

Appendix F

HAZUS Data Reports



FEMA

Debris Summary Report

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Increasing Resilience Together

March 15, 2024

All values are in tons.

	Finishes	Structures	Foundations	Total
New York				
Albany	3,978	345	275	4,597
Total	3,978	345	275	4,597
Scenario Total	3,978	345	275	4,597

Study Region: Albany
Scenario: 3sqmi
Return Period: 100

Debris Summary Report

Debris Category Totals (tons)



Finishes	3978.2
Structure	344.5
Foundation	274.7
Total:	4597.3

Totals only reflect data for those census tracts/blocks included in the user's study region and will reflect the entire county/state only if all of the census blocks for that county/state were selected at the time of study region creation.

Study Region: Albany
Scenario: 3sqmi
Return Period: 100



FEMA

Debris Summary Report

RiskMAP
Increasing Resilience Together

March 15, 2024

All values are in tons.

	Finishes	Structures	Foundations	Total
New York				
Albany	5,117	563	443	6,123
Total	5,117	563	443	6,123
Scenario Total	5,117	563	443	6,123

Study Region: Albany
Scenario: 3sqmi
Return Period: 500

Debris Summary Report

Debris Category Totals (tons)



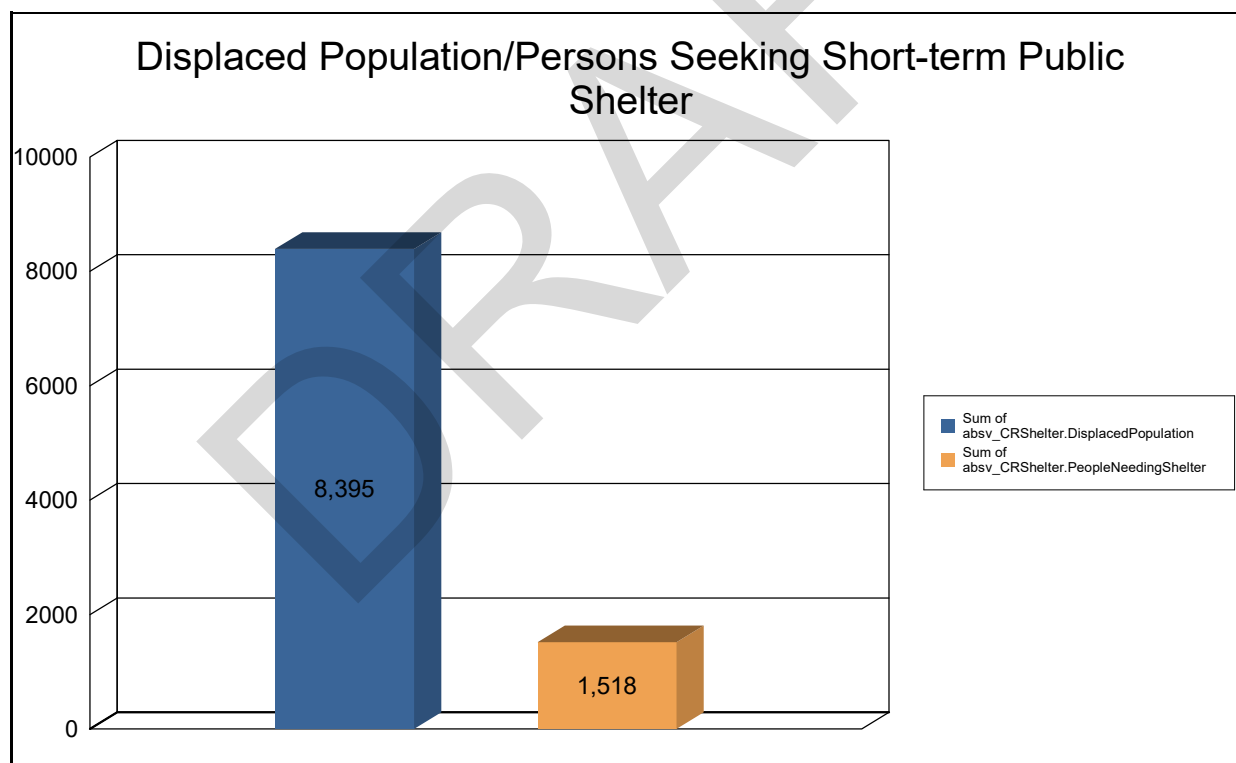
Totals only reflect data for those census tracts/blocks included in the user's study region and will reflect the entire county/state only if all of the census blocks for that county/state were selected at the time of study region creation.

Study Region: Albany
Scenario: 3sqmi
Return Period: 500

Shelter Summary Report

March 15, 2024

	# of Displaced People	# of People Needing Short Term Shelter
New York		
Albany	8,395	1,518
Total	8,395	1,518
Scenario Total	8,395	1,518



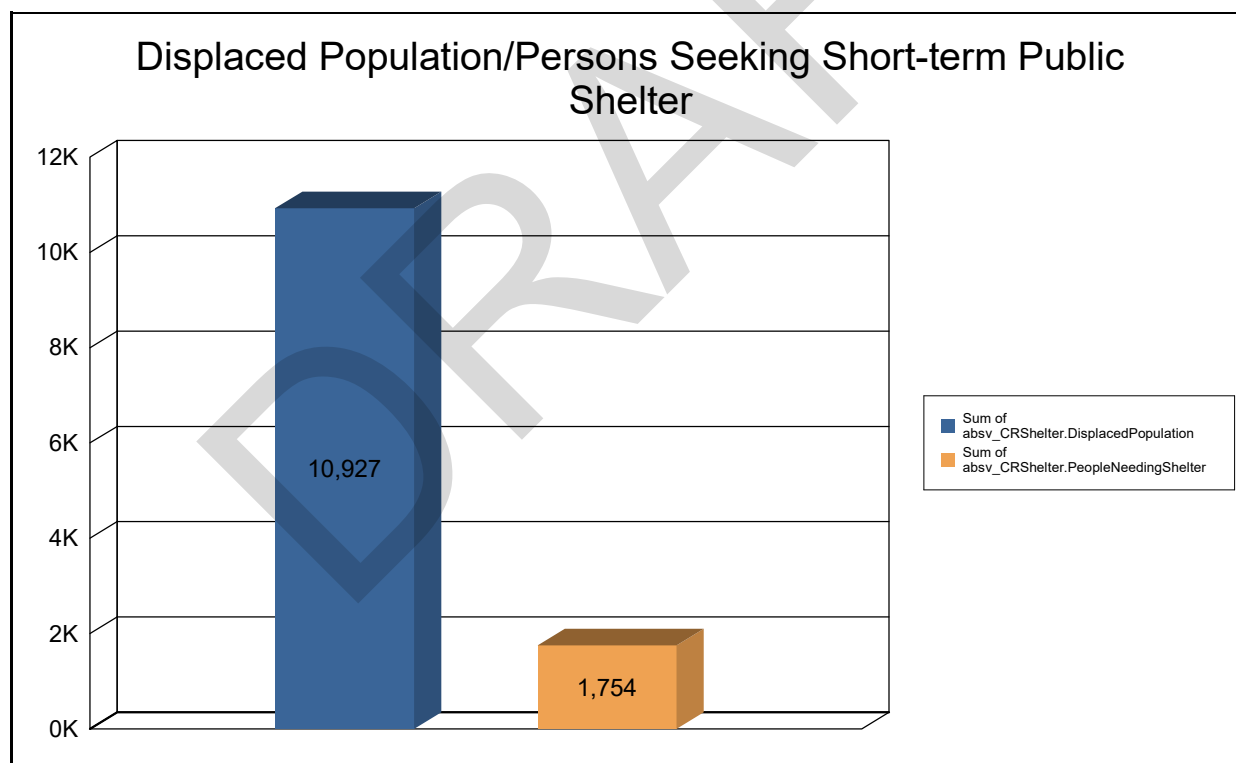
Totals only reflect data for those census tracts/blocks included in the user's study region and will reflect the entire county/state only if all of the census blocks for that county/state were selected at the time of study region creation.

Study Region: Albany
 Scenario: 3sqmi
 Return Period: 100

Shelter Summary Report

March 15, 2024

	# of Displaced People	# of People Needing Short Term Shelter
New York		
Albany	10,927	1,754
Total	10,927	1,754
Scenario Total	10,927	1,754



Totals only reflect data for those census tracts/blocks included in the user's study region and will reflect the entire county/state only if all of the census blocks for that county/state were selected at the time of study region creation.

Study Region: Albany
 Scenario: 3sqmi
 Return Period: 500

Direct Economic Annualized Losses for Buildings

March 15, 2024

All values are in thousands of dollars

Capital Stock Losses				Income Losses					
Building Loss	Contents Loss	Inventory Loss	Building Loss Ratio %	Relocation Loss	Capital Related Loss	Wages Losses	Rental Income Loss	Total Loss	
New York									
Albany	174,263	327,666	29,174	1.8	111,888	238,967	606,038	64,698	1,552,694
Total	174,263	327,666	29,174	1.8	111,888	238,967	606,038	64,698	1,552,694
Scenario Total	174,263	327,666	29,174	1.8	111,888	238,967	606,038	64,698	1,552,694

Totals only reflect data for those census tracts/blocks included in the user's study region and will reflect the entire county/state only if all of the census blocks for that county/state were selected at the time of study region creation.

Direct Economic Annualized Losses for Buildings

March 15, 2024

All values are in thousands of dollars

	Capital Stock Losses			Building Loss Ratio %	Income Losses				Total Loss
	Building Loss	Contents Loss	Inventory Loss		Relocation Loss	Capital Related Loss	Wages Losses	Rental Income Loss	
New York									
Albany	231,297	445,848	38,403	2.4	135,096	286,394	731,648	79,526	1,948,212
Total	231,297	445,848	38,403	2.4	135,096	286,394	731,648	79,526	1,948,212
Scenario Total	231,297	445,848	38,403	2.4	135,096	286,394	731,648	79,526	1,948,212

Totals only reflect data for those census tracts/blocks included in the user's study region and will reflect the entire county/state only if all of the census blocks for that county/state were selected at the time of study region creation.

Direct Economic Loss For Transportation

March 15, 2024

All values are in thousands of dollars

	Highway	Railway	Light Rail	Bus Facility	Ports	Ferries	Airport	Total
New York								
Albany								
Segments	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
Bridges	\$28.41	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$28.41
Tunnels	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
Facilities	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
Total	\$28.41	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$28.41
Total	\$28.41	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$28.41
Scenario Total	\$28.41	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$28.41

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Direct Economic Loss For Transportation



March 15, 2024

All values are in thousands of dollars

	Highway	Railway	Light Rail	Bus Facility	Ports	Ferries	Airport	Total
New York								
Albany								
Segments	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
Bridges	\$62.80	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$62.80
Tunnels	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
Facilities	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
Total	\$62.80	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$62.80
Total	\$62.80	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$62.80
Scenario Total	\$62.80	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$62.80

Totals only reflect data for those census tracts/blocks included in the user's study region and will reflect the entire county/state only if all of the census blocks for that county/state were selected at the time of study region creation.

Study Region: Albany
Scenario: 3sqmi
Return Period: 500

Direct Economic Losses for Utilities

March 15, 2024

All values are in thousands of dollars.

	Potable Water	Waste Water	Oil Systems	Natural Gas	Electric Power	Communication	Total
New York							
Albany							
Facilities	\$0.00	\$148,922.24	\$72.19	\$0.00	\$0.00	\$0.00	\$148,994.43
Pipelines	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
Total	\$0.00	\$148,922.24	\$72.19	\$0.00	\$0.00	\$0.00	\$148,994.43
Total	\$0.00	#####	\$72.19	\$0.00	\$0.00	\$0.00	\$148,994.43
Scenario Total	\$0.00	\$148,922.24	\$72.19	\$0.00	\$0.00	\$0.00	\$148,994.43

Totals only reflect data for those census tracts/blocks included in the user's study region and will reflect the entire county/state only if all of the census blocks for that county/state were selected at the time of study region creation.

Study Region: Albany
Scenario: 3sqmi
Return Period: 100

Direct Economic Losses for Utilities

March 15, 2024

All values are in thousands of dollars.

	Potable Water	Waste Water	Oil Systems	Natural Gas	Electric Power	Communication	Total
New York							
Albany							
Facilities	\$420.71	\$190,983.28	\$85.63	\$0.00	\$0.00	\$0.00	\$191,489.62
Pipelines	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
Total	\$420.71	\$190,983.28	\$85.63	\$0.00	\$0.00	\$0.00	\$191,489.62
Total	\$420.71	#####	\$85.63	\$0.00	\$0.00	\$0.00	\$191,489.62
Scenario Total	\$420.71	\$190,983.28	\$85.63	\$0.00	\$0.00	\$0.00	\$191,489.62

Totals only reflect data for those census tracts/blocks included in the user's study region and will reflect the entire county/state only if all of the census blocks for that county/state were selected at the time of study region creation.

Study Region: Albany
 Scenario: 3sqmi
 Return Period: 500



Hazus: Flood Global Risk Report

Region Name: Albany

Flood Scenario: 3sqmi

Print Date: Friday, March 15, 2024

Disclaimer:

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.



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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 64 square miles and contains 4,746 census blocks. The region contains over 133 thousand households and has a total population of 314,684 people. The distribution of population by State and County for the study region is provided in Appendix B.

There are an estimated 105,181 buildings in the region with a total building replacement value (excluding contents) of 62,614 million dollars. Approximately 91.15% of the buildings (and 60.01% of the building value) are associated with residential housing.



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Building Inventory

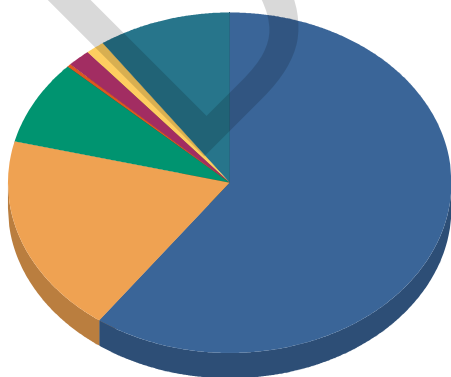
General Building Stock

Hazus estimates that there are 105,181 buildings in the region which have an aggregate total replacement value of 62,614 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	37,573,699	60.0%
Commercial	11,881,148	19.0%
Industrial	4,975,315	7.9%
Agricultural	241,119	0.4%
Religion	960,169	1.5%
Government	969,277	1.5%
Education	6,013,452	9.6%
Total	62,614,179	100%

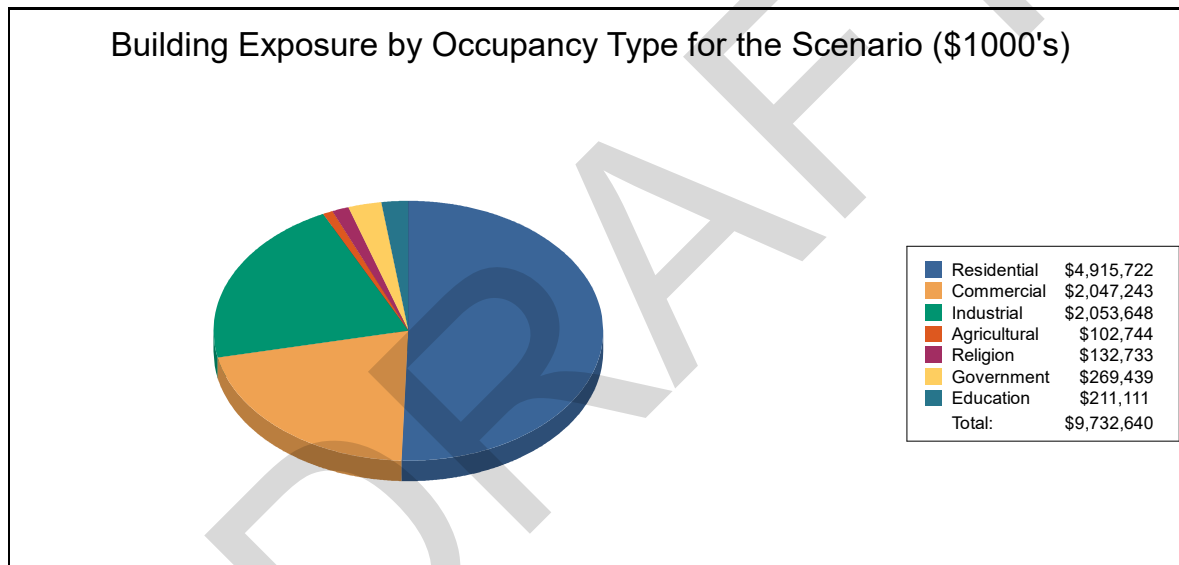
Building Exposure by Occupancy Type for the Study Region
(\$1000's)



Residential	\$37,573,699
Commercial	\$11,881,148
Industrial	\$4,975,315
Agricultural	\$241,119
Religion	\$960,169
Government	\$969,277
Education	\$6,013,452
Total:	\$62,614,179

Table 2
Building Exposure by Occupancy Type for the Scenario

Occupancy	Exposure (\$1000)	Percent of Total
Residential	4,915,722	50.5%
Commercial	2,047,243	21.0%
Industrial	2,053,648	21.1%
Agricultural	102,744	1.1%
Religion	132,733	1.4%
Government	269,439	2.8%
Education	211,111	2.2%
Total	9,732,640	100%



Essential Facility Inventory

For essential facilities, there are 9 hospitals in the region with a total bed capacity of 1,558 beds. There are 121 schools, 62 fire stations, 28 police stations and 2 emergency operation centers.

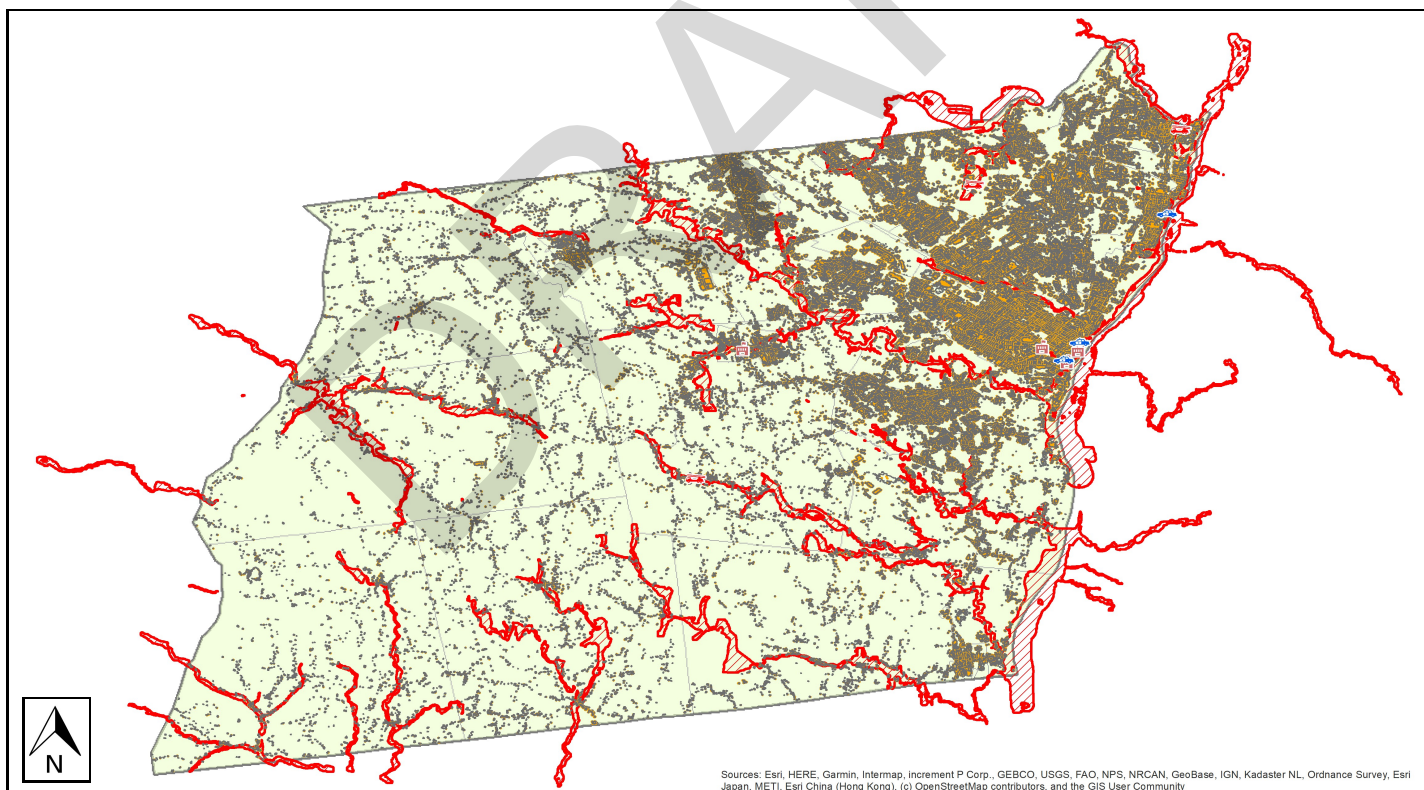
Flood Scenario Parameters

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

Study Region Name:	Albany
Scenario Name:	3sqmi
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 399 buildings will be at least moderately damaged. This is over 69% of the total number of buildings in the scenario. There are an estimated 2 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

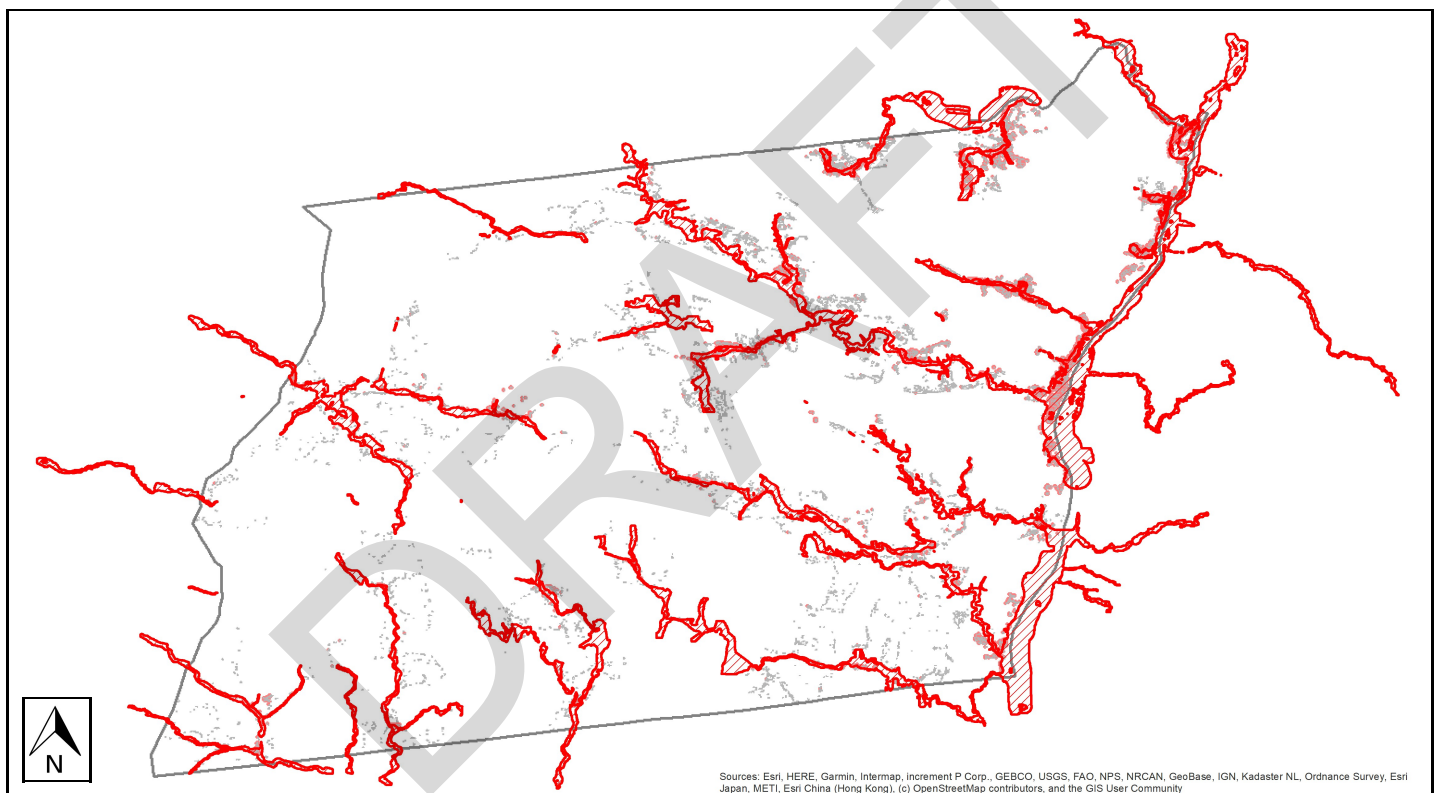


Table 3: Expected Building Damage by Occupancy

Occupancy	1-10		11-20		21-30		31-40		41-50		>50	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Agriculture	10	91	1	9	0	0	0	0	0	0	0	0
Commercial	33	72	10	22	0	0	3	7	0	0	0	0
Education	0	0	0	0	0	0	0	0	0	0	0	0
Government	5	83	1	17	0	0	0	0	0	0	0	0
Industrial	77	74	26	25	1	1	0	0	0	0	0	0
Religion	3	75	1	25	0	0	0	0	0	0	0	0
Residential	370	51	263	36	78	11	11	2	2	0	2	0
Total	498		302		79		14		2		2	

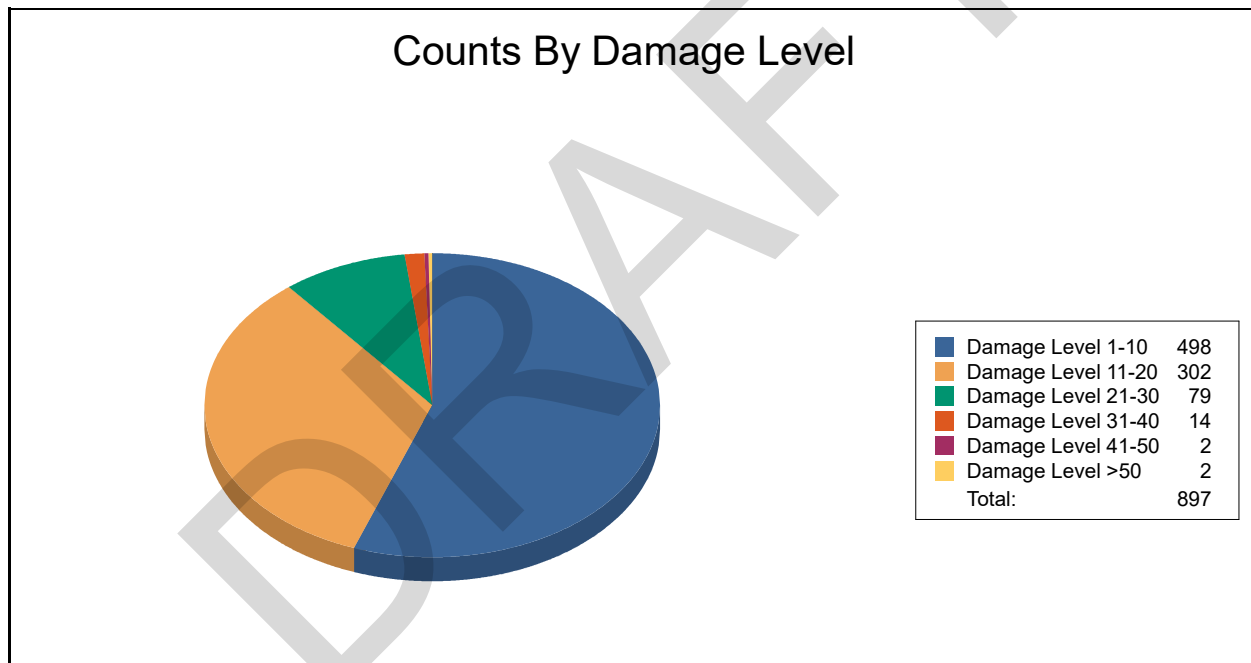


Table 4: Expected Building Damage by Building Type

Building Type	1-10		11-20		21-30		31-40		41-50		>50	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Concrete	13	87	2	13	0	0	0	0	0	0	0	0
ManufHousing	0	0	0	0	0	0	0	0	0	0	0	0
Masonry	51	69	20	27	2	3	1	1	0	0	0	0
Steel	70	74	21	22	4	4	0	0	0	0	0	0
Wood	339	50	250	37	72	11	10	1	2	0	2	0

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Essential Facility Damage

Before the flood analyzed in this scenario, the region had 1,558 hospital beds available for use. On the day of the scenario flood event, the model estimates that 1,558 hospital beds are available in the region.

Table 5: Expected Damage to Essential Facilities

Classification	Total	# Facilities		
		At Least Moderate	At Least Substantial	Loss of Use
Emergency Operation Centers	2	0	0	0
Fire Stations	62	2	0	0
Hospitals	9	0	0	0
Police Stations	28	2	0	0
Schools	121	3	0	3

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.



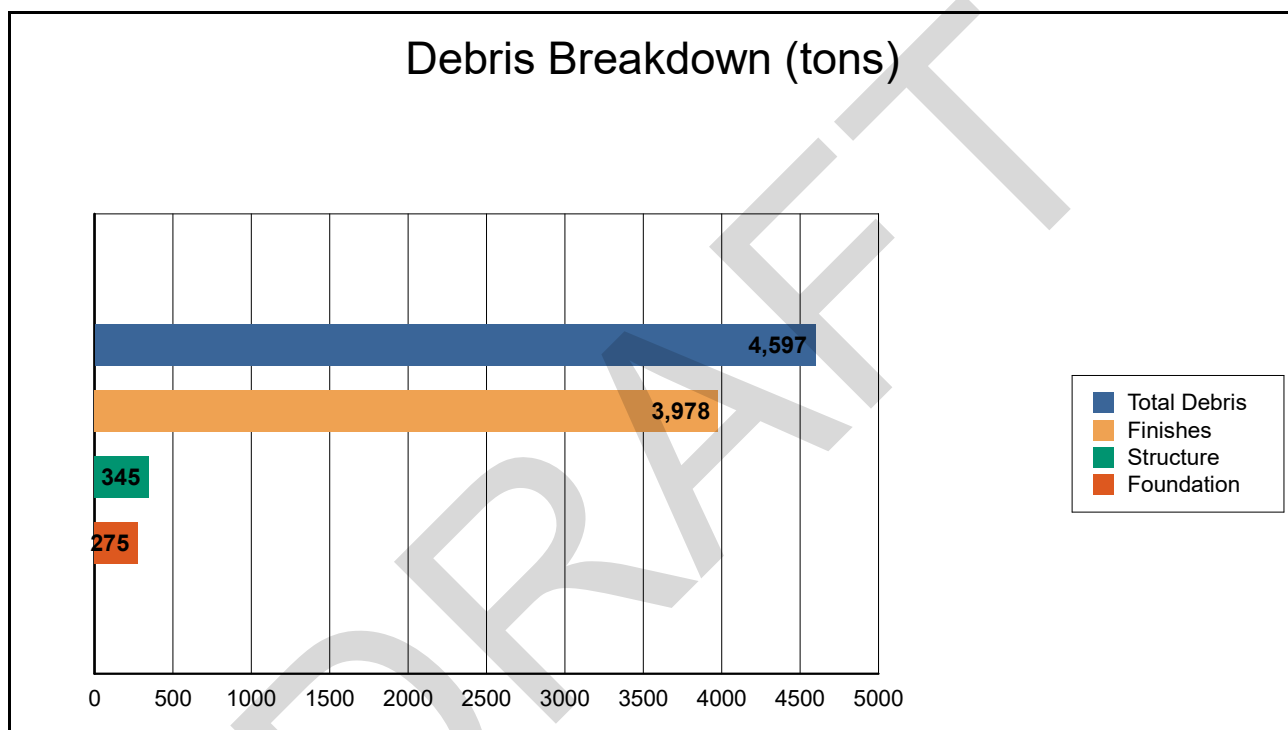
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Induced Flood Damage

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.

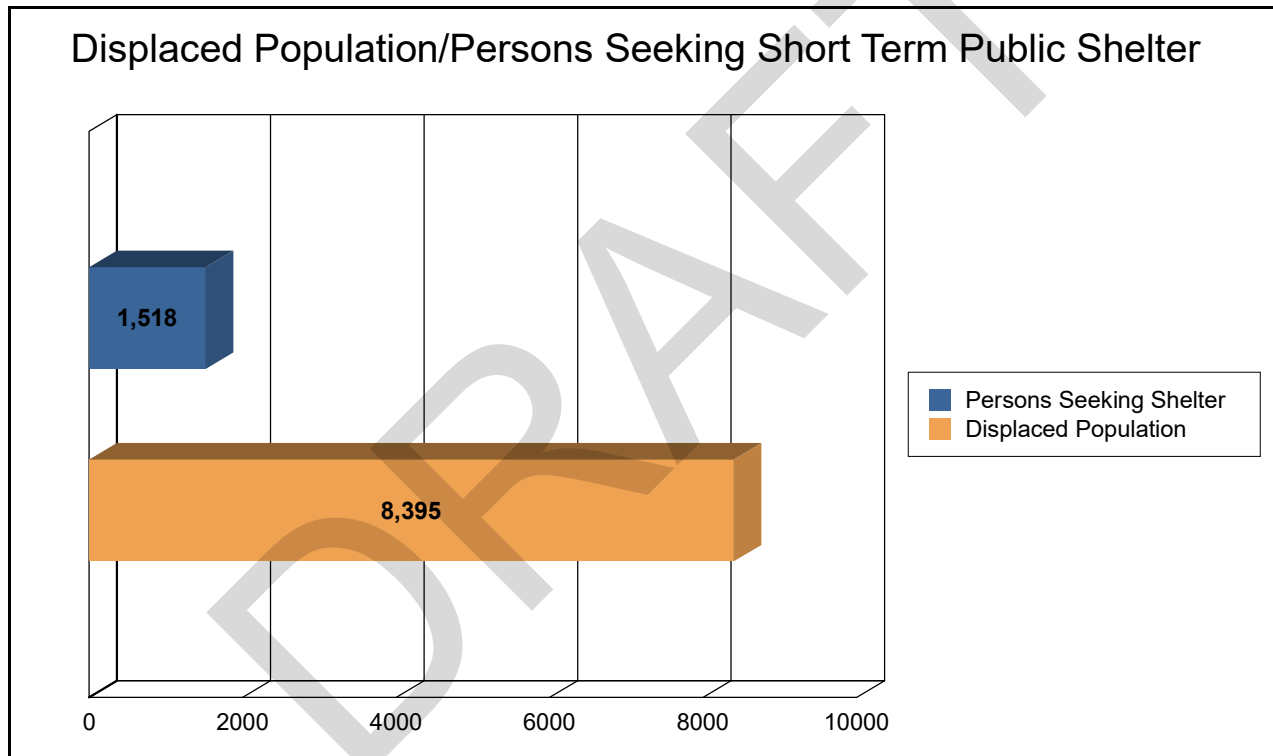


The model estimates that a total of 4,597 tons of debris will be generated. Of the total amount, Finishes comprises 87% of the total, Structure comprises 7% of the total, and Foundation comprises 6%. If the debris tonnage is converted into an estimated number of truckloads, it will require 184 truckloads (@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 2,798 households (or 8,395 of people) will be displaced due to the flood. Displacement includes households evacuated from within or very near to the inundated area. Of these, 1,518 people (out of a total population of 314,684) will seek temporary shelter in public shelters.



Economic Loss

The total economic loss estimated for the flood is 1,552.69 million dollars, which represents 15.95 % 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.

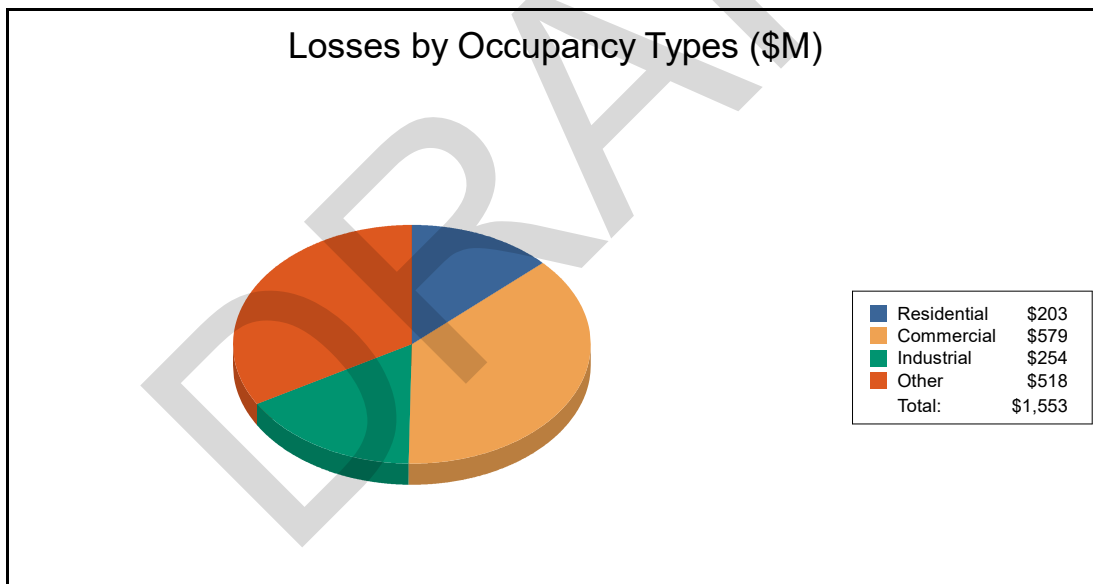
The total building-related losses were 531.10 million dollars. 66% of the estimated losses were related to the business interruption of the region. The residential occupancies made up 13.06% of the total loss. Table 6 below provides a summary of the losses associated with the building damage.

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Table 6: Building-Related Economic Loss Estimates
(Millions of dollars)

Category	Area	Residential	Commercial	Industrial	Others	Total
Building Loss						
	Building	72.55	36.95	55.95	8.81	174.26
	Content	42.58	93.64	141.29	50.16	327.67
	Inventory	0.00	2.91	20.34	5.93	29.17
	Subtotal	115.13	133.50	217.58	64.90	531.10
Business Interruption						
	Income	8.83	190.76	10.44	28.93	238.97
	Relocation	32.17	46.74	11.11	21.87	111.89
	Rental Income	25.89	31.76	2.81	4.23	64.70
	Wage	20.77	175.93	11.77	397.57	606.04
	Subtotal	87.67	445.19	36.13	452.60	1,021.59
ALL	Total	202.80	578.69	253.71	517.50	1,552.69





Appendix A: County Listing for the Region

- New York
- Albany

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Appendix B: Regional Population and Building Value Data

	Population	Building Value (thousands of dollars)		
		Residential	Non-Residential	Total
New York				
Albany	314,684	37,573,699	25,040,480	62,614,179
Total	314,684	37,573,699	25,040,480	62,614,179
Total Study Region	314,684	37,573,699	25,040,480	62,614,179

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Hazus: Flood Global Risk Report

Region Name: Albany

Flood Scenario: 3sqmi

Print Date: Friday, March 15, 2024

Disclaimer:

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Section	Page #
General Description of the Region	3
Building Inventory	
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Note:

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Building Inventory

General Building Stock

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Government	969,277	1.5%
Education	6,013,452	9.6%
Total	62,614,179	100%

Building Exposure by Occupancy Type for the Study Region
(\$1000's)

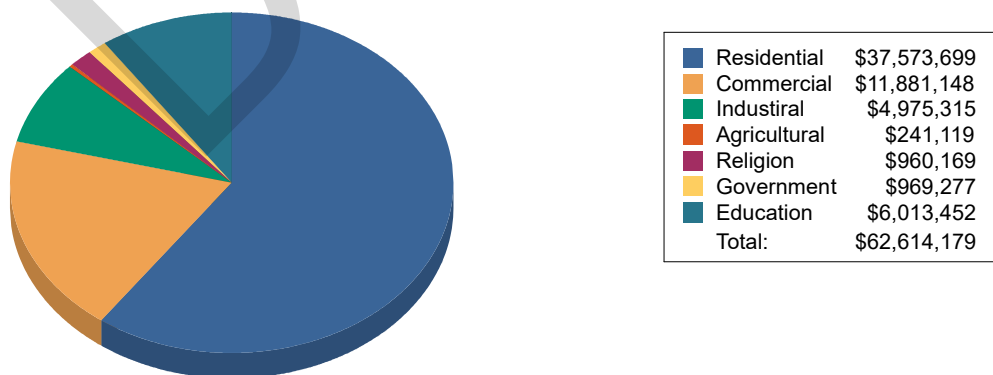
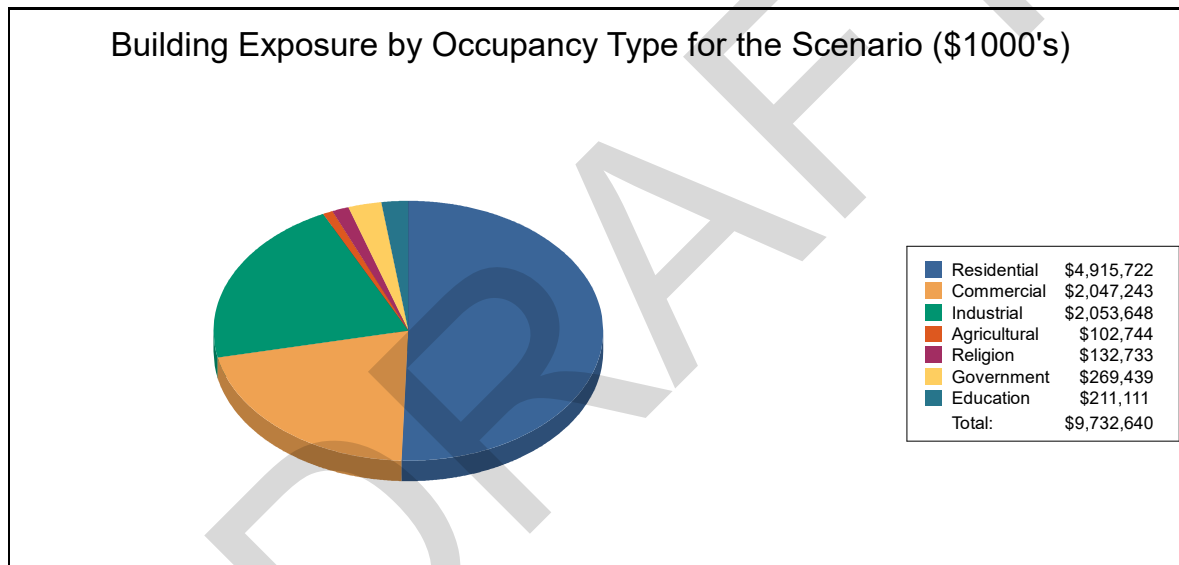


Table 2
Building Exposure by Occupancy Type for the Scenario

Occupancy	Exposure (\$1000)	Percent of Total
Residential	4,915,722	50.5%
Commercial	2,047,243	21.0%
Industrial	2,053,648	21.1%
Agricultural	102,744	1.1%
Religion	132,733	1.4%
Government	269,439	2.8%
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Total	9,732,640	100%



Essential Facility Inventory

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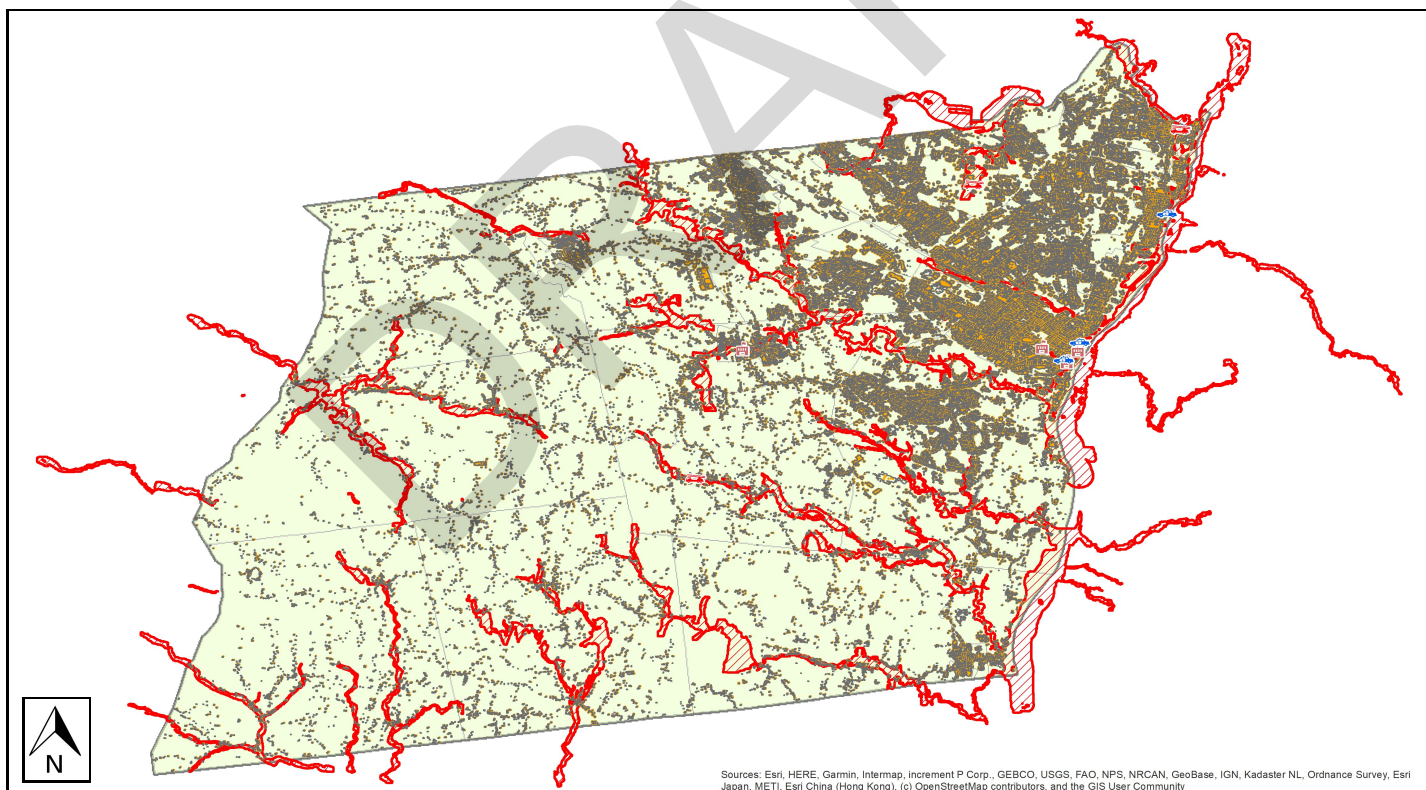
Flood Scenario Parameters

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

Study Region Name:	Albany
Scenario Name:	3sqmi
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



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Building Damage

General Building Stock Damage

Hazus estimates that about 530 buildings will be at least moderately damaged. This is over 66% of the total number of buildings in the scenario. There are an estimated 1 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

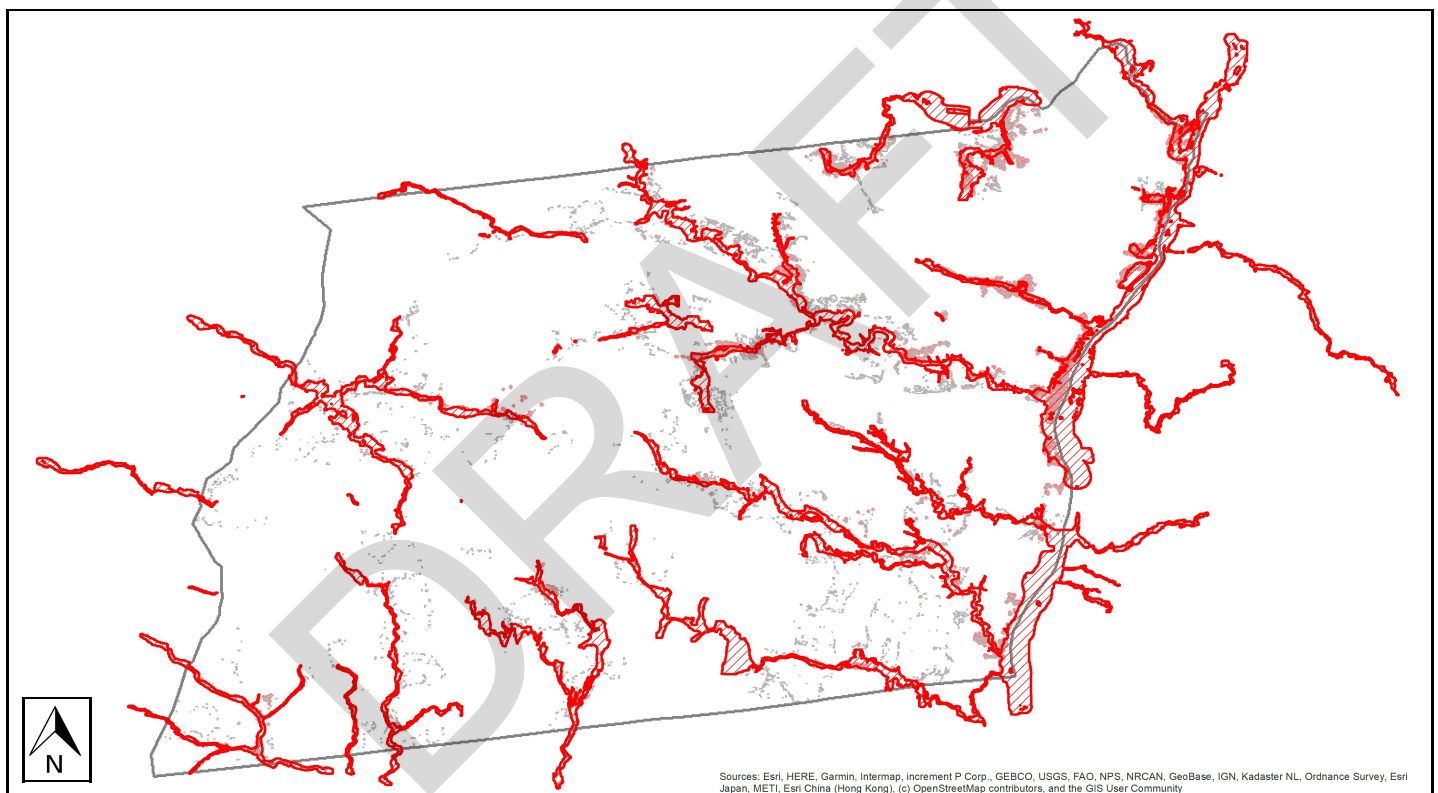


Table 3: Expected Building Damage by Occupancy

Occupancy	1-10		11-20		21-30		31-40		41-50		>50	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Agriculture	5	45	6	55	0	0	0	0	0	0	0	0
Commercial	40	62	20	31	2	3	1	2	2	3	0	0
Education	0	0	0	0	0	0	0	0	0	0	0	0
Government	2	33	4	67	0	0	0	0	0	0	0	0
Industrial	71	59	48	40	2	2	0	0	0	0	0	0
Religion	3	60	2	40	0	0	0	0	0	0	0	0
Residential	494	53	322	34	96	10	22	2	2	0	1	0
Total	615		402		100		23		4		1	

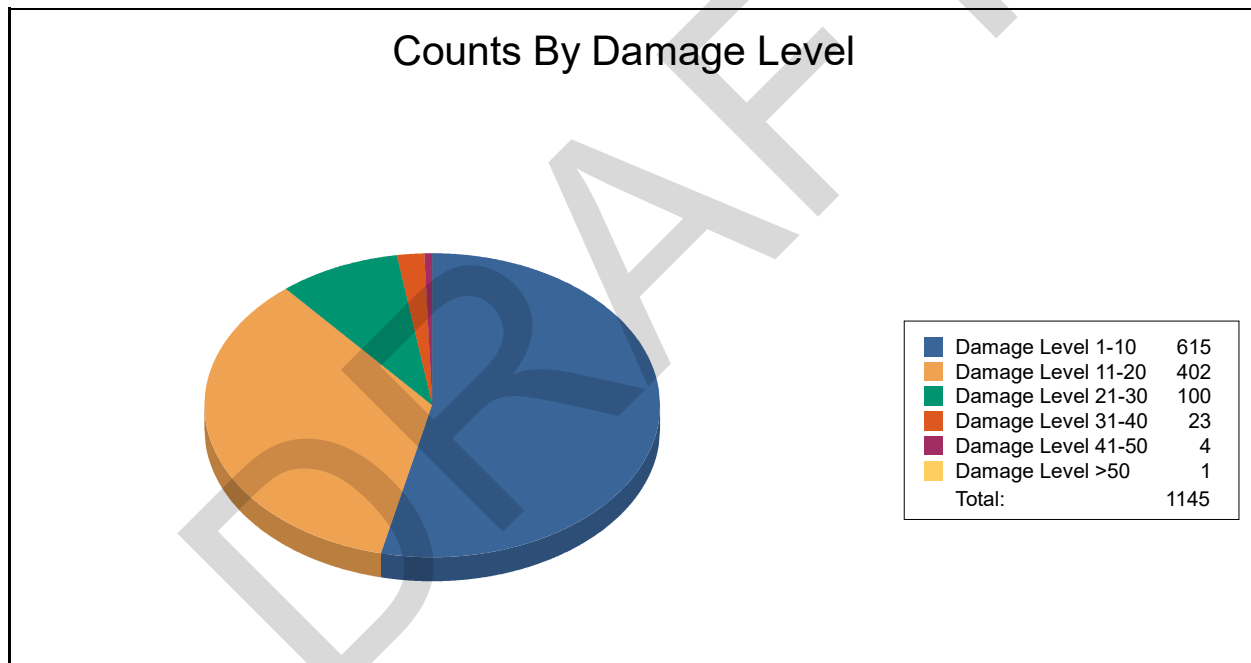


Table 4: Expected Building Damage by Building Type

Building Type	1-10		11-20		21-30		31-40		41-50		>50	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Concrete	10	53	9	47	0	0	0	0	0	0	0	0
ManufHousing	0	0	0	0	0	0	0	0	0	0	0	0
Masonry	68	63	34	31	5	5	1	1	0	0	0	0
Steel	74	61	43	36	3	2	1	1	0	0	0	0
Wood	444	51	311	36	91	10	20	2	2	0	1	0

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Essential Facility Damage

Before the flood analyzed in this scenario, the region had 1,558 hospital beds available for use. On the day of the scenario flood event, the model estimates that 1,558 hospital beds are available in the region.

Table 5: Expected Damage to Essential Facilities

Classification	Total	# Facilities		
		At Least Moderate	At Least Substantial	Loss of Use
Emergency Operation Centers	2	0	0	0
Fire Stations	62	3	0	0
Hospitals	9	0	0	0
Police Stations	28	3	0	0
Schools	121	4	0	4

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.



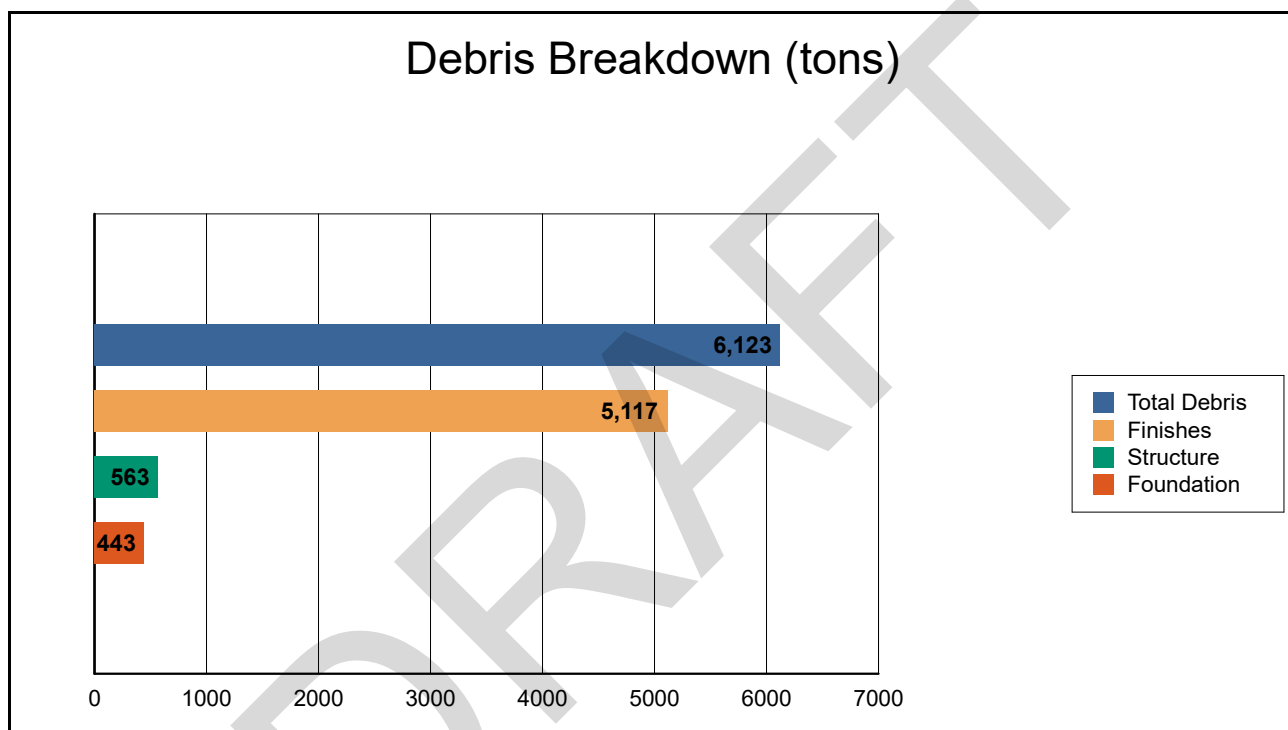
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Induced Flood Damage

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.

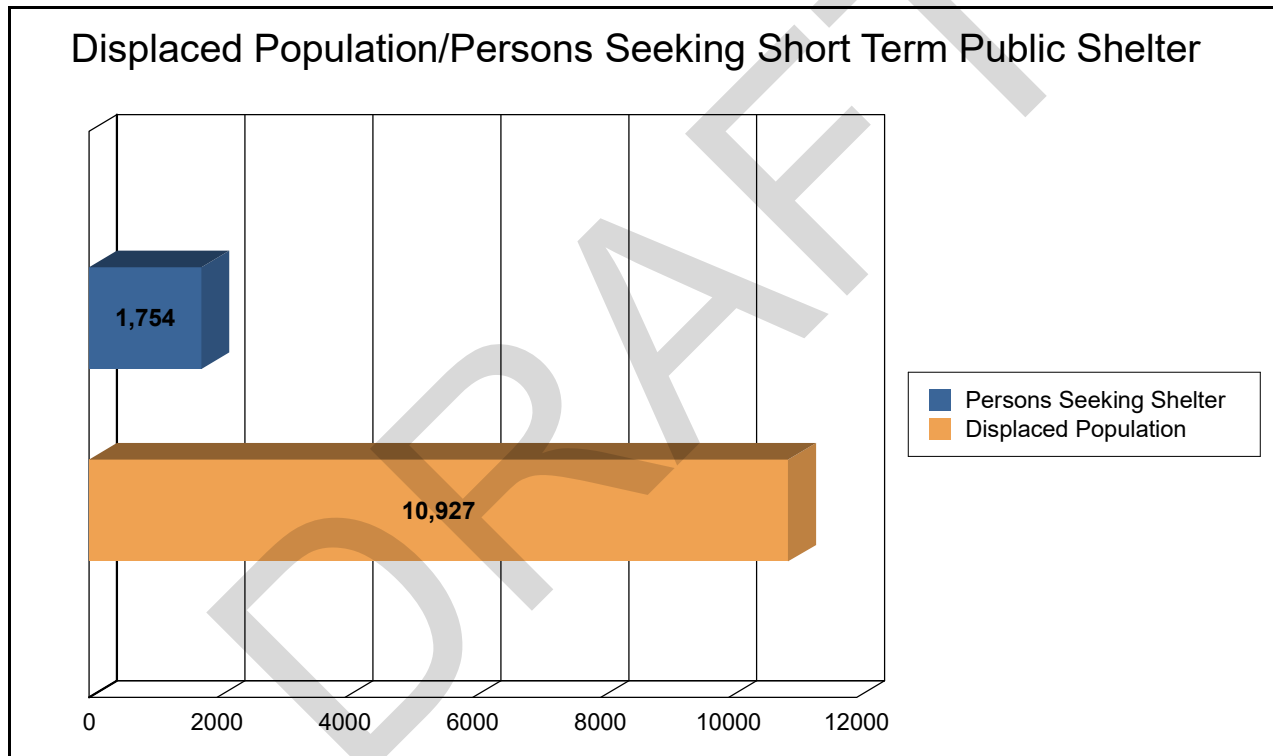


The model estimates that a total of 6,123 tons of debris will be generated. Of the total amount, Finishes comprises 84% of the total, Structure comprises 9% of the total, and Foundation comprises 7%. If the debris tonnage is converted into an estimated number of truckloads, it will require 245 truckloads (@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 3,642 households (or 10,927 of people) will be displaced due to the flood. Displacement includes households evacuated from within or very near to the inundated area. Of these, 1,754 people (out of a total population of 314,684) will seek temporary shelter in public shelters.



Economic Loss

The total economic loss estimated for the flood is 1,948.21 million dollars, which represents 20.02 % 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.

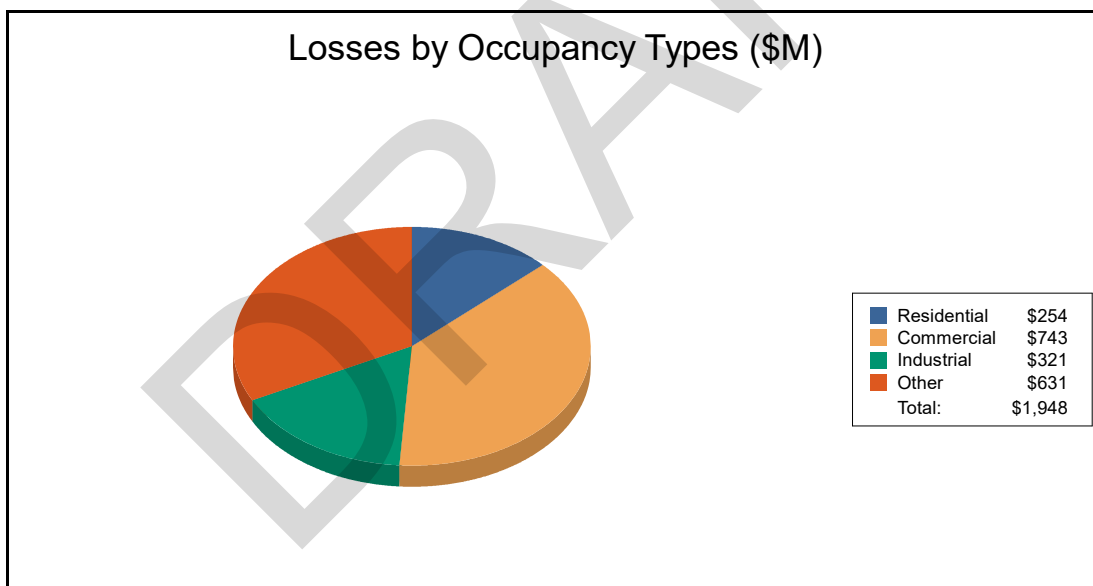
The total building-related losses were 715.55 million dollars. 63% of the estimated losses were related to the business interruption of the region. The residential occupancies made up 13.04% of the total loss. Table 6 below provides a summary of the losses associated with the building damage.

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Table 6: Building-Related Economic Loss Estimates
(Millions of dollars)

Category	Area	Residential	Commercial	Industrial	Others	Total
Building Loss						
	Building	93.87	53.48	71.88	12.07	231.30
	Content	55.69	140.68	182.15	67.33	445.85
	Inventory	0.00	4.68	25.92	7.80	38.40
	Subtotal	149.57	198.84	279.95	87.20	715.55
Business Interruption						
	Income	9.27	233.74	11.55	31.84	286.39
	Relocation	40.82	57.08	12.66	24.53	135.10
	Rental Income	32.56	39.03	3.14	4.80	79.53
	Wage	21.78	213.96	13.24	482.66	731.65
	Subtotal	104.43	543.81	40.59	543.83	1,232.66
ALL	Total	254.00	742.65	320.54	631.03	1,948.21





Appendix A: County Listing for the Region

- New York
- Albany

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Appendix B: Regional Population and Building Value Data

	Population	Building Value (thousands of dollars)		
		Residential	Non-Residential	Total
New York				
Albany	314,684	37,573,699	25,040,480	62,614,179
Total	314,684	37,573,699	25,040,480	62,614,179
Total Study Region	314,684	37,573,699	25,040,480	62,614,179

