local, FEMA Mitigation Grant Programs	Short- to medium term
18	Guymard Turnpike: Culvert replacement and bank stabilization	Existing	Flooding, severe storm	1,3	1a, 3d	Town	Highway Dept	High	Local, FEMA HM Grant Programs	Medium– to long-term
19	Guymard Turnpike: Culvert replacement	Existing	Flooding, severe storm	1,3	1a, 3d	Town	Highway Dept	Moderate to high	Local, FEMA Mitigation Grant Programs	Short- to medium term
20	Oakridge Park Subdivision; bank stabilization, restoration of historic canal stone wall	Existing	Flooding, severe storm	1,3	1a, 3d	Town	Highway Dept	High	Local, FEMA Mitigation Grant Programs	Medium –to long-term
21	Peenpack Trail: bank stabilization	Existing	Flooding, severe storm	1,3	1a, 3d	Town	Highway Dept	Moderate to high	Local, FEMA Mitigation Grant Programs	Short- to medium term
22	Upper Brook Road: bank stabilization	Existing	Flooding, severe storm	1,3	1a, 3d	Town	Highway Dept	Moderate to high	Local, FEMA Mitigation Grant Programs	Short- to medium term
23	Academy Avenue: replace box culvert	Existing	Flooding, severe storm	1,3	1a, 3d	Town	Highway Dept	Moderate to high	Local, FEMA Mitigation Grant Programs	Short- to medium term
24	Sleepy Hollow Road: culvert replacement	Existing	Flooding, severe storm	1,3	1a, 3d	Town	Highway Dept	Moderate to high	Local, FEMA Mitigation Grant Programs	Short- to medium term
25	Plank Road; bank stabilization	Existing	Flooding, severe storm	1,3	1a, 3d	Town	Highway Dept	Moderate to high	Local, FEMA Mitigation Grant Programs	Short- to medium term
26	Kennel Road: bank stabilization	Existing	Flooding, severe storm	1,3	1a, 3d	Town	Highway Dept	Moderate to high	Local, FEMA Mitigation Grant Programs	Short- to medium term
27	Port Orange area: bank stabilization	Existing	Flooding, severe storm	1,3	1a, 3d	Town	Highway Dept	Moderate to high	Local, FEMA Mitigation Grant Programs	Short- to medium term
28	Brandt Road: box culvert needed	Existing	Flooding, severe storm	1,3	1a, 3d	Town	Highway Dept	Moderate to high	Local, FEMA Mitigation Grant Programs	Short- to medium term
29	Prospect Hill: culvert upgrade required	Existing	Flooding, severe storm	1,3	1a, 3d	Town	Highway Dept	Moderate to high	Local, FEMA Mitigation Grant Programs	Short- to medium term
30	Zock Road: new culvert needed	Existing	Flooding, severe storm	1,3	1a, 3d	Town	Highway Dept	Moderate to high	Local, FEMA Mitigation Grant Programs	Short- to medium term
31	Old Cahoonzie Road – culvert replacement and bank stabilization	Existing	Flooding, severe storm	1,3	1a, 3d	Town	Highway Department	Moderate to high	Local, FEMA Mitigation Grant Programs	Short- to medium term
32	Replacement of catch basins near Sparrowbush Fire Company (79 Main St, Sparrowbush) and repair of disturbed areas	Existing	Flooding, severe storm	1,3,4	1a, 3d, 4a	Town	Highway Dept	Moderate	Local, FEMA Mitigation Grant Program	Short - to medium term

After identifying the Mitigation Actions, the Team developed a priorities list that would link the mitigation actions with the stated goals and objectives. These priorities were evaluated on the established cost scale and compared to the potential benefits if implemented and provided in Table 23.

Table 23
Hazard Mitigation Priorities

1	Where appropriate, promote retrofitting of structures located in hazard-prone areas to protect structures from future damage, esp. repetitive loss and severe repetitive loss properties. Identify facilities that are viable candidates for retrofitting based on cost-effectiveness versus relocation.	7	H	H	Y	Y	N	M-H
2	Where appropriate, encourage purchase or relocation of structures located in hazard-prone areas to protect structures from future damage, esp. repetitive loss and severe repetitive loss properties. Identify facilities that are viable candidates for relocation based on cost-effectiveness versus retrofitting.	7	H	H	Y	Y	N	M-H
3	Promote participation in the Community Rating System	3	M	L	Y	N	Y	H
4	Maintain compliance with NFIP	3	M	L	Y	N	Y	H
5	Review, improve, and support implementation of existing emergency plans and laws.	7	L	L	Y	N	Y	M
6	Increase public awareness of hazard mitigation programs, including flood mitigation programs. Provide public outreach to educate the public on HM opportunities.	4	M	L	Y	Y	Y	H

7	Identify vulnerable community members (e.g., elderly, disabled) and establish targeted outreach programs to communicate hazard preparedness information	1	M	L	Y	Y	Y	H
8	Develop / maintain web presence dedicated to hazard mitigation communication; consider Town website and/or Facebook	4	M	M	Y	Y	Y	H
9	Develop hazard mitigation / emergency preparedness pamphlet for distribution to Town residents via website, mailing with tax bills, etc.	4	M	L	Y	Y	Y	M
10	Consider the implementation of stronger codes to address flooding and other natural hazards	5	M	L	Y	N	Y	H
11	Consider implementation of "no net increase" requirements for stormwater mgmt for new subdivisions	4	M	L	Y	N	Y	H
12	Maintain communication with Orange & Rockland re: continuity of service and preventive maintenance programs	3	M	L	Y	N	Y	H
13	Monitor O&R tree-trimming program and alert utility if high hazard areas are not being addressed	3	M	L	Y	N	Y	H
14	Develop list of critical drainage facilities that may contribute to localized flooding	3	M	L	Y	N	Y	H
15	Develop program to inspect critical drainage facilities in advance of forecasted storms	3	M	L	Y	N	Y	H
16	Shin Hollow Road; concrete culvert requires rehabilitation	2	M	L	Y	Y	Y	H
17	Old Greenville Turnpike: This location requires a new box culvert; 35'	2	M	M-H	Y	Y	Y	H
18	Guymard Turnpike: Culvert replacement and bank stabilization	2	M	H	Y	Y	Y	H

19	Guymard Turnpike: Culvert replacement	2	M	M-H	Y	Y	Y	H
20	Oakridge Park Subdivision; bank stabilization, restoration of historic canal stone wall	2	M	H	Y	Y	Y	H
21	Peenpack Trail: bank stabilization	2	M	M-H	Y	Y	Y	H
22	Upper Brook Road: bank stabilization	2	M	M-H	Y	Y	Y	H
23	Academy Avenue: replace box culvert	2	M	M-H	Y	Y	Y	H
24	Sleepy Hollow Road: culvert replacement	2	M	M-H	Y	Y	Y	H
25	Plank Road; bank stabilization	2	M	M-H	Y	Y	Y	H
26	Kennel Road: bank stabilization	2	M	M-H	Y	Y	Y	H
27	Port Orange area: bank stabilization	2	M	M-H	Y	Y	Y	H
28	Brandt Road: box culvert needed	2	M	M-H	Y	Y	Y	H
29	Prospect Hill: culvert upgrade required	2	M	M-H	Y	Y	Y	H
30	Zock Road: new culvert needed	2	M	M-H	Y	Y	Y	H
31	Old Cahoonzie Road: new culverts and bank stabilization	2	M	M-H	Y	Y	Y	H
32	Replacement of catch basins near Sparrowbush Fire Company (79 Main St, Sparrowbush) and repair of disturbed areas	3	M	M	Y	Y	Y	H

7.0 Plan Maintenance

This Town of Deerpark hazard mitigation plan (the Plan) will change and adapt as time progresses and changes occur within the Town and its various local jurisdictions. The Disaster Mitigation Act of 2000 requires that adopted mitigation plans define and document the processes and mechanisms for maintaining and updating the hazard mitigation plan at least once every five years in order for the participating jurisdictions to remain eligible for funding. This hazard mitigation plan maintenance process must include:

- Monitoring and evaluating the Plan;
- Updating the Plan;
- Providing an implementation schedule; and
- Outlining steps for continued public involvement.

In order to keep the Town's hazard mitigation plan current and build upon previous hazard mitigation planning efforts, successes, and failures, Town of Deerpark will utilize members its Hazard Mitigation Plan Team to monitor, evaluate, and update the Plan on an annual basis.

7.1 Monitoring, Evaluating, and Updating the Plan

It is envisioned that the members of the Hazard Mitigation Plan Team that was established at the beginning of this process will provide the basis for a review committee (the Committee) that will be responsible for meeting annually (at a minimum) to discuss the implementation of the Plan and identify any needed revisions. It is recognized that with increased growth and the passing of time, there may be changes in representatives on the committee. Any representative changes will be indicated when the plan is formally updated. This annual meeting will be planned and facilitated by members of the Town of Deerpark Emergency Management Office. The Committee may also meet to evaluate and update the Town's mitigation plan following a major disaster event. This would allow the Committee members to determine if the actions recommended in the plan are appropriate or to determine if any changes are warranted

based on the pattern of disaster damages. The Committee will be tasked with reviewing all proposed additions and updates to the plan and presenting recommendations to the Town Board for approval.

One month prior to the annual plan review meeting, a reminder will be distributed to each representative. This reminder will engage representatives to think of how risks and hazards have changed within the Town, whether the goals and objectives identified in the plan still address the current concerns of the Town, and whether the status of any proposed mitigation action has changed or whether additional actions should be included. The implementation progress of proposed mitigation actions is important to review in order to determine whether the plan is being executed correctly and to the optimal extent. Items that should be reviewed for each mitigation action include the current status of the action, the ultimate cost of the action, the success (if completed action), and the funding sources used for the action.

During the annual Plan review meeting the committee members will provide an update to the group of their individual review of the Plan and the implementation details for the proposed mitigation actions. Notes of update meetings will be kept and will include specific details associated with any proposed changes to the plan. During re-approval years (every 5 years), once revisions are approved by the Town Board, the updated Plan will be submitted to SEMO and FEMA for review and approval in accordance with the five year review schedule dictated in DMA 2000.

7.2 Implementation Schedule

To summarize, the proposed hazard mitigation plan five-year review will be completed as follows:

- Representatives comprising the Review Committee will meet on an annual basis to discuss the implementation progress and specifics of the Plan. Meeting discussions will be documented, including proposed changes to the plan. All discussion and proposed changes will be kept in a separate Appendix of the Plan document.

- When a five year update is required, the Review Committee will meet one year prior to the Plan's expiration date to update and revise all elements of the Plan and produce a final updated Plan.
- This updated Plan will be presented to the Town Board to formally concur with and adopt the proposed changes.
- Once the Town Board has adopted the updated Plan, the updated Plan will be submitted to SEMO for review and comment and to FEMA for approval.

The Town of Deerpark Hazard Mitigation Plan and subsequent updates will be incorporated into and referenced in future updates of the Town of Deerpark Comprehensive Plan. Elements of the Plan will be considered during local and Town-wide development and comprehensive planning. The approved Plan will also serve as an important resource for developing and/or updating emergency operations plans and procedures throughout the Town of Deerpark.

7.3 Continued Public Involvement

It is the intent of Town of Deerpark to keep the public informed about the hazard mitigation planning efforts, actions, and projects that occur within the Town. To accomplish this goal, and in addition to the public involvement already incorporated into the completion and review of the original document, the following opportunities for public involvement in this ongoing process will be made available:

- A web link will be provided on Town of Deerpark's website that will include a digital copy of the Plan and a list of upcoming planning activities and a plan update schedule.

- Public announcements of and invitations to annual Committee planning meetings and five-year mitigation plan update events; and
- Performance of public outreach and mitigation training events throughout the Town, especially in higher risk hazard areas.

References

Alliance Energy, 2010, Facilities: Rio Project, http://www.allianceenergy.us/rio.html, accessed March 4, 2010.

Enloe, J. National Oceanic and Atmospheric Administration (NOAA). National Climate Data Center (NCDC). The Northeast Snowfall Impact Scale - NESIS. Last Updated Wednesday, 3-Mar-2010 11:13:04 EST. Accessed 2010 http://www.ncdc.noaa.gov/snow-and-ice/nesis.php.

FEMA, 2010a, Definition of flood/flooding, http://www.fema.gov/plan/prevent/floodplain/nfipkeywords/flood_or_flooding.shtm, accessed March 17, 2010.

Hammer, Gregory R., undated: The Climate of New York (narrative). Climates of the States, New York, in Climatography of the United States: NCDC Publication Clim-60, National Climatic Data Center. http://cdo.ncdc.noaa.gov/cgi-bin/climatenormals/climatenormals.pl?directive=prod_select2&prodtype=CLIM60&subrnum=

Kocin, P. J. and L. W. Uccellini, 2004: A Snowfall Impact Scale Derived From Northeast Storm Snowfall Distributions. *Bull. Amer. Meteor. Soc.*, **85**, 177-194. http://www.ncdc.noaa.gov/snow-and-ice/docs/kocin-uccellini.pdf

National Weather Service, 2005, Online Glossary, http://www.weather.gov/glossary, accessed March 17, 2010.

National Weather Service, 2010, Flood Safety, http://www.floodsafety.noaa.gov/floodsafe.shtml, accessed March 17, 2010.

NCDC, 2010, Climate of 2010 – February, U.S. Palmer Drought Indices, National Climatic Data Center, http://www.ncdc.noaa.gov/oa/climate/research/prelim/drought/palmer.html, accessed March 4, 2010

NRCC, 2010, Northeast Drought Page, Northeast Regional Climate Center, http://www.nrcc.cornell.edu/drought/, accessed March 4, 2010.

NYSDEC, 2010, Part 673: Dam Safety Regulations; §673.5 (b) Hazard Classifications, http://www.dec.ny.gov/regs/4598.html#14086, accessed March 4, 2005.

PPL Generation, LLC, 2002, Emergency Action Plan, Wallenpaupack Hydroelectric Station, FERC Project No. 487, PA Dam No. 52-051, originally prepared 1975, last revised December 20, 2002.

Squires, M. F. and J. H. Lawrimore, 2006: Development of an Operational Snowfall Impact Scale. 22nd IIPS, Atlanta, GA. http://www.ncdc.noaa.gov/snow-and-ice/docs/squires.pdf