

SECTION 2: HAZARD IDENTIFICATION & RISK ASSESSMENT

2.1 HIRA OVERVIEW & HAZARD IDENTIFICATION SUMMARY

The State of Ohio is prone to many natural and manmade hazards. Ohio has experienced thousands of hazard events, resulting in millions of dollars in losses and casualties, and 44 Presidential disaster declarations. In 2003 as part of an overall effort to reduce future exposure to damages and meet the planning requirements of the DMA 2000, the State of Ohio began the development of the initial Hazard Identification and Risk Assessment (HIRA). The HIRA has been subsequently reviewed and approved for the 2008 plan update.

A HIRA is a systematic way to identify and analyze hazards to determine their scope, impact and the vulnerability of the built environment to such hazards.

This section will cover 6 separate requirements of the 44 CFR 201.4 (identifying hazards, profiling hazard events, assessing vulnerability by jurisdiction, estimating potential losses by jurisdiction, assessing vulnerability of state facilities, and estimating potential losses of state facilities). The first four of the six requirements are integrated into each hazard for which is detailed. The last two (state facility vulnerability assessment and loss estimation) is discussed in this section. The following will provide a more in-depth explanation of these six elements and describe the steps taken to ensure the element was met.

Identifying hazards

The 44 CFR 201.4 (c)(2)(i) requires the risk assessment shall include an overview of the type of all natural hazards that can affect the state. This section of the plan presents a list of potential hazards that may likely impact the state. Due to the states northern geographical setting on Lake Erie, it is vulnerable to a wide array of hazards that threaten its communities, businesses, governments and environment. To determine the hazards that pose the greatest threat to the state, the OMPAT in conjunction with FEMA developed a list of potential hazards by conducting a review of several key resources, which include:

- Review of historical data on events that have occurred in the last 40 years;
- Review of 2003 plan data;
- Collaboration with various agencies that are the known “experts” on different hazards, including the Ohio Departments of Natural Resources, Transportation and Environmental Protection Agency;
- Review of hazards identified in guidance materials provided by FEMA – Region V on identifying hazards; and
- Review of the local mitigation plans. Ohio currently has 93 approved single and multi jurisdictional plans with 11 in progress. The approved plans were used to assess the impacts hazards are having throughout the state.

Risk Assessment

44 CFR 201.4 (c)(2)(i) – The risk assessment shall include an overview of the location of all natural hazards that can affect the State, including information on previous occurrences of hazard events, as well as the probability of future hazard events, using maps where appropriate. The risk assessment relies upon information about past hazard events from published sources such as NOAA, USGS, USACE and ODNR, among other agencies.

The risk assessment section for each hazard in this plan includes a description of the location of the hazard, past occurrences, and a discussion of probability of future hazard events.

Vulnerability Analysis by Jurisdiction

44 CFR 201.4 (c)(2)(ii) – The risk assessment shall include an overview and analysis of the state’s vulnerability to the hazards described in this paragraph (c)(2), based on estimates provided in local risk assessments. The state shall describe vulnerability in terms of the jurisdictions most threatened by the identified hazards, and most vulnerable to damage and loss associated with hazard events. The methodology for this section varies by hazard due to available data and will be more thoroughly discussed prior to the results of the section for each hazard.

Integration of LHMP data into the state HIRA was done, where determined appropriate. In the past three years, the LHMP focus has been on having communities undertake and complete plans. In the next SOHMP update, there will be a much better integration, and analysis of LHMP data (see Section 4.3 on a discussion of issues related to integration) as a result of the web portal project and associated reports/functions, etc. that will be developed. In the meantime, the HIRA information from LHMPs was reviewed by taking a representative sample (30 plans) and reviewing them to “ground truth” data and assumptions made in the SOHMP. Specifically the review entailed determining which hazards were identified as the most severe threats and comparing them to the data developed from the statewide risk assessment. Also, where there was a hazard with either a specific geographic extent (subsidence due to karst topography), or where there is a known high-risk area associated with a statewide hazard (Xenia and tornadoes), LHMPs were reviewed and applicable information was included in the SOHMP.

Estimating Potential Losses by Jurisdiction

44 CFR 201.4 (c)(2)(iii) – The risk assessment shall include an overview and analysis of potential losses to identified structures, based on estimates provided in local risk assessments. The methodology for this section varies by hazard due to available data and will be more thoroughly discussed prior to the results of the section for each hazard.

Similar to the requirement to utilize vulnerability analysis information from LHMPs, LHMP data was reviewed and incorporated using the method described above.

Assessing Vulnerability of State Facilities

44 CFR 201.4 (c)(2)(ii) – The risk assessment shall include an overview and analysis of the state’s vulnerability to the hazards described in this paragraph (c)(2), based on estimates provided in local risk assessments. State-owned or operated critical facilities located in the identified hazard areas shall be addressed. The general methodology for the development of this section is discussed below any specific variations by hazard is addressed within the specific hazard.

The State of Ohio currently maintains a partial listing of state-owned facilities located in the Risk Management Section of the Department of Administrative Services. The listing, as it exists from DAS is not sufficient for a vulnerability assessment or loss estimation. A growing number of the facilities are geocoded and many of the addresses are not sufficient to allow for automated geocoding. Considering the state owns everything from 30 story skyscrapers to sheds, the decision was made to focus on structures whose value exceeds \$1 million or more has a key purpose in disaster response. Special cases exist at multi-building compound, such as prisons, while other structures were included which had lower values (or limited importance) due to their proximity to a structure meeting the thresholds.

Subsequently, the state determined which of the state-owned structures were considered to be critical facilities during a disaster. Critical facilities are defined as any facility whose services are necessary to the recovery and response operations following a disaster. Then, as disasters occurred, the Mitigation Strategy, prepared in support of the administration of the Hazard Mitigation Grant Program, included activities to geocode and obtain additional information on these identified facilities so vulnerability assessments and loss estimations could be completed.

The initial effort to geocode and collect basic building information focused on Franklin and Delaware counties. These counties encompass the state capital of Columbus. The center for most state operations is located in these counties. This initial effort was completed by URS Corporation HMTAP contract with their firm. Subsequent efforts included all counties declared in DR-1507-OH, DR-1556-OH, DR-1580-OH and DR-1720-OH. The Federal Coordinating Officers for these disasters allowed mitigation DAE’s to collect the same information URS collected for the declared counties.

The most recent effort was completed by a DAE activated to specifically complete another leg of the collection effort. After consultation with members of the Ohio EMA, the decision was made to start with the largest urban areas and work to the sparsely populated counties. The target leg of the effort was greater Cleveland. This included all the surrounding counties that encompass the Cleveland Metropolitan Statistical Area.

As resources become available, the next locations to address are the greater Cincinnati area followed by Dayton, Toledo and Youngstown. Once all urban areas are complete the process will move to the most populated rural counties and work until all of Ohio has been geocoded.

For those counties still pending geocoding, the values of the anticipated inventory are provided. Because the State is a dynamic entity which builds, purchases, sells and razes, structures the result is an ever changing inventory. Due to the uncertainty of the actual count and value of building, only those counties which have been geocoded are used for analysis

Estimating Potential Losses of State Facilities

44 CFR 201.4 (c)(2)(iii) – The risk assessment shall include an overview and analysis of potential losses to identified structures, based on estimates provided in local risk assessments. The state shall estimate the potential dollar losses to state-owned or operated buildings, infrastructure, and critical facilities located in the identified hazard areas. The general methodology for the development of this section is discussed below any specific variations by hazard is addressed within the specific hazard.

At this time, assessments have been completed in 20 of the 34 counties for state structures in Region 1 (see Table 2.1.a and Appendix C). The assessment will be completed as resources become available. Currently, there are a total of 118 state-owned structures. The value of geocoded structures in the region is \$420,804,675. Out of those 85 are state-owned structures and 33 are classified as critical facilities. The value of geocoded state-owned and critical facilities in region one is \$388,716,248 and \$32,088,427 respectively. The county with the largest dollar exposure of state-owned facilities is Marion at \$288,139,569, due to a high security prison. Seneca County has the highest dollar exposure to critical facilities at \$3,271,799.

Out of Region 2, assessments have been conducted on 19 of the 25 counties (see Table 2.1.a and Appendix C). The assessment for the remaining counties will be completed as resources become available. Presently, there are a total of 377 state owned structures. The value of geocoded structures in the region is \$2,565,418,691. 323 structures are state-owned structures and 54 are classified as critical facilities. The value state owned and critical facilities in region one is \$2,362,890,560 and \$202,528,131 respectively. As would be expected, Franklin county which contains the state capital represents the lion's share of the dollar value with \$1,859,092,160 in state-owned structures and \$154,972,529 in critical facilities.

Twenty-four of the 29 counties within Region 3 have been assessed for vulnerable state-owned structures and critical facilities (see Table 2.1.a and Appendix C). The assessment for the remaining counties will be completed in phases as resources become available. Presently, there are a total of 185 state-owned structures. The value of geocoded structures in the region is \$174,461,204. 130 structures are state-owned structures and 45 are classified as critical facilities. The value of state-owned and critical facilities in region one is \$312,328,458 and \$34,776,160 respectively. The county with the largest dollar exposure of state-owned facilities is Belmont at \$49,135,708 again due to a prison. Lawrence County has the highest dollar exposure to critical facilities at \$2,115,090.

UPDATE SUMMARY

The 2003 HIRA identified a comprehensive list of hazards, both manmade and natural, but only included a more complete risk assessment and vulnerability analysis for five hazards. The 2008 update includes risk assessments/vulnerability analyses on all 12 natural hazards, and one technological hazard (dam/levee failure). The developing these data was a collaborative process involving several state and Federal agencies who are deemed to be the “experts” in a particular hazard. For the 2008 update the existing analyzed hazards were reviewed for accuracy and availability of improved data. Based on the review it was determined that the tornado, winter storm, landslide and dam/levee failure hazards showed no significant changes since they were developed and decision was made to leave these unchanged until future events warrant action. The following major updates have been made:

- Severe Thunderstorms, Coastal Erosion, Wildfire, Land Subsidence, Droughts and Earthquakes are added;
- Hazardous Materials and Terrorism were removed after careful consideration of the sensitivity of the information and the potential for misuse;
- Natural Biohazards is refocused to address Invasive Species due in part to the Emerald Ash Borer infestation which occurred in the intervening time period.

Table 2.1.a

Total State Owned Structure and Critical Facility Information by Region											
Region 1				Region 2				Region 3			
County	SO St. Value	SO CF Value	Total	County	SO St. Value	SO CF Value	Total	County	SO St. Value	SO CF Value	Total
Allen	\$20,294,446	\$7,966,963	\$28,261,409	Ashtabula	\$40,124,846	\$3,463,499	\$43,588,345	Adams	\$0	\$760,627	\$760,627
Auglaize	\$2,027,076	\$1,529,944	\$3,557,020	Butler	\$0	\$5,505,878	\$5,505,878	Athens	\$32,505,169	\$2,808,250	\$35,313,419
Champaign	\$0	\$1,147,740	\$1,147,740	Cuyahoga	\$50,772,179	\$6,213,702	\$56,985,881	Belmont	\$49,135,708	\$1,347,740	\$50,483,448
Clark	\$0	\$1,050,078	\$1,050,078	Delaware	\$23,872,985	\$7,394,232	\$31,267,217	Brown	\$65,208	\$970,328	\$1,035,536
Clinton	\$0	\$2,197,818	\$2,197,818	Fairfield	\$17,986,893	\$766,764	\$18,753,657	Carroll	\$0	\$611,224	\$611,224
Crawford	\$0	\$1,143,222	\$1,143,222	Franklin	\$1,859,092,160	\$154,972,529	\$2,014,064,689	Clermont	\$3,431,946	\$253,692	\$3,685,638
Defiance	\$0	\$4,340,497	\$4,340,497	Geauga	\$383,336	\$834,720	\$1,218,056	Columbiana	\$1,568,280	\$859,423	\$2,427,703
Darke	\$0	\$868,109	\$868,109	Greene	\$4,660,889	\$3,011,201	\$7,672,090	Coshocton	\$0	\$811,244	\$811,244
Erie	\$96,117,027	\$3,489,853	\$99,606,880	Hamilton	\$44,379,039	\$5,348,848	\$49,727,887	Gallia	\$17,060,839	\$2,091,100	\$19,151,939
Fayette	\$222,581	\$1,051,434	\$1,274,015	Knox	\$18,357,401	\$804,670	\$19,162,071	Guernsey	\$7,604,726	\$1,347,740	\$8,952,466
Fulton	\$0	\$978,140	\$978,140	Lake	\$152,384	\$2,409,217	\$2,561,601	Harrison	\$0	\$1,057,617	\$1,057,617
Hancock	\$450,896	\$1,819,770	\$2,270,666	Licking	\$22,315,457	\$1,996,725	\$24,312,182	Highland	\$0	\$597,712	\$597,712
Hardin	\$0	\$1,302,642	\$1,302,642	Lorain	\$101,265,777	\$1,046,127	\$102,311,904	Hocking	\$489,094	\$817,921	\$1,307,015
Henry	\$0	\$792,984	\$792,984	Mahoning	\$63,773,028	\$351,783	\$64,124,811	Holmes	\$0	\$394,405	\$394,405
Huron	\$0	\$586,443	\$586,443	Medina	\$1,059,595	\$169,000	\$1,228,595	Jackson	\$500,000	\$1,266,000	\$1,766,000
Logan	\$0	\$627,344	\$627,344	Montgomery	\$70,386,516	\$5,887,936	\$76,274,452	Jefferson	\$500,000	\$1,266,000	\$1,766,000
Lucas	\$111,043,289	\$1,893,190	\$112,936,479	Pickaway	\$214,139,019	\$2,292,098	\$216,431,117	Lawrence	\$0	\$2,115,090	\$2,115,090
Madison	\$257,920,017	\$1,581,407	\$259,501,424	Portage	\$5,133,427	\$1,793,566	\$6,926,993	Meigs	\$0	\$1,167,669	\$1,167,669
Marion	\$288,139,569	\$648,543	\$288,788,112	Richland	\$21,422,096	\$1,413,370	\$22,835,466	Monroe	\$0	\$1,389,960	\$1,389,960
Mercer	\$0	\$1,512,930	\$1,512,930	Stark	\$38,275,862	\$1,006,516	\$39,282,378	Morgan	\$496,641	\$1,508,239	\$2,004,880
Morrow	\$0	\$1,381,740	\$1,381,740	Summit	\$60,369,325	\$3,552,785	\$63,922,110	Muskingum	\$1,634,022	\$200,000	\$1,834,022
Miami	\$0	\$5,995,119	\$5,995,119	Trumbull	\$8,858,101	\$0	\$8,858,101	Noble	\$57,142,664	\$969,943	\$58,112,606
Ottawa	\$32,968,327	\$2,494,800	\$35,463,127	Warren	\$59,409,389	\$2,879,191	\$62,288,580	Perry	\$0	\$1,385,505	\$1,385,505
Paulding	\$0	\$866,022	\$866,022	Wayne	\$0	\$946,254	\$946,254	Pike	\$0	\$822,565	\$822,565
Preble	\$0	\$1,887,841	\$1,887,841	TOTAL	\$2,362,890,560	\$202,528,131	\$2,565,418,691	Ross	\$5,781,342	\$2,019,777	\$7,801,119
Putnam	\$0	\$1,479,060	\$1,479,060					Scioto	\$109,023,716	\$1,673,596	\$110,697,312
Sandusky	\$2,390,700	\$635,000	\$3,025,700					Tuscarawas	\$19,764,050	\$1,745,600	\$21,509,650
Seneca	\$11,557,307	\$3,271,799	\$14,829,106					Vinton	\$0	\$774,725	\$774,725
Shelby	\$5,436,099	\$3,024,399	\$8,460,498					Washington	\$5,624,640	\$1,742,468	\$7,367,108
Union	\$60,567,524	\$951,936	\$61,519,460					TOTAL	\$146,161,665	\$28,299,539	\$174,461,204
Van Wert	\$20,750	\$1,147,740	\$1,168,490								
Williams	\$0	\$3,425,334	\$3,425,334								
Wood	\$7,606,913	\$4,723,866	\$12,330,778								
Wyandot	\$0	\$699,287	\$699,287								
TOTAL	\$388,716,248	\$32,088,427	\$420,804,675								

Legend

White Cell ~ Geocoded

Amber Cell ~ Data Only

Additional county inventories will be completed as oportunities arise.

HAZARD IDENTIFICATION SUMMARY

The hazards evaluated in the SOHMP to determine whether they could potentially affect the state include:

- | | |
|----------------------------|--|
| 1) Coastal Erosion | 2) Droughts |
| 3) Earthquakes | 4) Floods |
| 5) Storm Surges | 6) Landslides |
| 7) Land Subsidence | 8) Natural Biohazards (Invasive Species) |
| 9) Severe Thunderstorms | 10) Windstorms |
| 11) Hailstorms | 12) Severe Winter/Ice Storms |
| 13) Tornadoes | 14) Wildfire |
| 15) Tropical Cyclones | 16) Snow Avalanches |
| 17) Extreme Summer Weather | 18) Expansive Soils |
| 19) Tsunami | 20) Volcano |
| 21) Dam Failure | 22) HAZMAT |
| 23) Terrorism | 24) Urban Fire |
| 25) Nuclear Accidents | |

The list was more closely examined, paying special attention to the likelihood of future occurrence and the fact that many of the identified hazards are interrelated (i.e., landslides can be a result of flooding). Following this, the list of hazards was pared down to the hazards that are most likely to affect the state and are most likely to pose a more serious threat.

For the purpose of ranking hazards affecting the state, in order of importance for mitigating their effects, a hazard index was assigned (see Table 2.1.a) on a scale of 1-5, with 5 being the highest priority for considering mitigation goals (highest, high, medium, low, and lowest). This index takes into account the anticipated frequency of occurrence (see Table 2.1.b), the specific consequences of impact (see Table 2.1.c) and if there has been a past declaration for that particular hazard. This is not meant to be a scientific process, but will serve as a way to prioritize mitigation goals based on the potential frequency and likely extent of damage from hazards known to affect the state.

It is important to note that HIRAs are developed for many different purposes. For the purposes of emergency planning and similar functions, a document called the *2007 Ohio HIRA* has also been produced. The 2007 Ohio HIRA (Appendix Y) prioritizes hazards utilizing criteria developed to facilitate emergency planning. These criteria include frequency, duration, speed of onset, magnitude, impact on business, impact on people, and impact on property. This method assigns a numerical value to vulnerability based on the criteria of impacts on businesses,

people, and property. The 2007 Ohio HIRA places more emphasis on life safety issues versus the HIRA performed for the SOHMP which places a similarly high priority on property/facility damage. Also, the 2007 HIRA evaluates manmade hazards. This data is valuable as it is another method to “ground truth” the data in the SOHMP HIRA.

Table 2.1.a

Hazard Index Ranking				
Impact →				
Frequency of Occurrence ↓	Catastrophic	Critical	Limited	Negligible
Highly Likely	5 (<i>Highest</i>)	4 (<i>High</i>)	4 (<i>High</i>)	3 (<i>Medium</i>)
Likely	5 (<i>Highest</i>)	4 (<i>High</i>)	3 (<i>Medium</i>)	2 (<i>Low</i>)
Possible	4 (<i>High</i>)	3 (<i>Medium</i>)	2 (<i>Low</i>)	2 (<i>Low</i>)
Unlikely	3 (<i>Medium</i>)	2 (<i>Low</i>)	1 (<i>Lowest</i>)	1 (<i>Lowest</i>)
Highly Unlikely	2 (<i>Low</i>)	1 (<i>Lowest</i>)	1 (<i>Lowest</i>)	1 (<i>Lowest</i>)

Source: FEMA, 1997

Table 2.1.b

Frequency of Occurrence	
Highly Likely	Near 100 Percent probability in the next year.
Likely	Between 10 and 100 percent probability in the next year, or at least one chance in the next 10 years.
Possible	Between 1 and 10 percent probability in the next year, or at least one chance in the next 100 years.
Unlikely	Less than 1 percent probability in the next year or less than once chance in the next 100 years.
Highly Unlikely	Little to no probability in next 100 years.

Source: FEMA, 1997

Table 2.1.c

Consequences of Impact	
Catastrophic	Multiple Deaths, complete shutdown of facilities for 30 days or more, more than 50 percent of property is severely damaged.
Critical	Multiple severe injuries, complete shutdown of critical facilities for at least 2 weeks, more than 25 percent of property is severely damaged.
Limited	Some injuries, complete shutdown of critical facilities for more than one week, more than 10 percent of property severely damaged.
Negligible	Minor injuries, minimal quality-of-life impact, shutdown of critical facilities and services for 24 hours or less, less than 10 percent of property is severely damaged.
<i>Source: FEMA, 1997</i>	

Table 2.1.d

Hazard Ranking Assessment				
Hazard	Past Federal Declarations	Frequency	Impcat	Hazard Ranking
Natural Hazards				
Coastal Erosion	No	Highly Likely	Negligible	3
Droughts	No	Likely	Negligible	2
Earthquakes	No	Possible	Limited	2
Floods	Yes	Highly Likely	Critical	4
Seiche / Coastal Flooding	No	Likely	Limited	3
Landslides	Yes	Highly Likely	Limited	4
Land Subsidence	No	Possible	Negligible	2
Invasive Species	No	Highly Likely	Limited	4
Severe Thunderstorms	Yes	Highly Likely	Critical	4
Windstorms	Yes	Highly Likely	Critical	4
Hailstorms	No	Likely	Negligible	2
Severe Winter/Ice Storms	Yes	Highly Likely	Critical	4
Tornadoes	Yes	Highly Likely	Critical	4
Wildfire	No	Likely	Limited	3
Tropical Cyclones	No	Unlikely	Negligible	1
Snow Avalanches	No	Highly Unlikely	Negligible	1
Extreme Summer Weather	No	Likely	Negligible	2
Expansive Soils	No	Unlikely	Negligible	1
Tsunami	No	Highly Unlikely	Negligible	1
Volcano	No	Highly Unlikely	Negligible	1
Technological Hazards				
Dam Failure	No	Possible	Critical	3
Hazardous Materials Events	No	Likely	Negligible	2
Terrorism	No	Unlikely	Critical	2
Urban Fire	No	Highly Likely	Negligible	3

Once the hazard ranking was complete an assessment was conducted to narrow the field of hazards (see Table 2.1.d). Several hazards were deleted from the list based on the unlikelihood of occurrence and the potential for a negligible impact on the state should they occur. These include tropical cyclones, snow avalanches, extreme summer weather, expansive soils, tsunami events, and volcano events. Other hazards were combined, as many of them are factors in larger hazards. The final hazard list included 15 hazards, which are listed in order of importance below.

- **Flooding** (4) – which includes flash flooding, normal riverine flooding. There have been numerous past declarations for this disaster.
- **Seiche / Coastal Flooding** (4) – this is a geographically specific hazard for areas bordering Lake Erie. There have been no past declarations for this disaster.
- **Tornadoes** (4) – which includes windstorms. There have been several past declarations for tornados and high wind events as a result of severe thunderstorms.
- **Landslides** (4) – which includes road slips and mudslides. There have been several declarations for this type of disaster many as a result of severe flooding.
- **Winter Storms** (4) – which includes snowstorms, ice storms and any other winter precipitation. There have been declarations for this type of disaster.
- **Severe Summer Storms** (4) – these storms have a higher ranking than dam failure simply because there are many factors associated with severe thunderstorms. In Ohio the primary disaster factors for severe thunderstorms have been flooding, tornadoes, high wind events, and landslides all of which have been addressed separately. Other aspects of sever thunderstorms (hail and lightning) are not as pressing in the overall mitigation process.
- **Invasive Species** (4) – There have been no federal declarations for invasive species to date.
- **Dam / Levee Failure** (3) – Though dam-failure is not at the top of the ranking chart it is still considered an important hazard as it has a significant impact on flooding.
- **Coastal Erosion** (3) –Erosion from coastal storms and normal Lake Erie fluctuations.
- **Wildfire** (3) – there have been no federal declarations for wildfire to date.
- **Land Subsidence** (2) – there have been no federal declarations for land subsidence to date.
- **Droughts** (2) – there have been no federal declarations for droughts to date.
- **Earthquakes** (2) – there have been no federal declarations for earthquakes to date.

- **Hazardous Materials** (2) – which includes nuclear accidents. There have been no federal declarations for HAZMAT events to date.
- **Terrorism** (2) – there have been no federal declarations directly referred to as terrorism in the past. However, in August 2003 there was a declaration related to power outage, which initiated in Cleveland and spanned across a good portion of the northern United States and southern Canada. This grid could be considered a major target in future terrorist activities and should be planned for accordingly.

This plan discusses each of the hazards in more detail with the exception of two technological hazards that were previously mentioned in the 2003 SOHMP – terrorism and hazardous materials. It is felt that these two hazards are better addressed in ongoing homeland security and emergency management planning efforts and are represented in the 2007 Ohio HIRA.

According to the Ohio HIRA, the following are the top ten hazards (ranking score in parenthesis): Windstorm/tornado (24.25), Flood/flash flood/seiche (22.75), emerging disease (21.75), earthquake (7.9 magnitude) (21.25), building/structure collapse (20.75), landslide/mudslide/subsidence (19.25), snow/ice/hail/sleet (19.25), terrorism (19), product defect or contamination (18.75), and extreme temperature (heat and cold) (18.5). These tend to correspond fairly well with the hazards profiled in the SOHMP HIRA, with the exception of earthquake (scenario in the Ohio HIRA different than in the SOHMP HIRA), invasive species, and terrorism.