Section III. Risk Assessment

Hazard Identification (2010):

In the previously approved plan, a great deal of effort went into a methodology of ranking hazards for the county's four regions with the assistance of SEMO representatives and HAZNY software (see HAZNY Workshop below). For this update, SEMO representatives were not available due to travel restrictions, so a full review and ranking of hazards was not done. The two new participants to the County Plan (Towns of Granger and Rushford) were provided the earlier rating of hazards in their regions and they confirmed the relevance from their experience. For the next plan update, we plan to conduct a HAZUS full review as per FEMA requirements at the time.

During discussions at the 2010 Regional Meetings, it was decided to include the hazard of Pandemic. The ranking (priority) for Dam Failure was increased in the Western Region. (See Table 10). In updating their risk assessments, participants were encouraged to revisit and refresh their earlier Hazard Analysis and Profiles to identify any new hazards of concern based on more recent hazard events and the Hazard Definitions (Appendix F) provided by SEMO. As in the previous Plan, Participants would again focus on high (321-400) and moderately high (241-320) hazards. (See Table 10)

HAZNY Hazard Analysis Workshop (2005)

HAZNY is an automated interactive spreadsheet that asks specific questions on 35 potential hazards that could affect the community and records and evaluates the responses to these questions. See Appendix F (HAZNY List) for a comprehensive list of hazards and their definitions. HAZNY also includes historical and expert data on selected hazards. HAZNY was designed specifically for groups, rather than individual use. The program contains "Ground Rules" that maintain the integrity of the program and provide a substantial foundation to compare results amongst different municipalities. There are five factors that were considered for each hazard: Scope, Frequency, Impact, Onset, and Duration. For a complete overview of these factors, see Appendix G. Allegany County previously assembled a group of local officials in five separate meetings to consider and discuss the questions and issues raised by the HAZNY program by region. Representatives from the New York State Emergency Management Office and the Allegany County Office of Emergency Services facilitated the meetings and recorded the results.

Allegany County is a diverse county having many unique features that are specific to certain areas of the county. It was determined early in the Hazard Analysis process, to split the County into regions based on these unique features. The county was split roughly into north, south, east and western quadrants.

Allegany County was divided into four regions for planning purposes (based on geography, topography, and similar experience with natural hazards).

North – Town of Grove, Town of Allen, Town of Birdsall, Town of Burns, Town of Granger, Town of West Almond, Village of Canaseraga.
South – Town of Amity, Town of Ward, Town of Scio, Town of Wellsville, Town of Alma, Town Genesee, Town of Bolivar, Town of Willing, Village of Belmont, Village of Bolivar, Village of Wellsville.
East – Town of Alfred, Town of Almond, Town of Andover, Town of Angelica, Town of Independence, Village of Andover, Village of Almond, Village of Angelica, Alfred University, Alfred State College, Village of Alfred.
West – Town of Centerville, Town of Hume, Town of Rushford, Town of Caneadea, Town of New Hudson, Town of Belfast, Town of Cuba, Town of Friendship, Town of Clarksville, Town of Rushford, Town of Wirt, Village of Cuba, Village of Richburg, Houghton College, Cuba Lake District, Rushford Lake District.

Also included in the County's Plan is the Western New York and Pennsylvania Railroad (WNYP) or Southern Tier Extension Railroad Authority (STERA) that will be addressed under the county portion. STERA is present in many towns and villages within the county.

The Regional Groups analyzed hazards potentially affecting their communities or Planning Region in Allegany County. HAZNY rated each hazard based on the Regional Group's assessment and assigned a numerical value.

These values were categorized as follows:
321 – 400 High Hazard
241 – 320 Moderately High Hazard
161 – 240 Moderately Low Hazard
44 – 160 Low Hazard

The Allegany County Office of Emergency Services and the State Emergency Management Office collaborated during the hazard identification stage.

John Tucker, Director of the County Office of Emergency Services, began each meeting with an overview of the Disaster Mitigation Act of 2000 and the FEMA requirements under the Stafford Act. Doug Winner, the Region V State Emergency Management Representative led the HAZNY portion of the meetings. Before the review of hazards the software was briefly explained and the ground rules and list of hazards reviewed, (these were sent to the participants in advance of the meeting to give them ample time to familiarize themselves with the process). It was explained early in the process that the concentration would be on natural hazards and would only include human-caused or technological hazards as time permitted or as suggested by participants. Each of the thirty-five hazards was reviewed and the group as a whole decided if the hazard required further evaluation. Discussion of past hazard events from recollection by many participants contributed to the success of the meetings. Also available to aid in the meetings was a listing of hazard events that had occurred in the county from the Office of Emergency Services files, Allegany County Historians Office, National Weather Service (NWS), and the National Oceanic Atmospheric Administration, dating from the late 1800s to present.

Each final HAZNY report includes a prioritized listing of all hazards identified in the process as well as historical events pertinent to the discussion.* The biggest hazard threats for the region were listed as well as any hazards identified as having "no warning" or were considered a "frequent" event. A chart of hazards versus ratings was included.

*Discussion data for the Northern region is limited, however the historical data collected gives an accurate picture of the events and hazards analyzed by this region.

Frequency

The HAZNY program defines frequency as simply a prediction of how often a hazard will occur in the future. It is not the frequency of the credible worst-case event but an occurrence that would require the activation of the jurisdiction's emergency response forces above and beyond the normal day-to-day operations.

History is a good indicator of future events and was considered before determining frequency. The frequency factor choices include a descriptive term and quantifying definition:

Descriptive Term	**Quantifier**
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

Table 11 and Figure 8 that follow give an overview of Federally Declared Disasters; however, it does not include non-federally declared storms that affected emergency response operations. These events will be addressed in further detail in this Section as well as Appendices H and I. Appendix J reflects the Hazard Events for Allegany County from the earliest records available through 2010.

Table 10. Identified Hazards by Region.

Northern Region Hazards	Rating
PANDEMIC	
ICE STORM	308
FLOOD	289
SEVERE STORM	287
WINTER STORM (SEVERE)	279
TORNADO	260
EPIDEMIC	254
TRANS ACCIDENT	231
OIL SPILL	230
HAZMAT (IN TRANSIT)	228
EXPLOSION	217
TERRORISM	212
FIRE	208
UTILITY FAILURE	192
HAZMAT (FIXED SITE)	186
WILDFIRE	180
WATER SUPPLY CONTAMINATION	160

Western Region Hazards	Rating
PANDEMIC	
SEVERE STORM	344
WATER SUPPLY CONTAMINATION	328
FLOOD	323
WINTER STORM (SEVERE)	310
TORNADO	293
LANDSLIDE	292
EARTHQUAKE	288
ICE STORM	278
WILDFIRE	273
HAZMAT (FIXED SITE)	262
DAM FAILURE	245
OIL SPILL	234
ICE JAM	204
HAZMAT (IN TRANSIT)	160

Southern Region Hazards	Rating
PANDEMIC	
FLOOD	323
TORNADO	287
ICE STORM	278
WINTER STORM (SEVERE)	268
SEVERE STORM	266
WATER SUPPLY CONTAMINATION	260
HAZMAT (FIXED SITE)	240
UTILITY FAILURE	231

Eastern Region Hazards	Rating
PANDEMIC	
SEVERE STORM	350
FLOOD	323
ICE STORM	314
UTILITY FAILURE	314
WINTER STORM (SEVERE)	310
TORNADO	308
WATER SUPPLY CONTAMINATION	266
LANDSLIDE	240
HAZMAT (FIXED SITE)	232

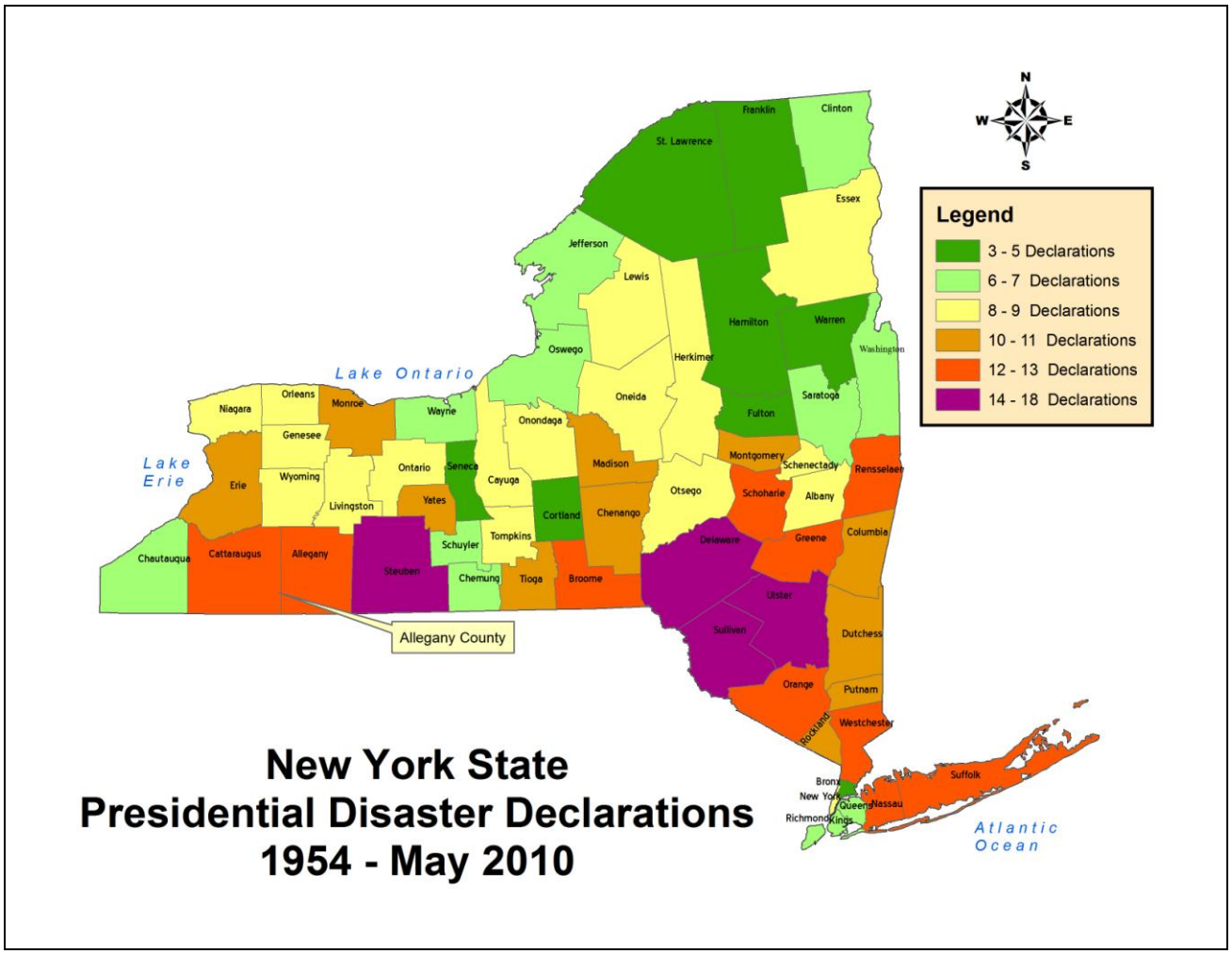
After the groups reviewed the final list of hazards, those identified and prioritized (Table 10), each individual region decided to concentrate their greatest efforts on the hazards identified as high and moderately high. Moderately low and low hazards posed very little risk for loss and very low probability of occurrence, so were not included in their risk assessments. The excluded hazards are as follows:

Northern Region – Trans Accident, Oil Spill, Hazmat (in transit), Explosion, Terrorism, Fire, Utility Failure, Hazmat (fixed site), Wildfire, Water Supply Contamination
Southern Region- Hazmat (fixed site), Utility Failure
Eastern Region- Landslide, Hazmat (fixed site)
Western Region- Oil Spill, Ice Jam, Hazmat (in transit)

Table 11: Allegany County Federally Declared Disasters & Emergency Declarations

Declaration Date	Type of Hazard	Damage Estimate	FEMA DR/EM#	Rainfall Totals
10/30/1967	Severe storms/flooding	Not available	233	No records
6/24/1972	Tropical Storm Agnes	Not available	338	13.7" (4 day duration)
10/02/1975	Storms, rains, landslides & flooding	Not available	487	No records
9/25/1984	Severe storms/flooding	$2,100,000.00	725	3-4.5"
3/21/1991	Severe winter storm	$750,000.00	898	No records
3/17/1993	Statewide Blizzard	$149,000.00	3107	No records
2/05/1996	Severe storms/flooding	$7,700,000.00	1095	No records
8/11/1998	Severe storms/flooding	$318,000.00	1233	No records
8/01/2000	Severe storms/flooding	$2,000,000.00	1335	4-5"
10/02/2001	Fires and explosions	Not available	1391	No records
7/21 – 8/13/2003	Severe storms/flooding & tornadoes	$5,000,000	1486	5.24"(4 day duration)
8/23/03	New York Power Outage	$2,500	3186	No records
5/13-17/2004	Severe storms/flooding	$1,461,490	1534	No records
8/29-9/16/2004	Flooding	$1,100,000	1564	n/a
9/17-9/24/2004	Flooding	n/a	1565	n/a
8/8-8/10/2009	Flood & Tornado	$1,270,000	1857	2-3" per hour
11/12-11/14/2009	Severe Storms and Flooding Associated with Tropical Depression Ida and a Nor'easter	n/a	1869	
3/13-3/15/2010	Severe Storms and Flooding	n/a	1899	

Figure 8: Presidential Disaster Declarations New York State 1954-May 2010



From 1954 to May 2010 Allegany County experienced 13 Disaster Declarations for flood events, the fifth highest in the state.

Northern Region Representation

Number of Hazards Identified:
North – 16
South – 8
East – 9
West - 14

The initial participants for the ***Northern*** region met on November 20, 2003. This region identified 16 hazards. Mike Johnsen, Supervisor and Jesse Griffith, Superintendent of Highways represented the Town of Grove came with previous historical data for their municipality, Don Timothy, Superintendent of Highways and George Hopkins, Supervisor represented the Town of Allen. Both George and Don have served in this capacity for approximately 10-12 years providing hazard events from the highway perspective as well as the administrative aspect. Donald Hoffman, Supervisor and Mike Sherman, Superintendent of Highways represented the Town of West Almond, Gary Gilbert, Supervisor represented the Town of Burns, Jerry Livingston, Jr., Supervisor and Bob Marble, Superintendent of Highways, represented the Town of Birdsall. Paul Mess, Working Supervisor represented the Village of Canaseraga. Guy James, Deputy Supt. II represented the County Department of Public Works. Doug Winner, Disaster Preparedness Program Representative from the NYS Emergency Management Office and John Tucker, Director of Emergency Services of Allegany County facilitated the meeting.

Southern Region Representation

The initial participants for the ***Southern*** region met on March 29, 2004 and identified eight hazards. Rick Gould, Supervisor and Ike Griswold, Superintendent of Highways represented the Town of Bolivar. Bill Hanson, Public Works Assistant Director represented the Village of Wellsville. Tim Bradford, Councilmen, Carla Roeske, Councilwoman, Don LaForge, Sr., Councilmen, Darwin Fanton, Supervisor, Margaret Billings, Town Clerk/Tax Collector, and Roger Billings, Superintendent of Highways, represented the Town of Willing. Charles Burdick, Superintendent of Highways represented the Town of Genesee. John Walsh, Councilman, represented the Town of Alma. Dwight Allen, Consultant represented the Town of Amity. Dave Roeske, Superintendent of Public Works and Guy James, Deputy Supt. II represented the County Department of Public Works. Fred Sinclair, District Manager, represented the County Soil and Water Conservation District. Bill Dibble and Edgar Sherman, District III County Legislators were present. Doug Winner, Disaster Preparedness Program Representative from the NYS Emergency Management Office, John Tucker, Director of Emergency Services of Allegany County and Colleen Cavagna, Environmental Planner for the OES, SWCD, and the CDPW facilitated the meeting.

Eastern Region Representation

The initial participants for the ***Eastern*** region met on April 22, 2004. They identified nine hazards that affected their region. Paul Drum, Superintendent of Highways/Public Works, and Kim Costello represented the Town and Village of Almond. Kevin Demick, Superintendent of Highways/Street Superintendent represented the Town and Village of Angelica. Mel Stebbins, Superintendent of Highways represented the Town of Independence. David Wallace, Superintendent of Highways represented the Town of Andover. Rob Phelps, Public Works Superintendent represented the Village of Andover. Dan Fleming, Supervisor represented the Town of Scio. Guy James, Deputy Supt. II

represented the County Department of Public Works. Doug Winner, Disaster Preparedness Program Representative from the NYS Emergency Management Office, John Tucker, Director of Emergency Services of Allegany County and Colleen Cavagna, Environmental Planner for the OES, SWCD, and the CDPW facilitated the meeting.

Western Region Representation

The initial participants for the ***Western*** region met on May 12, 2004. The Western region identified 14 hazards from their HAZNY meeting. Joe Thompson, Deputy Supervisor, Barb Deming, Supervisor, Jerry Scott, Councilmen, and Tom Homuth, Superintendent of Highways represented the Town of Cuba. Dave Stenzel, Operator and Dave Edwards, Special District Superintendent, represented the Town of Caneadea. Richard Shelley, Supervisor and David Sortore, Superintendent of Highways represented the Town of Friendship. Jim Pomeroy and Richard Boas represented the Rushford Lake District as well as the Town of Rushford. Ron Paulsen, Superintendent of Highways represented the Town of Hume. George Ellis, Supervisor represented the Town of Centerville. Dorsey Lawson, Director of Facilities and Steve Peck, Director of Administrative Services represented Houghton College. Loren Luzier, Superintendent of Highways represented the Town of New Hudson. Rod Sisson, Superintendent of Highways represented the Town of Clarksville. Bill Nichols, Superintendent of Highways represented the Town of Belfast. Randy White, Public Works Foreman represented the Village of Richburg. Charles Bliss, Senior Building Construction Engineer represented the State of New York Department of State. Fred Sinclair, District Manager, represented the County Soil and Water Conservation District. Guy James, Deputy Supt. II represented the County Department of Public Works. Doug Winner, Disaster Preparedness Program Representative from the NYS Emergency Management Office, John Tucker, Director of Emergency Services of Allegany County and Colleen Cavagna, Environmental Planner for the OES, SWCD, and the CDPW facilitated the meeting.

Tom Barnes represented the Southern Tier Extension Railroad Authority and developed an outline of their hazards and events (updated in 2010 by Lucas Brewer, Real Property Manager, Western New York and Pennsylvania Railroad (WNYP), Appendix O). The Southern Tier Extension Railroad Authority identified flooding as their greatest hazard.

Description of Allegany County's Natural Environment

WNYP way freight east of Wellsville, NY, August 6, 2004

(http://www.lalrr.com/wnypeofwells8-6-04.jpg)

Allegany County is in the section of New York State known as the Southwestern Plateau. Glacial ice covered the entire county, even the highest hilltops, but the greatest ice flow was in the valleys. It smoothed and rounded the hills and cut the valleys deep and wide. The southern part of the county is rugged and largely forested; the northern part is more open and dominantly rolling and hilly.

The approximate area is 1,049.7 square miles or 671,840 acres. The elevation ranges from 2,548 feet above sea level at Alma Hill to 1,137 feet above sea level where the Genesee River leaves the county on the north. Allegany County boasts the highest elevation point (2080 feet) along Route 86 (mile marker 117.2/117.3). The hilltops in the southern part of the county are 2,000 to 2,400 feet above sea level; those in the northern part are 200 to 400 feet lower.

Allegany County has a continental climate characterized by fairly high day temperatures and cool nights during the comparatively short summers (range averages 50s to 80s degrees F.). The winter is long and severe; usually lasting from the middle of November until March. This section of New York lies in what may be called the eastern cloudy belt. The county has an average annual snowfall of 70 inches with the annual precipitation ranging from 33 inches in the northern part of the county to 40 inches in the southern part.

The entire county is underlain by nearly horizontal beds of shales and sandstone rocks, which are buried under glacial drift that is very deep in the valleys but is less than a foot to 10 or 15 feet deep on the hills and valley sides. On the steeper slopes and higher ridges of the southern part of the county, the till mantle is very thin. Along the lower slopes where the ice sheet was deeper and the ice front stood for a longer time, deeper deposits of till were left. It is evident that the till left in the valleys and on the lower uplands of the northern part of the county was transported much greater distances than that of the southern part. Not only is it deeper, but it contains more of the rocks that crop out far to the north. When the ice receded, a lake was formed in the present Genesee Valley where layers of clays, silts, and sands were deposited. The clayey Caneadea soils have developed from these temporary lakes. The bedrock includes mainly Chemung sandstone and shale of the Devonian period and relatively small outcrops of Cattaraugus shales of the Carboniferous period. These geologic events had much to do with the formation and deposition of soil-forming material and had a direct influence on the nature and properties of the present soils.

Allegany County contains four watersheds with the predominant watershed being the Upper Genesee. The Genesee River flows from the southeastern corner of Allegany County running diagonal to the northwestern corner creating the Upper Genesee watershed (04130002). The Upper Genesee watershed is the largest within Allegany County with three smaller watersheds; the Tioga (02050104), Cattaraugus (04120102), and Upper Allegheny (05010001). Three watersheds occur within New York and Pennsylvania with the exception of the Cattaraugus watershed that only occurs within New York State.

While the Genesee River is the largest river within Allegany County, the Canisteo River also has an impact on the Town and Village of Almond. The tributaries that flow into the major river systems create a large portion of the county's flood damage. Typically the tributaries of the Genesee River swell and fall quickly, while the Genesee rises and falls at a slower rate and requires more time to recede. Listed below are the main tributaries that during flood events have the potential to significantly impact the jurisdictions:

Deer Creek, Bells Brook, Windfall Creek, Wolf Creek, Dodge Creek, Little Genesee Creek, California Hollow Brook, Little Genesee Creek, Honeoye Creek, Hunt Creek, Ford Brook, South Branch-Ford Brook, Marsh Creek, Redwater Creek, Chenunda Creek, Cryder Creek, South Branch Van Campen Creek, Gordon Brook, Knight Creek, Brimmer Brook, Vandermark Creek, Dyke Creek, Trapping Brook, East Valley Creek, Indian Creek, Griffin Creek, West Branch Creek, Oil Creek, North Branch, White Creek, South Branch Van Campen Creek, Plum Bottom Creek, Feathers Creek, Phillips Creek, Canacadea Creek, Black Creek, Crawford Creek, Wigwam Creek, Angelica Creek, Baker Creek, Black Creek 2, Canisteo River, Karr Valley Creek, McHenry Valley Creek, Caneadea Creek, Rush Creek 1, Rush Creek 2, Canaseraga Creek, Keshequa Creek, Cold Creek, and Sixtown Creek.

For an accurate picture, the hydrology of the area must also take into account the steep terrain; water flows swiftly through this terrain causing an increased erosion potential.

Figure 9. Allegany County Natural Environment Areas with a Steep Slope (%).

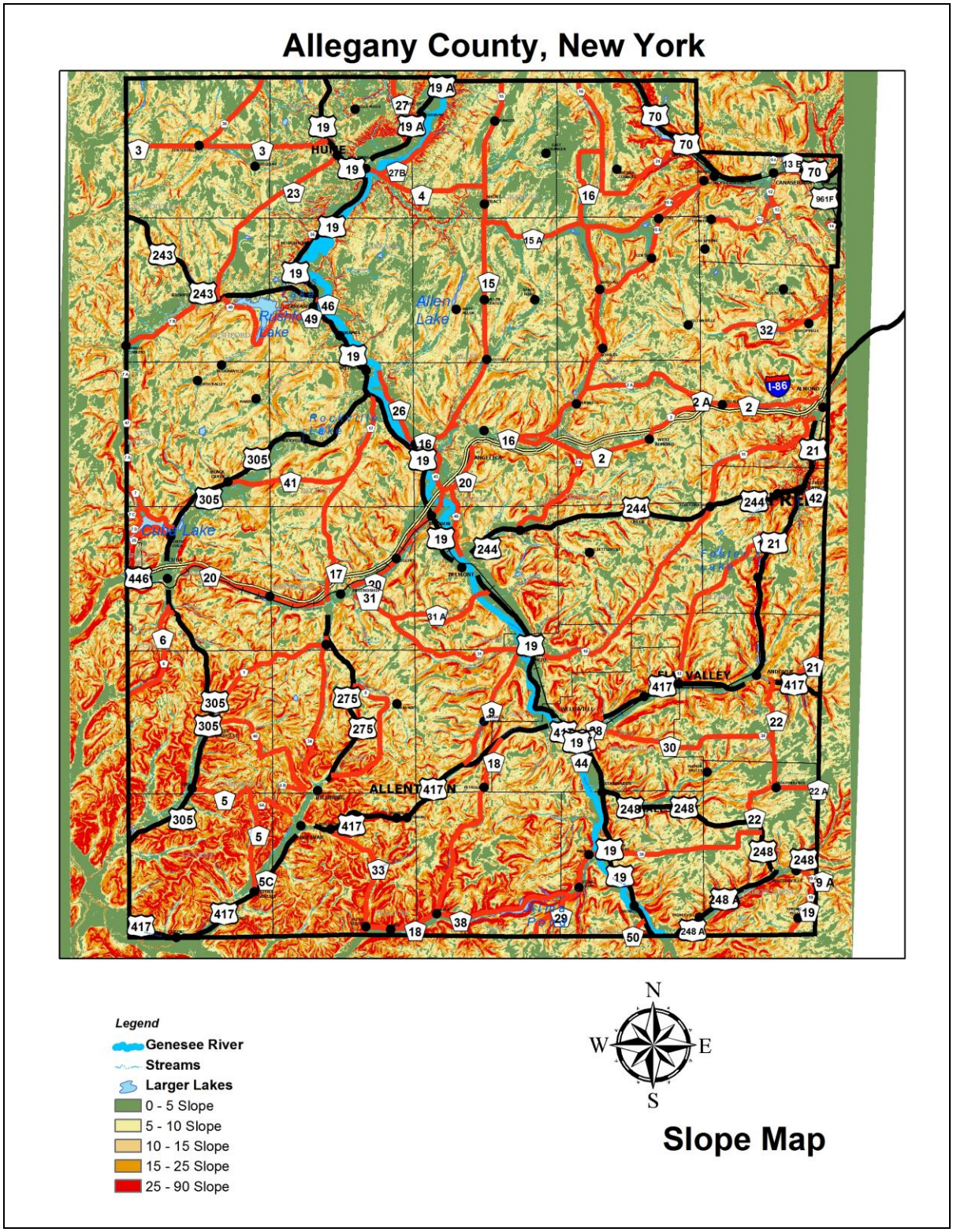
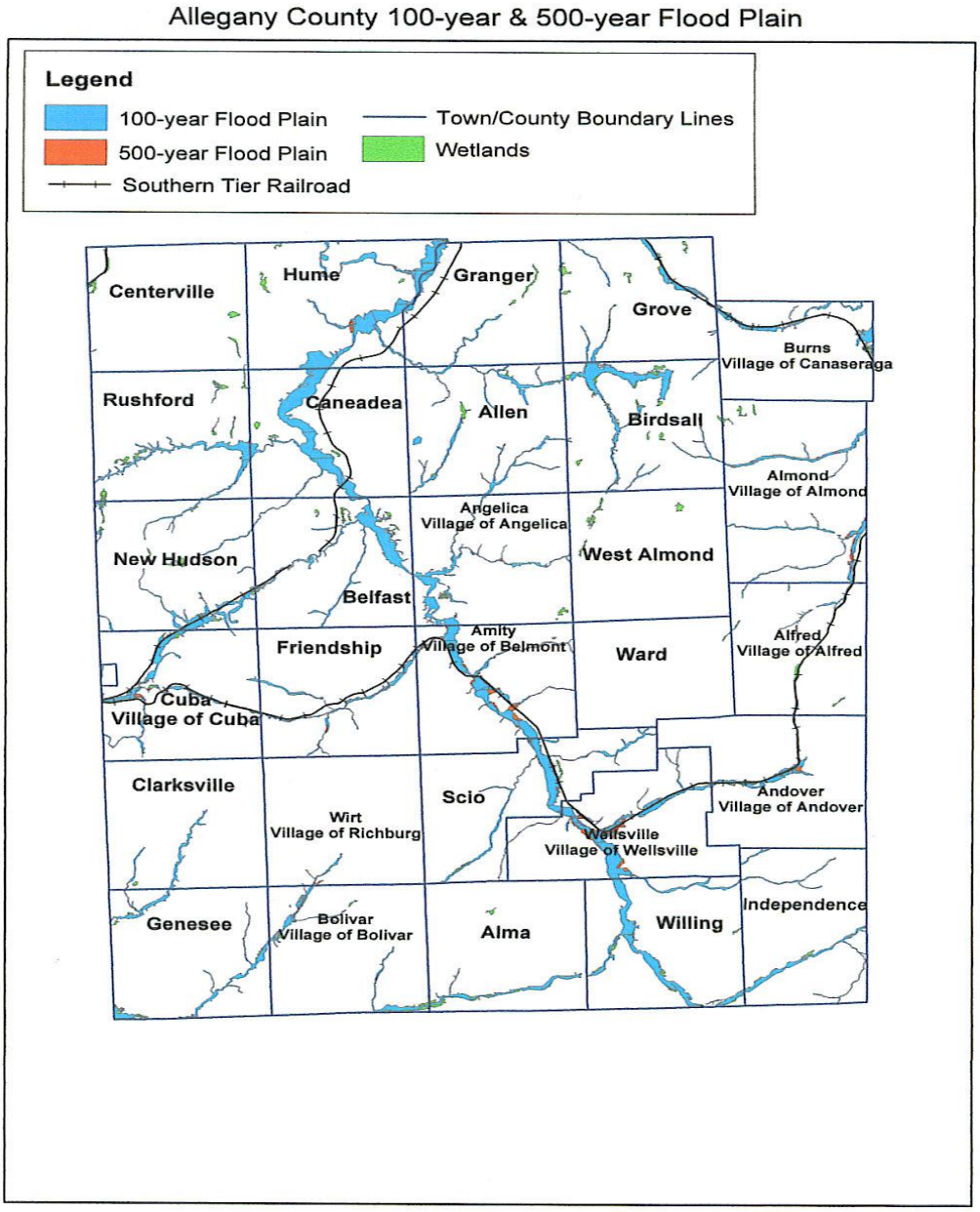


Figure 10: Allegany County Hydrologic Unit Map with Rivers and Streams.

To understand better Allegany County's flood potential, each jurisdiction used their floodplain maps as a basis for potential flooding. However, it must be noted that flooding does not occur only in the identified floodplain areas, but flooding is also prevalent due to the steep slopes throughout the county and the inadequate storm sewer systems in areas not noted as being within the floodplain. Further, the Flood Insurance Rate Map's (FIRM) for Allegany County are old and most have been compiled from old flat maps that have never been verified. These maps need to be updated for more accurate floodplain zones throughout Allegany County; however, Allegany County is not scheduled for Flood Map Modernization or Risk Map at this time. Some townships, such as the Towns of Ward and West Almond, do not have FIRMs and have only a Flood Hazard Boundary Map (FHBM) for their jurisdiction.

Figure 11: Allegany County Floodplain by Jurisdiction



Allegany County's total population from the 2000 Census count was 49,927; the rural population comprised 79% of the total and the urban population 21%. The average household size was 2.53. The 2009 Estimated Census Population is 49,157; the rural population is estimated to comprise 76% of the total and the urban population 24%. The 2006-2008 average estimated household size is 2.46. (American Community Survey 2006-2008)

Table 12: Allegany County Population from 1960-2010.

Allegany County Population	Total
1960 Census Population	43,978
1970 Census Population	46,458
1980 Census Population	51,742
1990 Census Population	50,470
2000 Census Population	49,927
2003 Estimated Census Population	50,220
2005 Estimated Census Population	49,824
2007 Estimated Census Population	49,183
2009 Estimated Census Population	49,157
2010 Census Population	TBD

The population of Allegany County increased 18% from 1960 to1980; however from 1980-2000 the population decreased approximately 3.6%. The 2010 Census is currently being determined. Using the Census estimated population trend through 2009, it suggests that Allegany County may continue a population decline at a rate of 1.5% since the 2000 census count.

Development Trends

Each jurisdiction described the development of their vacant or unused land from the following selections: very rapidly (or much faster than planned), rapidly (or somewhat faster than planned), little or no development, or developed land is being abandoned. Ninety percent felt that they had little or no development occurring in their vacant or unused land, while 10% felt development was occurring rapidly. Three jurisdictions or 7% considered themselves completely developed.

When asked about expansion, redevelopment or reconstruction of existing properties in their areas they were asked to select from the following answers: numerous properties in many locations, some properties in a few locations, very few or no properties, structures being removed/abandoned in a few locations, or structures being removed/abandoned in several locations. Forty-five percent described the expansion or redevelopment occurring in their jurisdictions as very few or no properties, another fifty-two percent felt they had some properties in a few locations being redeveloped. Only 2% had structures that were being removed/abandoned in a few locations.

The Northern region has large amounts of land available for development planning on average 71% still open for development; however the Village of Canaseraga has a percentage of 4 open for development. Based on 2009 population estimates, thus far, in the Northern region populations have declined marginally for the majority of the participants.

The Southern region has a broader range of development opportunities. The average available percentage of land is 50%; however, the Villages of Belmont and Wellsville have a percentage of zero and <5 percentage, respectively, and the Town of Scio a 10 percentage that is open for development while the Town of Ward has 90% of its land still open for development. Based on 2009 population estimates, thus far, in the Southern region populations have declined slightly for the majority of the participants.

It would appear for the most part that the Eastern region follows suit, having less available lands for development in its Villages (Village of Almond, 0%, and the Village of Alfred, 2%) and more in the townships (Alfred and Almond, 75%, Andover, 60%, and Angelica, 70%). The average available land for development is 39% of the jurisdiction. Based on 2009 population estimates, thus far, in the Eastern region populations have declined slightly for the majority of the participants with the exception of Alfred that has seen some increase.

The Western region has an average 51.5% of its area open for development; however, the Villages of Cuba and Richburg have a percentage of 0 and 10, respectively. Based on 2009 population estimates, thus far, in the Western region populations have declined slightly for the majority of the participants.