

5.0 HAZARD AND VULNERABILITY DATA – APPENDIX A

The information included in this appendix supplements the discussion of Paulding County’s hazards and vulnerabilities from Section 2: Hazard Identification and Risk Assessment. A complete list of historical incidents of each hazard is provided here. Additionally, detailed data on the anticipated damage to Paulding County from a 100-year flood and earthquake, per HAZUS estimates, is provided.

5.1 HAZARD HISTORY DATA

The National Climactic Data Center has maintained records on weather incidents across the United States since 1950. The tables below provide a complete history of the incidents in Paulding County from 1950 through 2016.

5.1.1 Drought and Extreme Heat

No incidents on record per NCDC records.

5.1.2 Flood

The flood incidents identified in this table include events classified as flood and flash flood that occurred in Paulding County since 1950.

Hazard	Location	Date	Deaths	Injuries	Property Damage	Crop Damage
Flash Flood	Countywide	05/16/1996	0	0	750K	0
Flood	Paulding (Zone)	05/17/1996	0	0	1M	0
Flood	Paulding (Zone)	02/27/1997	0	0	0	0
Flood	Paulding (Zone)	03/01/1997	0	0	0	0
Flash Flood	Payne	05/25/1997	0	0	10K	0
Flood	Paulding (Zone)	06/12/1998	0	0	0	0
Flash Flood	Paulding	08/05/1998	0	0	400K	250K
Flood	Countywide	04/20/2000	0	0	0	0
Flash Flood	Paulding	06/17/2003	0	0	0	0
Flash Flood	Cecil	06/17/2003	0	0	0	0
Flash Flood	Paulding	06/17/2003	0	0	150K	0
Flood	Paulding (Zone)	06/17/2003	0	0	50K	0
Flash Flood	Countywide	06/13/2004	0	0	0	0
Flood	Payne	02/06/2008	0	0	50K	0
Flash Flood	Antwerp	05/21/2010	0	0	0	0
Flash Flood	Antwerp	05/25/2011	0	0	0	0
Flood	Antwerp	06/15/2015	0	0	0	0
Flash Flood	Paulding	06/27/2015	0	0	0	0
Flood	Grover Hill Arpt	06/27/2015	0	0	0	0

5.1.3 Severe Thunderstorm

Thunderstorm incidents include events that produced any combination of hail, lightning and thunderstorm wind; all hazards were not necessarily present in all incidents.

Hazard	Location	Date	Deaths	Injuries	Property Damage	Crop Damage
Thunderstorm Wind	Paulding County	01/10/1975	0	0	0	0
Thunderstorm Wind	Paulding County	04/08/1980	0	0	0	0
Thunderstorm Wind	Paulding County	04/08/1980	0	0	0	0
Thunderstorm Wind	Paulding County	04/08/1980	0	0	0	0
Hail	Paulding County	07/12/1980	0	0	0	0
Thunderstorm Wind	Paulding County	06/15/1982	0	0	0	0
Thunderstorm Wind	Paulding County	08/04/1984	0	0	0	0
Thunderstorm Wind	Paulding County	08/08/1984	0	0	0	0
Thunderstorm Wind	Paulding County	08/08/1984	0	0	0	0
Hail	Paulding County	03/28/1985	0	0	0	0
Thunderstorm Wind	Paulding County	09/09/1985	0	0	0	0
Thunderstorm Wind	Paulding County	05/06/1985	0	0	0	0
Thunderstorm Wind	Paulding County	06/27/1986	0	0	0	0
Thunderstorm Wind	Paulding County	07/25/1986	0	0	0	0
Thunderstorm Wind	Paulding County	08/26/1986	0	0	0	0
Thunderstorm Wind	Paulding County	09/12/1986	0	0	0	0
Thunderstorm Wind	Paulding County	09/26/1986	0	0	0	0
Thunderstorm Wind	Paulding County	06/29/1987	0	0	0	0
Hail	Paulding County	05/09/1988	0	0	0	0
Hail	Paulding County	02/18/1992	0	0	0	0
Thunderstorm Wind	Paulding County	06/17/1992	0	0	0	0
Thunderstorm Wind	Paulding County	06/17/1992	0	0	0	0
Hail	Paulding County	06/23/1992	0	0	0	0
Thunderstorm Wind	Paulding County	07/14/1992	0	0	0	0
Thunderstorm Wind	Paulding County	07/14/1992	0	0	0	0
Hail	Antwerp	06/28/1994	0	0	0	0
Thunderstorm Wind	Oakwood	06/26/1995	0	0	4K	0
Thunderstorm Wind	Antwerp	10/29/1996	0	0	3K	0
Thunderstorm Wind	Payne	04/30/1997	0	0	2K	0
Thunderstorm Wind	Paulding	05/18/1997	0	0	5K	0
Thunderstorm Wind	Countywide	06/25/1997	0	0	10K	0
Thunderstorm Wind	Antwerp	03/28/1998	0	0	3K	0
Thunderstorm Wind	Haviland	05/03/1998	0	0	0	0
Thunderstorm Wind	Antwerp	06/12/1998	0	0	10K	0
Hail	Paulding	06/12/1998	0	0	0	0
Thunderstorm Wind	Latty	06/19/1998	0	0	100K	0
Thunderstorm Wind	Paulding	08/24/1998	0	0	50K	0
Thunderstorm Wind	Countywide	11/10/1998	0	0	10K	0
Thunderstorm Wind	Paulding	12/06/1998	0	0	50K	0

Hail	Paulding	04/10/1999	0	0	0	0
Thunderstorm Wind	Paulding	05/17/1999	0	0	0	0
Hail	Oakwood	05/17/1999	0	0	0	0
Thunderstorm Wind	Charloe	06/09/1999	0	0	0	0
Thunderstorm Wind	Antwerp	05/09/2000	0	0	0	0
Thunderstorm Wind	Paulding	05/18/2000	0	0	0	0
Thunderstorm Wind	Paulding	05/18/2000	0	0	0	0
Thunderstorm Wind	Paulding	06/14/2000	0	0	0	0
Thunderstorm Wind	Paulding	06/14/2000	0	0	10K	0
Hail	Briceton	08/02/2000	0	0	0	0
Thunderstorm Wind	Melrose	08/06/2000	0	0	10K	0
Thunderstorm Wind	Countywide	08/06/2000	0	0	0	0
Thunderstorm Wind	Oakwood	08/06/2000	0	0	10K	0
Thunderstorm Wind	Payne	06/12/2001	0	0	0	0
Thunderstorm Wind	Payne	06/12/2001	0	0	0	0
Thunderstorm Wind	Paulding	07/10/2001	0	0	<1K	0
Thunderstorm Wind	Paulding	07/10/2001	0	0	0	0
Hail	McGill	08/22/2001	0	0	0	0
Hail	McGill	08/22/2001	0	0	0	0
Hail	Payne	08/22/2001	0	0	0	0
Hail	McGill	08/22/2001	0	0	0	0
Thunderstorm Wind	Antwerp	09/08/2001	0	0	0	0
Thunderstorm Wind	Oakwood	09/08/2001	0	0	0	0
Thunderstorm Wind	Charloe	09/08/2001	0	0	0	0
Thunderstorm Wind	Antwerp	06/28/2003	0	0	0	0
Hail	Payne	07/04/2003	0	0	0	0
Hail	Paulding	07/04/2003	0	0	0	0
Thunderstorm Wind	Paulding	07/06/2003	0	0	0	0
Thunderstorm Wind	Charloe	07/07/2003	0	0	0	0
Thunderstorm Wind	Payne	07/08/2003	0	0	0	0
Thunderstorm Wind	Cecil	07/08/2003	0	0	2K	0
Hail	Payne	08/01/2003	0	0	0	0
Thunderstorm Wind	Payne	08/01/2003	0	0	0	0
Thunderstorm Wind	Payne	08/01/2003	0	0	0	0
Thunderstorm Wind	Grover Hill	08/01/2003	0	0	0	0
Thunderstorm Wind	Payne	08/01/2003	0	0	0	0
Thunderstorm Wind	Payne	08/26/2003	0	0	0	0
Thunderstorm Wind	Haviland	11/12/3003	0	0	1K	0
Hail	Paulding	05/17/2004	0	0	0	0
Thunderstorm Wind	Payne	05/21/2004	0	0	0	0
Thunderstorm Wind	Countywide	05/23/2004	0	0	3K	0
Hail	Antwerp	06/13/2004	0	0	0	0
Thunderstorm Wind	Antwerp	06/13/2004	0	0	0	0
Thunderstorm Wind	Countywide	06/13/2004	0	0	10K	0
Thunderstorm Wind	Roselms	06/14/2004	0	0	0	0
Thunderstorm Wind	Antwerp	06/14/2004	0	0	0	0
Hail	Haviland	04/20/2005	0	0	0	0
Hail	Grover Hill	05/11/2005	0	0	0	0

Thunderstorm Wind	Paulding	06/05/2005	0	0	0	0
Hail	Antwerp	07/21/2005	0	0	0	0
Hail	Antwerp	09/22/2005	0	0	0	0
Thunderstorm Wind	Antwerp	11/06/2005	0	0	100K	0
Thunderstorm Wind	Antwerp	03/31/2006	0	0	10K	0
Hail	Antwerp	05/17/2006	0	0	0	0
Hail	Antwerp	05/17/2006	0	0	0	0
Hail	Antwerp	06/19/2006	0	0	0	0
Hail	Paulding	06/19/2006	0	0	0	0
Hail	Paulding	06/19/2006	0	0	0	0
Thunderstorm Wind	Paulding	06/19/2006	0	0	0	0
Hail	Grover Hill	06/19/2006	0	0	0	0
Hail	Antwerp	06/22/2006	0	0	0	0
Hail	Antwerp	05/01/2007	0	0	0	0
Thunderstorm Wind	Paulding	08/24/2007	0	0	0	0
Thunderstorm Wind	Broughton	08/24/2007	0	0	0	0
Thunderstorm Wind	Batson	05/30/2008	0	0	40K	0
Thunderstorm Wind	Paulding	06/06/2008	0	0	25K	0
Thunderstorm Wind	Arthur	06/06/2008	0	0	5K	0
Hail	Topton	06/25/2008	0	0	0	0
Hail	Grover Hill	06/25/2008	0	0	0	0
Thunderstorm Wind	Knoxdale	04/07/2010	0	0	10K	0
Thunderstorm Wind	Cecil	04/07/2010	0	0	100K	0
Hail	Paulding	05/05/2010	0	0	0	0
Hail	Arthur	05/07/2010	0	0	0	0
Thunderstorm Wind	Antwerp	06/18/2010	0	0	0	0
Thunderstorm Wind	Paulding	06/18/2010	0	0	0	0
Thunderstorm Wind	Paulding	06/23/2010	0	0	0	0
Thunderstorm Wind	Latty	06/23/2012	0	0	0	0
Thunderstorm Wind	Paulding	08/11/2010	0	0	0	0
Thunderstorm Wind	Cecil	08/11/2010	0	0	0	0
Hail	Antwerp	04/19/2011	0	0	0	0
Hail	Antwerp	05/25/2011	0	0	0	0
Hail	Paulding	05/25/2011	0	0	0	0
Thunderstorm Wind	Paulding	07/11/2011	0	0	0	0
Thunderstorm Wind	Antwerp	07/11/2011	0	0	0	0
Thunderstorm Wind	Tipton	07/22/2011	0	0	0	0
Thunderstorm Wind	Paulding Buehler Arp	09/09/2011	0	0	0	0
Thunderstorm Wind	Paulding	08/09/2011	0	0	10K	0
Thunderstorm Wind	Paulding Buehler Arp	08/09/2011	0	0	0	0
Hail	Antwerp	08/24/2011	0	0	0	0
Thunderstorm Wind	Oakwood	08/24/2011	0	0	0	0
Thunderstorm Wind	Antwerp	06/29/2012	0	0	0	0
Thunderstorm Wind	Paulding	06/29/2012	0	0	0	0
Thunderstorm Wind	Antwerp	06/29/2012	0	0	0	0
Thunderstorm Wind	Antwerp	06/29/2012	0	0	0	0
Hail	Payne	09/07/2012	0	0	0	0
Thunderstorm Wind	Grover Hill	09/07/2012	0	0	0	0

Thunderstorm Wind	Mandale	11/17/2013	0	0	0	0
Thunderstorm Wind	Junction	05/09/2014	0	0	0	0
Thunderstorm Wind	Antwerp	07/01/2014	0	0	0	0
Hail	Tipton	07/26/2014	0	0	0	0
Hail	Payne	07/26/2014	0	0	0	0
Thunderstorm Wind	Grover Hill	05/30/2015	0	0	0	0
Thunderstorm Wind	Oakwood	06/15/2015	0	0	0	0
Thunderstorm Wind	Antwerp	07/18/2015	0	0	0	0
Thunderstorm Wind	Emmet	07/18/2015	0	0	0	0
Thunderstorm Wind	Antwerp	08/23/2015	0	0	0	0
Thunderstorm Wind	Renollet	08/23/2015	0	0	0	0
Thunderstorm Wind	Arthur	08/23/2015	0	0	0	0
Hail	Latty	03/27/2016	0	0	0	0
Hail	Oakwood	03/27/2016	0	0	0	0
Hail	Paulding	02/28/2017	0	0	0	0
Hail	Antwerp	04/19/2017	0	0	0	0
Thunderstorm Wind	Paulding	04/19/2017	0	0	0	0
Thunderstorm Wind	Emmet	05/18/2017	0	0	0	0
Thunderstorm Wind	Payne	05/18/2017	0	0	0	0
Thunderstorm Wind	Payne	05/18/2017	0	0	0	0
Thunderstorm Wind	Tipton	05/18/2017	0	0	0	0

5.1.4 Tornado

Confirmed tornadoes occurring in Paulding County since 1950 are listed below.

Hazard	Location	Date	Fujita	Deaths	Injuries	Property Damage	Crop Damage
Tornado	Paulding County	04/03/1974	F2	0	0	250K	0
Tornado	Paulding County	04/03/1974	F3	0	1	250K	0
Tornado	Paulding County	04/03/1974	F1	0	0	0	0
Tornado	Paulding County	04/03/1974	F1	0	0	25K	0
Tornado	Paulding County	06/30/1977	F1	0	0	250K	0
Tornado	Paulding County	07/05/1980	F1	0	6	250K	0
Tornado	Paulding County	06/03/1989	F1	0	0	250K	0
Tornado	Roselms	11/10/2002	F3	0	0	0	0
Tornado	Haviland	10/26/2010	EF1	0	0	0	0
Tornado	Oakwood	10/26/2010	EF1	0	0	0	0
Tornado	Mandale	11/17/2013	EF1	0	0	0	0
Tornado	Knoxdale	08/24/2016	EF2	0	0	0	0

5.1.5 Windstorm

Incidents identified as windstorms are limited to wind-only events. Events in which severe wind occurred along with another hazards, such as winter weather or severe thunderstorms, are identified under the primary hazard.

Hazard	Location	Date	Magnitude	Deaths	Injuries	Property Damage	Crop Damage
High Wind	Paulding (Zone)	04/06/1997	60 kts.	0	0	0	0
High Wind	Paulding (Zone)	12/11/2000	59 kts.	0	0	0	0
High Wind	Paulding (Zone)	03/09/2002		0	0	0	0
High Wind	Paulding (Zone)	11/12/2003	56 kts.	0	0	0	0
High Wind	Paulding (Zone)	03/05/2004	52 kts.	0	0	0	0
High Wind	Paulding (Zone)	09/14/2008	56 kts.	0	0	5K	0
High Wind	Paulding (Zone)	02/11/2009	50 kts.	0	0	0	0
High Wind	Paulding (Zone)	12/09/2009	50 kts.	0	0	0	0
High Wind	Paulding (Zone)	11/24/2014	50 kts.	0	0	0	0
High Wind	Paulding (Zone)	03/08/2017	52 kts.	0	0	0	0

5.1.6 Winter Storm

Winter storm events include incidents classified as blizzard, cold/ extreme cold/wind chill, ice storm, or winter storm that occurred in Paulding County since 1950.

Hazard	Location	Date	Deaths	Injuries	Property Damage	Crop Damage
Winter Storm	Paulding (Zone)	01/02/1996	0	0	50K	0
Ice Storm	Paulding (Zone)	03/06/1996	0	0	0	0
Winter Storm	Paulding (Zone)	03/19/1996	0	0	0	0
Winter Storm	Paulding (Zone)	01/26/2004	0	0	0	0
Winter Storm	Paulding (Zone)	12/22/2004	0	0	0	0
Winter Storm	Paulding (Zone)	01/05/2005	0	0	0	0
Winter Storm	Paulding (Zone)	01/22/2005	0	0	0	0
Blizzard	Paulding (Zone)	02/13/2007	0	0	0	0
Ice Storm	Paulding (Zone)	02/24/2007	0	0	30K	0
Ice Storm	Paulding (Zone)	12/09/2007	0	0	0	0
Winter Storm	Paulding (Zone)	12/15/2007	0	0	0	0
Winter Storm	Paulding (Zone)	02/01/2008	0	0	0	0
Winter Storm	Paulding (Zone)	02/25/2008	0	0	0	0
Winter Storm	Paulding (Zone)	03/04/2008	0	0	0	0
Ice Storm	Paulding (Zone)	12/19/2008	0	0	0	0
Winter Storm	Paulding (Zone)	02/09/2010	0	0	0	0
Winter Storm	Paulding (Zone)	12/12/2010	0	0	0	0
Winter Storm	Paulding (Zone)	02/01/2013	0	0	0	0

Winter Storm	Paulding (Zone)	01/05/2014	0	0	0	0
Extreme Cold/Wind Chill	Paulding (Zone)	01/06/2014	0	0	0	0
Winter Storm	Paulding (Zone)	02/04/2014	0	0	0	0
Winter Storm	Paulding (Zone)	03/12/2014	0	0	0	0
Extreme Cold/Wind Chill	Paulding (Zone)	01/08/2015	0	0	0	0

5.2 HAZUS LOSS ESTIMATES

HAZUS is a nationally accepted methodology that utilizes U.S. Census and local Geographic Information Systems (GIS) data to estimate losses for earthquakes, hurricanes, and floods. Because floods and earthquakes are identified as risks for Paulding County, HAZUS was used to generate and evaluate the county's vulnerability to these incidents. Estimates from HAZUS were generated using 2010 U.S. Census Bureau data, which calculated the population of Paulding County as 19,614.

5.2.1 Flood

To evaluate Paulding County's vulnerability to flood, a 100-year flood scenario was utilized to generate loss estimates. For a flood of this magnitude, the damage to the county would be significant. The incident would expose a significant portion of the county's buildings to damage. Table 5-1 identifies buildings by occupancy type for all of Paulding County and those exposed to risk in this scenario.

Table 5-1: Building Occupancy Type

Occupancy	Paulding County Exposure (\$1000)	100-Year Flood Scenario Exposure (\$1000)
Residential	1,612,245	396,157
Commercial	218,641	49,650
Industrial	174,289	21,602
Agricultural	50,113	11,964
Religion	46,024	5,507
Government	17,590	686
Education	19,102	536
Total	2,138,004	486,102

Essential Facility Inventory

Essential facilities are healthcare facilities like hospitals and clinics, fire and EMS stations, police stations, and operations and dispatch centers. Schools are included in essential facilities. Essential facilities in Mercer County are identified in Table 5-2.

Table 5-2: Essential Facility Inventory

Facility Type	Number
Hospital	1
Schools	11
Fire Stations	7
Police Stations	2

Estimated Building Damage

Per HAZUS estimates, 8 buildings will sustain at least moderate damage. Zero buildings are likely to be completely destroyed. Tables 5-3 and 5-4 identify the anticipated building damage based on occupancy type and building type.

Table 5-3: Expected Building Damage by Occupancy

Occupancy	Percent Damaged					
	1-10%	11-20%	21-30%	31-40%	41- 50 %	> 50%
Agriculture	0	0	0	0	0	0
Commercial	0	0	0	0	0	0
Education	0	0	0	0	0	0
Government	0	0	0	0	0	0
Industrial	0	0	0	0	0	0
Religious	0	0	0	0	0	0
Residential	6	5	3	0	0	0
Total	6	5	3	0	0	0

Table 5-4: Expected Building Damage by Building Type

Building Type	Percent Damaged					
	1-10%	11-20%	21-30%	31-40%	41- 50 %	> 50%
Concrete	0	0	0	0	0	0
Manufactured Housing	0	0	0	0	0	0
Masonry	0	0	0	0	0	0
Steel	0	0	0	0	0	0
Wood	6	5	3	6	0	0
Total	6	5	3	6	0	0

Based on this scenario, HAZUS does not predict that any critical facilities will sustain moderate or significant damage. Therefore, it is anticipated that the hospital beds, emergency services, and institutional services normally present in the county would continue to be functional in a 100-year flood scenario.

Table 5-5: Expected Damage to Essential Facilities

Classification	Total	Moderate Damage	Substantial Damage	Loss of Use
Fire Stations	7	0	0	0
Hospitals	1	0	0	0
Police Stations	2	0	0	0
Schools	11	0	0	0

Shelter Requirements

When flooding forces people from their homes, some will seek refuge at a public shelter. In this incident, it is anticipated that 155 households would be displaced and approximately 25 people would seek temporary shelter.

Building Related Losses

The total economic loss for the identified 100-year flood event is estimated to be \$11.85M.

Building-related losses are separated into two loss categories: direct building loss and business interruption loss. Building losses include structural damage and damage to contents. Business interruption losses include the costs associated with not being able to conduct normal business, displaced workers, and lost opportunities. Table 5-6 provides a summary of the anticipated losses.

Table 5-6: Building-Related Economic Loss Estimates
(Millions of dollars)

Area	Residential	Commercial	Industrial	Others	Total
<i>Building Loss</i>					
Building	5.61	0.40	0.37	0.12	6.49
Content	2.29	1.32	0.81	0.78	5.19
Inventory	0.00	0.06	0.07	0.04	0.17
<i>Business Interruption</i>					
Income	0.00	0.0	0.00	0.00	0.00
Relocation	0.00	0.00	0.00	0.00	0.00
Rental Income	0.00	0.00	0.00	0.00	0.00
Wage	0.00	0.00	0.00	0.00	0.00
Total	7.90	1.78	1.25	0.93	11.86

5.2.2 Earthquake

The simulated earthquake epicenter was assumed to be inside the Village of Paulding, Paulding County's most populated jurisdiction, for a worst-case scenario. The magnitude of the simulated earthquake measured 5.5 on the Richter Scale. The HAZUS loss estimation program utilized 2010 U.S. Census data for this scenario. There are an estimated 9,000 buildings in the county with a replacement value of \$2,183M.

Critical Facility Inventory

HAZUS separates critical facilities into essential facilities and high potential loss (HPL) facilities. Essential facilities are healthcare facilities like hospitals and clinics, fire and EMS stations, police stations, and operations and dispatch centers. Schools are included in essential facilities. HPL facilities include dams, levees, nuclear power plants, military installations and hazardous material sites.

Table 5-7: Critical Facility Inventory

Essential Facilities		High Potential Loss Facilities	
Facility Type	Number	Facility Type	Number
Hospital	1	Hazardous Materials Sites	44
Schools	11		
Fire Stations	7		
Police Stations	2		

Transportation and Utility Lifeline Inventory

Lifeline systems are defined as transportation and utilities. Transportation systems include highways, railways, and airports. Utility systems include water treatment and potable water plants, wastewater treatment plants, natural gas suppliers, fuel oil suppliers, electrical power plants, and communications hubs. The total value of these lifeline systems exceeds \$779M and includes more than 54 km of highways, 155 bridges, and 1,614 km of pipes.

Table 5-8: Transportation System Inventory

System	Components	Quantity	Replacement Value
Highways	Bridges	155	\$67.80M
	Segments	7	\$186.70M
Railway	Bridges	2	\$0.10M
	Segments	26	\$71.30M
Total			\$325.90M

Table 5-9: Utility System Inventory

System	Components	Quantity	Replacement Value
Potable Water	Distribution Lines	N/A	\$16.10M
	Facilities	1	\$35.0M
Waste Water	Distribution Lines	N/A	\$9.70M
	Facilities	6	\$419.60M
Natural Gas	Distribution Lines	N/A	\$6.50M
Communication	Facilities	1	\$0.10M
Total			\$486.90M

Building Damage

The estimated building damage according to HAZUS is extensive. The number of buildings projected to sustain moderate damage is 2,417, approximately 27% of all buildings in the county. It is estimated that 177 buildings would be destroyed. Table 5-10 summarizes the anticipated building damages.

Table 5-10: Expected Building Damage by Occupancy

Occupancy	None	Slight	Moderate	Extensive	Complete
Agriculture	55	39	58	35	10
Commercial	143	94	110	53	15
Education	5	3	3	1	0
Government	12	6	7	3	1
Industrial	52	33	45	25	7
Other Residential	280	244	397	241	58
Religion	27	13	12	6	2
Single Family Residential	3,751	1,841	966	277	86
Total	4,325	2,274	1,599	641	178

Depending on the type of building construction, damage from an earthquake can be more or less serious. Based on common types of construction, the scenario is extrapolated into damage according to type of construction type.

Table 5-11: Expected Building Damage by Building Type

Building Type	None	Slight	Moderate	Extensive	Complete
Wood	3,347	1,543	606	78	6
Steel	76	45	84	54	14
Concrete	27	16	22	11	2
Precast	25	12	23	18	4
Reinforced Masonry	19	2	6	4	1
Unreinforced Masonry	673	456	484	241	96
Manufactured Housing	167	199	374	234	56
Total	4,325	2,274	1,599	641	178

Essential Facility Damage

According to HAZUS estimates, only 2 of the county's hospital beds would be available and functional on the day of the earthquake. These would be needed by patients already hospitalized at the time of the earthquake and by those requiring hospitalization for injuries sustained in the incident. One week post-quake, it is estimated that 8% of these beds would be available. By the 30-day mark, an estimated 27% would be fully functional. Anticipated damage to other essential facilities is detailed in Table 5-12.

Table 5-12: Expected Damage to Essential Facilities

Classification	Total	Moderate Damage >50%	Complete Damage > 50%	With Functionality >50% on Day 1
Hospitals	1	1	0	0
Schools	11	4	0	0
Police Stations	2	1	0	0
Fire Stations	7	2	0	0

Transportation and Utility Lifeline Damage

Per HAZUS estimates, nearly all highways, bridges, railways, and rail bridges will have more than 50% functionality on the first day after an earthquake, and will continue to experience greater than 50% function throughout the recovery period. Limited damage to these transportation systems is expected.

Tables 5-13 and 5-14 describe the anticipated damage to utility system facilities and pipelines.

Table 5-13: Expected Utility System Facility Damage

System	Total	Moderate Damage	Complete Damage	Day 1 >50% Functionality	Day 7 >50% Functionality
Potable Water	1	1	0	0	1
Waste Water	6	6	0	0	4
Communication	1	1	0	0	1

Table 5-14: Expected Utility System Pipeline Damage

Utility	Total Pipeline	Anticipated Leaks	Anticipated Line Breaks
Potable Water	807 km	90	23
Wastewater	484 km	65	16
Natural Gas	323 km	19	5

Electrical service is more challenging and time consuming to restore. Table 5-15 outlines the number of customers anticipated to be without electric service following the incident. There are 7,769 total households in the county.

Table 5-15: Expected Electric Power System Performance

Days Post-Event	Households Without Service
Day 1	4,896
Day 3	2,998
Day 7	1,110
Day 30	178
Day 90	0

Post-Incident Fire Risk

Because there is often limited water supply following an earthquake, fires can be a significant hazard. HAZUS estimates the number of fires that would occur based upon the prospect of water not being available to fight fires and an abundance of spontaneous ignition. According to these estimates, no fire ignitions are probable and no damage or loss is anticipated.

Debris Generation

The amount of debris generated by an earthquake can be substantial. HAZUS classifies debris into two types based on the handling equipment required: brick/wood and reinforced concrete/steel. In the given scenario, a total of 0.07 million tons of debris is anticipated. Brick/wood would comprise 48% of that amount. When converting these totals to truckloads, debris removal would require 2,920 truckloads, assuming 25 tons per truck.

Shelter Needs

Temporary public shelters are often necessary post-quake to provide housing for people displaced by the event. HAZUS estimates that 131 households would be displaced and 75 people would seek housing in a temporary shelter.

Casualties

The number of people estimated to be injured or killed by the earthquake is divided into four categories based on the extent of the victim's injuries:

- Level 1 – Require medical attention but not hospitalization
- Level 2 – Require hospitalization for non-life threatening injuries
- Level 3 – Require hospitalization for critical injuries
- Level 4 – Fatalities

Casualty estimates are provided for 3 times of day that represent periods of the day that various sectors of the community operate at peak capacity loads. These figures are provided in Table 5-16.

Table 5-16: Casualty Estimates

Time	Location	Level 1	Level II	Level III	Level IV
2 AM	Commercial	1	0	0	0
	Commuting	0	0	0	0
	Educational	0	0	0	0
	Hotels	0	0	0	0
	Industrial	2	1	0	0
	Other Residential	14	3	0	0
	Single Family Residential	45	10	1	3
	TOTAL	63	14	2	3
2 PM	Commercial	38	9	1	2
	Commuting	0	0	0	0
	Educational	17	4	1	1
	Hotels	0	0	0	0
	Industrial	17	4	1	1
	Other Residential	3	1	0	0
	Single Family	10	2	0	1
	TOTAL	85	20	3	5
5 PM	Commercial	28	7	1	2
	Commuting	2	2	4	1
	Educational	1	0	0	0
	Hotels	0	0	0	0
	Industrial	11	3	0	1
	Other Residential	5	1	0	0
	Single Family Residential	18	4	1	1
	TOTAL	65	17	6	5

Building-Related Losses

Total economic loss for this earthquake scenario is estimated to be \$390.13M. This estimate includes building and lifeline related losses and is based on the building inventory in Paulding County. Building losses are examined in two categories: direct building loss and business interruption loss. Direct building losses include structural damage and damage to contents.

Business interruption losses include the costs associated with not being able to conduct normal business, displaced workers, and lost opportunities.

Total estimated building losses are anticipated to be \$229.86M. Business interruption expenses account for 13% of this total. Residential structures are expected to sustain the greatest loss by far, more than 62% of the total loss for the county.

Table 5-17 provides a summary of the anticipated building-related losses. All figures are expressed in millions of dollars.

Table 5-17: Building-Related Economic Loss Estimates

Area	Single-Family	Other Residential	Commercial	Industrial	Other	Total
<i>Income Losses</i>						
Wage	0.00	0.22	3.71	0.48	0.60	5.01
Capital Related	0.00	0.09	3.34	0.34	0.16	3.94
Rental	2.07	0.75	2.03	0.20	0.20	5.25
Relocation	7.60	1.84	3.15	0.89	1.88	15.34
<i>Capital Stock Losses</i>						
Structural	17.89	2.69	5.41	3.58	5.82	35.40
Non-Structural	69.60	10.10	13.43	10.57	8.44	112.15
Content	27.61	2.49	7.47	7.61	5.56	50.74
Inventory	0.00	0.00	0.28	1.36	0.39	2.03
TOTAL	124.78	18.18	38.63	25.02	23.06	229.86

Transportation and Utility Lifeline Losses

Earthquakes often cause extensive damage to a community's infrastructure. Tables 5-18 and 5-19 depict the potential damage Paulding County could expect to its transportation and utility systems. Loss figures address only the cost to repair, not business interruption costs. Numbers are expressed in millions of dollars.

Table 5-18: Transportation System Economic Losses

System	Component	Inventory Value	Economic Loss
Highway	Segments	186.72	\$0.00M
	Bridges	67.84	\$4.69M
Railways	Segments	71.29	\$0.00M
	Bridges	0.09	\$0.00
Total		325.90	\$4.70M

Table 5-19: Utility System Economic Losses

System	Component	Inventory Value	Economic Loss
Potable Water	Facilities	35.00	\$16.88M
	Distribution Lines	16.10	\$0.41M
Waste Water	Facilities	419.60	\$137.88M
	Distribution Lines	9.70	\$0.29M
Natural Gas	Distribution Lines	6.50	\$0.08M
Communication	Facilities	0.10	\$0.04M
Total		486.94	\$155.58M