

## Appendix F

### HAZUS Data Reports



## Debris Summary Report



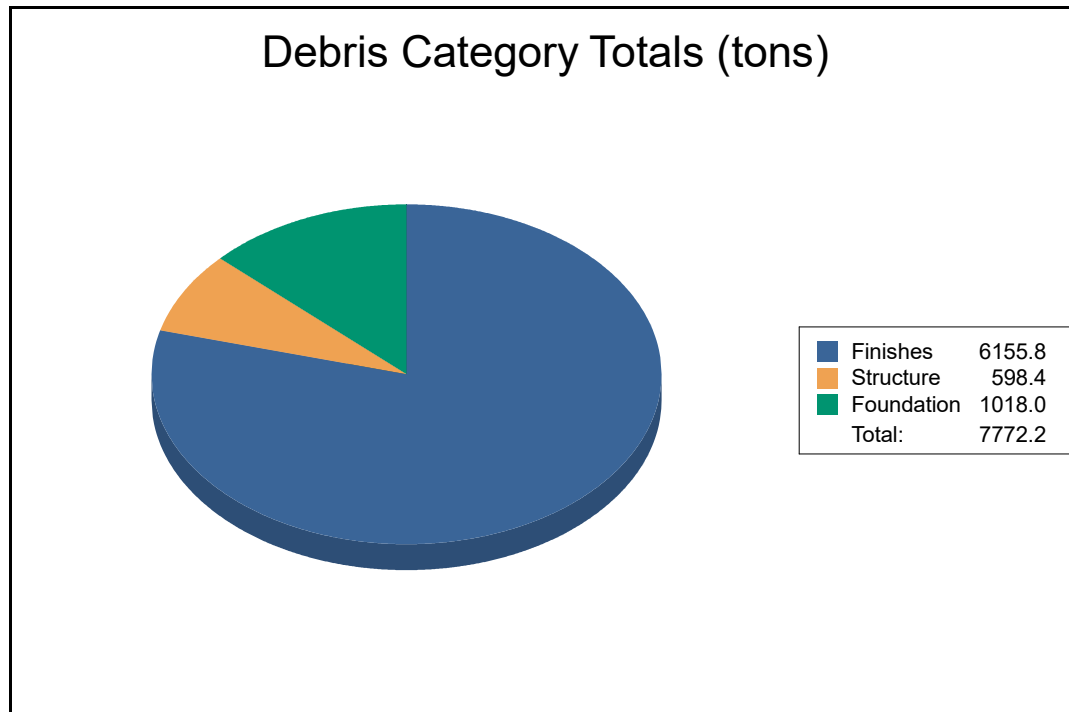
November 07, 2023

All values are in tons.

	Finishes	Structures	Foundations	Total
<b>New York</b>				
Tioga	6,156	598	1,018	7,772
<b>Total</b>	<b>6,156</b>	<b>598</b>	<b>1,018</b>	<b>7,772</b>
<b>Scenario Total</b>	<b>6,156</b>	<b>598</b>	<b>1,018</b>	<b>7,772</b>



## Debris Summary Report



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:** TiogaCounty  
**Scenario:** TiogaCountyFloods3SquareMiles  
**Return Period:** 100



## Debris Summary Report



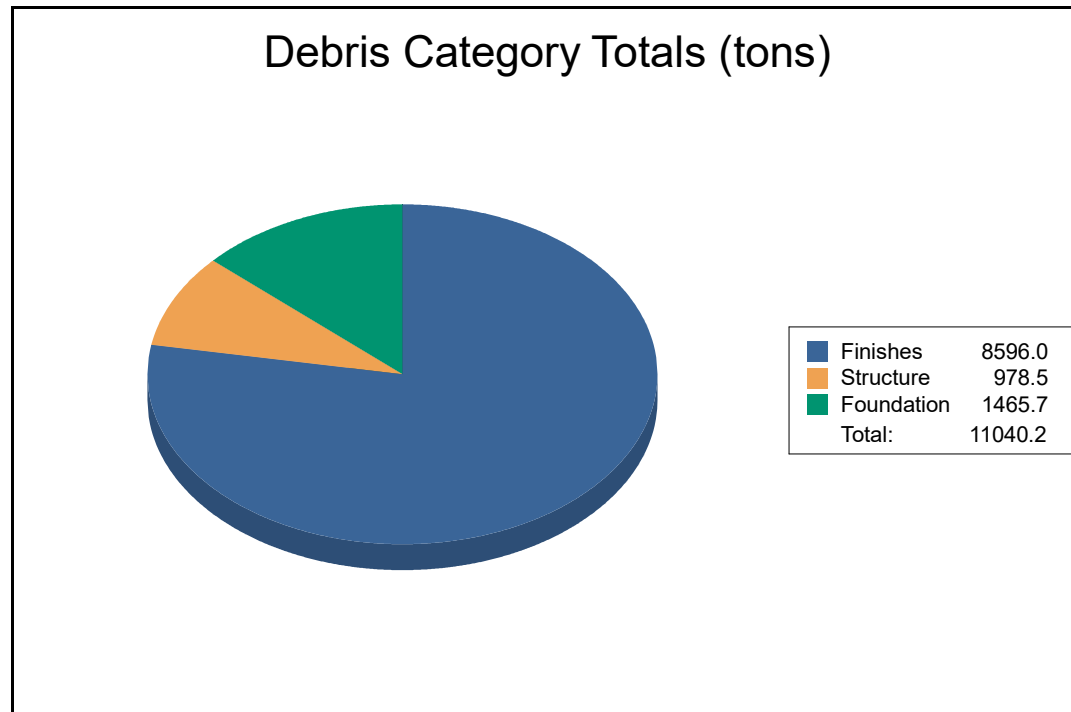
November 07, 2023

All values are in tons.

	Finishes	Structures	Foundations	Total
<b>New York</b>				
Tioga	8,596	978	1,466	11,040
<b>Total</b>	<b>8,596</b>	<b>978</b>	<b>1,466</b>	<b>11,040</b>
<b>Scenario Total</b>	<b>8,596</b>	<b>978</b>	<b>1,466</b>	<b>11,040</b>



## Debris Summary Report



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:** TiogaCounty  
**Scenario:** TiogaCountyFloods3SquareMiles  
**Return Period:** 500



## Direct Economic Annualized Losses for Buildings

November 07, 2023

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	
<b>New York</b>									
Tioga	158,481	302,503	25,452	3.1	97,825	143,879	457,283	40,946	1,226,369
<b>Total</b>	<b>158,481</b>	<b>302,503</b>	<b>25,452</b>	<b>3.1</b>	<b>97,825</b>	<b>143,879</b>	<b>457,283</b>	<b>40,946</b>	<b>1,226,369</b>
<b>Scenario Total</b>	<b>158,481</b>	<b>302,503</b>	<b>25,452</b>	<b>3.1</b>	<b>97,825</b>	<b>143,879</b>	<b>457,283</b>	<b>40,946</b>	<b>1,226,369</b>

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: TiogaCounty  
 Scenario: TiogaCountyFloods3SquareMiles  
 Return Period: 100



## Direct Economic Annualized Losses for Buildings

November 07, 2023

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	
<b>New York</b>									
Tioga	211,505	384,274	39,091	4.2	117,208	168,148	515,196	49,735	1,485,157
<b>Total</b>	<b>211,505</b>	<b>384,274</b>	<b>39,091</b>	<b>4.2</b>	<b>117,208</b>	<b>168,148</b>	<b>515,196</b>	<b>49,735</b>	<b>1,485,157</b>
<b>Scenario Total</b>	<b>211,505</b>	<b>384,274</b>	<b>39,091</b>	<b>4.2</b>	<b>117,208</b>	<b>168,148</b>	<b>515,196</b>	<b>49,735</b>	<b>1,485,157</b>

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: TiogaCounty  
 Scenario: TiogaCountyFloods3SquareMiles  
 Return Period: 500



## Direct Economic Loss For Transportation

November 07, 2023

All values are in thousands of dollars

	Highway	Railway	Light Rail	Bus Facility	Ports	Ferries	Airport	Total
<b>New York</b>								
<b>Tioga</b>								
Segments	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
Bridges	\$44.42	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$44.42
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
<b>Total</b>	<b>\$44.42</b>	<b>\$0.00</b>	<b>\$0.00</b>	<b>\$0.00</b>	<b>\$0.00</b>	<b>\$0.00</b>	<b>\$0.00</b>	<b>\$44.42</b>
<b>Total</b>	<b>\$44.42</b>	<b>\$0.00</b>	<b>\$0.00</b>	<b>\$0.00</b>	<b>\$0.00</b>	<b>\$0.00</b>	<b>\$0.00</b>	<b>\$44.42</b>
<b>Scenario Total</b>	<b>\$44.42</b>	<b>\$0.00</b>	<b>\$0.00</b>	<b>\$0.00</b>	<b>\$0.00</b>	<b>\$0.00</b>	<b>\$0.00</b>	<b>\$44.42</b>

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: TiogaCounty  
 Scenario: TiogaCountyFloods3SquareMiles  
 Return Period: 100





## Direct Economic Loss For Transportation

November 07, 2023

All values are in thousands of dollars

	Highway	Railway	Light Rail	Bus Facility	Ports	Ferries	Airport	Total
<b>New York</b>								
<b>Tioga</b>								
Segments	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
Bridges	\$95.13	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$95.13
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
<b>Total</b>	<b>\$95.13</b>	<b>\$0.00</b>	<b>\$0.00</b>	<b>\$0.00</b>	<b>\$0.00</b>	<b>\$0.00</b>	<b>\$0.00</b>	<b>\$95.13</b>
<b>Total</b>	<b>\$95.13</b>	<b>\$0.00</b>	<b>\$0.00</b>	<b>\$0.00</b>	<b>\$0.00</b>	<b>\$0.00</b>	<b>\$0.00</b>	<b>\$95.13</b>
<b>Scenario Total</b>	<b>\$95.13</b>	<b>\$0.00</b>	<b>\$0.00</b>	<b>\$0.00</b>	<b>\$0.00</b>	<b>\$0.00</b>	<b>\$0.00</b>	<b>\$95.13</b>

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: TiogaCounty  
 Scenario: TiogaCountyFloods3SquareMiles  
 Return Period: 500



**Direct Economic Losses for Utilities**

November 07, 2023

All values are in thousands of dollars.

	Potable Water	Waste Water	Oil Systems	Natural Gas	Electric Power	Communication	Total
<b>New York</b>							
<b>Tioga</b>							
Facilities	\$0.00	\$124,180.64	\$0.00	\$0.00	\$0.00	\$0.00	\$124,180.64
Pipelines	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
<b>Total</b>	<b>\$0.00</b>	<b>\$124,180.64</b>	<b>\$0.00</b>	<b>\$0.00</b>	<b>\$0.00</b>	<b>\$0.00</b>	<b>\$124,180.64</b>
<b>Total</b>	<b>\$0.00</b>	<b>#####</b>	<b>\$0.00</b>	<b>\$0.00</b>	<b>\$0.00</b>	<b>\$0.00</b>	<b>\$124,180.64</b>
<b>Scenario Total</b>	<b>\$0.00</b>	<b>\$124,180.64</b>	<b>\$0.00</b>	<b>\$0.00</b>	<b>\$0.00</b>	<b>\$0.00</b>	<b>\$124,180.64</b>

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: TiogaCounty  
 Scenario: TiogaCountyFloods3SquareMiles  
 Return Period: 100



**Direct Economic Losses for Utilities**

November 07, 2023

All values are in thousands of dollars.

	Potable Water	Waste Water	Oil Systems	Natural Gas	Electric Power	Communication	Total
<b>New York</b>							
<b>Tioga</b>							
Facilities	\$0.00	\$151,120.59	\$0.00	\$0.00	\$0.00	\$0.00	\$151,120.59
Pipelines	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
<b>Total</b>	<b>\$0.00</b>	<b>\$151,120.59</b>	<b>\$0.00</b>	<b>\$0.00</b>	<b>\$0.00</b>	<b>\$0.00</b>	<b>\$151,120.59</b>
<b>Total</b>	<b>\$0.00</b>	<b>#####</b>	<b>\$0.00</b>	<b>\$0.00</b>	<b>\$0.00</b>	<b>\$0.00</b>	<b>\$151,120.59</b>
<b>Scenario Total</b>	<b>\$0.00</b>	<b>\$151,120.59</b>	<b>\$0.00</b>	<b>\$0.00</b>	<b>\$0.00</b>	<b>\$0.00</b>	<b>\$151,120.59</b>

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: TiogaCounty  
 Scenario: TiogaCountyFloods3SquareMiles  
 Return Period: 500



# Hazus: Flood Global Risk Report

**Region Name:** TiogaCounty

**Flood Scenario:** TiogaCountyFloods3SquareMiles

**Print Date:** Tuesday, November 7, 2023

**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.*



**FEMA**

**RiskMAP**  
Increasing Resilience Together



## Table of Contents

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



**FEMA**

**RiskMAP**  
Increasing Resilience Together



## 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 22 square miles and contains 1,617 census blocks. The region contains over 20 thousand households and has a total population of 48,430 people. The distribution of population by State and County for the study region is provided in Appendix B.

There are an estimated 23,466 buildings in the region with a total building replacement value (excluding contents) of 9,717 million dollars. Approximately 90.39% of the buildings (and 63.81% of the building value) are associated with residential housing.



**FEMA**

**RiskMAP**  
Increasing Resilience Together



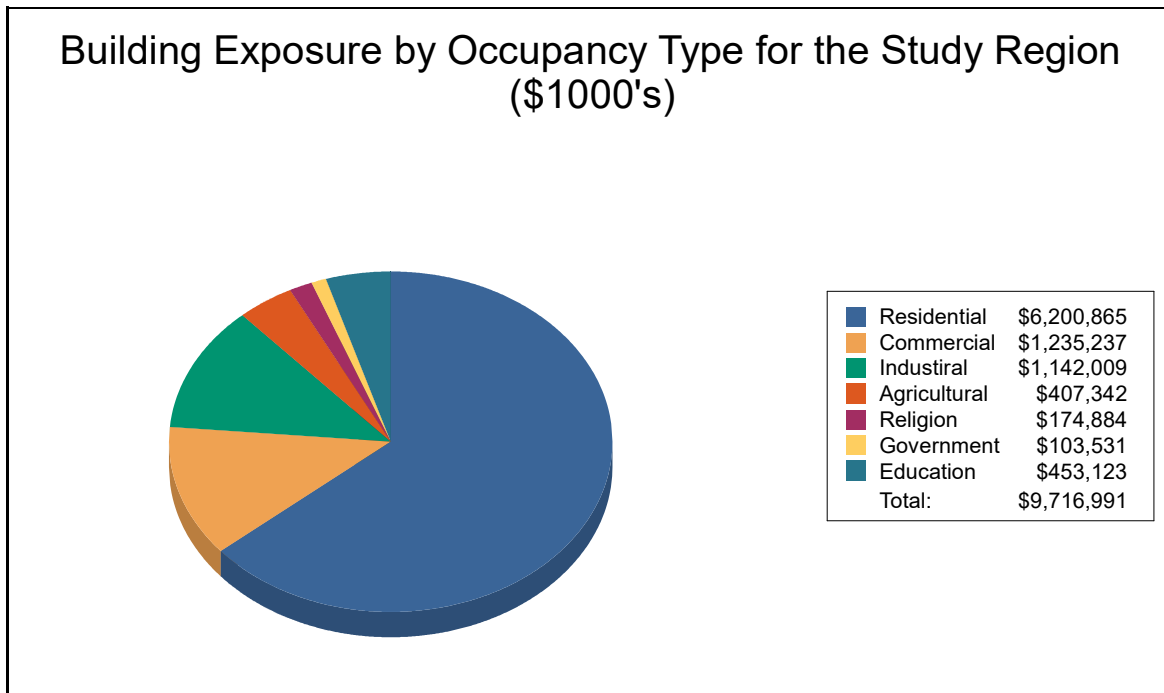
## Building Inventory

### General Building Stock

Hazus estimates that there are 23,466 buildings in the region which have an aggregate total replacement value of 9,717 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	6,200,865	63.8%
Commercial	1,235,237	12.7%
Industrial	1,142,009	11.8%
Agricultural	407,342	4.2%
Religion	174,884	1.8%
Government	103,531	1.1%
Education	453,123	4.7%
<b>Total</b>	<b>9,716,991</b>	<b>100%</b>



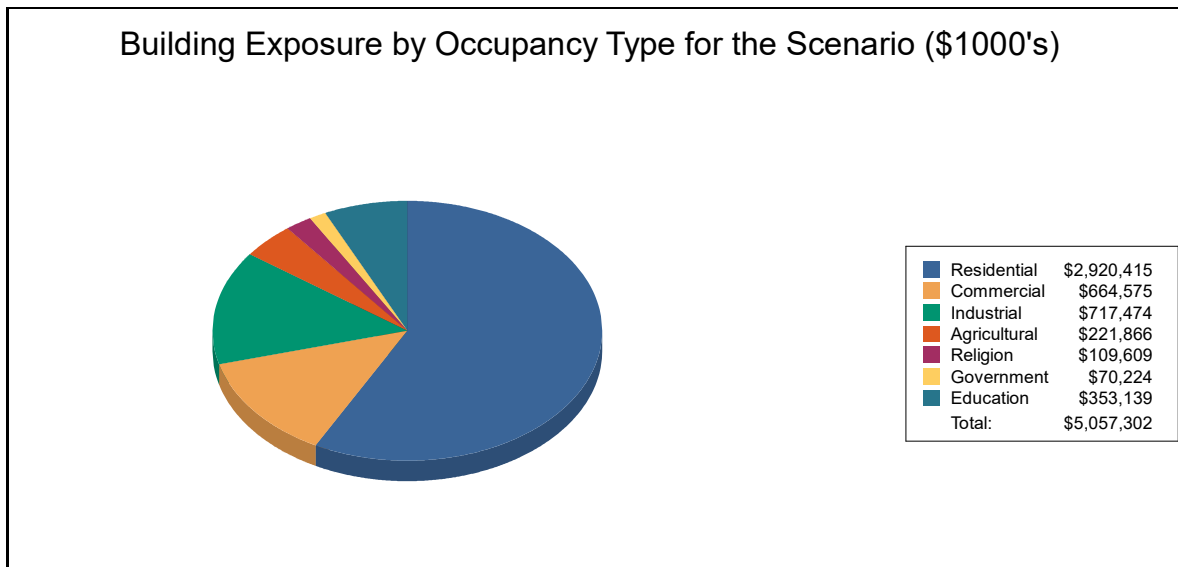
**FEMA**

**RiskMAP**  
 Increasing Resilience Together



**Table 2  
Building Exposure by Occupancy Type for the Scenario**

<b>Occupancy</b>	<b>Exposure (\$1000)</b>	<b>Percent of Total</b>
Residential	2,920,415	57.7%
Commercial	664,575	13.1%
Industrial	717,474	14.2%
Agricultural	221,866	4.4%
Religion	109,609	2.2%
Government	70,224	1.4%
Education	353,139	7.0%
<b>Total</b>	<b>5,057,302</b>	<b>100%</b>



**Essential Facility Inventory**

For essential facilities, there are no hospitals in the region with a total bed capacity of no beds. There are 22 schools, 16 fire stations, 6 police stations and 1 emergency operation center.





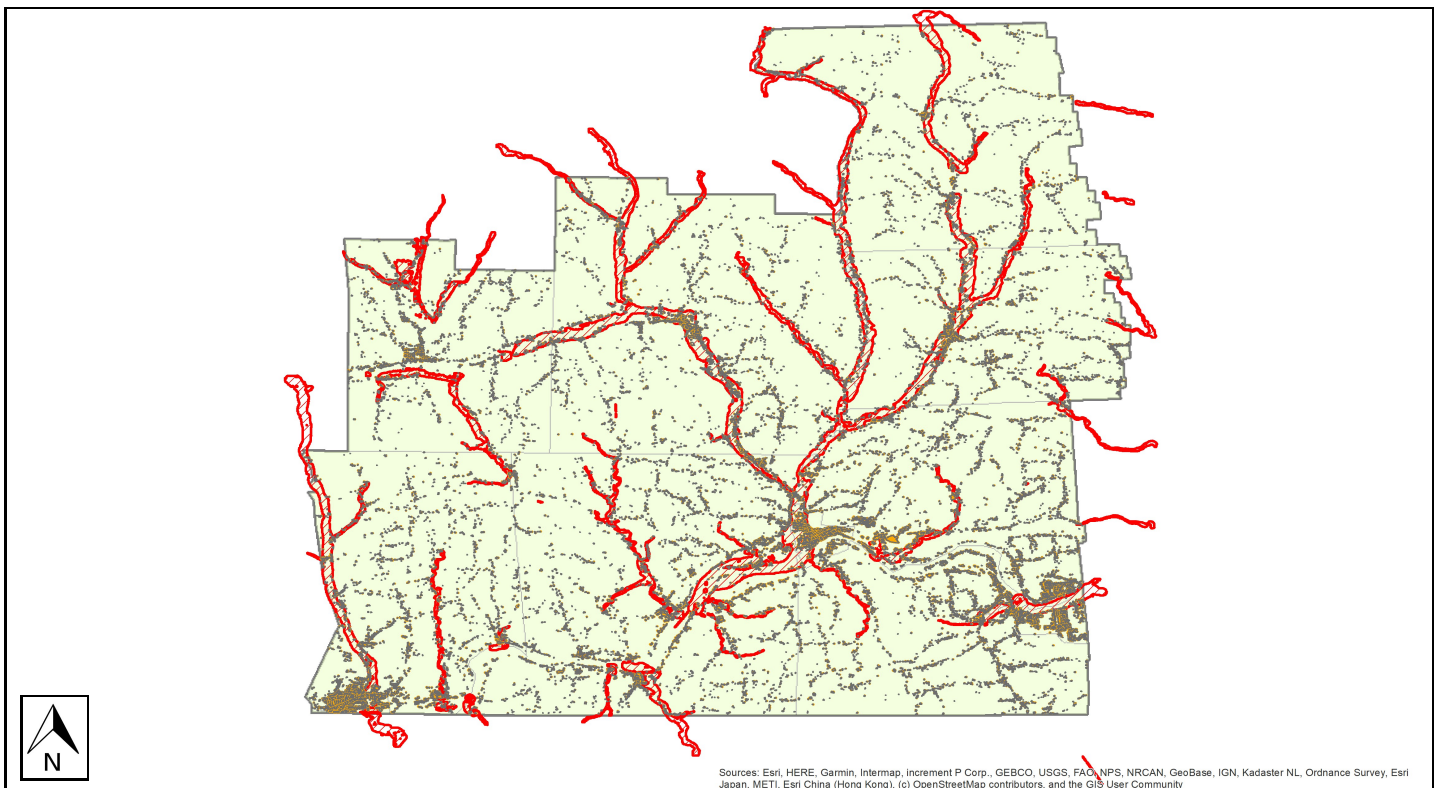
## Flood Scenario Parameters

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

<b>Study Region Name:</b>	TiogaCounty
<b>Scenario Name:</b>	TiogaCountyFloods3SquareMiles
<b>Return Period Analyzed:</b>	100
<b>Analysis Options Analyzed:</b>	No What-Ifs

### Study Region Overview Map

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



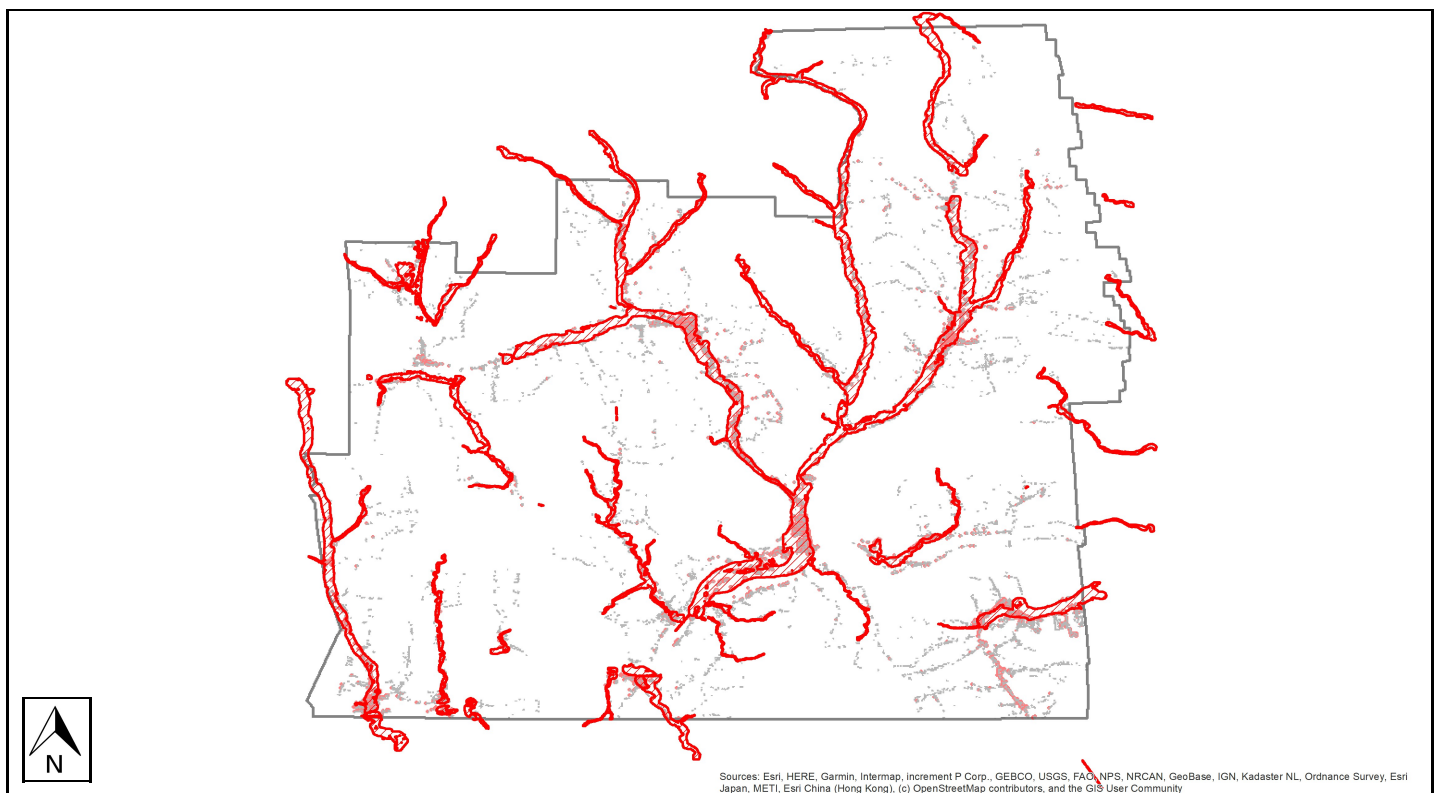


## Building Damage

### General Building Stock Damage

Hazus estimates that about 655 buildings will be at least moderately damaged. This is over 81% of the total number of buildings in the scenario. There are an estimated 3 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**



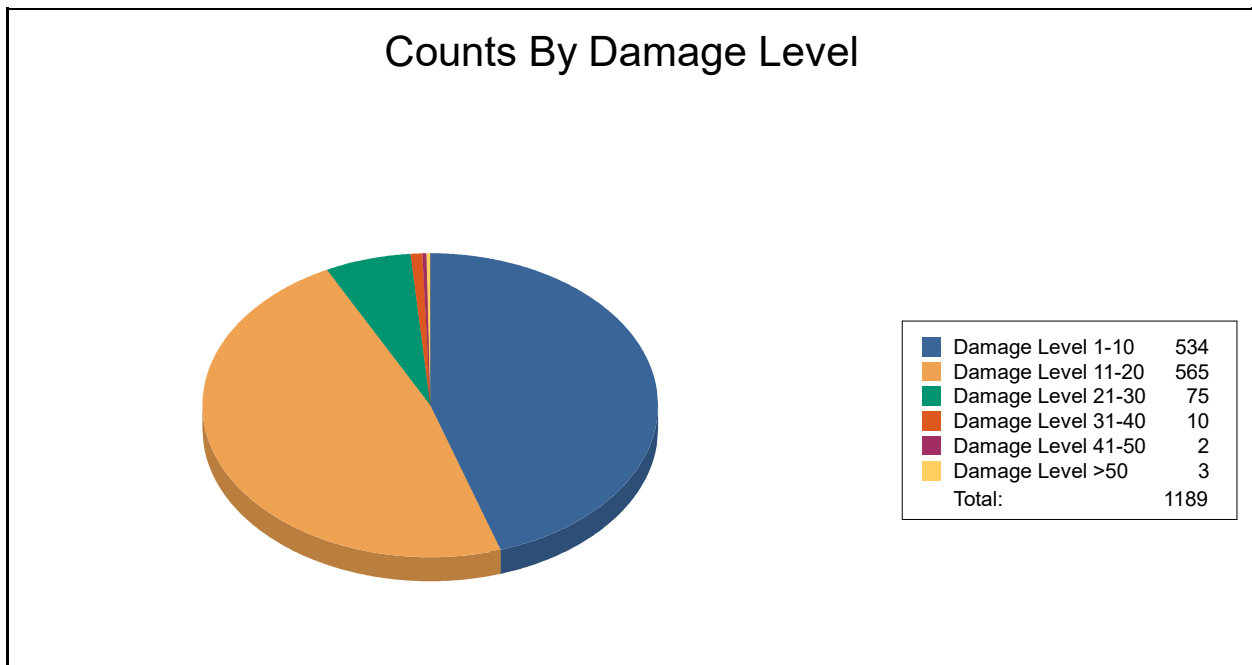
**FEMA**

**RiskMAP**  
Increasing Resilience Together



**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	8	73	2	18	1	9	0	0	0	0	0	0
Commercial	16	33	27	56	4	8	1	2	0	0	0	0
Education	3	100	0	0	0	0	0	0	0	0	0	0
Government	1	33	2	67	0	0	0	0	0	0	0	0
Industrial	1	5	14	70	2	10	3	15	0	0	0	0
Religion	3	30	7	70	0	0	0	0	0	0	0	0
Residential	502	46	513	47	68	6	6	1	2	0	3	0
<b>Total</b>	<b>534</b>		<b>565</b>		<b>75</b>		<b>10</b>		<b>2</b>		<b>3</b>	



**FEMA**

**RiskMAP**  
Increasing Resilience Together



**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	0	0	2	100	0	0	0	0	0	0	0	0
ManufHousing	6	43	2	14	2	14	0	0	1	7	3	21
Masonry	68	49	64	46	7	5	0	0	0	0	0	0
Steel	10	29	17	50	4	12	3	9	0	0	0	0
Wood	428	45	461	48	63	7	6	1	1	0	0	0



**FEMA**

**RiskMAP**  
Increasing Resilience Together



## Essential Facility Damage

Before the flood analyzed in this scenario, the region had 0 hospital beds available for use. On the day of the scenario flood event, the model estimates that 0 hospital beds are available in the region.

**Table 5: Expected Damage to Essential Facilities**

Classification	# Facilities			
	Total	At Least Moderate	At Least Substantial	Loss of Use
Emergency Operation Centers	1	0	0	0
Fire Stations	16	0	0	0
Hospitals	0	0	0	0
Police Stations	6	0	0	0
Schools	22	0	0	0

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.



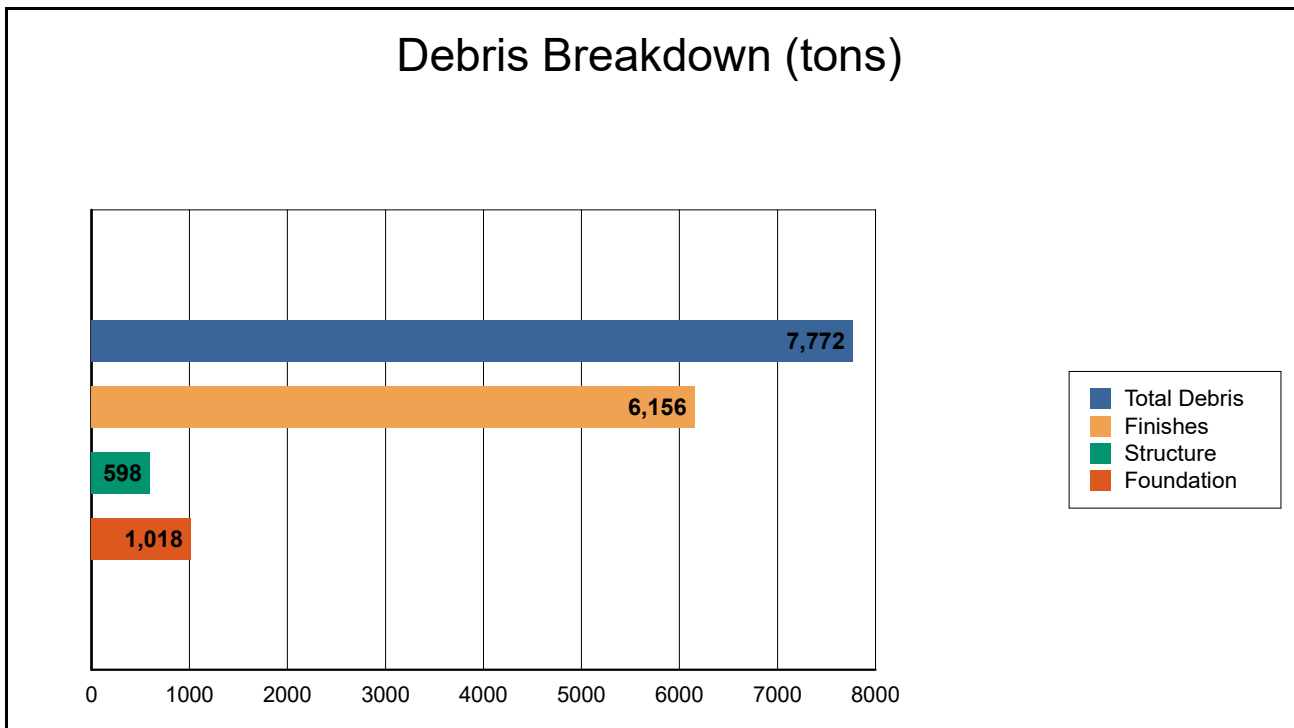
**FEMA**

**RiskMAP**  
Increasing Resilience Together

## 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.



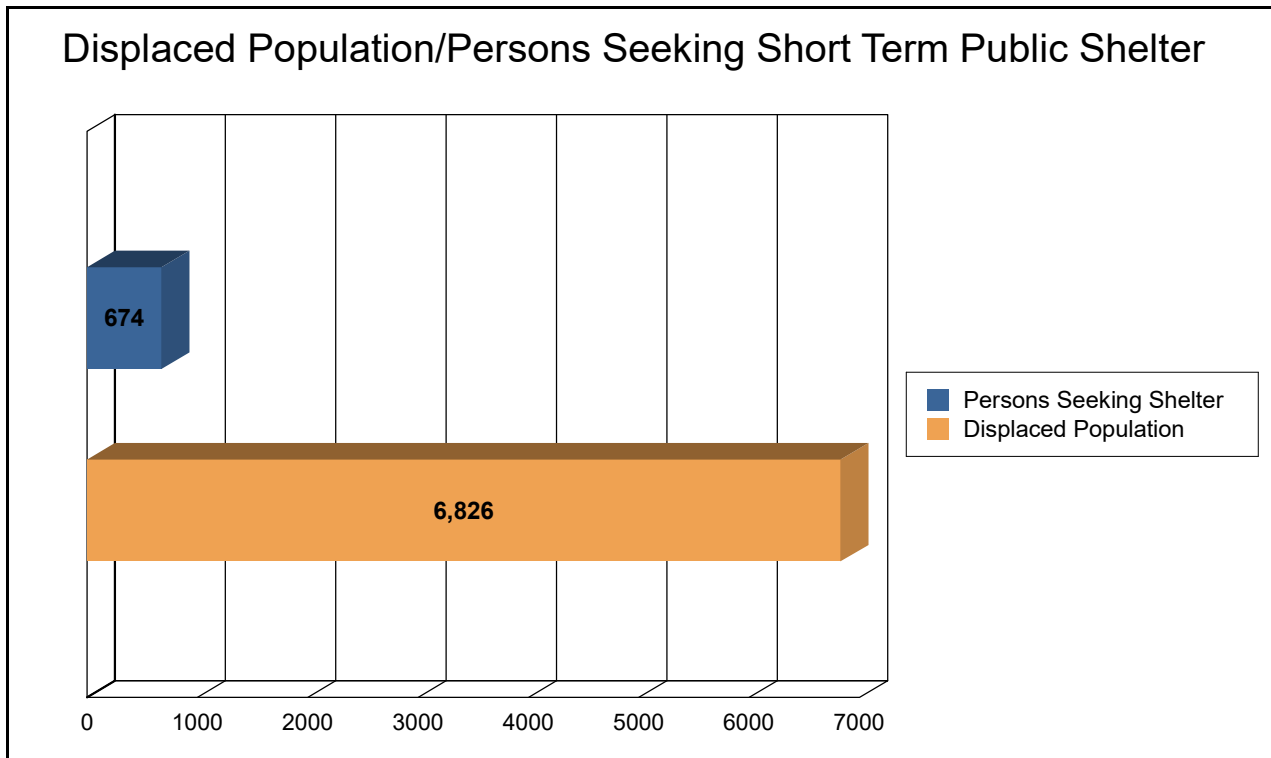
The model estimates that a total of 7,772 tons of debris will be generated. Of the total amount, Finishes comprises 79% of the total, Structure comprises 8% of the total, and Foundation comprises 13%. If the debris tonnage is converted into an estimated number of truckloads, it will require 311 truckloads (@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 2,275 households (or 6,826 of people) will be displaced due to the flood. Displacement includes households evacuated from within or very near to the inundated area. Of these, 674 people (out of a total population of 48,430) will seek temporary shelter in public shelters.



FEMA

RiskMAP  
Increasing Resilience Together



## Economic Loss

The total economic loss estimated for the flood is 1,226.37 million dollars, which represents 24.25 % 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 486.44 million dollars. 60% of the estimated losses were related to the business interruption of the region. The residential occupancies made up 16.34% of the total loss. Table 6 below provides a summary of the losses associated with the building damage.



**FEMA**

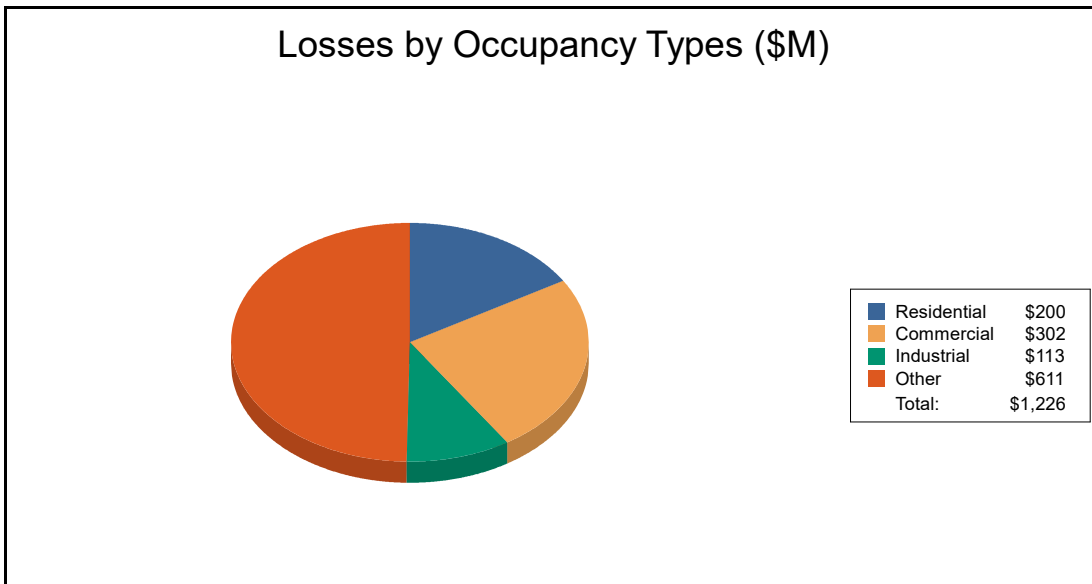
**RiskMAP**  
Increasing Resilience Together





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

Category	Area	Residential	Commercial	Industrial	Others	Total
<u>Building Loss</u>						
	Building	84.62	24.77	27.89	21.20	158.48
	Content	42.50	71.92	63.91	124.17	302.50
	Inventory	0.00	4.90	9.26	11.29	25.45
	<b>Subtotal</b>	<b>127.12</b>	<b>101.59</b>	<b>101.06</b>	<b>156.67</b>	<b>486.44</b>
<u>Business Interruption</u>						
	Income	1.63	90.49	3.52	48.24	143.88
	Relocation	45.20	20.58	3.57	28.48	97.83
	Rental Income	22.62	15.30	0.89	2.14	40.95
	Wage	3.85	73.56	4.44	375.44	457.28
	<b>Subtotal</b>	<b>73.30</b>	<b>199.93</b>	<b>12.41</b>	<b>454.29</b>	<b>739.93</b>
<u>ALL</u>	<b>Total</b>	<b>200.42</b>	<b>301.52</b>	<b>113.47</b>	<b>610.96</b>	<b>1,226.37</b>



**FEMA**

**RiskMAP**  
Increasing Resilience Together



## **Appendix A: County Listing for the Region**

New York  
- Tioga



**FEMA**



**Appendix B: Regional Population and Building Value Data**

	Population	Building Value (thousands of dollars)		
		Residential	Non-Residential	Total
<b>New York</b>				
Tioga	48,430	6,200,865	3,516,126	9,716,991
<b>Total</b>	<b>48,430</b>	<b>6,200,865</b>	<b>3,516,126</b>	<b>9,716,991</b>
<b>Total Study Region</b>	<b>48,430</b>	<b>6,200,865</b>	<b>3,516,126</b>	<b>9,716,991</b>



**FEMA**

**RiskMAP**  
Increasing Resilience Together



# Hazus: Flood Global Risk Report

**Region Name:** TiogaCounty

**Flood Scenario:** TiogaCountyFloods3SquareMiles

**Print Date:** Tuesday, November 7, 2023

**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.*



**FEMA**

**RiskMAP**  
Increasing Resilience Together



## Table of Contents

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



**FEMA**

**RiskMAP**  
Increasing Resilience Together



## 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 22 square miles and contains 1,617 census blocks. The region contains over 20 thousand households and has a total population of 48,430 people. The distribution of population by State and County for the study region is provided in Appendix B.

There are an estimated 23,466 buildings in the region with a total building replacement value (excluding contents) of 9,717 million dollars. Approximately 90.39% of the buildings (and 63.81% of the building value) are associated with residential housing.



**FEMA**

**RiskMAP**  
Increasing Resilience Together



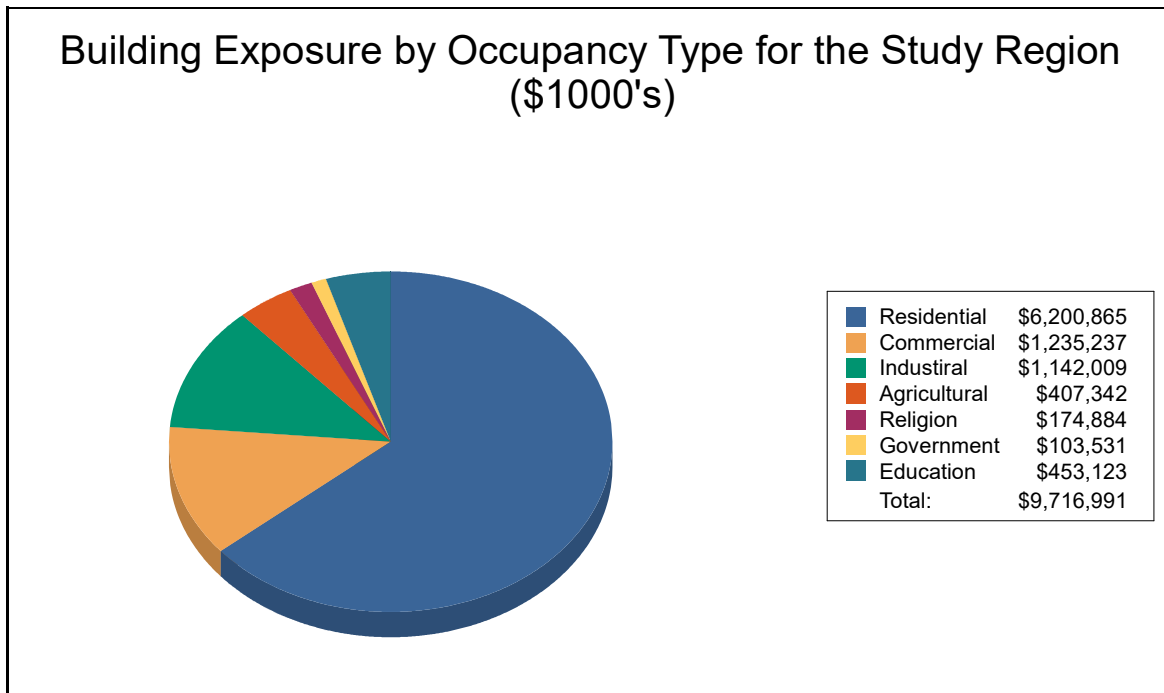
## Building Inventory

### General Building Stock

Hazus estimates that there are 23,466 buildings in the region which have an aggregate total replacement value of 9,717 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	6,200,865	63.8%
Commercial	1,235,237	12.7%
Industrial	1,142,009	11.8%
Agricultural	407,342	4.2%
Religion	174,884	1.8%
Government	103,531	1.1%
Education	453,123	4.7%
<b>Total</b>	<b>9,716,991</b>	<b>100%</b>



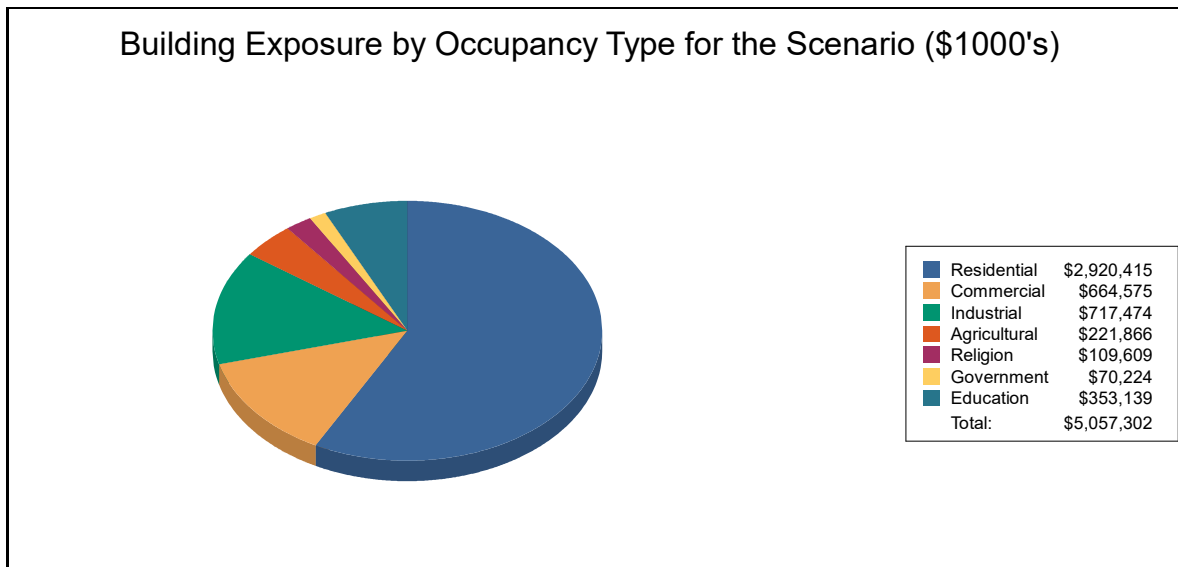
FEMA

**RiskMAP**  
Increasing Resilience Together



**Table 2  
Building Exposure by Occupancy Type for the Scenario**

Occupancy	Exposure (\$1000)	Percent of Total
Residential	2,920,415	57.7%
Commercial	664,575	13.1%
Industrial	717,474	14.2%
Agricultural	221,866	4.4%
Religion	109,609	2.2%
Government	70,224	1.4%
Education	353,139	7.0%
<b>Total</b>	<b>5,057,302</b>	<b>100%</b>



### Essential Facility Inventory

For essential facilities, there are no hospitals in the region with a total bed capacity of no beds. There are 22 schools, 16 fire stations, 6 police stations and 1 emergency operation center.





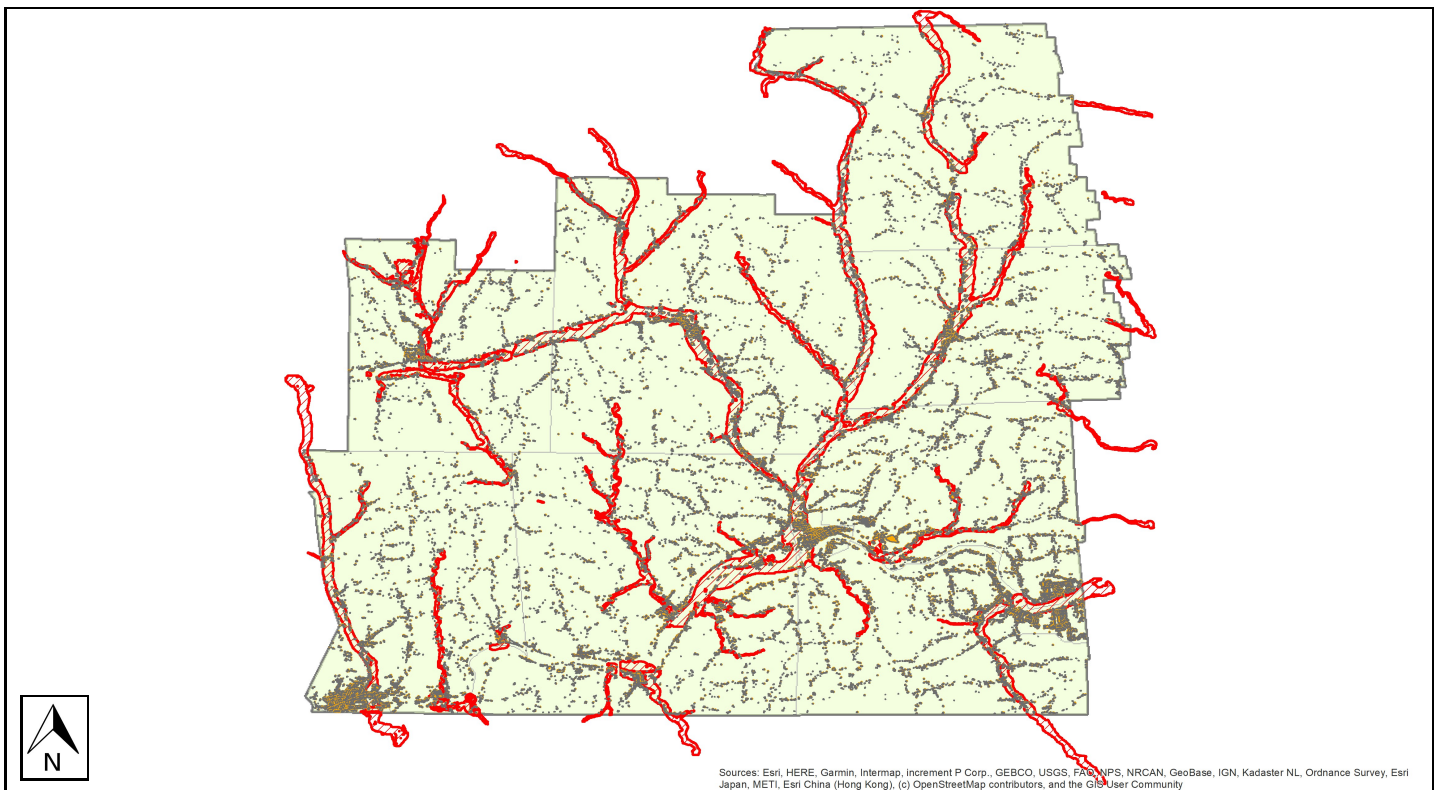
## Flood Scenario Parameters

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

<b>Study Region Name:</b>	TiogaCounty
<b>Scenario Name:</b>	TiogaCountyFloods3SquareMiles
<b>Return Period Analyzed:</b>	500
<b>Analysis Options Analyzed:</b>	No What-Ifs

### Study Region Overview Map

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



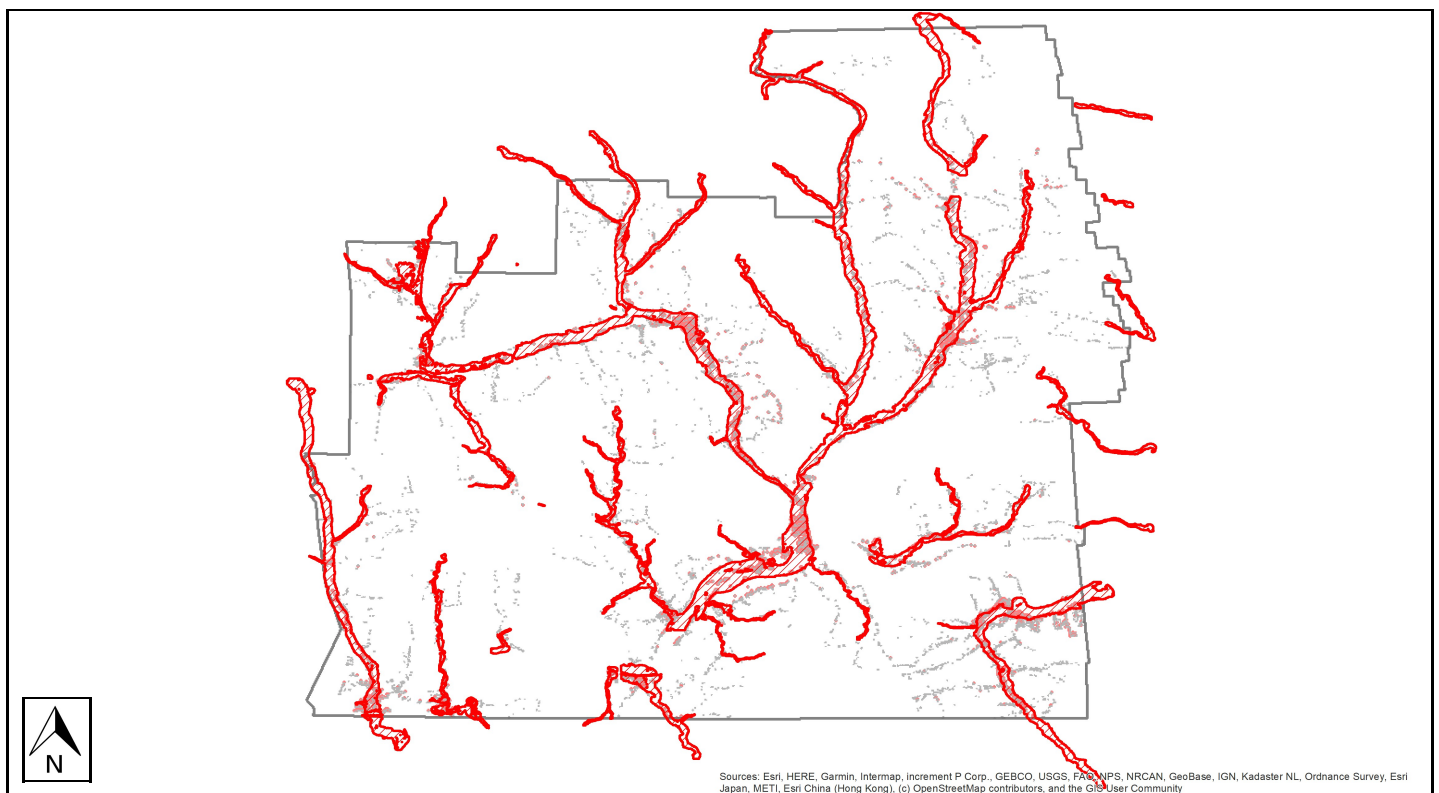


## Building Damage

### General Building Stock Damage

Hazus estimates that about 910 buildings will be at least moderately damaged. This is over 81% of the total number of buildings in the scenario. There are an estimated 6 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.

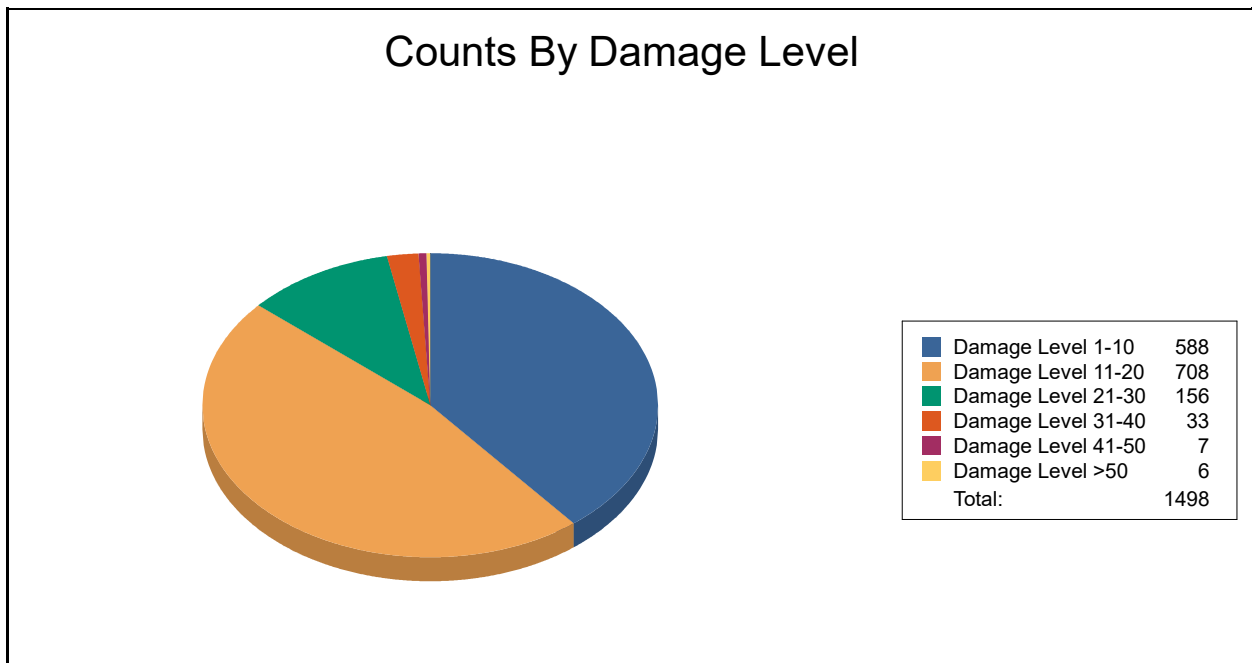
**Total Economic Loss (1 dot = \$300K) Overview Map**





**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	6	50	4	33	2	17	0	0	0	0	0	0
Commercial	16	33	20	42	11	23	1	2	0	0	0	0
Education	3	100	0	0	0	0	0	0	0	0	0	0
Government	1	100	0	0	0	0	0	0	0	0	0	0
Industrial	4	13	14	45	5	16	5	16	3	10	0	0
Religion	1	13	7	88	0	0	0	0	0	0	0	0
Residential	557	40	663	48	138	10	27	2	4	0	6	0
<b>Total</b>	<b>588</b>		<b>708</b>		<b>156</b>		<b>33</b>		<b>7</b>		<b>6</b>	



**FEMA**

**RiskMAP**  
Increasing Resilience Together



**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	1	50	1	50	0	0	0	0	0	0	0	0
ManufHousing	8	33	6	25	2	8	0	0	2	8	6	25
Masonry	73	45	70	43	16	10	3	2	0	0	0	0
Steel	10	24	17	41	6	15	5	12	3	7	0	0
Wood	481	39	590	48	124	10	24	2	2	0	0	0



**FEMA**

**RiskMAP**  
Increasing Resilience Together



## Essential Facility Damage

Before the flood analyzed in this scenario, the region had 0 hospital beds available for use. On the day of the scenario flood event, the model estimates that 0 hospital beds are available in the region.

**Table 5: Expected Damage to Essential Facilities**

Classification	# Facilities			
	Total	At Least Moderate	At Least Substantial	Loss of Use
Emergency Operation Centers	1	0	0	0
Fire Stations	16	0	0	0
Hospitals	0	0	0	0
Police Stations	6	0	0	0
Schools	22	0	0	0

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.



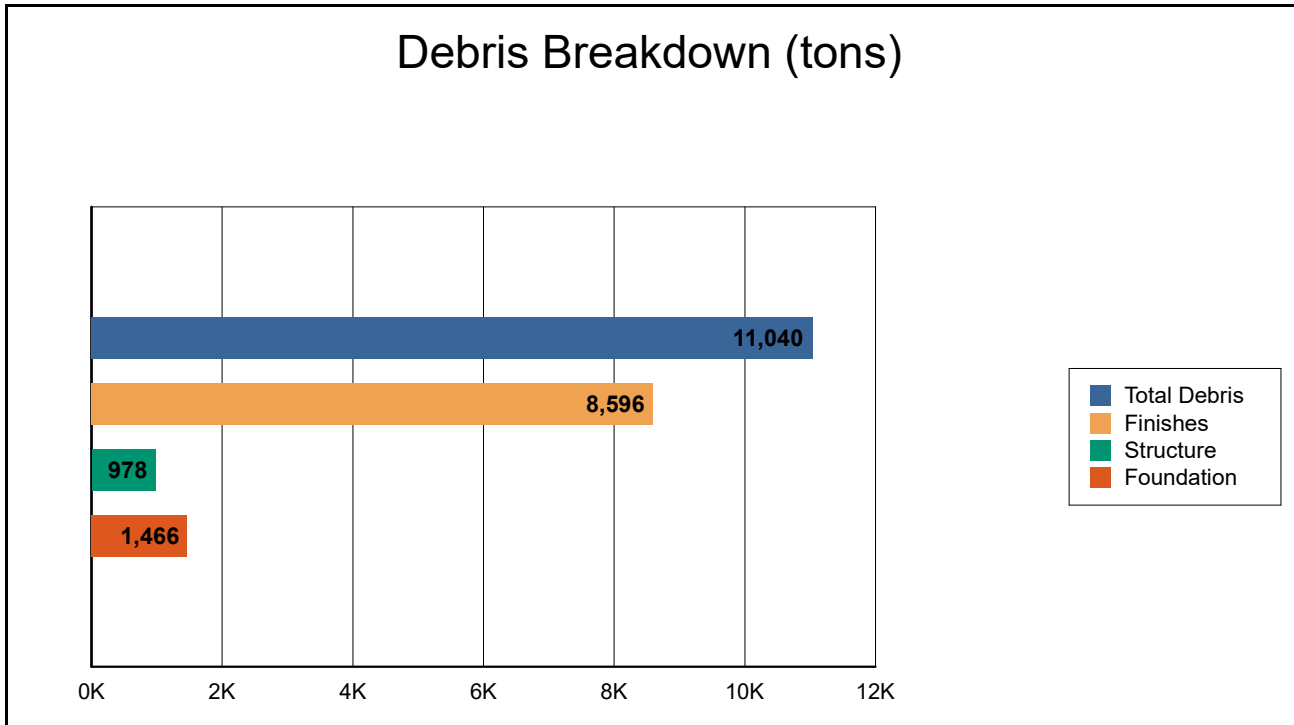
**FEMA**

**RiskMAP**  
Increasing Resilience Together

## 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.



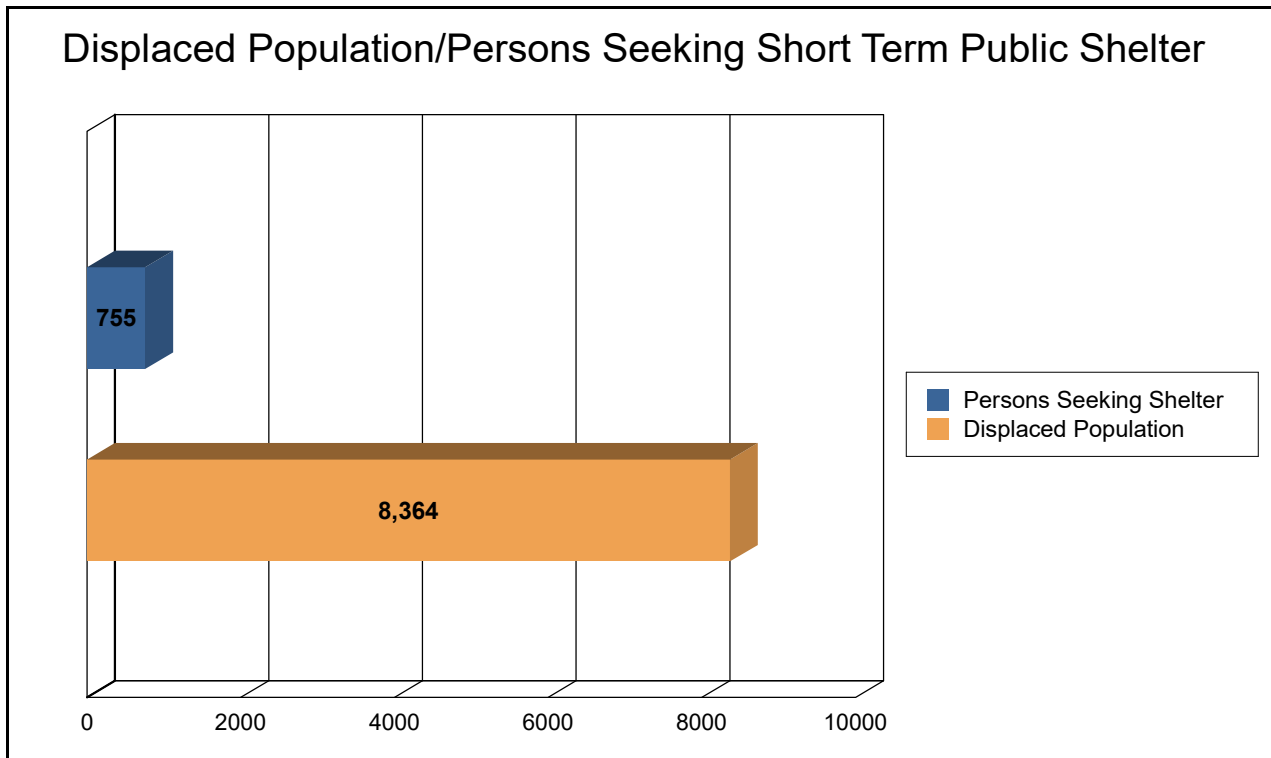
The model estimates that a total of 11,040 tons of debris will be generated. Of the total amount, Finishes comprises 78% of the total, Structure comprises 9% of the total, and Foundation comprises 13%. If the debris tonnage is converted into an estimated number of truckloads, it will require 442 truckloads (@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 2,788 households (or 8,364 of people) will be displaced due to the flood. Displacement includes households evacuated from within or very near to the inundated area. Of these, 755 people (out of a total population of 48,430) will seek temporary shelter in public shelters.



FEMA

RiskMAP  
Increasing Resilience Together



## Economic Loss

The total economic loss estimated for the flood is 1,485.16 million dollars, which represents 29.37 % 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 634.87 million dollars. 57% of the estimated losses were related to the business interruption of the region. The residential occupancies made up 17.99% of the total loss. Table 6 below provides a summary of the losses associated with the building damage.



FEMA

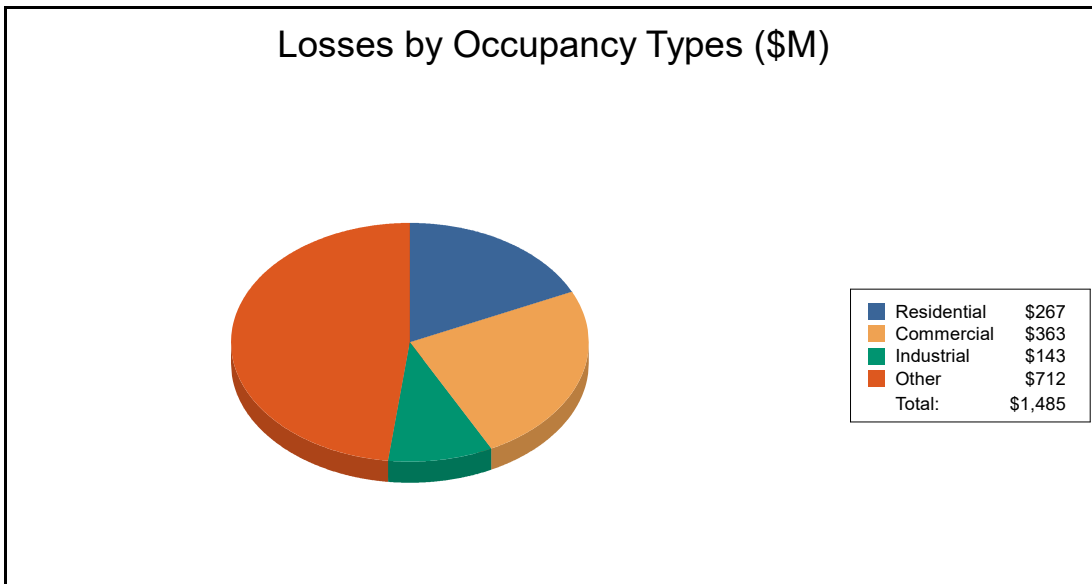
**RiskMAP**  
Increasing Resilience Together





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

Category	Area	Residential	Commercial	Industrial	Others	Total
<u>Building Loss</u>						
	Building	117.48	31.84	34.94	27.25	211.51
	Content	58.63	90.07	81.69	153.90	384.27
	Inventory	0.00	6.26	11.55	21.28	39.09
	<b>Subtotal</b>	<b>176.10</b>	<b>128.16</b>	<b>128.18</b>	<b>202.43</b>	<b>634.87</b>
<u>Business Interruption</u>						
	Income	2.15	107.07	4.11	54.82	168.15
	Relocation	56.07	24.67	4.36	32.11	117.21
	Rental Income	27.86	18.38	1.07	2.44	49.74
	Wage	5.07	85.07	5.19	419.87	515.20
	<b>Subtotal</b>	<b>91.14</b>	<b>235.18</b>	<b>14.73</b>	<b>509.23</b>	<b>850.29</b>
<u>ALL</u>	<b>Total</b>	<b>267.25</b>	<b>363.35</b>	<b>142.91</b>	<b>711.66</b>	<b>1,485.16</b>





## **Appendix A: County Listing for the Region**

New York  
- Tioga



**FEMA**



**Appendix B: Regional Population and Building Value Data**

	Population	Building Value (thousands of dollars)		
		Residential	Non-Residential	Total
<b>New York</b>				
Tioga	48,430	6,200,865	3,516,126	9,716,991
<b>Total</b>	<b>48,430</b>	<b>6,200,865</b>	<b>3,516,126</b>	<b>9,716,991</b>
<b>Total Study Region</b>	<b>48,430</b>	<b>6,200,865</b>	<b>3,516,126</b>	<b>9,716,991</b>



**FEMA**

**RiskMAP**  
Increasing Resilience Together



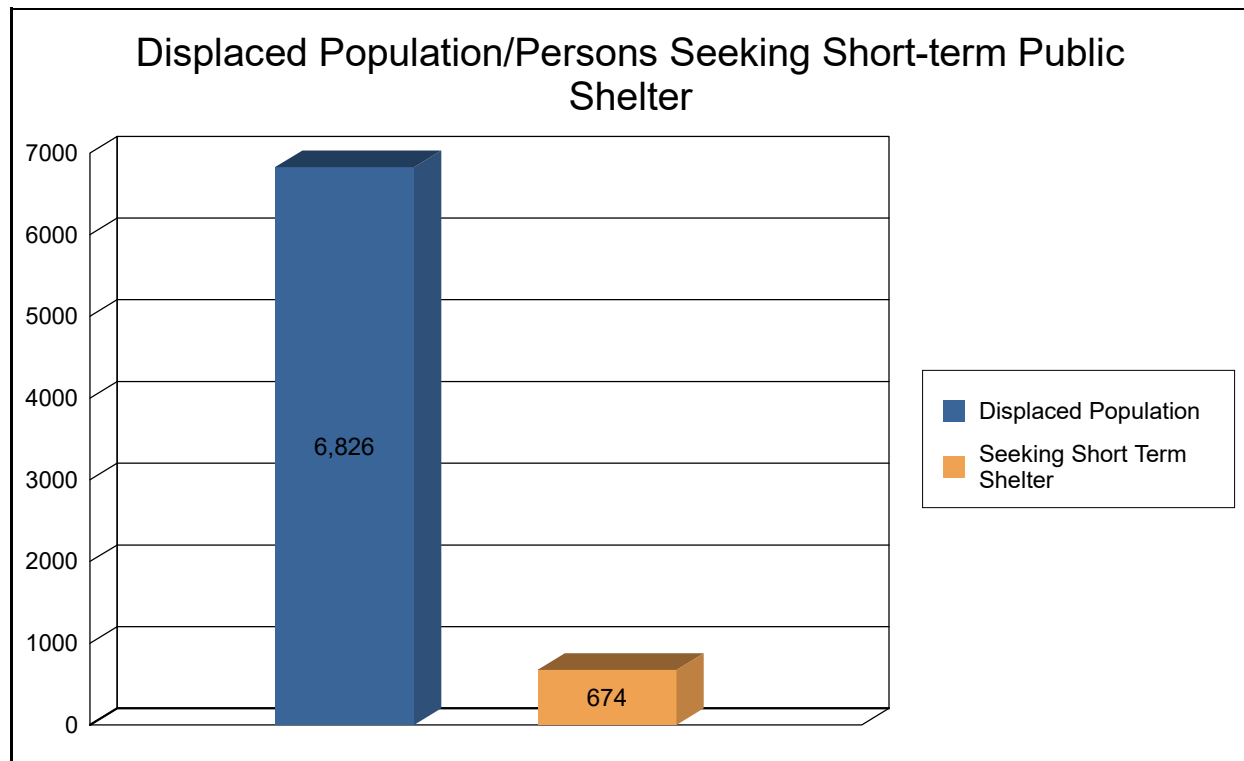
FEMA

# Shelter Summary Report



November 07, 2023

	# of Displaced People	# of People Needing Short Term Shelter
<b>New York</b>		
Tioga	6,826	674
<b>Total</b>	<b>6,826</b>	<b>674</b>
<b>Scenario Total</b>	<b>6,826</b>	<b>674</b>



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: TiogaCounty  
 Scenario: TiogaCountyFloods3SquareMiles  
 Return Period: 100

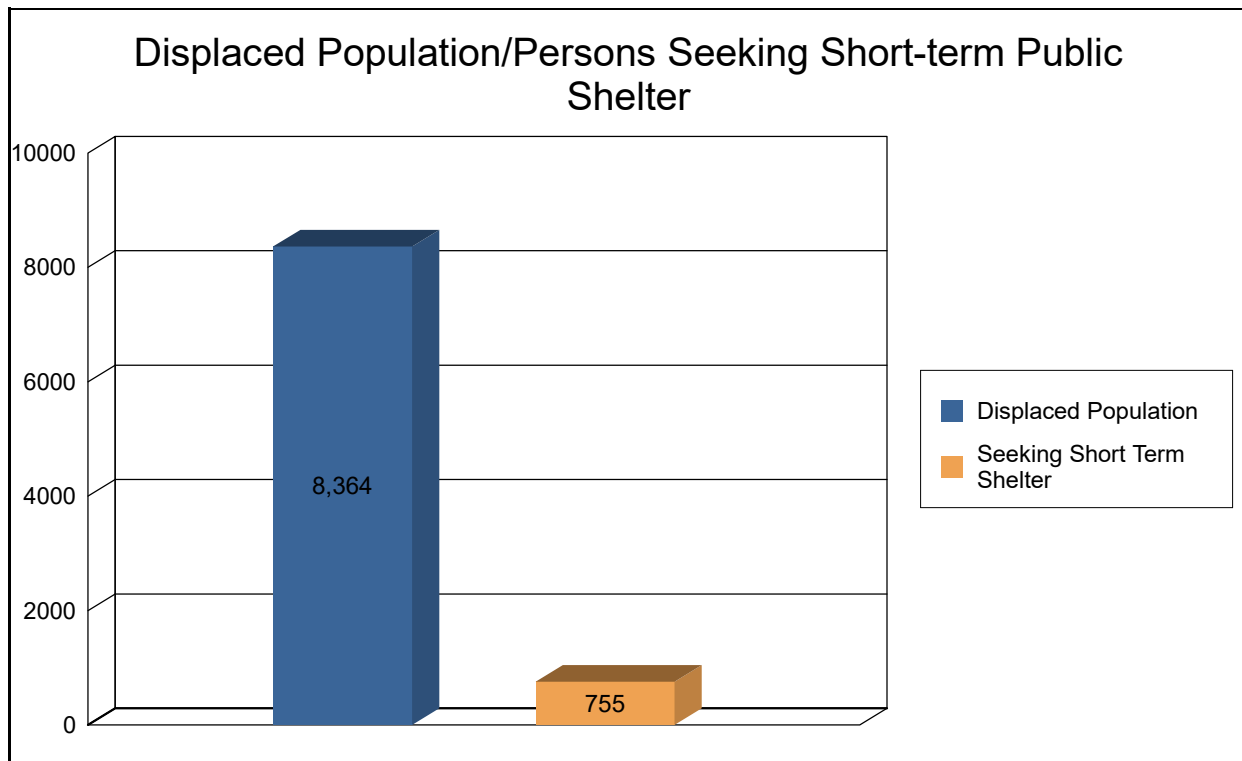


# Shelter Summary Report



November 07, 2023

	# of Displaced People	# of People Needing Short Term Shelter
<b>New York</b>		
Tioga	8,364	755
<b>Total</b>	<b>8,364</b>	<b>755</b>
<b>Scenario Total</b>	<b>8,364</b>	<b>755</b>



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:** TiogaCounty  
**Scenario:** TiogaCountyFloods3SquareMiles  
**Return Period:** 500