

## **9. DROUGHT**

A drought is a prolonged period of limited precipitation affecting the supply and quality of water. The Planning Committee used available data to determine a score of 201 according to the HIRA model ranking system.

### **a. Location of Affected Area**

A drought may occur anywhere within the County, and it would typically impact a large region.

### **b. Magnitude/Severity of Hazard**

Meteorologists and hydrologists have their own precise definitions of drought. Meteorologists compare deficiencies in precipitation to normal levels, while hydrologists consider stream flow and water levels in aquifers, lakes and reservoirs along with precipitation. The State of New York uses elements of both disciplines to determine when a drought is occurring.

New York is divided into nine “drought management regions” based roughly on drainage basin (watershed) and county lines. The NYSDEC monitors precipitation, lake and reservoir levels, stream flow and groundwater levels at least monthly in each region and more frequently during periods of drought. The NYSDEC uses this data to assess the condition of each region, which can range from “normal” to “drought disaster”.

New York also uses the Palmer Drought Index, a measure of soil moisture computed by the National Weather Service. The two indices reveal different aspects of drought. The Palmer Index, with its emphasis on soil moisture, is useful in exploring agricultural impacts. The State Index helps assess the impact on human welfare and the regional economy.

Damages due to drought may include drinking water supply depletions, crop failure, the inability to fight and extinguish a fire and damage to local properties due to use restrictions. Potential cascade effects of drought include fire or wildfire due to dry conditions and water supply contamination due to extremely low levels of water supply reservoirs.

### **c. Past Hazard Events/Historical Damages**

According to NOAA records, drought periods of 14 days or more occur slightly more often than every other year in Albany County (77 times in 130 years).

The following is a list of Drought Periods in the Albany Region (including the Albany County).

## DRY SPELLS ALBANY NY

(National Climatic Data Center - official data source)

*Periods of at least 14 consecutive days with  
no measurable precipitation*

Year	Dates	# of Days
<b>1874</b>	April 30 - May 15	16@
<b>1875</b>	August 20 - September 5	17@
<b>1877</b>	January 17-30	14@
	April 2-17	16@
<b>1879</b>	September 25 - October 17	23*
<b>1880</b>	August 5-18	14
<b>1883</b>	August 3-17	15
<b>1884</b>	April 19 - May 4	16
<b>1886</b>	September 30 - October 13	14
<b>1887</b>	May 8-23	16
	October 22 - November	19
<b>1889</b>	August 23 - September 6	15*
<b>1890</b>	April 10-23	14
<b>1892</b>	March 24 - April 8	16
<b>1899</b>	November 17 - December 1	15
<b>1900</b>	March 28 - April 11	15
	August 28 - September 15	19
<b>1901</b>	February 10 - March 1	20
	October 16-31	16
<b>1903</b>	April 17 - May 3	17
	May 8-29	22
<b>1904</b>	October 28 - November 12	16
	November 15 - December 2	18
<b>1906</b>	September 4-19	16
<b>1908</b>	September 3-27	25*
	October 12-25	14

<b>1912</b>	January 30 - February 18	20
<b>1913</b>	April 14-27	14
<b>1914</b>	September 3-22	20*
	October 1-15	15
<b>1915</b>	March 3-20	18*
	April 12-27	16
<b>1917</b>	October 31 - November 21	22*
<b>1918</b>	March 15 - April 2	19
<b>1919</b>	January 9-22	14
<b>1922</b>	April 19 - May 3	15
	September 16 - October 2	17
<b>1924</b>	March 8-25	18
	October 9-31	23
<b>1929</b>	October 8-21	14
<b>1930</b>	September 28 - October 14	17!
<b>1932</b>	May 9-25	17
	November 20 - December 8	19
<b>1938</b>	September 28 - October 19	22
<b>1939</b>	November 14 - December 1	18*
<b>1941</b>	September 11-29	19*
<b>1942</b>	August 17 - September 2	17
<b>1944</b>	January 7-22	16
<b>1947</b>	September 23 - October 17	25*
<b>1949</b>	May 30 - June 19	21
<b>1950</b>	September 24 - October 9	16
<b>1952</b>	August 17-31	15
	October 7-27	21
<b>1953</b>	November 8-22	15
<b>1956</b>	July 26 - August 9	15!
	October 8-22	15*
<b>1962</b>	June 25 - July 8	14
<b>1963</b>	October 4-26	23!
<b>1964</b>	September 4-24	21

	October 4-18	15
<b>1968</b>	April 9-23	15
<b>1970</b>	October 24 - November 9	17
<b>1973</b>	January 5-18	14
<b>1976</b>	November 12-27	16
<b>1978</b>	February 15 - March 2	16
	April 21-May 4	14
<b>1979</b>	December 27-31 (cont.)	
<b>1980</b>	(cont.) January 1-10	15
	January 24 - February 15	23
<b>1982</b>	October 16-30	15
<b>1984</b>	October 4-18	15
	November 14-28	15
<b>1985</b>	March 13-27	15
<b>1987</b>	February 10-27	18
	March 3-19	17
<b>1991</b>	October 28 - November 10	14
<b>1994</b>	November 7-20	14
<b>1995</b>	August 13-30	18

\* True dry spell. Includes a period of at least 14 consecutive days with no precipitation.

! Absolute dry spell. All days with no precipitation.

#### **d. Probable Future Events**

Due to the nature of drought, being a natural phenomenon, it is likely that the historic trend of these weather related occurrences would continue.

#### **e. Vulnerability Assessment/Estimate of Potential Losses**

Since much of the County is developed, the possibility of damage to public and private property is likely due to severe storms. Residential and commercial property is vulnerable. The onset of a drought may be several days, but many may be caught in a circumstance where they would not be fully prepared.

The impact of a drought is that serious injury or death is unlikely.

Droughts may cause moderate damage to property and little or no damage to

infrastructure. It may take up to one or two days for the County's emergency staff to recover from the impacts of a drought.

However, a drought can adversely impact the County's surface water resources such as ponds, lakes, streams, freshwater wetlands, and estuaries that function as nurseries, spawning and feeding grounds for marine life provide shelter and food for birds and wildlife. Ponds and lakes rely on groundwater to maintain water depth needed to support native aquatic species. Streams require groundwater to maintain a continuous flow for sensitive fish such as trout. These impacts are essentially quality of life related and affect recreational uses such as fishing, hiking, bird watching, etc.

#### f. **Land Use Analysis/Development Trends**

In order to deal with this situation all Water Districts that supply water to the residents of Albany County have a Drought Response Plan as part of their Emergency Management Plan.

According to local Emergency Response Plans, drought conditions are monitored by analyzing average annual rainfall and by monitoring and recording static water levels and pumping water levels in each well on a quarterly basis. Drought criteria is established as follows:

A **Drought Watch** is to be declared if the annual rainfall in one year is below 40 inches.

A **Drought Warning** is to be declared if the average annual rainfall is below 40 inches for two consecutive years.

A **Drought Emergency** is to be declared if the average annual rainfall is below 40 inches for three consecutive years; or if a drought emergency is declared by Albany County; or if static water levels show a decline of five (5) or more feet from the recorded levels.

A **Drought Disaster** is to be declared if the average annual rainfall is below 40 inches for five (5) or more consecutive years; or if a drought disaster is declared by Albany County; or if the static water levels decline ten (10) or more feet below recorded levels; or if the pumping water level in any well drops to 20 feet above the pump intake.

Upon the declaration of a drought watch, a voluntary program for water conservation by all water district customers will be promoted by notice to customers a minimum of two times during the year. The notice shall include suggestions for conservations measures to be taken by the customers.

Upon declaration of a drought warning, a program for a 10% voluntary reduction in water usage by all water district customers will be promoted by notice to customers a

minimum of four times a year. The notice shall include recommended practices to be used by customers to reduce water usage by 10%.

Upon the declaration of a drought emergency, a program for a mandatory reduction of 25% of water usage by all water district customers will be implemented. A local public awareness program will be implemented to require customers to reduce their non-essential water uses, such as irrigation, car washing, filling of swimming pools, etc. and to implement conservation measures for essential water uses. Increase monitoring of reservoir levels and static and pumping water levels at water supply wells. If necessary and if feasible, lower pump settings when water levels reach predetermined critical levels.

If initial measures do not attain required pumpage reduction, the following shall be implemented:

1. Ban all non-essential water uses, such as irrigation, car washing, filling of swimming pools, etc.
2. Increase public awareness program and water conservations campaign.
3. If necessary, initiate penalties for violations of water use restrictions.

The following steps will be taken upon the declaration of a drought disaster:

1. Initiate more severe reductions and restriction on water use.
2. If necessary, initiate higher penalties and/or shut off of water for violations of water use restrictions.

Albany County residents rely on precipitation (in reservoirs) for most water supply needs. This includes Alcove, Basic, Stoney Creek, Watervliet, Vly and Altamont reservoirs.

According to the U.S. Census Bureau, the population growth has leveled off for several decades. The most recent prediction estimates the population to remain stable at the present. Water demand, however, continues to grow as lifestyles change, especially in residential suburban areas.

Water restrictions have been in place for the Towns of Colonie, Bethlehem and Guilderland during the summer months. The restrictions impose strict water conservation measures for residential high water users such as lawn watering and swimming pools, and commercial high water uses such as car washes and cooling towers for air conditioning where recycling is required.

The management of the water supply system, in cooperation with water suppliers within the County, will insure a safe supply of water for many years. Because of this and the tremendous volume of water contained in reservoirs with vast watersheds, it is highly unlikely that a drought disaster could occur.

## 10. **INFESTATION**

Infestation is an excessive population of insects, rodents, or other animals requiring control measures due to their potential to carry diseases, destroy property or crops, or harm the environment. The Planning Committee used available data to determine a score of 201 according to the HIRA model ranking system.

### **a. Location of Affected Area**

Infestation may occur anywhere within the County, and it may impact a small region or neighborhood.

### **b. Magnitude/Severity of Hazard**

Damages due to infestation include loss of crops, forests, landscape vegetation, possible structural damage, and possible health impacts. Potential cascade effects of infestation include epidemic from disease carrying insects, rodents or other animals, and the possibility of structural collapse due to infestation with termites or carpenter ants. Infestation could last for more than one week.

### **c. Past Hazard Events/Historical Damages**

Infestation is an infrequent event in Albany County. Past widespread pest infestation within the County includes gypsy moths, termites, carpenter ants, Asian longhorned beetles, mosquitoes, greenhead flies, deer flies, black flies (no see ums), potato nematodes, apple maggots and ticks.

### **d. Probable Future Events**

According to the USDA Forest Service, the gypsy moth (*Lymantria dispar*) feeds on over 300 species of trees and shrubs. The likelihood of infestation in the future is great.

### **e. Vulnerability Assessment/Estimate of Potential Losses**

Vulnerable areas include public and private property. Crops are particularly vulnerable, as well as wood frame structures. Landscaping, trees and lawns are vulnerable. Many commonly used landscape plants are not native and are susceptible to infestation.

Forested areas are vulnerable to gypsy moths, which prefer oak, apple, birch, box elder, hawthorne, linden, poplar, sweet gum and willow. In May, gypsy moth caterpillars (larvae) damage leaves by eating them and cause severe defoliation that can kill trees.

Termites and carpenter ants are widespread within the County, and many wood frame structure more than a few years old has some degree of damage from these insects, although it may not be evident to the casual observer. It is likely that local subterranean infestation would continue.

Asian longhorned beetles attack mainly maples, which exist throughout the County. Deer ticks exist in suitable habitat areas that include wooded areas and fields found throughout the County, including residential yard areas.

A small aphid-like Asian insect, the wooly adelgid, has been spreading throughout the eastern U.S. killing hemlock trees, including the Eastern Hemlock, common in Albany County.

The onset of infestation is several days warning. The impact of infestation is the possibility of serious injury or death is unlikely. Infestation may cause moderate damage to property and little or no damage to infrastructure. It may take up to one week for the County's emergency staff to recover from the impacts of infestation.

**f. Land Use Analysis/Development Trends**

The insects and mammals of concern are found in developed and undeveloped areas throughout the County. The developed areas of the County contain many trees found on wooded lots and as street trees and landscaping. Rural portions of the County consist of agricultural land that is susceptible. Information from the local Cornell extension office would be helpful in controlling infestation. Local Planning Boards may want to consider favoring native species in landscape plans because they are generally less susceptible to infestation and more tolerant to disease.

## 11. **WILDFIRE**

A wildfire is an uncontrolled fire spreading due to vegetative fuel, exposing and possibly consuming structures. According to the HIRA ranking, wildfire scored 192 in Albany County.

### **a. Location of Affected Area**

A wildfire could happen in a number of locations within the County, and could impact a small region or neighborhood.

### **b. Magnitude/Severity of Hazard**

Small wildfires occur annually within the County, but due to quick responses they generally do not get out of control.

Wildfire may cause destruction of forests and other vegetation, buildings and houses, and other property. Potential cascade effects of wildfire include explosion due to the uncontrolled fire interacting with various containers and materials, structural collapse and utility failure.

### **c. Past Events/Historical Damages**

Although according to statistics from NOAA, there are no records of a wildfire in Albany County in the past fifty years, there have been a few wildfires. In the 1970s there were uncontrollable fires in the Pine Bush Unique area in the Town of Guilderland. In 2003, there was a wildfire that burned 12 acres and lasted two days due to its location on a difficult cliff.

### **d. Probable Future Events**

It is likely that the small brush fires would continue to occur, but due to controlled burns and brush hogging, the severity of future fires may be mitigated.

### **e. Vulnerability Assessment/Estimate of Potential Losses**

Vulnerable areas are the wooded areas of the County, including the Pine Bush State Unique Area, Thacher State Park, various wildlife management areas, and any forested areas.

### **f. Land Use Analysis/Development Trends**

Like many developed areas, suburban sprawl tends to encroach into wooded areas, which would mean that more houses would be closer to forested areas that are prone to wildfire.

## 12. **BLIGHT**

Blight is a disease of agricultural crops or non-agricultural plants resulting in withering, lack of growth, and death of its parts without rotting. The Planning Committee used available data to determine a score of 185 according to the HIRA model ranking system.

### **a. Location of Affected Area**

Blight can happen anywhere within the County, and it may impact a large region.

### **b. Magnitude/Severity of Hazard**

Damages due to blight may be caused by a number of diseases. Potential cascade effects of blight include infestation by insects due to a weakened condition of vegetation. Blight typically lasts more than a week.

### **c. Past Hazard Events/Historical Damages**

Past blights in the State of New York (including Albany County) include the American Chestnut blight.

During the 1800's, the American Chestnut tree (*Castanea dentata*) was prevalent in eastern forests from Maine to the Midwest and to Alabama, and was known as "the queen of the forest." A blight caused by *Endothia parasitica* (a fungus), was introduced to the U.S. from the Orient in the early 1900's. Most of the American Chestnuts were killed by the blight within a 40-year period. To this day, American Chestnuts are not common, and larger mature trees are rare.

In 1999, Albany County experienced a tomato blight that impacted the tomato crop. Other crop related diseases include a potato tuber blight that occurred in the County.

### **d. Probable Future Events**

The probability of blight in the future is likely, due to the biological nature of the cause of blight.

### **e. Vulnerability Assessment/Estimate of Potential Losses**

Since there is a significant portion of the County that is agricultural or wooded, the possibility of damage to public and private property is likely. The onset of blight is several days warning.

The impact of a severe storm is that serious injury or death is unlikely.

Blight may cause little or no damage to private property and little or no damage to public infrastructure. It may take a week or more for the County's emergency staff to recover from the impacts of blight.

### **f. Land Use Analysis/Development Trends**

The types of causes of blight may be found in developed and undeveloped areas within the County. The developed areas of the County contain many trees found on wooded lots and as street trees and landscaping. Rural portions of the County consist of agricultural land that is susceptible. Information from the local Cornell extension office

would be helpful in controlling infestation. Local Planning Boards may want to consider favoring native species in landscape plans because they are generally less susceptible to infestation and more tolerant to disease.

### **13. EPIDEMIC**

An epidemic is the occurrence or outbreak of disease to an unusual number of individuals or portion of the population, human or animal. The Planning Committee used available data to determine a score of 179 according to the HIRA model ranking system.

#### **a. Location of Affected Area**

An epidemic may occur anywhere within the County, and it may impact a significant area of the County.

#### **b. Magnitude/Severity of Hazard**

Potential epidemics within the County include Lyme disease, West Nile virus and the rabies virus. All of these diseases are known to exist within the County, and are of widespread concern. Damages due to epidemic include widespread illness. Potential cascade effects of epidemic may include civil unrest due to a panic for treatment, depending on the severity of the epidemic.

#### **c. Past Hazard Events/Historical Damages**

Epidemics are infrequently events in Albany County. Lyme disease, West Nile virus and rabies virus are threats to the public health that have not reached epidemic proportions.

Lyme disease was named after a County in Connecticut following an arthritic outbreak in children in 1977. Lyme disease is caused by *Borrelia burgdorferi*, a bacteria transmitted to humans by infected deer ticks. According to the National Center for Disease Control, Albany County is in a high risk area for Lyme disease.

West Nile virus historically had been found in humans, birds and other animals in Africa, Eastern Europe, Western Asia and the Middle East. In 1999 it was first found in the United States, but until that time it had not been found in the Western Hemisphere. Presently, the Center for Disease Control (CDC) believes that mosquitoes spread the virus in the U.S., usually during the late summer and early fall months after the mosquitoes have had time to breed. The disease is characterized by flu-like symptoms, and in 2002 there were over 80 cases reported in the State of New York, according to the CDC. There is a county program for spraying for mosquito breeding areas in the Albany County.

Another potential epidemic is rabies, a virus that is transmitted by contact with rabid raccoons, bats, dogs, cats, skunks and other animals. The virus causes an infection that may be fatal. Although this has not reached epidemic proportions, it is a concern.

Severe Acute Respiratory Syndrome (SARS) is a relatively recent epidemic that was discovered in 2003. According to the World Health Organization, there have been more than 30 cases reported in the State of New York. Although this could outbreak anywhere, there are no confirmed cases in the Albany County.

The bird flu was a rumored epidemic that could have reached pandemic proportions. A pandemic is an epidemic that crosses continents.

#### **d. Probable Future Events**

The probability of epidemic in the future is not very likely, but it is a concern due to the biological nature of the cause.

#### **e. Vulnerability Assessment/Estimate of Potential Losses**

Vulnerable areas include those where ticks, bats and raccoons are found, as well as mosquito breeding places such as shallow stagnant pools of standing water that may exist for prolonged periods. Ticks are associated with mice and deer (as part of their life cycle), and are found in wooded areas, shrubs, and attached to other plants and their habitat includes anywhere mice and deer could be found. Raccoons are found in wooded, suburban and urban areas, and generally need a hollow tree for shelter, which could be anywhere in the County. Bats are not only found in caves. They roost in dead or hollowed trees, and are found in wooded areas and swamps, as well as suburban environments.

The impact of epidemic is the possibility of serious injury or death, but likely not in large numbers. Epidemics would generally not cause damage to property or infrastructure. It may take more than two weeks for the County's emergency staff to recover from the impacts of an epidemic.

#### **f. Land Use Analysis/Development Trends**

Habitat for ticks, raccoons, bats and mosquitos (the carriers of the main diseases of concern for epidemic) are found anywhere within the County, including urban, suburban and rural areas. Information for the Cornell extension office and the Center for Disease Control would be helpful in controlling epidemic from the above sources.

## Reported cases of Lyme disease—United States, 2005



1 dot placed randomly within county of residence for each reported case

## 14. HURRICANE

Hurricanes are tropical cyclones (the air circulation is counterclockwise in the Northern Hemisphere), which have a central barometric pressure of 29.0 inches or less of mercury and wind velocities of 74 miles per hour (65 knots), or more. Air within a hurricane circulates in a large spiral around a relatively calm center or “eye.” The Planning Committee used available data to determine a score of 170 according to the HIRA model ranking system.

### **a. Location of Affected Area**

A hurricane is a large storm that would impact a large region. A typical hurricane is many miles wide and it would typically travel along a path that would extend many miles before losing strength. If a hurricane would occur, it could impact a significant portion of the County.

### **b. Magnitude/Severity of Hazard**

Damages due to hurricanes may be caused by lightning strikes, high winds that may cause fallen tree branches and flying debris and due to heavy rainfall for prolonged periods. Potential cascade effects of hurricanes include fire from lightning strikes or downed power lines, flooding from heavy precipitation, landslides from heavy precipitation, structural collapse due to wind, tornadoes spawned by severe storm cells, traffic accidents caused by severe weather conditions and utility failure due to winds, lightning or flooding.

The diameters of hurricanes vary from 50 to over 500 miles with wind velocities greatest near the eye and decreasing to relatively light winds at the outer periphery. Hurricanes move forward at a moderate speed, usually 25 to 30 miles per hour, as they approach the Long Island coast, although at times the forward speed may reach 60 miles per hour. In most cases the hurricanes have moderated considerably from their peak intensity before reaching Long Island; however, a number of exceptions have occurred in which hurricanes of devastating intensity have struck the area. The winds frequently weaken to velocities on the order of 60 miles per hour upon reaching the North Atlantic coast.

Hurricanes are classified in accordance with the Saffir-Simpson Scale which estimates the destructive forces associated with hurricanes as shown on the following table.

**TABLE 1**

***The Saffir/Simpson Hurricane Scale***

<b>Category 1</b>	Winds of 74 to 95 mph. Damage primarily to shrubbery, trees, foliage, and unanchored mobile homes. No real damage to other structures. Some damage to poorly constructed signs. And/or: storm surge 4 to 5 feet above normal. Low-lying coastal roads inundated, minor pier damage, some small craft in exposed anchorage torn from moorings.
<b>Category 2</b>	Winds of 96 to 110 mph. Considerable damage to shrubbery and tree foliage; some trees blown down. Major damage to exposed mobile homes. Extensive damage to poorly constructed signs. Some damage to roofing materials of buildings; some window and door damage. No major damage to buildings. And/or: storm surge 6 to 8 feet above normal. Coastal roads and low-lying escape routes inland cut by rising water 2 to 4 hours before arrival of hurricane center. Considerable damage to piers. Marinas flooded. Small craft in unprotected anchorages torn from moorings. Evacuation of some shoreline residences and low-lying island areas required.
<b>Category 3</b>	Winds of 111 to 130 mph. Foliage torn from trees; large trees blown down. Practically all poorly constructed signs blown down. Some damage to roofing materials of buildings; some window and door damage. Some structural damage to small buildings. Mobile homes destroyed. And/or: storm surge 9 to 12 feet above normal. Serious flooding at coast and many smaller structures near coast destroyed; larger structures near coast damaged by battering waves and floating debris. Low-lying escape routes inland cut by rising water 3 to 5 hours before hurricane center arrives. Flat terrain 5 feet or less above sea level flooded inland 8 miles or more. Evacuation of low-lying residences within several blocks of shoreline possibly required.
<b>Category 4</b>	Winds of 131 to 155 mph. Shrubs and trees blown down; all signs down. Extensive damage to roofing materials, windows and doors. Complete failure of roofs on many small residences. Complete destruction of mobile homes. And/or: storm surge 13 to 18 feet above normal. Flat terrain 10 feet or less above sea level flooded inland as far as 6 miles. Major damage to lower floors of structures near shore due to flooding and battering by waves and floating debris. Low-lying escape routes inland cut by rising water 3 to 5 hours before hurricane center arrives. Major erosion of beaches. Massive evacuation of all residences within 500 yards of shore possibly required, and of single-story residences on low ground within 2 miles of shore.
<b>Category 5</b>	Winds greater than 155 mph. Shrubs and trees blown down; considerable damage to roofs of buildings; all signs down. Very severe and extensive damage to windows and doors. Complete failure of roofs on many residences and industrial buildings. Extensive shattering of glass in windows and doors. Complete failure of roofs on many residences and industrial buildings. Extensive shattering of glass in windows and doors. Some complete building failures. Small buildings overturned or blown away. Complete destruction of mobile homes. And/or: storm surge greater than 18 feet above normal. Major damage of lower floors of all structures less than 15 feet above sea level within 500 yards of shore. Low-lying escape routes inland cut by rising water 3 to 5 hours before hurricane center arrives. Massive evacuation of residential areas on low ground within 5 to 10 miles of shore possibly required.

### **c. Past Hazard Events/Historical Damages**

According to NOAA, a hurricane has never occurred in Albany County. However, hurricanes that pass off the coast of New York in the north Atlantic do impact Albany County. Although the hurricane force winds may not be present, the prolonged periods of heavy rainfall from hurricanes that track off shore or associated with hurricane remnants have significant impacts on Albany County.

- September 17-18, 2004: Flash flooding occurred in the southern portion of the County due to the remnants of Hurricane Ivan. Over 5-1/2 inches of rainfall was recorded at Selkirk.
- September 1999: the remnants of Hurricane Floyd dumped 5 to 10-inches of rain in the region.
- July 14, 1996: the remnants of Hurricane Bertha poured several inches of rain over the area, causing flooding.
- June, 1972: The remnants of Hurricane Agnes caused flooding in the County.
- October 17, 1955: 7-inches of rain fell due to Hurricane Katie causing the Mohawk River to rise four feet over flood stage.

### **d. Probable Future Events**

According to NOAA (National Oceanic and Atmospheric Administration), an average of 10 tropical storms would form each year in the Atlantic Ocean, the Caribbean Sea or Gulf of Mexico. Six of these storms would, on average, become hurricanes. The United States would be hit with five hurricanes every three years, and two of which would be designated as major hurricanes.

Information pertaining to major hurricanes that make landfall is provided for ten year periods from 1931 through 2000 as released by NOAA.

The official hurricane season for the Atlantic Ocean region begins June 1<sup>st</sup> and ends in November. The peak season for hurricanes occurs in the months of August, September, and October, when they originate over warm water in the belt of equatorial calms in the Caribbean Sea area and in the vicinity of the Cape Verde Islands. The eastern coast of the United States, including New York, is within one of the major hurricane pathways in the Atlantic.

The National Weather Service has done a study of the frequency of storms in the Atlantic Area. Utilizing statistical data on the motion of tropical storms in the Atlantic Area, the National Weather Service calculated the expected numbers of tropical storms and hurricanes per 100-year period impacting various locations along the eastern coast. The data show that these occurrences are greater in portion of coastal New York State

compared to the part of the state that includes Albany County. The results of this study for the New York coastline are as follows:

Expected No. of Tropical Storms/100 Years	Expected No. of Hurricanes/100 Years	Probability of at Least One Tropical Storm Over a 10 Year Period	Probability of at Least One Hurricane Over a 10 Year Period
19	7	0.85	0.50

Due to the fact that no hurricane has reached Albany County, it is unlikely that a hurricane would occur in Albany County. However, the possibility of remnants of hurricanes or extratropical storms (downgraded or a weakened form of a hurricane) may impact the County.

**e. Vulnerability Assessment/Estimate of Potential Losses**

Since hurricanes are a weather related event, all areas of the County are vulnerable. Since much of the County is developed, the possibility of damage to public and private property is likely due to hurricanes. Residential and commercial property is particularly vulnerable, especially certain types of home construction such as trailer parks (there are four within the County, listed in Part I of this report). Wooded areas, wooded lots and street trees are vulnerable to wind damage, and utility lines are equally vulnerable. Agricultural land is also vulnerable to hurricane damage, which could completely destroy crops. The onset of a hurricane (or hurricane remnants) may be several days, but many may be caught in a circumstance where they would not be fully prepared.

The impact of a hurricane is the possibility of serious injury or death, but likely not in large numbers. Moderate damage to property and infrastructure could be expected from a hurricane. It may take up to one week for the County’s emergency staff to recover from the impacts of a hurricane.

**f. Land Use Analysis/Development Trends**

Due to the residential and commercial development of the waterfront portions of the County, the vulnerability of the area is high (see section on Flood). Much of the County is developed, and hurricanes in those areas would significantly impact people, property and services. Many of the residential areas, whether in the urban, suburban or rural areas, contain many mature trees that were either part of the former landscape or were planted as part of development. Much damage would be due to downed or wind blown trees that may damage structures and utility lines. Additionally, typical utility lines (for power, telephone and cable) are located on poles that could be significantly impacted due to damage from strong winds associated with hurricanes. The severity and extent of damages could be greatly reduced by providing warnings that severe storms are imminent.



**Hurricane Floyd, September 15, 1999**



**Hurricane Floyd, September 16, 1999**

## 15. **ICE JAM**

An ice jam is flooding that occurs due to a break up of frozen rivers whereby the broken ice floats downstream until it is blocked by an obstruction, creating an ice dam that blocks the channel and causes flooding upstream. According to the HIRA ranking, ice jams scored 169 in Albany County.

### **a. Location of Affected Area**

The potential impact area of ice jams would be in a small region, generally along the Hudson River, the Mohawk River and to a lesser extent Normans Kill.

### **b. Magnitude/Severity of Hazard**

Potential cascade effects of ice jams include dam failure due to ice blockage and flooding, either upstream due to ice blockage in channels or due to the result of ice breakup within the water courses. The ice jam hazard generally lasts two to three days.

According to a paper entitled Ice Jams on the Lower Mohawk River Formed During the 2000 Mid-Winter Flood, by Jason R. Lederer and John I. Garver of the Union College Geology Department in Schenectady, approximately 80% of the most severe flooding on the lower Mohawk River have been associated with ice jams.

### **c. Past Events/Historical Damages**

Ice jams are infrequent events in Albany County. According to Lederer and Garver, major “breakup” floods have occurred on the Mohawk River in 1832, 1865, 1870, 1886, 1891, 1893, 1913, 1914, 1936, 1964 and 1996. The following ice jams occurred in the area.

- Hudson River, February 29, 2000: An ice jam release on the Mohawk River caused flooding on Green Island.
- Schoharie River, 1996
- Schoharie River March 5, 1979
- Hudson River, January 11, 1978
- Mohawk River March 1964: An ice jam release on the Mohawk River resulted in the greatest hourly flow at the Cohoes gauging station. There was a 24-foot high wall of water that cascaded over the dam at Cohoes.
- Mohawk River March, 1936: Over four inches of rain fell onto snow and ice that had accumulated. The breakup of ice caused a jam in the river, and the resultant runoff was estimated to be equivalent of a 7.46-inch rainfall, according to the US Army Corps of engineers. Flooding occurred as a result of backwater condition at Cohoes. Tons of ice also jammed the Hudson River, and lower river ice jams caused flood waters to inundate Albany to a depth of two to three feet along the river front.
- Hudson River 1869

#### **d. Probable Future Events**

Due to historical data and climatic conditions, ice jams are likely to continue on the Mohawk and Hudson Rivers.

#### **e. Vulnerability Assessment/Estimate of Potential Losses**

The County is vulnerable to ice jams due to the fact that there is a severe bend and relatively shallow water in the Mohawk River at Cohoes. Ice forms more readily in shallower water. Ice from upstream areas also has a tendency to jam at a bend such as the one at Cohoes. Historically, ice jams cause flooding to the stockade section of Albany. Generally, ice breaks at the lock near Colonie (Lock no.7).

The onset of an ice jam would generally be one day. The impact of an ice jam is that the possibility of serious injury or death is unlikely. Ice jams would typically cause moderate damage to property or infrastructure. It may take one or two days for the County's emergency staff to recover from the impacts of an ice jam.

#### **f. Land Use Analysis/Development Trends**

The existing development along the jam prone areas of the Mohawk and Hudson Rivers includes a number of residential and commercial uses. Impacted areas due to ice jams would likely be located in the flood plains. Local Planning Boards should consider development restrictions in these areas.