Appendix F

HAZUS Data Reports

Hazus: Flood Global Risk Report

Region Name: Chautauqua_HMP

Flood Scenario: 5mi_1

Print Date: Tuesday, November 29, 2022

Disclaimer:
This version of Hazus utilizes 2010 Census Data.
Totals only reflect data for those census tracts/blocks included in the user's study region.

The estimates of social and economic impacts contained in this report were produced using Hazus loss estimation methodology software which is based on current scientific and engineering knowledge. There are uncertainties inherent in any loss estimation technique. Therefore, there may be significant differences between the modeled results contained in this report and the actual social and economic losses following a specific Flood. These results can be improved by using enhanced inventory data and flood hazard information.

FEMA

RiskMAP
Increasing Resilience Together

Table of Contents

Section	Page #
General Description of the Region	3
Building Inventory	
General Building Stock	4
Essential Facility Inventory	5
Flood Scenario Parameters	6
Building Damage	
General Building Stock	7
Essential Facilities Damage	9
Induced Flood Damage	10
Debris Generation	
Social Impact	10
Shelter Requirements	
Economic Loss	12
Building-Related Losses	
Appendix A: County Listing for the Region	15
Appendix B: Regional Population and Building Value Data	16

General Description of the Region

Hazus is a regional multi-hazard loss estimation model that was developed by the Federal Emergency Management Agency (FEMA) and the National Institute of Building Sciences (NIBS). The primary purpose of Hazus is to provide a methodology and software application to develop multi-hazard losses at a regional scale. These loss estimates would be used primarily by local, state and regional officials to plan and stimulate efforts to reduce risks from multi-hazards and to prepare for emergency response and recovery.

The flood loss estimates provided in this report were based on a region that included 1 county(ies) from the following state(s):

- New York

Note:
Appendix A contains a complete listing of the counties contained in the region.

The geographical size of the region is approximately 1,085 square miles and contains 6,374 census blocks. The region contains over 54 thousand households and has a total population of 134,905 people (2010 Census Bureau data). The distribution of population by State and County for the study region is provided in Appendix B.

There are an estimated 61,846 buildings in the region with a total building replacement value (excluding contents) of 17,205 million dollars. Approximately 90.73% of the buildings (and 71.75% of the building value) are associated with residential housing.

Building Inventory

General Building Stock

Hazus estimates that there are 61,846 buildings in the region which have an aggregate total replacement value of 17,205 million dollars. Table 1 and Table 2 present the relative distribution of the value with respect to the general occupancies by Study Region and Scenario respectively. Appendix B provides a general distribution of the building value by State and County.

Table 1
Building Exposure by Occupancy Type for the Study Region

Occupancy	Exposure ($1000)	Percent of Total
Residential	12,344,285	71.7%
Commercial	2,700,170	15.7%
Industrial	1,194,649	6.9%
Agricultural	121,748	0.7%
Religion	392,752	2.3%
Government	212,125	1.2%
Education	239,294	1.4%
Total	**17,205,023**	**100%**

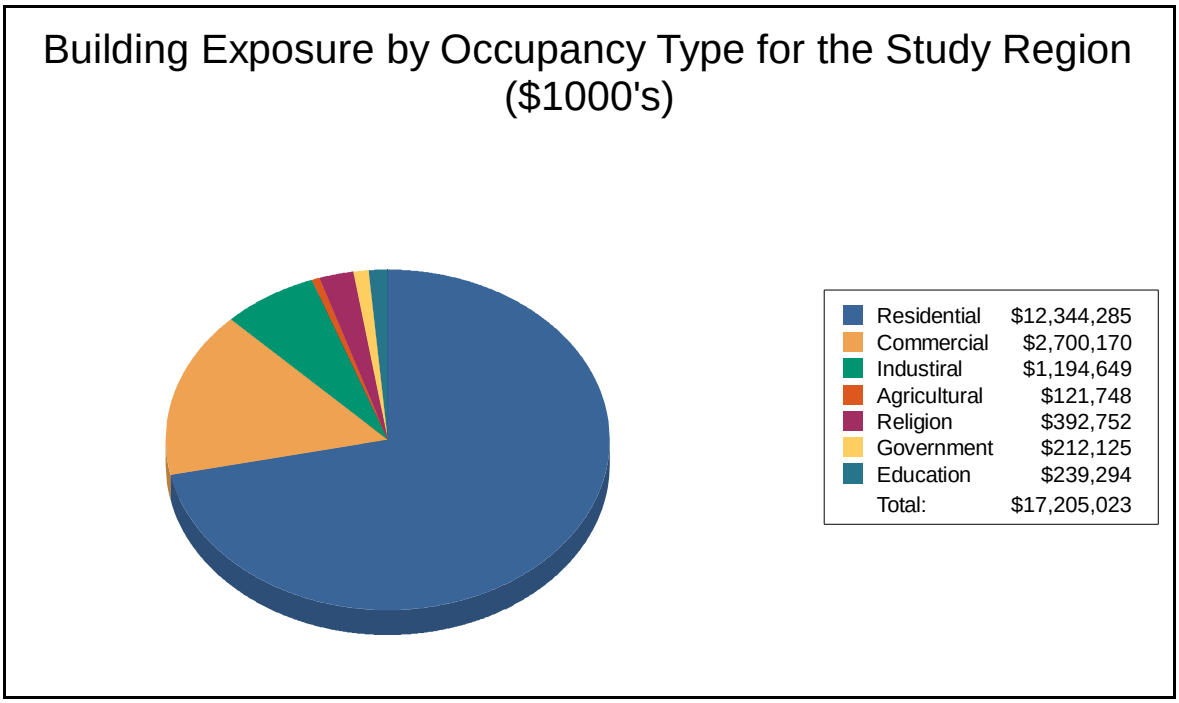
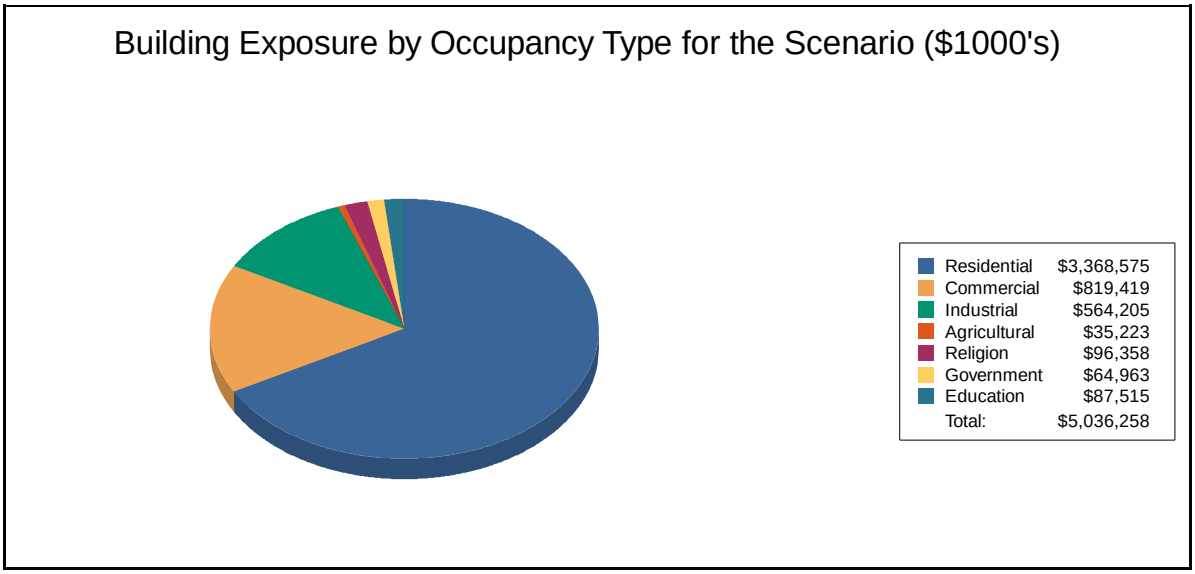


Table 2
Building Exposure by Occupancy Type for the Scenario

Occupancy	Exposure ($1000)	Percent of Total
Residential	3,368,575	66.9%
Commercial	819,419	16.3%
Industrial	564,205	11.2%
Agricultural	35,223	0.7%
Religion	96,358	1.9%
Government	64,963	1.3%
Education	87,515	1.7%
Total	**5,036,258**	**100%**



Essential Facility Inventory

For essential facilities, there are 7 hospitals in the region with a total bed capacity of 399 beds. There are 72 schools, 53 fire stations, 15 police stations and 1 emergency operation center.

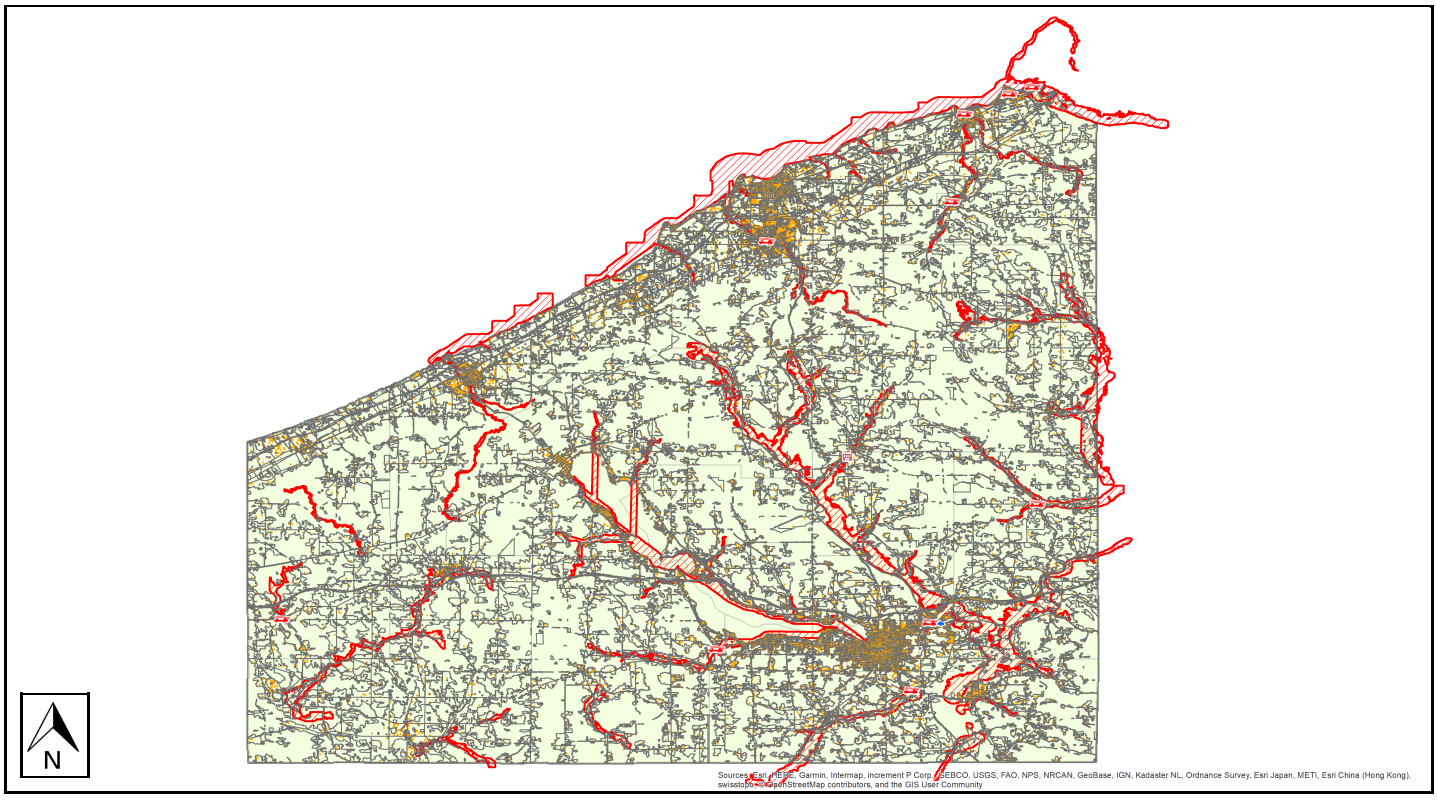
Flood Scenario Parameters

Hazus used the following set of information to define the flood parameters for the flood loss estimate provided in this report.

Study Region Name:	Chautauqua_HMP
Scenario Name:	5mi_1
Return Period Analyzed:	100
Analysis Options Analyzed:	No What-Ifs

Study Region Overview Map

Illustrating scenario flood extent, as well as exposed essential facilities and total exposure



Building Damage

General Building Stock Damage

Hazus estimates that about 720 buildings will be at least moderately damaged. This is over 83% of the total number of buildings in the scenario. There are an estimated 0 buildings that will be completely destroyed. The definition of the 'damage states' is provided in the Hazus Flood Technical Manual. Table 3 below summarizes the expected damage by general occupancy for the buildings in the region. Table 4 summarizes the expected damage by general building type.

Total Economic Loss (1 dot = $300K) Overview Map

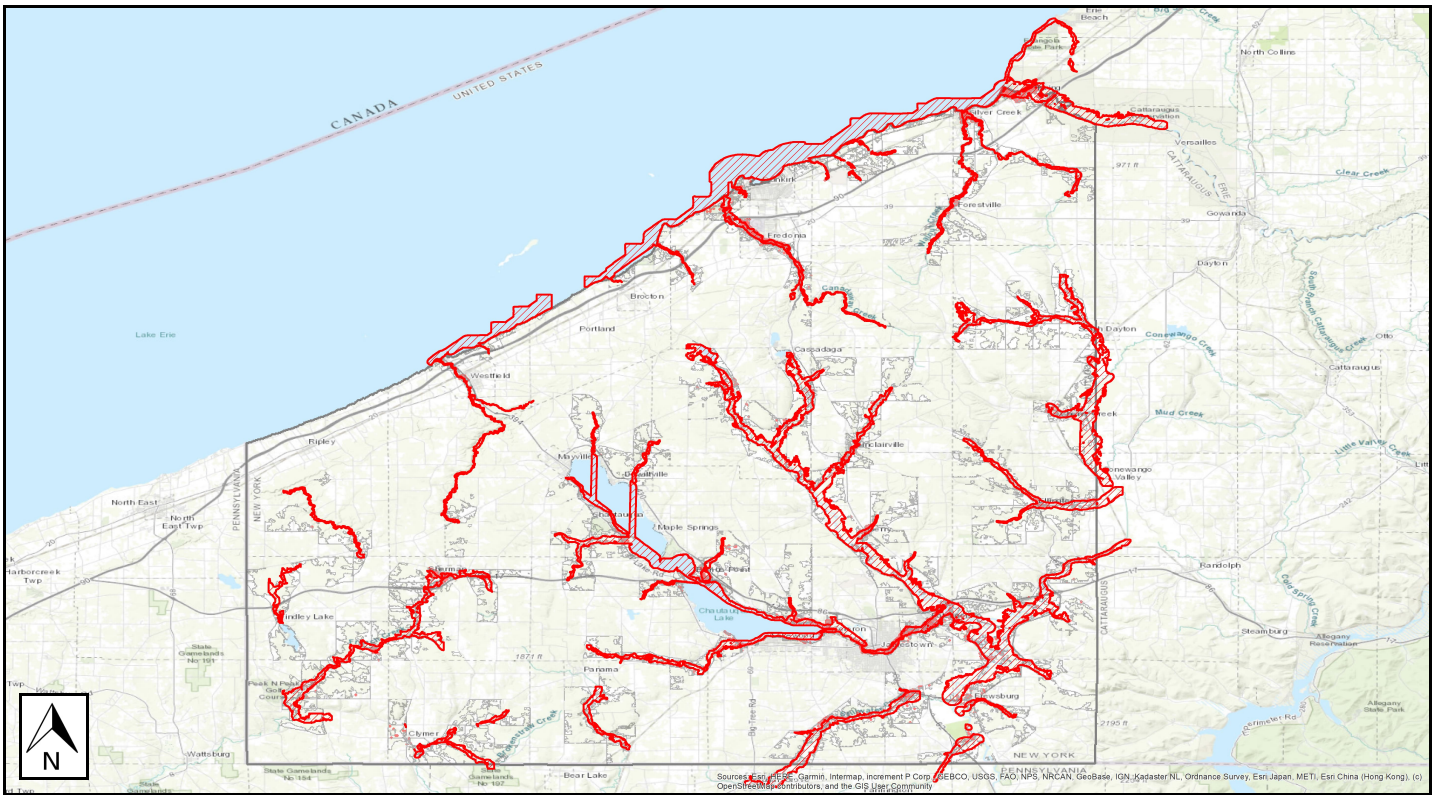


Table 3: Expected Building Damage by Occupancy

	1-10		11-20		21-30		31-40		41-50		>50	
Occupancy	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**
Agriculture	0	0	0	0	0	0	0	0	0	0	0	0
Commercial	3	43	4	57	0	0	0	0	0	0	0	0
Education	0	0	0	0	0	0	0	0	0	0	0	0
Government	3	100	0	0	0	0	0	0	0	0	0	0
Industrial	13	59	9	41	0	0	0	0	0	0	0	0
Religion	0	0	0	0	0	0	0	0	0	0	0	0
Residential	1,049	60	658	37	43	2	5	0	1	0	0	0
Total	**1,068**		**671**		**43**		**5**		**1**		**0**	

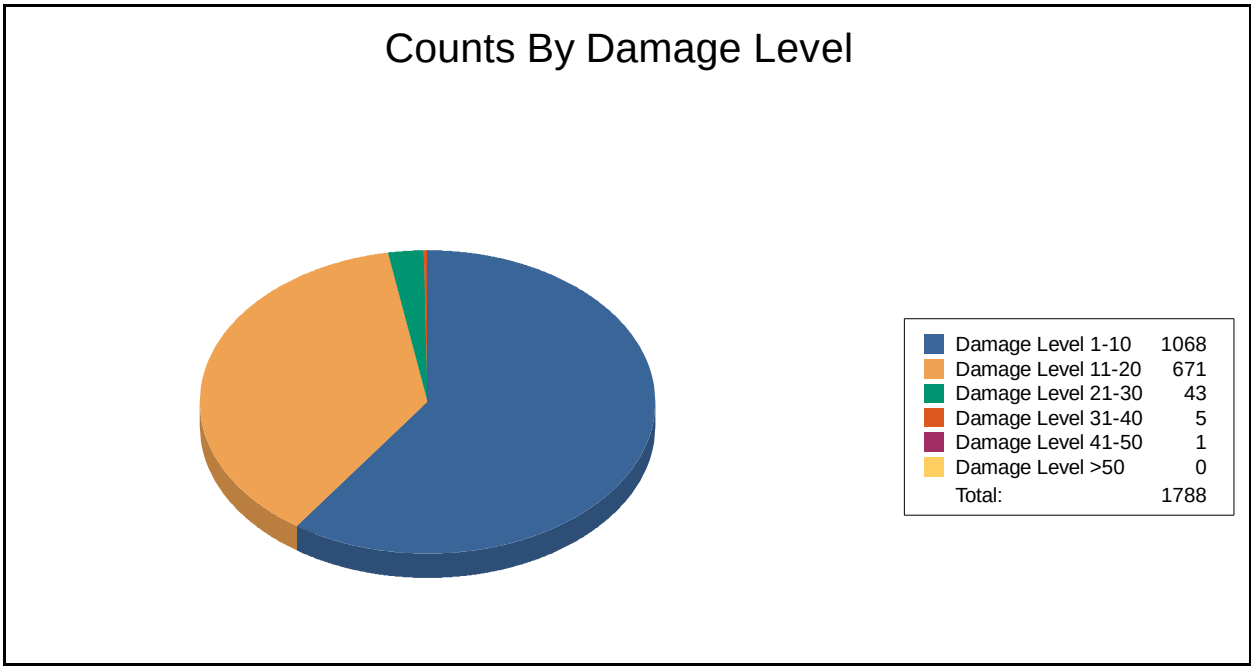


Table 4: Expected Building Damage by Building Type

Building Type	1-10		11-20		21-30		31-40		41-50		>50	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Concrete	5	83	1	17	0	0	0	0	0	0	0	0
ManufHousing	0	0	2	100	0	0	0	0	0	0	0	0
Masonry	121	64	69	36	0	0	0	0	0	0	0	0
Steel	12	60	8	40	0	0	0	0	0	0	0	0
Wood	923	59	588	38	43	3	5	0	1	0	0	0

Essential Facility Damage

Before the flood analyzed in this scenario, the region had 399 hospital beds available for use. On the day of the scenario flood event, the model estimates that 399 hospital beds are available in the region.

Table 5: Expected Damage to Essential Facilities

		# Facilities		
Classification	Total	At Least Moderate	At Least Substantial	Loss of Use
Emergency Operation Centers	1	0	0	0
Fire Stations	53	10	0	10
Hospitals	7	0	0	0
Police Stations	15	2	0	2
Schools	72	1	0	1

If this report displays all zeros or is blank, two possibilities can explain this.

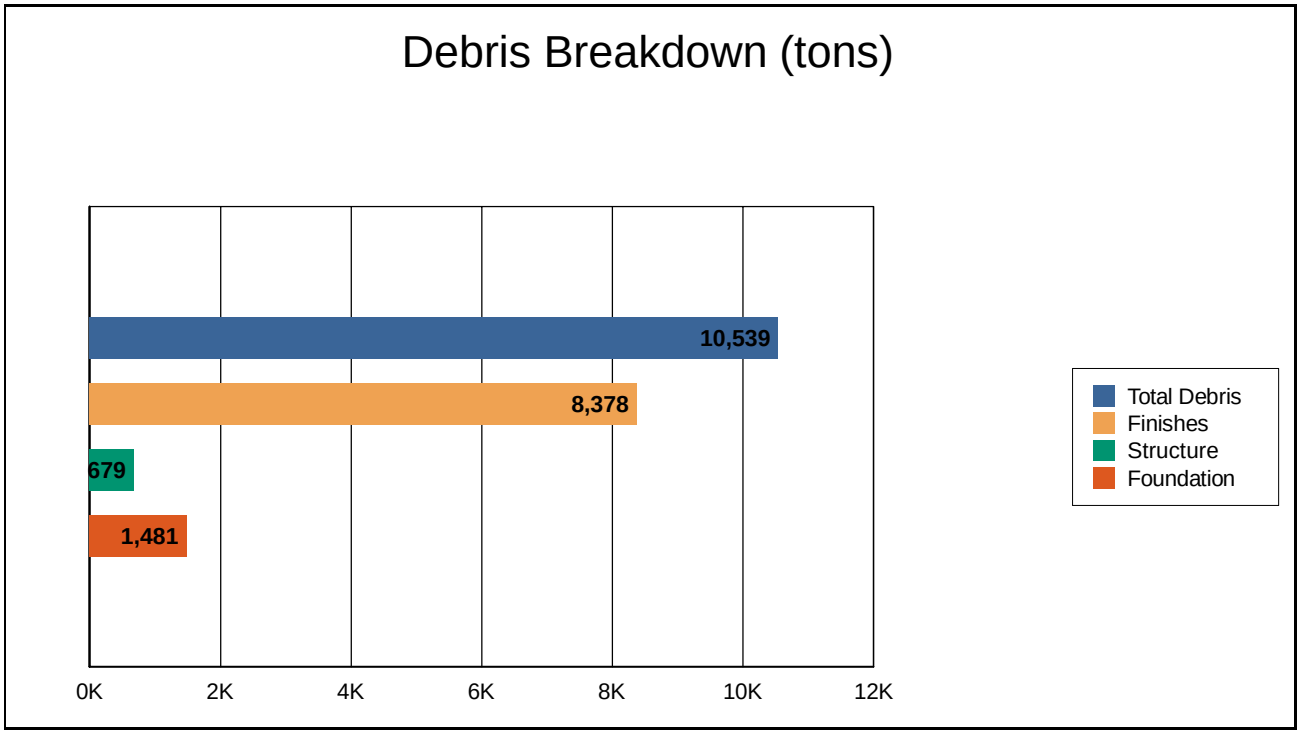
(1) None of your facilities were flooded. This can be checked by mapping the inventory data on the depth grid.

(2) The analysis was not run. This can be tested by checking the run box on the Analysis Menu and seeing if a message box asks you to replace the existing results.

Induced Flood Damage

Debris Generation

Hazus estimates the amount of debris that will be generated by the flood. The model breaks debris into three general categories: 1) Finishes (dry wall, insulation, etc.), 2) Structural (wood, brick, etc.) and 3) Foundations (concrete slab, concrete block, rebar, etc.). This distinction is made because of the different types of material handling equipment required to handle the debris.

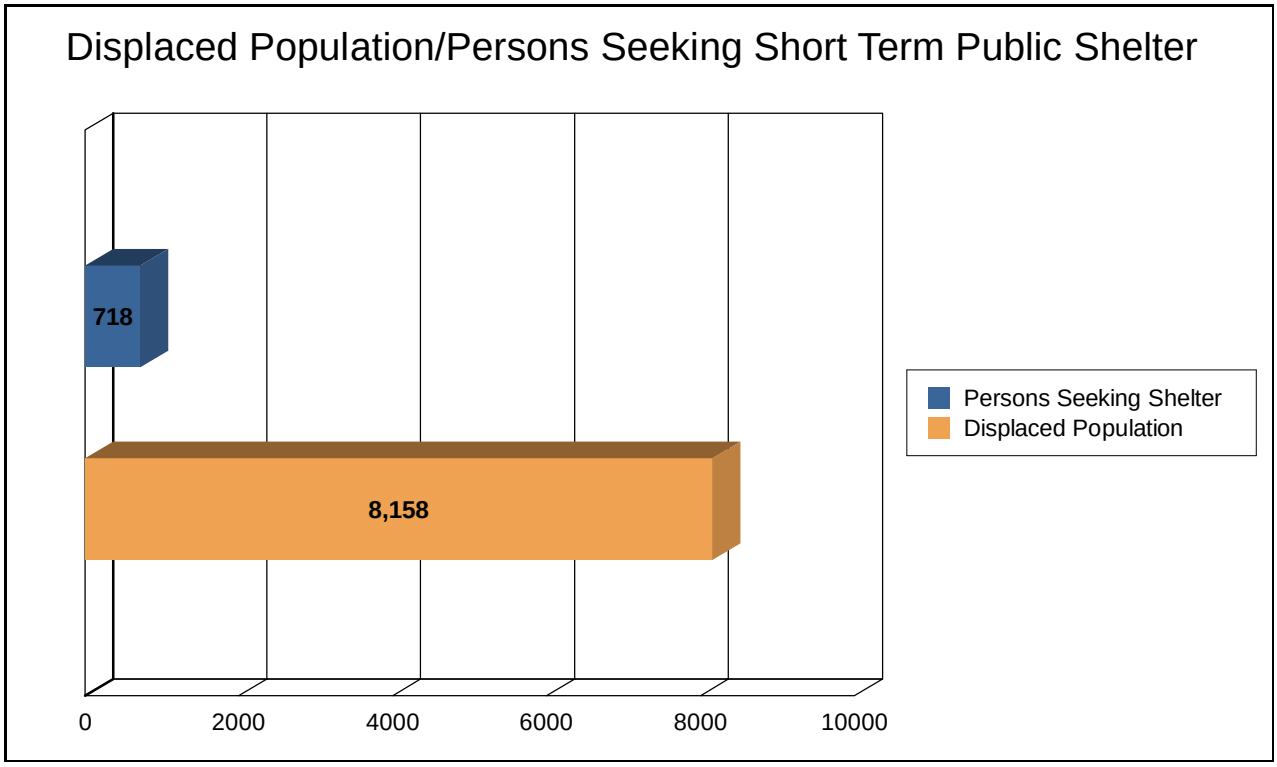


The model estimates that a total of 10,539 tons of debris will be generated. Of the total amount, Finishes comprises 80% of the total, Structure comprises 6% of the total, and Foundation comprises 14%. If the debris tonnage is converted into an estimated number of truckloads, it will require 422 truckloads (@25 tons/truck) to remove the debris generated by the flood.

Social Impact

Shelter Requirements

Hazus estimates the number of households that are expected to be displaced from their homes due to the flood and the associated potential evacuation. Hazus also estimates those displaced people that will require accommodations in temporary public shelters. The model estimates 2,719 households (or 8,158 of people) will be displaced due to the flood. Displacement includes households evacuated from within or very near to the inundated area. Of these, 718 people (out of a total population of 134,905) will seek temporary shelter in public shelters.



Economic Loss

The total economic loss estimated for the flood is 851.29 million dollars, which represents 16.90 % of the total replacement value of the scenario buildings.

Building-Related Losses

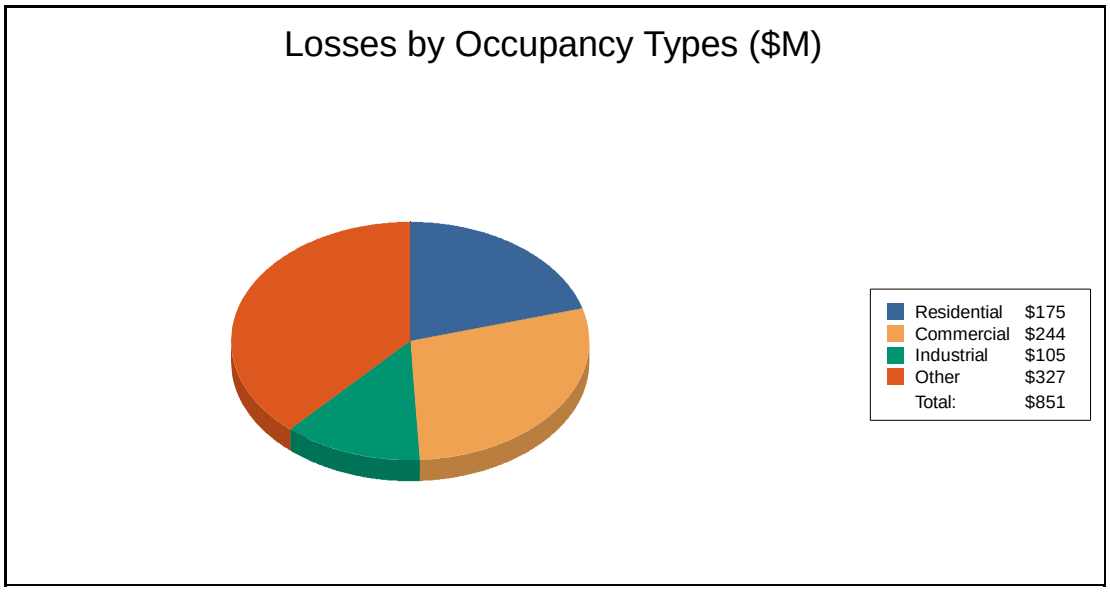
The building losses are broken into two categories: direct building losses and business interruption losses. The direct building losses are the estimated costs to repair or replace the damage caused to the building and its contents. The business interruption losses are the losses associated with inability to operate a business because of the damage sustained during the flood. Business interruption losses also include the temporary living expenses for those people displaced from their homes because of the flood.

The total building-related losses were 298.72 million dollars. 65% of the estimated losses were related to the business interruption of the region. The residential occupancies made up 20.54% of the total loss. Table 6 below provides a summary of the losses associated with the building damage.

Table 6: Building-Related Economic Loss Estimates

(Millions of dollars)

Category	Area	Residential	Commercial	Industrial	Others	Total
Building Loss						
	Building	66.51	15.84	23.54	3.84	109.71
	Content	42.54	53.72	59.77	20.26	176.29
	Inventory	0.00	1.23	11.38	0.11	12.72
	Subtotal	**109.05**	**70.79**	**94.68**	**24.20**	**298.72**
Business Interruption						
	Income	0.86	64.83	2.50	9.57	77.76
	Relocation	44.04	20.62	3.36	7.88	75.89
	Rental Income	18.88	14.88	0.86	0.76	35.38
	Wage	2.05	72.46	3.99	285.03	363.53
	Subtotal	**65.83**	**172.79**	**10.71**	**303.24**	**552.57**
ALL	**Total**	**174.87**	**243.58**	**105.39**	**327.44**	**851.29**



Appendix A: County Listing for the Region

New York

- Chautauqua

Appendix B: Regional Population and Building Value Data

	Population	Building Value (thousands of dollars)		
		Residential	Non-Residential	Total
New York				
Chautauqua	134,905	12,344,285	4,860,738	17,205,023
Total	**134,905**	**12,344,285**	**4,860,738**	**17,205,023**
Total Study Region	**134,905**	**12,344,285**	**4,860,738**	**17,205,023**

Hazus: Flood Global Risk Report

Region Name: Chautauqua_HMP

Flood Scenario: 5mi_1

Print Date: Tuesday, November 29, 2022

Disclaimer:
This version of Hazus utilizes 2010 Census Data.
Totals only reflect data for those census tracts/blocks included in the user's study region.

The estimates of social and economic impacts contained in this report were produced using Hazus loss estimation methodology software which is based on current scientific and engineering knowledge. There are uncertainties inherent in any loss estimation technique. Therefore, there may be significant differences between the modeled results contained in this report and the actual social and economic losses following a specific Flood. These results can be improved by using enhanced inventory data and flood hazard information.

FEMA

RiskMAP
Increasing Resilience Together

Table of Contents

Section	Page #
General Description of the Region	3
Building Inventory	
General Building Stock	4
Essential Facility Inventory	5
Flood Scenario Parameters	6
Building Damage	
General Building Stock	7
Essential Facilities Damage	9
Induced Flood Damage	10
Debris Generation	
Social Impact	10
Shelter Requirements	
Economic Loss	12
Building-Related Losses	
Appendix A: County Listing for the Region	15
Appendix B: Regional Population and Building Value Data	16

General Description of the Region

Hazus is a regional multi-hazard loss estimation model that was developed by the Federal Emergency Management Agency (FEMA) and the National Institute of Building Sciences (NIBS). The primary purpose of Hazus is to provide a methodology and software application to develop multi-hazard losses at a regional scale. These loss estimates would be used primarily by local, state and regional officials to plan and stimulate efforts to reduce risks from multi-hazards and to prepare for emergency response and recovery.

The flood loss estimates provided in this report were based on a region that included 1 county(ies) from the following state(s):

- New York

Note:
Appendix A contains a complete listing of the counties contained in the region.

The geographical size of the region is approximately 1,085 square miles and contains 6,374 census blocks. The region contains over 54 thousand households and has a total population of 134,905 people (2010 Census Bureau data). The distribution of population by State and County for the study region is provided in Appendix B.

There are an estimated 61,846 buildings in the region with a total building replacement value (excluding contents) of 17,205 million dollars. Approximately 90.73% of the buildings (and 71.75% of the building value) are associated with residential housing.

Building Inventory

General Building Stock

Hazus estimates that there are 61,846 buildings in the region which have an aggregate total replacement value of 17,205 million dollars. Table 1 and Table 2 present the relative distribution of the value with respect to the general occupancies by Study Region and Scenario respectively. Appendix B provides a general distribution of the building value by State and County.

Table 1
Building Exposure by Occupancy Type for the Study Region

Occupancy	Exposure ($1000)	Percent of Total
Residential	12,344,285	71.7%
Commercial	2,700,170	15.7%
Industrial	1,194,649	6.9%
Agricultural	121,748	0.7%
Religion	392,752	2.3%
Government	212,125	1.2%
Education	239,294	1.4%
Total	**17,205,023**	**100%**

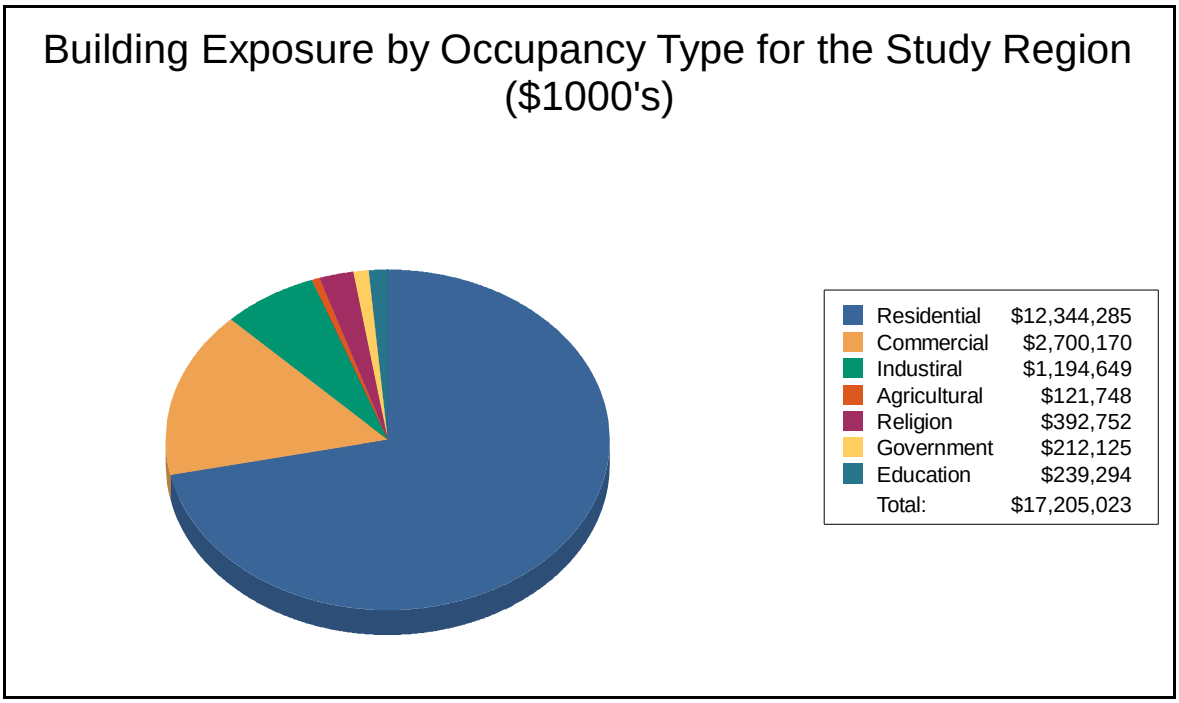
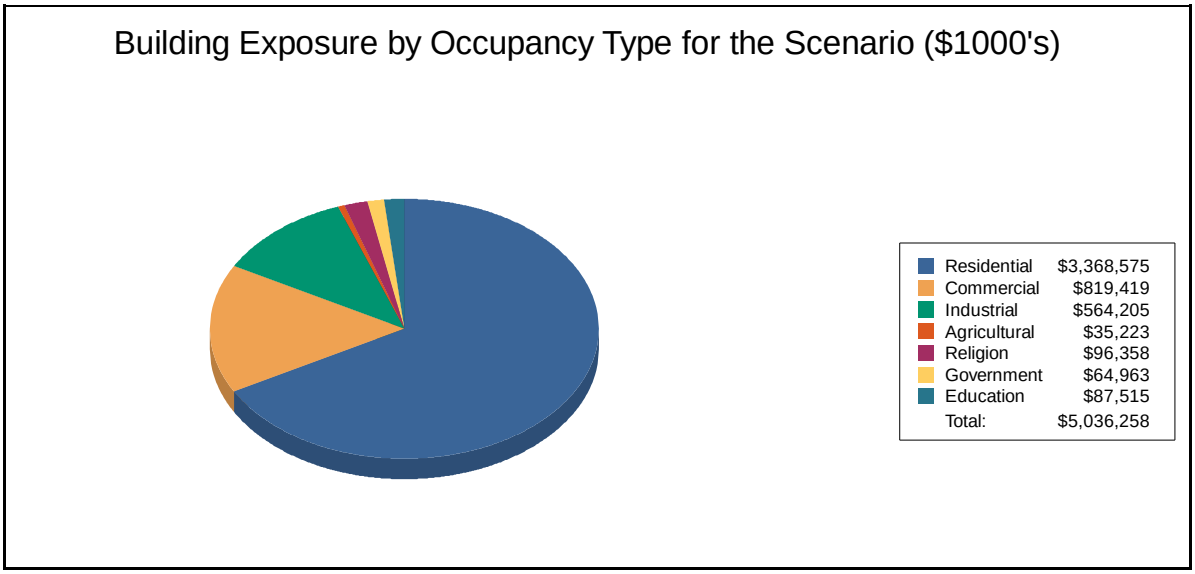


Table 2
Building Exposure by Occupancy Type for the Scenario

Occupancy	Exposure ($1000)	Percent of Total
Residential	3,368,575	66.9%
Commercial	819,419	16.3%
Industrial	564,205	11.2%
Agricultural	35,223	0.7%
Religion	96,358	1.9%
Government	64,963	1.3%
Education	87,515	1.7%
Total	**5,036,258**	**100%**



Essential Facility Inventory

For essential facilities, there are 7 hospitals in the region with a total bed capacity of 399 beds. There are 72 schools, 53 fire stations, 15 police stations and 1 emergency operation center.

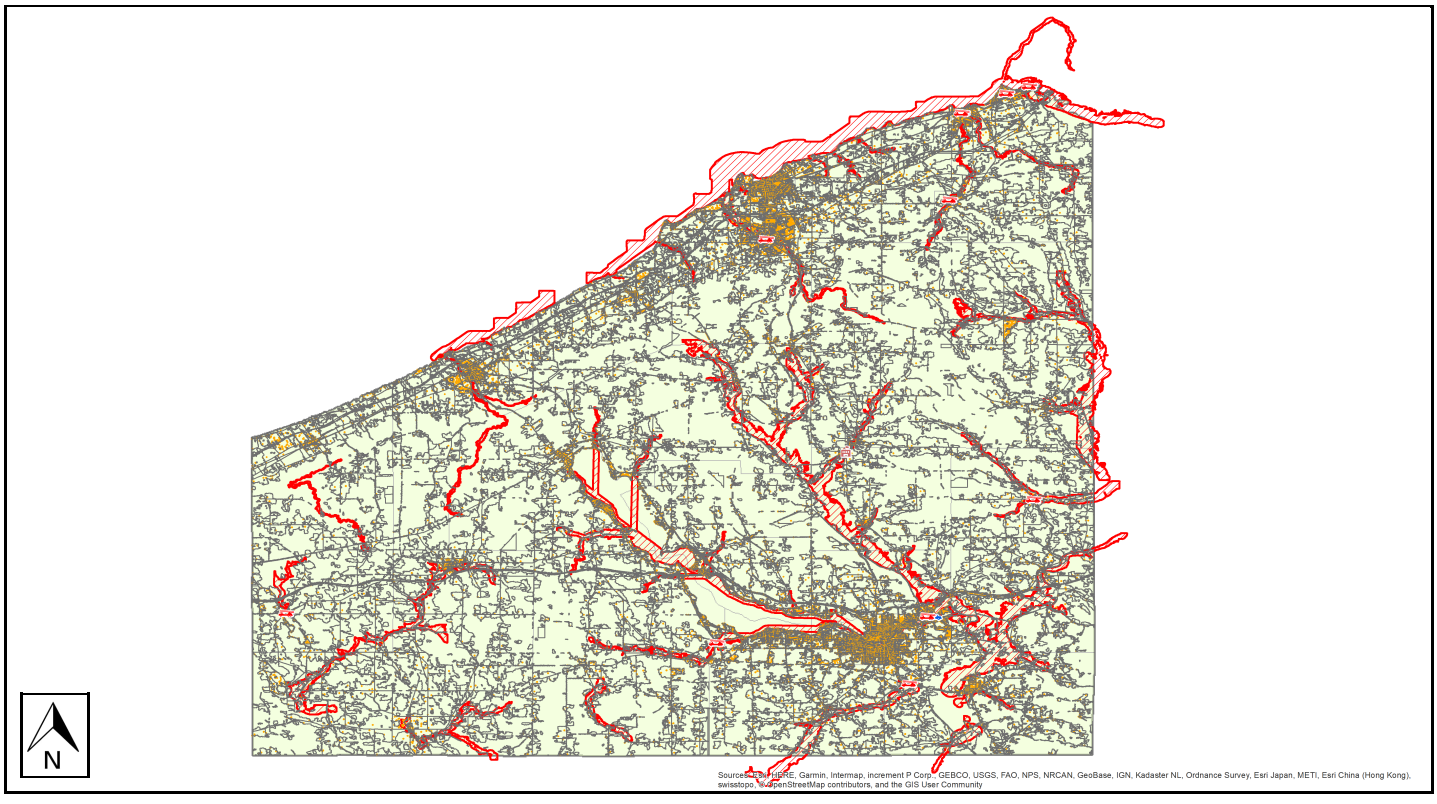
Flood Scenario Parameters

Hazus used the following set of information to define the flood parameters for the flood loss estimate provided in this report.

Study Region Name:	Chautauqua_HMP
Scenario Name:	5mi_1
Return Period Analyzed:	500
Analysis Options Analyzed:	No What-Ifs

Study Region Overview Map

Illustrating scenario flood extent, as well as exposed essential facilities and total exposure



Building Damage

General Building Stock Damage

Hazus estimates that about 941 buildings will be at least moderately damaged. This is over 83% of the total number of buildings in the scenario. There are an estimated 0 buildings that will be completely destroyed. The definition of the 'damage states' is provided in the Hazus Flood Technical Manual. Table 3 below summarizes the expected damage by general occupancy for the buildings in the region. Table 4 summarizes the expected damage by general building type.

Total Economic Loss (1 dot = $300K) Overview Map

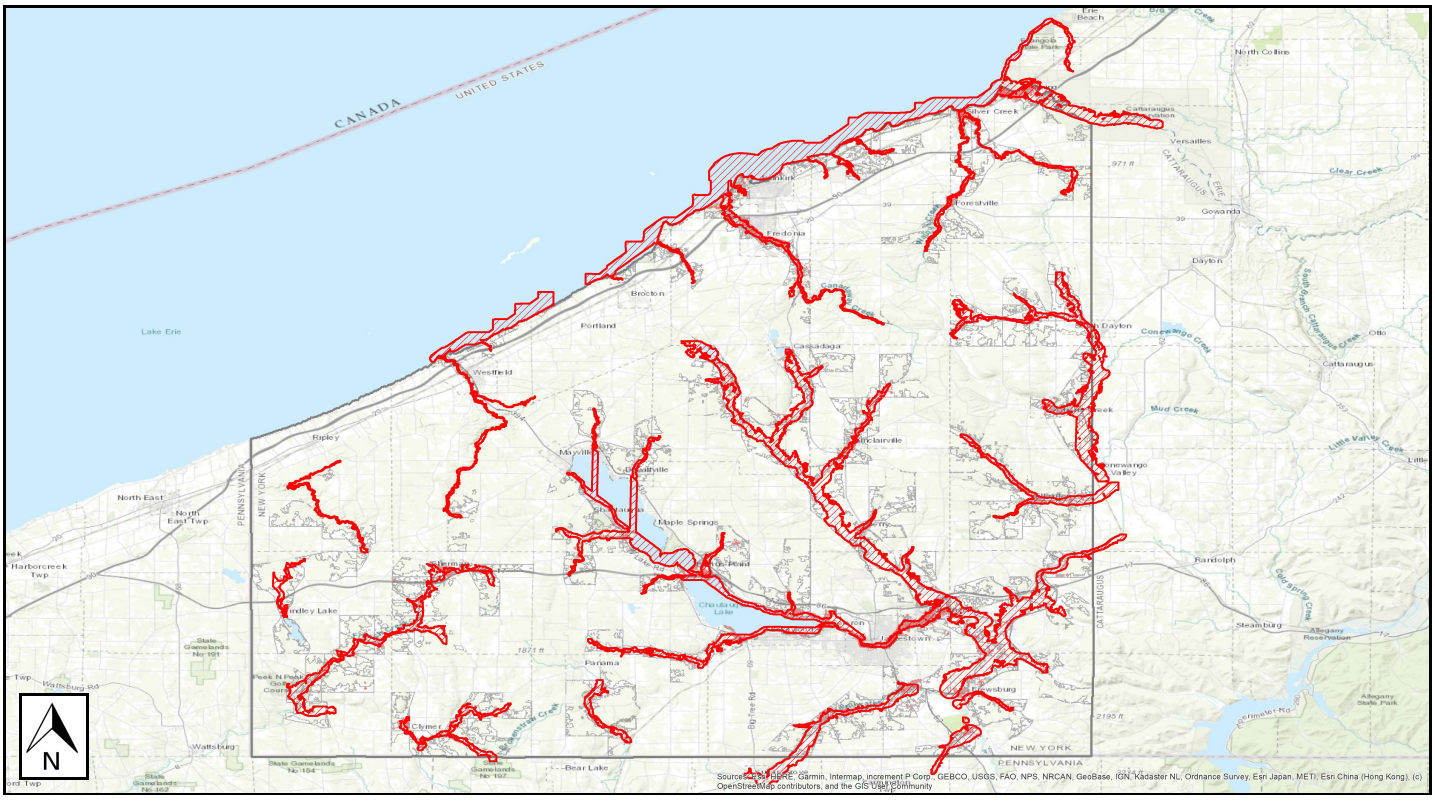


Table 3: Expected Building Damage by Occupancy

	1-10		11-20		21-30		31-40		41-50		>50	
Occupancy	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**
Agriculture	0	0	0	0	0	0	0	0	0	0	0	0
Commercial	13	72	5	28	0	0	0	0	0	0	0	0
Education	0	0	0	0	0	0	0	0	0	0	0	0
Government	3	100	0	0	0	0	0	0	0	0	0	0
Industrial	15	58	10	38	1	4	0	0	0	0	0	0
Religion	0	0	0	0	0	0	0	0	0	0	0	0
Residential	1,153	55	835	40	60	3	28	1	2	0	0	0
Total	**1,184**		**850**		**61**		**28**		**2**		**0**	

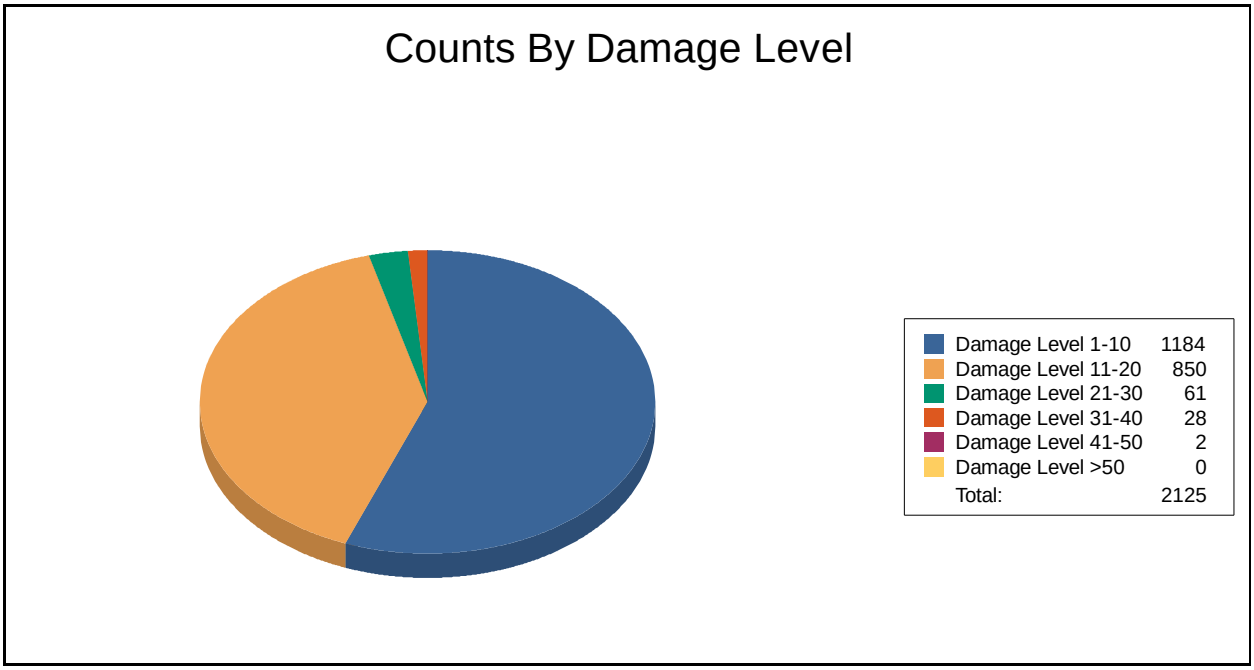


Table 4: Expected Building Damage by Building Type

Building Type	1-10		11-20		21-30		31-40		41-50		>50	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Concrete	4	67	2	33	0	0	0	0	0	0	0	0
ManufHousing	0	0	2	100	0	0	0	0	0	0	0	0
Masonry	131	58	92	41	3	1	0	0	0	0	0	0
Steel	18	62	10	34	1	3	0	0	0	0	0	0
Wood	1,017	55	741	40	57	3	28	2	2	0	0	0

Essential Facility Damage

Before the flood analyzed in this scenario, the region had 399 hospital beds available for use. On the day of the scenario flood event, the model estimates that 399 hospital beds are available in the region.

Table 5: Expected Damage to Essential Facilities

		# Facilities		
Classification	Total	At Least Moderate	At Least Substantial	Loss of Use
Emergency Operation Centers	1	0	0	0
Fire Stations	53	10	0	10
Hospitals	7	0	0	0
Police Stations	15	2	0	2
Schools	72	1	0	1

If this report displays all zeros or is blank, two possibilities can explain this.

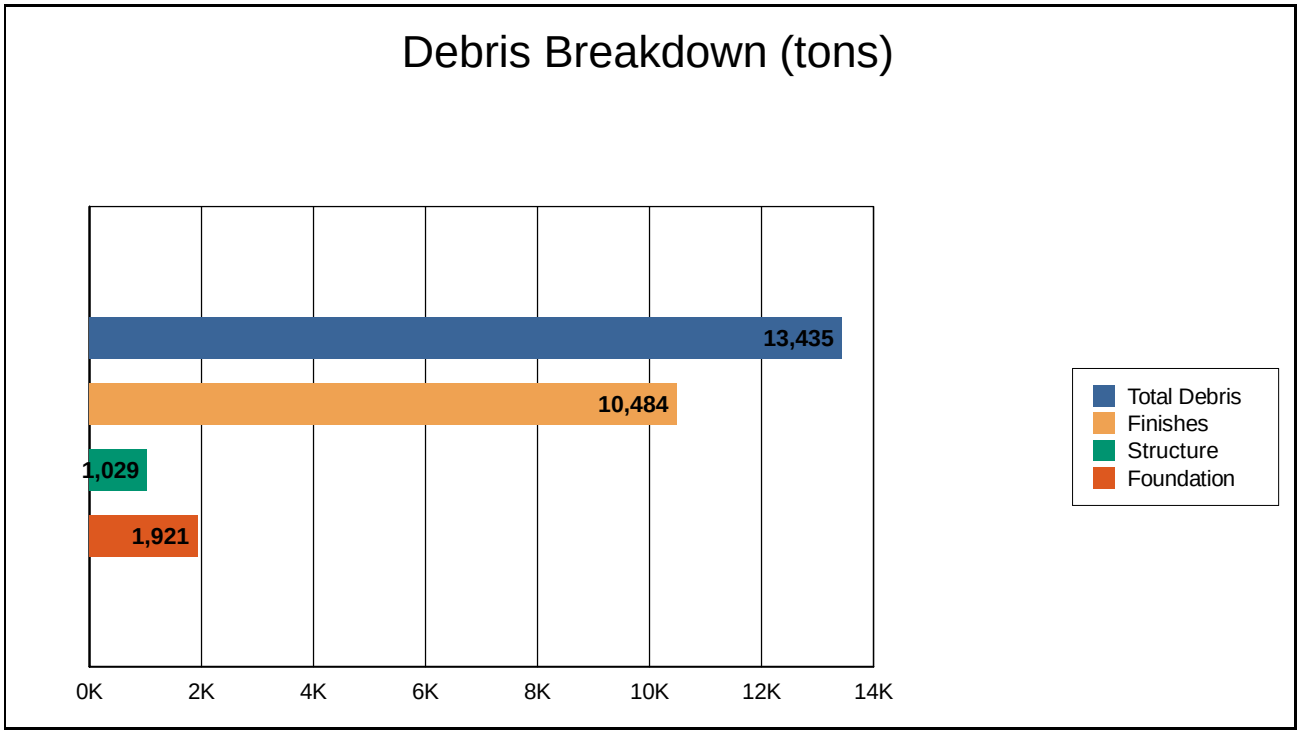
(1) None of your facilities were flooded. This can be checked by mapping the inventory data on the depth grid.

(2) The analysis was not run. This can be tested by checking the run box on the Analysis Menu and seeing if a message box asks you to replace the existing results.

Induced Flood Damage

Debris Generation

Hazus estimates the amount of debris that will be generated by the flood. The model breaks debris into three general categories: 1) Finishes (dry wall, insulation, etc.), 2) Structural (wood, brick, etc.) and 3) Foundations (concrete slab, concrete block, rebar, etc.). This distinction is made because of the different types of material handling equipment required to handle the debris.

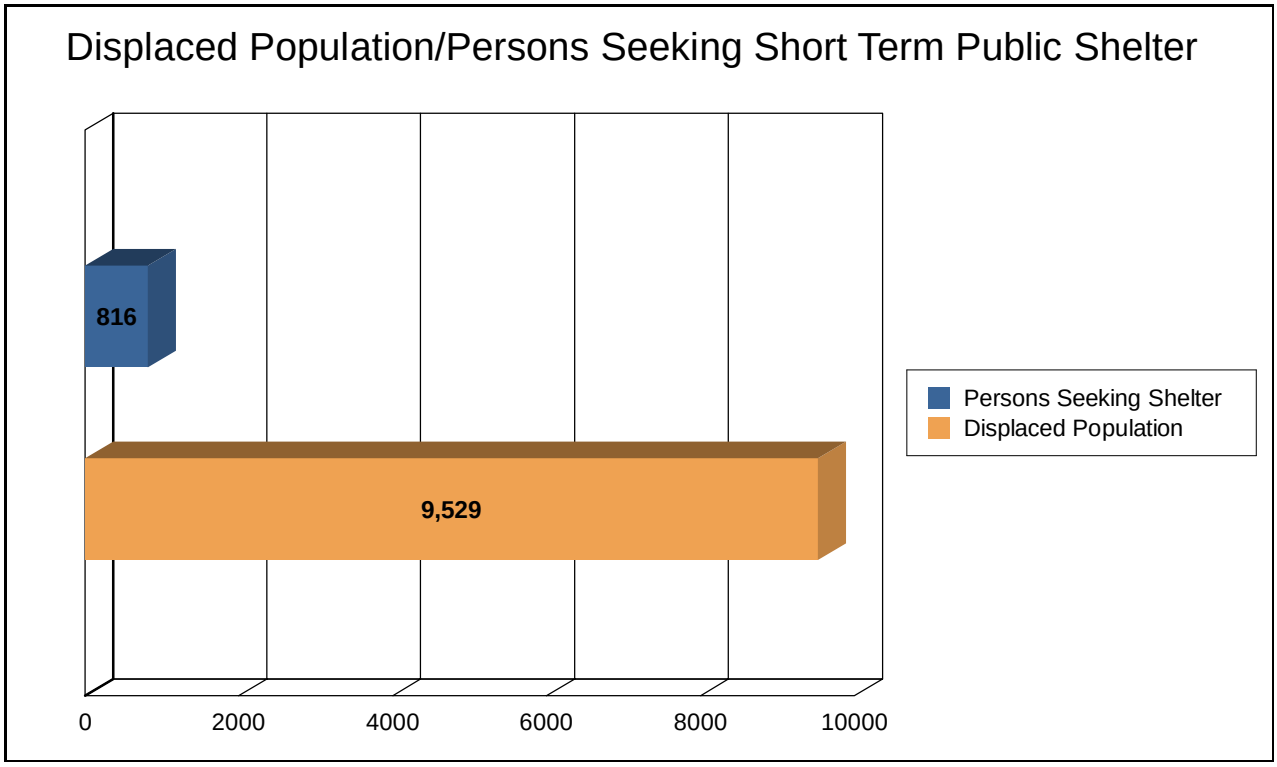


The model estimates that a total of 13,435 tons of debris will be generated. Of the total amount, Finishes comprises 78% of the total, Structure comprises 8% of the total, and Foundation comprises 14%. If the debris tonnage is converted into an estimated number of truckloads, it will require 538 truckloads (@25 tons/truck) to remove the debris generated by the flood.

Social Impact

Shelter Requirements

Hazus estimates the number of households that are expected to be displaced from their homes due to the flood and the associated potential evacuation. Hazus also estimates those displaced people that will require accommodations in temporary public shelters. The model estimates 3,176 households (or 9,529 of people) will be displaced due to the flood. Displacement includes households evacuated from within or very near to the inundated area. Of these, 816 people (out of a total population of 134,905) will seek temporary shelter in public shelters.



Economic Loss

The total economic loss estimated for the flood is 984.56 million dollars, which represents 19.55 % of the total replacement value of the scenario buildings.

Building-Related Losses

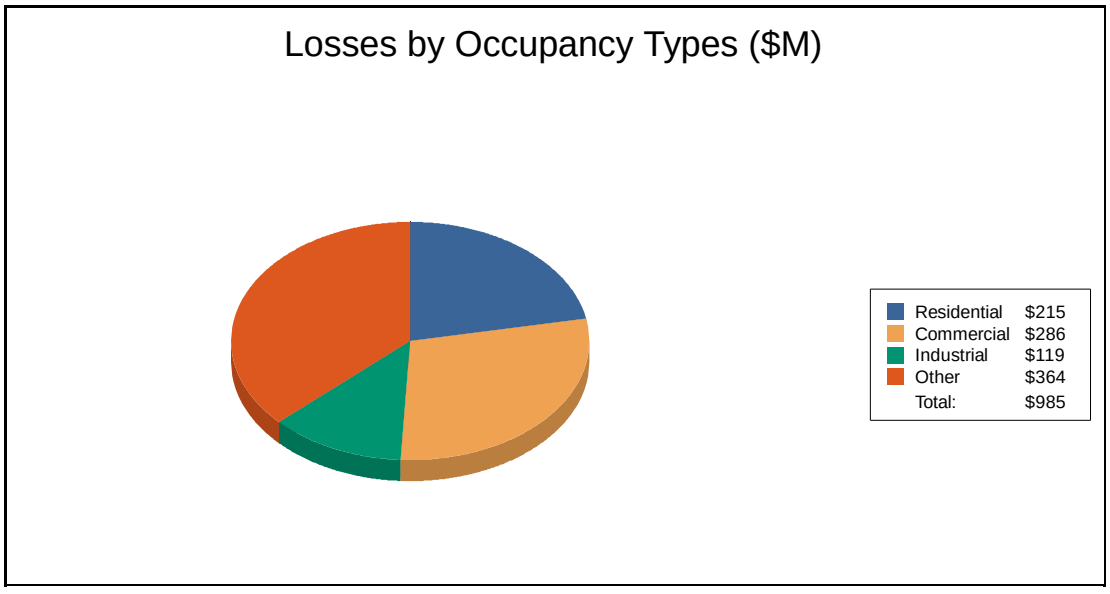
The building losses are broken into two categories: direct building losses and business interruption losses. The direct building losses are the estimated costs to repair or replace the damage caused to the building and its contents. The business interruption losses are the losses associated with inability to operate a business because of the damage sustained during the flood. Business interruption losses also include the temporary living expenses for those people displaced from their homes because of the flood.

The total building-related losses were 361.74 million dollars. 63% of the estimated losses were related to the business interruption of the region. The residential occupancies made up 21.82% of the total loss. Table 6 below provides a summary of the losses associated with the building damage.

Table 6: Building-Related Economic Loss Estimates

(Millions of dollars)

Category	Area	Residential	Commercial	Industrial	Others	Total
Building Loss						
	Building	84.81	19.24	26.74	4.73	135.52
	Content	52.70	64.85	68.19	25.99	211.73
	Inventory	0.00	1.47	12.87	0.15	14.49
	Subtotal	**137.51**	**85.55**	**107.80**	**30.87**	**361.74**
Business Interruption						
	Income	1.19	75.04	2.69	10.81	89.73
	Relocation	51.38	23.78	3.62	8.72	87.50
	Rental Income	21.89	17.12	0.92	0.85	40.77
	Wage	2.83	84.55	4.29	313.14	404.82
	Subtotal	**77.30**	**200.49**	**11.52**	**333.52**	**622.82**
ALL	**Total**	**214.81**	**286.04**	**119.32**	**364.39**	**984.56**



Appendix A: County Listing for the Region

New York

- Chautauqua

Appendix B: Regional Population and Building Value Data

	Population	Building Value (thousands of dollars)		
		Residential	Non-Residential	Total
New York				
Chautauqua	134,905	12,344,285	4,860,738	17,205,023
Total	**134,905**	**12,344,285**	**4,860,738**	**17,205,023**
Total Study Region	**134,905**	**12,344,285**	**4,860,738**	**17,205,023**

Hazus: Earthquake Global Risk Report

Region Name: Chautauqua_HMP

Earthquake Scenario: Annualized Loss

Print Date: November 29, 2022

Disclaimer:

This version of Hazus utilizes 2010 Census Data.

Totals only reflect data for those census tracts/blocks included in the user's study region.

The estimates of social and economic impacts contained in this report were produced using Hazus loss estimation methodology software which is based on current scientific and engineering knowledge. There are uncertainties inherent in any loss estimation technique. Therefore, there may be significant differences between the modeled results contained in this report and the actual social and economic losses following a specific earthquake. These results can be improved by using enhanced inventory, geotechnical, and observed ground motion data.

Table of Contents

Section	Page #
General Description of the Region	3
Building and Lifeline Inventory	4
Building Inventory	
Critical Facility Inventory	
Transportation and Utility Lifeline Inventory	
Earthquake Scenario Parameters	7
Direct Earthquake Damage	8
Buildings Damage	
Essential Facilities Damage	
Transportation and Utility Lifeline Damage	
Induced Earthquake Damage	14
Fire Following Earthquake	
Debris Generation	
Social Impact	15
Shelter Requirements	
Casualties	
Economic Loss	17
Building Related Losses	
Transportation and Utility Lifeline Losses	

Appendix A: County Listing for the Region

Appendix B: Regional Population and Building Value Data

General Description of the Region

Hazus-MH is a regional earthquake loss estimation model that was developed by the Federal Emergency Management Agency (FEMA) and the National Institute of Building Sciences. The primary purpose of Hazus is to provide a methodology and software application to develop multi-hazard losses at a regional scale. These loss estimates would be used primarily by local, state and regional officials to plan and stimulate efforts to reduce risks from multi-hazards and to prepare for emergency response and recovery.

The earthquake loss estimates provided in this report was based on a region that includes 1 county(ies) from the following state(s):

New York

Note:
Appendix A contains a complete listing of the counties contained in the region.

The geographical size of the region is 1,084.38 square miles and contains 35 census tracts. There are over 54 thousand households in the region which has a total population of 134,905 people (2010 Census Bureau data). The distribution of population by Total Region and County is provided in Appendix B.

There are an estimated 61 thousand buildings in the region with a total building replacement value (excluding contents) of 17,205 (millions of dollars). Approximately 91.00 % of the buildings (and 72.00% of the building value) are associated with residential housing.

The replacement value of the transportation and utility lifeline systems is estimated to be 6,140 and 6,481 (millions of dollars) , respectively.

Building and Lifeline Inventory

Building Inventory

Hazus estimates that there are 61 thousand buildings in the region which have an aggregate total replacement value of 17,205 (millions of dollars) . Appendix B provides a general distribution of the building value by Total Region and County.

In terms of building construction types found in the region, wood frame construction makes up 70% of the building inventory. The remaining percentage is distributed between the other general building types.

Critical Facility Inventory

Hazus breaks critical facilities into two (2) groups: essential facilities and high potential loss facilities (HPL). Essential facilities include hospitals, medical clinics, schools, fire stations, police stations and emergency operations facilities. High potential loss facilities include dams, levees, military installations, nuclear power plants and hazardous material sites.

For essential facilities, there are 7 hospitals in the region with a total bed capacity of 399 beds. There are 72 schools, 53 fire stations, 15 police stations and 1 emergency operation facilities. With respect to high potential loss facilities (HPL), there are no dams identified within the inventory. The inventory also includes 59 hazardous material sites, no military installations and no nuclear power plants.

Transportation and Utility Lifeline Inventory

Within Hazus, the lifeline inventory is divided between transportation and utility lifeline systems. There are seven (7) transportation systems that include highways, railways, light rail, bus, ports, ferry and airports. There are six (6) utility systems that include potable water, wastewater, natural gas, crude & refined oil, electric power and communications. The lifeline inventory data are provided in Tables 1 and 2.

The total value of the lifeline inventory is over 12,621.00 (millions of dollars). This inventory includes over 423.78 miles of highways, 558 bridges, 10,750.34 miles of pipes.

Table 1: Transportation System Lifeline Inventory

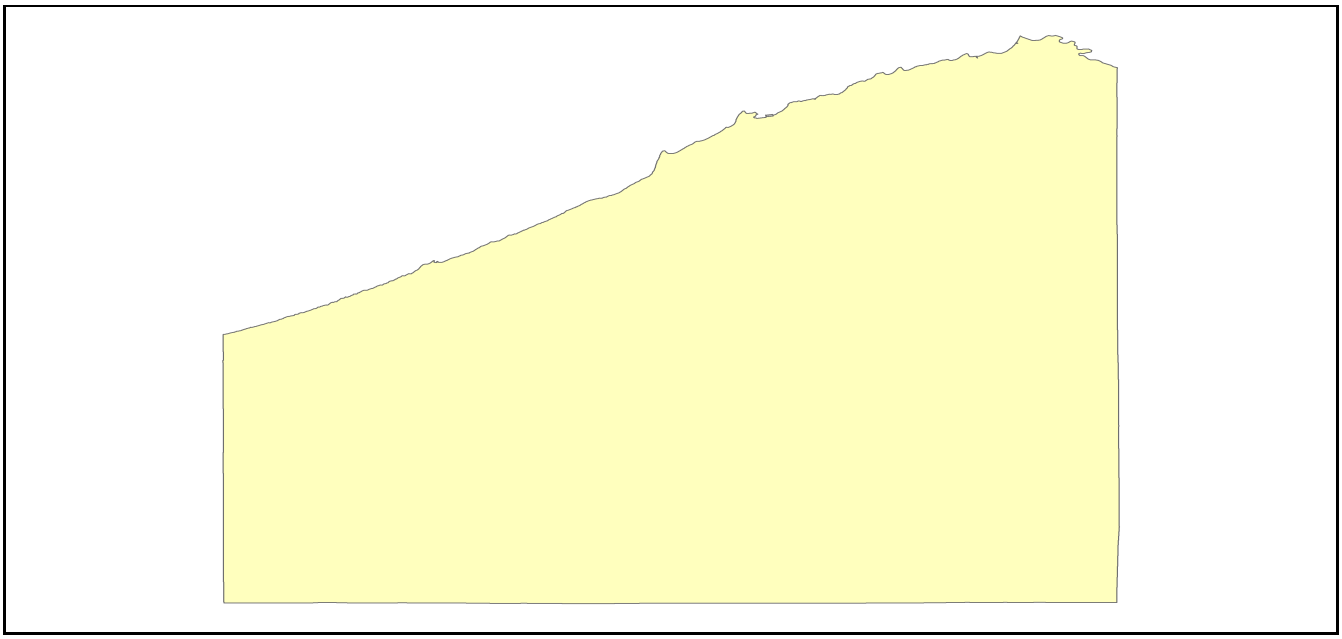
System	Component	# Locations/ # Segments	Replacement value (millions of dollars)
Highway	Bridges	558	1251.7115
	Segments	149	3688.9929
	Tunnels	0	0.0000
		Subtotal	**4940.7044**
Railways	Bridges	111	588.2104
	Facilities	2	5.3260
	Segments	106	368.4381
	Tunnels	0	0.0000
		Subtotal	**961.9745**
Light Rail	Bridges	0	0.0000
	Facilities	0	0.0000
	Segments	0	0.0000
	Tunnels	0	0.0000
		Subtotal	**0.0000**
Bus	Facilities	12	20.3489
		Subtotal	**20.3489**
Ferry	Facilities	2	2.6620
		Subtotal	**2.6620**
Port	Facilities	0	0.0000
		Subtotal	**0.0000**
Airport	Facilities	3	15.8975
	Runways	4	199.3450
		Subtotal	**215.2425**
		Total	**6,140.90**

Table 2: Utility System Lifeline Inventory

System	Component	# Locations / Segments	Replacement value (millions of dollars)
Potable Water	Distribution Lines	NA	209.3717
	Facilities	0	0.0000
	Pipelines	0	0.0000
		Subtotal	**209.3717**
Waste Water	Distribution Lines	NA	125.6230
	Facilities	30	4546.7080
	Pipelines	0	0.0000
		Subtotal	**4672.3310**
Natural Gas	Distribution Lines	NA	83.7487
	Facilities	2	3.7094
	Pipelines	84	399.4503
		Subtotal	**486.9084**
Oil Systems	Facilities	0	0.0000
	Pipelines	0	0.0000
		Subtotal	**0.0000**
Electrical Power	Facilities	2	1111.7708
		Subtotal	**1111.7708**
Communication	Facilities	11	1.2980
		Subtotal	**1.2980**
		Total	**6,481.70**

Earthquake Scenario

Hazus uses the following set of information to define the earthquake parameters used for the earthquake loss estimate provided in this report.



Scenario Name	Annualized Loss
Type of Earthquake	Probabilistic
Fault Name	NA
Historical Epicenter ID #	NA
Probabilistic Return Period	Annualized
Longitude of Epicenter	NA
Latitude of Epicenter	NA
Earthquake Magnitude	NA
Depth (km)	NA
Rupture Length (Km)	NA
Rupture Orientation (degrees)	NA
Attenuation Function	NA

Direct Earthquake Damage

Building Damage

Hazus estimates that about 0 buildings will be at least moderately damaged. This is over 0.00 % of the buildings in the region. There are an estimated 0 buildings that will be damaged beyond repair. The definition of the 'damage states' is provided in Volume 1: Chapter 5 of the Hazus technical manual. Table 3 below summarizes the expected damage by general occupancy for the buildings in the region. Table 4 below summarizes the expected damage by general building type.

Damage Categories by General Occupancy Type

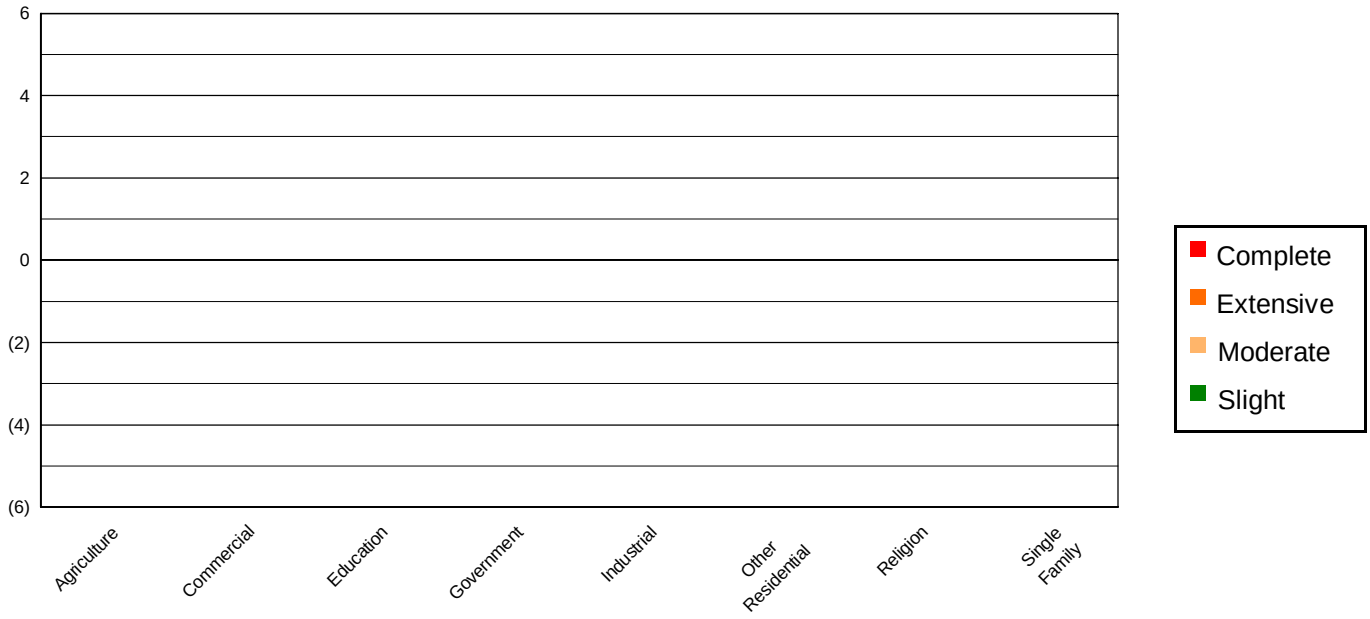


Table 3: Expected Building Damage by Occupancy

	None		Slight		Moderate		Extensive		Complete	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Agriculture	247.00	0.43	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Commercial	1937.00	3.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Education	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Government	14.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Industrial	343.00	0.59	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Other Residential	9426.00	16.23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Religion	218.00	0.38	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Single Family	45907.00	79.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	**58,092**		**0**		**0**		**0**		**0**	

Table 4: Expected Building Damage by Building Type (All Design Levels)

	None		Slight		Moderate		Extensive		Complete	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Wood	43111.00	74.21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Steel	1270.00	2.19	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Concrete	620.00	1.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Precast	14.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
RM	376.00	0.65	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
URM	8187.00	14.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MH	4514.00	7.77	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	**58,092**		**0**		**0**		**0**		**0**	

*Note:
RM Reinforced Masonry
URM Unreinforced Masonry
MH Manufactured Housing

Essential Facility Damage

Before the earthquake, the region had 399 hospital beds available for use. On the day of the earthquake, the model estimates that only 394 hospital beds (99.00%) are available for use by patients already in the hospital and those injured by the earthquake. After one week, 100.00% of the beds will be back in service. By 30 days, 100.00% will be operational.

Table 5: Expected Damage to Essential Facilities

Classification	Total	# Facilities		
		At Least Moderate Damage > 50%	Complete Damage > 50%	With Functionality > 50% on day 1
Hospitals	7	0	0	7
Schools	72	0	0	72
EOCs	1	0	0	1
PoliceStations	15	0	0	15
FireStations	53	0	0	53

Transportation Lifeline Damage

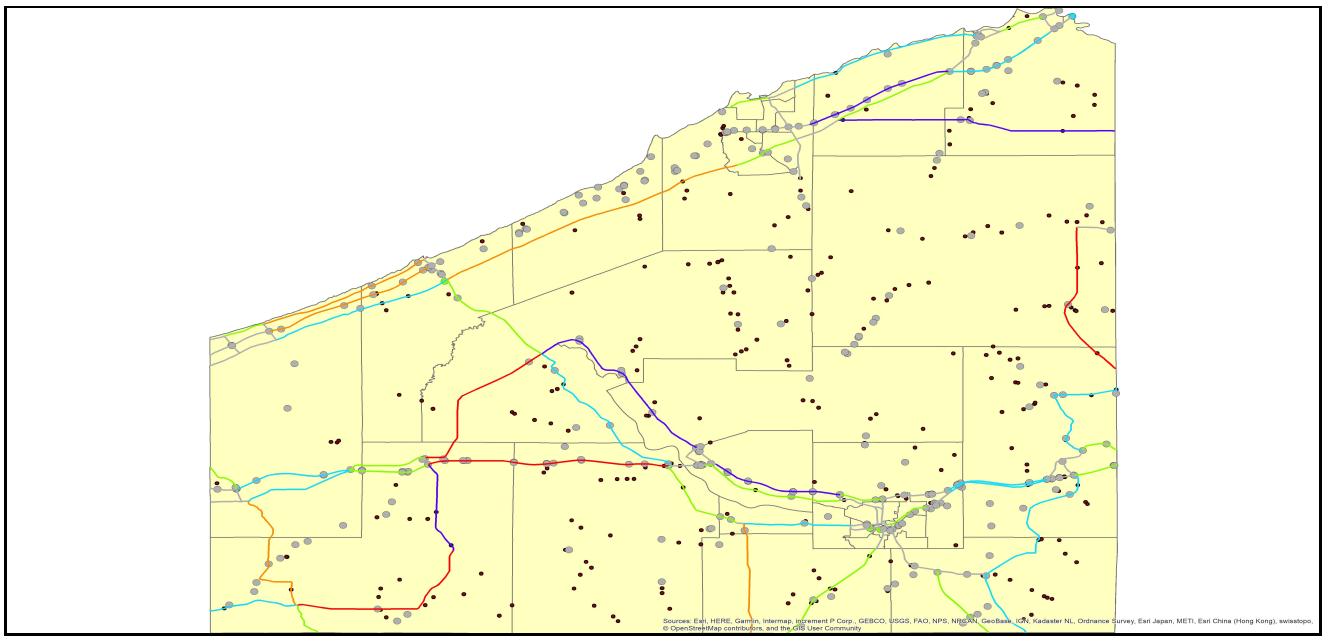


Table 6: Expected Damage to the Transportation Systems

System	Component		Number of Locations_			
		Locations/ Segments	With at Least Mod. Damage	With Complete Damage	With Functionality > 50 %	
					After Day 1	After Day 7
Highway	Segments	149	0	0	149	149
	Bridges	558	0	0	558	558
	Tunnels	0	0	0	0	0
Railways	Segments	106	0	0	106	106
	Bridges	111	0	0	111	111
	Tunnels	0	0	0	0	0
	Facilities	2	0	0	2	2
Light Rail	Segments	0	0	0	0	0
	Bridges	0	0	0	0	0
	Tunnels	0	0	0	0	0
	Facilities	0	0	0	0	0
Bus	Facilities	12	0	0	12	12
Ferry	Facilities	2	0	0	2	2
Port	Facilities	0	0	0	0	0
Airport	Facilities	3	0	0	3	3
	Runways	4	0	0	4	4

Table 6 provides damage estimates for the transportation system.

Note: Roadway segments, railroad tracks and light rail tracks are assumed to be damaged by ground failure only. If ground failure maps are not provided, damage estimates to these components will not be computed.

Tables 7-9 provide information on the damage to the utility lifeline systems. Table 7 provides damage to the utility system facilities. Table 8 provides estimates on the number of leaks and breaks by the pipelines of the utility systems. For electric power and potable water, Hazus performs a simplified system performance analysis. Table 9 provides a summary of the system performance information.

Table 7 : Expected Utility System Facility Damage

System	# of Locations				
	Total #	With at Least Moderate Damage	With Complete Damage	with Functionality > 50 %	
				After Day 1	After Day 7
Potable Water	0	0	0	0	0
Waste Water	30	0	0	30	30
Natural Gas	2	0	0	2	2
Oil Systems	0	0	0	0	0
Electrical Power	2	0	0	2	2
Communication	11	0	0	11	11

Table 8 : Expected Utility System Pipeline Damage (Site Specific)

System	Total Pipelines Length (miles)	Number of Leaks	Number of Breaks
Potable Water	6,505	1	0
Waste Water	3,903	1	0
Natural Gas	343	0	0
Oil	0	0	0

Table 9: Expected Potable Water and Electric Power System Performance

	Total # of Households	Number of Households without Service				
		At Day 1	At Day 3	At Day 7	At Day 30	At Day 90
Potable Water	54,244	0	0	0	0	0
Electric Power		0	0	0	0	0

Induced Earthquake Damage

Fire Following Earthquake

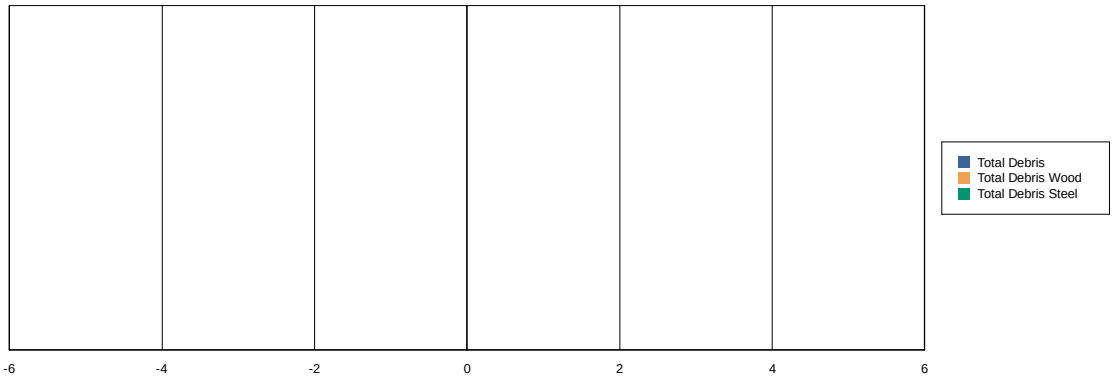
Fires often occur after an earthquake. Because of the number of fires and the lack of water to fight the fires, they can often burn out of control. Hazus uses a Monte Carlo simulation model to estimate the number of ignitions and the amount of burnt area. For this scenario, the model estimates that there will be 0 ignitions that will burn about 0.00 sq. mi 0.00 % of the region's total area.) The model also estimates that the fires will displace about 0 people and burn about 0 (millions of dollars) of building value.

Debris Generation

Hazus estimates the amount of debris that will be generated by the earthquake. The model breaks the debris into two general categories: a) Brick/Wood and b) Reinforced Concrete/Steel. This distinction is made because of the different types of material handling equipment required to handle the debris.

The model estimates that a total of 0 tons of debris will be generated. Of the total amount, Brick/Wood comprises % of the total, with the remainder being Reinforced Concrete/Steel. If the debris tonnage is converted to an estimated number of truckloads, it will require 0 truckloads (@25 tons/truck) to remove the debris generated by the earthquake.

Earthquake Debris (millions of tons)



Brick/ Wood	Reinforced Concrete/Steel	Total Debris	Truck Load
		0.00	0 (@25 tons/truck)

Social Impact

Shelter Requirement

Hazus estimates the number of households that are expected to be displaced from their homes due to the earthquake and the number of displaced people that will require accommodations in temporary public shelters. The model estimates 0 households to be displaced due to the earthquake. Of these, 0 people (out of a total population of 134,905) will seek temporary shelter in public shelters.

Displaced Households/ Persons Seeking Short Term Public Shelter

Displaced households as a result of the earthquake	Persons seeking temporary public shelter
0	0

Casualties

Hazus estimates the number of people that will be injured and killed by the earthquake. The casualties are broken down into four (4) severity levels that describe the extent of the injuries. The levels are described as follows;

- Severity Level 1: Injuries will require medical attention but hospitalization is not needed.
- Severity Level 2: Injuries will require hospitalization but are not considered life-threatening
- Severity Level 3: Injuries will require hospitalization and can become life threatening if not promptly treated.
- Severity Level 4: Victims are killed by the earthquake.

The casualty estimates are provided for three (3) times of day: 2:00 AM, 2:00 PM and 5:00 PM. These times represent the periods of the day that different sectors of the community are at their peak occupancy loads. The 2:00 AM estimate considers that the residential occupancy load is maximum, the 2:00 PM estimate considers that the educational, commercial and industrial sector loads are maximum and 5:00 PM represents peak commute time.

Table 10 provides a summary of the casualties estimated for this earthquake

Table 10: Casualty Estimates

		Level 1	Level 2	Level 3	Level 4
2 AM	Commercial	0.00	0.00	0.00	0.00
	Commuting	0.00	0.00	0.00	0.00
	Educational	0.00	0.00	0.00	0.00
	Hotels	0.00	0.00	0.00	0.00
	Industrial	0.00	0.00	0.00	0.00
	Other-Residential	0.00	0.00	0.00	0.00
	Single Family	0.01	0.00	0.00	0.00
	Total	**0**	**0**	**0**	**0**
2 PM	Commercial	0.01	0.00	0.00	0.00
	Commuting	0.00	0.00	0.00	0.00
	Educational	0.00	0.00	0.00	0.00
	Hotels	0.00	0.00	0.00	0.00
	Industrial	0.00	0.00	0.00	0.00
	Other-Residential	0.00	0.00	0.00	0.00
	Single Family	0.00	0.00	0.00	0.00
	Total	**0**	**0**	**0**	**0**
5 PM	Commercial	0.00	0.00	0.00	0.00
	Commuting	0.00	0.00	0.00	0.00
	Educational	0.00	0.00	0.00	0.00
	Hotels	0.00	0.00	0.00	0.00
	Industrial	0.00	0.00	0.00	0.00
	Other-Residential	0.00	0.00	0.00	0.00
	Single Family	0.00	0.00	0.00	0.00
	Total	**0**	**0**	**0**	**0**

Economic Loss

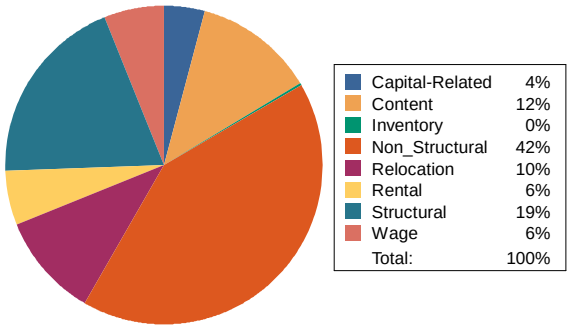
The total economic loss estimated for the earthquake is 0.09 (millions of dollars), which includes building and lifeline related losses based on the region's available inventory. The following three sections provide more detailed information about these losses.

Building-Related Losses

The building losses are broken into two categories: direct building losses and business interruption losses. The direct building losses are the estimated costs to repair or replace the damage caused to the building and its contents. The business interruption losses are the losses associated with inability to operate a business because of the damage sustained during the earthquake. Business interruption losses also include the temporary living expenses for those people displaced from their homes because of the earthquake.

The total building-related losses were 0.05 (millions of dollars); 26 % of the estimated losses were related to the business interruption of the region. By far, the largest loss was sustained by the residential occupancies which made up over 55 % of the total loss. Table 11 below provides a summary of the losses associated with the building damage.

Earthquake Losses by Loss Type ($ millions)



Earthquake Losses by Occupancy Type ($ millions)

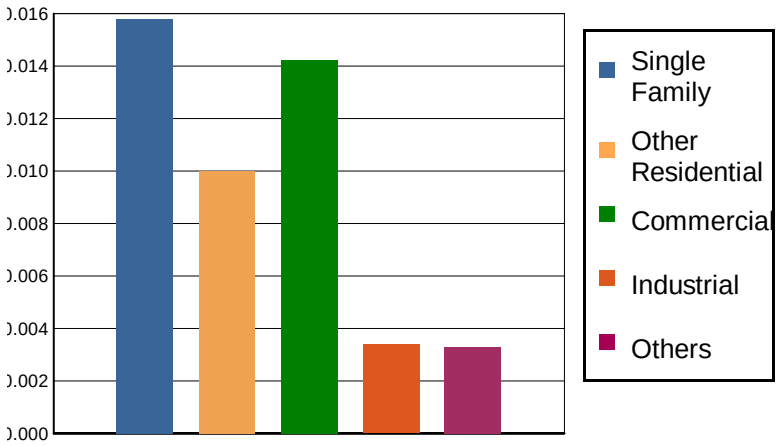


Table 11: Building-Related Economic Loss Estimates

(Millions of dollars)

Category	Area	Single Family	Other Residential	Commercial	Industrial	Others	Total
Income Losses							
	Wage	0.0000	0.0002	0.0023	0.0000	0.0003	0.0028
	Capital-Related	0.0000	0.0001	0.0019	0.0000	0.0000	0.0020
	Rental	0.0005	0.0010	0.0011	0.0000	0.0000	0.0026
	Relocation	0.0019	0.0008	0.0015	0.0002	0.0005	0.0049
	Subtotal	**0.0024**	**0.0021**	**0.0068**	**0.0002**	**0.0008**	**0.0123**
Capital Stock Losses							
	Structural	0.0035	0.0021	0.0021	0.0007	0.0007	0.0091
	Non_Structural	0.0080	0.0050	0.0037	0.0015	0.0013	0.0195
	Content	0.0019	0.0008	0.0016	0.0009	0.0005	0.0057
	Inventory	0.0000	0.0000	0.0000	0.0001	0.0000	0.0001
	Subtotal	**0.0134**	**0.0079**	**0.0074**	**0.0032**	**0.0025**	**0.0344**
	Total	**0.02**	**0.01**	**0.01**	**0.00**	**0.00**	**0.05**

Transportation and Utility Lifeline Losses

For the transportation and utility lifeline systems, Hazus computes the direct repair cost for each component only. There are no losses computed by Hazus for business interruption due to lifeline outages. Tables 12 & 13 provide a detailed breakdown in the expected lifeline losses.

Table 12: Transportation System Economic Losses
(Millions of dollars)

System	Component	Inventory Value	Economic Loss	Loss Ratio (%)
Highway	Segments	3688.9929	0.0000	0.00
	Bridges	1251.7115	0.0000	0.00
	Tunnels	0.0000	0.0000	0.00
	Subtotal	**4940.7044**	**0.0000**	
Railways	Segments	368.4381	0.0000	0.00
	Bridges	588.2104	0.0000	0.00
	Tunnels	0.0000	0.0000	0.00
	Facilities	5.3260	0.0035	0.07
	Subtotal	**961.9745**	**0.0035**	
Light Rail	Segments	0.0000	0.0000	0.00
	Bridges	0.0000	0.0000	0.00
	Tunnels	0.0000	0.0000	0.00
	Facilities	0.0000	0.0000	0.00
	Subtotal	**0.0000**	**0.0000**	
Bus	Facilities	20.3489	0.0077	0.04
	Subtotal	**20.3489**	**0.0077**	
Ferry	Facilities	2.6620	0.0000	0.00
	Subtotal	**2.6620**	**0.0000**	
Port	Facilities	0.0000	0.0000	0.00
	Subtotal	**0.0000**	**0.0000**	
Airport	Facilities	15.8975	0.0109	0.07
	Runways	199.3450	0.0000	0.00
	Subtotal	**215.2425**	**0.0109**	
	Total	**6,140.93**	**0.02**	

Table 13: Utility System Economic Losses

(Millions of dollars)

System	Component	Inventory Value	Economic Loss	Loss Ratio (%)
Potable Water	Pipelines	0.0000	0.0000	0.00
	Facilities	0.0000	0.0000	0.00
	Distribution Line	209.3717	0.0061	0.00
	Subtotal	**209.3717**	**0.0061**	
Waste Water	Pipelines	0.0000	0.0000	0.00
	Facilities	4546.7080	0.0091	0.00
	Distribution Line	125.6230	0.0031	0.00
	Subtotal	**4672.3310**	**0.0122**	
Natural Gas	Pipelines	399.4503	0.0000	0.00
	Facilities	3.7094	0.0000	0.00
	Distribution Line	83.7487	0.0011	0.00
	Subtotal	**486.9084**	**0.0011**	
Oil Systems	Pipelines	0.0000	0.0000	0.00
	Facilities	0.0000	0.0000	0.00
	Subtotal	**0.0000**	**0.0000**	
Electrical Power	Facilities	1111.7708	0.0000	0.00
	Subtotal	**1111.7708**	**0.0000**	
Communication	Facilities	1.2980	0.0000	0.00
	Subtotal	**1.2980**	**0.0000**	
	Total	**6,481.68**	**0.02**	

Appendix A: County Listing for the Region

Chautauqua,NY

Appendix B: Regional Population and Building Value Data

State	County Name	Population	Building Value (millions of dollars)		
			Residential	Non-Residential	Total
New York					
	Chautauqua	134,905	12,344	4,860	17,205
Total Region		**134,905**	**12,344**	**4,860**	**17,205**

Hazus: Earthquake Global Risk Report

Region Name: Chautauqua_HMP

Earthquake Scenario: 500-Year

Print Date: November 29, 2022

Disclaimer:

This version of Hazus utilizes 2010 Census Data.

Totals only reflect data for those census tracts/blocks included in the user's study region.

The estimates of social and economic impacts contained in this report were produced using Hazus loss estimation methodology software which is based on current scientific and engineering knowledge. There are uncertainties inherent in any loss estimation technique. Therefore, there may be significant differences between the modeled results contained in this report and the actual social and economic losses following a specific earthquake. These results can be improved by using enhanced inventory, geotechnical, and observed ground motion data.

Table of Contents

Section	Page #
General Description of the Region	3
Building and Lifeline Inventory	4
Building Inventory	
Critical Facility Inventory	
Transportation and Utility Lifeline Inventory	
Earthquake Scenario Parameters	7
Direct Earthquake Damage	8
Buildings Damage	
Essential Facilities Damage	
Transportation and Utility Lifeline Damage	
Induced Earthquake Damage	14
Fire Following Earthquake	
Debris Generation	
Social Impact	15
Shelter Requirements	
Casualties	
Economic Loss	17
Building Related Losses	
Transportation and Utility Lifeline Losses	

Appendix A: County Listing for the Region

Appendix B: Regional Population and Building Value Data

General Description of the Region

Hazus-MH is a regional earthquake loss estimation model that was developed by the Federal Emergency Management Agency (FEMA) and the National Institute of Building Sciences. The primary purpose of Hazus is to provide a methodology and software application to develop multi-hazard losses at a regional scale. These loss estimates would be used primarily by local, state and regional officials to plan and stimulate efforts to reduce risks from multi-hazards and to prepare for emergency response and recovery.

The earthquake loss estimates provided in this report was based on a region that includes 1 county(ies) from the following state(s):

New York

Note:
Appendix A contains a complete listing of the counties contained in the region.

The geographical size of the region is 1,084.38 square miles and contains 35 census tracts. There are over 54 thousand households in the region which has a total population of 134,905 people (2010 Census Bureau data). The distribution of population by Total Region and County is provided in Appendix B.

There are an estimated 61 thousand buildings in the region with a total building replacement value (excluding contents) of 17,205 (millions of dollars). Approximately 91.00 % of the buildings (and 72.00% of the building value) are associated with residential housing.

The replacement value of the transportation and utility lifeline systems is estimated to be 6,140 and 6,481 (millions of dollars) , respectively.

Building and Lifeline Inventory

Building Inventory

Hazus estimates that there are 61 thousand buildings in the region which have an aggregate total replacement value of 17,205 (millions of dollars) . Appendix B provides a general distribution of the building value by Total Region and County.

In terms of building construction types found in the region, wood frame construction makes up 70% of the building inventory. The remaining percentage is distributed between the other general building types.

Critical Facility Inventory

Hazus breaks critical facilities into two (2) groups: essential facilities and high potential loss facilities (HPL). Essential facilities include hospitals, medical clinics, schools, fire stations, police stations and emergency operations facilities. High potential loss facilities include dams, levees, military installations, nuclear power plants and hazardous material sites.

For essential facilities, there are 7 hospitals in the region with a total bed capacity of 399 beds. There are 72 schools, 53 fire stations, 15 police stations and 1 emergency operation facilities. With respect to high potential loss facilities (HPL), there are no dams identified within the inventory. The inventory also includes 59 hazardous material sites, no military installations and no nuclear power plants.

Transportation and Utility Lifeline Inventory

Within Hazus, the lifeline inventory is divided between transportation and utility lifeline systems. There are seven (7) transportation systems that include highways, railways, light rail, bus, ports, ferry and airports. There are six (6) utility systems that include potable water, wastewater, natural gas, crude & refined oil, electric power and communications. The lifeline inventory data are provided in Tables 1 and 2.

The total value of the lifeline inventory is over 12,621.00 (millions of dollars). This inventory includes over 423.78 miles of highways, 558 bridges, 10,750.34 miles of pipes.

Table 1: Transportation System Lifeline Inventory

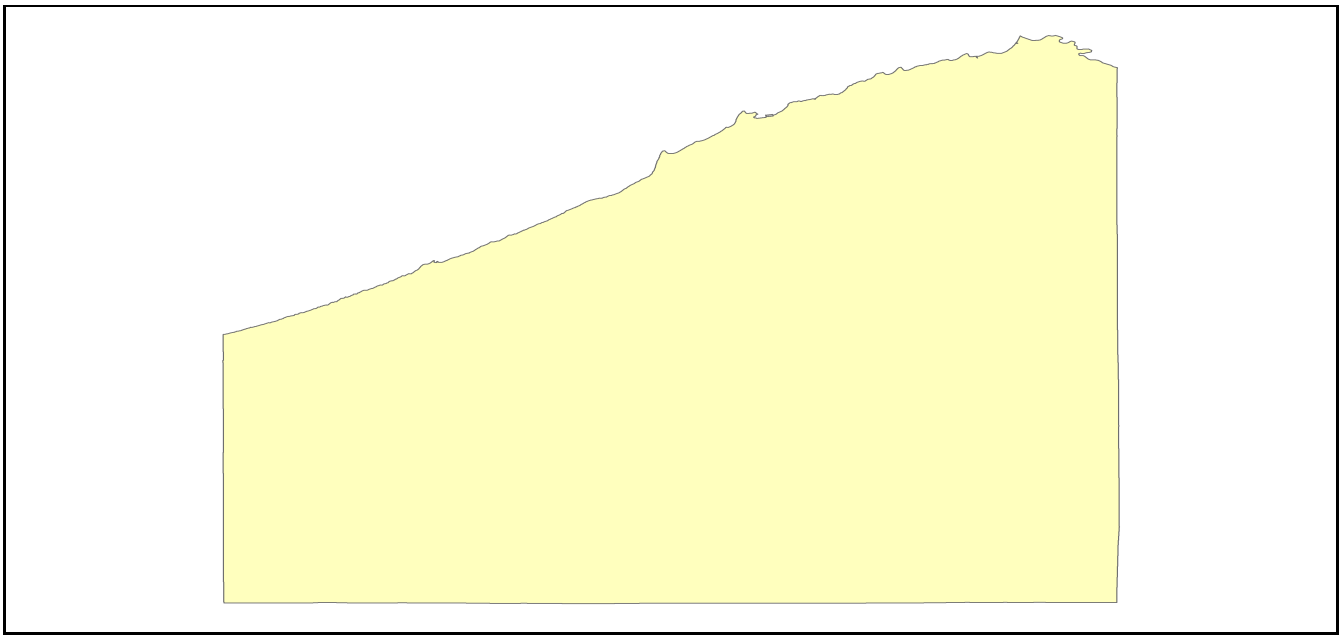
System	Component	# Locations/ # Segments	Replacement value (millions of dollars)
Highway	Bridges	558	1251.7115
	Segments	149	3688.9929
	Tunnels	0	0.0000
		Subtotal	**4940.7044**
Railways	Bridges	111	588.2104
	Facilities	2	5.3260
	Segments	106	368.4381
	Tunnels	0	0.0000
		Subtotal	**961.9745**
Light Rail	Bridges	0	0.0000
	Facilities	0	0.0000
	Segments	0	0.0000
	Tunnels	0	0.0000
		Subtotal	**0.0000**
Bus	Facilities	12	20.3489
		Subtotal	**20.3489**
Ferry	Facilities	2	2.6620
		Subtotal	**2.6620**
Port	Facilities	0	0.0000
		Subtotal	**0.0000**
Airport	Facilities	3	15.8975
	Runways	4	199.3450
		Subtotal	**215.2425**
		Total	**6,140.90**

Table 2: Utility System Lifeline Inventory

System	Component	# Locations / Segments	Replacement value (millions of dollars)
Potable Water	Distribution Lines	NA	209.3717
	Facilities	0	0.0000
	Pipelines	0	0.0000
		Subtotal	**209.3717**
Waste Water	Distribution Lines	NA	125.6230
	Facilities	30	4546.7080
	Pipelines	0	0.0000
		Subtotal	**4672.3310**
Natural Gas	Distribution Lines	NA	83.7487
	Facilities	2	3.7094
	Pipelines	84	399.4503
		Subtotal	**486.9084**
Oil Systems	Facilities	0	0.0000
	Pipelines	0	0.0000
		Subtotal	**0.0000**
Electrical Power	Facilities	2	1111.7708
		Subtotal	**1111.7708**
Communication	Facilities	11	1.2980
		Subtotal	**1.2980**
		Total	**6,481.70**

Earthquake Scenario

Hazus uses the following set of information to define the earthquake parameters used for the earthquake loss estimate provided in this report.



Scenario Name	500-Year
Type of Earthquake	Probabilistic
Fault Name	NA
Historical Epicenter ID #	NA
Probabilistic Return Period	500.00
Longitude of Epicenter	NA
Latitude of Epicenter	NA
Earthquake Magnitude	5.00
Depth (km)	NA
Rupture Length (Km)	NA
Rupture Orientation (degrees)	NA
Attenuation Function	NA

Direct Earthquake Damage

Building Damage

Hazus estimates that about 0 buildings will be at least moderately damaged. This is over 0.00 % of the buildings in the region. There are an estimated 0 buildings that will be damaged beyond repair. The definition of the 'damage states' is provided in Volume 1: Chapter 5 of the Hazus technical manual. Table 3 below summarizes the expected damage by general occupancy for the buildings in the region. Table 4 below summarizes the expected damage by general building type.

Damage Categories by General Occupancy Type

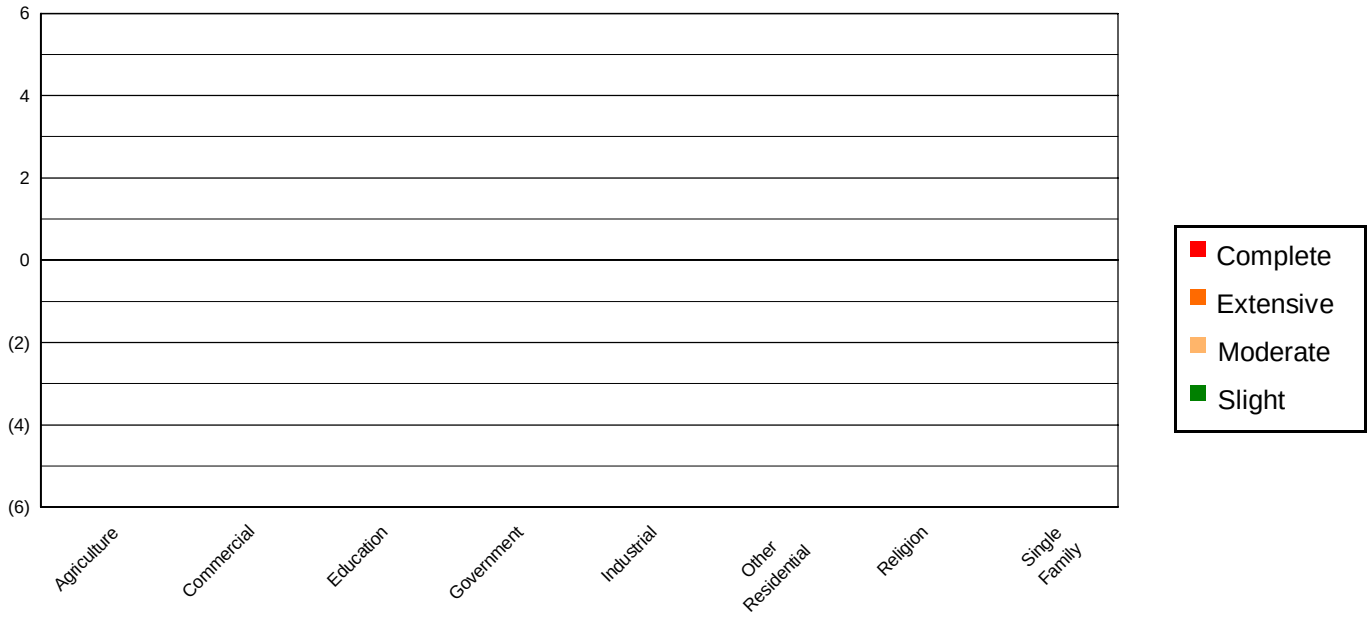


Table 3: Expected Building Damage by Occupancy

	None		Slight		Moderate		Extensive		Complete	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Agriculture	247.00	0.43	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Commercial	1937.00	3.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Education	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Government	14.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Industrial	343.00	0.59	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Other Residential	9426.00	16.23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Religion	218.00	0.38	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Single Family	45907.00	79.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	**58,092**		**0**		**0**		**0**		**0**	

Table 4: Expected Building Damage by Building Type (All Design Levels)

	None		Slight		Moderate		Extensive		Complete	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Wood	43111.00	74.21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Steel	1270.00	2.19	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Concrete	620.00	1.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Precast	14.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
RM	376.00	0.65	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
URM	8187.00	14.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MH	4514.00	7.77	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	**58,092**		**0**		**0**		**0**		**0**	

*Note:
RM Reinforced Masonry
URM Unreinforced Masonry
MH Manufactured Housing

Essential Facility Damage

Before the earthquake, the region had 399 hospital beds available for use. On the day of the earthquake, the model estimates that only 394 hospital beds (99.00%) are available for use by patients already in the hospital and those injured by the earthquake. After one week, 100.00% of the beds will be back in service. By 30 days, 100.00% will be operational.

Table 5: Expected Damage to Essential Facilities

Classification	Total	# Facilities		
		At Least Moderate Damage > 50%	Complete Damage > 50%	With Functionality > 50% on day 1
Hospitals	7	0	0	7
Schools	72	0	0	72
EOCs	1	0	0	1
PoliceStations	15	0	0	15
FireStations	53	0	0	53

Transportation Lifeline Damage

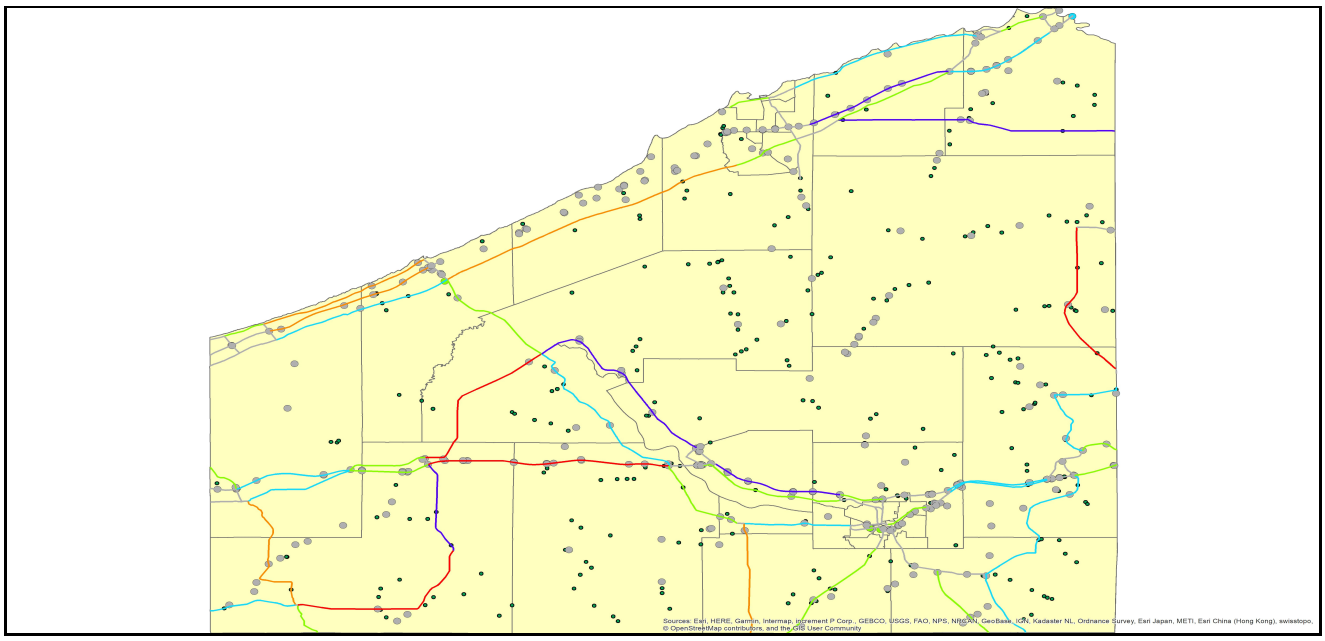


Table 6: Expected Damage to the Transportation Systems

System	Component		Number of Locations_			
		Locations/ Segments	With at Least Mod. Damage	With Complete Damage	With Functionality > 50 %	
					After Day 1	After Day 7
Highway	Segments	149	0	0	149	149
	Bridges	558	0	0	558	558
	Tunnels	0	0	0	0	0
Railways	Segments	106	0	0	106	106
	Bridges	111	0	0	111	111
	Tunnels	0	0	0	0	0
	Facilities	2	0	0	2	2
Light Rail	Segments	0	0	0	0	0
	Bridges	0	0	0	0	0
	Tunnels	0	0	0	0	0
	Facilities	0	0	0	0	0
Bus	Facilities	12	0	0	12	12
Ferry	Facilities	2	0	0	2	2
Port	Facilities	0	0	0	0	0
Airport	Facilities	3	0	0	3	3
	Runways	4	0	0	4	4

Table 6 provides damage estimates for the transportation system.

Note: Roadway segments, railroad tracks and light rail tracks are assumed to be damaged by ground failure only. If ground failure maps are not provided, damage estimates to these components will not be computed.

Tables 7-9 provide information on the damage to the utility lifeline systems. Table 7 provides damage to the utility system facilities. Table 8 provides estimates on the number of leaks and breaks by the pipelines of the utility systems. For electric power and potable water, Hazus performs a simplified system performance analysis. Table 9 provides a summary of the system performance information.

Table 7 : Expected Utility System Facility Damage

System	# of Locations				
	Total #	With at Least Moderate Damage	With Complete Damage	with Functionality > 50 %	
				After Day 1	After Day 7
Potable Water	0	0	0	0	0
Waste Water	30	0	0	30	30
Natural Gas	2	0	0	2	2
Oil Systems	0	0	0	0	0
Electrical Power	2	0	0	2	2
Communication	11	0	0	11	11

Table 8 : Expected Utility System Pipeline Damage (Site Specific)

System	Total Pipelines Length (miles)	Number of Leaks	Number of Breaks
Potable Water	6,505	1	0
Waste Water	3,903	1	0
Natural Gas	343	0	0
Oil	0	0	0

Table 9: Expected Potable Water and Electric Power System Performance

	Total # of Households	Number of Households without Service				
		At Day 1	At Day 3	At Day 7	At Day 30	At Day 90
Potable Water	54,244	0	0	0	0	0
Electric Power		0	0	0	0	0

Induced Earthquake Damage

Fire Following Earthquake

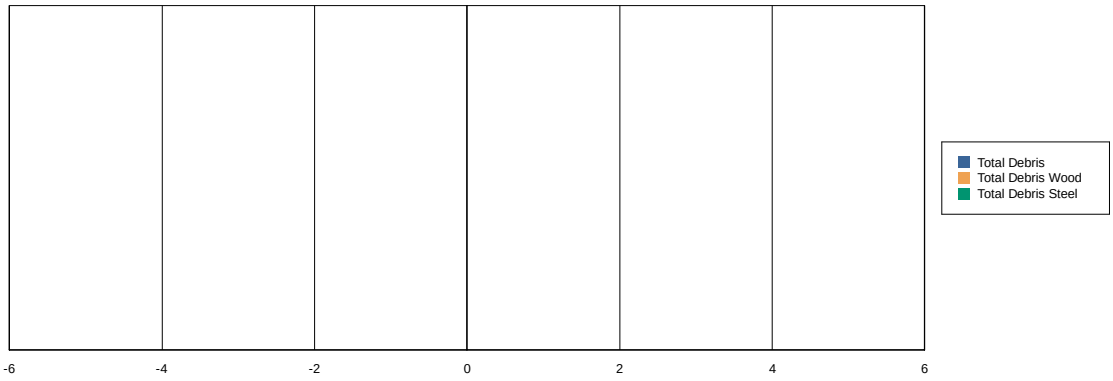
Fires often occur after an earthquake. Because of the number of fires and the lack of water to fight the fires, they can often burn out of control. Hazus uses a Monte Carlo simulation model to estimate the number of ignitions and the amount of burnt area. For this scenario, the model estimates that there will be 0 ignitions that will burn about 0.00 sq. mi 0.00 % of the region's total area.) The model also estimates that the fires will displace about 0 people and burn about 0 (millions of dollars) of building value.

Debris Generation

Hazus estimates the amount of debris that will be generated by the earthquake. The model breaks the debris into two general categories: a) Brick/Wood and b) Reinforced Concrete/Steel. This distinction is made because of the different types of material handling equipment required to handle the debris.

The model estimates that a total of 0 tons of debris will be generated. Of the total amount, Brick/Wood comprises % of the total, with the remainder being Reinforced Concrete/Steel. If the debris tonnage is converted to an estimated number of truckloads, it will require 0 truckloads (@25 tons/truck) to remove the debris generated by the earthquake.

Earthquake Debris (millions of tons)



Brick/ Wood	Reinforced Concrete/Steel	Total Debris	Truck Load
		0.00	0 (@25 tons/truck)

Social Impact

Shelter Requirement

Hazus estimates the number of households that are expected to be displaced from their homes due to the earthquake and the number of displaced people that will require accommodations in temporary public shelters. The model estimates 0 households to be displaced due to the earthquake. Of these, 0 people (out of a total population of 134,905) will seek temporary shelter in public shelters.

Displaced Households/ Persons Seeking Short Term Public Shelter

Displaced households as a result of the earthquake	Persons seeking temporary public shelter
0	0

Casualties

Hazus estimates the number of people that will be injured and killed by the earthquake. The casualties are broken down into four (4) severity levels that describe the extent of the injuries. The levels are described as follows;

- Severity Level 1: Injuries will require medical attention but hospitalization is not needed.
- Severity Level 2: Injuries will require hospitalization but are not considered life-threatening
- Severity Level 3: Injuries will require hospitalization and can become life threatening if not promptly treated.
- Severity Level 4: Victims are killed by the earthquake.

The casualty estimates are provided for three (3) times of day: 2:00 AM, 2:00 PM and 5:00 PM. These times represent the periods of the day that different sectors of the community are at their peak occupancy loads. The 2:00 AM estimate considers that the residential occupancy load is maximum, the 2:00 PM estimate considers that the educational, commercial and industrial sector loads are maximum and 5:00 PM represents peak commute time.

Table 10 provides a summary of the casualties estimated for this earthquake

Table 10: Casualty Estimates

		Level 1	Level 2	Level 3	Level 4
2 AM	Commercial	0.00	0.00	0.00	0.00
	Commuting	0.00	0.00	0.00	0.00
	Educational	0.00	0.00	0.00	0.00
	Hotels	0.00	0.00	0.00	0.00
	Industrial	0.00	0.00	0.00	0.00
	Other-Residential	0.00	0.00	0.00	0.00
	Single Family	0.01	0.00	0.00	0.00
	Total	**0**	**0**	**0**	**0**
2 PM	Commercial	0.01	0.00	0.00	0.00
	Commuting	0.00	0.00	0.00	0.00
	Educational	0.00	0.00	0.00	0.00
	Hotels	0.00	0.00	0.00	0.00
	Industrial	0.00	0.00	0.00	0.00
	Other-Residential	0.00	0.00	0.00	0.00
	Single Family	0.00	0.00	0.00	0.00
	Total	**0**	**0**	**0**	**0**
5 PM	Commercial	0.00	0.00	0.00	0.00
	Commuting	0.00	0.00	0.00	0.00
	Educational	0.00	0.00	0.00	0.00
	Hotels	0.00	0.00	0.00	0.00
	Industrial	0.00	0.00	0.00	0.00
	Other-Residential	0.00	0.00	0.00	0.00
	Single Family	0.00	0.00	0.00	0.00
	Total	**0**	**0**	**0**	**0**

Economic Loss

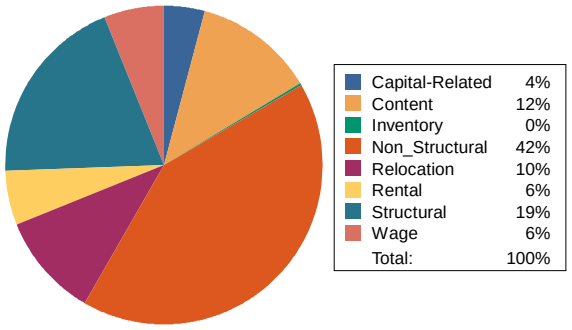
The total economic loss estimated for the earthquake is 0.09 (millions of dollars), which includes building and lifeline related losses based on the region's available inventory. The following three sections provide more detailed information about these losses.

Building-Related Losses

The building losses are broken into two categories: direct building losses and business interruption losses. The direct building losses are the estimated costs to repair or replace the damage caused to the building and its contents. The business interruption losses are the losses associated with inability to operate a business because of the damage sustained during the earthquake. Business interruption losses also include the temporary living expenses for those people displaced from their homes because of the earthquake.

The total building-related losses were 0.05 (millions of dollars); 26 % of the estimated losses were related to the business interruption of the region. By far, the largest loss was sustained by the residential occupancies which made up over 55 % of the total loss. Table 11 below provides a summary of the losses associated with the building damage.

Earthquake Losses by Loss Type ($ millions)



Earthquake Losses by Occupancy Type ($ millions)

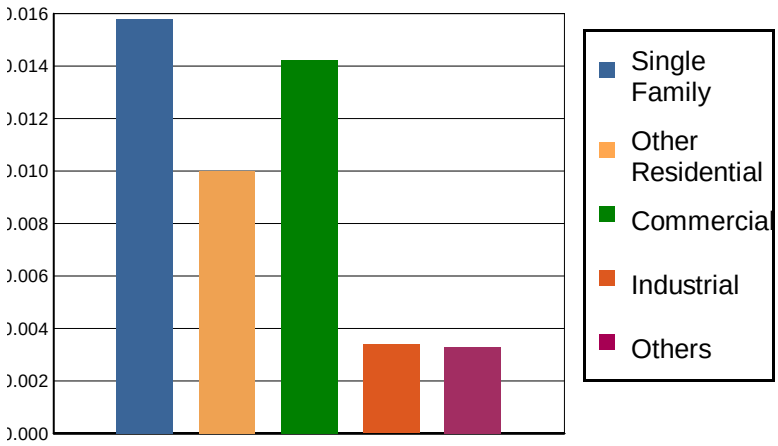


Table 11: Building-Related Economic Loss Estimates

(Millions of dollars)

Category	Area	Single Family	Other Residential	Commercial	Industrial	Others	Total
Income Losses							
	Wage	0.0000	0.0002	0.0023	0.0000	0.0003	0.0028
	Capital-Related	0.0000	0.0001	0.0019	0.0000	0.0000	0.0020
	Rental	0.0005	0.0010	0.0011	0.0000	0.0000	0.0026
	Relocation	0.0019	0.0008	0.0015	0.0002	0.0005	0.0049
	Subtotal	**0.0024**	**0.0021**	**0.0068**	**0.0002**	**0.0008**	**0.0123**
Capital Stock Losses							
	Structural	0.0035	0.0021	0.0021	0.0007	0.0007	0.0091
	Non_Structural	0.0080	0.0050	0.0037	0.0015	0.0013	0.0195
	Content	0.0019	0.0008	0.0016	0.0009	0.0005	0.0057
	Inventory	0.0000	0.0000	0.0000	0.0001	0.0000	0.0001
	Subtotal	**0.0134**	**0.0079**	**0.0074**	**0.0032**	**0.0025**	**0.0344**
	Total	**0.02**	**0.01**	**0.01**	**0.00**	**0.00**	**0.05**

Transportation and Utility Lifeline Losses

For the transportation and utility lifeline systems, Hazus computes the direct repair cost for each component only. There are no losses computed by Hazus for business interruption due to lifeline outages. Tables 12 & 13 provide a detailed breakdown in the expected lifeline losses.

Table 12: Transportation System Economic Losses
(Millions of dollars)

System	Component	Inventory Value	Economic Loss	Loss Ratio (%)
Highway	Segments	3688.9929	0.0000	0.00
	Bridges	1251.7115	0.0000	0.00
	Tunnels	0.0000	0.0000	0.00
	Subtotal	**4940.7044**	**0.0000**	
Railways	Segments	368.4381	0.0000	0.00
	Bridges	588.2104	0.0000	0.00
	Tunnels	0.0000	0.0000	0.00
	Facilities	5.3260	0.0035	0.07
	Subtotal	**961.9745**	**0.0035**	
Light Rail	Segments	0.0000	0.0000	0.00
	Bridges	0.0000	0.0000	0.00
	Tunnels	0.0000	0.0000	0.00
	Facilities	0.0000	0.0000	0.00
	Subtotal	**0.0000**	**0.0000**	
Bus	Facilities	20.3489	0.0077	0.04
	Subtotal	**20.3489**	**0.0077**	
Ferry	Facilities	2.6620	0.0000	0.00
	Subtotal	**2.6620**	**0.0000**	
Port	Facilities	0.0000	0.0000	0.00
	Subtotal	**0.0000**	**0.0000**	
Airport	Facilities	15.8975	0.0109	0.07
	Runways	199.3450	0.0000	0.00
	Subtotal	**215.2425**	**0.0109**	
	Total	**6,140.93**	**0.02**	

Table 13: Utility System Economic Losses

(Millions of dollars)

System	Component	Inventory Value	Economic Loss	Loss Ratio (%)
Potable Water	Pipelines	0.0000	0.0000	0.00
	Facilities	0.0000	0.0000	0.00
	Distribution Line	209.3717	0.0061	0.00
	Subtotal	**209.3717**	**0.0061**	
Waste Water	Pipelines	0.0000	0.0000	0.00
	Facilities	4546.7080	0.0091	0.00
	Distribution Line	125.6230	0.0031	0.00
	Subtotal	**4672.3310**	**0.0122**	
Natural Gas	Pipelines	399.4503	0.0000	0.00
	Facilities	3.7094	0.0000	0.00
	Distribution Line	83.7487	0.0011	0.00
	Subtotal	**486.9084**	**0.0011**	
Oil Systems	Pipelines	0.0000	0.0000	0.00
	Facilities	0.0000	0.0000	0.00
	Subtotal	**0.0000**	**0.0000**	
Electrical Power	Facilities	1111.7708	0.0000	0.00
	Subtotal	**1111.7708**	**0.0000**	
Communication	Facilities	1.2980	0.0000	0.00
	Subtotal	**1.2980**	**0.0000**	
	Total	**6,481.68**	**0.02**	

Appendix A: County Listing for the Region

Chautauqua,NY

Appendix B: Regional Population and Building Value Data

State	County Name	Population	Building Value (millions of dollars)		
			Residential	Non-Residential	Total
New York					
	Chautauqua	134,905	12,344	4,860	17,205
Total Region		**134,905**	**12,344**	**4,860**	**17,205**

Hazus: Earthquake Global Risk Report

Region Name: Chautauqua_HMP

Earthquake Scenario: 1000-Year

Print Date: November 29, 2022

Disclaimer:
This version of Hazus utilizes 2010 Census Data.
Totals only reflect data for those census tracts/blocks included in the user's study region.

The estimates of social and economic impacts contained in this report were produced using Hazus loss estimation methodology software which is based on current scientific and engineering knowledge. There are uncertainties inherent in any loss estimation technique. Therefore, there may be significant differences between the modeled results contained in this report and the actual social and economic losses following a specific earthquake. These results can be improved by using enhanced inventory, geotechnical, and observed ground motion data.

Table of Contents

Section	Page #
General Description of the Region	3
Building and Lifeline Inventory	4
Building Inventory	
Critical Facility Inventory	
Transportation and Utility Lifeline Inventory	
Earthquake Scenario Parameters	7
Direct Earthquake Damage	8
Buildings Damage	
Essential Facilities Damage	
Transportation and Utility Lifeline Damage	
Induced Earthquake Damage	14
Fire Following Earthquake	
Debris Generation	
Social Impact	15
Shelter Requirements	
Casualties	
Economic Loss	17
Building Related Losses	
Transportation and Utility Lifeline Losses	

Appendix A: County Listing for the Region

Appendix B: Regional Population and Building Value Data

General Description of the Region

Hazus-MH is a regional earthquake loss estimation model that was developed by the Federal Emergency Management Agency (FEMA) and the National Institute of Building Sciences. The primary purpose of Hazus is to provide a methodology and software application to develop multi-hazard losses at a regional scale. These loss estimates would be used primarily by local, state and regional officials to plan and stimulate efforts to reduce risks from multi-hazards and to prepare for emergency response and recovery.

The earthquake loss estimates provided in this report was based on a region that includes 1 county(ies) from the following state(s):

New York

Note:
Appendix A contains a complete listing of the counties contained in the region.

The geographical size of the region is 1,084.38 square miles and contains 35 census tracts. There are over 54 thousand households in the region which has a total population of 134,905 people (2010 Census Bureau data). The distribution of population by Total Region and County is provided in Appendix B.

There are an estimated 61 thousand buildings in the region with a total building replacement value (excluding contents) of 17,205 (millions of dollars). Approximately 91.00 % of the buildings (and 72.00% of the building value) are associated with residential housing.

The replacement value of the transportation and utility lifeline systems is estimated to be 6,140 and 6,481 (millions of dollars) , respectively.

Building and Lifeline Inventory

Building Inventory

Hazus estimates that there are 61 thousand buildings in the region which have an aggregate total replacement value of 17,205 (millions of dollars) . Appendix B provides a general distribution of the building value by Total Region and County.

In terms of building construction types found in the region, wood frame construction makes up 70% of the building inventory. The remaining percentage is distributed between the other general building types.

Critical Facility Inventory

Hazus breaks critical facilities into two (2) groups: essential facilities and high potential loss facilities (HPL). Essential facilities include hospitals, medical clinics, schools, fire stations, police stations and emergency operations facilities. High potential loss facilities include dams, levees, military installations, nuclear power plants and hazardous material sites.

For essential facilities, there are 7 hospitals in the region with a total bed capacity of 399 beds. There are 72 schools, 53 fire stations, 15 police stations and 1 emergency operation facilities. With respect to high potential loss facilities (HPL), there are no dams identified within the inventory. The inventory also includes 59 hazardous material sites, no military installations and no nuclear power plants.

Transportation and Utility Lifeline Inventory

Within Hazus, the lifeline inventory is divided between transportation and utility lifeline systems. There are seven (7) transportation systems that include highways, railways, light rail, bus, ports, ferry and airports. There are six (6) utility systems that include potable water, wastewater, natural gas, crude & refined oil, electric power and communications. The lifeline inventory data are provided in Tables 1 and 2.

The total value of the lifeline inventory is over 12,621.00 (millions of dollars). This inventory includes over 423.78 miles of highways, 558 bridges, 10,750.34 miles of pipes.

Table 1: Transportation System Lifeline Inventory

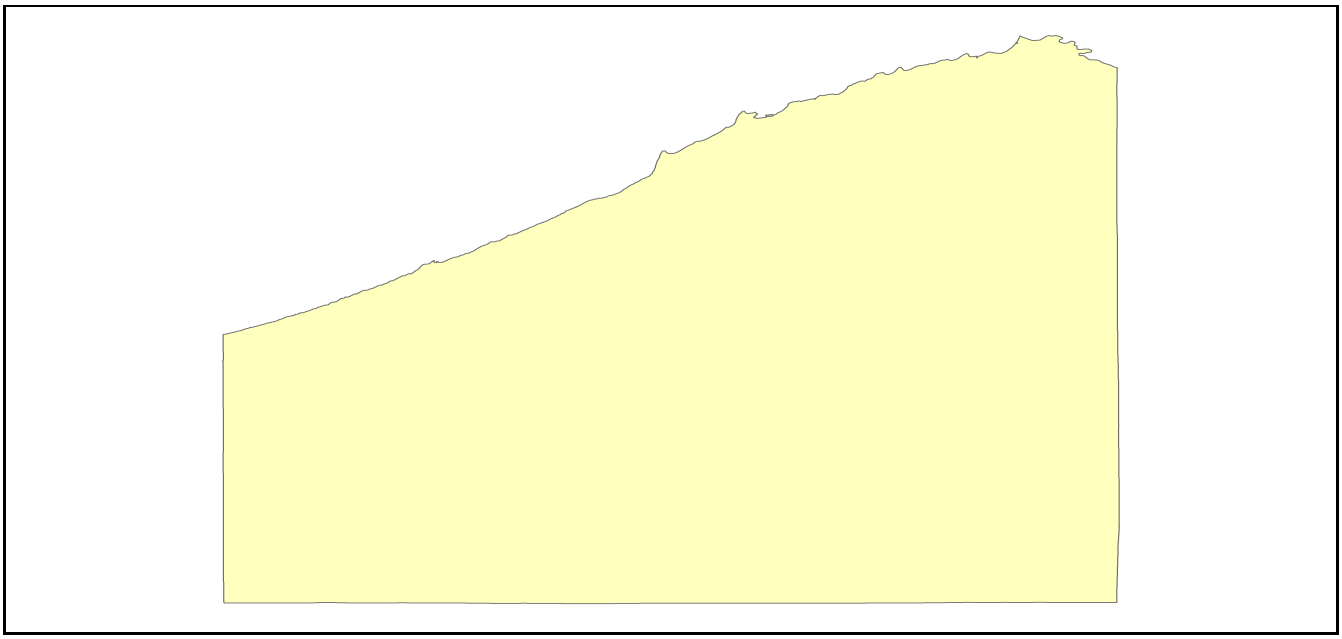
System	Component	# Locations/ # Segments	Replacement value (millions of dollars)
Highway	Bridges	558	1251.7115
	Segments	149	3688.9929
	Tunnels	0	0.0000
		Subtotal	**4940.7044**
Railways	Bridges	111	588.2104
	Facilities	2	5.3260
	Segments	106	368.4381
	Tunnels	0	0.0000
		Subtotal	**961.9745**
Light Rail	Bridges	0	0.0000
	Facilities	0	0.0000
	Segments	0	0.0000
	Tunnels	0	0.0000
		Subtotal	**0.0000**
Bus	Facilities	12	20.3489
		Subtotal	**20.3489**
Ferry	Facilities	2	2.6620
		Subtotal	**2.6620**
Port	Facilities	0	0.0000
		Subtotal	**0.0000**
Airport	Facilities	3	15.8975
	Runways	4	199.3450
		Subtotal	**215.2425**
		Total	**6,140.90**

Table 2: Utility System Lifeline Inventory

System	Component	# Locations / Segments	Replacement value (millions of dollars)
Potable Water	Distribution Lines	NA	209.3717
	Facilities	0	0.0000
	Pipelines	0	0.0000
		Subtotal	**209.3717**
Waste Water	Distribution Lines	NA	125.6230
	Facilities	30	4546.7080
	Pipelines	0	0.0000
		Subtotal	**4672.3310**
Natural Gas	Distribution Lines	NA	83.7487
	Facilities	2	3.7094
	Pipelines	84	399.4503
		Subtotal	**486.9084**
Oil Systems	Facilities	0	0.0000
	Pipelines	0	0.0000
		Subtotal	**0.0000**
Electrical Power	Facilities	2	1111.7708
		Subtotal	**1111.7708**
Communication	Facilities	11	1.2980
		Subtotal	**1.2980**
		Total	**6,481.70**

Earthquake Scenario

Hazus uses the following set of information to define the earthquake parameters used for the earthquake loss estimate provided in this report.



Scenario Name	1000-Year
Type of Earthquake	Probabilistic
Fault Name	NA
Historical Epicenter ID #	NA
Probabilistic Return Period	1,000.00
Longitude of Epicenter	NA
Latitude of Epicenter	NA
Earthquake Magnitude	5.00
Depth (km)	NA
Rupture Length (Km)	NA
Rupture Orientation (degrees)	NA
Attenuation Function	NA

Direct Earthquake Damage

Building Damage

Hazus estimates that about 0 buildings will be at least moderately damaged. This is over 0.00 % of the buildings in the region. There are an estimated 0 buildings that will be damaged beyond repair. The definition of the 'damage states' is provided in Volume 1: Chapter 5 of the Hazus technical manual. Table 3 below summarizes the expected damage by general occupancy for the buildings in the region. Table 4 below summarizes the expected damage by general building type.

Damage Categories by General Occupancy Type

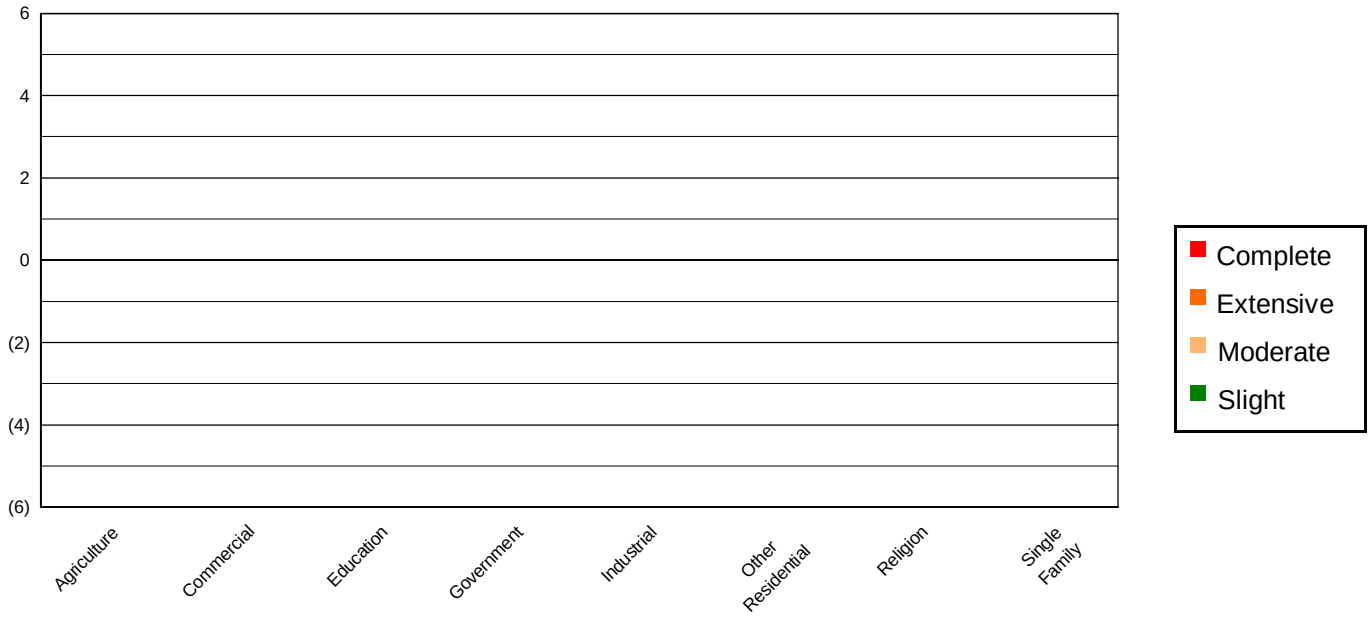


Table 3: Expected Building Damage by Occupancy

	None		Slight		Moderate		Extensive		Complete	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Agriculture	247.00	0.43	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Commercial	1937.00	3.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Education	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Government	14.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Industrial	343.00	0.59	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Other Residential	9426.00	16.23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Religion	218.00	0.38	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Single Family	45907.00	79.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	**58,092**		**0**		**0**		**0**		**0**	

Table 4: Expected Building Damage by Building Type (All Design Levels)

	None		Slight		Moderate		Extensive		Complete	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Wood	43111.00	74.21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Steel	1270.00	2.19	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Concrete	620.00	1.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Precast	14.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
RM	376.00	0.65	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
URM	8187.00	14.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MH	4514.00	7.77	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	**58,092**		**0**		**0**		**0**		**0**	

*Note:
RM Reinforced Masonry
URM Unreinforced Masonry
MH Manufactured Housing

Essential Facility Damage

Before the earthquake, the region had 399 hospital beds available for use. On the day of the earthquake, the model estimates that only 394 hospital beds (99.00%) are available for use by patients already in the hospital and those injured by the earthquake. After one week, 100.00% of the beds will be back in service. By 30 days, 100.00% will be operational.

Table 5: Expected Damage to Essential Facilities

Classification	Total	# Facilities		
		At Least Moderate Damage > 50%	Complete Damage > 50%	With Functionality > 50% on day 1
Hospitals	7	0	0	7
Schools	72	0	0	72
EOCs	1	0	0	1
PoliceStations	15	0	0	15
FireStations	53	0	0	53

Transportation Lifeline Damage

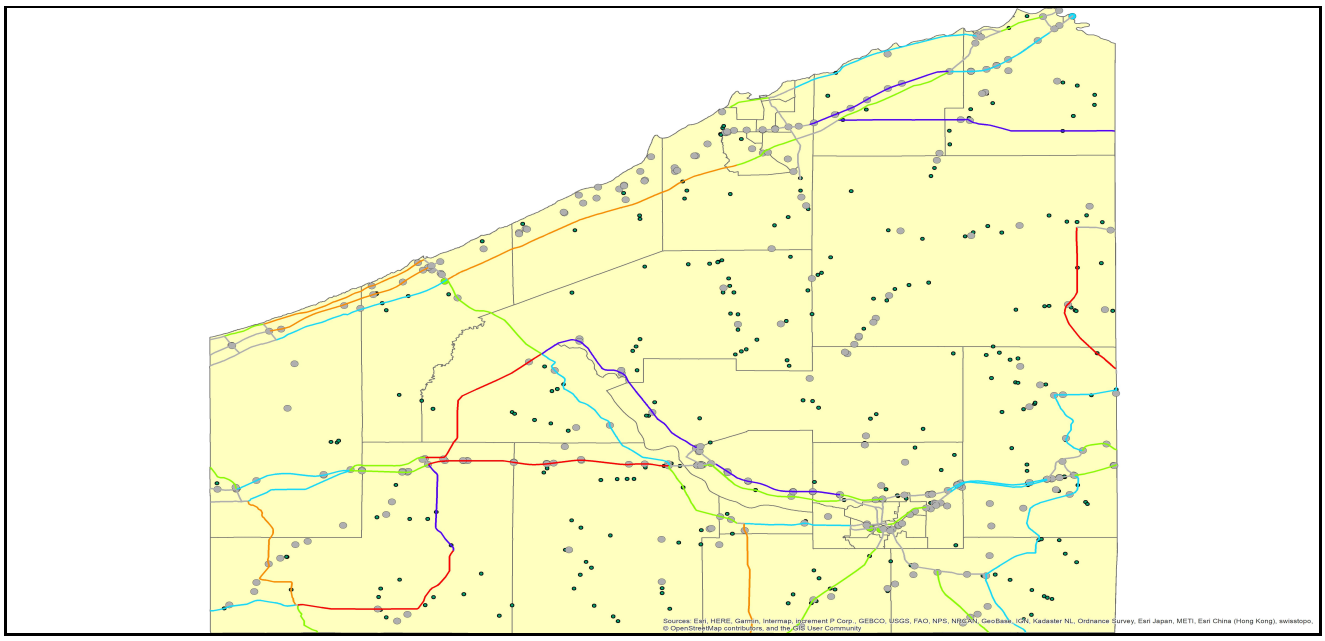


Table 6: Expected Damage to the Transportation Systems

System	Component		Number of Locations_			
		Locations/ Segments	With at Least Mod. Damage	With Complete Damage	With Functionality > 50 %	
					After Day 1	After Day 7
Highway	Segments	149	0	0	149	149
	Bridges	558	0	0	558	558
	Tunnels	0	0	0	0	0
Railways	Segments	106	0	0	106	106
	Bridges	111	0	0	111	111
	Tunnels	0	0	0	0	0
	Facilities	2	0	0	2	2
Light Rail	Segments	0	0	0	0	0
	Bridges	0	0	0	0	0
	Tunnels	0	0	0	0	0
	Facilities	0	0	0	0	0
Bus	Facilities	12	0	0	12	12
Ferry	Facilities	2	0	0	2	2
Port	Facilities	0	0	0	0	0
Airport	Facilities	3	0	0	3	3
	Runways	4	0	0	4	4

Table 6 provides damage estimates for the transportation system.

Note: Roadway segments, railroad tracks and light rail tracks are assumed to be damaged by ground failure only. If ground failure maps are not provided, damage estimates to these components will not be computed.

Tables 7-9 provide information on the damage to the utility lifeline systems. Table 7 provides damage to the utility system facilities. Table 8 provides estimates on the number of leaks and breaks by the pipelines of the utility systems. For electric power and potable water, Hazus performs a simplified system performance analysis. Table 9 provides a summary of the system performance information.

Table 7 : Expected Utility System Facility Damage

System	# of Locations				
	Total #	With at Least Moderate Damage	With Complete Damage	with Functionality > 50 %	
				After Day 1	After Day 7
Potable Water	0	0	0	0	0
Waste Water	30	0	0	30	30
Natural Gas	2	0	0	2	2
Oil Systems	0	0	0	0	0
Electrical Power	2	0	0	2	2
Communication	11	0	0	11	11

Table 8 : Expected Utility System Pipeline Damage (Site Specific)

System	Total Pipelines Length (miles)	Number of Leaks	Number of Breaks
Potable Water	6,505	1	0
Waste Water	3,903	1	0
Natural Gas	343	0	0
Oil	0	0	0

Table 9: Expected Potable Water and Electric Power System Performance

	Total # of Households	Number of Households without Service				
		At Day 1	At Day 3	At Day 7	At Day 30	At Day 90
Potable Water	54,244	0	0	0	0	0
Electric Power		0	0	0	0	0

Induced Earthquake Damage

Fire Following Earthquake

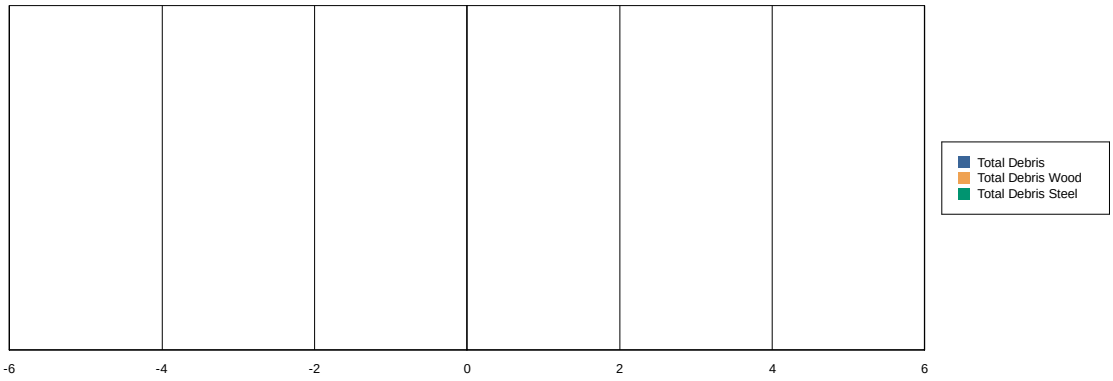
Fires often occur after an earthquake. Because of the number of fires and the lack of water to fight the fires, they can often burn out of control. Hazus uses a Monte Carlo simulation model to estimate the number of ignitions and the amount of burnt area. For this scenario, the model estimates that there will be 0 ignitions that will burn about 0.00 sq. mi 0.00 % of the region's total area.) The model also estimates that the fires will displace about 0 people and burn about 0 (millions of dollars) of building value.

Debris Generation

Hazus estimates the amount of debris that will be generated by the earthquake. The model breaks the debris into two general categories: a) Brick/Wood and b) Reinforced Concrete/Steel. This distinction is made because of the different types of material handling equipment required to handle the debris.

The model estimates that a total of 0 tons of debris will be generated. Of the total amount, Brick/Wood comprises % of the total, with the remainder being Reinforced Concrete/Steel. If the debris tonnage is converted to an estimated number of truckloads, it will require 0 truckloads (@25 tons/truck) to remove the debris generated by the earthquake.

Earthquake Debris (millions of tons)



Brick/ Wood	Reinforced Concrete/Steel	Total Debris	Truck Load
		0.00	0 (@25 tons/truck)

Social Impact

Shelter Requirement

Hazus estimates the number of households that are expected to be displaced from their homes due to the earthquake and the number of displaced people that will require accommodations in temporary public shelters. The model estimates 0 households to be displaced due to the earthquake. Of these, 0 people (out of a total population of 134,905) will seek temporary shelter in public shelters.

Displaced Households/ Persons Seeking Short Term Public Shelter

Displaced households as a result of the earthquake	Persons seeking temporary public shelter
0	0

Casualties

Hazus estimates the number of people that will be injured and killed by the earthquake. The casualties are broken down into four (4) severity levels that describe the extent of the injuries. The levels are described as follows;

- Severity Level 1: Injuries will require medical attention but hospitalization is not needed.
- Severity Level 2: Injuries will require hospitalization but are not considered life-threatening
- Severity Level 3: Injuries will require hospitalization and can become life threatening if not promptly treated.
- Severity Level 4: Victims are killed by the earthquake.

The casualty estimates are provided for three (3) times of day: 2:00 AM, 2:00 PM and 5:00 PM. These times represent the periods of the day that different sectors of the community are at their peak occupancy loads. The 2:00 AM estimate considers that the residential occupancy load is maximum, the 2:00 PM estimate considers that the educational, commercial and industrial sector loads are maximum and 5:00 PM represents peak commute time.

Table 10 provides a summary of the casualties estimated for this earthquake

Table 10: Casualty Estimates

		Level 1	Level 2	Level 3	Level 4
2 AM	Commercial	0.00	0.00	0.00	0.00
	Commuting	0.00	0.00	0.00	0.00
	Educational	0.00	0.00	0.00	0.00
	Hotels	0.00	0.00	0.00	0.00
	Industrial	0.00	0.00	0.00	0.00
	Other-Residential	0.00	0.00	0.00	0.00
	Single Family	0.01	0.00	0.00	0.00
	Total	**0**	**0**	**0**	**0**
2 PM	Commercial	0.01	0.00	0.00	0.00
	Commuting	0.00	0.00	0.00	0.00
	Educational	0.00	0.00	0.00	0.00
	Hotels	0.00	0.00	0.00	0.00
	Industrial	0.00	0.00	0.00	0.00
	Other-Residential	0.00	0.00	0.00	0.00
	Single Family	0.00	0.00	0.00	0.00
	Total	**0**	**0**	**0**	**0**
5 PM	Commercial	0.00	0.00	0.00	0.00
	Commuting	0.00	0.00	0.00	0.00
	Educational	0.00	0.00	0.00	0.00
	Hotels	0.00	0.00	0.00	0.00
	Industrial	0.00	0.00	0.00	0.00
	Other-Residential	0.00	0.00	0.00	0.00
	Single Family	0.00	0.00	0.00	0.00
	Total	**0**	**0**	**0**	**0**

Economic Loss

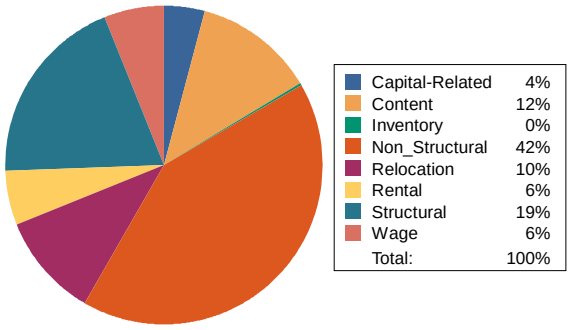
The total economic loss estimated for the earthquake is 0.09 (millions of dollars), which includes building and lifeline related losses based on the region's available inventory. The following three sections provide more detailed information about these losses.

Building-Related Losses

The building losses are broken into two categories: direct building losses and business interruption losses. The direct building losses are the estimated costs to repair or replace the damage caused to the building and its contents. The business interruption losses are the losses associated with inability to operate a business because of the damage sustained during the earthquake. Business interruption losses also include the temporary living expenses for those people displaced from their homes because of the earthquake.

The total building-related losses were 0.05 (millions of dollars); 26 % of the estimated losses were related to the business interruption of the region. By far, the largest loss was sustained by the residential occupancies which made up over 55 % of the total loss. Table 11 below provides a summary of the losses associated with the building damage.

Earthquake Losses by Loss Type ($ millions)



Earthquake Losses by Occupancy Type ($ millions)

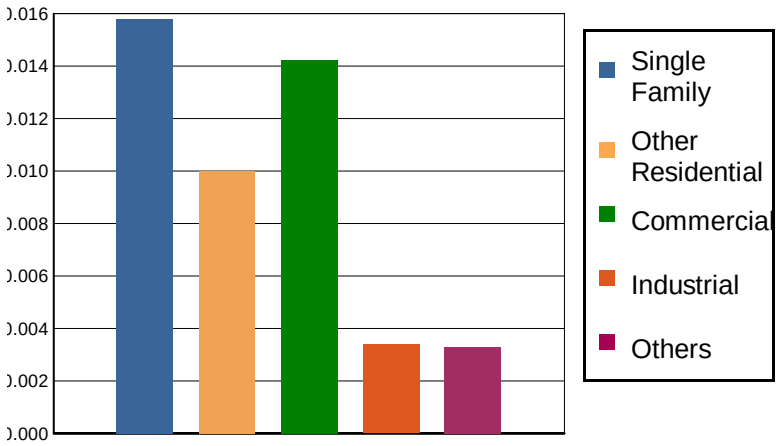


Table 11: Building-Related Economic Loss Estimates

(Millions of dollars)

Category	Area	Single Family	Other Residential	Commercial	Industrial	Others	Total
Income Losses							
	Wage	0.0000	0.0002	0.0023	0.0000	0.0003	0.0028
	Capital-Related	0.0000	0.0001	0.0019	0.0000	0.0000	0.0020
	Rental	0.0005	0.0010	0.0011	0.0000	0.0000	0.0026
	Relocation	0.0019	0.0008	0.0015	0.0002	0.0005	0.0049
	Subtotal	**0.0024**	**0.0021**	**0.0068**	**0.0002**	**0.0008**	**0.0123**
Capital Stock Losses							
	Structural	0.0035	0.0021	0.0021	0.0007	0.0007	0.0091
	Non_Structural	0.0080	0.0050	0.0037	0.0015	0.0013	0.0195
	Content	0.0019	0.0008	0.0016	0.0009	0.0005	0.0057
	Inventory	0.0000	0.0000	0.0000	0.0001	0.0000	0.0001
	Subtotal	**0.0134**	**0.0079**	**0.0074**	**0.0032**	**0.0025**	**0.0344**
	Total	**0.02**	**0.01**	**0.01**	**0.00**	**0.00**	**0.05**

Transportation and Utility Lifeline Losses

For the transportation and utility lifeline systems, Hazus computes the direct repair cost for each component only. There are no losses computed by Hazus for business interruption due to lifeline outages. Tables 12 & 13 provide a detailed breakdown in the expected lifeline losses.

Table 12: Transportation System Economic Losses
(Millions of dollars)

System	Component	Inventory Value	Economic Loss	Loss Ratio (%)
Highway	Segments	3688.9929	0.0000	0.00
	Bridges	1251.7115	0.0000	0.00
	Tunnels	0.0000	0.0000	0.00
	Subtotal	**4940.7044**	**0.0000**	
Railways	Segments	368.4381	0.0000	0.00
	Bridges	588.2104	0.0000	0.00
	Tunnels	0.0000	0.0000	0.00
	Facilities	5.3260	0.0035	0.07
	Subtotal	**961.9745**	**0.0035**	
Light Rail	Segments	0.0000	0.0000	0.00
	Bridges	0.0000	0.0000	0.00
	Tunnels	0.0000	0.0000	0.00
	Facilities	0.0000	0.0000	0.00
	Subtotal	**0.0000**	**0.0000**	
Bus	Facilities	20.3489	0.0077	0.04
	Subtotal	**20.3489**	**0.0077**	
Ferry	Facilities	2.6620	0.0000	0.00
	Subtotal	**2.6620**	**0.0000**	
Port	Facilities	0.0000	0.0000	0.00
	Subtotal	**0.0000**	**0.0000**	
Airport	Facilities	15.8975	0.0109	0.07
	Runways	199.3450	0.0000	0.00
	Subtotal	**215.2425**	**0.0109**	
	Total	**6,140.93**	**0.02**	

Table 13: Utility System Economic Losses

(Millions of dollars)

System	Component	Inventory Value	Economic Loss	Loss Ratio (%)
Potable Water	Pipelines	0.0000	0.0000	0.00
	Facilities	0.0000	0.0000	0.00
	Distribution Line	209.3717	0.0061	0.00
	Subtotal	**209.3717**	**0.0061**	
Waste Water	Pipelines	0.0000	0.0000	0.00
	Facilities	4546.7080	0.0091	0.00
	Distribution Line	125.6230	0.0031	0.00
	Subtotal	**4672.3310**	**0.0122**	
Natural Gas	Pipelines	399.4503	0.0000	0.00
	Facilities	3.7094	0.0000	0.00
	Distribution Line	83.7487	0.0011	0.00
	Subtotal	**486.9084**	**0.0011**	
Oil Systems	Pipelines	0.0000	0.0000	0.00
	Facilities	0.0000	0.0000	0.00
	Subtotal	**0.0000**	**0.0000**	
Electrical Power	Facilities	1111.7708	0.0000	0.00
	Subtotal	**1111.7708**	**0.0000**	
Communication	Facilities	1.2980	0.0000	0.00
	Subtotal	**1.2980**	**0.0000**	
	Total	**6,481.68**	**0.02**	

Appendix A: County Listing for the Region

Chautauqua,NY

Appendix B: Regional Population and Building Value Data

State	County Name	Population	Building Value (millions of dollars)		
			Residential	Non-Residential	Total
New York					
	Chautauqua	134,905	12,344	4,860	17,205
Total Region		**134,905**	**12,344**	**4,860**	**17,205**

Hazus: Hurricane Global Risk Report

Region Name: Chautauqua_HMP

Hurricane Scenario: Probabilistic 500-year Return Period

Print Date: Tuesday, November 29, 2022

Disclaimer:
This version of Hazus utilizes 2010 Census Data.
Totals only reflect data for those census tracts/blocks included in the user's study region.

The estimates of social and economic impacts contained in this report were produced using Hazus loss estimation methodology software which is based on current scientific and engineering knowledge. There are uncertainties inherent in any loss estimation technique. Therefore, there may be significant differences between the modeled results contained in this report and the actual social and economic losses following a specific Hurricane. These results can be improved by using enhanced inventory data.

Table of Contents

Section	Page #
General Description of the Region	3
Building Inventory	4
General Building Stock	
Essential Facility Inventory	
Hurricane Scenario Parameters	5
Building Damage	6
General Building Stock	
Essential Facilities Damage	
Induced Hurricane Damage	8
Debris Generation	
Social Impact	8
Shelter Requirements	
Economic Loss	9
Building Losses	
Appendix A: County Listing for the Region	10
Appendix B: Regional Population and Building Value Data	11

General Description of the Region

Hazus is a regional multi-hazard loss estimation model that was developed by the Federal Emergency Management Agency and the National Institute of Building Sciences. The primary purpose of Hazus is to provide a methodology and software application to develop multi-hazard losses at a regional scale. These loss estimates would be used primarily by local, state and regional officials to plan and stimulate efforts to reduce risks from multi-hazards and to prepare for emergency response and recovery.

The hurricane loss estimates provided in this report are based on a region that includes 1 county(ies) from the following state(s):

- New York

Note:
Appendix A contains a complete listing of the counties contained in the region.

The geographical size of the region is 1,084.66 square miles and contains 35 census tracts. There are over 54 thousand households in the region and a total population of 134,905 people (2010 Census Bureau data). The distribution of population by State and County is provided in Appendix B.

There are an estimated 61 thousand buildings in the region with a total building replacement value (excluding contents) of 17,205 million dollars (2014 dollars). Approximately 91% of the buildings (and 72% of the building value) are associated with residential housing.

Building Inventory

General Building Stock

Hazus estimates that there are 61,846 buildings in the region which have an aggregate total replacement value of 17,205 million (2014 dollars). Table 1 presents the relative distribution of the value with respect to the general occupancies. Appendix B provides a general distribution of the building value by State and County.

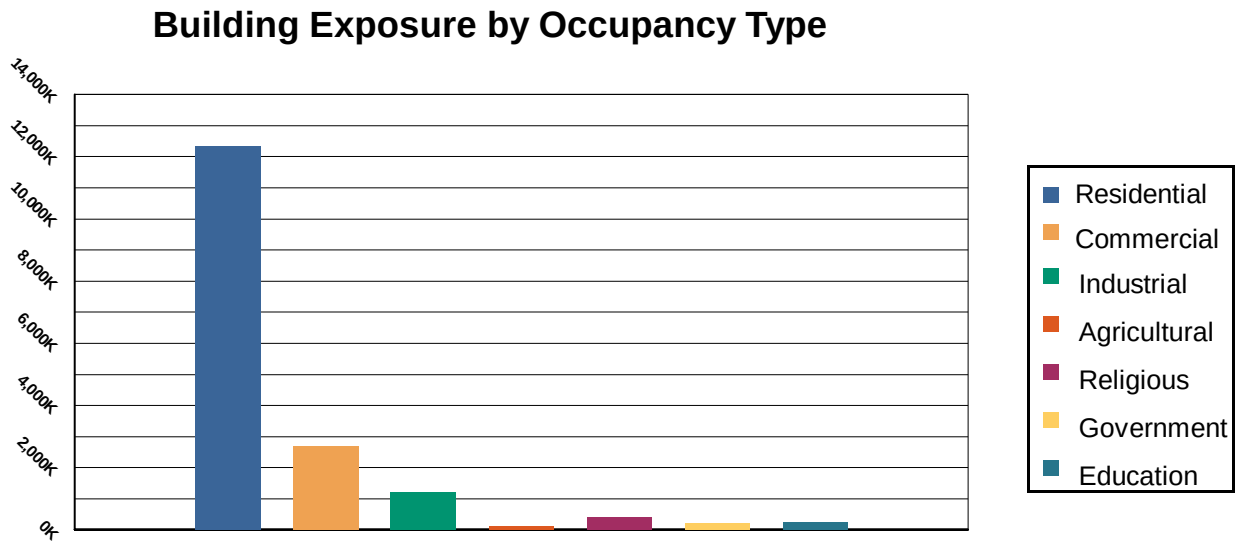


Table 1: Building Exposure by Occupancy Type

Occupancy	Exposure ($1000)	Percent of Tot
Residential	12,344,285	71.75 %
Commercial	2,700,170	15.69%
Industrial	1,194,649	6.94%
Agricultural	121,748	0.71%
Religious	392,752	2.28%
Government	212,125	1.23%
Education	239,294	1.39%
Total	**17,205,023**	**100.00%**

Essential Facility Inventory

For essential facilities, there are 7 hospitals in the region with a total bed capacity of 399 beds. There are 72 schools, 53 fire stations, 15 police stations and 1 emergency operation facilities.

Hurricane Scenario

Hazus used the following set of information to define the hurricane parameters for the hurricane loss estimate provided in this report.

Scenario Name:	Probabilistic
Type:	Probabilistic

Building Damage

General Building Stock Damage

Hazus estimates that about 0 buildings will be at least moderately damaged. This is over 0% of the total number of buildings in the region. There are an estimated 0 buildings that will be completely destroyed. The definition of the 'damage states' is provided in the Hazus Hurricane technical manual. Table 2 below summarizes the expected damage by general occupancy for the buildings in the region. Table 3 summarizes the expected damage by general building type.

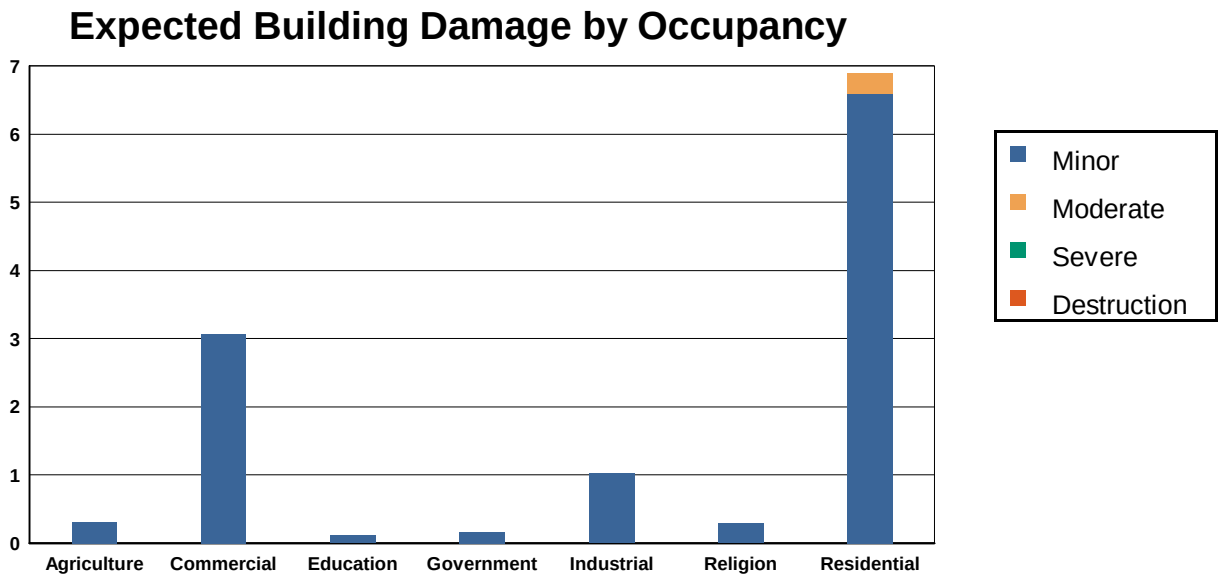


Table 2: Expected Building Damage by Occupancy : 500 - year Event

	None		Minor		Moderate		Severe		Destruction	
Occupancy	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**
Agriculture	401.69	99.92	0.31	0.08	0.00	0.00	0.00	0.00	0.00	0.00
Commercial	3,589.93	99.91	3.07	0.09	0.00	0.00	0.00	0.00	0.00	0.00
Education	119.89	99.91	0.11	0.09	0.00	0.00	0.00	0.00	0.00	0.00
Government	171.83	99.90	0.17	0.10	0.00	0.00	0.00	0.00	0.00	0.00
Industrial	1,054.98	99.90	1.02	0.10	0.00	0.00	0.00	0.00	0.00	0.00
Religion	391.71	99.93	0.29	0.07	0.00	0.00	0.00	0.00	0.00	0.00
Residential	56,104.11	99.99	6.59	0.01	0.30	0.00	0.00	0.00	0.00	0.00
Total	**61,834.14**		**11.56**		**0.30**		**0.00**		**0.00**	

Table 3: Expected Building Damage by Building Type : 500 - year Event

Building Type	None		Minor		Moderate		Severe		Destruction	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Concrete	451	99.90	0	0.10	0	0.00	0	0.00	0	0.00
Masonry	8,257	99.93	5	0.06	0	0.00	0	0.00	0	0.00
MH	3,375	100.00	0	0.00	0	0.00	0	0.00	0	0.00
Steel	2,446	99.90	2	0.10	0	0.00	0	0.00	0	0.00
Wood	43,728	100.00	0	0.00	0	0.00	0	0.00	0	0.00

Essential Facility Damage

Before the hurricane, the region had no hospital beds available for use. On the day of the hurricane, the model estimates that 399 hospital beds (0%) are available for use by patients already in the hospital and those injured by the hurricane. After one week, none of the beds will be in service. By 30 days, none will be operational.

Thematic Map of Essential Facilities with greater than 50% moderate

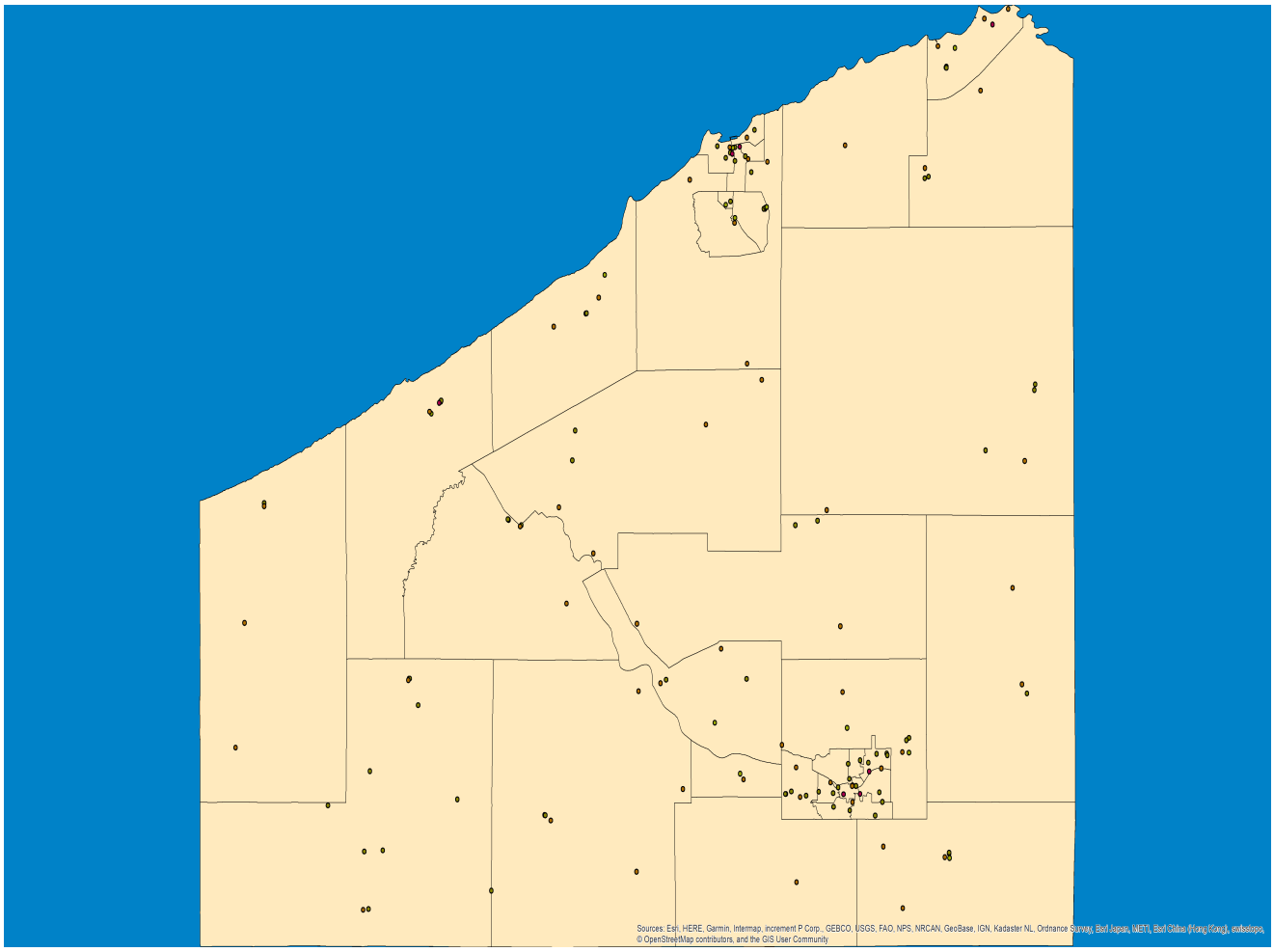
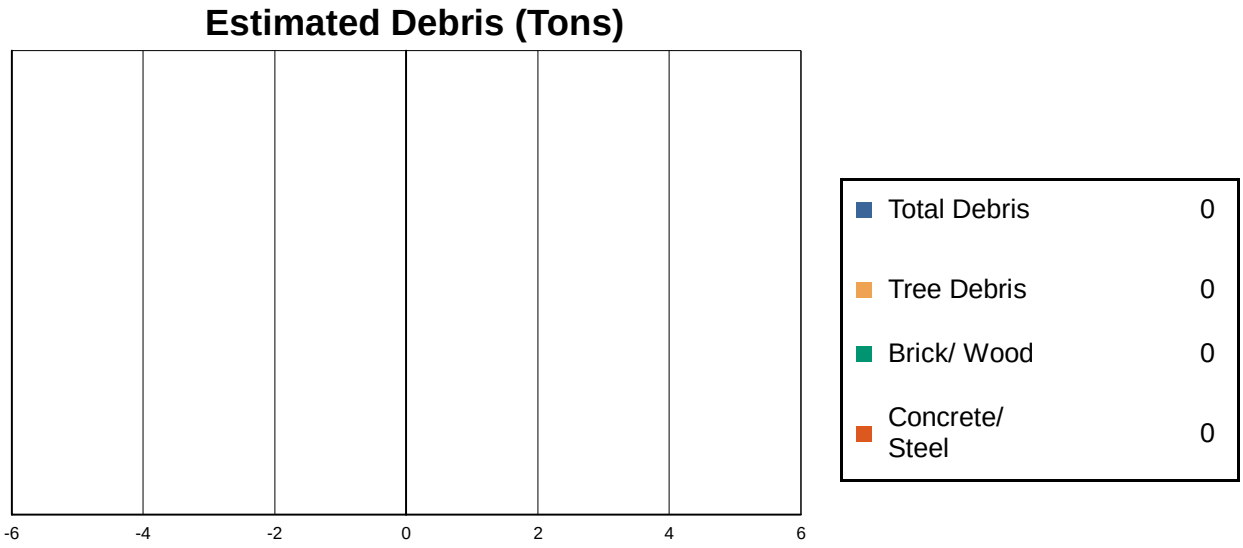


Table 4: Expected Damage to Essential Facilities

		# Facilities		
Classification	**Total**	**Probability of at Least Moderate**	**Probability of Complete Damage > 50%**	**Expected Loss of Use < 1 day**
EOCs	1	0	0	1
Fire Stations	53	0	0	53
Hospitals	7	0	0	7
Police Stations	15	0	0	15
Schools	72	0	0	72

Induced Hurricane Damage

Debris Generation

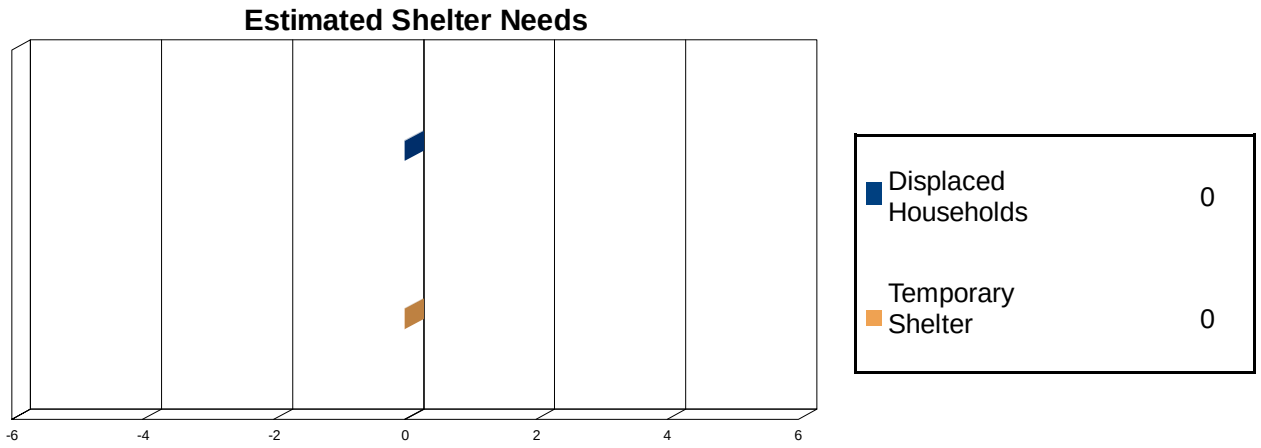


Hazus estimates the amount of debris that will be generated by the hurricane. The model breaks the debris into four general categories: a) Brick/Wood, b) Reinforced Concrete/Steel, c) Eligible Tree Debris, and d) Other Tree Debris. This distinction is made because of the different types of material handling equipment required to handle the debris.

The model estimates that a total of 0 tons of debris will be generated. Of the total amount, 0 tons (0%) is Other Tree Debris. Of the remaining 0 tons, Brick/Wood comprises 0% of the total, Reinforced Concrete/Steel comprises of 0% of the total, with the remainder being Eligible Tree Debris. If the building debris tonnage is converted to an estimated number of truckloads, it will require 0 truckloads (@25 tons/truck) to remove the building debris generated by the hurricane. The number of Eligible Tree Debris truckloads will depend on how the 0 tons of Eligible Tree Debris are collected and processed. The volume of tree debris generally ranges from about 4 cubic yards per ton for chipped or compacted tree debris to about 10 cubic yards per ton for bulkier, uncompacted debris.

Social Impact

Shelter Requirement



Hazus estimates the number of households that are expected to be displaced from their homes due to the hurricane and the number of displaced people that will require accommodations in temporary public shelters. The model estimates 0 households to be displaced due to the hurricane. Of these, 0 people (out of a total population of 134,905) will seek temporary shelter in public shelters.

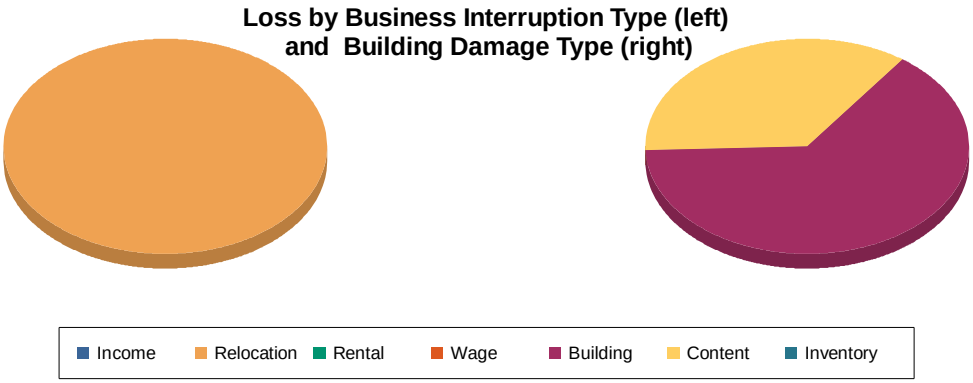
Economic Loss

The total economic loss estimated for the hurricane is 0.0 million dollars, which represents 0.00 % of the total replacement value of the region's buildings.

Building-Related Losses

The building related losses are broken into two categories: direct property damage losses and business interruption losses. The direct property damage losses are the estimated costs to repair or replace the damage caused to the building and its contents. The business interruption losses are the losses associated with inability to operate a business because of the damage sustained during the hurricane. Business interruption losses also include the temporary living expenses for those people displaced from their homes because of the hurricane.

The total property damage losses were 0 million dollars. 2% of the estimated losses were related to the business interruption of the region. By far, the largest loss was sustained by the residential occupancies which made up over 100% of the total loss. Table 5 below provides a summary of the losses associated with the building damage.



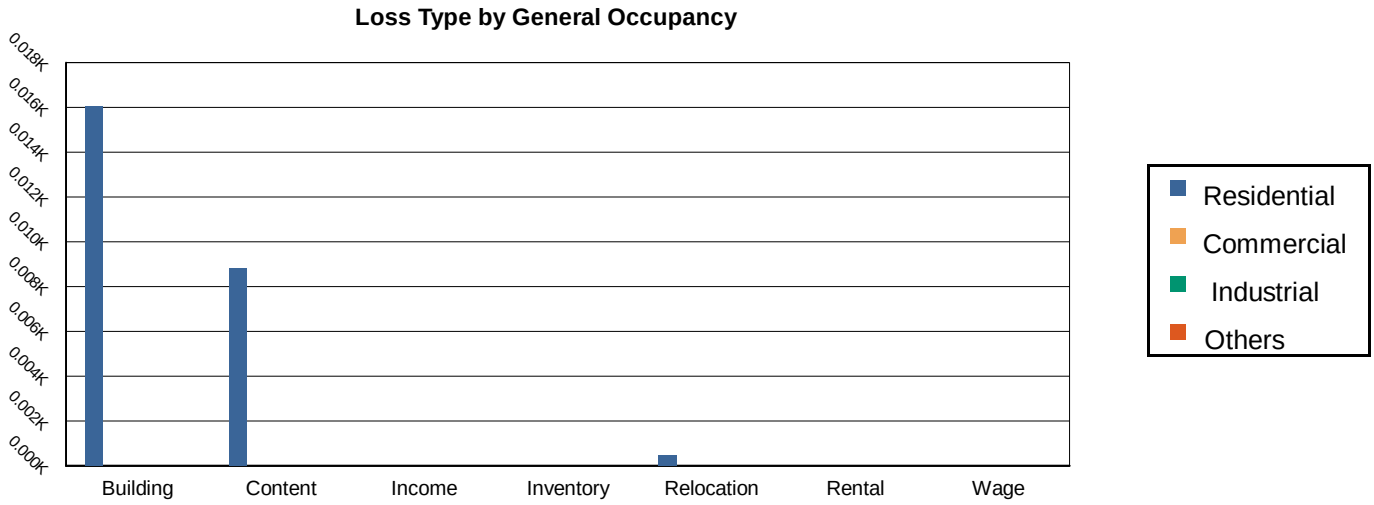


Table 5: Building-Related Economic Loss Estimates

(Thousands of dollars)

Category	Area	Residential	Commercial	Industrial	Others	Total
Property Damage						
	Building	16.06	0.00	0.00	0.00	16.06
	Content	8.81	0.00	0.00	0.00	8.81
	Inventory	0.00	0.00	0.00	0.00	0.00
	Subtotal	**24.88**	**0.00**	**0.00**	**0.00**	**24.88**
Business Interruption Loss						
	Income	0.00	0.00	0.00	0.00	0.00
	Relocation	0.49	0.00	0.00	0.00	0.49
	Rental	0.00	0.00	0.00	0.00	0.00
	Wage	0.00	0.00	0.00	0.00	0.00
	Subtotal	**0.49**	**0.00**	**0.00**	**0.00**	**0.49**

Total

Total	**25.36**	**0.00**	**0.00**	**0.00**	**25.36**

Appendix A: County Listing for the Region

New York
- Chautauqua

Appendix B: Regional Population and Building Value Data

		Building Value (thousands of dollars)		
	Population	Residential	Non-Residential	Total
New York				
Chautauqua	134,905	12,344,285	4,860,738	17,205,023
Total	**134,905**	**12,344,285**	**4,860,738**	**17,205,023**
Study Region Total	**134,905**	**12,344,285**	**4,860,738**	**17,205,023**

Hazus: Hurricane Global Risk Report

Region Name: Chautauqua_HMP

Hurricane Scenario: Probabilistic 1000-year Return Period

Print Date: Tuesday, November 29, 2022

Disclaimer:
This version of Hazus utilizes 2010 Census Data.
Totals only reflect data for those census tracts/blocks included in the user's study region.

The estimates of social and economic impacts contained in this report were produced using Hazus loss estimation methodology software which is based on current scientific and engineering knowledge. There are uncertainties inherent in any loss estimation technique. Therefore, there may be significant differences between the modeled results contained in this report and the actual social and economic losses following a specific Hurricane. These results can be improved by using enhanced inventory data.

Table of Contents

Section	Page #
General Description of the Region	3
Building Inventory	4
General Building Stock	
Essential Facility Inventory	
Hurricane Scenario Parameters	5
Building Damage	6
General Building Stock	
Essential Facilities Damage	
Induced Hurricane Damage	8
Debris Generation	
Social Impact	8
Shelter Requirements	
Economic Loss	9
Building Losses	
Appendix A: County Listing for the Region	10
Appendix B: Regional Population and Building Value Data	11

General Description of the Region

Hazus is a regional multi-hazard loss estimation model that was developed by the Federal Emergency Management Agency and the National Institute of Building Sciences. The primary purpose of Hazus is to provide a methodology and software application to develop multi-hazard losses at a regional scale. These loss estimates would be used primarily by local, state and regional officials to plan and stimulate efforts to reduce risks from multi-hazards and to prepare for emergency response and recovery.

The hurricane loss estimates provided in this report are based on a region that includes 1 county(ies) from the following state(s):

- New York

Note:
Appendix A contains a complete listing of the counties contained in the region.

The geographical size of the region is 1,084.66 square miles and contains 35 census tracts. There are over 54 thousand households in the region and a total population of 134,905 people (2010 Census Bureau data). The distribution of population by State and County is provided in Appendix B.

There are an estimated 61 thousand buildings in the region with a total building replacement value (excluding contents) of 17,205 million dollars (2014 dollars). Approximately 91% of the buildings (and 72% of the building value) are associated with residential housing.

Building Inventory

General Building Stock

Hazus estimates that there are 61,846 buildings in the region which have an aggregate total replacement value of 17,205 million (2014 dollars). Table 1 presents the relative distribution of the value with respect to the general occupancies. Appendix B provides a general distribution of the building value by State and County.

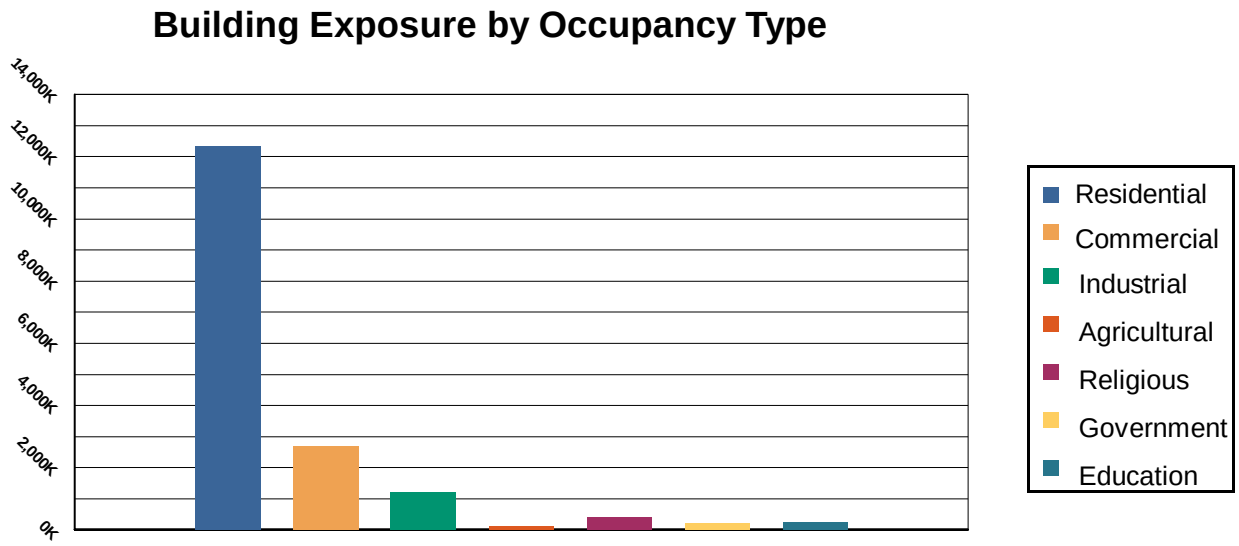


Table 1: Building Exposure by Occupancy Type

Occupancy	Exposure ($1000)	Percent of Tot
Residential	12,344,285	71.75 %
Commercial	2,700,170	15.69%
Industrial	1,194,649	6.94%
Agricultural	121,748	0.71%
Religious	392,752	2.28%
Government	212,125	1.23%
Education	239,294	1.39%
Total	**17,205,023**	**100.00%**

Essential Facility Inventory

For essential facilities, there are 7 hospitals in the region with a total bed capacity of 399 beds. There are 72 schools, 53 fire stations, 15 police stations and 1 emergency operation facilities.

Hurricane Scenario

Hazus used the following set of information to define the hurricane parameters for the hurricane loss estimate provided in this report.

Scenario Name:	Probabilistic
Type:	Probabilistic

Building Damage

General Building Stock Damage

Hazus estimates that about 1 buildings will be at least moderately damaged. This is over 0% of the total number of buildings in the region. There are an estimated 0 buildings that will be completely destroyed. The definition of the 'damage states' is provided in the Hazus Hurricane technical manual. Table 2 below summarizes the expected damage by general occupancy for the buildings in the region. Table 3 summarizes the expected damage by general building type.

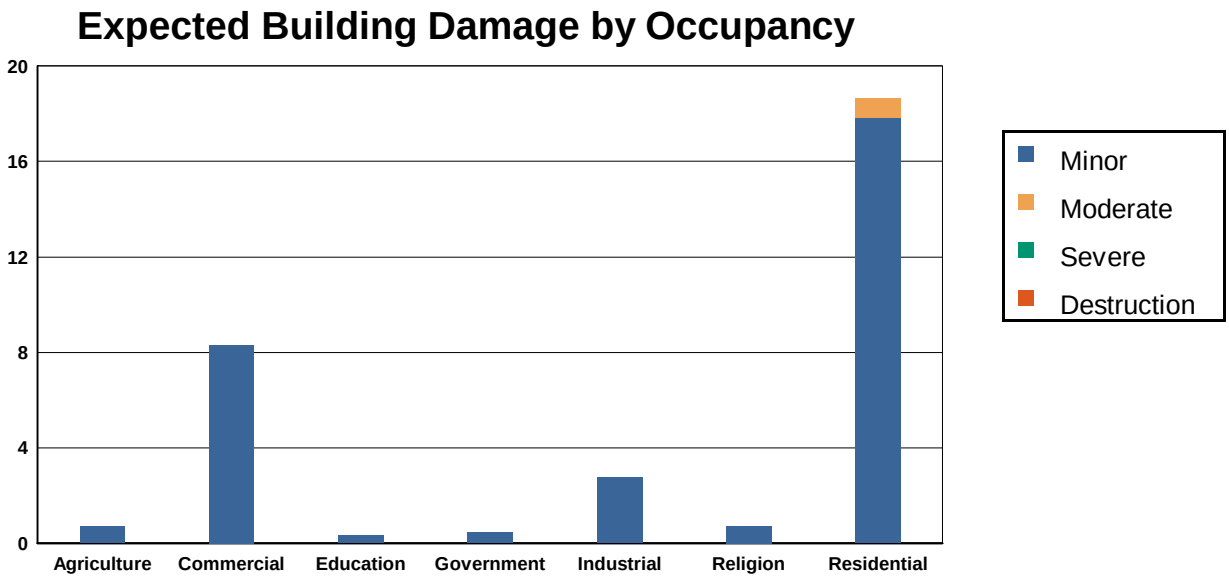


Table 2: Expected Building Damage by Occupancy : 1000 - year Event

	None		Minor		Moderate		Severe		Destruction	
Occupancy	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**
Agriculture	401.30	99.83	0.70	0.17	0.00	0.00	0.00	0.00	0.00	0.00
Commercial	3,584.70	99.77	8.30	0.23	0.00	0.00	0.00	0.00	0.00	0.00
Education	119.69	99.74	0.31	0.26	0.00	0.00	0.00	0.00	0.00	0.00
Government	171.54	99.73	0.46	0.27	0.00	0.00	0.00	0.00	0.00	0.00
Industrial	1,053.25	99.74	2.75	0.26	0.00	0.00	0.00	0.00	0.00	0.00
Religion	391.28	99.82	0.72	0.18	0.00	0.00	0.00	0.00	0.00	0.00
Residential	56,092.34	99.97	17.83	0.03	0.83	0.00	0.00	0.00	0.00	0.00
Total	**61,814.11**		**31.06**		**0.83**		**0.00**		**0.00**	

Table 3: Expected Building Damage by Building Type : 1000 - year Event

Building Type	None		Minor		Moderate		Severe		Destruction	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Concrete	450	99.68	1	0.32	0	0.00	0	0.00	0	0.00
Masonry	8,248	99.81	15	0.18	1	0.01	0	0.00	0	0.00
MH	3,375	100.00	0	0.00	0	0.00	0	0.00	0	0.00
Steel	2,441	99.72	7	0.28	0	0.00	0	0.00	0	0.00
Wood	43,727	100.00	1	0.00	0	0.00	0	0.00	0	0.00

Essential Facility Damage

Before the hurricane, the region had no hospital beds available for use. On the day of the hurricane, the model estimates that 399 hospital beds (0%) are available for use by patients already in the hospital and those injured by the hurricane. After one week, none of the beds will be in service. By 30 days, none will be operational.

Thematic Map of Essential Facilities with greater than 50% moderate

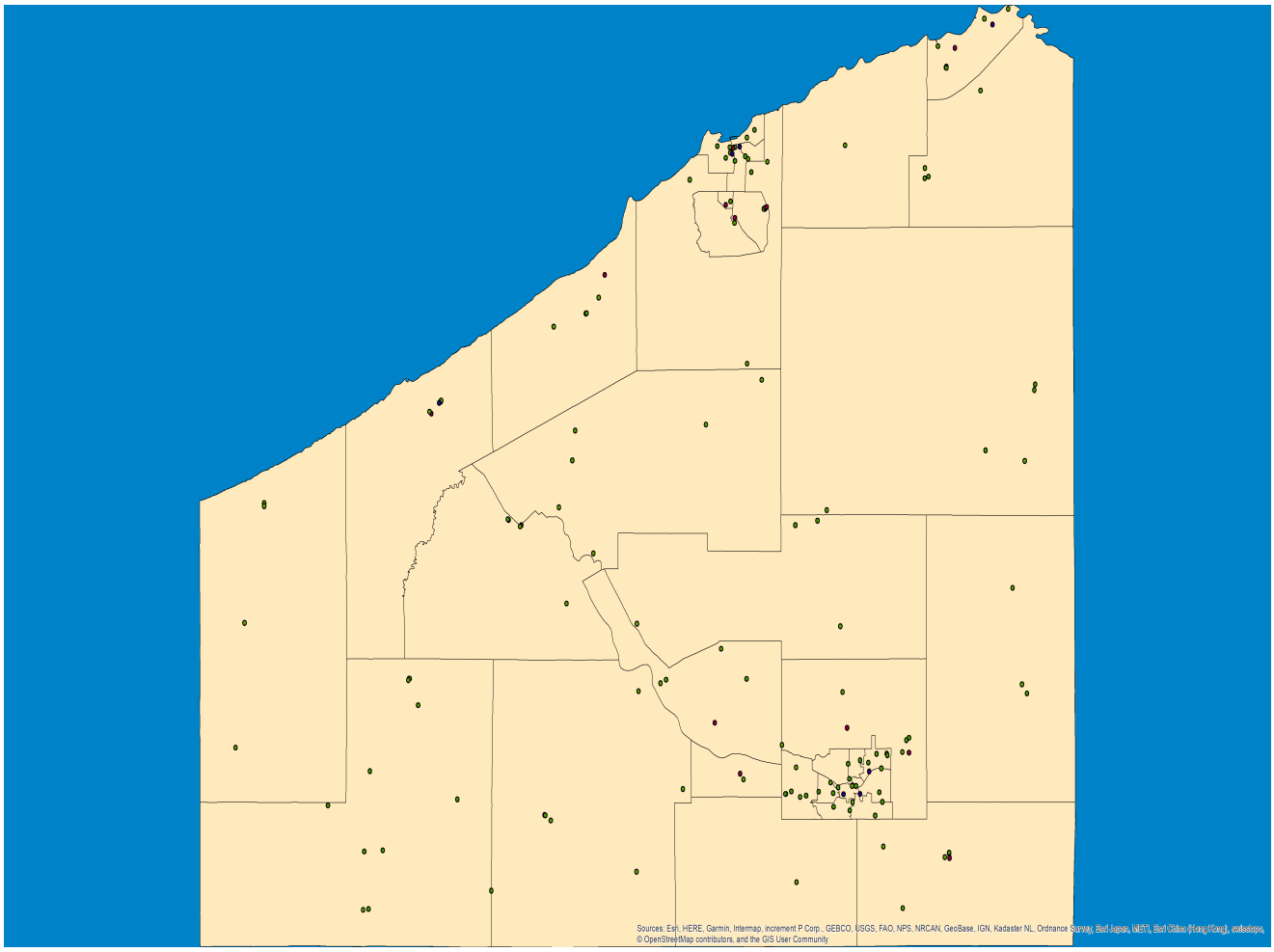
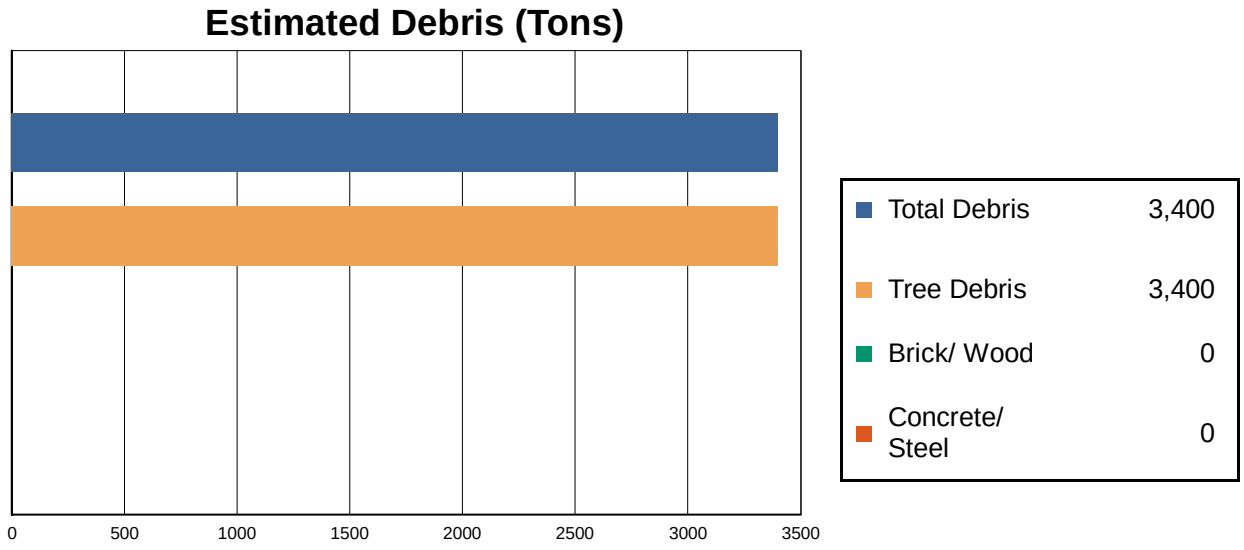


Table 4: Expected Damage to Essential Facilities

		# Facilities		
Classification	**Total**	**Probability of at Least Moderate**	**Probability of Complete Damage > 50%**	**Expected Loss of Use < 1 day**
EOCs	1	0	0	1
Fire Stations	53	0	0	53
Hospitals	7	0	0	7
Police Stations	15	0	0	15
Schools	72	0	0	72

Induced Hurricane Damage

Debris Generation

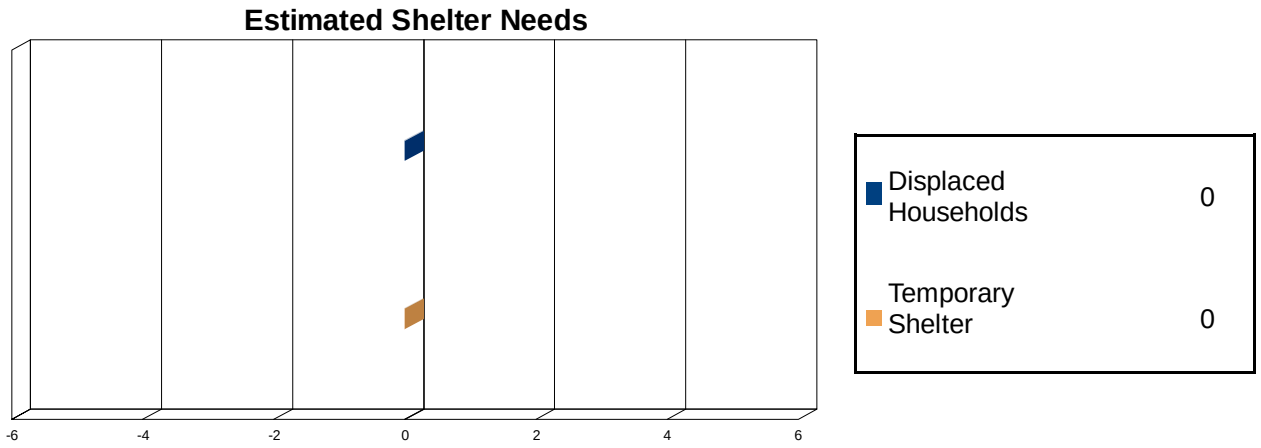


Hazus estimates the amount of debris that will be generated by the hurricane. The model breaks the debris into four general categories: a) Brick/Wood, b) Reinforced Concrete/Steel, c) Eligible Tree Debris, and d) Other Tree Debris. This distinction is made because of the different types of material handling equipment required to handle the debris.

The model estimates that a total of 3,400 tons of debris will be generated. Of the total amount, 3,233 tons (95%) is Other Tree Debris. Of the remaining 167 tons, Brick/Wood comprises 0% of the total, Reinforced Concrete/Steel comprises of 0% of the total, with the remainder being Eligible Tree Debris. If the building debris tonnage is converted to an estimated number of truckloads, it will require 0 truckloads (@25 tons/truck) to remove the building debris generated by the hurricane. The number of Eligible Tree Debris truckloads will depend on how the 167 tons of Eligible Tree Debris are collected and processed. The volume of tree debris generally ranges from about 4 cubic yards per ton for chipped or compacted tree debris to about 10 cubic yards per ton for bulkier, uncompacted debris.

Social Impact

Shelter Requirement



Hazus estimates the number of households that are expected to be displaced from their homes due to the hurricane and the number of displaced people that will require accommodations in temporary public shelters. The model estimates 0 households to be displaced due to the hurricane. Of these, 0 people (out of a total population of 134,905) will seek temporary shelter in public shelters.

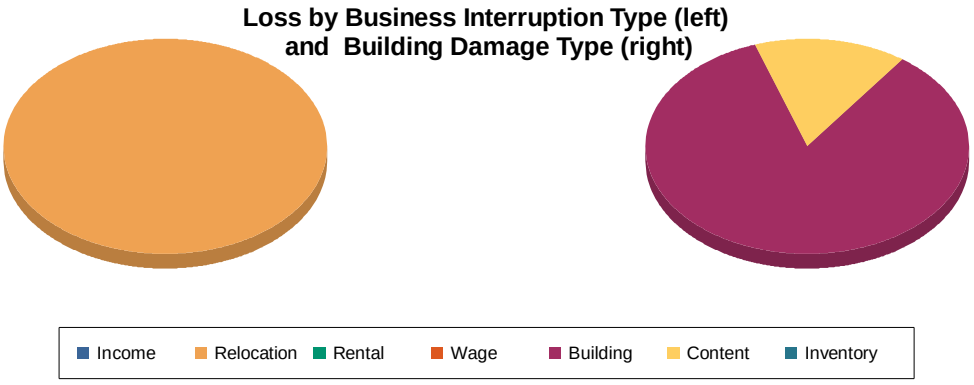
Economic Loss

The total economic loss estimated for the hurricane is 0.5 million dollars, which represents 0.00 % of the total replacement value of the region's buildings.

Building-Related Losses

The building related losses are broken into two categories: direct property damage losses and business interruption losses. The direct property damage losses are the estimated costs to repair or replace the damage caused to the building and its contents. The business interruption losses are the losses associated with inability to operate a business because of the damage sustained during the hurricane. Business interruption losses also include the temporary living expenses for those people displaced from their homes because of the hurricane.

The total property damage losses were 0 million dollars. 0% of the estimated losses were related to the business interruption of the region. By far, the largest loss was sustained by the residential occupancies which made up over 98% of the total loss. Table 5 below provides a summary of the losses associated with the building damage.



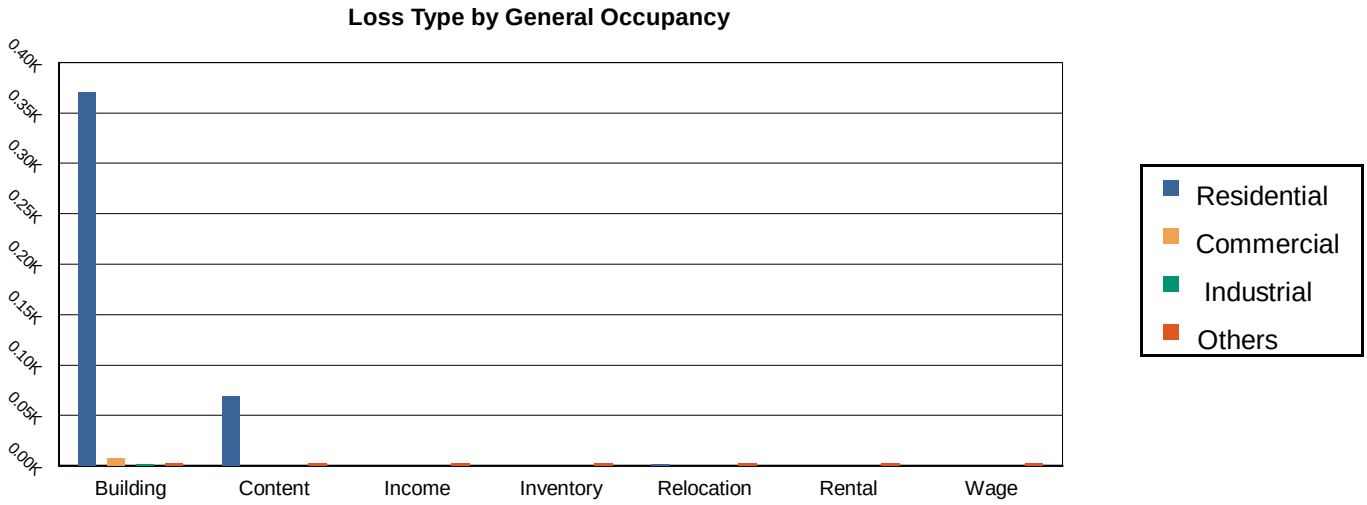


Table 5: Building-Related Economic Loss Estimates

(Thousands of dollars)

Category	Area	Residential	Commercial	Industrial	Others	Total
Property Damage						
	Building	370.47	6.97	1.27	2.55	381.27
	Content	68.86	0.00	0.00	0.00	68.86
	Inventory	0.00	0.00	0.00	0.00	0.00
	Subtotal	**439.33**	**6.97**	**1.27**	**2.55**	**450.13**
Business Interruption Loss						
	Income	0.00	0.00	0.00	0.00	0.00
	Relocation	1.43	0.00	0.00	0.00	1.43
	Rental	0.00	0.00	0.00	0.00	0.00
	Wage	0.00	0.00	0.00	0.00	0.00
	Subtotal	**1.43**	**0.00**	**0.00**	**0.00**	**1.43**

Total

Total	**440.76**	**6.97**	**1.27**	**2.55**	**451.56**

Appendix A: County Listing for the Region

New York
- Chautauqua

Appendix B: Regional Population and Building Value Data

		Building Value (thousands of dollars)		
	Population	Residential	Non-Residential	Total
New York				
Chautauqua	134,905	12,344,285	4,860,738	17,205,023
Total	**134,905**	**12,344,285**	**4,860,738**	**17,205,023**
Study Region Total	**134,905**	**12,344,285**	**4,860,738**	**17,205,023**