PASSHE
Pennsylvania State System of Higher Education

CLARION UNIVERSITY
SINCE 1867

MULTI-UNIVERSITY HAZARD MITIGATION PLAN UPDATE PROJECT

HAZARD MITIGATION PLAN

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DELTA DEVELOPMENT GROUP INC.

Executive Summary

After suffering the effects of floods, windstorms, winter storms, and other natural and/or human-caused hazards, the students, faculty, and staff of Clarion University, located in Clarion Borough, Pennsylvania, recognized the need for a long-term approach to reduce their vulnerability to hazards. In 2013, the Pennsylvania State System of Higher Education (PASSHE), the organization responsible for coordinating the 14 state-funded universities and three multi-university centers, began a hazard mitigation planning process to identify the hazards that can affect the University and create a strategy to reduce damage and lessen injuries from these hazards.

PASSHE contracted the services of the Michael Baker Corporation (Baker), Delta Development Group, Inc. (Delta), and Vernon Land Use, LLC (Vernon) (hereinafter collectively referred to as the "Baker Team") to update an all-hazards mitigation plan. This document represents the culmination of the higher education-oriented planning process that involved numerous stakeholders across the University and local community. The planning process consisted of the following steps:

- Identification and prioritization of the hazards that may affect the University
- Assessment of the University's vulnerability to these hazards
- Identification of the mitigation actions that can reduce that vulnerability
- Development of a strategy for implementing those actions, including identifying the department(s) responsible for that implementation

Throughout the planning process, the campus community, relevant stakeholders, and the general public were given the opportunity to comment on the Hazard Mitigation Plan (HMP) draft and provide suggestions for the final version. Three public meetings were advertised and conducted to give students, faculty, staff, and local residents an opportunity to provide input on the HMP.

The following hazards were identified by the Clarion University Hazard Mitigation Steering Committee (Steering Committee) as presenting the highest risk to the University:

NATURAL HAZARDS	HUMAN-CAUSED HAZARDS
Earthquake	Dam Failure
Extreme Temperature	Transportation Accidents
Flooding/Flash Flood/Ice Jam	Utility Interruption
Hurricane/Tropical Storm/Nor'easter	Terrorism
Lightning Strike	
Pandemic	
Radon Exposure	
Subsidence/Sinkhole	
Tornado/Windstorm	
Winter Storm	

To mitigate against the effects of these hazards, the Steering Committee identified the following goals for hazard mitigation over the next five years:

- Increase public education and awareness of existing and potential hazards in the University
- Protect the students, faculty, staff, and visitors of the University as well as public and private property from the impacts of natural and human-caused hazards
- Encourage proper information management of data related to natural and human-caused hazards in the University
- Increase local and University government awareness of hazard mitigation programs
- Improve emergency services and capabilities in the University to protect citizens from natural and human-caused

The individual objectives and actions that will be implemented are shown in Section 6 (Mitigation Strategy).

Certification of Annual Review Meetings

The Steering Committee has reviewed this HMP. See Section 8 (Plan Adoption) of this HMP for further details regarding this form. The Director of Emergency Management at Clarion University hereby certifies the review.

YEAR	DATE OF MEETING	PUBLIC OUTREACH ADDRESSED?*	SIGNATURE
2017			
2018			
2019			
2020			
2021			

*CONFIRM "YES" HERE ANNUALLY AND DESCRIBE ON THE RECORD OF CHANGES PAGE.

Record of Changes

DATE	DESCRIPTION OF CHANGE MADE, MITIGATION ACTION COMPLETED, OR PUBLIC OUTREACH PERFORMED	CHANGE MADE BY (PRINT NAME)	CHANGE MADE BY (SIGNATURE)

REMINDER: PLEASE ATTACH ALL ASSOCIATED MEETING AGENDAS, SIGN-IN SHEETS, HANDOUTS, AND MINUTES.

Table of Contents

1 INTRODUCTION

1.1 Background

Across the United States, natural and human-caused disasters have led to increasing levels of deaths, injuries, property damage, and interruption of business, educational, and government services. The time, money, and efforts to recover from these disasters exhaust resources, diverting attention from critical public programs and private agendas. With more than 100 statewide or county-specific gubernatorial and presidential disaster declarations since 1954, the Pennsylvania State System of Higher Education (PASSHE), along with the students, faculty, staff, and other stakeholders of Clarion University, located in Clarion Borough, Pennsylvania, recognized the impact of disasters on their institution and community. They then concluded that proactive efforts were needed to reduce the effects of natural and human-caused hazards.

Federal and state governments have utilized mitigation concepts to minimize environmental degradation and to reduce loss of life and property associated with natural hazards. However, mitigation was most often applied in a post-disaster environment. In an effort to increase public awareness and to reduce the costs associated with disaster preparedness, the Federal Emergency Management Agency (FEMA) developed a National Mitigation Strategy. The National Mitigation Strategy was an outgrowth of changing perceptions of hazards and their relationship to development. It represents a sustained effort to reduce hazard vulnerabilities through public outreach and partnership development, and was created with input from federal agencies, state and local governments, and the general public.

Hazard mitigation is a phrase that describes actions taken to prevent or reduce the long-term risks to life and property from hazards. Pre-disaster mitigation actions are taken in advance of a hazard event and are essential to breaking the typical disaster cycle of damage, reconstruction, and repeated damage. With careful selection, mitigation actions can be long-term, cost-effective means of reducing the risk of loss.

Accordingly, the Clarion University Hazard Mitigation Steering Committee (Steering Committee), comprising University administrative officials and staff, emergency responders, faculty representatives, and student representatives, has upgraded this Hazard Mitigation Plan (HMP). On behalf of the University, PASSHE used a competitive process to select and contract the Michael Baker Corporation (Baker), Delta Development Group, Inc. (Delta), and Vernon Land Use, LLC (Vernon) (hereinafter collectively referred to as the "Baker Team") to update the University's HMP.

The HMP is the result of several months of work by the staff, faculty, and students of the University and representatives from the Baker team to update a pre-disaster, multi-hazard mitigation plan that will not only guide the University toward greater disaster resistance, but also will respect the character and needs of the community.

1.2 Purpose

The purpose of this HMP is to minimize the effects that natural and human-caused hazards have on the people, property, environment, and business and educational operations within the University. This document exists to provide the background information and rationale for the mitigation actions that the Steering Committee and University representatives have chosen to implement.

The document is guided by the Disaster Mitigation Act of 2000 (DMA 2000) and its implementing regulations (44 CFR §201.6, published on February 26, 2002). Institutions of higher education are recommended to comply with the DMA 2000 and these regulations in order to best serve their staff, faculty, and students and to enhance their ability to acquire hazard mitigation funding. At a minimum, successful mitigation plans must include (1) an action plan to mitigate hazards, risks, and vulnerabilities, and (2) a strategy to implement those actions.

1.3 Scope

The implementation actions within this HMP apply to the University and any administrative units, academic departments, or other related organizations that adopt this HMP as their own. The Steering Committee sought thorough stakeholder participation throughout the planning process and writing of the HMP. For the purpose of this planning process, stakeholder participation was defined as submission of department/organization-specific information (e.g., completing a Risk Assessment Update Worksheet or Capability Assessment Survey) and attendance by a department/organizational representative at a planning or public meeting conducted as part of the planning process.

1.4 Authorities and References

Appendix A lists references used to prepare the HMP. Existing plans and studies were reviewed and integrated into the HMP. The University's Master Plan and Emergency Operations Plan was incorporated into multiple aspects of this HMP. Information from the University's Master Plan and Emergency Operations Plan and other documents was used to formulate the University profile, to identify the history of individual hazards, and to detail the population projections in Clarion University. Information from the County Comprehensive Plan and the County HMP was also used to enhance the hazard identification and vulnerability analysis, along with determining mitigation strategies and activities.

2 UNIVERSITY PROFILE

2.1 Geography and Environment

Clarion University encompasses approximately one fifth of a square mile and is located in Clarion County, in the Commonwealth of Pennsylvania. The University is located in Clarion Borough, which surrounds the campus. To the north of Clarion Borough and across the Clarion River is Highland Township.

Nestled in the Appalachian Mountains of northwestern Pennsylvania, Clarion University is situated in a small town surrounded by forests and farmland. The Clarion River feeds into the Allegheny River to the west. With a backdrop of rolling wooded hills, the Clarion community offers canoeing, horseback riding, and camping; for those who love winter activities, 12 miles of snowmobile trails, ice-skating, and cross-country ski trails are located in Cook Forest State Park to the northeast. There are also state game lands to the north in Highland Township and to the east in Clarion Township.

2.2 University Facts and Institutional Trends

Originally, Clarion University was a seminary and was founded in 1867. The Carrier Seminary of Western Pennsylvania was a coeducational institution. After many years of debate, the seminary became a Normal School in 1887. The Normal School was purchased by the state of Pennsylvania in 1915 and became a college-level institution in 1920. In 1983, the state changed the classification of Clarion from college to university, as it did with all state colleges in Pennsylvania. Today, Clarion University is one of 14 comprehensive universities within the Pennsylvania State System of Education.

This area of Pennsylvania was first settled in 1801 by Scotch-Irish and German settlers. Clarion County was formed out of Armstrong and Venango Counties in 1839. The Borough of Clarion was founded in 1839 and incorporated in 1841. The area was used extensively for farming; lumber, oil, and natural gas production; and coal mining. Today, the Cook Forest Park (which sprawls mostly through Clarion County) is the largest stand of virgin white pine trees east of the Mississippi River.

Today, the area comprises rural farmland and forests. Clarion Borough is about 1.6 square miles with more than 5,000 (c. 2010) residents. The closest cities to the campus include Youngstown, OH (an hour drive), Pittsburgh, PA (one and a half hour drive), and Erie, PA (about an hour). The Autumn Leaf Festival is Clarion's largest event, attracting 500,000 people annually. The festival is a 10-day event and serves as the University's Homecoming weekend. The tradition began in 1953 by accident, as the business owners were asked to decorate the town for the then college's Homecoming. Since the 1950s, the festival has become an international, award-winning 10-day event.

The Venango College of Clarion University, the University's only satellite campus, is located to the northwest in Oil City, PA, and offers the region many opportunities. The campus offers the School of Humanities, Science and Technology; the School of Nursing and Allied Health; the College of Business Administration; and the College of Education and Human Services. The campus is situated on the southwestern side of Oil City immediately next to the Allegheny River, which forms the campus's western border. The southern and eastern borders of the campus consist of sprawling wooded areas.

From a seminary to a Normal School and finally to a multidiscipline institution, Clarion University is now a well-known university for many programs. Clarion has a diverse undergraduate studies program with 11 Associate Degree programs, 102 Bachelor Degree programs, and 19 Master Degree programs. There are four colleges within Clarion University: Arts and Sciences, Business Administration, Education and Human Services, and Nursing and Allied Health.

As shown in Table 2.3.1-2, 5,368 students were enrolled in both undergraduate and graduate programs (4,555 and 813 respectively) in 2015. For the 2015-2016 academic year, there were 2,215 applications (96 percent admittance rate) with approximately 953 students accepting to enroll. The graduation rate within 6 years from Clarion is 50 percent, as compared to a 59 percent national average from four-year degree-granting institutions (Clarion University Office of Information Management and Institutional Research, 2016). The school also has 39 administrative offices that oversee day-to-day activities as well as advanced planning for the university.

Students at the university enjoy a wide range of sports teams, clubs, and organizations. Students are able to create any organizations they are passionate about as long as there is backing by a current university professor. There are a total of 159 clubs and organizations that have varying themes such as sports and recreational clubs, cultural clubs, special interest, Greek life, etc. Clarion also participates in the Pennsylvania State Athletics Conference (PSAC) and has 15 NCAA Division II men and women's sport teams affiliated with PSAC.

2.3 Places, Population, and Demographics

Population and demographic information provides baseline data about the University community. This community comprises several key groups, most specifically, students, faculty, and staff.[1] Changes in demographics or populations may be used to identify higher-risk populations. Maintaining up-to-date data on demographics will allow the University to better assess magnitudes of hazards and develop more specific mitigation plans. Baseline demographic information for Clarion University is provided in Tables 2.3.1-1 through 2.3.1-3:

Table 2.3.1-1 Baseline Demographic Information

DEMOGRAPHICS	2015
Total population	6,063
Male	2,167
Female	3,896

SOURCE: CLARION UNIVERSITY OFFICE OF INFORMATION MANAGEMENT AND INSTITUTIONAL RESEARCH, 2016

[1] For the purposes of this HMP, staff will refer to all non-faculty university employees.

Table 2.3.1-2 Baseline Student Demographic Information	
DEMOGRAPHICS	**2015**
Total students	5,368
Male	1,863
Female	3,505
Undergraduate	4,555
Full-Time	3,703
Part-Time	852
Graduate	813
Full-Time	190
Part-Time	623

SOURCE: CLARION UNIVERSITY OFFICE OF INFORMATION MANAGEMENT AND INSTITUTIONAL RESEARCH, 2016

Table 2.3.1-3 Baseline Employee Demographic Information	
DEMOGRAPHICS	**2015**
Total employees	695
Male	304
Female	391
Position Type	
Faculty	318
Staff	377
Faculty Type	
Full-time (Tenure and Tenure Track)	203
Adjunct (Not Tenure Track)	115
Union	
AFSCME	193
APSCUF	318
SCUPA	38
OPEIU	13
PSSU	6
SPFPA	12
Non-union (Management and Executive)	81
Other	10

SOURCE: CLARION UNIVERSITY OFFICE OF INFORMATION MANAGEMENT AND INSTITUTIONAL RESEARCH, 2016

Based on figures from the Office of Information Management and Institutional Research, Clarion University has an estimated 2015 population of 6,063 persons, including all students and employees,

which is shown in Table 2.3.1-1. This represents a decline from 2010, when Clarion had an estimated population of 8,125, which is shown in Table 2.3.1-4. The 2015 population density on Clarion University's campus is 30,315 persons per square mile, which is a very high population density. Additionally, according to the U.S. Census, the surrounding community of Clarion County has a population of about 39,988 persons US Census and a density of 66 persons per square mile. (County populations are based on the County Profile from the Center for Rural Pennsylvania, available online at http://www.ruralpa2.org/county_profiles.cfm.)

However, the University and surrounding community have a variable population density, as the numbers quoted above are based on enrollment rates for an entire academic year and include online-only enrollments. The majority of students are only on campus during the fall/spring semesters, and the student population varies between the fall and spring semesters. The population of the University also radically shifts during intersession periods (i.e., winter and summer semesters), as the majority of students spend that time at their primary residence.

Additional considerations regarding the transient nature of the University community concern daily population changes. The majority of classes, even during the peak fall/spring semesters, occur between 10 a.m. and 2 p.m. Some classes can be held any time from 7:30 a.m. until 9:30 p.m. Staff typically work a 37.5 – 40-hour week, from 8 a.m. until 5 p.m. Faculty teaches 24 credit hours per year and no more than three classes per semester, and host five office hours per week for students. They may remain on campus at other times as well, depending on their level of involvement with University committees, organizations, and other activities.

Additionally, whether a student, staff member, or faculty member is full time or part time will also impact the frequency with which they are on campus. The majority of adjunct faculty members only teach courses during the evening (i.e., 6 p.m. – 9 p.m.). After 10 p.m. on weekday evenings, the majority of the University population consists of resident students. During weekends, the majority of the population also consists of resident students, although this number may be less than the amount during the week, as some students travel home on a routine basis to visit family and friends.

A variable population density means that the level of vulnerability to risk will shift throughout the course of the year and throughout the course of the day. Periods of time where there are less people on the campus and the University has a lower population density (i.e., intersession periods, evenings, nights, and weekends) can make it more difficult to disperse information, instructions, and resources, as it is more difficult to determine who and where people are on campus. However, a low population density also helps prevent hazards from affecting as many people. For example, flooding and building closures over the summer are less likely to cause course schedule disruptions than during the fall or spring. The centralized nature of the University campus also helps contribute to easier means of communicating and dispersing resources, even when the population density is lower.

In contrast, periods of time where there are more people on campus and the University has a higher population density (i.e., fall/spring semesters and weekdays) can also lead to greater risk as utility interruptions, transportation accidents, and other events will disrupt a larger number of people. Another example is that diseases may spread more quickly due to greater contact between people.

Age and student year are other key demographic trends. These students, faculty, and staff may have access and functional needs. For example, many may be unable to drive; therefore, special evacuation plans may need to be created for them. They may also have hearing or vision impairments that could make receiving emergency instructions difficult. Both older and younger populations have higher risks for contracting certain diseases.

As with older students, faculty, and staff, many first- and second-year students, along with transfer students, may face greater challenges. They are less likely to be familiar with the area, and many may not have access to a car while on campus. Forty-nine percent of the student population comprises freshmen and sophomores. Juniors, seniors, super seniors, and graduate students are more likely to live off campus and have personal transportation.

As notated in Table 2.3.1-3, the majority of University employees are represented by a PASSHE union. Management employees are the only non-represented, permanent employees on campus, and these positions include professional and management positions in offices, such as the bursar, registrar, human resources, academic deans, etc.

Employees who work in general administration, maintenance, facilities management, custodial, and information technology areas are represented by the American Federation of State, County, and Municipal Employees (AFSCME).

Advanced professional positions in admissions, financial aid, residence life, the registrar, and career services are typically represented by the State College & University Professional Association (SCUPA). Faculty, department chairs, librarians, and athletic trainers belong to the Association of Pennsylvania State College and University Faculties (APSCUF).

University nurse practitioners and supervisors fall under the Office of Professional Employees International Union Healthcare Pennsylvania (OPEIU), while physicians are represented by the Pennsylvania Doctor's Alliance (PDA).

Social workers, drug and alcohol treatment specialist supervisors, juvenile court consultants, and licensed occupational therapists belong to the Pennsylvania Social Service Union (PSSU). The unions play a major role in University employees' lives as they facilitate standard working hours, standardized payroll amounts, and more.

Table 2.3.1-4 Clarion University Population			
DEPARTMENT NAME	2010 ESTIMATES	2015 ESTIMATES	PERCENT CHANGE
Students	7,315	5,368	-27%
Faculty	413	318	-23%
Staff	397	377	-5%
Total	**8,125**	**6,063**	**-25%**

SOURCE: CLARION UNIVERSITY OFFICE OF INFORMATION MANAGEMENT AND INSTITUTIONAL RESEARCH, 2016

As demonstrated in Table 2.3.1-4Table 2.3.1-4, Clarion University has approximately 6,063 students, faculty, and staff on campus. Between 2010 and 2015, the University decreased in population by roughly 25%. It is important for the University to accurately track and predict campus population. If the University population ever decreases significantly for a long period of time, the University must properly maintain its existing infrastructure and has plans to manage or redevelop unused properties to ensure adequate housing, classrooms, and facilities if the campus population continues the following trends.

Table 2.3.1-5 Race and Ethnicity in Clarion University (2015 Estimates)						
RACE AND ETHNICITY	UNDER-GRADUATES (#)	UNDER-GRADUATES (%)	GRADUATES (#)	GRADUATES (%)	TOTAL STUDENTS (#)	TOTAL STUDENTS (%)
Black, Non-Hispanic	366	8.0%	25	3.1%	391	7.3%
Asian or Pacific Islander	50	1.1%	14	1.7%	64	1.2%
Hispanic	68	1.5%	6	0.7%	74	1.4%
American Indian or Alaskan Native	8	0.2%	2	0.2%	10	0.2%
International	0	0.0%	0	0.0%	0	0.0%
White, Non-Hispanic	3,844	84.4%	719	88.4%	4,563	85.0%
Multi-Racial	78	1.7%	8	1.0%	86	1.6%
Not Specified	141	3.1%	39	4.8%	180	3.4%
Total	**4,555**	**100.0%**	**813**	**100.0%**	**5,368**	**100.0%**

SOURCE: CLARION UNIVERSITY OFFICE OF INFORMATION MANAGEMENT AND INSTITUTIONAL RESEARCH, 2016

As shown in Table 2.3.1-5 above, while Clarion University does not have any international students, certain demographics within Clarion University's population may include foreign-born students that do not speak English as their native language. Although Clarion is home to students whose first language is not English, all foreign-born students are required to submit proof of English language proficiency. Non-native speakers of English are required to score at least a 500 on the paper-based Test of English as a Foreign Language (TOEFL), a 173 on the computer-based test, or a 61 on the Internet-based test. Students may also demonstrate proficiency by submitting a score of six (6) or higher on the International English

Language Testing System (IELTS) exam or satisfactory completion of an Intensive Level 112 from an ELS Language Center.

Although Clarion University requires foreign-born students to be conversationally and academically proficient in English, some non-native English-speaking students may have difficulty with communicating during a disaster event due to unfamiliar/new terminology and high-stress situations. In addition, Clarion occasionally hosts international guests for conferences, study abroad programs, and other events. In order to ensure all persons can receive emergency instructions, Clarion should identify hazard mitigation strategies to address any potential language barriers.

Table 2.3.1-6 Housing Characteristics in Clarion University

HOUSING CHARACTERISTICS	2015 ESTIMATES
Total Enrolled Students	5,368
On-Campus Housing (Residence Halls and Suites)	923
Off-Campus Housing (Apartments)	588
Total Students in University housing	1,511
Housing Rates*	
Hilltop Suites	$3,995 - $4,885
Suites on Main	$3,764 - $4,772
Reinhard Villages (Off-Campus)	$3,450 - $4,075

SOURCE: CLARION UNIVERSITY, 2016

**Numbers are based on 2015–2016 Housing Rates*

As shown in Table 2.3.1-6, an estimate 1,511 students live in Clarion University housing. Clarion University has six on-campus residential properties. These properties include residence halls, suites, and apartments, such as Hill Top Suites (Campus View Suites and Valley View Suites), Suites on Main (Suites on Main Street North and Suites on Main Street South), Nair Hall, and Wilkinson Hall. However, demolition began on Nair and Wilkinson Halls in March 2016, and these dormitories will be replaced with a parking lot. Reinhard Villages is an off-campus university housing option that is home to an estimated 588 students and is generally less expensive than Clarion's on-campus housing options. Many other students live in off-campus housing and apartments (i.e., residences not maintained by the University). Some off-campus housing is approved and recommended by the University, but other apartment complexes or privately leased apartments have no relationship, either formal or informal, with the University. All of these properties may be vulnerable to various natural hazards, particularly flooding and windstorms. Damage to residential properties is not only expensive to repair or rebuild, but also devastating to the displaced people.

Although the University's priority needs to be on re-establishing on-campus housing for its immediate residents, it is important to recall the impact that residential damage may have on students and staff who live off-campus. Additionally, many students who live in off-campus housing are still likely to live in the immediate surrounding community and may need the University's support in recovery as well.

Table 2.3.1-7 Economic Characteristics in Clarion University			
ECONOMIC CHARACTERISTICS	2014 AUDIT, DRAFT	2015 PROPOSED BUDGET	PERCENTAGE CHANGE
Total Operating Revenue	$68,077,315	$65,932,462	-3.2%
Net Tuitition and Fees	$39,590,420	$40,296,883	1.8%
Governmental Grants and Contracts	$11,410,655	$9,804,831	-14.1%
Nongovernmental Grants and Contracts	$705,877	$562,525	-20.3%
Sales and Services	$3,673,932	$2,013,293	-45.2%
Auxiliary Enterprises	$12,236,170	$13,031,430	6.5%
Other Revenues	$460,261	$223,500	-51.4%
Total Non-Operating Revenue	$31,795,663	$32,040,411	0.8%
Total Other Revenues	$1,466,652	$1,024,000	-30.2%
Net Position - Beginning of Year	$11,118,426	$4,778,049	-57.0%
Total Operating Expenses	$107,680,007	$109,608,500	1.8%
Net Position (End of Year)	$4,778,049	-$5,833,578	**-222.1%**

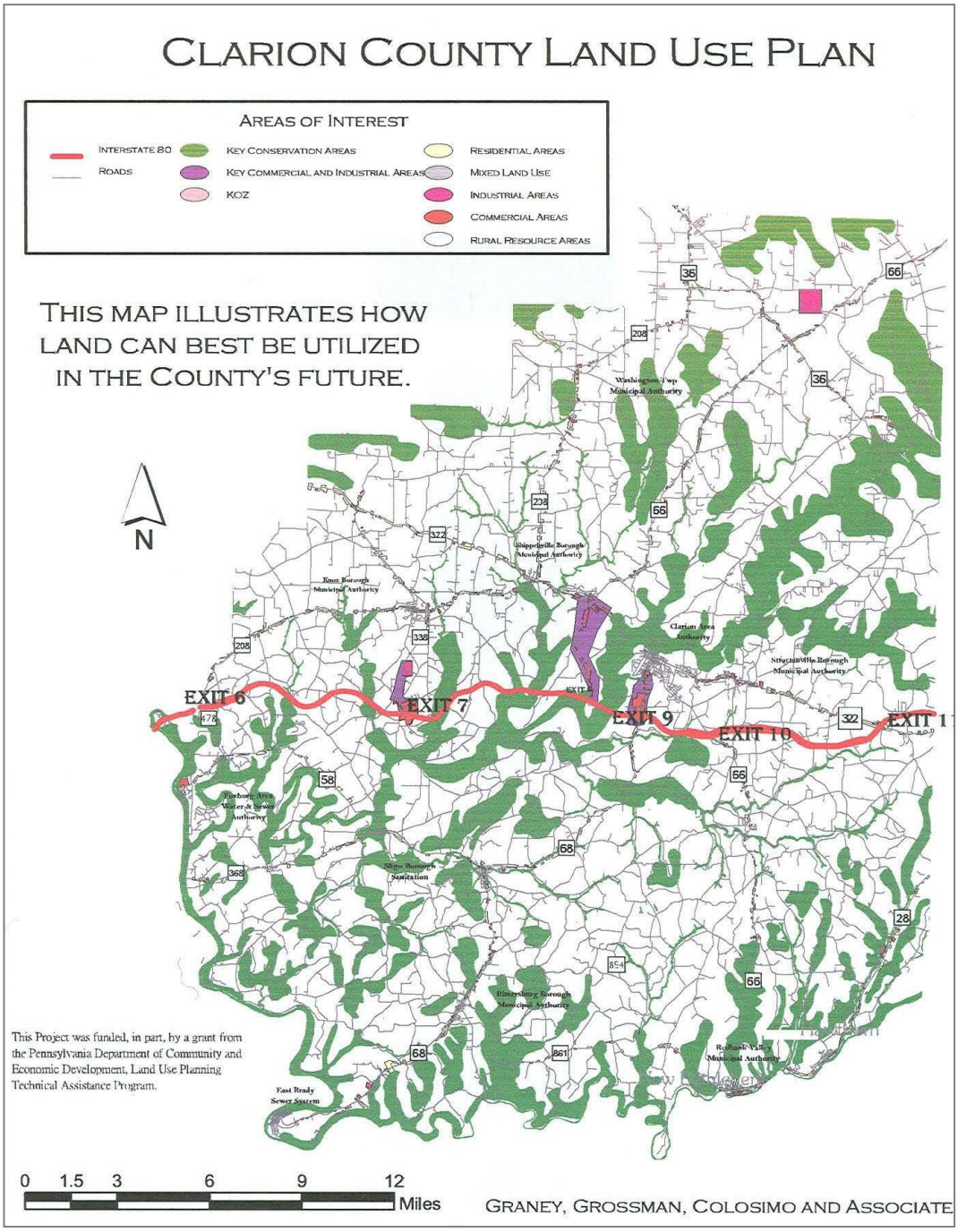
SOURCE: CLARION UNIVERSITY DIVISION OF BUDGETING AND ACCOUNTING, 2016

As shown in Table 2.3.1-7 above, the net operating revenue in Clarion University's 2015 proposed budget was $65,932,462. This amount was lower than the total operating revenue of $68,077,315 in 2014, representing a 3.2% decline. The University will need to consider the amount of funding available for mitigation activities, based on its current net income and any potential donations or other funding streams. More on funding opportunities and financial resources are discussed in Section 5 (Capability Assessment).

2.4 Land Use and Community Development

Clarion County's Comprehensive Plan, which also impacts Clarion University, details its land use goals and objectives. Existing planning mechanisms should be integrated into the HMP in order to ensure alignment and understanding of how mitigating efforts and community planning efforts complement each other. Some of the action items outlined in the Comprehensive Plan may have a direct effect on mitigation activities for the University. Additionally, the County Hazard Mitigation Plan, adopted in 2013, may incorporate planning and mitigation activities that will also be of benefit to the University. This HMP emphasizes the following County Comprehensive Plan and County HMP goals and objectives most closely related to HMP activities.

Figure 2.4.1-1 Clarion County Land Use Map



CLARION COUNTY HAZARD MITIGATION PLAN, PAGE 17–AUGUST 2013

3 PLANNING PROCESS

A successful planning process builds partnerships and brings together members representing students, faculty, and staff from a myriad of academic and administrative departments, as well as the general public and stakeholders from the surrounding community, to reach consensus on how the university will prepare for and respond to the hazards that are most likely to occur. Applying a comprehensive and transparent process adds validity to an HMP. Those involved gain a better understanding of the problem/issue and how solutions and actions were devised. The result is a revised set of common community values and widespread support for directing financial, technical, and human resources to an agreed-upon action. The planning process was an integral part of updating the HMP. This section describes the planning process used to update the HMP, gaining participation from 35 university academic departments and 39 university administrative departments.

3.1 Update Process and Participation Summary

To develop the HMP, PASSHE contracted the services of the Baker Team to update an all-hazards mitigation plan for Clarion University.

In accordance with the DMA 2000 requirements, this HMP documents the following topics:

- Planning process
- Hazard identification
- Risk assessment
- Mitigation strategy: goals, actions, and projects
- Formal adoption
- Pennsylvania Emergency Management Agency (PEMA) and FEMA approval

The *All-Hazard Mitigation Planning Standard Operating Guide* provides the standard planning process used in Pennsylvania to create and update HMPs, including this HMP, and is cited in Appendix A. Hazard vulnerability and risk assessment are described in Section 4 (Risk Assessment), and mitigation strategy is described in Section 6 (Mitigation Strategy).

Public participation and Steering Committee meetings served as the main forums for gathering information to update the HMP. The Steering Committee and consultants were afforded access to the information in relevant and approved plans, policies, and procedures for the University. Opportunities for public participation included attending public meetings, completing written surveys, and reviewing and commenting on the existing plan and other documents. Meetings, surveys, and teleconferences were used to gather input from students, faculty, staff, and other stakeholders to develop all sections of the HMP. Through this process, the University was able to establish a comprehensive approach to reducing the effects of hazards on the University.

3.2 The Steering Committee

The University's Steering Committee consists of the following members:

- Glen Reid, Director of Emergency Management
- Karen Whitney, President
- Peter Fackler, Vice President for Finance and Administration
- Chad Thomas, Vice President for Student Affairs
- Ric Taylor, Director of Facilities
- Chris Reber, Dean of Venango College
- Tim Fogarty, Associate Vice President for Finance and Administration (Human Resources)
- John Massa, Safety Officer
- Sam Puleio, Vice President for Information Technology
- Marcy Trombetta, Interim Director of Public Safety
- Carol Garbarino-Bauer, Director for Health Services
- Dave Soboslay, Delta Development Group, Inc.
- Alysse Stehli, Delta Development Group, Inc.

Glen Reid served as the University's primary point of contact for the mitigation planning process. The Steering Committee was supported in this planning effort by the Baker team.

The Steering Committee acknowledged that identifying hazards that specifically affect the University; assessing their likelihood of occurrence; and determining the potential damage to the people, property, and environment of the University was one of the most important steps in developing a comprehensive HMP. The Steering Committee chose to focus on an all-hazards approach as opposed to narrowing the focus to human-caused or natural disasters only.

3.3 Meetings and Documentation

The Steering Committee held the following meetings during the development process of the HMP:

Table 3.3.1-1 Public and Planning Meetings

DATE	DESCRIPTION OF MEETING
January 23, 2014	Kick-off meeting with Steering Committee members
March 5, 2014	Public kick-off meeting with Steering Committee members, students, faculty, staff, and other stakeholders
May 29, 2014	Public meeting to review risk assessment and to set mitigation goals, objectives, and actions
November 15, 2015	Public meeting to review the HMP draft and for the Steering Committee to approve its submission to PEMA and FEMA for formal review

Each meeting was followed by detailed meeting minutes that documented all discussion, decisions, and unmet needs identified during the meetings. These minutes were shared among the Steering Committee members and attendees of the meeting. Documentation from all meetings can be found in Appendix B - - Meeting and Other Participation Documents. Students, faculty, and staff were informed of public meetings through various sources, including newspapers, press releases, and announcements on the website (http://www.clarionuniversityhmp.com/).

The University partnered with the Baker Team to aid in the development of the HMP. The contractors assisted the County in drafting planning documents, preparing meeting materials, and facilitating meetings. The Steering Committee reviewed any documentation produced by the Baker Team, provided validation, and acted as an advocate for the HMP. Comments received from the public were incorporated into the HMP.

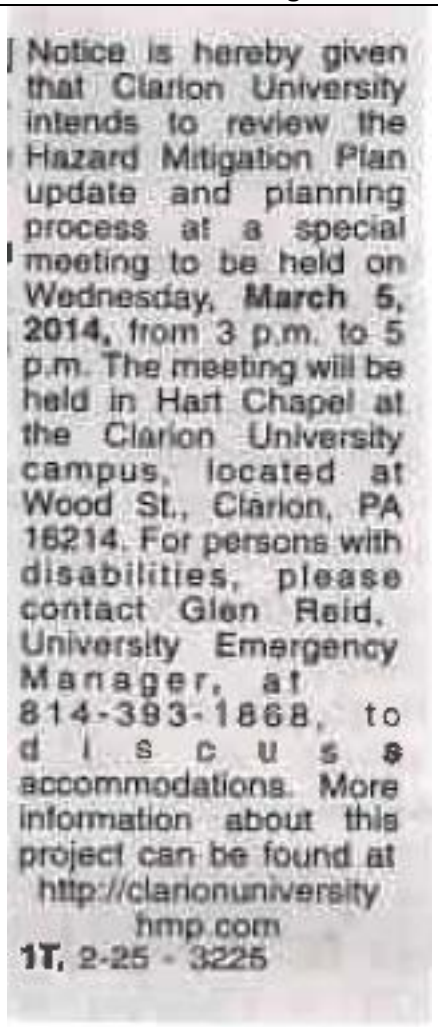
3.4 Public and Stakeholder Participation

To maximize the effectiveness of the HMP, the Steering Committee sought continual public and stakeholder engagement. Public input was encouraged and collected through a variety of methods. The Steering Committee sought participation from all parts of the campus, including students, faculty, and staff. A survey seeking input on identifying hazards to the campus, assessing overall risk, and determining the University's response capability was shared with the campus community. The survey was provided in both electronic and paper formats to ensure the maximum number of potential responses. During the HMP update process, a total of 427 surveys were received for inclusion in the HMP 335 students and 92 faculty and staff members responded representing 6 colleges and schools and 5 departments. Local, state, and federal agencies; the surrounding municipality and neighboring jurisdictions; local businesses; community leaders; and other relevant private and nonprofit groups that had a vested interest in the development of the HMP were given the opportunity to participate in the planning process by either attending a planning or public meeting or by offering comments on the website posting the existing HMP. Invitations to participate in meetings were sent to all campus departments, local government officials, and other relevant stakeholders identified by the University. Appendix B, includes copies of invitation letters and lists of individuals to whom they were sent. Also in attendance at these meetings were representatives of various other stakeholder groups, including the following:

- Clarion County Office of Emergency Services
- Clarion County Commissioners' Office

Through public notices published in the local newspaper and other various local media outlets, the above groups and the general public were invited to review the HMP on the project website (http://www.clarionuniversityhmp.com/) and to send comments to the University's Department of Emergency Management or to the Baker team. During the project period, the University HMP project website received 242 hits. In addition, public meetings were held during the planning process as listed in Section 3 (Planning Process), under "Meetings and Documentation." Each of these meetings was preceded by a public notice inviting the general public to review and comment on the HMP, as well as to attend the meeting itself. Copies of the public notices for public meetings and the opening of the public comment period are shown below. These notices were published on February 25, 2014, and May 2014, respectively.

Figure 3.4.1-1 Public Notice

HVA Meeting	Final Review Meeting
 Notice is hereby given that Clarion University intends to review the Hazard Mitigation Plan update and planning process at a special meeting to be held on Wednesday, **March 5, 2014,** from 3 p.m. to 5 p.m. The meeting will be held in Hart Chapel at the Clarion University campus, located at Wood St., Clarion, PA 16214. For persons with disabilities, please contact Glen Reid, University Emergency Manager, at 814-393-1868, to discuss accommodations. More information about this project can be found at http://clarionuniversityhmp.com **1T,** 2-25 - 3225	PUBLIC NOTICE Notice is hereby given that Clarion University intends to review the draft of the updated Mansfield University Hazard Mitigation Plan (HMP) on December 15, 2015 from 3:00 pm - 4:00 pm. This meeting is to be held at Clarion University - Gemmell Student Center, Room 250-252, 840 Wood Street, Clarion, PA 16214. The HMP describes the hazards that can affect the University and the surrounding community and the actions that can be taken to reduce impacts of hazards. Questions may be directed to: David Nitsch at dnitsch@deltaone.com or 717-441-9030. Interested persons may download and submit comments on the Draft Plan at www.clarionuniversityhmp.com. 2T - 12-1, 12-8 - 4000

The following section, entitled "Inclusive Planning," includes a table showing overall university participation in the planning process.

As illustrated, the Steering Committee felt that the campus community and stakeholder participation was critical to the process. The Steering Committee met regularly to review the status of the HMP, the HMP itself, and strategies to involve the public. Since this particular HMP was an update, the Steering Committee felt it was critical to allow adequate time for stakeholders to review each section individually.

Survey and Focus on Inclusive Planning Process

Clarion University took an inclusive planning approach to preparing its HMP, in that the HMP will apply to the University and to the multiple populations on campus. The University is able to provide resources (funding, data, GIS, etc.) to which individual departments or students may not have access. However, the University was dependent on the student, faculty, and staff buy-in, since the HMP cannot be successfully implemented without campus wide support. The University, together with Delta, undertook an intensive effort to involve as many students, faculty, and staff from a multitude of departments and majors in the HMP process. Every student, faculty member, and staff member was given the opportunity to participate in this process. Students, faculty, and staff were invited to attend public and other meetings, asked for comment on the HMP drafts that were posted to the website, and/or asked to create and prioritize mitigation actions.

Participation in the HMP process culminates in formal adoption of the HMP. The tables on the following pages reflect the variety of individuals that participated in the HMP's development.

Table 3.4.1-2 STUDENT/STAFF/FACULTY DEMOGRAPHICS FOR WORKSHEET/SURVEY

DEMOGRAPHIC CHARACTERISTIC	NUMBER OF SURVEYS RECEIVED
Student Year	
Freshman	106
Sophomore	79
Junior	53
Senior/Super Senior	77
Graduate	20
Faculty / Staff Member	92
Total:	**427 Respondents**
College / School	
College of Arts, Education and Sciences	150
College of Business Administration and Information Sciences	68
School of Education	45
School of Information Sciences	7
School of Health Sciences	51
Venango College of Clarion County	14
Not Applicable	92
Total:	**427 Respondents**
Faculty / Staff Affiliation	

Table 3.4.1-2 STUDENT/STAFF/FACULTY DEMOGRAPHICS FOR WORKSHEET/SURVEY	
DEMOGRAPHIC CHARACTERISTIC	**NUMBER OF SURVEYS RECEIVED**
Division of Finance and Administration	11
Division of Academic Affairs	48
Division of Student Affairs	16
Division of University Advancement	6
President's Division	3
Not Applicable	343
Total:	427 Respondents

Table 3.4.1-3 Meeting Attendance/HMP Adoption			
DEPARTMENT	**MEETINGS**		
	STAKEHOLDER KICK-OFF MEETING	**RISK ASSESSMENT/ MITIGATION STRATEGY MEETING**	**DRAFT REVIEW PUBLIC MEETING**
Students	1	1	0
Faculty	0	0	0
Staff	5	4	4
Community	3	1	1

4 RISK ASSESSMENT

4.1 Update Process Summary

This risk assessment provides a factual basis for activities proposed by the University in its mitigation strategy. In order to assess the University's full scope of vulnerability to a particular hazard, those hazards that may affect Clarion University are identified and defined in terms of:

- location and geographic extent
- range of magnitude (regarding impact)
- past occurrences, and
- the likelihood of future occurrences.

The Steering Committee identified natural and human-caused hazards that have the potential to affect the University. The occurrence of a past hazard event in the surrounding area or on campus provided an indication of future possible incidence, but the fact that a hazard event has not previously occurred did not exclude the hazard from further investigation. Similarly, the frequency of past occurrences of specific hazard events did not by itself guarantee a hazard's inclusion in the HMP.

The hazard identification survey that was provided to the Steering Committee included a list of all 34 hazards that are in PEMA's Standard List of Hazards, taken from the Commonwealth of Pennsylvania's *All-Hazard Mitigation Planning Standard Operating Guide*. The purpose of the survey was to collect information from university officials on what hazards affect their campus and the frequency of incidents. Based on the responses to this survey, information from the 2010 Pennsylvania State HMP update, and past disaster declarations, the following hazards were determined to be most prevalent to Clarion University and essential for inclusion in this HMP.

Table 4.1.1-1 Selected Natural and Human-Caused Hazards

NATURAL HAZARDS	HUMAN-CAUSED HAZARDS
Earthquake	Dam Failure
Extreme Temperature	Transportation Accidents
Flooding/Flash Flood/Ice Jam	Utility Interruption
Hurricane/Tropical Storm/Nor'easter	Terrorism
Lightning Strike	
Pandemic	
Radon Exposure	
Subsidence/Sinkhole	
Tornado/Windstorm	
Winter Storm	

After careful consideration, the Steering Committee chose not to profile the below hazards in the HMP. These hazards were not profiled either because a hazard event of this type cannot occur at the University

or because the risk level and potential impact of a hazard were determined to be too minimal. Some of the hazards below may impact the County (and therefore, the University at a secondary level, such as in the ability for employees to travel to work). Only hazards that directly impact the University were selected for profiling; County officials will engage the University to implement mitigation strategies for secondary hazards, as determined necessary.

Table 4.1.1-2 Non-Selected Natural and Human-Caused Hazards

NATURAL HAZARDS	HUMAN-CAUSED HAZARDS
Avalanche/Glacier	Building or Structure Collapse
Coastal Erosion	Disorientation
Drought	Drowning
Dust/Sandstorm	Environmental Hazard
Expansive Soils	Levy Failure
Hailstorm	Nuclear Incidents
Invasive Species	Urban Fire and Explosion
Landslide	War and Criminal Activity
Tsunami	
Wildfire	
Volcano	

Following hazard identification and profiling, a vulnerability assessment was performed to identify the impact of natural or human-caused hazard events on people, buildings, infrastructure, and the community. Each natural and human-caused hazard is discussed in terms of its potential impact on the University, including the types of populations and critical facilities that may be at risk. The assessment allows the University to focus mitigation efforts on areas most likely to be damaged or most likely to require early response to a hazard event. A vulnerability analysis was performed to identify people, land, or facilities that may be impacted by hazard events and to describe what those events can do to physical, social, and economic assets.

The following section provides a summary of previous disaster declarations affecting Clarion University as well as a review of hazards identified as having the potential to impact the University in 2016. Only the most current and credible sources were used to complete the hazard profiles, which are detailed below under “Hazard Profiles and Vulnerability Analysis” (see Appendix A for source details).

4.2 Hazard Identification

4.2.1 Table of Presidential Disaster and Emergency Declarations

Gubernatorial Disaster Declarations are declared when a disaster exceeds the ability of the local government’s ability to respond. Additionally, Presidential Disaster and Emergency Declarations are issued when it has been determined that both state and local governments need assistance in responding to a disaster incident. Table 4.2.1-1 identifies several Gubernatorial and Presidential Disaster and

Emergency Declarations, issued between June 1972 and June 2006, which have affected the County in which the University is based. Additional declarations beyond those listed can be found on the FEMA website (http://www.fema.gov/disasters/) or the PEMA website.
(http://www.portal.state.pa.us/portal/server.pt/community/governors_proclamations/4725)

Table 4.2.1-1 Presidential and Gubernatorial Disaster and Emergency Declarations Affecting Clarion County

DECLARATION NUMBER*	DATE	INCIDENT
1649	June 2006	Severe Storms and Flooding
1557	September 2004	Tropical Depression Ivan
1093	January 1996	Flooding
1085	January 1996	Blizzard
485	September 1975	Severe Storms, Heavy Rain, Flooding
340	June 1972	Tropical Storm Agnes

SOURCE: CLARION COUNTY HAZARD MITIGATION PLAN, 2013

**If applicable*

4.2.2 Summary of Hazards

The Steering Committee was provided the Pennsylvania Standard List of Hazards to be considered for evaluation in this HMP. The Steering Committee decided that this HMP should identify, profile, and analyze 14 hazards. Table 4.2.2-1 contains a complete list of the hazards that have the potential to impact the University, as identified through input from those who participated in this HMP planning process and information available in the state HMP. Specific hazard profiles are detailed below under "Hazard Profiles and Vulnerability Analysis."

Table 4.2.2-1 Hazards Identified in the 2016 Clarion University Hazard Mitigation Plan, As Defined and Referenced in Pennsylvania's All-Hazard Mitigation Planning Standard Operating Guide

HAZARD NAME	HAZARD DESCRIPTION
NATURAL HAZARDS	
Earthquake	An earthquake is the motion or trembling of the ground produced by sudden displacement of rock usually within the upper 10–20 miles of the Earth's crust. Earthquakes result from crustal strain, volcanism, landslides, or the collapse of underground caverns. Earthquakes can affect hundreds of thousands of square miles, cause damage to property measured in the tens of billions of dollars, result in loss of life and injury to hundreds of thousands of persons, and disrupt the social and economic functioning of the affected area. Most property damage and earthquake-related deaths are caused by the failure and collapse of structures due to ground shaking which is dependent upon amplitude and duration of the earthquake. (FEMA, 1997)

Table 4.2.2-1 Hazards Identified in the 2016 Clarion University Hazard Mitigation Plan, As Defined and Referenced in Pennsylvania's All-Hazard Mitigation Planning Standard Operating Guide

HAZARD NAME	HAZARD DESCRIPTION
Extreme Temperature	Extreme cold temperatures drop well below what is considered normal for an area during the winter months and often accompany winter storm events. Combined with increases in wind speed, such temperatures in Pennsylvania can be life threatening to those exposed for extended periods of time. Extreme heat can be described as temperatures that hover 10°F or more above the average high temperature for a region during the summer months. Extreme heat is responsible for more deaths in Pennsylvania than all other natural disasters combined. (Lawrence County, PA HMP, 2004)
Flooding/Flash Flood/Ice Jam	Flooding is the temporary condition of partial or complete inundation on normally dry land and it is the most frequent and costly of all hazards in Pennsylvania. Flooding events are generally the result of excessive precipitation. General flooding is typically experienced when precipitation occurs over a given river basin for an extended period of time. Flash flooding is usually a result of heavy localized precipitation falling in a short time period over a given location, often along mountain streams and in urban areas where much of the ground is covered by impervious surfaces. The severity of a flood event is dependent upon a combination of stream and river basin topography and physiography, hydrology, precipitation and weather patterns, present soil moisture conditions, the degree of vegetative clearing as well as the presence of impervious surfaces in and around flood-prone areas. (NOAA, 2009) Winter flooding can include ice jams that occur when warm temperatures and heavy rain cause snow to melt rapidly. Snowmelt combined with heavy rains can cause frozen rivers to swell, which breaks the ice layer on top of a river. The ice layer often breaks into large chunks, which float downstream, piling up in narrow passages and near other obstructions such as bridges and dams. All forms of flooding can damage infrastructure. (USACE, 2007)
Hurricane/Tropical Storm/Nor'easter	Hurricanes, tropical storms, and nor'easters are classified as cyclones and are any closed circulation developing around a low-pressure center in which the winds rotate counter-clockwise (in the Northern Hemisphere) and whose diameter averages 10–30 miles across. While most of Pennsylvania is not directly affected by the devastating impacts cyclonic systems can have on coastal regions, many areas in the state are subject to the primary damaging forces associated with these storms including high-level sustained winds, heavy precipitation, and tornadoes. Areas in northwestern Pennsylvania could be susceptible to storm surge and tidal flooding. The majority of hurricanes and tropical storms form in the Atlantic Ocean, Caribbean Sea, and Gulf of Mexico during the official Atlantic hurricane season (June through November). (FEMA, 1997)
Lightning Strike	Lightning is a discharge of electrical energy resulting from the build-up of positive and negative charges within a thunderstorm. The flash or "bolt" of light usually occurs within clouds, or between clouds and the ground. A bolt of lightning can reach temperatures approaching 50,000°F. On average, 89 people are killed each year by lightning strikes in the United States. Within Pennsylvania, the annual average number of thunder and lightning events a given area can expect ranges between 40–70 events per year. (FEMA, 1997)

Table 4.2.2-1 Hazards Identified in the 2016 Clarion University Hazard Mitigation Plan, As Defined and Referenced in Pennsylvania's All-Hazard Mitigation Planning Standard Operating Guide

HAZARD NAME	HAZARD DESCRIPTION
Pandemic	A pandemic occurs when infection from of a new strain of a certain disease, to which most humans have no immunity, substantially exceeds the number of expected cases over a given period of time. Such a disease may or may not be transferable between humans and animals. (Martin & Martin-Granel, 2006)
Radon Exposure	Radon is a cancer-causing natural radioactive gas that you can't see, smell, or taste. It is a large component of the natural radiation that humans are exposed to and can pose a serious threat to public health when it accumulates in poorly ventilated residential and occupation settings. According to the USEPA, radon is estimated to cause about 21,000 lung cancer deaths per year, second only to smoking as the leading cause of lung cancer. (EPA 402-R-03-003: EPA Assessment…2003) An estimated 40% of the homes in Pennsylvania are believed to have elevated radon levels. (Pennsylvania Department of Environmental Protection, 2009)
Subsidence/Sinkhole	Subsidence is a natural geologic process that commonly occurs in areas with underlying limestone bedrock and other rock types that are soluble in water. Water passing through naturally occurring fractures dissolves these materials leaving underground voids. Eventually, overburden on top of the voids causes a collapse that can damage structures with low strain tolerances. This collapse can take place slowly over time or quickly in a single event, but in either case [*sic*]. Karst topography describes a landscape that contains characteristic structures such as sinkholes, linear depressions, and caves. In addition to natural processes, human activity such as water, natural gas, and oil extraction can cause subsidence and sinkhole formations. (FEMA, 1997)
Tornado/Windstorm	A windstorm can occur during severe thunderstorms, winter storms, coastal storms, or tornadoes. Straight-line winds such as a downburst have the potential to cause wind gusts that exceed 100 miles per hour. Based on 40 years of tornado history and over 100 years of hurricane history, FEMA identifies western and central Pennsylvania as being more susceptible to higher winds than eastern Pennsylvania. (FEMA, 1997) A tornado is a violent windstorm characterized by a twisting, funnel-shaped cloud extending to the ground. Tornadoes are most often generated by thunderstorm activity (but sometimes result from hurricanes or tropical storms) when cool, dry air intersects and overrides a layer of warm, moist air forcing the warm air to rise rapidly. The damage caused by a tornado is a result of high wind velocities and wind-blown debris. According to the National Weather Service, tornado wind speeds can range between 30 to more than 300 miles per hour. They are more likely to occur during the spring and early summer months of March through June and are most likely to form in the late afternoon and early evening. Most tornadoes are a few dozen yards wide and touch down briefly, but even small, short-lived tornadoes can inflict tremendous damage. Destruction ranges from minor to catastrophic depending on the intensity, size, and duration of the storm. Structures made of light materials such as mobile homes are most susceptible to damage. Waterspouts are weak tornadoes that form over warm water and are relatively uncommon in Pennsylvania. Each year, an average of over 800 tornadoes is reported nationwide, resulting in an average of 80 deaths and 1,500 injuries. (NOAA, 2002)

Table 4.2.2-1 Hazards Identified in the 2016 Clarion University Hazard Mitigation Plan, As Defined and Referenced in Pennsylvania's All-Hazard Mitigation Planning Standard Operating Guide

HAZARD NAME	HAZARD DESCRIPTION
	Based on NOAA Storm Prediction Center Statistics, the number of recorded F3, F4, and F5 tornadoes between 1950-1998 ranges from <1 to 15 per 3,700 square mile area across Pennsylvania. (FEMA, 2009) A waterspout is a tornado over a body of water. (American Meteorological Society, 2009)
Winter Storm	Winter storms may include snow, sleet, freezing rain, or a mix of these wintry forms of precipitation. A winter storm can range from a moderate snowfall or ice event over a period of a few hours to blizzard conditions with wind-driven snow that lasts for several days. Many winter storms are accompanied by low temperatures and heavy and/or blowing snow, which can severely impair visibility and disrupt transportation. The Commonwealth of Pennsylvania has a long history of severe winter weather. (NOAA, 2009)
HUMAN-Caused HAZARDS	
Dam Failure	A dam is a barrier across flowing water that obstructs, directs, or slows down water flow. Dams provide benefits such as flood protection, power generation, drinking water, irrigation, and recreation. Failure of these structures results in an uncontrolled release of impounded water. Failures are relatively rare, but immense damage and loss of life is possible in downstream communities when such events occur. Aging infrastructure, hydrologic, hydraulic and geologic characteristics, population growth, and design and maintenance practices should be considered when assessing dam failure hazards. The failure of the South Fork Dam, located in Johnstown, PA, was the deadliest dam failure ever experienced in the United States. It took place in 1889 and resulted in the Johnstown Flood that claimed 2,209 lives. (FEMA, 1997) Today there are approximately 3,200 dams and reservoirs throughout Pennsylvania. (Pennsylvania Department of Environmental Protection, 2009)
Transportation Accidents	Transportation accidents can result from any form of air, rail, water, or road travel. It is unlikely that small accidents would significantly impact the larger community. However, certain accidents could have secondary regional impacts such as a hazardous materials release or disruption in critical supply/access routes, especially if vital transportation corridors or junctions are present. (Research and Innovative Technology Administration, 2009) Traffic congestion in certain circumstances can also be hazardous. Traffic congestion is a condition that occurs when traffic demand approaches or exceeds the available capacity of the road network. This hazard should be carefully evaluated during emergency planning since it is a key factor in timely disaster or hazard response, especially in areas with high population density. (Federal Highway Administration, 2009)
Utility Interruption	Utility interruption hazards are hazards that impair the functioning of important utilities in the energy, telecommunications, public works, and information network sectors. Utility interruption hazards include the following: **Geomagnetic Storms;** including temporary disturbances of the Earth's magnetic field resulting in disruptions of communication, navigation, and satellite systems. (National Research Council et al., 1986)

Table 4.2.2-1 Hazards Identified in the 2016 Clarion University Hazard Mitigation Plan, As Defined and Referenced in Pennsylvania's All-Hazard Mitigation Planning Standard Operating Guide

HAZARD NAME	HAZARD DESCRIPTION
	Fuel or Resource Shortage; resulting from supply chain breaks or secondary to other hazard events, for example. (Mercer County, PA, 2005) **Electromagnetic Pulse;** originating from an explosion or fluctuating magnetic field and causing damaging current surges in electrical and electronic systems. (Institute for Telecommunications Sciences, 1996) **Information Technology Failure;** due to software bugs, viruses, or improper use. (Rainer Jr., et al., 1991) **Ancillary Support Equipment;** electrical generating, transmission, system-control, and distribution-system equipment for the energy industry. (Hirst & Kirby, 1996) **Public Works Failure;** damage to or failure of highways, flood control systems, deepwater ports and harbors, public buildings, bridges, dams, for example. (United States Senate Committee on Environment and Public Works, 2009) **Telecommunications System Failure;** Damage to data transfer, communications, and processing equipment, for example. (FEMA, 1997) **Transmission Facility or Linear Utility Accident;** liquefied natural gas leakages, explosions, facility problems, for example. (United States Department of Energy, 2005) **Major Energy, Power, Utility Failure;** interruptions of generation and distribution, power outages, for example. (United States Department of Energy, 2000)
Terrorism	Terrorism is use of force or violence against persons or property with the intent to intimidate or coerce. Acts of terrorism include threats of terrorism; assassinations; kidnappings; hijackings; bomb scares and bombings; cyber-attacks (computer-based); and the use of chemical, biological, nuclear and radiological weapons (FEMA, 2009). Increasingly, cyber-attacks have become a more pressing concern for governments.

SOURCE: ALL-HAZARD PLANNING MITIGATION STANDARD OPERATING GUIDE

4.3 Hazard Profiles

NATURAL HAZARDS

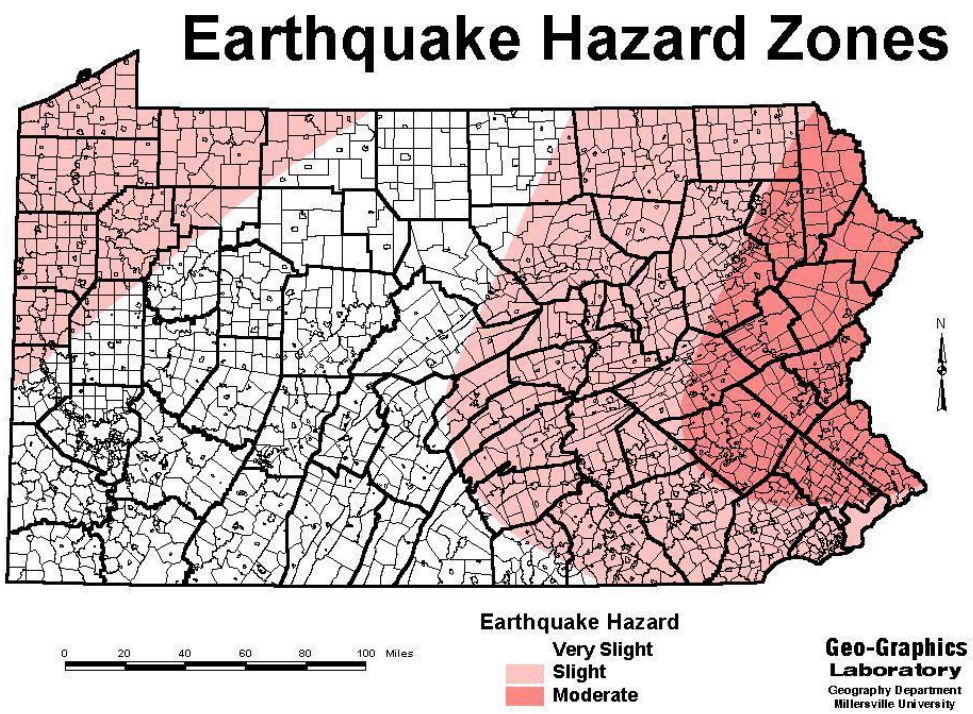
4.3.1 Earthquake

4.3.1.1 *Location and Extent*

An earthquake is the motion or trembling of the ground produced by sudden displacement of rock, usually within the upper 10–20 miles of Earth's crust. Earthquakes result from crustal strain, volcanism, landslides, or the collapse of underground caverns. (FEMA, 1997)

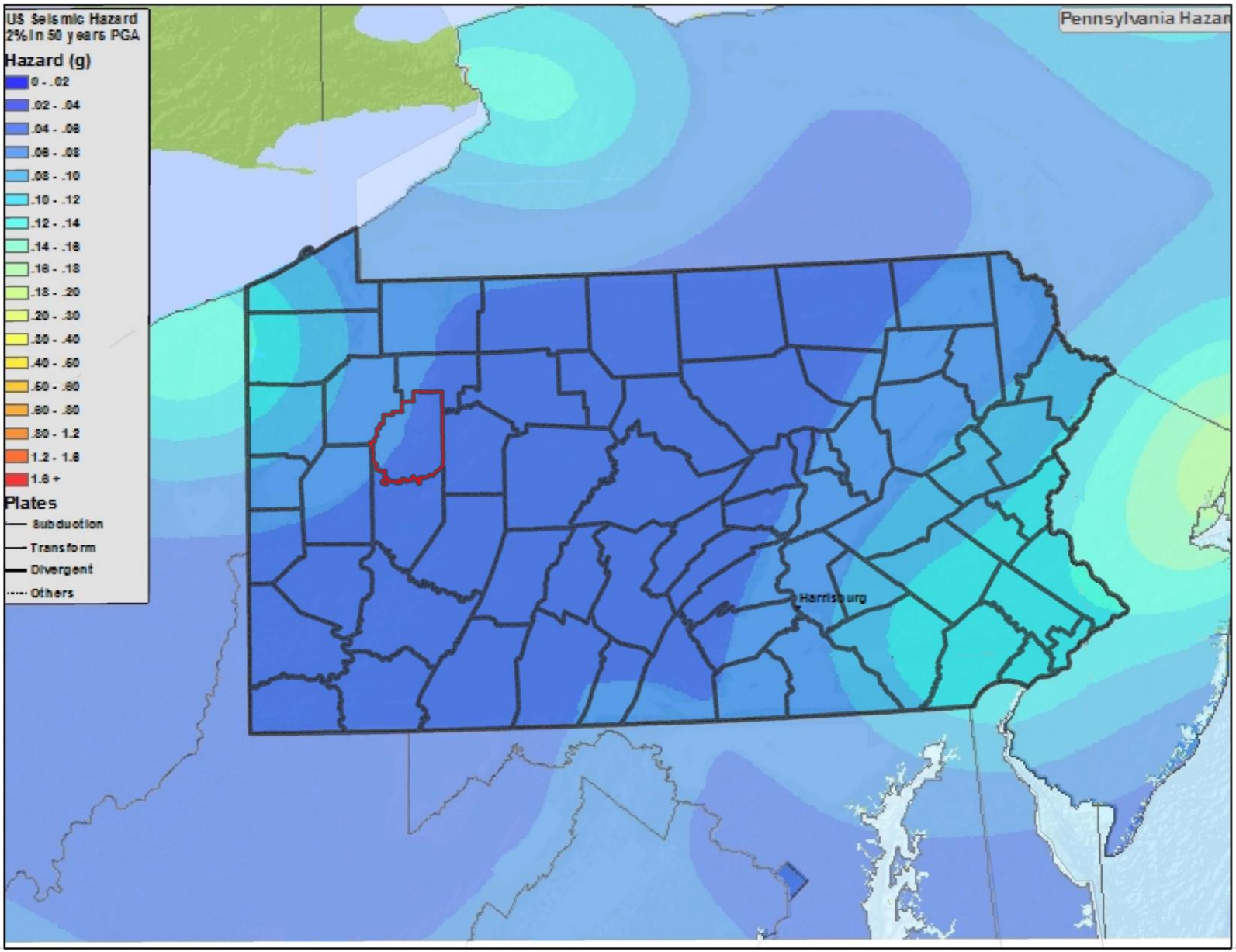
Earthquake incidents in Pennsylvania do not typically impact areas greater than 100 kilometers from the epicenter of the incident and are usually mild in nature. The Department of Earth Sciences of Millersville University identified relative earthquake hazard zones for Pennsylvania. As seen in Figure 4.3.1-1, most of Clarion County is located in the "very slight" zone, with the far-northwest section falling under the "slight" zone. Clarion County-area historical earthquake activity is significantly below Pennsylvania state average. It is 96% smaller than the overall U.S. average.[2] While the overall relative hazard is very low, historically earthquakes have occurred around the surrounding region and a strong earthquake in Ohio could affect the campus.

Figure 4.3.1-1 Earthquake Hazard Zones in Pennsylvania



[2] City-Data.com – Earthquake Activity, Clarion County, PA – http://www.city-data.com/county/Clarion_County-PA.html#ixzz36PMNLge5

Figure 4.3.1-2 Earthquake Hazard Zones in Pennsylvania



4.3.1.2 *Range Of Magnitude*

Compared with other states, especially California and Alaska, Pennsylvania is relatively free of earthquake activity. Even considering only the eastern half of North America, Pennsylvania has experienced fewer earthquakes than most other states. Nonetheless, earthquakes have occurred in Pennsylvania at a range of magnitudes.

Earthquake magnitude is often measured using the Richter scale, an open-ended logarithmic scale that describes the energy release of an earthquake. Table 4.3.1-1 summarizes Richter Scale Magnitudes as they relate to the spatial extent of impacted areas. There have been no historical earthquakes in Clarion County. Statewide, Pennsylvania has not experienced any earthquakes with a magnitude greater than 6.0.

Table 4.3.1-1 Richter Scale Magnitudes and Associated Earthquake Effects

RICHTER MAGNITUDES	EARTHQUAKE EFFECTS
Less than 3.5	Generally not felt, but recorded.
3.5–5.4	Often felt, but rarely causes damage.
Under 6.0	At most, slight damage to well-designed buildings.
6.1–6.9	Can be destructive in areas where people live, up to about 100 kilometers across.
7.0–7.9	Major earthquake; can cause serious damage over large areas.
8.0 or greater	Great earthquake; can cause serious damage in areas several hundred kilometers across.

The Richter scale does not give any indication of the impact or damage of an earthquake, although it can be inferred that higher-magnitude incidents cause more damage. Instead, the impact of an earthquake incident is measured in terms of the earthquake's intensity, usually measured using the Modified Mercalli Intensity Scale, shown in Table 4.3.1-2. Many earthquakes that occurred in the past do not have recorded intensities. Since the worst earthquake recorded in Pennsylvania was a magnitude 5.2, a worst-case earthquake incident would be of a similar magnitude in Clarion County. As described in Table 4.3.1-1 and Table 4.3.1-2, this magnitude of incident would be felt, and non-stationary objects would shake or fall off shelves, trees would sway, and suspended objects would swing, but damage would overall be mild and would likely be concentrated in populated areas of the County.

Table 4.3.1-2 Modified Mercalli Intensity Scale with Associated Impacts

SCALE	INTENSITY	DESCRIPTION OF EFFECTS	CORRESPONDING RICHTER SCALE MAGNITUDE
I	Instrumental	Detected only on seismographs	<4.2
II	Feeble	Some people feel it	<4.2
III	Slight	Felt by people resting; like a truck rumbling by	<4.2
IV	Moderate	Felt by people walking	<4.2

Table 4.3.1-2 Modified Mercalli Intensity Scale with Associated Impacts

SCALE	INTENSITY	DESCRIPTION OF EFFECTS	CORRESPONDING RICHTER SCALE MAGNITUDE
V	Slightly Strong	Sleepers awake; church bells ring	<4.8
VI	Strong	Trees sway; suspended objects swing; objects fall off shelves	<5.4
VII	Very Strong	Mild alarm, walls crack, plaster falls	<6.1
VIII	Destructive	Moving cars uncontrollable, masonry fractures, poorly constructed buildings damaged	<6.9
IX	Ruinous	Some houses collapse, ground cracks, pipes break open	<6.9
X	Disastrous	Ground cracks profusely, many buildings destroyed, liquefaction and landslides widespread	<7.3
XI	Very Disastrous	Most buildings and bridges collapse, roads, railways, pipes and cables destroyed, general triggering of other hazards	<8.1
XII	Catastrophic	Total destruction, trees fall, ground rises and falls in waves	>8.1

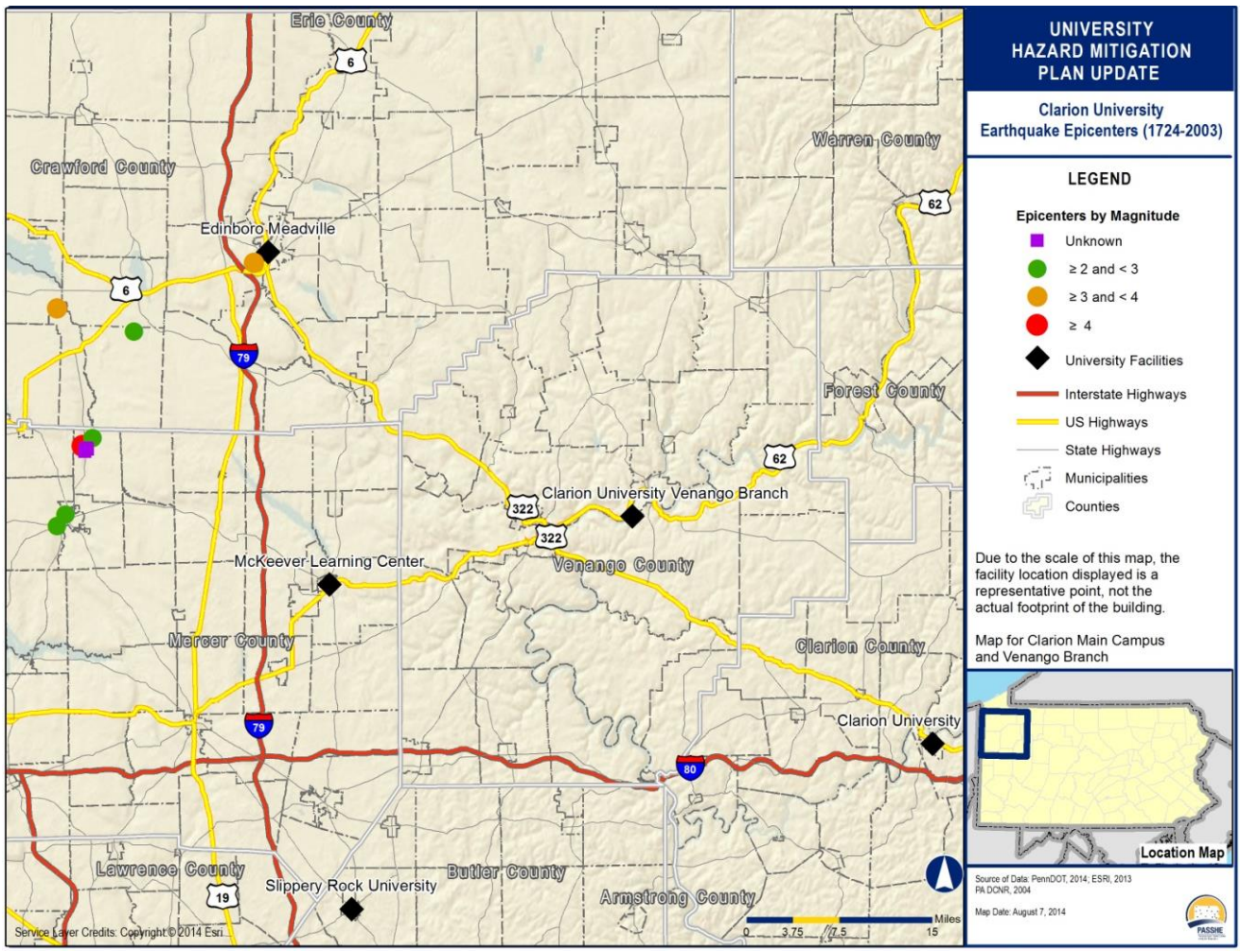
Environmental impacts of earthquakes can be numerous, widespread, and devastating, particularly if indirect impacts like economic impacts are considered. Some examples of these impacts are listed below, but are unlikely to occur in Clarion County or at the University:

- Induced flooding or landslides and avalanches
- Poor water quality
- Damage to vegetation
- Breakage in sewage or toxic material containments

4.3.1.3 *Past Occurrence*

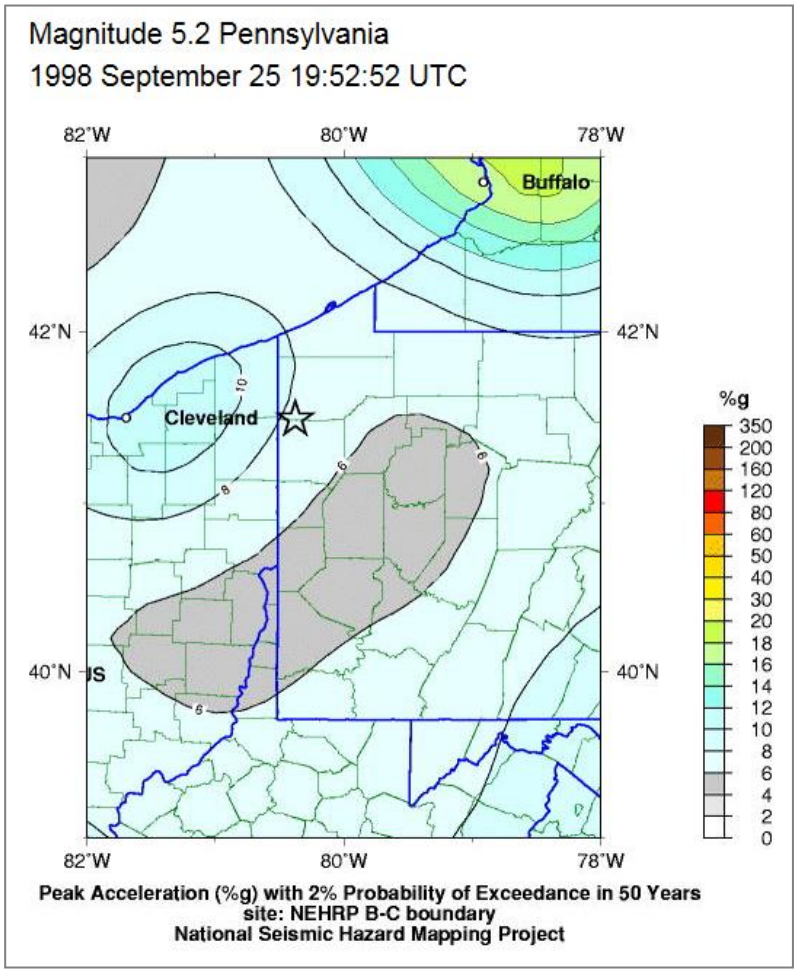
Earthquakes can impact an area up to 100 kilometers. There have been 165 earthquake epicenters in Pennsylvania. According to records maintained by various sources (PA DCNR, PennDOT, and ESRI), there have been low-range magnitude earthquake epicenters recorded in Clarion County, as illustrated in Figure 4.3.1-3, less than 100 kilometers to Clarion University.

Figure 4.3.1-3 Historic Earthquakes in Clarion County, PA



However, as shown in Figure 4.3.1-4, an earthquake that measured a magnitude 5.2 occurred on September 25, 1998.[3] There was minor damage as a result of the earthquake, and it was reportedly felt in the Greenville-Jamestown area, Pennsylvania, throughout most of Pennsylvania, northern Ohio, northern Indiana, southeastern Michigan, New York, and as far east as Syracuse and West Virginia. It was also felt in parts of Illinois, New Jersey, and much of southern Ontario, Canada.[4]

Figure 4.3.1-4 HISTORIC EARTHQUAKES IN PA – MAGNITUDE 5.2



4.3.1.4 *Future Occurrence*

One way to express an earthquake's severity is to compare its acceleration to the normal acceleration due to gravity. Peak horizontal ground acceleration (PHGA) measures the strength of ground movements in this manner. PHGA is the percentage of g (acceleration due to gravity) experienced during the earthquake or the rate in change of motion of the Earth's surface during an earthquake as a percentage of the established rate of acceleration due to gravity. In general, an acceleration of 10 percent to 15 percent of

[3] The Largest Earthquakes, State by State by Carl W. Stover and Jerry L. Coffman, 1993, Seismicity of the United States, 1568-1989 (Revised), U.S. Geological Survey Professional Paper 1527

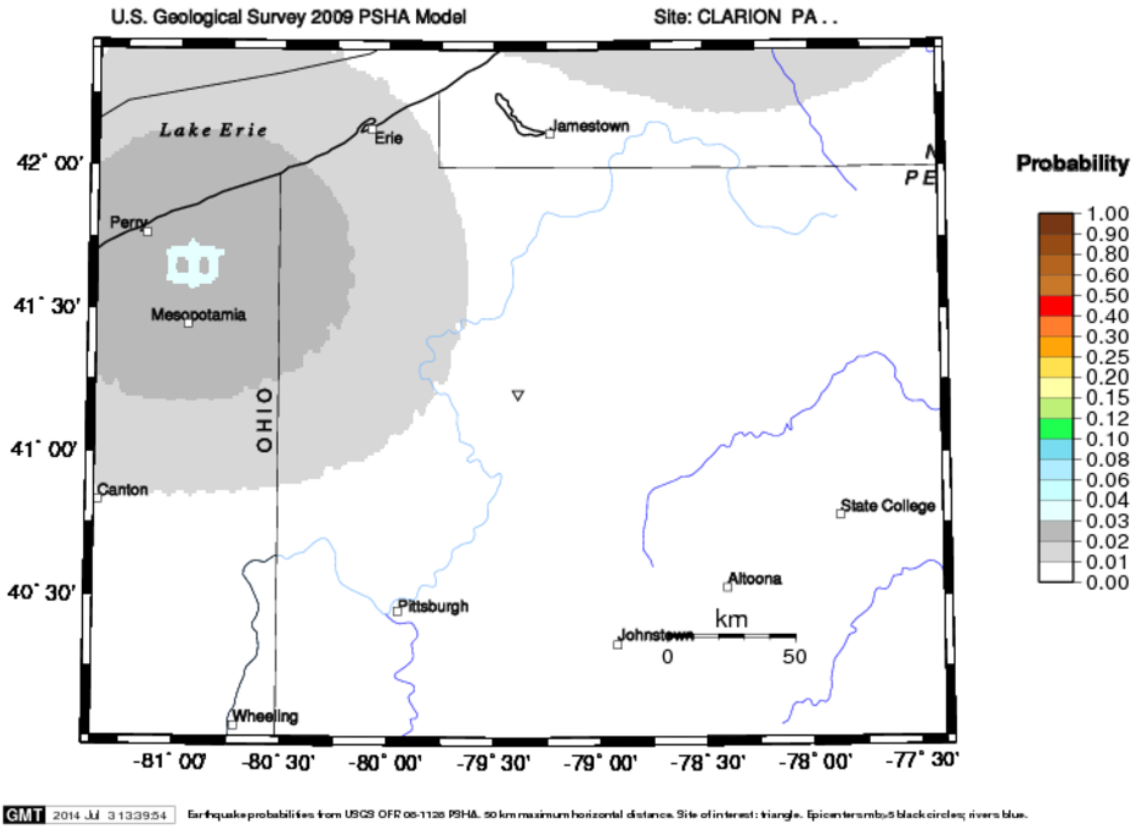
[4] http://earthquake.usgs.gov/earthquakes/eqarchives/year/1998/1998_09_25_haz.php

gravity is associated with structural damage to ordinary buildings not designed to withstand earthquakes, although soil conditions at individual sites will impact the amount of damage.

The U.S. Geologic Survey models the contours that represent earthquake ground motions that have a 10 percent probability of being experienced over a 50-year period. The PHGA value for Clarion County is between one and two. These values correspond to incidents with low intensities and an expectation of little or no structural damage. The lack of past incidents indicates that earthquakes are unlikely to occur around Clarion University and that if they do occur, their impacts will be small. Overall, the future occurrence of earthquakes in the Clarion area can be considered *unlikely*, as defined by the Risk Factor methodology probability criteria.

Figure 4.3.1-5 displays earthquake probabilities that are computed from the source model of the 2008 USGS-National Seismic Hazard Mapping Project (NSHMP) update. The region of model validity is the conterminous (lower 48 states) USA and Alaska. The generated maps will show the probabilities of earthquakes within 50 years with a radius of 50 kilometers.[5]

Figure 4.3.1-5 PROBABILITY OF EARTHQUAKE WITH M> WITHIN 50 YEARS AND 50 KM



[5] 2009 Earthquake Probability Mapping – USGS Geological Hazards Science Center – http://geohazards.usgs.gov/eqprob/2009/index.php

4.3.1.5 *Vulnerability Assessment*

Since earthquakes have not been a hazard to Clarion County or Clarion University in the past, future incidents are expected to be small and shallow, if they occur at all. Many incidents are only recorded by seismographs, so the overall vulnerability to this hazard is expected to be low. In the incident of an earthquake epicenter around Clarion University, trees may sway, unanchored objects may be upset and, at worst, walls may crack and plaster may fall.

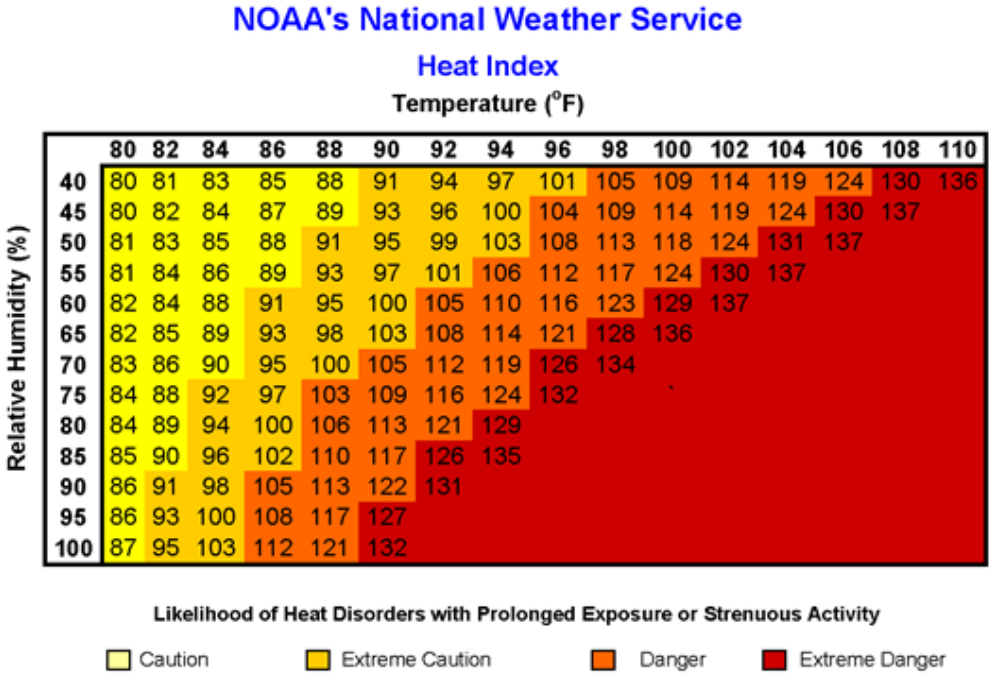
4.3.2 Extreme Temperatures

4.3.2.1 *Location and Extent*

Although often overlooked when compared against more dramatic hazard events, extreme temperatures have a significant impact on the health, safety, and wellbeing of a community. Extreme temperatures include both heat and cold.

The majority of the world, including all of the United States and Pennsylvania, is vulnerable to heat waves or periods of extreme heat that are both longer and hotter than normal. Heat waves in the eastern half of the United States are often associated with ridges, i.e., elongated areas of high pressure. Wet conditions are generally found to the west of the ridge while sunny, dry conditions are found to the east. Heat waves occur when a ridge stays stationary for several days, causing temperatures on the east side of the ridge to rise well above normal levels. Extreme levels of humidity or dryness can also accompany heat waves, influencing the heat index or the body's perception of air temperature. Areas with high humidity also maintain a higher heat index. For instance, a temperature of 95°F and a humidity of 75 percent produces a heat index of 128. See Figure 4.3.2-1 below for the standard heat index chart calculations.

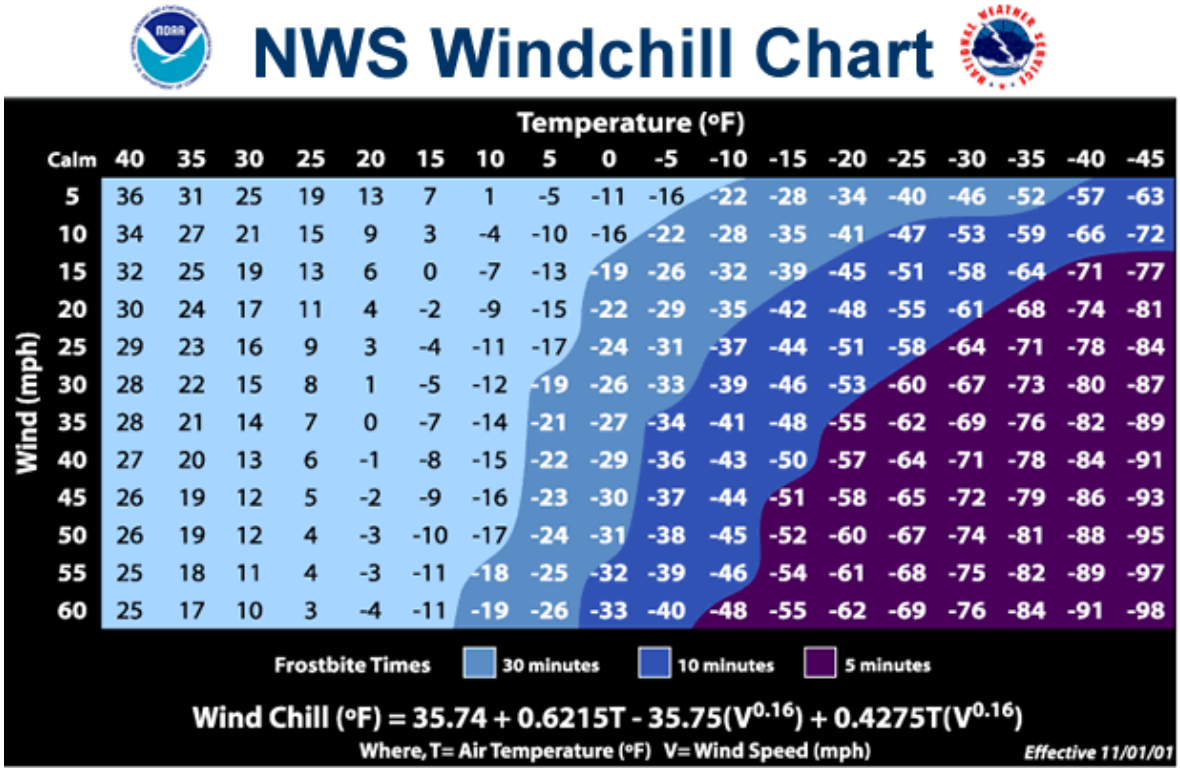
Figure 4.3.2-1 NOAA Heat Index Chart



SOURCE: NOAA, 2014

Extreme cold is equally as threatening to human safety and well-being as extreme heat. The definition of extreme cold will vary depending upon the region of the county. In areas that do not usually experience winter weather, even near freezing temperatures can constitute extreme cold. As with the other end of the spectrum, extreme cold can result in a cold wave or cold snap. Cold waves occur when there is a rapid temperature fall within a 24-hour period. The National Weather Service defines cold waves based on the rate of the temperature drop and the final minimum temperature, as well as the region of the country and the time of year. The Weather Channel considers a cold wave to be an extremely cold period of time of at least two days, with temperatures below normal in at least 15 states and with at least five of those states having temperatures over 15 degrees below normal. The wind chill index is cold's equivalent to the heat index. Wind chill temperature influences people's perception of how cold it is outside and is based on the rate of heat loss, caused by a combination of wind and cold. Increased wind rates draw heat from the body more quickly, leading to a drop in internal body temperature. The figure below demonstrates wind chill calculations, as determined by the National Weather Service and NOAA.

Figure 4.3.2-2 NWS and NOAA Wind Chill Index Chart



SOURCE: NOAA, 2014

4.3.2.2 *Range of Magnitude*

Extreme temperatures are actually more deadly than many other natural hazards, although they are often quickly forgotten because of their more subtle nature. Heat waves start gradually and take many weeks to peak. Their potential impact, however, should not be overlooked. From 1992 to 2002, heat waves killed approximately 200 people per year in the U.S., which is equivalent to the number of deaths from flooding, lightning, tornadoes and hurricanes combined during the same 10-year period. Heat stress can show itself through several heat-related illnesses, including heat cramps, heat exhaustion, and heat stroke. Heat stroke requires immediate medical attention and can result in death. When the body heats too rapidly to cool itself or when the body loses too much fluid and/or salt via dehydration and sweating, heat stress is

imminent. An individual's vulnerability to heat stress is impacted by the amount of time spent exposed to direct sunlight, wind speed, and normal health conditions. NOAA cites some of these health conditions as including age (older adults and young children), obesity, fever, heart disease, mental illness, poor circulation, prescription drug and alcohol use, and sunburn. Sunburn, caused by ultraviolet radiation from the sun, can significantly retard the skin's ability to shed excess heat. Additionally, extreme heat can lead to food spoiling faster, particularly if not carefully managed, and cause a secondary minor epidemic due to food-borne illnesses.

Vulnerability to injury and death also significantly increases during periods of extreme cold. A study on the climate effects on health by Kalkstein notes that total mortality rates are about 15 percent higher on an average winter day than on an average summer day. Cold is responsible for death both directly and indirectly. The most commonly associated direct causes of cold-related death and injuries include hypothermia, frostbite, influenza, and pneumonia. Indirect causes can include death and injuries from falls, accidents, carbon monoxide poisoning, and house fires.

The CDC defines hypothermia as abnormally cold temperatures that cause your body to lose heat faster than it can be produced. Body temperature that is too low also affects cognitive processing, meaning that someone experiencing hypothermia may become confused and not appreciate the danger they are in. Hypothermia can occur at even relatively warm temperatures, such as 40°F, if a person is chilled from sweat, rain, or has been submersed in cold water. Certain demographic and health characteristics increase susceptibility to hypothermia. Victims of hypothermia more frequently include the following:

- Elderly people with inadequate food, clothing, or heating
- Babies sleeping in cold bedrooms
- Children left unattended
- Adults under the influence of alcohol
- Mentally ill individuals
- People who remain outdoors for long periods—the homeless, hikers, hunters, etc.

Frostbite is an additional severe cold weather concern and is caused by parts of the body freezing. It more often affects extremities, such as the nose, ears, cheeks, chin, fingers, and toes, and frostbite can cause permanent damage, sometimes-requiring amputation. People with reduced blood circulation and those who are not dressed properly for the weather are at increased risk to frostbite.

Clarion University Health Services reports only one case of frostbite and one case of heat exhaustion since 2012. However, Health Services also estimates that 20 percent of the population has co-morbid conditions, such as asthma or allergies, cardiac conditions, immune suppression, pregnancy, etc., which would affect or exacerbate a weather-related injury. Health Services also estimates that approximately 30 percent of the population experiences situational adjustment disorder, general anxiety disorder, etc., which would also potentially increase their risk for weather-related injuries.

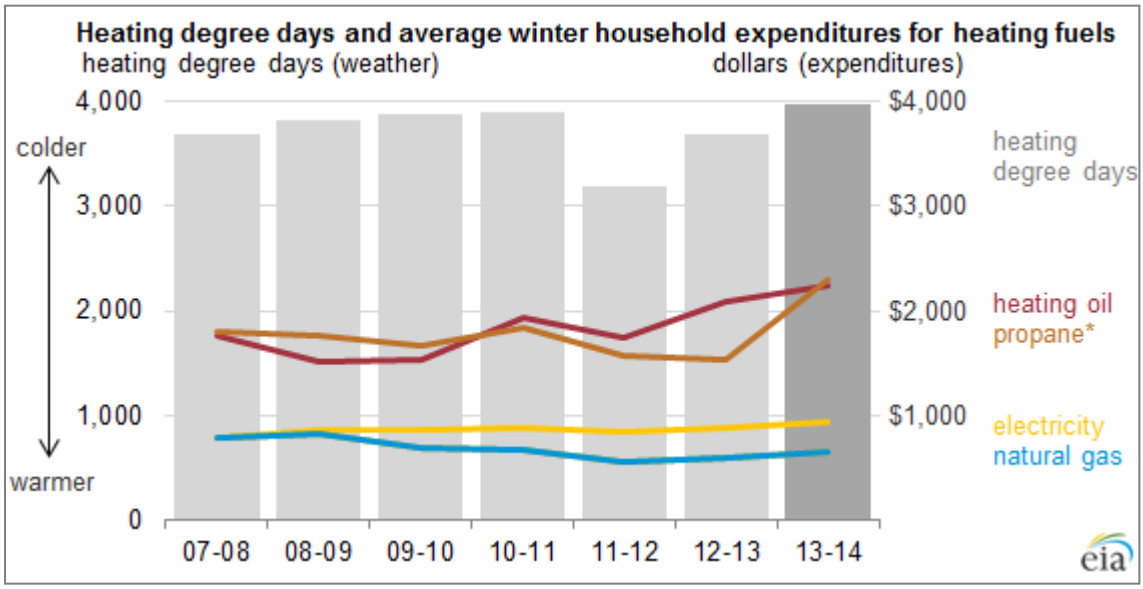
Extreme temperatures have an impact on more than just human health. They can also affect economic costs in transportation, agriculture, production, energy, and infrastructure. Transportation can be influenced by temperature in several ways. Most applicable to the University would be that highways and roads are damaged through excessive heat, which causes asphalt roads to soften. Concrete roads can

explode, lifting large chunks of concrete off the ground. During a heat wave in 1980, hundreds of miles of highways buckled. Excessive heat also places stress on automobile cooling systems, diesel trucks, and locomotives, causing an increase in mechanical failures, and airplanes lose lift at high temperatures. Extreme cold also impacts transportation, as it stresses diesel engines, gels fuel, and stresses vehicle batteries. Metal bridge structures can also be negatively impacted by severe cold.

Although the University is not an agricultural community, Clarion County's economy includes a significant agricultural base. Additionally, negative impacts to agriculture can lead to an increase in food costs and other economic expenditures necessary to the University. Extreme heat kills large numbers of livestock, particularly poultry, pigs, and rabbits. Milk production also decreases during heat waves. Depending on the time of year, heat can also impact crop yields for wheat, rice, corn, potato and soybeans. Cold snaps, particularly in the growing season, also significantly affect crop yields and livestock. Heat also raises water temperature, both degrading water quality and negatively impacting fish populations and aquatic ecosystems.

Extreme temperatures also play a powerful role in energy consumption. Added demand for air conditioning or heat during a heat wave or cold snap impacts the economy and can cause system overloads or rolling blackouts. Additionally, transmission lines will sag or overheat in high temperatures. After the extremely cold, prolonged winter in 2014, the U.S. Energy Information Administration (EIA) estimated that average heating days were 13 percent higher than last winter (indicating colder weather) and 10 percent above the 10-year average. The extreme weather had the greatest effect on households in the Midwest that primarily use propane and on households in the Northeast that use heating oil. The current estimate for average U.S. expenditures for homes using heating oil is $2,243, which is $197 higher than projected in October.

Figure 4.3.2-3 Heating Degree Days vs. Costs on Heating Fuel



SOURCE: EIA, 2014

Infrastructure is another major area greatly influenced by extreme temperatures. During a heat wave, bridges and metal structures are susceptible to heat failure. While water will be used to cool these

structures, this can cause a reduced water supply and pressure in many areas. At the other end of the spectrum, extreme cold can cause ground-freezing issues, especially notable when there is little to no snow cover. Of greatest potential infrastructure impact to the University is the potential for water pipes to burst, causing ice problems and loss of water pressure, as well as public health and safety issues.

4.3.2.3 *Past Occurrences*

As mentioned above, extreme temperatures do not often get a lot of publicity despite their deadly nature. One of the most deadly heat waves occurred a little over 10 years ago, during the summer of 2003 in Europe, killing over 30,000 people. Switzerland broke a 250-year record in June 2003 for the hottest month ever recorded, and Great Britain set its hottest day ever recorded on August 10, 2003, at 100.2°F. Daily highs for temperatures in central and southern Europe ranged from 95°F–104°F. Climatologists concluded that the summer of 2003 was the hottest in Europe in over 500 years.

Through the State Climate Extremes Committee (SCEC) and National Climate Extremes Committee (NCEC), NOAA tracks the climactic extremes for severe weather events, including temperature. The following table demonstrates temperature extremes for Pennsylvania and the U.S.

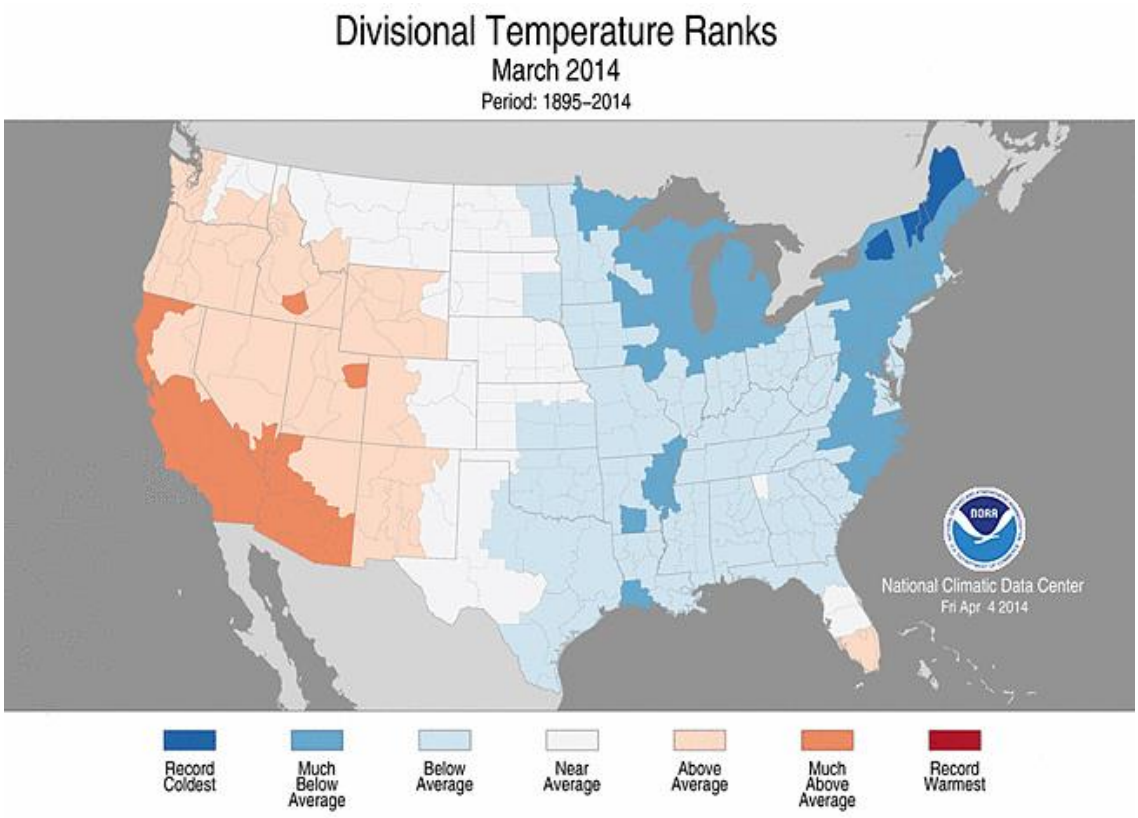
Table 4.3.2-1 State and National Temperature Records

RECORD LEVEL	RECORD TYPE	LOCATION	DATE	TEMPERATURE
SCEC	Pennsylvania Maximum Temperature	Phoenixville, PA	July 9–10, 1936	111°F
SCEC	Pennsylvania Minimum Temperature	Smethport, PA	January 5, 1904	-42°F
NCEC	National Maximum Temperature	Greenland Ranch, CA	July 10, 1913	134°F
NCEC	National Minimum Temperature	Prospect Creek, AK	January 23, 1971	-80°F
NCEC	Maximum 24-hour change	Loma, MT	January 14–15, 1972	103°F

SOURCE: NOAA, 2014

In contrast, temperatures at Clarion University and in Clarion County, PA, typically fluctuate between a little less than 18°F and less than 80°F, depending on the time of year. Additionally, as evidenced by NCDC records, the winter months of 2014 ranked far below the average temperature, although the anomalies did not break any temperature records for the region.

Figure 4.3.2-4 Divisional Temperature Ranks



SOURCE: NCDC, 2014

4.3.2.4 *Future Occurrences*

Extreme cold and hot temperatures will continue to impact the Clarion University campus. Although the frequency of heat waves and cold waves cannot currently be definitively predicted with long-range forecasts, meteorologists can identify frequent trends and likely temperature ranges based on regional historical data and upcoming weather conditions.

Certain extreme weather and temperature are expected to continue to become more frequent, and although there is much debate over the issue of climate change, many leading experts are concerned about a potential warming of the Earth. According to the U.S. Climate Change Science Program and NOAA, "most of North America has been experiencing more unusually hot days and nights, fewer unusually cold days and nights and fewer frost days. Heavy downpours have become more frequent and intense. Droughts are becoming more severe in some regions." (2008)

As a result, NOAA developed the North American Climate Extremes Monitoring (NACEM) tool to improve the understanding of observed changes in extreme climate conditions by facilitating the ability to analyze and examine trends and occurrences of certain types of extreme or threshold events at the station-by-station level. The NACEM calculates each available index at the station-level and provides corresponding anomalies, data permitting, with respect to the 1961–90 long-term average. The tool is designed to be interactive, allowing users to select a month, season, or specific year (from 1955 to present) to view graphics for a specific index or station of interest.

4.3.2.5 *Vulnerability Assessment*

Based on available information, Clarion is vulnerable to the effects of extreme temperatures. The campus is vulnerable both to the direct health impacts of extreme heat and cold and to the secondary impacts on the economy, infrastructure, and energy expenditure. Road closures or building/maintenance issues caused by extreme heat or cold would potentially impact student and employee safety, as well as the ability of the University to conduct daily operations.

Despite the vulnerability to this hazard, extreme temperatures most frequently occur during winter and summer session when fewer people are on campus. Even though classes are offered during intersession periods, many of the classes are offered electronically, and the number of faculty and students on campus on a daily basis is drastically reduced. This decrease in population lessens the University's vulnerability to the hazard both because there are less people to be impacted and because there are less people utilizing roadways and in need of heat and air conditioning.

4.3.3 Flooding/Flash Flood/Ice Jam

Flooding is the temporary condition of partial or complete inundation on normally dry land, and it is the most frequent and costly of all hazards in Pennsylvania. Flooding incidents are generally the result of excessive precipitation. General flooding is typically experienced when precipitation occurs over a given river basin for an extended period of time. Flash flooding is usually a result of heavy localized precipitation falling in a short time period over a given location, often along mountain streams and in urban areas where much of the ground is covered by impervious surfaces.

The severity of a flood incident is dependent upon a combination of stream and river basin topography and physiography, hydrology, precipitation and weather patterns, present soil moisture conditions, the degree of vegetative clearing as well as the presence of impervious surfaces in and around flood-prone areas (NOAA, 2009). Winter flooding can include ice jams that occur when warm temperatures and heavy rain cause snow to melt rapidly. Snowmelt combined with heavy rains can cause frozen rivers to swell, which breaks the ice layer on top of a river. The ice layer often breaks into large chunks, which float downstream, piling up in narrow passages and near other obstructions such as bridges and dams. All forms of flooding can damage infrastructure (USACE, 2007).

4.3.3.1 *Location and Extent*

Many communities in Clarion County are located along stream and creek valleys throughout the County. The waterways most prone to flooding in Clarion County include the Allegheny River, Clarion River, Redbank Creek, Piney Creek, Deer Creek and Trout Run, and the main flood season typically runs from December to April. Although Clarion University does not generally flood, it is less than a mile from the Clarion River and the surrounding municipality of Clarion Borough can flood. Clarion University's secondary Venango campus is also vulnerable to flooding due to its very close proximity to the Allegheny River. In fact, the Venango campus is less than 700 feet from the river.

Excess water from snowmelt or rainfall accumulates and overflows onto stream banks and adjacent floodplains. Floodplains are lowlands adjacent to rivers, streams, and creeks that are subject to recurring floods. The size of the floodplain is described by the recurrence interval of a given flood. Flood recurrence intervals are explained in more detail in the Future Occurrence section below.

When assessing the potential spatial extent of flooding, it is important to know that a floodplain associated with a flood that has a 10 percent chance of occurring in a given year is smaller than the floodplain associated with a flood that has a 0.2 percent annual chance of occurring. Community development of the floodplain has resulted in frequent flooding in these areas.

The NFIP, for which Flood Insurance Rate Maps (FIRMs) are published, identifies the 1 percent-annual-flood chance. This 1 percent-annual-chance flood incident is used to delineate the Special Flood Hazard Area (SFHA) and identify Base Flood Elevations. Figure 4.3.3-1 illustrates these terms. The SFHA serves as the primary regulatory boundary used by FEMA, the Commonwealth of Pennsylvania, and Clarion County's local governments, including Clarion Borough, which controls the land owned by the University.

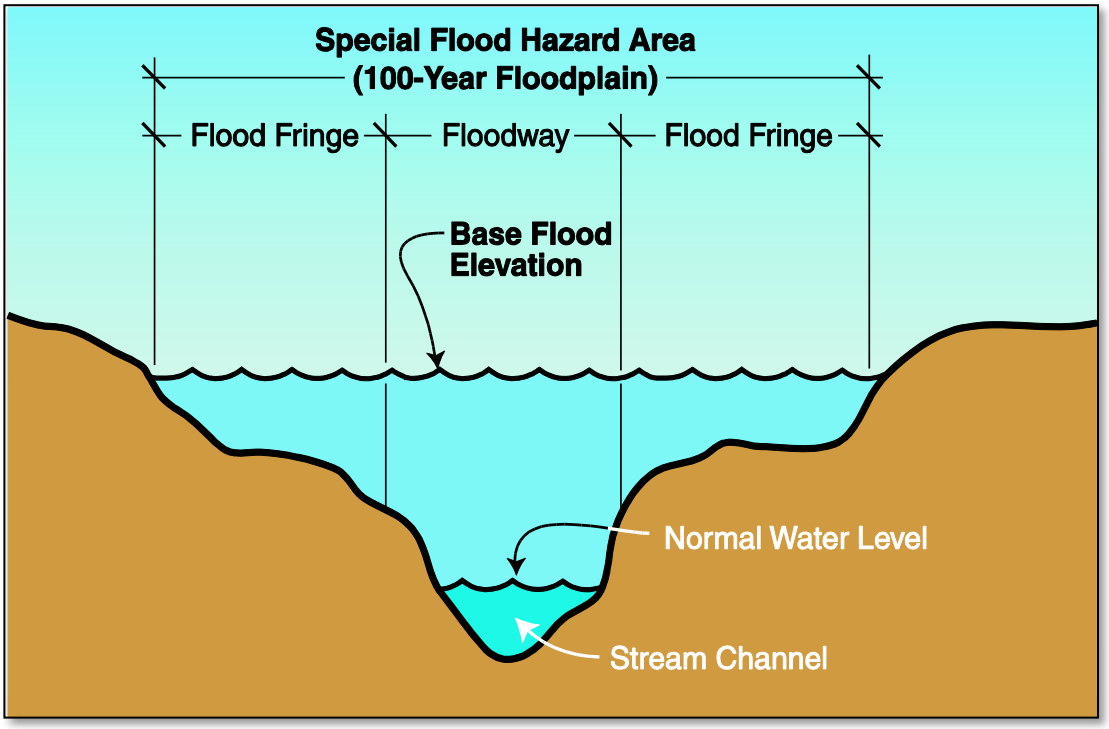


Figure 4.3.3-1 SFHA, 1 Percent–Annual–Chance (100-Year) Floodplain, Floodway, and Flood

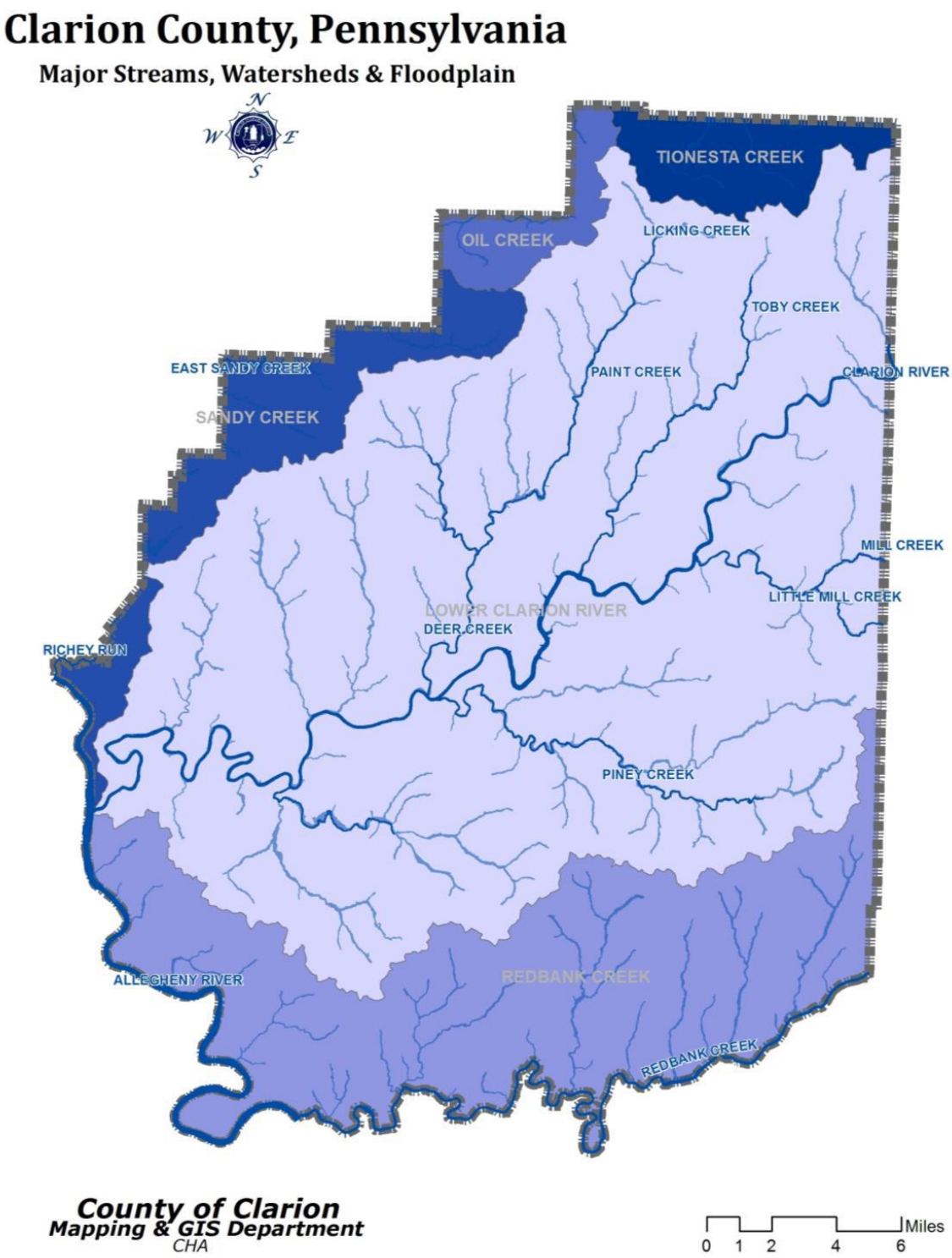
The effective, Countywide Digital Flood Insurance Rate Maps (DFIRMs) were released for Clarion County and all communities on December 2, 2011 and revised on December 9, 2014. All communities within the County, including Clarion Borough, are now shown on a single set of Countywide FIRMs. Prior to the publication of this digital data, flood hazard information from FEMA was available through paper FIRMs and Q3 data. Q3 Flood Data is digitized data that is developed by scanning the existing FIRM hardcopy and vectorizing a thematic overlay of flood risks. Vector Q3 Flood Data files contain only certain features from the existing FIRM hardcopy. Q3 vector data are contained in one single countywide file, including all incorporated and unincorporated areas of a county. The final FIRMs and DFIRM data for Clarion County can be obtained from the FEMA Map Service Center (http://www.msc.fema.gov). These maps can be used to identify the expected

spatial extent and elevation of flooding from a 1 percent- and 0.2 percent-annual-chance incident. In Clarion County, 30 of the 34 municipalities are flood-prone.

Figure 4.3.3-2 shows the location of watercourses and flood zones in Clarion County as identified in the DFIRM database. The location of approximate and detailed (including Base Flood Elevations) Special Flood Hazard Areas (1 percent-annual-flood chance) are shown. Flooding occurs in the major watersheds and along the major waterways in Clarion County.

The Integrated Flood Observing and Warning System (IFLOWS) was initially put into service in 1992 and continues to provide critical data to the Clarion County Emergency Management Agency, allowing much more precise and real-time monitoring of rainfall amounts and stream levels. This data is also transmitted to PEMA as well as the NWS in Pittsburgh, Pennsylvania, so that these agencies can disseminate this information to the general public in a timelier manner.

Figure 4.3.3-2 Location of Watercourses and Flood Zones throughout Clarion County



4.3.3.2 *Range of Magnitude*

Floods are considered hazards when people and property are affected. Most injuries and deaths from flooding happen when people are swept away by flood currents, and most property damage results from inundation by sediment-filled water. A large amount of rainfall over a short time span can result in flash flood conditions. Small amounts of rain can result in floods in locations where the soil is frozen or saturated from a previous wet period or if the rain is concentrated in an area of impermeable surfaces, such as large parking lots, paved roadways, or other impervious, developed areas.

Several factors determine the severity of floods, including rainfall intensity and duration, topography, ground cover, and rate of snowmelt. Water runoff is greater in areas with steep slopes and little to no vegetative ground cover. Also, urbanization typically results in the replacement of vegetative ground cover with asphalt and concrete, increasing the volume of surface runoff and storm water, particularly in areas with poorly planned storm water drainage systems.

In the winter and early spring (February to April), major flooding has occurred as a result of heavy rainfall on dense snowpack throughout contributing watersheds. Summer floods have occurred from intense rainfall on previously saturated soils. Summer thunderstorms deposit large quantities of rainfall over a short period of time that can result in flash flood incidents, when the velocity of floodwaters has the potential to amplify the impacts of a flood incident.

Winter floods also have resulted from runoff of intense rainfall on frozen ground, and, on rare occasions, local flooding has been exacerbated by ice jams in rivers. Ice jam floods occur on rivers that are totally or partially frozen. A rise in stream stage will break up a totally frozen river and create ice flows that can pile up on channel obstructions such as shallow riffles, logjams, or bridge piers. The jammed ice creates a dam across the channel over which the water and ice mixture continues to flow, allowing for more jamming to occur.

Hurricane Agnes was the costliest hurricane to hit the United States in recorded history. Agnes developed on June 14, 1972, from the interaction of a polar front and an upper trough over the Yucatan Peninsula. Initially, the storm was a tropical depression, had strengthened to a tropical storm by June 16, and early on June 18 intensified to a hurricane. After moving inland, Agnes weakened on June 19, but then regained strength and formed into a tropical storm by June 21. The most significant effects, by far, occurred in Pennsylvania, mostly due to severe flooding. The hurricane severely flooded the Susquehanna and Lackawanna Rivers causing significant damage to the Scranton/Wilkes-Barre metropolitan area.

Following the storm, then-President of the United States Richard Nixon declared the states of Florida, Virginia, Maryland, Pennsylvania, and New York as disaster areas. Agnes had a devastating impact on the already-bankrupt railroads in the northeastern United States, as lines were washed out and shipments were delayed. The severe floods near Lawrenceville, Pennsylvania, were the catalyst for the construction of the Tioga Reservoir in 1973. The flooding in Wilkes-Barre, Pennsylvania, and the adjacent town of Kingston led to the construction of a levee system that in 2006, successfully prevented massive flooding and, in the same year, was deemed very safe and protective by the Army Corps of Engineers. The levee also protected the area from Hurricane Irene in 2011, with the water cresting just barely below the height of the structure. Conversely, the existing Kinzua Dam, built against the wishes of the Seneca Nation of

New York, spared much of Western Pennsylvania from the worst flooding, by filling the Allegheny Reservoir to capacity.

4.3.3.3 *Past Occurrence*

Clarion University is situated in a county with a long history of flooding incidents. Ten of the past 12 Presidential Disaster and Emergency Declarations affecting Clarion County have been in response to hazard incidents related to heavy rains and flooding (See Table 4.3.3-5). FEMA Disaster Declarations Summary is a summarized dataset describing all federally declared disasters. This information begins with the first disaster declaration in 1953 and features all three disaster declaration types: major disaster, emergency, and fire management assistance. The dataset includes declared recovery programs and geographic areas (county not available before 1964; Fire Management records are considered partial due to historical nature of the dataset).

Table 4.3.3-1 Declared County – Clarion

DISASTER #	PA PROGRAM DECLARED	DECLARATION DATE	DISASTER TYPE	INCIDENT TYPE	INCIDENT BEGIN DATE	INCIDENT END DATE
3235	Yes	9/10/05	EM	Hurricane	8/29/05	10/1/05
1555	No	9/19/04	DR	Severe Storm(S)	9/8/04	9/9/04
1557	Yes	9/19/04	DR	Hurricane	9/17/04	10/1/04
1485	Yes	8/23/03	DR	Severe Storm(S)	7/21/03	9/12/03
1130	Yes	7/26/96	DR	Flood	7/19/96	7/19/96
1093	Yes	1/21/96	DR	Flood	1/19/96	2/1/1996
3105	Yes	3/16/93	EM	Snow	3/13/93	3/17/93
641	Yes	6/15/81	DR	Flood	6/15/81	6/15/81
629	Yes	8/19/80	DR	Flood	8/19/80	8/19/80
3026	Yes	1/29/77	EM	Snow	1/29/77	1/29/77
340	Yes	6/23/72	DR	Flood	6/23/72	6/23/72

SOURCE: FEMA – DISASTER DECLARATIONS SUMMARY UPDATED JULY 25, 2014[6]

Table 4.3.3-6 lists flood and flash flood incidents from 1996 to 2014 obtained from the NCDC database. Each incident includes the date of the occurrence, a brief description of the incident, and the location where the incident occurred. In most cases, a majority of the incidents affected the entire county, and therefore were classified as countywide events.

[6] Dataset is the official FEMA Disaster Declarations. The dataset was accessed November 5, 2014, and retrieved from FEMA.gov. FEMA and the Federal Government cannot vouch for the data or analyses derived from these data after the data have been retrieved from the Agency's website(s) and/or Data.gov.

Table 4.3.3-2 Flood and Flash Flood Incidents Impacting Clarion County ("Countywide" Indicates That Several Locations in the County Were Affected)	
DATE	**LOCATION AND DESCRIPTION**
1/19/1996	Countywide. Numerous small streams and some roads were flooded across the county.
1/19/1996	Countywide. The first of what eventually became numerous large ice jams were reported by ice observers on the Allegheny River and its tributaries by December 26. This abnormally early ice development continued to build as frigid temperatures persisted. Early on the morning of the 19th, the river level at Lock 9, Rimer, Pennsylvania, quickly rose 9 feet. The water was from an upstream ice jam that had broken. Ice and flood waters from its tributaries continued and led to moderate to major flooding along the Allegheny River to Pittsburgh. Property damages for Clarion County include flooding on the Clarion River. Damages for Allegheny are totaled under the flood description for the Monongahela River.
7/19/1996	Countywide. In response to very heavy rains across parts of the Allegheny River Basin, the Allegheny River went above flood stage between Lock 9 and Lock 3. The river crested 3.5 feet above the 19-foot flood stage at Lock 9. A bit upstream in East Brady, a few boats broke loose from their moorings and some docks were damaged. Further downstream to Lock 3, the river crested much lower, less than 2 feet above flood stage at all points.
7/19/1996	Countywide. After heavy thunderstorm rains pounded the region, producing extensive flash flooding, especially in Clarion and Jefferson Counties, flooding continued for several more hours.
2/5/1997	Fairmount City. Red Bank Creek, between Fairmount City and New Bethlehem, went out of its banks due to ice jams. Water began to flood Route 28 and within 1 1/2 hours later, the road was closed in the New Bethlehem area. Ice was reported up to the top of the guardrails at Water Street. The ice jam then broke and the ice was flushed downstream before daybreak. The water levels then receded.
1/24/1999	Countywide. The Clarion River at Cooksburg briefly rose to its flood stage of 13.0 feet on the morning of the 24th. By the early evening of the 24th, the river fell back below flood stage. Only localized minor flooding occurred, with no damage reported.
8/26/2001	Lucinda. Several slow-moving thunderstorms passing over northern Clarion County produced rainfall totals of well over 2 inches. One rain gage in the Lucinda area measured 4.5 inches; another in the Fryburg area measured 4.27 inches. Several reports of basement flooding were received from this sparsely populated area.
4/15/2002	Rimersburg. Heavy thunderstorm rains temporarily flooded portions of State Highway 68 near Rimersburg and State Highway 861 between Rimersburg and New Bethlehem.
5/12/2002	Mechanicsville. Thunderstorm rains produced roadway flooding along State Highway 66, just south of Interstate 80.
6/12/2003	St. Petersburg. Numerous roads flooded.
7/27/2003	Sligo. Glade Run Rd flooded near Frogtown. Olean Rd flooded in Frogtown. Flooding in Sligo first reported 826 PM EDT. Many roads remained flooded into the morning of the 28th.
8/7/2003	Lucinda. Road flooded in Clarion. Route 66 flooded between Shippenville and Lucinda.
8/26/2003	Hawthorne. Routes 28, 66, and 68 flooded.
9/1/2003	Shippenville. Route 208 flooded.
9/1/2003	Strattanville. Road flooded.
11/19/2003	Sligo. Roads flooded.
8/28/2004	Countywide. About 5 miles northwest of Knox, Shatler and Macklehatten Rds were closed by flooding.

Table 4.3.3-2 Flood and Flash Flood Incidents Impacting Clarion County ("Countywide" Indicates That Several Locations in the County Were Affected)	
DATE	**LOCATION AND DESCRIPTION**
9/9/2004	Countywide. At 132 AM EDT on 9th, Rte 208 flooded near Shippenville; Huey Rd flooded 4 miles south of Sligo; and Rte 58 flooded 6 miles west of Sligo. Some roads were still flooded as of 8 AM EDT on 9th. Clarion River at Cooksburg (northeast corner of Clarion Co) rose to flood stage (13 ft) at 4 PM EDT on 9th; crested at 13.4 at 6 PM on 9th; and fell below flood stage 11 PM EDT on 9th. (FRANCES)
1/6/2005	Countywide. By 10 AM on 6th, a few roads had minor flooding; some basements flooded.
7/5/2005	Limestone. Rte 66 flooded.
6/22/2006	Countywide. Numerous roads flooded throughout the county.
7/21/2006	Sligo. Rtes 58, 68, and 368 closed because of flooding.
7/30/2006	Foxburg. At 555 PM EDT, streams were over their banks, flooding several roads. Radar indicated 3 inches of rain in 3 hrs. By 640 PM EDT, Canoe Road in Callensburg was closed by flooding.
3/15/2007	New Bethlehem. Red Bank Creek flooded side streets in New Bethlehem.
7/9/2010	Emergency management reported flash flooding in downtown Clarion with North 5th Street and South Street closed.
3/11/2011	Scotch Hill area flooded.
6/27/2013	Shannondale. Emergency manager reported a roadway flooded near its intersection with Shannondale Road.
7/10/2013	Shippenville. Emergency management reported flash flooding on Paint Blvd.
7/18/2013	Tylersburg. The public reported Sunny Drive closed due to flash flooding.

In addition to its main campus, Clarion University also has a secondary campus in Oil City, Venango County. This secondary campus is very vulnerable to flooding. The history of flooding for Oil City, as reported to the NCDC, is listed below.

Table 4.3.3-3 Flood and Flash Flood Incidents Impacting Oil City, Venango County	
DATE	**DESCRIPTION**
1/18/1996	Ice jams along Oil Creek between Oil City and north of Rouseville caused extensive low-land flooding. Route 8 was closed due to flooding. The jam at Oil City at the mouth of Oil Creek extended up to one mile upstream at the height of the jam. The subsequent release of the water behind the jam contributed to further major flooding along the Allegheny River. Widespread flooding of small streams and creeks continued into the early morning hours of the 20th before the water receded. Most of the damage was related to ice jam flooding. A beer distributor had a hole ripped into a building a beer kegs spilled into the river. Over 40 homes had their basements flooded. A bridge was also damaged due to the ice.
1/19/1996	Flooding between Oil City and Rouseville continued. Other small streams and creeks went out of their banks across the county.
1/19/1996	Widespread flooding of small streams and creeks continued into the early morning hours of the 20th before the water receded. Most of the damage was related to ice jam flooding. A beer distributor had a hole ripped into a building and beer kegs spilled into the Oil Creek, a tributary of the Allegheny River. Over 40 homes had their basements flooded. A bridge was also damaged due to the ice.
7/19/1996	Countywide flooding.
9/28/1996	Shaffer Run near Reno went out of its banks. Sage Run, south of Oil City, went out of its banks.

Table 4.3.3-3 Flood and Flash Flood Incidents Impacting Oil City, Venango County	
DATE	**DESCRIPTION**
1/23/1997	Ice began to build up on the Allegheny Rivers and its tributaries since January 11th. Below zero temperatures on the 18th and 19th rapidly increased ice development. On the morning of the 23rd, ice began to move out of Oil Creek, a tributary of the Allegheny River, and became jammed downstream near the mouth of the Allegheny River. Low-lying areas and some basements in Oil City flooded as water levels behind the jam rose. Three homes and a couple of businesses were also evacuated. The ice began to break up and water levels fell early in the afternoon.
8/2/2000	Roadway flooding was reported along State Highway 8 in the Oil City area. In the Sugarcreek area, several local roads were partially flooded.
7/22/2003	Creeks caused flooding.
5/20/2004	At 920 PM EDT, flooding was reported at Buckston Rd. and Rte 8. By 1045 PM, flooding occurred at Rte 220 and Russell Corners Rd, and Route 8 at Petroleum Center Rd.
9/17/2004	At 4 PM EDT on 17th, Moon Run Rd flooded in Oil City. 656 PM, 3.1 inches of rain 5 miles east of Oil City. (IVAN)
6/10/2005	Several roads flooded.
8/29/2006	By 713 AM EDT, Sage Run overflowed and flooded Rte 62 near Oil City; and buildings were flooded in Franklin. By 920 AM EDT, the town of Polk was flooded; about 50 homes received major damage. People were chest deep in water and had to be rescued. When water began spilling over the top of the earthen Piffer Dam, 250 people were evacuated. Other roads in the southwest part of Venango County were closed or washed out. By 8 AM EDT, the city of Franklin declared a disaster: the water treatment plant was flooded. Rte 62 remained closed, because of flooding, from Franklin to the Mercer County line. A manufacturing plant was flooded by 830 AM EDT. A gas station was flooded. A bridge was washed out on Deep Hollow Rd. 20 people had to be rescued. Polk and other parts of Venango County remained flooded until at least 5 PM EDT. Rain gauge in Polk recorded 3.2 inches of rain in 2 hours.
3/15/2007	Flooding caused several roads to be closed with streams and creeks out of their banks.
2/11/2009	An ice jam on Oil Creek at the Allegheny River confluence was causing road flooding in Oil City. The ice jam broke in a few hours.
2/18/2011	An ice jam at the mouth of Oil Creek caused a rapid rise in water levels with ice and water backed up to near SR 8 in Oil city. The jam broke and went into the Allegheny River after about an hour.
2/21/2014	Emergency management reported ice jam flooding on Oil Creek extending to the confluence with the Allegheny River. Numerous homes were impacted along Seneca Street.

In addition to the aforementioned past flood incidents, the NFIP identifies properties that frequently experience flooding. Repetitive loss properties are structures insured under the NFIP that have had at least two paid flood losses of more than $1,000 over any 10-year period since 1978. A property is considered a severe repetitive loss property either when there are at least four losses (each exceeding $5,000) or when there are two or more losses where the building payments exceed the property value.

As of 2013, there were nine repetitive loss properties in Clarion County (Clarion County HMP, 2013). These repetitive loss properties are located in two municipalities; however, neither Clarion Borough nor the University has any repetitive loss properties or SRL properties.

Floods are the most common and costly natural catastrophe in the United States. In terms of economic disruption, property damage, and loss of life, floods cause a tremendous economic impact. For that reason, flood insurance is almost never available under industry-standard homeowner's and renter's

policies. The best way for citizens to protect their property against flood losses is to purchase flood insurance through the NFIP. Congress established the NFIP in 1968 to help control the growing cost of federal disaster relief. The NFIP is administered by FEMA, part of the U.S. Department of Homeland Security. The NFIP offers federally backed flood insurance in communities that adopt and enforce effective floodplain management ordinances to reduce future flood losses.

Since 1983, the chief means of providing flood insurance coverage has been a cooperative venture of FEMA and the private insurance industry known as the Write Your Own (WYO) Program. This partnership allows qualified property and casualty insurance companies to "write" (i.e., issue) and service the NFIP's Standard Flood Insurance Policy (SFIP) under their own names. Today, nearly 90 WYO insurance companies issue and service the SFIP under their own names. More than 4.4 million federal flood insurance policies are in force. These policies represent $650 billion in flood insurance coverage for homeowners, renters, and business owners throughout the United States and its territories.

The NFIP provides flood insurance to individuals in communities that are members of the program. Membership in the program is contingent on the community adopting and enforcing floodplain management and development regulations. The NFIP is based on the voluntary participation of communities of all sizes. In the context of this program, a "community" is a political entity – whether an incorporated city, town, township, borough, village, or an unincorporated area of a county or parish – that has legal authority to adopt and enforce floodplain management ordinances for the area under its jurisdiction.

National Flood Insurance is available only in communities that apply for participation in the NFIP and agree to implement prescribed flood mitigation measures. Newly participating communities are admitted to the NFIP's Emergency Program. Most of these communities quickly earn "promotion" to the Regular Program. The Emergency Program is the initial phase of a community's participation in the NFIP. In return for agreeing to adopt more comprehensive floodplain management measures, an Emergency Program community can be "promoted" to the Regular Program. Local policyholders immediately become eligible to buy greater amounts of flood insurance coverage. In Clarion County, 30 municipalities are participating in the NFIP Regular Program. The minimum floodplain management requirements include the following:

- Review and permit all development in the SFHA
- Elevate new and substantially improved residential structures above the Base Flood Elevation
- Elevate or dry flood proof new and substantially improved nonresidential structures
- Limit development in floodways
- Locate or construct all public utilities and facilities so as to minimize or eliminate flood damage
- Anchor the foundation or structure to resist floatation, collapse, or lateral movement

In addition, Regular Program communities are eligible to participate in the NFIP's Community Rating System (CRS). Under the CRS, policyholders can receive premium discounts of 5 to 45 percent as their cities and towns adopt more comprehensive flood mitigation measures. Currently, Clarion Borough does not participate in CRS. CRS rewards those communities that establish floodplain management programs that go beyond NFIP minimum requirements by providing discounts on flood insurance premiums. Under

the CRS, communities receive credit for activities falling into four categories: public information, mapping and regulations, flood damage reduction, and flood preparedness.

The CRS was implemented in 1990 to recognize and encourage community floodplain management activities that exceed the minimum NFIP standards. Section 541 of the 1994 Act amends Section 1315 of the 1968 Act to codify the CRS in the NFIP, and expands the CRS goals to specifically include incentives to reduce the risk of flood-related erosion and to encourage measures that protect natural and beneficial floodplain functions. These goals have been incorporated into the CRS, and communities now receive credit toward premium reductions for activities that contribute to them.

There are 10 CRS classes that provide varied reductions in insurance premiums. Class 1 requires the most credit points and gives the largest premium reduction; Class 10 receives no premium reduction. CRS premium discounts on flood insurance range from 5 percent for Class 9 communities up to 45 percent for Class 1 communities.

The table below lists the municipalities whose participating in the NFIP most impact the University. The table shows whether the municipality participates in the NFIP along with the date of the initial FIRM and the current effective map date.

Table 4.3.3-4 Clarion University Relevant Municipality NFIP Participation

COMMUNITY	PARTICIPATION STATUS	COMMUNITY IDENTIFICATION	INITIAL FIRM IDENTIFIED	CURRENT EFFECTIVE MAP DATE
Clarion Borough, Clarion County	**Participating**	**421500#**	**11/29/1974**	**12/2/2011**
Oil City, Venango County	**Participating**	**420837#**	**11/30/1973**	**1/16/2014**

SOURCE: FEMA.GOV, 2014

4.3.3.4 *Future Occurrence*

In the areas around Clarion University and the Venango campus, flooding occurs commonly and can occur during any season of the year. Therefore, the future occurrence of floods at or near the University can be considered *likely* as defined by the Risk Factor Methodology probability criteria. Floods are described in terms of their extent (including the horizontal area affected and the vertical depth of floodwaters) and the related probability of occurrence. The NFIP uses historical records to determine the probability of occurrence for different extents of flooding. The probability of occurrence is expressed in percentages as the chance of a flood of a specific extent occurring in any given year.

The NFIP recognizes the 1 percent-annual-chance flood, also known as the base flood, as the standard for identifying properties subject to federal flood insurance purchase requirements. A 1 percent-annual-chance flood is a flood that has a 1 percent chance of occurring over a given year. The DFIRMs are used to identify areas subject to the 1 and 0.2 percent-annual-chance flooding. Areas subject to 2 percent- and 10 percent-annual-chance incidents are not shown on maps; however, water surface elevations associated with these incidents are included in the flood source profiles contained in the Flood Insurance Study Report. Table 4.3.3-5 shows a range of flood recurrence intervals and associated probabilities of occurrence.

Table 4.3.3-5 Recurrence Intervals and Associated Probabilities of Occurrence	
RECURRENCE INTERVAL	CHANGE OF OCCURRENCE IN ANY GIVEN YEAR (%)
10 years	10
50 years	2
100 years	1
500 years	0.2

4.3.3.5 *Vulnerability Assessment*

Clarion University is vulnerable to flooding that causes loss of lives, property damage, and road closures. Floodwater damages that occur to agricultural, urban, and other properties such as roads, bridges, and utilities are projected to increase when there is development in flood-prone lands.

For purposes of assessing vulnerability, the University focused on community assets that are located in the 1 percent-annual-chance floodplain. While greater and smaller floods are possible, information about the extent and depths for this floodplain is available for all communities in Clarion County, thus providing a consistent basis for analysis. The flood vulnerability map for Clarion Borough, showing the 1 percent-annual-chance flood hazard area, addressable structures, critical facilities, and transportation routes within it, can be seen in Figure 4.3.3-3.

Clarion University's Main Campus is not in the direct zone prone to flooding; however, it could potentially be vulnerable to secondary effects stemming from severe flooding, such as traffic issues, outages of critical services, and loss of ingress and egress to certain areas of the city.

The approximate 1 percent annual chance flood zones A and detailed 1 percent annual chance flood zones AE for the Venango branch campus are illustrated in Figure 4.3.3-4. The Venango Branch campus is vulnerable to flooding as a result of its proximity to the Allegheny River. In addition, a smaller stream that flows perpendicular and above the campus could potentially cause flooding in extreme inundation situations.

Figure 4.3.3-3 Clarion Borough Flood Vulnerability Map

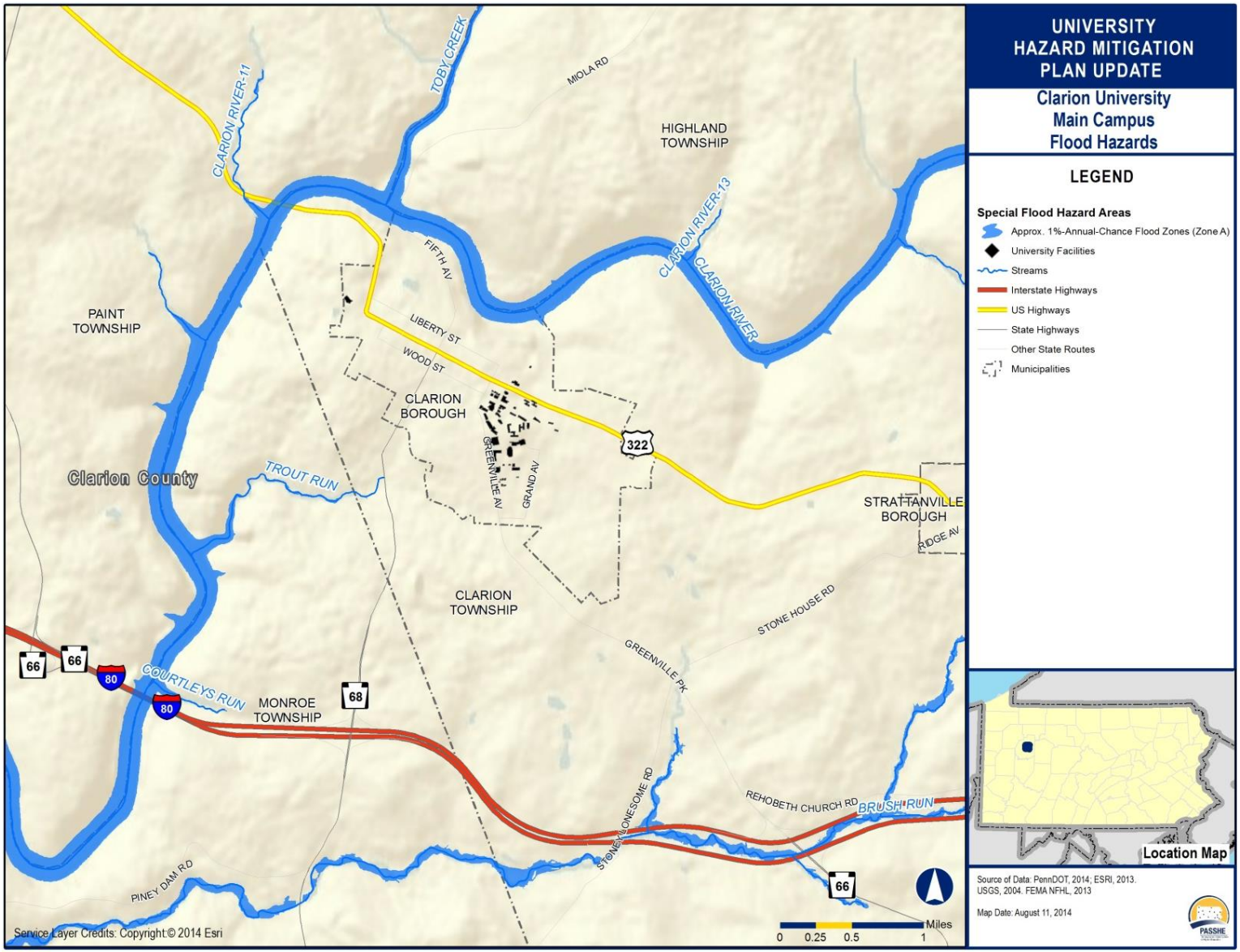


Figure 4.3.3-4 Clarion University – Venango Branch Flood Hazards

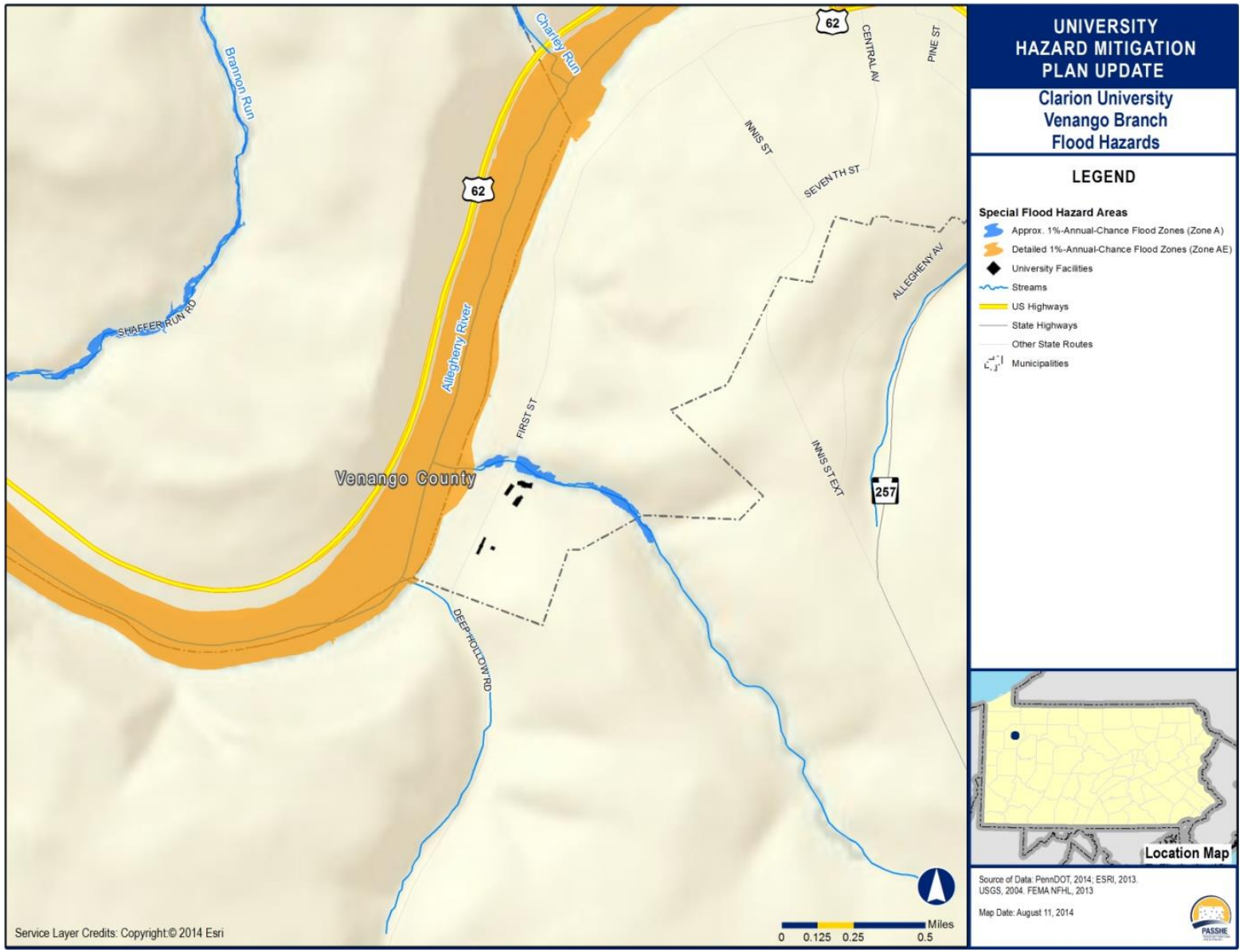


Table 4.3.3-6 displays the number of buildings intersecting the SFHA in each municipality in Clarion County, with Clarion Borough being bolded due to its impact on the University. Although some municipalities have no vulnerable buildings in the SFHA, Clarion Borough does have 10 buildings. All of these buildings, however, are residential properties and, therefore, do not include the University.

Table 4.3.3-6 Clarion County Structures within the Floodplain

MUNICIPALITY	RESIDENTIAL	COMMERCIAL	TOTAL
Ashland Township	0	0	0
Beaver Township	8	1	9
Brady Township	0	0	0
Callensburg Borough	0	0	0
Clarion Borough	**10**	**0**	**10**
Clarion Township	22	1	23
East Brady Borough	6	0	6
Elk Township	2	1	3
Farmington Township	9	1	10
Foxburg Borough	1	1	2
Hawthorn Borough	3	1	4
Highland Township	27	0	27
Knox Borough	0	0	0
Knox Township	2	1	3
Licking Township	2	0	2
Limestone Township	34	3	37
Madison Township	16	0	16
Millcreek Township	5	0	5
Monroe Township	9	1	10
New Bethlehem Borough	22	45	67
Paint Township	24	0	24
Perry Township	16	0	16
Piney Township	6	1	7
Porter Township	2	2	4
Redbank Township	29	9	38
Richland Township	1	0	1
Rimersburg Borough	0	0	0
Salem Township	0	0	0

Table 4.3.3-6 Clarion County Structures within the Floodplain			
MUNICIPALITY	RESIDENTIAL	COMMERCIAL	TOTAL
Shippenville Borough	0	0	0
Sligo Borough	20	0	20
St. Petersburg Borough	0	0	0
Strattanville Borough	0	0	0
Toby Township	4	1	5
Washington Township	5	0	5
TOTALS	285	69	354

According to HAZUS, critical facilities are defined as bus facilities, medical care facilities, communications towers, dams, electric power facilities, emergency operations facilities, fire stations, hazardous materials sites, highway bridges, oil facilities, police stations, port facilities, potable water facilities, rail facilities, rail bridges, schools, and wastewater facilities.

Businesses and other facilities are listed as critical facilities based on County or municipal needs and impacts should these facilities become affected by a flood or other major event.

Table 4.3.3-7 displays the number of critical facilities that are located in Clarion County by facility purpose. The University is considered a critical facility by the County; however, based on the 2013 County HMP, University buildings have never suffered any disaster-related loss, including flooding issues.

Table 4.3.3-7 Critical Facilities in Clarion County		
TYPE OF FACILITY	NUMBER OF FACILITIES	NUMBER SUFFERING LOSSES IN PREVIOUS DISASTERS
Power facilities	1 Hydro-electric Dam	0
Water facilities	15	1
Sewage and Wastewater	13	0
Communications	16	0
Education	19 School Buildings	2
	44 Clarion University Buildings	0
Emergency Medical Care	10	0
Fire Protection/Emergency Services	6 EMS Stations	1
	16 Fire Stations	0
	6 Law Enforcements Stations	0
COUNTY TOTAL	136	4

Additional information on flood vulnerability and losses at Clarion University, including the 1 percent-annual-chance flood incident results from HAZUS, FEMA's loss estimation software, the number of parcels vulnerable to flood hazards, and the assessed value of vulnerable parcels, is provided in the Potential Loss Estimates section.

4.3.4 Hurricane, Nor'easter

Hurricanes, tropical storms, and nor'easters are classified as cyclones and are any closed circulation developing around a low-pressure center in which the winds rotate counter-clockwise (in the Northern Hemisphere) and whose diameter averages 10 to 30 miles across. The majority of hurricanes and tropical storms form in the Atlantic Ocean, Caribbean Sea, and Gulf of Mexico during the official Atlantic hurricane season (June through November) (FEMA, 1997).

4.3.4.1 *Location and Extent*

Although Clarion University does not have any open-ocean coastline and is over 300 miles or five hours by car from the beach, the impacts of coastal storm systems such as hurricanes, tropical storms, and nor'easters can extend well inland.

Tropical storm systems (i.e., hurricanes, tropical storms, tropical depressions) impacting Pennsylvania and the Mid-Atlantic Region develop in tropical or subtropical waters of the Atlantic Ocean, Gulf of Mexico, or Caribbean Sea. Nor'easters are extra-tropical storms that typically develop from low-pressure centers off the Atlantic Coast north of North Carolina during the winter months. Extra-tropical is a term used to describe a hurricane or tropical storm whose cyclone has lost its tropical characteristics. While an extra-tropical storm determines the change in weather pattern and how the storm is gathering energy, it may still have winds that are tropical storm or hurricane force.

4.3.4.2 *Range of Magnitude*

Intense precipitation and wind resulting in flood and wind damage are the most common impacts associated with coastal storm systems in Pennsylvania. Nor'easters develop as extra-tropical cyclonic weather systems over the Atlantic Ocean and are capable of producing winds equivalent to hurricane or tropical storm force; precipitation from these storms may also come in the form of heavy snow or ice and produce blizzard conditions.

Tropical cyclones with maximum sustained winds of less than 39 miles per hour (mph) are called *tropical depressions*. A *tropical storm* is a cyclone with maximum sustained winds between 39 and 74 mph. These storms sometimes develop into *hurricanes* with wind speeds in excess of 74 mph. The impacts associated with hurricanes and tropical storms are primarily wind damage and flooding. It is not uncommon for tornadoes to develop during these events. Although hurricanes have not had any direct impacts on the University historically, there still exists the possibility that the University will receive more intense rainfall, damaging floods, northeast winds, and waterlogged soils that can impact road safety and utility continuation. In addition, a severe enough storm will have a strong economic impact on the region and can thus affect Clarion University indirectly.

The impact that tropical storm or hurricane events have on an area is typically measured in terms of wind speed. Expected damage from hurricane-force winds is measured using the Saffir-Simpson Scale. The

Saffir-Simpson Scale categorizes hurricane intensity linearly based upon maximum sustained winds, barometric pressure, and storm surge potential, which are combined to estimate potential damage. Table 4.3.4-1 lists Saffir-Simpson Scale categories with associated wind speeds and expected damages. Categories 3, 4, and 5 are classified as "major" hurricanes. While major hurricanes make up only 20 percent of all tropical cyclones making landfall, they account for over 70 percent of the damage in the United States.

Table 4.3.4-1 Saffir-Simpson Hurricane Scale

SCALE NUMBER (CATEGORY)	SUSTAINED WINDS (MPH)	DAMAGE	STORM SURGE
1	**74–95**	Minimal: Unanchored mobile homes, vegetation, and signs.	4–5 feet
2	**96–110**	Moderate: All mobile homes, roofs, small crafts, flooding.	6–8 feet
3	**111–130**	Extensive: Small buildings, low-lying roads cut off.	9–12 feet
4	**131–155**	Extreme: Roofs destroyed, trees down, roads cut off, mobile homes destroyed. Beach homes flooded.	13–18 feet
5	**More than 155**	Catastrophic: Most buildings destroyed. Vegetation destroyed. Major roads cut off. Homes flooded.	Greater than 18 feet

Of the past occurrences located in the following section, the most significant regional impact by a hurricane occurred in October 2012 during Hurricane Sandy. Hurricane Sandy caused massive damage along the coastline of New Jersey, New York, and Connecticut and triggered widespread power outages in the region. In Westchester County, NY, over 200,000 customers were without power for a period of a few days to over two weeks. Storm surge from the flooded sewage pump stations and wastewater treatment plants, forcing shutdown of facilities and the release of sewage into the Hudson River.

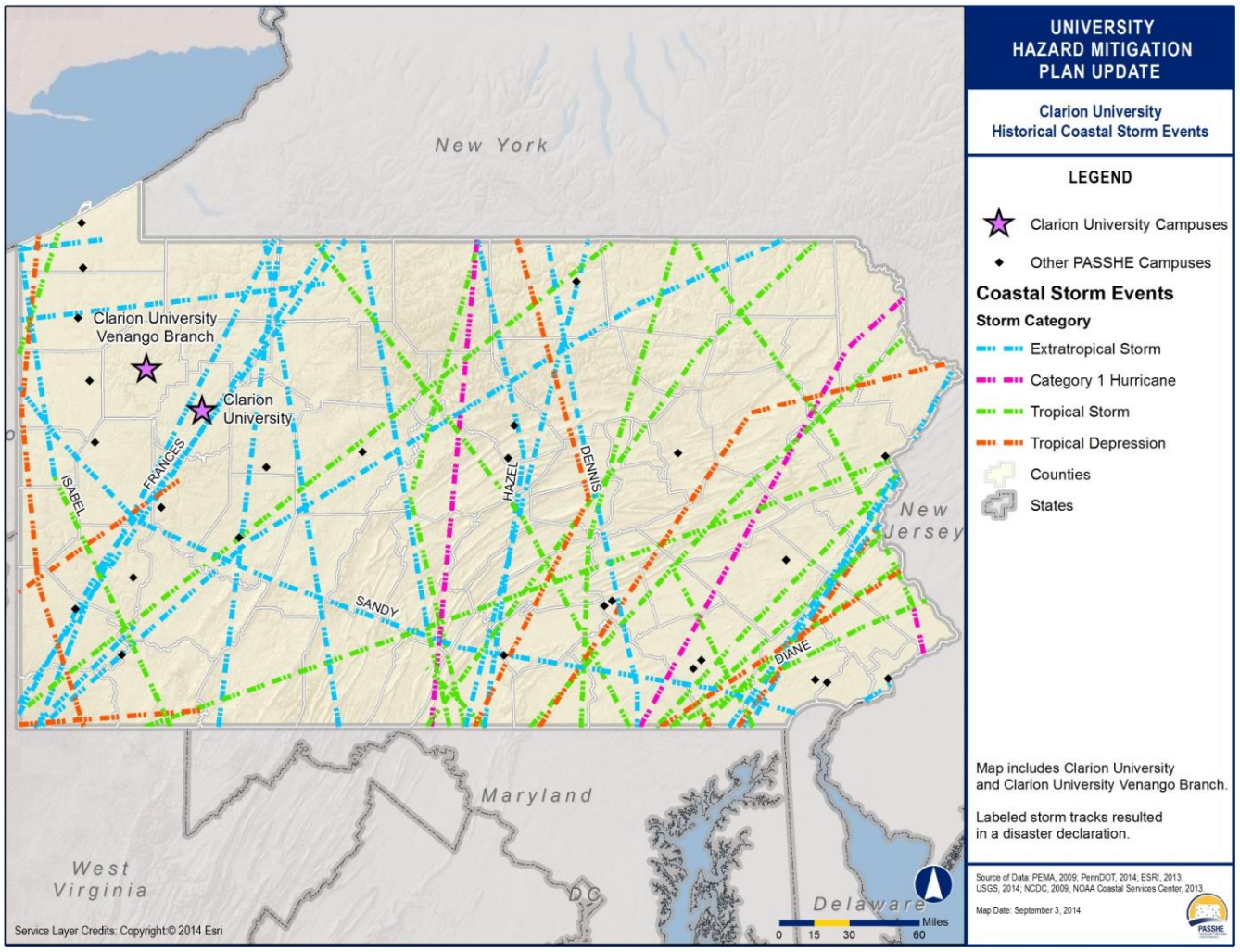
In contrast, Clarion University did not experience any direct effects from Hurricane Sandy. There may have been some increased rain and wind but not enough to trigger an event recording in the NCDC's Severe Weather database. The University did also experience some minor secondary impacts and attempted to aid regional recovery efforts through volunteer time and other support.

4.3.4.3 *Past Occurrences*

Clarion University does not experience the direct effects of hurricanes, nor'easters, and tropical storms; if there is an impact, the University is impacted through an increase of winds and heavy rains. These increase the potential for utility interruptions and traffic accidents. However, the distance from the coast allows the University to avoid hazards associated with storm surge and the worst of the wind and rains. As depicted in Figure 4.3.4-1, many of the storm events that occurred close to the University were extratropical storm activity. This term is used in advisories and tropical summaries to indicate that a cyclone has lost its "tropical" characteristics. The term implies both pole ward displacement of the cyclone

and the conversion of the cyclone's primary energy source from the release of latent heat of condensation to baroclinic (the temperature contrast between warm and cold air masses) processes. [7]

Figure 4.3.4-1 Historical Coastal Storm Events



The worst hurricane in Pennsylvania history was record-setting Hurricane Agnes of 1972. Parts of Pennsylvania received 19 inches of rain. There were 50 fatalities reported and more than 100,000 people were forced to evacuate their homes. Over 68,000 homes and 3,000 businesses were destroyed and 220,000 people were left homeless. Damage estimates calculate the total losses in Pennsylvania alone to be above $2.3 billion. Calculating inflation, the current dollar cost would be above $12.9 billion.

[7] Glossary of National Hurricane Center – NOAA Terms

Additionally, much of Pennsylvania has experienced hurricane-force winds, particularly in the eastern half of the state. Table 4.3.4-2 lists some of Pennsylvania's most significant historical hurricane or hurricane-like events.

Table 4.3.4-2 Hurricanes, Tropical Storms, Nor'easters Affecting Pennsylvania

DATE	STORM NAME
October 4, 1869	Saxby Gale
October 4-5, 1877	Tropical Storm (no name)
October 23, 1978	The Great October Gale
October 13, 1893	Tropical Cyclone (no name)
September 29, 1896	Hurricane (no name)
August 23, 1933	Chesapeake and Potomac Hurricane
October 15, 1954	Hurricane Hazel
August 12-13, 1955	Hurricane Connie
August 18-19, 1955	Hurricane Diane
June 21-23, 1972	Hurricane Agnes
September 23-26, 1975	Hurricane Eloise
September 16, 1999	Hurricane Floyd
June 17, 2001	Tropical Storm Allison
September 18, 2003	Hurricane Isabel
September 8-10, 2004	Hurricane Frances
September 17-19, 2004	Hurricane Ivan
September 27-28, 2004	Hurricane Jeanne
August 27-28, 2011	Hurricane Irene
September 2-5, 2011	Hurricane Lee
October 22-31, 2012	Hurricane Sandy

4.3.4.4 *Future Occurrences*

Over the past few years, the Mid-Atlantic Region has experienced a change in weather patterns and the proliferation of stronger, more frequent severe weather events. Because of this change in weather patterns, the region will experience more frequent and stronger hurricanes and tropical storms.

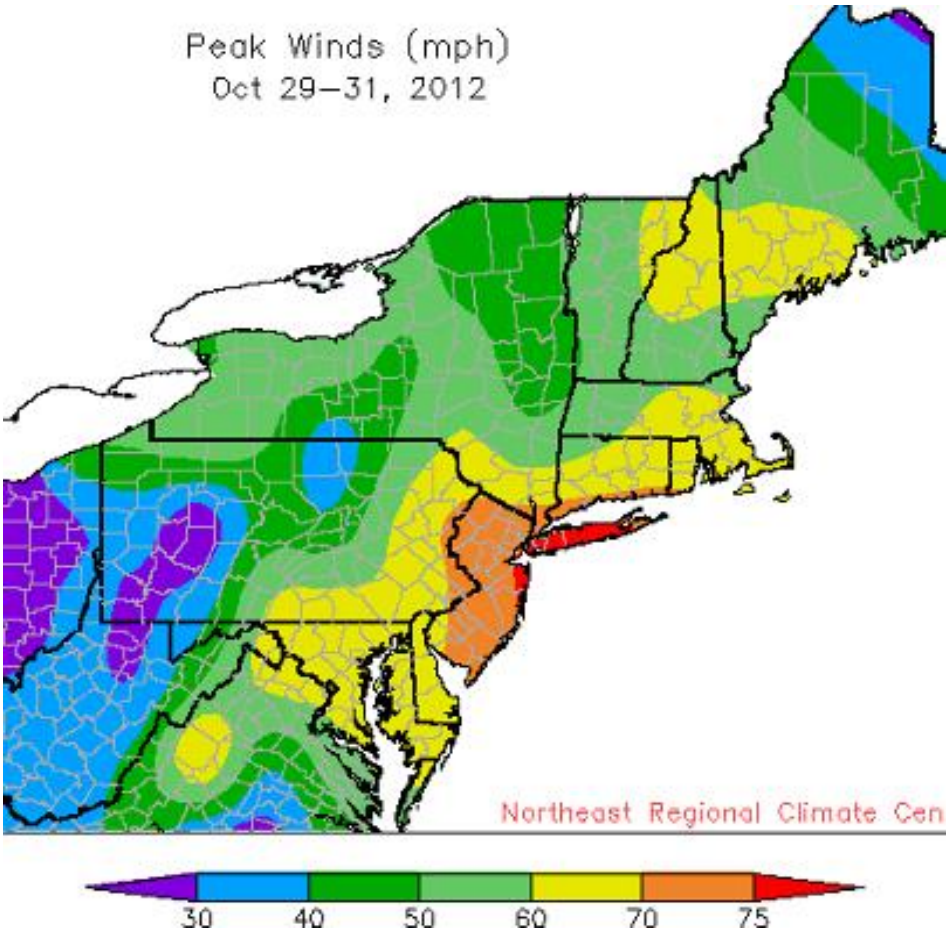
4.3.4.5 *Vulnerability Assessment*

Due to its location in the western part of Pennsylvania, Clarion University is less vulnerable to hurricanes than are certain areas on the eastern half of the state or along the coast. High winds, rains, and flooding are all secondary hazard events that result from hurricanes that can potentially impact the University. These can lead to uprooted trees, transportation accidents, and power outages. The University is also vulnerable to unique secondary hazards, such as ensuring that resident students have continued access to clean water and food. Additionally, nor'easters and late season snowstorms can lead to excessive snowfall, which will also enhance the potential impact.

Although the University is not at risk for storm surge, it will potentially experience the high force winds and strong rain that currently only impact it only during severe hurricanes. The closest major river, the

Clarion River, is less than a mile from the University. The flooding conditions of that river will not directly impact the University, yet flooding would compromise access routes to the campus.

Figure 4.3.4-2 Hurricane Sandy Wind Gusts



In 2012, Hurricane Sandy also demonstrated the vulnerability of many areas that did not expect to be severely impacted by a storm. Hurricane Sandy serves as a prominent case study on the importance of preparing for the long-term effects of a hurricane and the realization that not all hurricanes will hit lower on the East Coast (e.g., in North Carolina and Florida), as was often assumed in the past. Based on scope and ongoing repercussions from Hurricane Sandy, Clarion University officials have decided upon the importance of preparing for hurricanes, even though the University is unlikely to be frequently impacted by hurricanes.

4.3.5 Lightning Strike

4.3.5.1 *Location and Extent*

Lightning events occur across the entire Commonwealth. Different areas experience varying event frequencies, but in all cases lightning strikes occur primarily during the summer months. While the impact of flash events is highly localized, strong storms can result in numerous widespread events over a broad

area. In addition, the impacts of an event can be serious or widespread if lightning strikes a particularly significant location such as a power station or large public venue. In general, Clarion University is at a greater lightning risk than the majority of Clarion County because of higher population density.

4.3.5.2 *Range of Magnitude*

Each year, lightning is responsible for the deaths of approximately one hundred people, injuries to several hundred more, and millions of dollars in property damage, in the United States. In the past 15 years, there have been 14 deaths due to lighting (NOAA NWS, 2012). In many cases, heart damage, inflated lungs, or brain damage have resulted from lightning strikes, leading to death. Loss of consciousness, amnesia, paralysis, and burns are reported by many who have survived. Deaths and injuries to livestock and other animals, thousands of forest and brush fires, as well as millions of dollars in damage to buildings, communications systems, power lines, and electrical systems are also the result of lightning.

Between 1959 and 1994, Pennsylvania ranked third among all states in the U.S. with 644 casualties (i.e. combination of deaths and injuries) as a result of lightning strikes.. This represents approximately 5 percent of casualties that occurred throughout the U.S. over that 35-year period. Pennsylvania ranked first among all states in the U.S. with 1,441 damage reports. However, it is unclear what the total dollar value is for these damages (NOAA NWS, 1997). The worst-case lightning event would be a strike in a large crowd or gathering of people as might be the case at large sporting events or outdoor concerts. This could result in mass deaths or injuries.

4.3.5.3 *Past Occurrence*

Records from the National Climatic Data Center show that there were 10 lightning events in Clarion County between 1950 and 2014. Table 4.3.5-1 gives a description of these incidents. A lightning "event" is defined as a lightning strike, which results in fatality, injury, and/or property or crop damage (NCDC, 2010). To date, there have been no documented injuries or deaths due to lightning at Clarion University. Although there have been no documented injuries on campus, Clarion is still vulnerable to lightning strikes.

Table 4.3.5-1 Lightning Events

Date	County	Description	Cost (Property Damage)	Injuries	Fatalities
8/6/1968	Clarion	Lightning	$5,000.00	0	0
12/28/1968	Clarion	Wind and lightning	$7,462.00	0	0
6/5/1969	Clarion	Lightning	$14.00	0	0
6/13/1969	Clarion	Lightning	$147.00	0	0
6/19/1969	Clarion	Lightning/ wind/ hail	$277.00	0	0
6/26/1969	Clarion	Lightning/ hail	$714.00	0	0
6/27/1969	Clarion	Lightning	$2,272.00	0	0
6/30/1969	Clarion	Lightning/ wind	$714.00	0	0
7/4/1969	Clarion	Lightning/ wind	$1,515.00	0	0
7/12/1969	Clarion	Lightning	$151.00	0	0
6/17/1970	Clarion	Lightning/ rain/ wind and hail	$2,631.00	0.32	0
9/25/1970	Clarion	Lightning	$74.00	0	0

Table 4.3.5-1 Lightning Events

Date	County	Description	Cost (Property Damage)	Injuries	Fatalities
1/26/1971	Clarion	Blizzard/ wind/ lightning	$2,631.00	0.58	0
2/17/1971	Clarion	Lightning/ ice	$277.00	0	0
9/13/1972	Clarion	Rain/ lightning/ wind	$2,631.00	0	0
9/5/1973	Clarion	Strong wind/ heavy rain/ electrical	$1,250.00	0	0
4/14/1974	Clarion	Wind/ hail/ lightning	$27,777.00	0.28	0
4/21/1976	Clarion	Electrical storm/ high winds/ heavy rain/ hail	$263.00	0	0
6/13/1976	Clarion	Electrical	$1,666.00	0	0
7/11/1976	Clarion	Electrical	$2,500.00	0	0
7/23/1976	Clarion	Lightning	$5,000.00	0	0
7/6/1977	Clarion	Lightning	$10,000.00	0	0
7/16/1979	Clarion	Heavy rain/ wind/ electrical	$943.00	0	0
7/16/1980	Clarion	Wind/ hail/ lightning	$2,631,580.00	0.21	0
6/16/1986	Clarion	Thunderstorm wind/ lightning	$5,000.00	0	0
7/20/1986	Clarion	Thunderstorm wind/ lightning	$500.00	0	0
6/18/1993	Clarion	Lightning	$0.00	1	0
6/13/1994	Clarion	Lightning	$20,000.00	0	0
6/13/1994	Clarion	Lightning	$0.00	1	0

SOURCE: SPATIAL HAZARD EVENTS AND LOSSES DATABASE FOR THE UNITED STATES (SHELDUS)

4.3.5.4 *Future Occurrence*

Based on normal meteorological conditions and past history, the occurrence of lightning strikes in the future for Clarion University is *probable*. It is impossible to say when or where lightning will strike, but they will continue on and around Clarion University. Despite the high probability of lightning occurring, the probability of lightning strikes injuring or killing a Clarion University student, staff, or faculty member is *unlikely*.

4.3.5.5 *Vulnerability Assessment*

The environmental impacts most often associated with lightning strikes include damage or death to trees and ignition of wildfires. During the years of 2000–2012, the NCDC reports that in Pennsylvania, lightning caused 16 deaths, 159 injuries, and $14,310,000 in property damage. The highest reported loss in property damage in Pennsylvania occurred in Freysville Borough, York County, in 2007 when lightning caused $2 million in damage after striking a deodorizer manufacturing plant. The subsequent fire completely engulfed and destroyed the entire facility.

Losses due to lightning can be lessened by installing surge protection on critical electronic lighting or information technology systems. Lightning protection devices and methods such as lightning rods and grounding can be installed on a community's communications infrastructure and other critical facilities to reduce losses. Clarion University takes active steps to reduce vulnerability to lightning strikes by maintaining lightning safety standards, particularly in regard to outside events, such as sports games. The DTN Weather Sentry Alert System is used to notify subscribers when lightning first strikes within a 20-mile

radius and/or if lightning strikes within a 7-mile radius of campus. Clarion suspends athletic events and practice upon notification of a strike and follows the NCAA guidelines for resuming play.

4.3.6 Pandemic Hazardous Profile

An epidemic occurs when infection from a new strain of a certain disease, to which most humans have no immunity, substantially exceeds the number of expected cases over a given period of time. If an epidemic reaches global proportions, it becomes relabeled as a pandemic. Such a disease may or may not be transferable between humans and animals. The World Health Organization (WHO) defines an infectious disease as being caused by pathogenic microorganisms and as diseases that can be spread directly or indirectly from one person to another. Zoonotic diseases are infectious diseases transmitted from animals to humans. Examples of infectious diseases that may become pandemics are:

- Influenza
- Cholera
- Meningococcal meningitis
- HIV/AIDS and other sexually transmitted infections (STIs)
- Malaria
- Tuberculosis

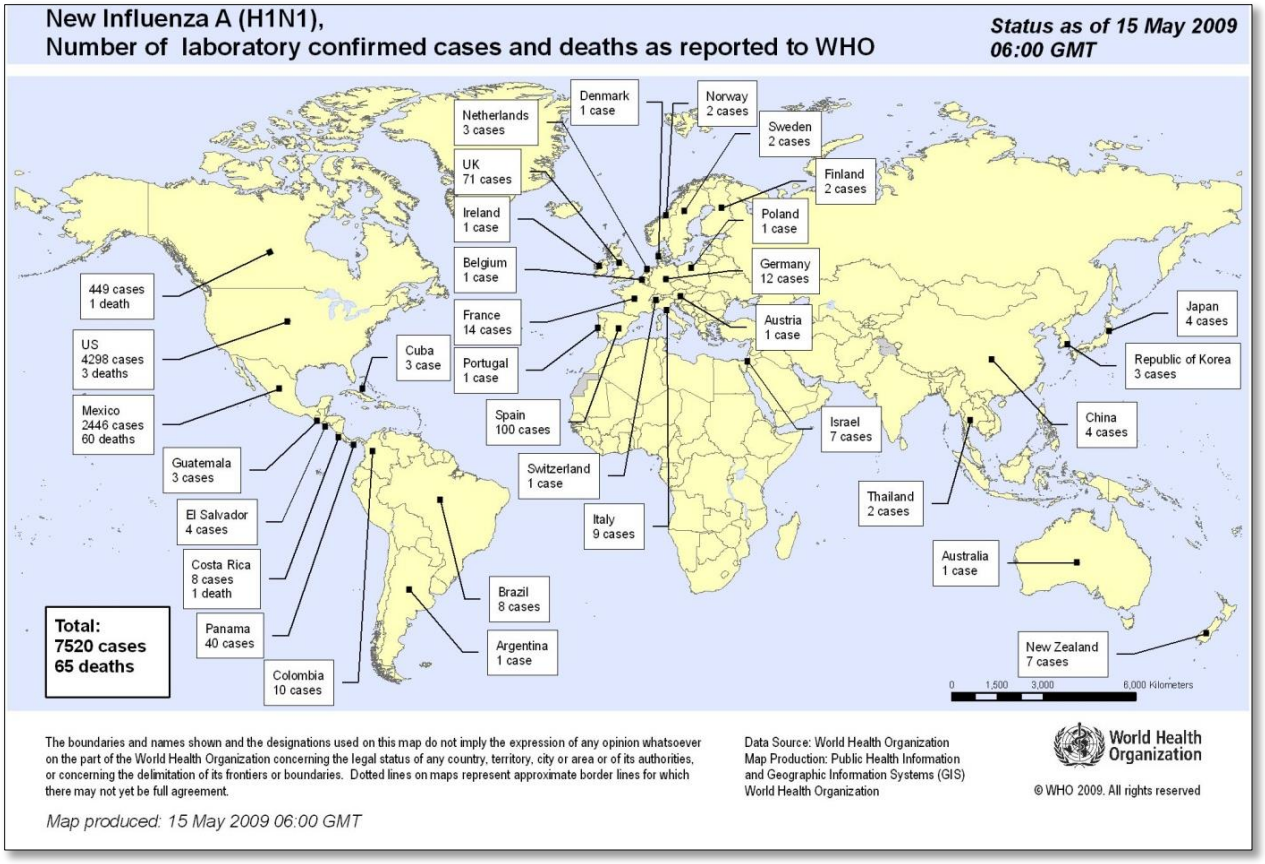
In a pandemic, young adults are more likely to be infected, increasing the potential for colleges and universities to be explosive disease outbreak centers. Outbreak management is essential in reducing the impact in both the institution and the surrounding community.

4.3.6.1 *Location and Extent*

A pandemic most typically affects or attacks the population of an extensive region, including and up to multiple countries and/or continent(s). It is further described as extensively epidemic. Generally, pandemic diseases cause sudden, pervasive illness in all age groups on a global scale. Figure 4.3.6-1 is an example of the novel influenza A (H1N1) virus – a communicable disease detected in early April 2009 – that achieved global outbreak status.

Because pandemic and infectious disease events cover a wide geographical area and can affect large populations, they potentially impact the entire population of Pennsylvania. The exact size and extent of an infected population is dependent upon how easily the illness is spread, the mode of transmission, and the amount of contact between infected and uninfected individuals.

Figure 4.3.6-1 Novel Influenza A (H1N1) – Laboratory Confirmed Cases and Deaths as Reported to



WHO

SOURCE: WHO MAP PRODUCTION: PUBLIC HEALTH INFORMATION AND GEOGRAPHIC INFORMATION SYSTEMS (GIS)

Universities therefore have the potential to become explosive, centrifugal outbreak centers due to their large young adult population, high levels of close social contact and permeable boundaries. During a pandemic or disease outbreak, the proportion affected may exceed the seasonal norm of one-third of the student population. As sites of transmission, they may have a negative impact on the larger communities in which they are embedded. Additionally, student behavior is often divergent from non-student adult populations. Hence, understanding of and outbreak management in such institutions are essential to minimize the impact of pandemic influenza in both the institution and its surrounds.

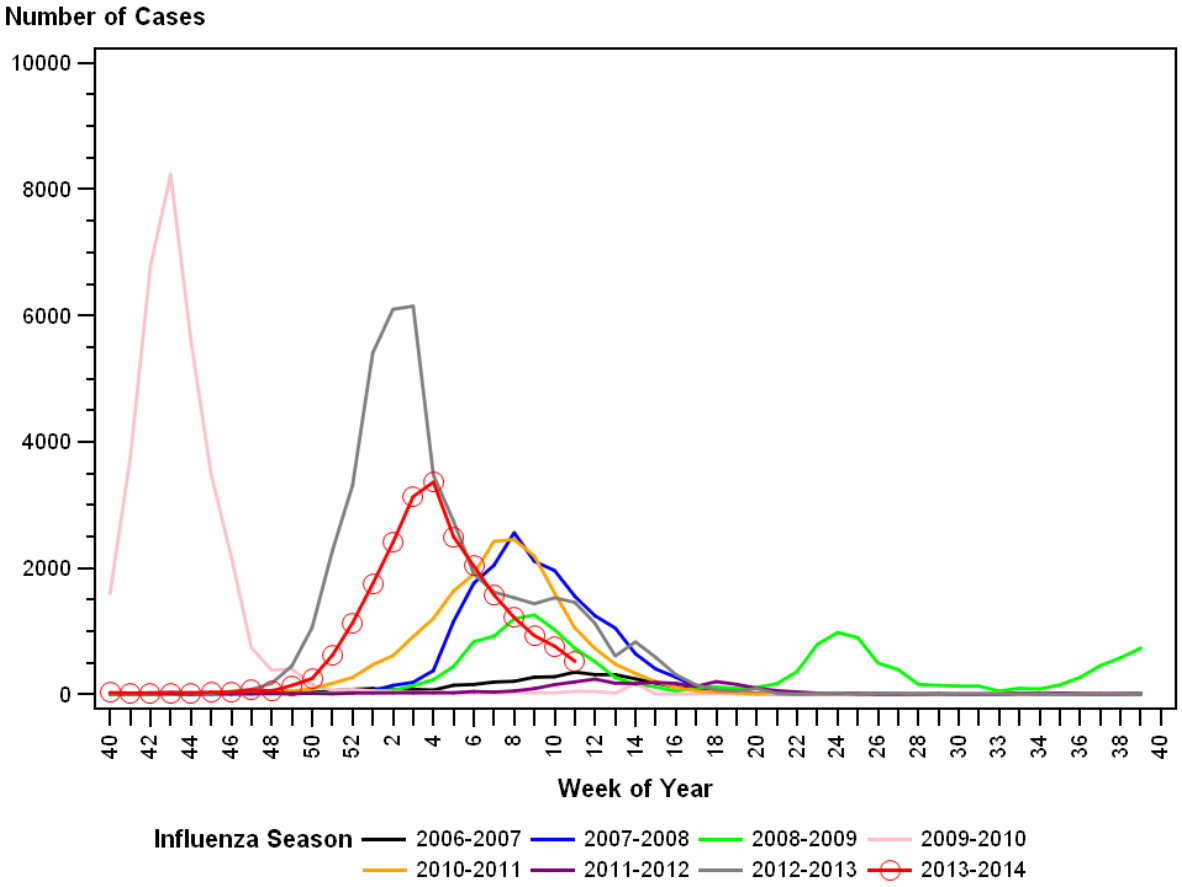
The transmission rates of pandemic illnesses are often higher in denser areas where there are large concentrations of people. The transmission rate of infectious disease will depend on the mode of transmission of a given illness.

4.3.6.2 *Range of Magnitude*

The magnitude of an epidemic or infectious disease threat for Clarion University, including the surrounding community, will range significantly, depending on the aggressiveness of the virus in question, the ease of transmission, and an institution's influence on promoting positive public health behavior among students. Historically, the most significant pandemic threat in both the United States and

Pennsylvania is influenza. Pandemic influenza is easily transmitted from person to person, but advances in medical technologies have greatly reduced the number of deaths caused by influenza. In terms of lives lost in Pennsylvania, the impact of various pandemic influenza outbreaks has declined over the past decade. Figure 4.3.6-2 below shows the comparison of the Pennsylvania National Electronic Disease Surveillance System (PA-NEDSS) influenza cases (all types) reported in Pennsylvania in the current season compared with the past seven (7) seasons.

Figure 4.3.6-2 Comparison of (PA-NEDSS) Influenza Cases Reported in PA Current Season (as of Week 12) Compared with the Past 7 Seasons



SOURCE: PENNSYLVANIA DEPARTMENT OF HEALTH (PA DOH), 2014

The magnitude of a pandemic may be exacerbated by the fact that an influenza pandemic will cause outbreaks across the United States, limiting the ability to transfer assistance from one jurisdiction to another. Additionally, effective preventative and therapeutic measures, including vaccines and other medications, will likely be in short supply or will not be available when a disease reaches pandemic proportions.

The 1918 Spanish flu pandemic remains the worst pandemic event on record, both in New York State and worldwide. While mortality figures were probably under-reported, between 20,000 and 24,000 New York City residents died from the flu or its complications.

4.3.6.3 *Past Occurrences*

A. Outbreak of Meningococcal Meningitis

On April 11, 1967, it was reported that Millersville University suffered a fatality when a 19-year-old student died from an infection of the meningococcal meningitis disease. The student was a junior at the University, studying French and was originally from York County. The student's death triggered a mass medical treatment and activated a 10-day incubation period of all the faculty and students at the University who may have been in contact with him. Overall, six students had been detained in the University's infirmary for observation, and the remaining were discharged after no new cases were reported.

In October 1993, another Millersville University student became gravely ill and collapsed on the Bloomsburg football field while performing in the marching band during the Millersville-Bloomsburg football game's halftime event. He was immediately taken to Bloomsburg Hospital, and subsequently transferred to Geisinger Medical Center for further treatment. His condition was described as very seriously ill due to the life-threatening disease. According to the news article, the student visited the MU infirmary on Friday, the day before the event, complaining of dizziness and a stiff neck; however, he refused treatment. He was carried off the field by members of the band, therefore, as a precaution, 150 band members were then later treated with oral antibiotics by the MU infirmary. It was estimated that over 400 students had received the vaccine by the Monday evening following Saturday's game. A college authority stated that during his 10-year tenure, the college had not encountered this type of meningitis prior to this incident.

The same article cited two other incidents – one at Kutztown University wherein a KU student died earlier in the year (September 30) from a serious form of meningococcal meningitis. Symptoms were reported only four days before his death. However, no other students at KU showed any symptoms of this type of meningitis. The second incident occurred at Shippensburg University. A female freshman came down with meningococcal meningitis around September 11. As a result, Shippensburg had to vaccinate over 200 students, including the 100 girls who lived on the same floor of her dorm, and 100 additional people who had been in close contact with the girl.

More recent cases have been documented, the most prevalent incident occurring in 2012, when 15 states reported an outbreak of fungal meningitis linked to contaminated steroid injections. According to an October 15 Reuters news article, New England Compounding Center (NECC) was implicated as the supplier of the contaminated drug. Nationally, 15 people died as a result of contracting the rare and deadly disease from injections. During the initial outbreak, the Centers for Disease Control and Prevention (CDC) tallied cases, showing that 205 people were stricken with the disease. Pennsylvania reported its first case in July 2012 when a patient received an epidural steroid shot from the medications supplied by NECC of Framingham, MA. The patient was hospitalized and successfully treated. Nearly 14,000 people nationwide were believed to have received the potentially contaminated medication. The lots were shipped to 76 different facilities, two of which were located in Pennsylvania, in 23 states.

Other cases reaching closer to home include two parents of a Penn State student who were treated for meningitis in April 2013, a West Chester University student was diagnosed with bacterial meningitis after

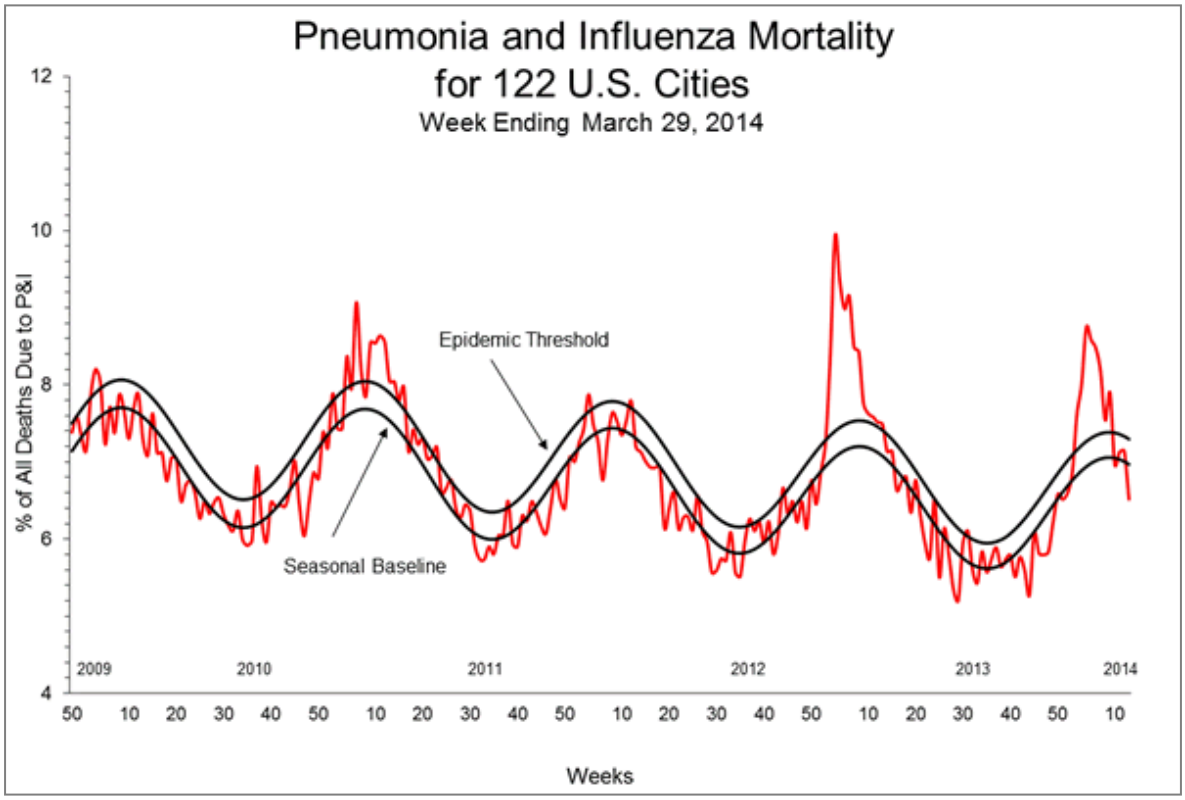
attending a conference in Penn State over the weekend of February 1–3, 2013, and an ROTC cadet at Widener University was diagnosed with viral meningitis in March 2014.

B. Influenza

Annually in the United States, influenza or influenza-like-illnesses (ILI) are responsible for a number of deaths. Due to the unpredictability of influenza, it is difficult to pinpoint an annual case fatality rate (CFR). The CDC continuously collects and compiles various influenza-related data, including gathering and monitoring ILI occurrences through the College Health Surveillance Network (CHSN). CHSN debuted in 2012, was established by the National Social Norms Institute (NSNI) to collect valid and reliable estimates of health conditions, and is an on-going project supported by the CDC and the University of Virginia. This national database provides specific information on epidemiologic trends and college student health services utilization. De-identified student health information is uploaded to CHSN's database on a monthly basis by participating universities.

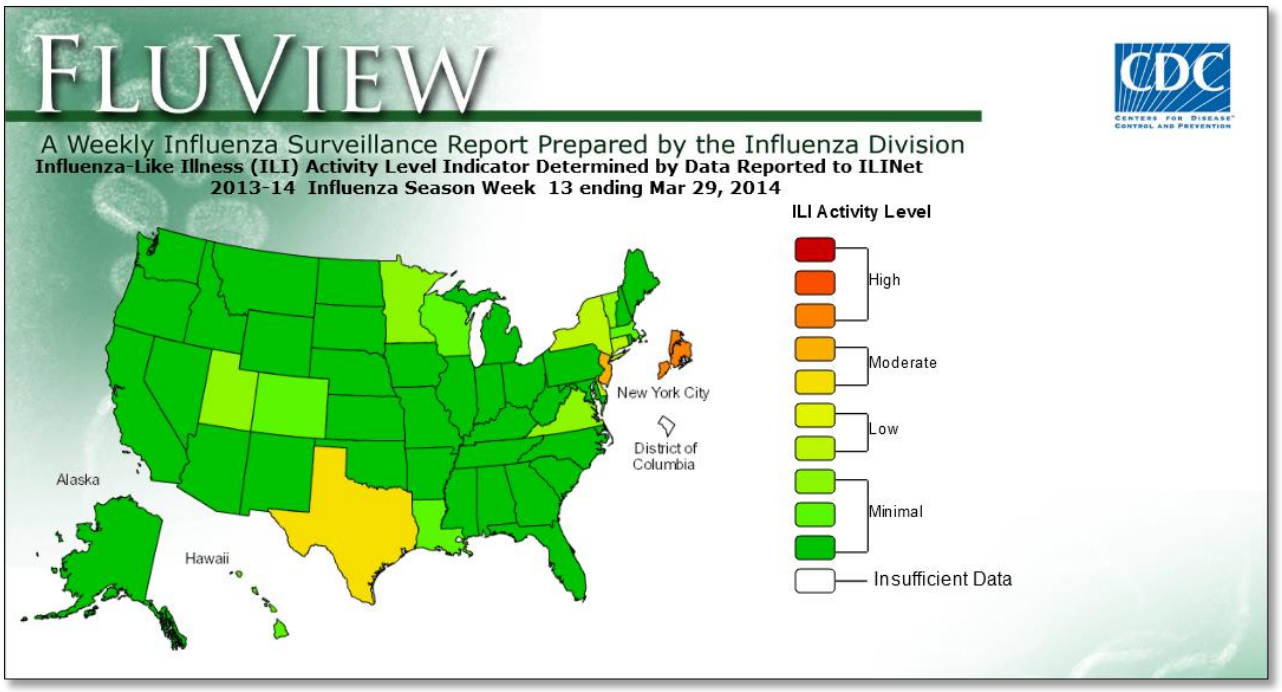
In 2013, influenza diagnosis spiked throughout the influenza season to levels above what is considered to be epidemic. However, as shown in Figure 4.3.6-3 and Figure 4.3.6-4, the ILI activity during the 2013–14 influenza season through week 13, ending March 29, 2014, shows a relatively low to minimal impact in the state.

Figure 4.3.6-3 Percentage of All Deaths Attributable to Pneumonia and Influenza (P&I)



SOURCE: CENTERS FOR DISEASE CONTROL AND PREVENTION (CDC) – HTTP://WWW.CDC.GOV/FLU/WEEKLY/

Figure 4.3.6-4 ILI Activity 2013–14 Influenza Season Week 13 Ending March 29, 2014



SOURCE: CDC, 2014 – HTTP://WWW.CDC.GOV/FLU/WEEKLY/

C. H1N1 Emerges

In April 2009, the CDC activated its Emergency Operations Center (EOC) to coordinate rapid response efforts to manage and control the H1N1 outbreak that first emerged in the United States. The H1N1 is described as having a unique combination of influenza virus genes never previously identified in animals or humans. The virus was a combination of genes most closely related to North American and Eurasian swine-lineage H1N1 influenza viruses. Therefore, initial reports referred to the virus as a swine origin influenza virus. However, further investigation of the initial human cases did not reveal exposure to pigs, and it quickly became apparent that this new virus was circulating among humans and not among pig herds in the United States.[8] The initial human cases were detected in two children – a 10- and 8-year-old in California who lived approximately 130 miles apart from each other.

The CDC and its coalition of emergency and health agencies stood ready – exercising response plans at all levels of the government (international, federal, state, local and community). In less than two weeks, beginning April 18, 2009, the CDC was highly instrumental in deploying complex, multi-faceted activities to control and reduce the spread of the virus. These activities included efforts to protect young children and school students from contracting the influenza virus.

Social distancing measures were put into effect upon CDC receiving reports of an investigation into a cluster of influenza-like illness in a New York City high school and other school closures occurring as a

[8] Centers for Disease Control and Prevention, http://www.cdc.gov/h1n1flu/cdcresponse.htm

result of the outbreak. Social distancing is the practice of increasing the distance between people to slow the spread of disease. CDC issued an MMWR Dispatch on the outbreak in the high school, that was, at the time, the location of the largest reported cluster of 2009 H1N1 cases in the United States. The Dispatch suggested that the high school age students had respiratory and fever symptoms similar to those caused by a seasonal flu, but in addition, about half had diarrhea, which is more than expected with seasonal flu. School administrators and public health officials were following their pandemic plans and doing everything they could to slow the spread of illness (i.e., stay home when ill unless to seek medical care, avoid large gatherings, encourage telecommuting, and implement school closures).

In response to the 2009 H1N1 pandemic, the American College Health Association (ACHA) initiated a pandemic influenza surveillance project to gain an understanding of the influenza activity on college campuses. Epidemiologic data on novel H1N1 flu suggested significant risk among those in the college setting. CDC defines an outbreak when at least 2.4 percent of total health care visits are for ILI.

Interested institutions of higher education voluntarily enlisted to submit data on a weekly basis regarding the number of new cases of ILI, and ACHA began reporting on the availability of the vaccine, along with the success uptake rate. This information was provided to the CDC, public health officials, and other college health professionals in an effort to continue assisting with tracking national vaccine trends. The H1N1 surveillance project was an important milestone for college health. Through the efforts of ACHA's national office and participating schools, the project resulted in an accurate representation of the epidemiology of the H1N1 outbreak on college campuses nationally. The data was invaluable to schools, local and state health departments, and the CDC.[9]

4.3.6.4 *Future Occurrences*

Public health experts from the US Department of Health and Human Services (DHHS) have shared that the next influenza pandemic is a matter of when, not if, it will occur. Seasonal flu vaccines do not prevent people from contracting a pandemic flu as the virus is constantly mutating. As a result, although the timing cannot be predicted, Clarion University of Pennsylvania may be affected by a non-seasonal pandemic outbreak at some time in the future. Mitigation efforts should focus on public outreach, education, and healthcare preparedness.

In the event of an influenza pandemic, colleges and universities will play an integral role in protecting the health and safety of students, employees, and their families. To supplement mitigation efforts, Clarion University should employ a pandemic influenza planning checklist. The Department of Health and Human Services (HHS) and the Centers for Disease Control and Prevention (CDC) have developed the following

[9] ACHA Pandemic Influenza Surveillance Influenza Like Illness (ILI) in Colleges and Universities – http://www.acha.org/ILI_Project/ILI_Surveillance.cfm

checklist as a framework to assist colleges and universities to develop and/or improve plans to prepare for and respond to an influenza pandemic.[10]

- Item 1: Coordination
  - Identify a pandemic coordinator and response team (including campus health services and mental health staff, student housing personnel, security, communications staff, physical plant staff, food services director, academic staff, and student representatives).
  - Define roles and responsibilities for preparedness, response, and recovery planning.
- Item 2: Accountability
  - Delineate accountability and responsibility as well as resources for key stakeholders engaged in planning and executing specific components of the operational plan.
  - Assure that the plan includes timelines, deliverables, and performance measures.
- Item 3: Scenario-driven
  - Incorporate into the pandemic plan scenarios that address college/university functioning based upon having various levels of illness in students and employees and different types of community containment interventions.
  - Plan for different outbreak scenarios including variations in severity of illness, mode of transmission, and rates of infection in the community.
  - Issues to consider:
    - Social distancing including
      - Cancellation of classes, sporting events and/or other public events;
      - Closure of campus, student housing, and/or public transportation; and
      - Self-isolation and/or assessment of the suitability of student housing for quarantine of exposed and/or ill students
        (See http://www.flu.gov/planning-preparedness/school/index.html).
    - Contingency plans for students who depend on student housing and food services (e.g., international students or students who live too far away to travel home)
    - Contingency plans for maintaining research laboratories, particularly those using animals
    - Stockpiling nonperishable food and equipment that may be needed in the case of an influenza pandemic
- Item 4: Legal Implications
  - Work with state and local public health and other local authorities to identify legal authority, decision-makers, trigger points, and thresholds to institute community containment measures such as closing (and re-opening) the college/university.
  - Identify and review the college/university's legal responsibilities and authorities for executing infection control measures, including case identification, reporting information

[10] Pandemic Influenza Planning for Colleges and Universities, Richard Hernandez, Dr. P.H., RRT, Dean, Allied Health Sciences Trident Technical College, Charleston, SC

about ill students and employees, isolation, movement restriction, and provision of healthcare on campus.

- Item 5: Consistency
  - Ensure that pandemic influenza planning is consistent with any existing college/university emergency operations plan, and is coordinated with the pandemic plan of the community and of the state higher education agency.
- Item 6: Cooperation
  - Work with the local health department to discuss an operational plan for surge capacity for healthcare and other mental health and social services to meet the needs of the college/university and community during and after a pandemic.
- Item 7: Communications
  - Establish an emergency communication plan and revise regularly.
  - This plan should identify key contacts with local and state public health officials as well as the state's higher education officials (including back-ups) and the chain of communications, including alternate mechanisms.
- Item 8: Incident Command
  - Test the linkages between the college/university's Incident Command System and the Incident Command Systems of the local and/or state health department and the state's higher education agency.
- Item 9: Practice
  - Implement an exercise/drill to test your plan, and revise it regularly.
  - Participate in exercises of the community's pandemic plan.
- Item 10: Recovery
  - Develop a recovery plan to deal with consequences of the pandemic (e.g., loss of students, loss of staff, financial, and operational disruption).
- Item 11: Share
  - Share what you have learned from developing your preparedness and response plan with other colleges/universities to improve community response efforts.

4.3.6.5 *Vulnerability Assessment*

Clarion University is a public university situated on 128 acres located in Clarion County, Pennsylvania. In 2013, Clarion University had a population of 6,520 students, 409 staff, and 344 faculty. The University also has a variable population density, which shifts depending on the time of day, the day of the week, and the semester, thereby shifting vulnerability levels. When the University experiences lower population density, a pandemic is less likely to spread as quickly through human contact and the resident/working populations are less likely to be as severely affected; however, lower population density time periods increase the difficulty of distributing information, instructions, and resources. In contrast, higher population density time periods increase the potential impact of a pandemic and the potential disruption of operations. Additionally, the effects of a severe pandemic on the country, the state, or the county as a whole may impact the University through secondary and indirect effects to the economy, agriculture, etc., and ultimately adversely affect the University by interrupting operations, attendance, ease of transportation, and continuity of services.

Studies throughout the country have demonstrated that the 2009 H1N1 influenza pandemic had a surprisingly marked effect on a group of individuals that was unexpected…mostly people who were younger than 24.[11] Campuses could turn out to be the epicenter of influenza outbreaks; therefore, mitigation strategies for communities may eventually include vaccination campaigns specifically targeted for college students.

According to the Community Health Surveillance Network (CHSN) reports, more than 18 million students are enrolled in American institutions of higher education. Currently, there are 22 four-year universities from across the country that are participating in the national surveillance network, contributing dual data components to CHSN's database: 1) ICD9 diagnosis and CPT procedure data, and 2) seasonal influenza activity.

The purpose of CHSN is to review diagnostic trends among the student community (e.g., respiratory infections, health screenings, back problems, and depression) and improve medical services. The data submitted to CHSN (consisting of over 600,000 students) is compiled, aggregated, and analyzed to determine the types of issues experienced by students visiting their university's student health centers. In turn, the findings will enable colleges and universities to closer examine the sub-populations that visit health centers. Another aspiration is weekly or even real-time reporting of diagnoses and symptoms, which in theory could help halt the spread of conditions like mumps or the flu.[12]

To participate, schools are required to have either IRB clearance from their own institution or a duly executed Data Use Agreement (DUA) with the University of Virginia. All participation is voluntary, but to stay an active member of CHSN, a university does have to upload data every month to a secure website. Protocol specifies that the upload should occur within the first week to 10 days of the following month. All participating schools that have electronic medical records systems can automate the data uploads. The website is designed so that an administrator can see a table of participating schools and the date of their data upload each month. An auto-generated reminder e-mail is created and sent when a school has not uploaded data for the previous month. Similarly, there are automatic quality checks in place for each upload so that an administrator can e-mail the school if there is any problem with the data. This system has been in place and working effectively since January 2011.

The second system in place tracks intermittent data and comprises ILI/influenza incidences, along with other communicable disease information, and is submitted during relevant times.[13] It is only operable

[11] H1N1 & Higher Ed Lessons Learned – Pandemic Influenza Tips, Tools, and Takeaways from the Big 10 + 2 Universities, prepared by the Center for Infectious Disease and Research and Policy (CIDRAP) at the University of Minnesota; sponsored by the Association of State and Territorial Health Officials (ASTHO)

[12] June 1, 2012 issue of Inside Higher Ed – The Health of Student Nations by Allie Grasgreen http://www.insidehighered.com/news/2012/06/01/college-health-surveillance-network-tracks-nationwide-student-data#ixzz30xcw6RwP

[13] Content contributed by Craig Roberts, PA-C, MS, Epidemiologist, University Health Services, Clinical Assistant Professor, Population Health Sciences, University of Wisconsin-Madison and Chair, ACHA Emerging Public Health

during flu season or if there is an outbreak of a particular communicable disease. This system is handled through the University of Virginia's website, but for those time-limited focused data, the entry is done weekly and requires just two numbers to be entered by hand onto the website (number of patients seen for the index disease and total number of patients seen that week). Not all schools who participate in the main work of CHSN choose to participate in the intermittent tracking. For the intermittent tracking, a reminder e-mail goes out on the first day of each week, with a summary of the data to date. Continued tracking is done only while the specific condition is active, with at least one reporting school either above the CDC definition of an outbreak or at least one school with an increasing number of patients being tracked.

To date, Clarion University has not been a participant of the surveillance program. Therefore, it is recommended that the University participate in CHSN to help support the network, gain a more accurate assessment of the student population health concerns across the country, and help identify and establish preventive health measures. If Clarion University currently does have the capacity to track key diagnostic, procedural, and patient demographic information captured during every visit to a Student Health Center, they should become a subscriber to the surveillance system. This patient data can be updated and submitted on a monthly basis to the national surveillance program.

4.3.7 Radon

4.3.7.1 *Location and Extent*

Radioactivity caused by airborne radon has been recognized for many years as an important component in the natural background radioactivity exposure of humans, but it was not until the 1980s that the wide geographic distribution of elevated values in houses and the possibility of extremely high radon values in houses were recognized. In 1984, routine monitoring of employees leaving the Limerick nuclear power plant near Reading, Pennsylvania, while it was still under construction and not yet functional, showed that readings on a construction worker at the plant frequently exceeded expected radiation levels. However, only natural, nonfission-product radioactivity was detected on him.

Subsequent testing of the employee's home in the Reading area showed extremely high radon levels around 2,500 pCi/L (pico Curies per Liter). To put this amount in perspective, the Environmental Protection Agency (EPA) guidelines state that actions should be taken if radon levels exceed 4 pCi/L in a home, and uranium miners have a maximum exposure of 67 pCi/L. As a result of this incident, the Reading Prong became the focus of the first large-scale radon scare in the world.

Radon is a gas that cannot be seen or smelled. It is a noble gas that originates by the natural radioactive decay of uranium and thorium. Like other noble gases (e.g., helium, neon, and argon), radon forms essentially no chemical compounds and tends to exist as a gas or as a dissolved atomic constituent in groundwater. Two isotopes of radon are significant in nature, 222Rn and 220Rn, formed in the radioactive decay series of 238U and 232Th, respectively. The isotope thoron (i.e., 220Rn) has a half-life (time for

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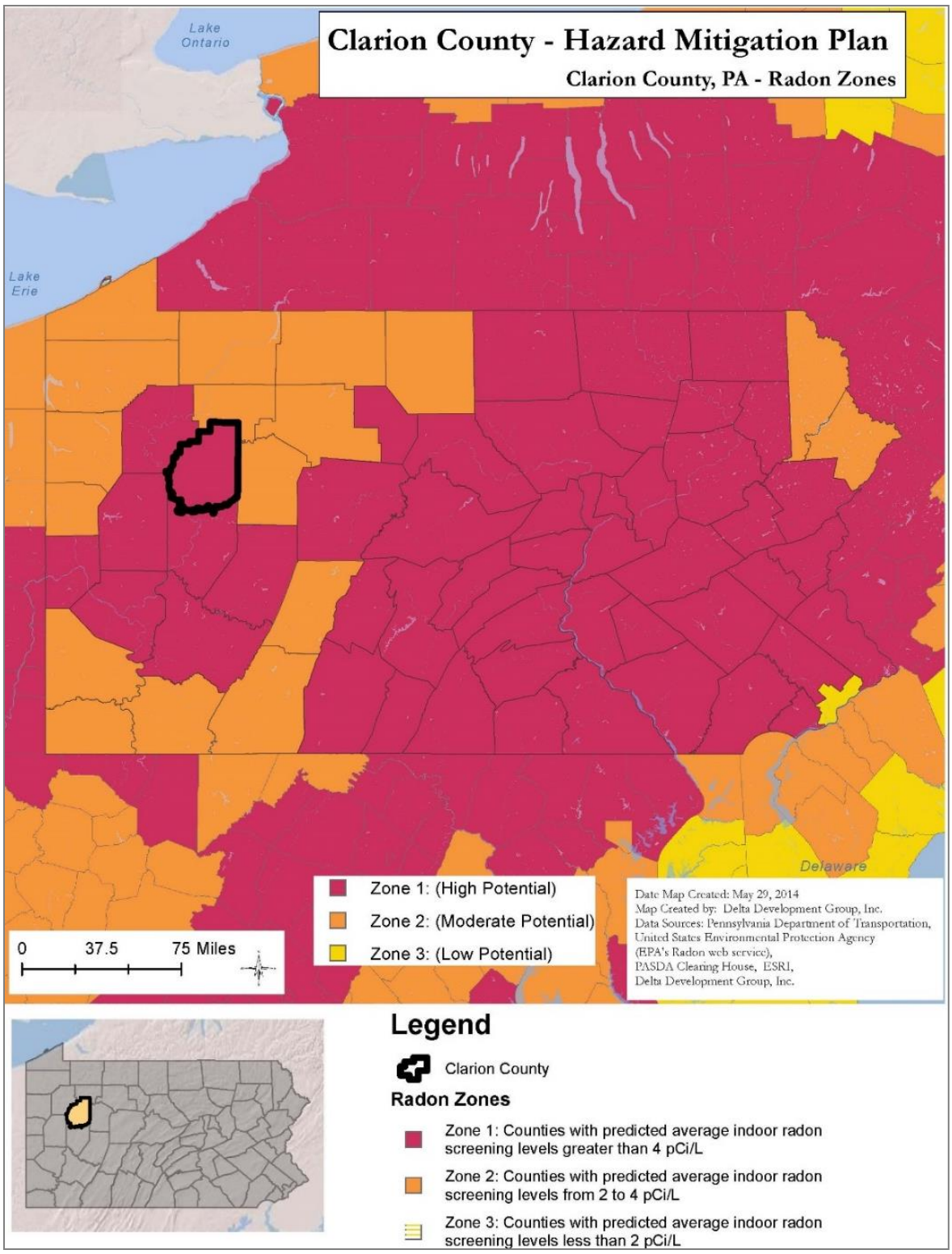
Threats and Emergency Response Coalition and Adrienne Keller, Ph.D., Research Director, National Social Norms Institute (NSNI), Associate Professor, Public Health Sciences, University of Virginia

decay of half of a given group of atoms) of 55 seconds, barely long enough for it to migrate from its source to the air inside a house and pose a health risk. However, radon (i.e., 222Rn), which has a half-life of 3.8 days, is a widespread hazard.

The distribution of radon is correlated with the distribution of radium (i.e., 226Ra), its immediate radioactive parent, and with uranium, its original ancestor. Due to the short half-life of radon, the distance that radon atoms can travel from their parent before decay is generally limited to distances of feet or tens of feet. Each county in Pennsylvania is classified as having a *low*, *moderate*, or *high* radon hazard potential. Clarion County is classified as having a high hazard, meaning there is a predicted indoor radon level greater than 4 pCi/L (see Figure 4.3.7-1). Venango County, where one of Clarion's secondary campuses is located, also has a high hazard rating.

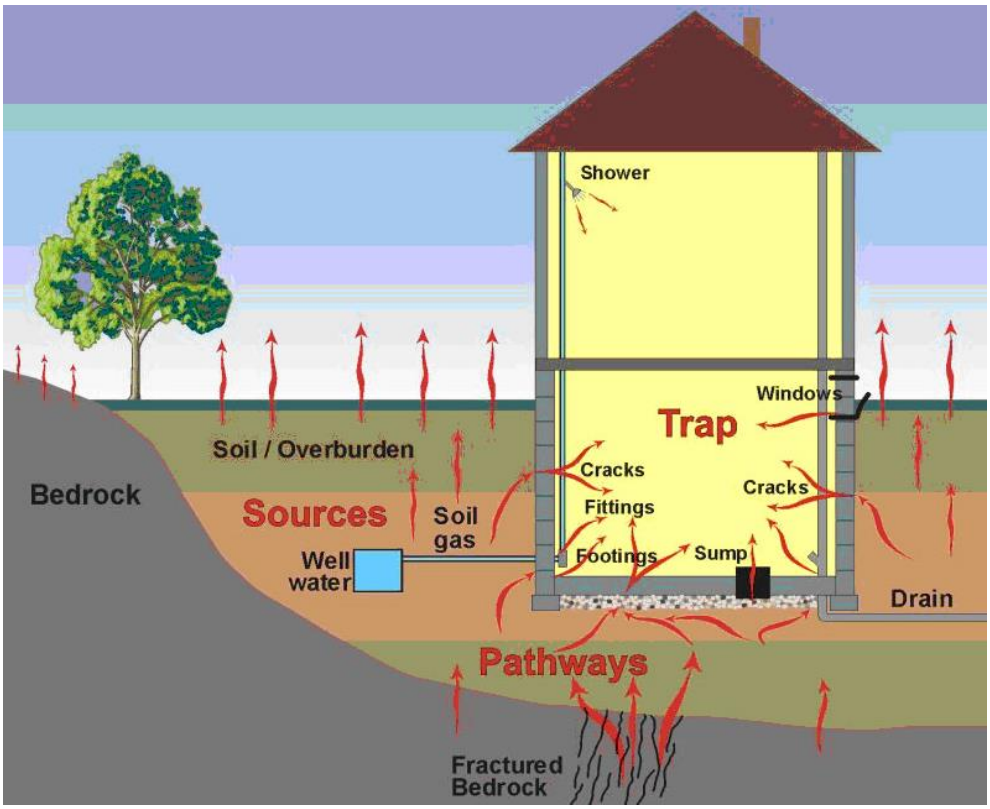
Figure 4.3.7-1 Clarion County Radon Hazard Zone



Three sources of radon in houses are now recognized (shown in Figure 4.3.7-2):

- Radon in soil air that flows into the house
- Radon dissolved in water from private wells and exsolved during water usage; this is rarely a problem in Pennsylvania.
- Radon emanating from uranium-rich building materials (e.g., concrete blocks or gypsum wallboard); this is not known to be a problem in Pennsylvania.

Figure 4.3.7-2 Sketch of radon entry points into a house (Arizona Geological Survey, 2006)



High radon levels were initially thought to be exacerbated in houses that are tightly sealed, but it is now recognized that rates of airflow into and out of houses, plus the location of air inflow and the radon content of air in the surrounding soil, are key factors in radon concentrations. Outflows of air from a house, caused by a furnace, fan, thermal "chimney" effect, or wind effects, require that air be drawn into the house to compensate. If the upper part of the house is tight enough to impede influx of outdoor air (where radon concentration is generally <0.1 pCi/L), then an appreciable fraction of the air may be drawn in from the soil or fractured bedrock through the foundation and slab beneath the house, or through cracks and openings for pipes, sumps, and similar features. Soil gas typically contains from a few hundred to a few thousand pCi/L of radon; therefore, even a small rate of soil gas inflow can lead to elevated radon concentrations in a house.

The radon concentration of soil gas depends upon a number of soil properties, the importance of which is still being evaluated. In general, 10 to 50 percent of newly formed radon atoms escape the host mineral

of their parent radium and gain access to the air-filled pore space. The radon content of soil gas clearly tends to be higher in soils containing higher levels of radium and uranium, especially if the radium occupies a site on or near the surface of a grain from which the radon can easily escape. The amount of pore space in the soil and its permeability for airflow, including cracks and channels, are important factors determining radon concentration in soil gas and its rate of flow into a house. Soil depth and moisture content, mineral host and form for radium, and other soil properties may also be important. For houses built on bedrock, fractured zones may supply air having radon concentrations similar to those in deep soil.

Areas where houses have high levels of radon can be divided into three groups in terms of uranium content in rock and soil:

- **Areas of very elevated uranium content (>50 ppm) around uranium deposits and prospects.** Although very high levels of radon can occur in such areas, the hazard normally is restricted to within a few hundred feet of the deposit. In Pennsylvania, such localities occupy an insignificant area.

- **Areas of common rocks having higher-than-average uranium content (5 to 50 ppm).** In Pennsylvania, such rock types include granitic and felsic alkali igneous rocks and black shales. In the Reading Prong, high uranium values in rock or soil and high radon levels in houses are associated with Precambrian granitic gneisses commonly containing 10 to 20 ppm uranium, but locally containing more than 500 ppm uranium. In Pennsylvania, elevated uranium occurs in black shales of the Devonian Marcellus Formation and possibly the Ordovician Martinsburg Formation. High radon values are locally present in areas underlain by these formations.

- **Areas of soil or bedrock that have normal uranium content but properties that promote high radon levels in houses.** This group is incompletely understood at present. Relatively high soil permeability can lead to high radon, the clearest example being houses built on glacial eskers. Limestone-dolomite soils also appear to be predisposed for high radon levels in houses, perhaps because of the deep clay-rich residuum in which radium is concentrated by weathering on iron oxide or clay surfaces, coupled with moderate porosity and permeability. The importance of carbonate soils is indicated by the fact that radon contents in 93 percent of a sample of houses built on limestone-dolomite soils near State College, Centre County, exceeded 4 pCi/L, and 21 percent exceeded 20 pCi/L, even though the uranium values in the underlying bedrock are all in the normal range of 0.5 to 5 ppm uranium.

The second factor listed above is most likely the cause of high radon levels in both Clarion County and Clarion University (DCNR, 2007). The majority of the County has high radon level test results. The areas and test results are shown in more detail in the Past Occurrence section.

4.3.7.2 *Range of Magnitude*

Exposure to radon is the second leading cause of lung cancer after smoking. It is the number one cause of lung cancer among nonsmokers. Radon is responsible for about 21,000 lung cancer deaths every year, approximately 2,900 of which occur among people who have never smoked. Lung cancer is the only known effect on human health from exposure to radon in air and, thus far, there is no evidence that children are

at greater risk of lung cancer than are adults (EPA, March 2010). The main hazard is actually from the radon daughter products (218Po, 214Pb, 214Bi), which may become attached to lung tissue and induce lung cancer by their radioactive decay.

According to the EPA, the average radon concentration in the indoor air of homes nationwide is about 1.3 pCi/L. The EPA recommends homes be mediated if the radon level is 4 pCi/L or more. However, because there is no known safe level of exposure to radon, the EPA also recommends that Americans consider fixing their home for radon levels between 2 pCi/L and 4 pCi/L. Table 4.3.7-1 shows the relationship between various radon levels, probability of lung cancer, comparable risks from other hazards, and action thresholds. As seen in the table below, a smoker exposed to radon has a much higher risk of lung cancer.

Table 4.3.7-1 Radon Risk for Smokers and Nonsmokers (EPA, March 2010)

RADON LEVEL (CCI/L)	CANCER RATE PER 1,000 PEOPLE WITH LIFETIME EXPOSURE*	COMPARATIVE CANCER RISK OF RADON EXPOSURE**	ACTION THRESHOLD
SMOKERS			
20	About 260 people could get lung cancer	250 times the risk of drowning	Fix Structure
10	About 150 people could get lung cancer	200 times the risk of dying in a home fire	
8	About 120 people could get lung cancer	30 times the risk of dying in a fall	
4	About 62 people could get lung cancer	5 times the risk of dying in a car crash	
2	About 32 people could get lung cancer	6 times the risk of dying from poison	Consider fixing structure between 2 and 4 pCi/L
1.3	About 20 people could get lung cancer	(Average indoor radon level)	Reducing radon levels below 2pCi/L is difficult
0.4	About 3 people could get lung cancer	(Average outdoor radon level)	
NONSMOKERS			
20	About 36 people could get lung cancer	35 times the risk of drowning	Fix Structure
10	About 18 people could get lung cancer	20 times the risk of dying in a home fire	
8	About 15 people could get lung cancer	4 times the risk of dying in a fall	
4	About 7 people could get lung cancer	The risk of dying in a car crash	
2	About 4 people could get lung cancer	The risk of dying from poison	Consider fixing structure between 2 and 4 pCi/L
1.3	About 2 people could get lung cancer	(Average indoor radon level)	Reducing radon levels below 2pCi/L is difficult
0.4		(Average outdoor radon level)	

NOTE: Risk may be lower for former smokers.
**Lifetime risk of lung cancer deaths from EPA Assessment of Risks from Radon in Homes (EPA 402-R-03-003).*
***Comparison data calculated using the Centers for Disease Control and Prevention's 1999–2001 National Center for Injury Prevention and Control Reports.*

The worst-case scenario for radon exposure would be that a large area in tightly sealed homes exposed residents to high levels of radon over a prolonged period of time, without the residents being aware. This worst-case scenario exposure then could lead to a large number of people with cancer attributed to the radon exposure.

4.3.7.3 *Past Occurrence*

Current data on abundance and distribution of radon, both as it affects individual houses in Pennsylvania and in Clarion County, is considered incomplete and potentially biased. The EPA has estimated that the national average indoor radon concentration is 1.3 pCi/L and the level for action is 4.0 pCi/L; however, they have estimated that the average indoor concentration in Pennsylvania basements is about 7.1 pCi/L and 3.6 pCi/L on the first floor (PA DEP, 2011). In addition to radon, radon daughter levels should be monitored. Radon daughters are the concentration of decay products of radon in the uranium chain. Fortunately the presence of radon daughter can be monitored through the means as radon gas. Table 4.3.7-3 provides suggested actions and timeframes for varying level of radon daughter exposure.

Table 4.3.7-2 Suggested Actions and Time Frame for Radon Daughters Exposure

EXPOSURE LEVEL*	SUGGESTED ACTION**	TIME FRAME FOR PLAN
More than 5.0 WL***	Residents should either promptly relocate or undertake temporary remedial action to lower levels as far below 5.0 WL as possible. Smoking in high areas discouraged.	Within 2–3 days
1.0 to 5.0 WL	Residents should undertake temporary remedial action to lower levels as far below 1.0 WL as possible. Smoking in high areas discouraged.	Within 1 week
0.5 to 1.0 WL	Residents should undertake temporary remedial action to lower levels as far below 0.5 WL as possible.	Within 2 weeks
0.1 to 0.5 WL	Residents should undertake temporary remedial action to lower levels as far below 0.1 WL as possible. Higher exposure levels require action to be taken in a shorter period of time.	3 weeks to 3 months
0.02 to 0.1 WL	Residents should undertake temporary and/or permanent remedial action to lower levels below 0.02 WL. Higher exposure levels require action to be taken in a shorter period of time.	4 to 15 months

** Assumes continuous 24-hour exposure in living area.*
*** Home testing should be conducted at the end of the indicated time frame to determine if remedial action has reduced the radon exposure levels below the indicated value. If remedial action has not been successful, residents should be aware of the risks associated with continuous exposure at the indicated levels.*
**** Work Levels of radon daughter exposure.*

The PA DEP Bureau of Radiation Protection provides information for homeowners on how to test for radon in their houses. If a test is reported to the Bureau at over 4 pCi/L, then the Bureau works to help the homeowner make repairs to the house to mitigate against high radon levels. The total number of tests reported to the Bureau since 1990 and their results are provided by ZIP code on the Bureau's website. However, this information is only provided if over 30 tests were reported in order to best approximate the average for the area.

The PA DEP, Radon Division conducts radon testing and reports the findings by ZIP codes. Clarion University is located within ZIP code 16214, while the Venango campus is located within ZIP code 16301. Findings from these tests are located in Table 4.3.7-3.

Table 4.3.7-3 Radon Level Tests and Results for Clarion University ZIP Codes

ZIP CODE	LOCATION	AREA IN HOME	NUMBER OF TESTS	MAXIMUM RESULTS (PCI/L)	AVERAGE RESULTS (PCI/L)
16214	Clarion, PA	Basement	508	857.1	10.4
16214	Clarion, PA	First Floor	107	16.9	3.2
16301	Oil City, PA	Basement	608	230.1	10.6
16301	Oil City, PA	First Floor	149	161.5	5.7

SOURCE: PA DEP, 2014

The PA DEP, Radon Division recommends that ***all*** homeowners test for radon, regardless of the ZIP code result. When a ZIP code result shows a low average, there can still be many homes in that ZIP code with elevated radon results. Air Chek, Inc., a company that provides home radon testing kits and manages the Radon.com website, lists the average indoor radon levels of Clarion County, as determined by radon test results from Air Chek, Inc., to be 9.5 pCi/L.

4.3.7.4 *Future Occurrence*

Radon exposure is inevitable given present soil, geologic, and geomorphic factors at Clarion University. Future occurrence of high radon level hazards can be considered *likely* as defined by the Risk Factor Methodology probability criteria.

Development in areas where previous radon levels have been significantly high will continue to be more susceptible to exposure. However, new incidents of concentrated exposure may occur with future development or deterioration of older structures. Exposure can be limited with proper testing for both past and future development and appropriate mitigation measures.

4.3.7.5 *Vulnerability Assessment*

As Table 4.3.7-3 shows, structures in Clarion University could be susceptible to high levels of radon. Smokers can be up to 10 times more vulnerable to lung cancer from high levels of radon depending on the level of radon they are exposed to (see Table 4.3.7-1). Older buildings that have crawl spaces or unfinished basements are more vulnerable because of the increased exposure to soils that could be releasing higher levels of radon gas. Additionally, buildings that rely on wells for their water supply may face an additional risk, although this type of exposure is low and rare in Pennsylvania.

Proper testing for radon levels should be completed across Clarion University. This testing will determine the level of vulnerability that the university population has in the classrooms, residence halls, and offices. The PA DEP Bureau of Radiation Protection provides short- and long-term tests to determine radon levels as well as information on how to mitigate high levels of radon in a building. According to the EPA, repairs to houses to protect against radon have comparable cost to common home repairs and some radon reduction systems can decrease radon levels in the home as much as 99 percent (EPA, 2010).

4.3.8 Subsidence

The USGS cites subsidence as a global problem, and has identified more than 17,000 square miles in 45 states that have been directly affected by subsidence. The USGS defines subsidence as occurring when large amounts of groundwater have been withdrawn from certain types of rocks, such as fine-grained sediments. The rock compacts due to the water being partly responsible for holding the ground up. When the water is withdrawn, the rocks fall in on themselves. Land subsidence can occur over large areas or in a small spot, such as a sinkhole. Subsidence can be a big event — states like California, Texas, and Florida have suffered hundreds of millions of dollars' worth of damage over the years.

4.3.8.1 *Location and Extent*

Subsidence potential around Clarion University is primarily associated with a history of mining in the County and the solution of carbonate bedrock such as limestone and dolomite by water. Over 70 percent of Clarion County is subject to sinkhole occurrence. The few mine maps available show that generally the mining that has occurred has been very deep. However, Figure 4.3.8-1 illustrates numerous underground abandoned mines surrounding Clarion University's main campus that could develop into subsidence or sinkhole risks. Figure 4.3.8-2 also shows underground mines near the Venango branch campus.

Figure 4.3.8-1 Clarion University Main Campus – Subsidence and Sinkhole Risk

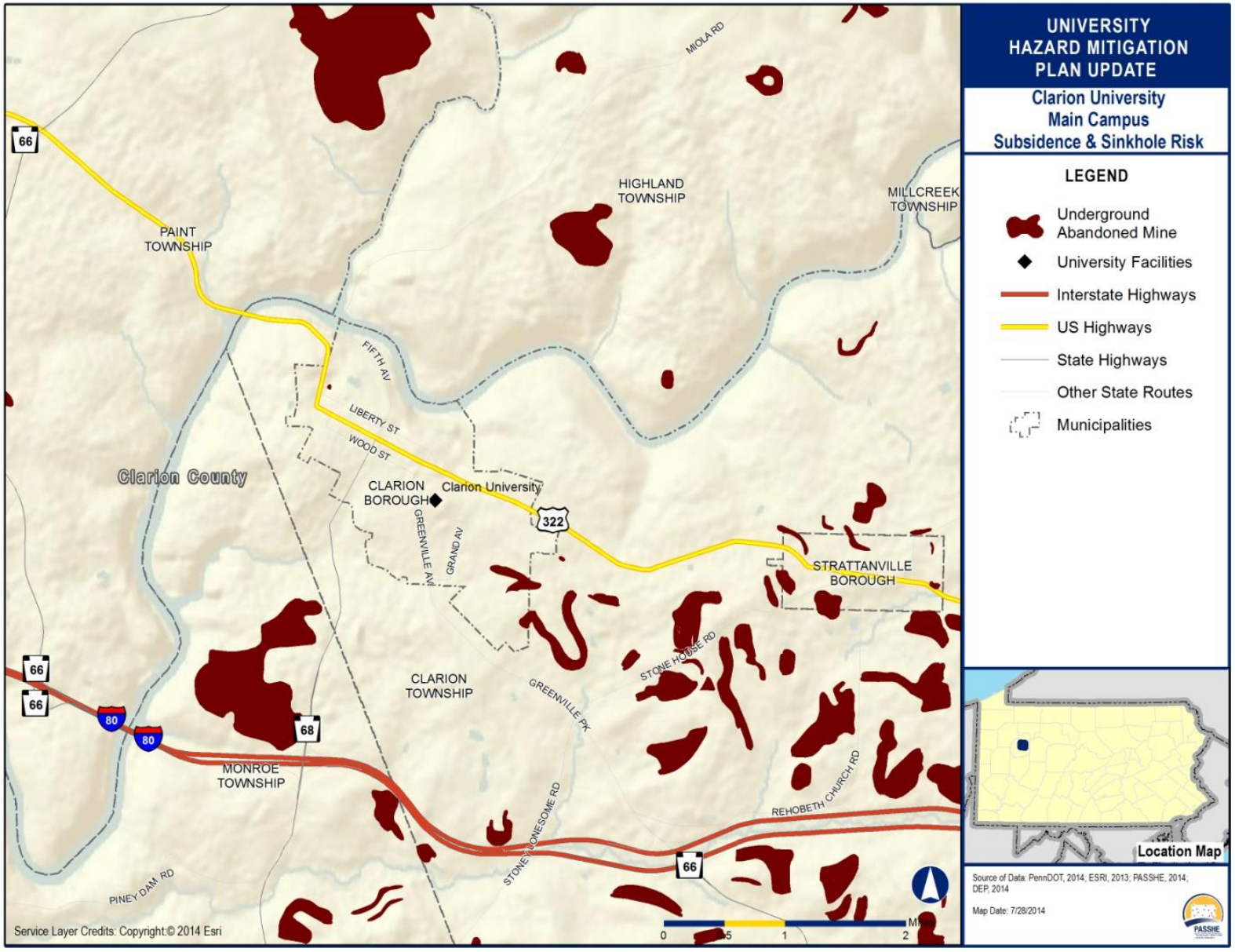
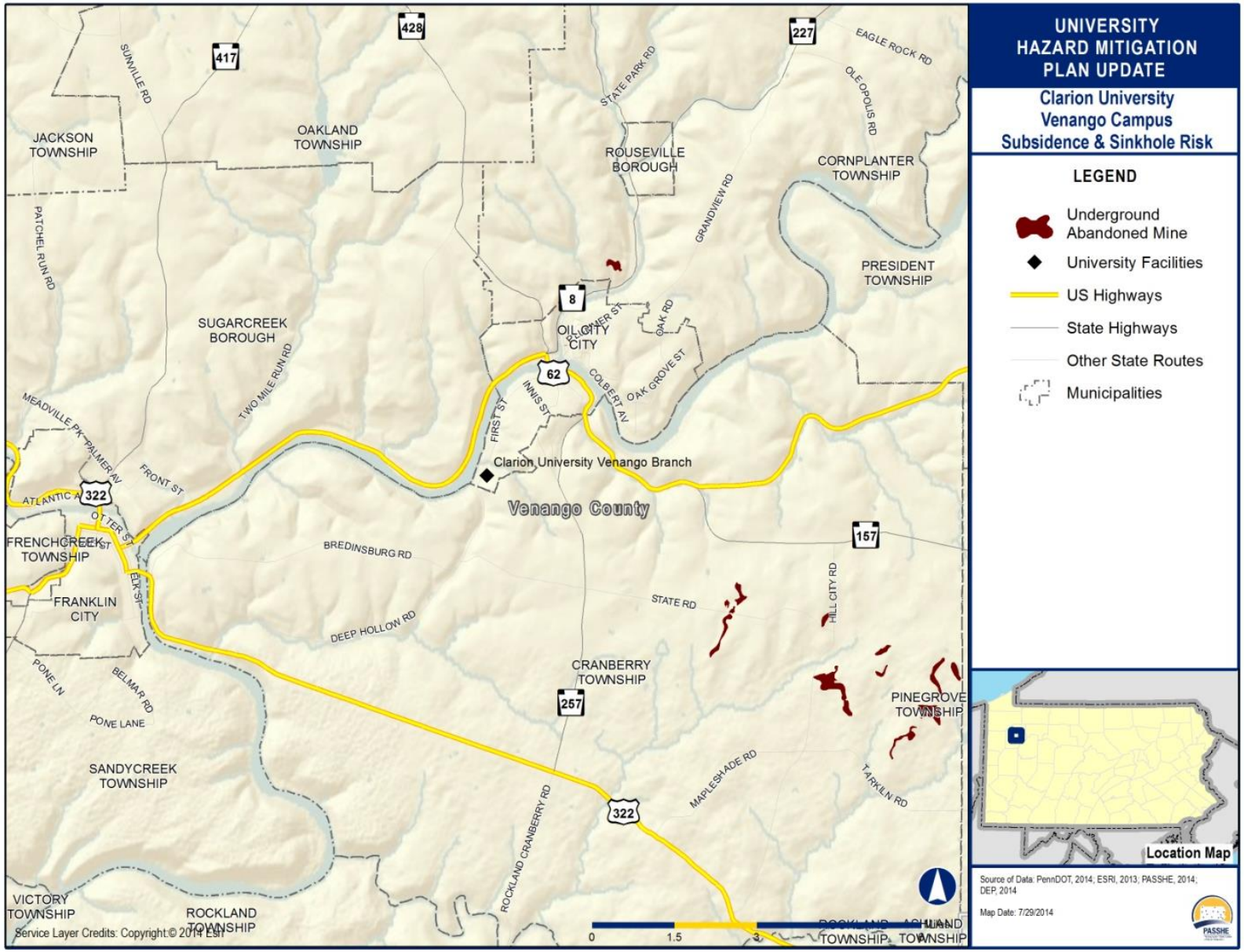


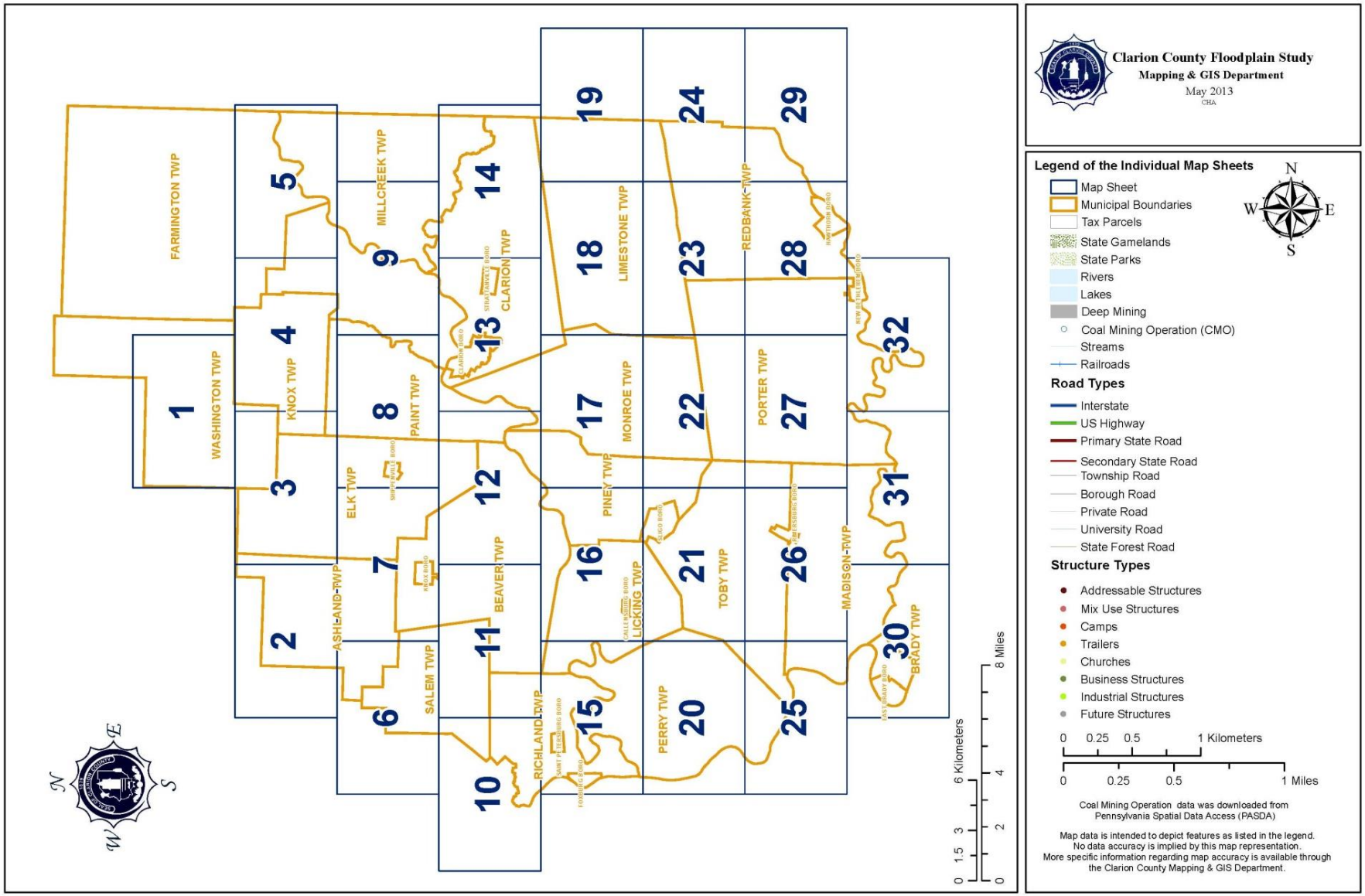
Figure 4.3.8-2 Clarion University Venango Campus – Subsidence and Sinkhole Risk



Regarding geologic subsidence (i.e., non-mining subsidence), water passing through naturally occurring fractures and bedding planes dissolves the bedrock, leaving voids below the surface. Consequently, overburden on top of the voids collapses, leaving surface depressions resulting in karst topography. Characteristic structures associated with karst topography include sinkholes, linear depressions, and caves. Often, a subsurface solution of limestone will not result in the immediate formation of karst features. Collapse sometimes occurs only after a large amount of activity, or when a heavy burden is placed on the overlying material. Durations of heavy rainfall can spur the formation of sinkholes. Abrupt or long-term changes in the ground surface may also occur following subsurface fluid extraction (e.g., natural gas, water, oil).

Figure 4.3.8-3 is an underground mining map index of Clarion County, identifying potential areas for subsidence events. The rest of the deep mining maps can be located in Appendix C: Deep Mining Maps.

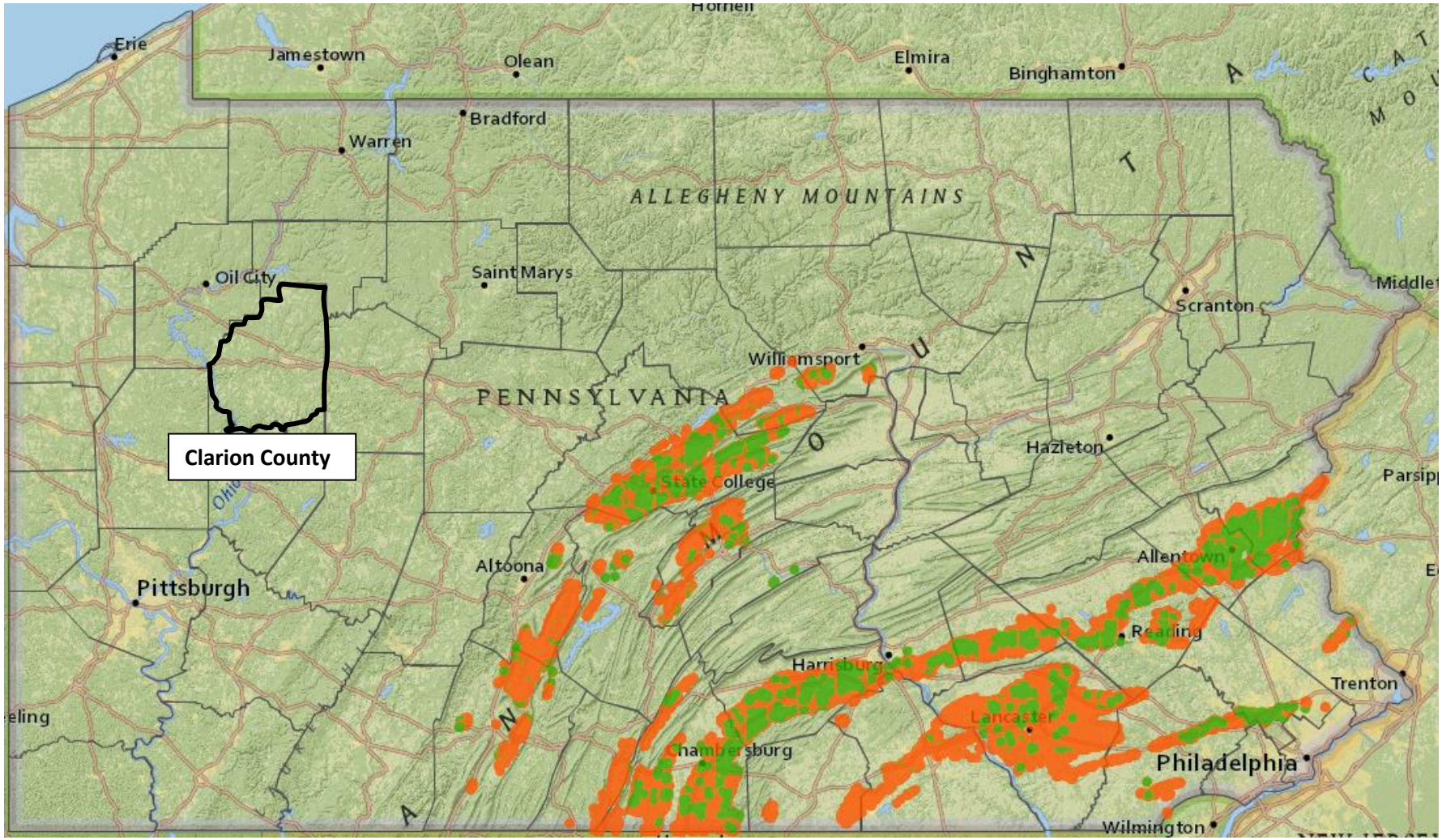
Figure 4.3.8-3 Deep Mining Map Index*



Due to the nature of geology in the region, karst features typically occur along southwest-to-northeast deposits of limestone. The deposits are predominantly Ordovician- and Cambrian-period layers, exposed at the surface through folding, faulting, and long-term erosion.

In addition, the Pennsylvania Department of Conservation and Natural Resources (DCNR) offers a mapping tool that shows the density of identified karst features for most of the band of carbonate rock running through Clarion County and Venango County. Within this band, the density of karst features ranges from 0 to approximately 600 per square mile. There is wide variation in the size of these features. Fewer karst features have been mapped in the existing urban areas of the County. However, this is likely a result of development activities that disguise, cover, or fill existing karst features rather than an absence of the features themselves.

Figure 4.3.8-4 Clarion County Karst Features (Subsidence and Sinkhole Map)



4.3.8.2 *Range of Magnitude*

Based on the geologic formations underlying the entirety of Clarion County, subsidence and sinkhole incidents may occur gradually or abruptly. Incidents could result in minor elevation changes or deep, gaping holes in the ground surface. Subsidence and sinkhole incidents can cause severe damage in urban environments, although gradual incidents can be addressed before significant damage occurs. If long-term subsidence or sinkhole formation is not recognized and mitigation measures are not implemented, fractures or complete collapse of building foundations and roadways may result. General recommendations have been published for site investigations prior to construction of buildings due to the potential for karst subsidence. These recommendations vary depending on the rock type immediately underlying soil cover and include thorough geotechnical investigations to identify un-collapsed karst features and potential excavation to solid rock prior to construction.

Groundwater in limestone and other similar carbonate rock formations can be easily polluted, because water moves readily from the Earth's surface down through solution cavities and fractures, thus undergoing very little filtration. Contaminants such as sewage, fertilizers, herbicides, pesticides, or industrial products are a secondary concern of subsidence.

4.3.8.3 *Past Occurrence*

Clarion County has experienced isolated incidents of sinkholes and subsidence over the years, particularly in coal regions. Houses, garages, trees, local streets and highways, and building foundations have all been impacted by subsidence events.

The University is vulnerable to these potential subsidence events. One of the more recent instances occurred in spring 2010 in Clarion Borough, at University-owned property, where a sinkhole measuring approximately 4 ft. deep and 3 ft. wide opened. Additionally, there are three mineshaft subsidence formations discovered in St. Petersburg Borough.

In August 2003, a residential area in Clarion Township also experienced two sinkholes, measuring 20 ft. deep and 4 ft. wide. The Department of Environmental Protection's Bureau of Abandoned Mine Reclamation (BAMR) conducted an investigation and mitigated the holes.

Although PA DEP does not currently have record of any other subsidence incidents, these examples demonstrate the potential for subsidence at the University.

4.3.8.4 *Future Occurrence*

Based on geological conditions and the presence of previously formed sinkholes, the occurrence of subsidence and sinkhole incidents in the future for Clarion University is *possible*. It is impossible to say when or where sinkholes can occur, but the potential exists for subsidence or sinkholes developing in and around the University.

4.3.8.5 *Vulnerability Assessment*

The areas along the karst bands and mining areas in the County are most vulnerable to the effects of natural subsidence incidents. DCNR describes subsidence as a low probability in the Clarion Borough. If subsidence events occur, local roads need annual repair, and damage to gas lines, telephone, and electrical entry road facilities could occur in highly populated areas. The Clarion County HMP identifies a

worst-case scenario as a major subsidence event occurring in Clarion Borough, as total damages could exceed $100 million.

In Pennsylvania, research has shown that sinkholes are generally found in areas underlain by carbonate bedrock, found in large areas of central and eastern Pennsylvania but not in Clarion County. Oil City is in a low susceptibility area for karst.

Subsidence can also occur as a result of underground mining, excessive pumping of ground water, or subsurface erosion due to the failure of existing utility lines. A substantial amount of the County may have been undermined for coal and subsidence cannot be ruled out; however, the area under the University is not *suspected* to have had underground mining. Thus, subsidence is deemed to be a relatively minor hazard for Clarion University.

According to the Department of Environmental Protection, the following municipalities in Clarion County have had a history of mining activities:

Table 4.3.8-1 List of Municipalities with a History of Mining Activity

MUNICIPALITY	MUNICIPALITY
Brady Township	Perry Township
Clarion Borough	Piney Township
Clarion Township	Porter Township
East Brady Borough	Redbank Township
Hawthorn Borough	Rimersburg Borough
Knox Township	St. Petersburg Borough
Limestone Township	Strattanville Borough
Madison Township	Toby Township
Monroe Township	Washington Township
Paint Township	

4.3.9 Tornado/Windstorm

4.3.9.1 *Location and Extent*

Tornadoes and windstorms can occur frequently at Clarion University and in the surrounding area, although incidents are usually localized. However, severe thunderstorms may result in conditions favorable to the formation of numerous or long-lived tornadoes. Tornadoes can occur at any time during the day or night, but are most frequent during late afternoon into early evening, the warmest hours of the day, and most likely to occur during the spring and early summer months of March through June. Tornado movement is characterized in two ways: direction and speed of spinning winds, and forward movement of the tornado, also known as the storm track. The forward motion of the tornado path can be a few hundred yards or several hundred miles in length. The width of tornadoes can vary greatly, but generally range in size from less than 100 feet to over a mile in width. Some tornadoes never touch the ground and are short-lived, while others may touch the ground several times.

Straight-line winds and windstorms are experienced on a more region-wide scale. While such winds usually accompany tornadoes, straight-line winds are caused by the movement of air from areas of higher pressure to areas of lower pressure. Stronger winds are the result of greater differences in pressure.

Windstorms are generally defined as having sustained wind speeds of 40 mph or greater lasting for one hour or longer, or winds of 58 mph or greater for any duration.

4.3.9.2 *Range of Magnitude*

Each year, tornadoes account for $1.1 billion in damages and cause more than 80 deaths nationally (National Center for Atmospheric Research [NCAR], 2001). While the extent of tornado damage is usually localized, the vortex of extreme wind associated with a tornado can result in some of the most destructive forces on Earth. Rotational wind speeds can range from 100 mph to more than 250 mph. In addition, the speed of forward motion can range from zero to 50 mph. Therefore, some estimates place the maximum velocity (combination of ground speed, wind speed, and upper winds) of tornadoes at about 300 mph. The damage caused by a tornado is a result of the high wind velocity and windblown debris, also accompanied by lightning or large hail. The most violent tornadoes have rotating winds of 250 mph or more and are capable of causing extreme destruction and turning normally harmless objects into deadly missiles.

Damages and deaths can be especially significant when tornadoes move through populated, developed areas. The destruction caused by tornadoes ranges from light to inconceivable depending on the intensity, size, and duration of the storm. Typically, tornadoes cause the greatest damages to structures of light construction such as mobile homes. The Enhanced Fujita Scale, also known as the EF-Scale, measures tornado strength and associated damages. The EF-Scale is an update to the earlier Fujita Scale, also known as the F-Scale, which was published in 1971. It classifies U.S. tornadoes into six intensity categories, as shown in Table 4.3.9-1, based upon the estimated maximum winds occurring within the wind vortex. Since its implementation by the National Weather Service in 2007, the EF-Scale has become the definitive metric for estimating wind speeds within tornadoes based upon damage to buildings and structures. F-Scale categories with corresponding EF-Scale wind speeds are provided in Table 4.3.9-1 since the magnitude of previous tornado occurrences is based on the F-Scale.

Table 4.3.9-1 Enhanced Fujita Scale (EF Scale) Categories with Associated Wind Speeds and Description of Damages

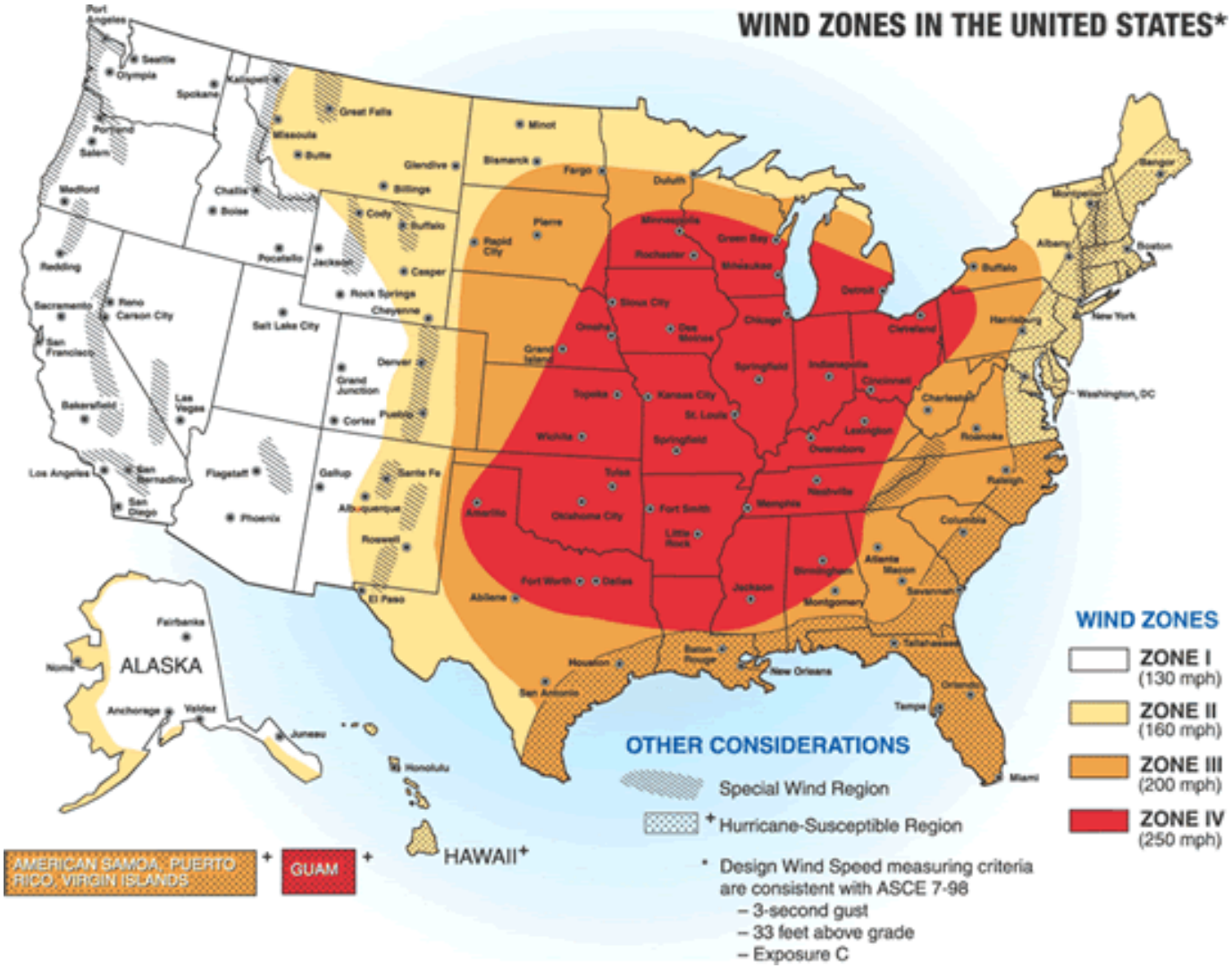
EF-SCALE NUMBER	WIND SPEED (MPH)	F-SCALE NUMBER	TYPE OF DAMAGE POSSIBLE
EF0	65–85	F0-F1	**Minor damage**: Peels surface off some roofs; some damage to gutters or siding; branches broken off trees; shallow-rooted trees pushed over. Confirmed tornadoes with no reported damage (i.e., those that remain in open fields) are always rated EF0.
EF1	86–110	F1	**Moderate damage**: Roofs severely stripped; mobile homes overturned or badly damaged; loss of exterior doors; windows and other glass broken.
EF2	111–135	F1-F2	**Considerable damage**: Roofs torn off well-constructed houses; foundations of frame homes shifted; mobile homes completely destroyed; large trees snapped or uprooted; light-object missiles generated; cars lifted off ground.
EF3	136–165	F2-F3	**Severe damage**: Entire stories of well-constructed houses destroyed; severe damage to large buildings such as shopping

Table 4.3.9-1 Enhanced Fujita Scale (EF Scale) Categories with Associated Wind Speeds and Description of Damages			
EF-SCALE NUMBER	**WIND SPEED (MPH)**	**F-SCALE NUMBER**	**TYPE OF DAMAGE POSSIBLE**
			malls; trains overturned; trees debarked; heavy cars lifted off the ground and thrown; structures with weak foundations blown away some distance.
EF4	166–200	F3	**Devastating damage**: Well-constructed houses and whole frame houses completely leveled; cars thrown and small missiles generated.
EF5	>200	F3-F6	**Extreme damage**: Strong frame houses leveled off foundations and swept away; automobile-sized missiles fly through the air in excess of 100 m (300 ft.); steel reinforced concrete structure badly damaged; high-rise buildings have significant structural deformation.

Figure 4.3.9-1 shows wind speed zones across the United States. It identifies wind speeds that could occur across the United States to be used as the basis for design and evaluation of the structural integrity of shelters and critical facilities. Pennsylvania falls within Zones II, III, and IV, meaning that design wind speeds for shelters and critical facilities should be able to withstand a three-second gust of up to the mph representative of that zone, regardless of whether the gust is the result of a tornado, hurricane, tropical storm, or windstorm incident. Therefore, these structures should be able to withstand speeds experienced in an EF4 tornado.

Figure 4.3.9-2 shows the wind speed zones across Pennsylvania. This represents wind zones throughout the United State and the areas within the wind zones.

Figure 4.3.9-1 Wind Zones in the United States



SOURCE: FEMA, 2013

Figure 4.3.9-2 Wind Zones in Clarion County (FEMA 2009)

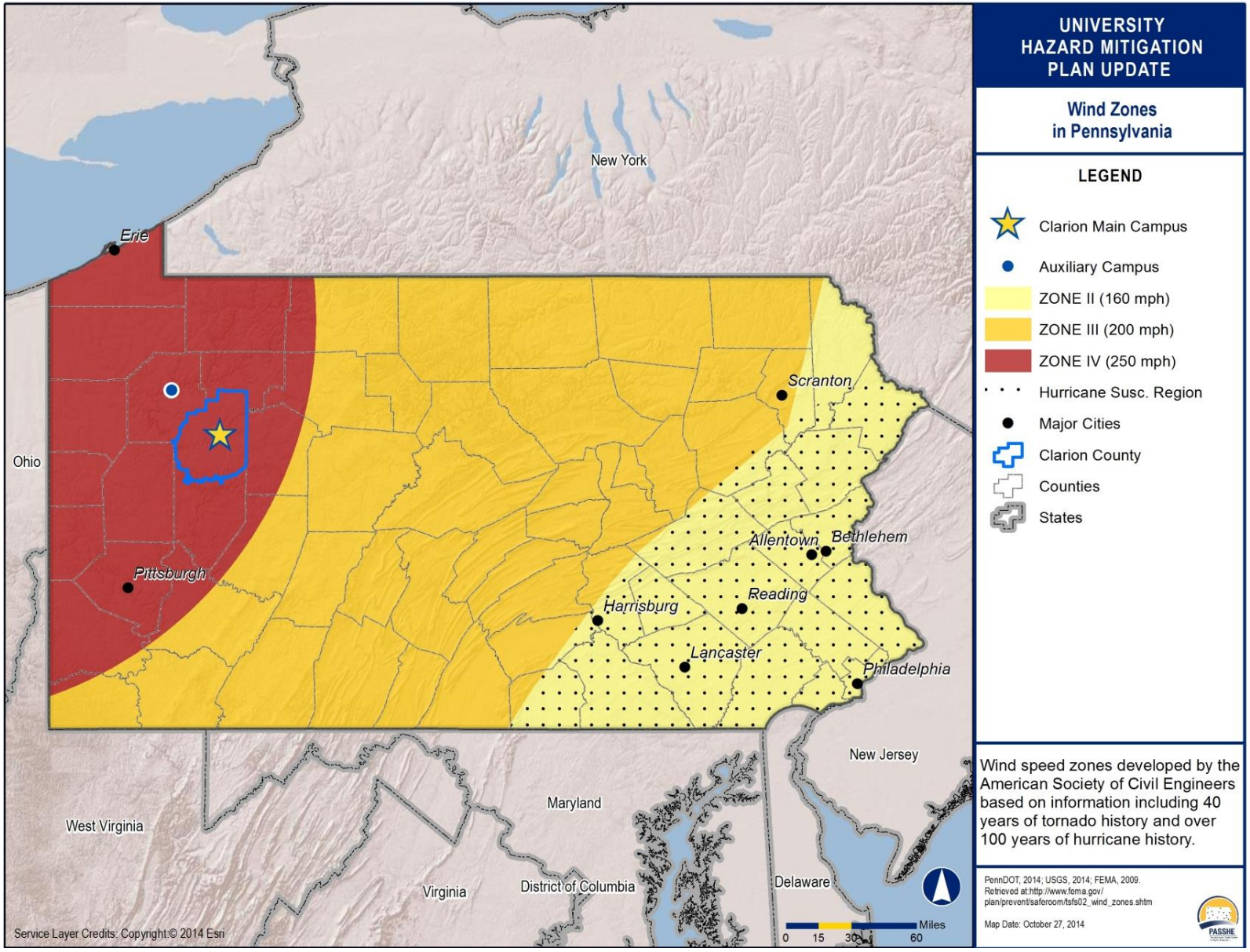


Table 4.3.9-2 Wind Zones and Areas Affected	
Wind Zones	**Areas Affected**
Zone I (130 mph)	All of Washington, Oregon, California, Idaho, Utah, and Arizona. Western parts of Montana, Wyoming, Colorado and New Mexico. Most of Alaska except the east and south coastlines.
Zone II (160 mph)	Eastern parts of Montana, Wyoming, Colorado, New Mexico. Most of North Dakota. Northern parts of Minnesota, Wisconsin and Michigan. Western parts of South Dakota, Nebraska and Texas. All New England States. Eastern parts of New York, Pennsylvania, Maryland, and Virginia. Washington, DC.
Zone III (200 mph)	Areas of Minnesota, South Dakota, Nebraska, Colorado, Kansas, Oklahoma, Texas, Louisiana, Mississippi, Alabama, Georgia, Tennessee, Kentucky, Pennsylvania, New York, Michigan, and Wisconsin. Most or all of Florida, Georgia, South Carolina, North Carolina, Virginia, West Virginia. All of American Samoa, Puerto Rico, and Virgin Islands.
Zone IV (250 mph)	Mid-U.S., including all of Iowa, Missouri, Arkansas, Illinois, Indiana, and Ohio and parts of adjoining states of Minnesota, South Dakota, Nebraska, Kansas, Oklahoma, Texas, Louisiana, Mississippi, Alabama, Georgia, Tennessee, Kentucky, Pennsylvania, Michigan, and Wisconsin. Guam.
Special Wind Region	Isolated areas in the following states: Washington, Oregon, California, Idaho, Utah, Arizona, Montana, Wyoming, Colorado, New Mexico. The borders between Vermont and New Hampshire; between New York, Massachusetts and Connecticut; between Tennessee and North Carolina.
Hurricane Susceptible Region	Southern U.S. coastline from Gulf Coast of Texas eastward to include entire state of Florida. East Coastline from Maine to Florida, including all of Massachusetts, Connecticut, Rhode Island, Delaware, and Washington, D.C. All of Hawaii, Guam, American Samoa, Puerto Rico and Virgin Islands.

SOURCE: FEMA, 2013

Clarion University has not been severely impacted by major tornados. No deaths and only one tornado-related injury has been reported over the years. The vast majority of tornadoes near Clarion University are F-0 through F-2 levels, as seen in Figure 4.3.9-2.

Figure 4.3.9-5 shows the tornado touchdown and tracking activity around the Venango Branch campus. The scale ranged between F-0 and F-2 levels. The track shown on the map is recorded from a tornado event that occurred on May 31, 1985, and traveled for 56.2 miles across Venango County.

Figure 4.3.9-2 Tornado F-Scale and Tracks in Clarion County and the Clarion University locality

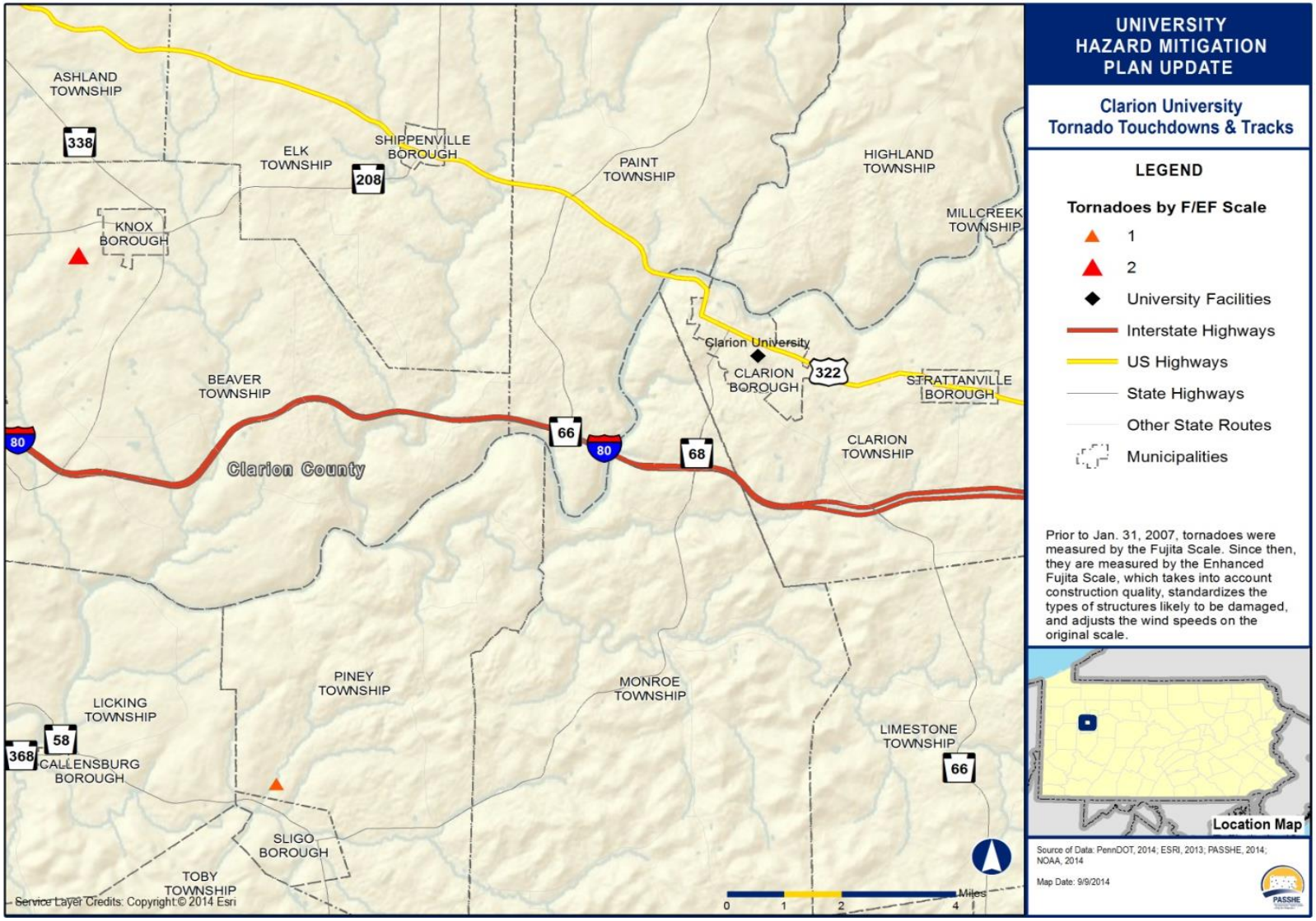
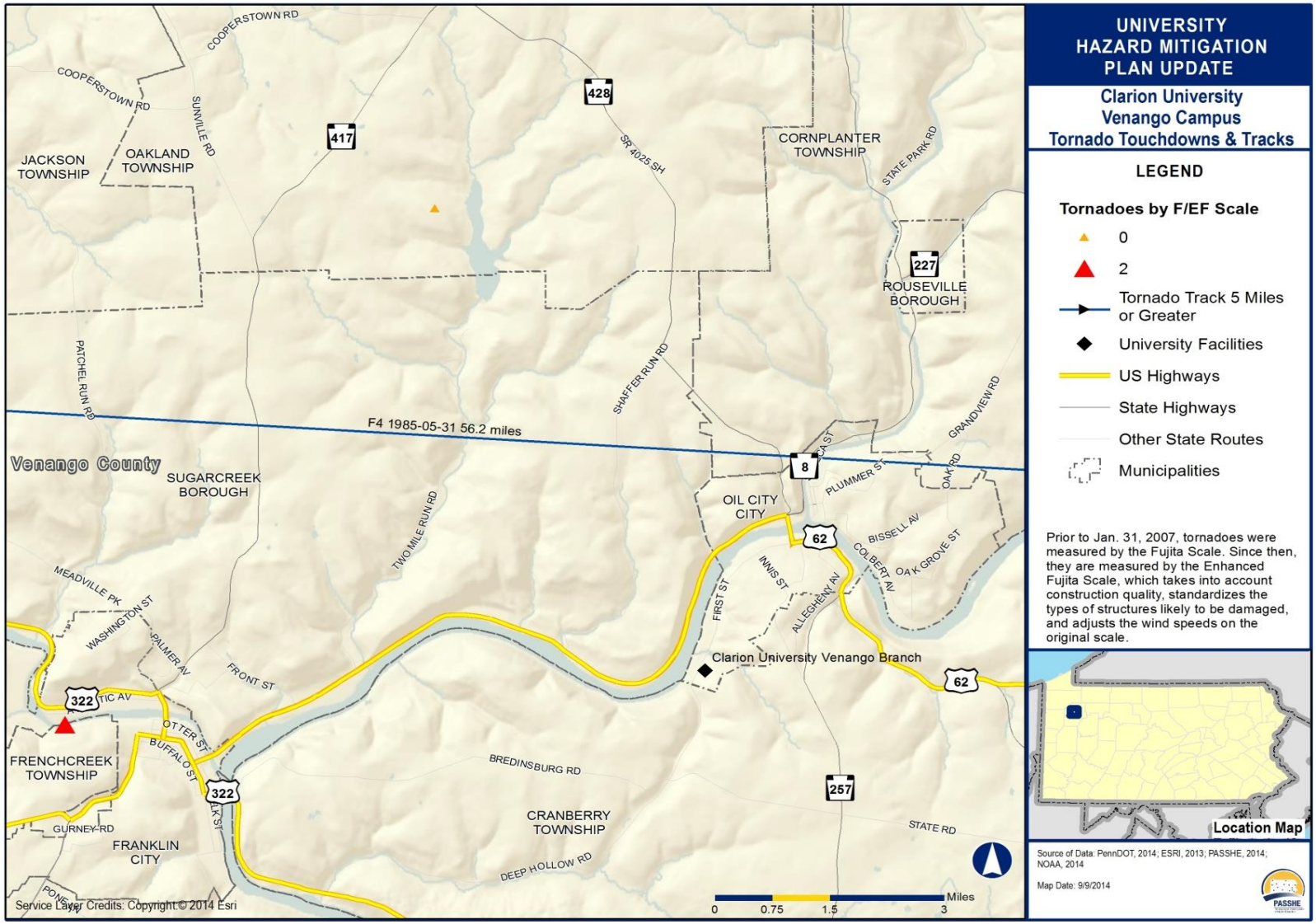


Figure 4.3.9-3 Tornado F/EF Scale Touchdowns & Tracks – Clarion University – Venango Campus, Clarion County



Since tornado incidents are typically localized, environmental impacts are rarely widespread. However, where these incidents occur, severe damage to plant species is likely. This includes loss of trees and an increased threat of wildfire in areas where dead trees are not removed. Hazardous material facilities should meet design requirements for the wind zones identified in Table 4.3.9-2 as a measure to prevent the release of hazardous materials into the environment.

4.3.9.3 *Past Occurrence*

Tornadoes have occurred in all seasons and all regions of Pennsylvania, but the northern, western, and southeastern portions of the Commonwealth have been struck more frequently. Table 4.3.9-3 shows the location and scale of tornados that have originated in Pennsylvania from 1950 to 2014.

The worst tornado incident noted in the County HMP occurred on May 31, 1985, when multiple tornados impacted Pennsylvania, New York, Ohio, and part of Canada. Although one of these tornados also occurred near the University, that tornado did not have the same devastating impact as others in the series. More than 75 people were killed in the United States, and the only F5 tornado in Pennsylvania was part of this event. There have been 15 high-wind incidents and one strong-wind incident recorded in Clarion County since 1996. The area around the University has also experienced 86 thunderstorm wind events since 1958. Historically, the University and surrounding area has experienced both severe windstorms and tornadoes.

Figure 4.3.9-4 Tornado Tracks and EF Scale Designation

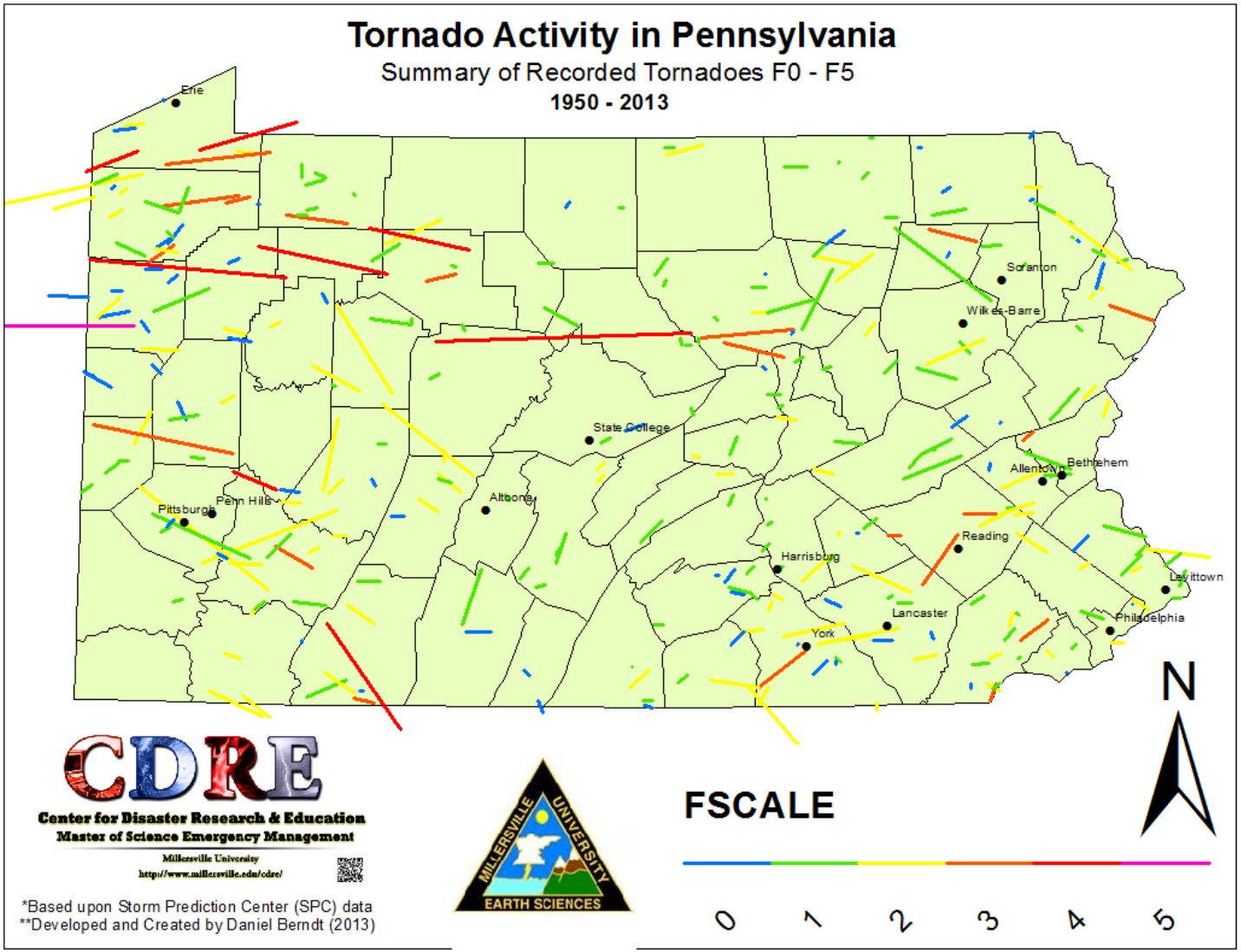


Table 4.3.9-3 Tornado Incidents for Clarion County, Pennsylvania from 1950–2014				
DATE	FUJITA SCALE MAGNITUDE	WIDTH (YARDS)	LENGTH (MILES)	ESTIMATED PROPERTY LOSS ($)
06/01/1954	2	33	0	2,500
10/04/1973	1	60	1	250,000
05/31/1985	0	300	2	0
07/19/1996	2	100	7.5	25,000
07/26/2002	0	150	2	30.000
06/18/2014	EF0	150	4.57	25,000

SOURCE: NCDC, 2014

4.3.9.4 *Future Occurrence*

According to the National Weather Service, the Commonwealth of Pennsylvania has an annual average of 10 tornadoes with two related deaths. While the chance of being hit by a tornado is small, the damage that results when the tornado arrives is devastating. An F4 tornado, with a 0.019 percent annual probability of occurring, can carry wind velocities of 200 mph, resulting in a force of more than 100 pounds per square foot of surface area. This is a "wind load" that exceeds the design limits of most buildings.

The number of windstorms and tornadoes occurring in the county is expected to remain constant. As the University's population continues to grow and as residential and commercial construction continues, the number of people and properties vulnerable to the effects of tornadoes and windstorms will increase accordingly.

Based on historical incidents between 1950 and 2014, Clarion University is likely to experience a tornado approximately once every 10 years and a windstorm one to two times per year. Using the Risk Factor Methodology, participants in this HMP development have indicated that they feel a tornado incident is *possible.*

4.3.9.5 *Vulnerability Assessment*

While the frequency of windstorms and minor tornadoes is expected to remain relatively constant, vulnerability increases in more densely developed areas. Since high-wind incidents may affect the University, it is important to identify specific critical facilities and assets that are most vulnerable to the hazard. Due to their lightweight and often unanchored design, mobile homes and commercial trailers are extremely vulnerable to high winds and will generally sustain the most damage. Many schools use such buildings to house specialty classes or temporary classroom quarters until a renovation or an addition to the main facility is completed. However, these types of structures represent a very small percentage of the occupied structures within the County and at the University.

FEMA recommends taking shelter from a storm in a hardened structure called a Safe Room for protection. Safe Rooms are constructed out of specific materials and designed to withstand extreme weather events, including tornadoes and hurricanes. Based on current knowledge of tornadoes and hurricanes, the occupants of a Safe Room built in accordance with FEMA guidance will have a very high probability of being protected from injury or death.

4.3.10 Winter Storm

Winter storms may include snow, sleet, freezing rain, or a mix of these wintry forms of precipitation. A winter storm can range from a moderate snowfall or ice incident over a period of a few hours to blizzard conditions with wind-driven snow that lasts for several days. Many winter storms are accompanied by low temperatures and heavy and/or blowing snow, which can seriously impair visibility and disrupt transportation. The Commonwealth of Pennsylvania has a long history of severe winter weather.

4.3.10.1 *Location and Extent*

Winter storms are regional incidents. Every county in the Commonwealth is subject to severe winter storms. However, the northern tier and western mountain regions, where Clarion University and the Venango campus are located, tend to experience more frequent and severe winter storms than the rest of the state. On average, the majority of Clarion County receives 30–40 inches of snow annually while Venango County, where the University's secondary campus is, receives between 30–50 inches annually (see Figure 4.3.10-1).

4.3.10.2 *Range of Magnitude*

Winter storms consist of cold temperatures, heavy snow or ice, and sometimes strong winds. They begin as low-pressure systems that move through Pennsylvania either following the jet stream or developing as extra-tropical cyclonic weather systems over the Atlantic Ocean called nor'easters. Due to their regular occurrence, these storms are considered hazards only when they result in damage to specific structures or cause disruption to traffic, communications, electric power, or other utilities.

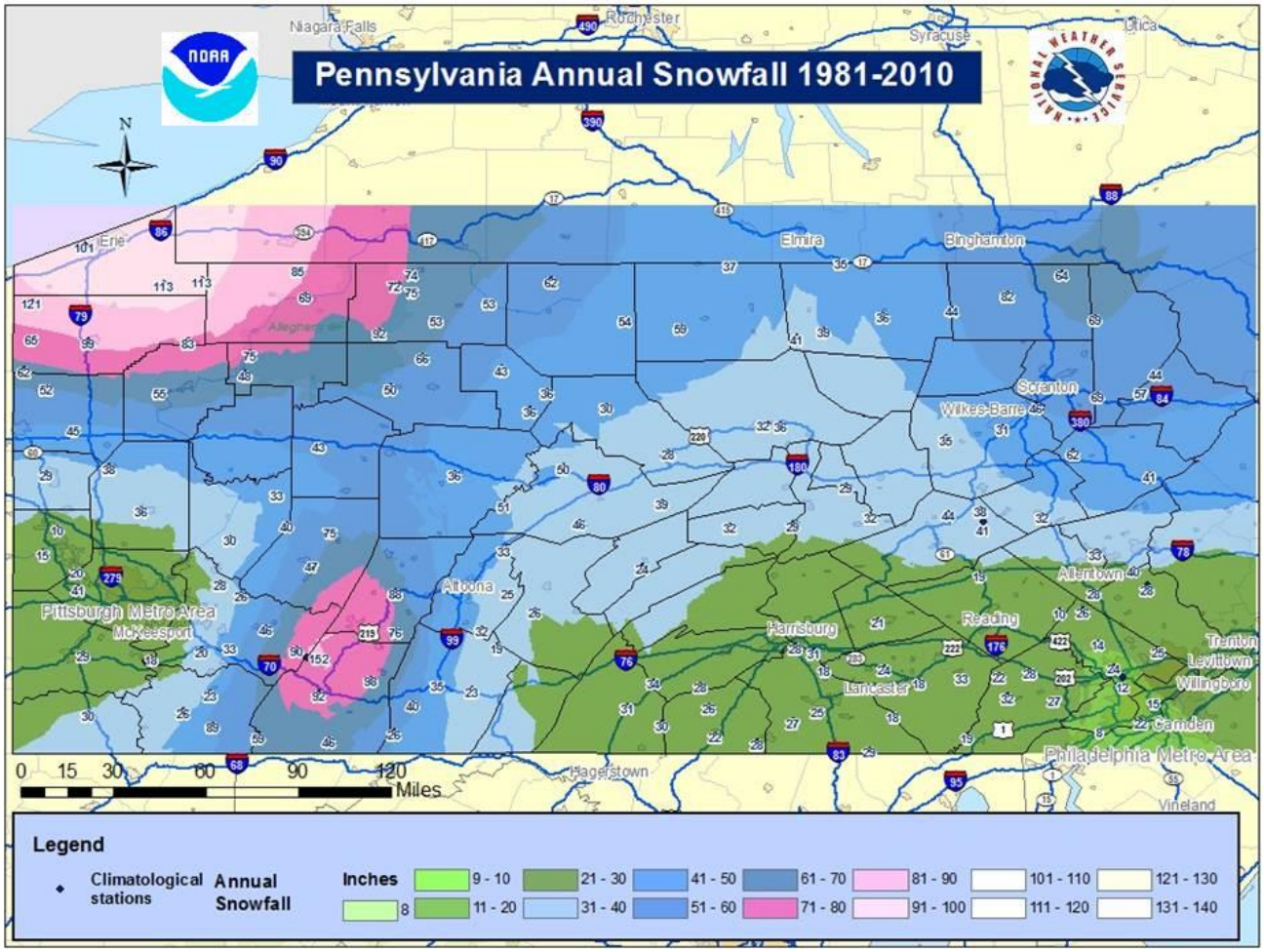
A winter storm can adversely affect roadways, utilities, and business activities, and can cause frostbite or loss of life. Winter weather occurring during the growing season can also cause damage to crops and reduce agricultural yields, a significant factor in Clarion County, even though it does not directly impact the University. These storms may include one or more of the following weather incidents:

- **Heavy Snowstorm:** Accumulations of four inches or more in a six-hour period, or six inches or more in a 12-hour period.
- **Sleet Storm:** Significant accumulations of solid pellets that form from the freezing of raindrops or partially melted snowflakes, causing slippery surfaces that pose hazards to pedestrians and motorists.
- **Ice Storm:** Significant accumulations of rain or drizzle freezing on objects (trees, power lines, roadways, etc.) as it strikes them, causing slippery surfaces and damage from the sheer weight of ice accumulation.
- **Blizzard:** Wind velocity of 35 miles per hour or more, temperatures below freezing, considerable blowing snow with visibility frequently below one-quarter mile lasting over an extended period of time.
- **Severe Blizzard:** Wind velocity of 45 miles per hour, temperatures of 10 degrees Fahrenheit or lower, a high density of blowing snow with visibility frequently measured in feet lasting over an extended period of time.

Any of the above incidents can result in the following: closing of major or secondary roads, stranded motorists, transportation accidents, loss of utility services, and depletion of oil heating supplies. Environmental impacts often include damage to shrubbery and trees due to heavy snow loading, ice buildup, and/or high winds that can break limbs or even bring down large trees. Gradual melting of snow and ice provides excellent

groundwater recharge. However, high temperatures following a heavy snowfall can cause rapid surface water runoff and severe flooding.

Figure 4.3.10-1 Mean Annual Snowfall for Pennsylvania and Clarion County



While its mean annual snowfall is 40 inches or less, Clarion County has experienced seasonal snowfalls ranging from a low of one half inch in the winter of 1994 to a high of 76.75 inches in the winter of 1960. Table 4.3.10-1 lists Clarion County's seasonal snowfalls from 1943–2014 as recorded by the NCDC's Annual Summaries Station Details reports. The "season" is defined as October through April.

Table 4.3.10-1 Seasonal Snowfall Amounts in Inches for Clarion University/Clarion, PA, 1943–2014

YEAR	SNOWFALL	YEAR	SNOWFALL	YEAR	SNOWFALL	YEAR	SNOWFALL
1943	4.5 IN	1965	24.2 IN	1987	42.1 IN	2009	50.8 IN
1944	73.7 IN	1966	29.4 IN	1988	26.1 IN	2010	56.6 IN
1945	45.6 IN	1967	25.9 IN	1989	35.9 IN	2011	10.6 IN
1946	22.1 IN	1968	18.2 IN	1990	25.0 IN	2012	17.6 IN
1947	52.0 IN	1969	32.3 IN	1991	17.0 IN	2013	41.0 IN
1948	38.4 IN	1970	15.4 IN	1992	40.8 IN	2014	37.5 IN

Table 4.3.10-1 Seasonal Snowfall Amounts in Inches for Clarion University/Clarion, PA, 1943–2014

YEAR	SNOWFALL	YEAR	SNOWFALL	YEAR	SNOWFALL	YEAR	SNOWFALL
1949	28.6 IN	1971	58.4 IN	1993	22.6 IN		
1950	57.3 IN	1972	31.1 IN	1994	0.5 IN*		
1951	38.3 IN	1973	11.8 IN	1995	35.1 IN		
1952	18.6 IN	1974	25.4 IN	1996	31.6 IN		
1953	17.0 IN	1975	33.7 IN	1997	33.0 IN		
1954	36.4 IN	1976	51.6 IN	1998	18.8 IN		
1955	27.1 IN	1977	52.5 IN	1999	39.9 IN		
1956	38.4 IN	1978	57.9 IN	2000	15.9 IN		
1957	35.9 IN	1979	23.8 IN	2001	25.6 IN		
1958	54.8 IN	1980	22.8 IN	2002	17.0 IN		
1959	17.1 IN	1981	13.0 IN	2003	40.8 IN		
1960	76.7 IN*	1982	41.1 IN	2004	30.8 IN		
1961	63.4 IN	1983	17.7 IN	2005	14.8 IN		
1962	56.8 IN	1984	36.3 IN	2006	8.0 IN		
1963	75.5 IN	1985	64.8 IN	2007	39.4 IN		
1964	21.5 IN	1986	32.5 IN	2008	47.4 IN		

*DENOTES LEAST AND GREATEST SEASONAL SNOWFALL

SOURCE: U.S. DEPARTMENT OF COMMERCE, NATIONAL OCEANIC & ATMOSPHERIC ADMINISTRATION, NATIONAL ENVIRONMENTAL SATELLITE, DATA, AND INFORMATION SERVICE, NATIONAL CLIMATIC DATA CENTER–ANNUAL SUMMARIES STATION DETAILS

Two of the 12 Presidential Disaster and Emergency Declarations affecting Clarion County have been in response to hazard incidents related to winter storms. The January 1996 snowstorm has been referred to as the "storm of the century," but the worst-case scenario of a winter storm in Clarion County occurred long ago on February 4, 1961. In a single day, the storm dropped nearly 22 inches of snow on the County and University with significant drifting, causing many primary and secondary road closures.

Table 4.3.10-2 Record Snowfall Data for Clarion

MONTH	RECORD SNOWFALL	YEAR
October	4.0 in	1934
November	18.7 in	1950
December	30.7 in	1944
January	57.0 in	1910
February	44.0 in	1910
March	25.5 in	1992
April	11.1 in	1953
May	4.0 in	1963

SOURCE: U.S. DEPARTMENT OF COMMERCE, NATIONAL OCEANIC & ATMOSPHERIC ADMINISTRATION, NATIONAL ENVIRONMENTAL SATELLITE, DATA, AND INFORMATION SERVICE, NATIONAL CLIMATIC DATA CENTER–ANNUAL SUMMARIES STATION DETAILS

4.3.10.3 *Past Occurrence*

The following raw, unedited dataset from FEMA's National Emergency Management Information System (NEMSIS) is primarily composed of historical data that was manually entered into NEMSIS. The NEMSIS system started in 1998. There have been five major disaster declarations or emergency declarations in Clarion County.

Table 4.3.10-3 Presidential & Gubernatorial Disaster & Emergency Declarations Affecting Clarion County

DISASTER #	PA PROGRAM DECLARED	DECLARATION DATE	DISASTER TYPE	INCIDENT TYPE	TITLE	INCIDENT BEGIN DATE	INCIDENT END DATE
1093	Yes	1/21/1996	DR	Flood	Severe Storms & Flooding	1/19/96	2/1/1996
3105	Yes	3/16/1993	EM	Snow	Severe Snowfall & Winter Storm	3/13/93	3/17/1993
641	Yes	6/15/1981	DR	Flood	Severe Storms & Flooding	6/15/81	6/15/1981
629	Yes	8/19/1980	DR	Flood	Severe Storms & Flooding	8/19/80	8/19/1980
3026	Yes	1/29/1977	EM	Snow	Snowstorms	1/29/77	1/29/1977

SOURCE: FEMA–DISASTER DECLARATIONS SUMMARY UPDATED JULY 25, 2014[14]

Clarion University, Clarion County, and the Commonwealth of Pennsylvania have experienced numerous severe winter weather incidents. Significant winter storm incidents that have affected Clarion County are listed below; these incidents represent a comprehensive list of snow incidents. Incidents occurring prior to 1993 have been compiled from SHELDUS, while incidents occurring after 1993 originate from the NCDC.

One of the most devastating winter storms in Pennsylvania occurred in early January 1994, with record snowfall depths in many areas, strong winds, and sleet/freezing rains. Within the state, there were numerous storm-related power outages reported and as many as 600,000 residents were without electricity, in some cases for several days at a time. A ravaging ice storm followed that closed major arterial roads and that downed trees and power lines across the state. Utility crews from a five-state area were called to assist in power restoration repairs. Officials from PPL Corporation stated that this was the worst winter storm in the history of the company; related damage-repair costs exceeded $5,000,000.

Table 4.3.10-4 History of Winter Storms in Clarion County

DATE	TYPE	PROPERTY DAMAGE*
12/29/1962	Wind – Winter Weather	$74,656.87
3/5/1965	Winter Weather	$16,129.03
11/30/1974	Winter Weather	$217,391.30

[14] Dataset is the official FEMA Disaster Declarations. The dataset was accessed November 5, 2014, and retrieved from FEMA.gov. FEMA and the Federal Government cannot vouch for the data or analyses derived from these data after the data have been retrieved from the Agency's website(s) and/or Data.gov.

Table 4.3.10-4 History of Winter Storms in Clarion County		
DATE	**TYPE**	**PROPERTY DAMAGE***
1/20/1978	Winter Weather	$2,631,578.95
1/26/1978	Wind – Winter Weather	$2,631,578.95
12/10/1992	Winter Weather	$74,626.90
3/13/1993	Winter Weather	$27,777.78
2/8/1994	Winter Weather	$21,739.13
1/2/1999	Winter Weather	$16,666.67
1/5/2005	Winter Weather	$24,000.00
**Please note that SHELDUS losses are calculated by dividing total losses associated with an incident by the number of communities experiencing damages. These losses should be considered a rough estimate.*		

Serious power supply shortages continued through mid-January because of record cold temperatures in many places, causing sporadic power generation outages across the Commonwealth. The entire Pennsylvania-New Jersey-Maryland grid and its partners in the District of Columbia, New York, and Virginia experienced 15- to 30-minute rolling blackouts, threatening the lives of people and the safety of buildings. Power and fuel shortages affecting Pennsylvania and the East Coast power grid system required Pennsylvania's governor to recommend power conservation measures be taken by all commercial, residential, and industrial power consumers.

The record cold conditions resulted in numerous water-main breaks and interruptions of service to thousands of municipal and city water customers throughout the Commonwealth. Additionally, the extreme cold in conjunction with accumulations of frozen precipitation resulted in acute shortages of road salt. As a result, trucks were dispatched to haul salt from New York to expedite deliveries to PennDOT storage sites.

4.3.10.4 *Future Occurrence*

Winter storms occur on the average of 35 times a year in Pennsylvania and are a regular occurrence in Clarion County. The NCDC indicates that, annually, areas in Clarion County receive an average of 30 to 40 inches of snow, with the secondary campus in Oil City, Venango, potentially receiving up to 50 inches annually; however, snowfall varies considerably from one year to the next. The future probability of winter storms at Clarion University is unknown, but it is assumed to be similar to the historical winter storms in western Pennsylvania previously identified.

Should severe weather conditions threaten to disrupt activities at the University, the safety and welfare of the students, staff, and faculty are the primary concern. Clarion University does have a plan in place to follow during severe weather events.

4.3.10.5 *Vulnerability Assessment*

Based on the available information, Clarion University can be considered vulnerable to the direct impacts of winter storms. Although not owned by the University, main roads through Clarion Borough could be compromised in the case of heavy snow or ice. Such road closures would directly affect the functionality of the University. In cases of inclement weather and/or hazardous driving conditions, the University utilizes campus wide delays or complete closures.

Students who reside in the residence halls will be in need of services such as food, water, electricity, and heat for the duration of the event. Faculty who are required to report during such times must keep the University operational at a level needed for these students. Students living off campus are vulnerable if they are not able to remain self-sufficient if access to stores or the University is compromised by snow or ice. Secondary hazards from a severe Winter Storm can create secondary hazards such as Utility Interruption. This can further reduce the functionality of the University.

HUMAN-CAUSED HAZARDS

4.3.11 Dam Failure

4.3.11.1 *Location and Extent*

Dam failures most often occur during or after a massive rainfall, flooding, or spring thaws, sometimes with little to no warning. Depending on the size of the water body where the dam is constructed, water contributions may come from distant upstream locations.

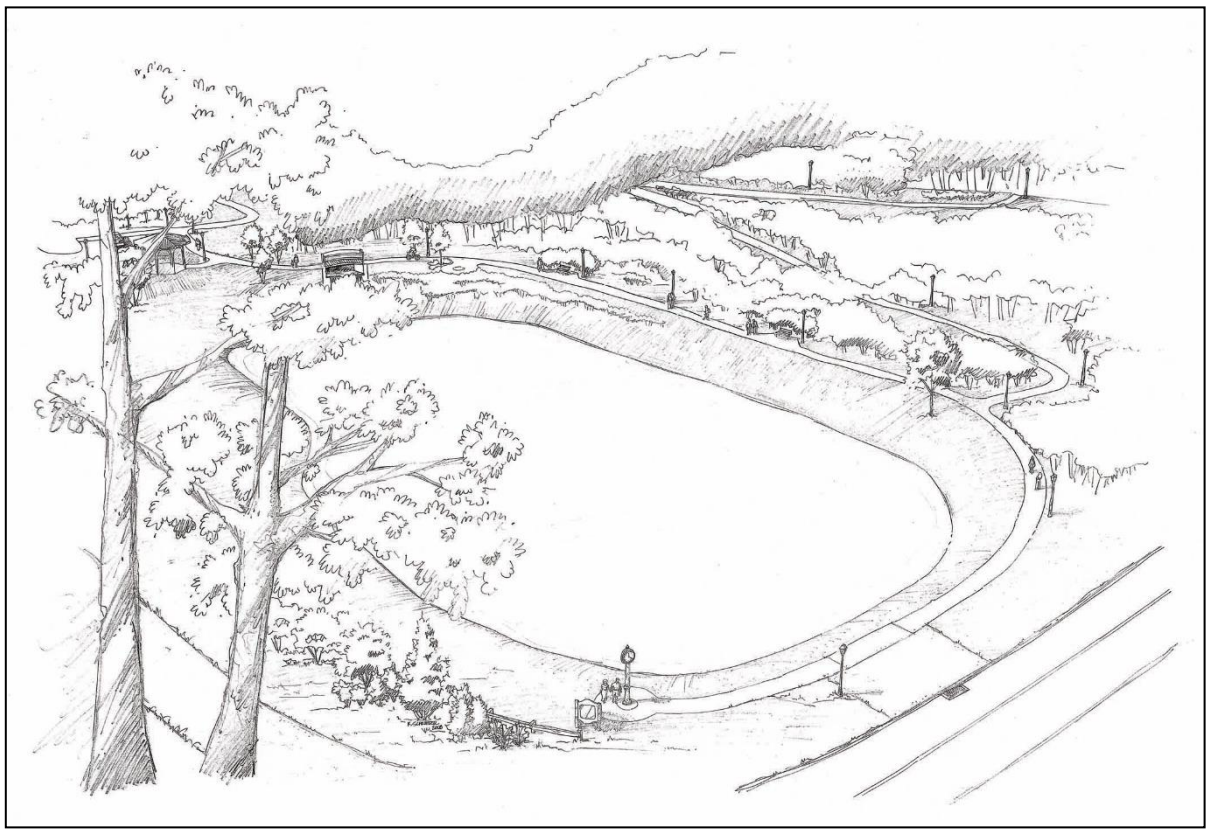
Although there are no dams in Clarion University's main campus, the Venango campus does maintain a dam to help regulate the West End Pond. This dam has been officially recognized by the National Inventory of Dams (NID), a registry that captures information about structures that are greater than or equal to 25 feet in height or that impound 50-acre-feet or more of water (an acre-foot is equal to 325,851 gallons of water). It includes structures above six feet in height, where failure would potentially cause damage downstream. The dams are classified in terms of hazard potential as "High," "Significant," or "Low," with High-hazard dams requiring Emergency Action Plans. The table below gives more details on the Venango dam, and Figure 4.3.11-1 provides a visual rendering of the dam at the Venango campus.

Table 4.3.11-1 Clarion University Dam Inventory

DAM NAME (OTHER DAM NAME)	RIVER	OWNER NAME	INSPECTION DATE	DRAINAGE AREA	PRIMARY PURPOSE	EAP COMPLETED
Clarion University-Venango Campus West End Dam	Allegheny River	Clarion University of Pennsylvania	7/18/2012	1.25	Recreation	Yes

SOURCE: NATIONAL INVENTORY OF DAMS, 2014

Figure 4.3.11-1 Clarion University Venango Dam Rendering



SOURCE: CLARION UNIVERSITY, 2014

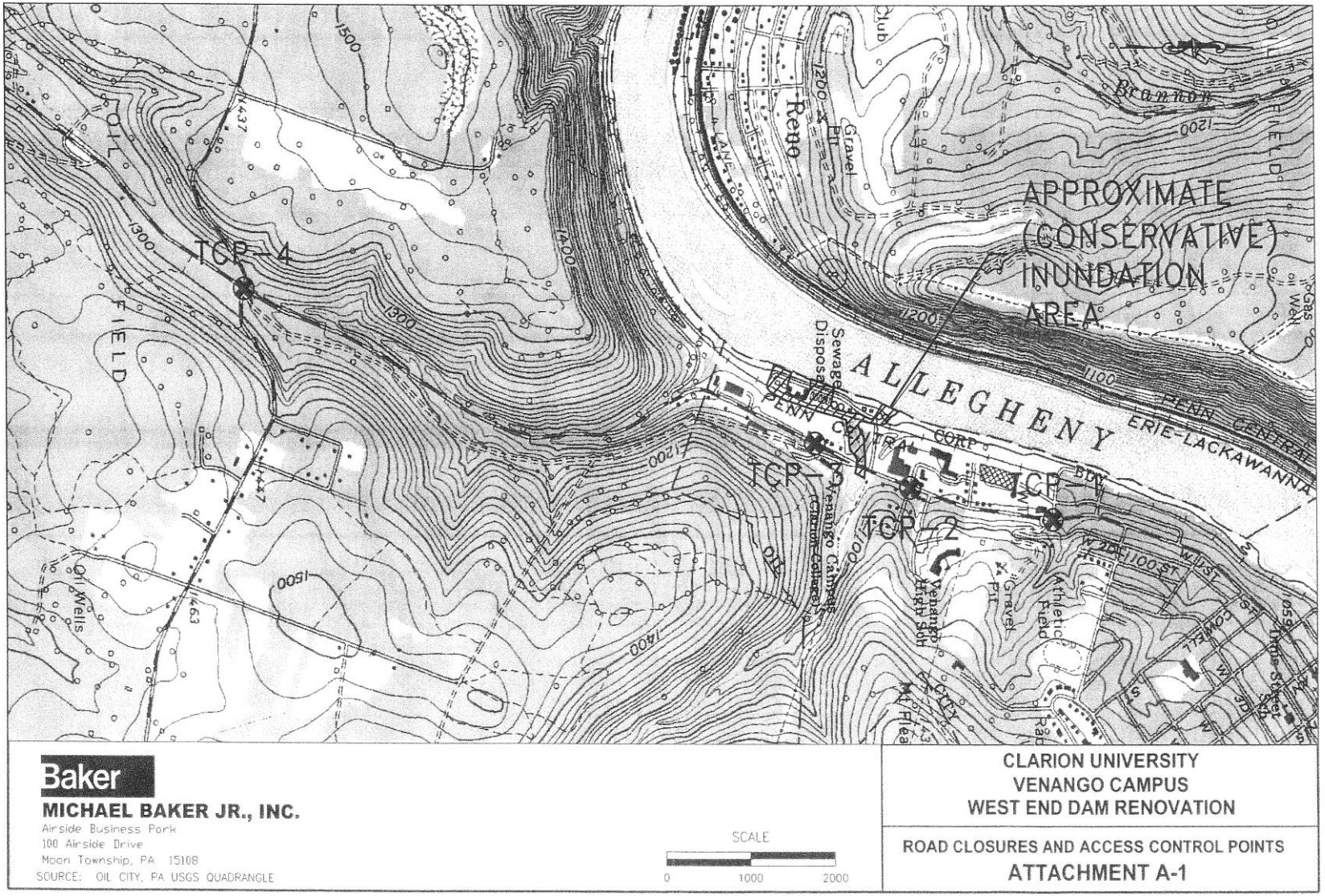
The Venango Campus West End Dam is located by the West End Pond, which lies in the northwestern comer of the Venango campus, at the intersection of Osborne and West First Streets. The pond pre-dates the campus, and it has been a favorite destination for students and staff since the late 1890s. The pond and adjoining grounds have become a favorite setting for wedding and graduation photography, study between classes, nature study, picnics, and quiet reflection.

In the early 1960s, ownership of the pond transferred from Oil City to the Commonwealth of Pennsylvania to coincide with the inception of the Venango Campus. The pond was kept in good condition until a severe flood in 1996 damaged the upstream sediment trap and led to substantial amounts of sediment being added to the pond. This siltation visibly diminished pond surface area and depth, as well as adversely impacting aesthetics and the fish habitat.

In 2008, the University received funding from the Pennsylvania Department of Conservation and Natural Resources (DCNR) for the completion of the planning work and for detailed engineering design. Through these funds, along with University funding contributions, Clarion University restored the aesthetic and recreational value of the pond. Part of these restorations included extending the then eight-foot diameter culvert under West First Street and modifying the dam outlet structure to control for the 100-year storm or flood event without overtopping the roadway, per Pennsylvania DEP Division of Dam Safety regulations.

The University also re-graded the pond to create a three-foot high berm between the pond and West First Street to provide additional storage volume for a 100-year storm or flood event. Figure 4.3.11-2 shows the extent of the flood area before the initial renovations were done in 2008 and emphasizes the importance of this renovation project. Since 2009, annual inspections of the pond and dam facility have led to recommendations for dredging the shallow portion of the pond on a five-year cycle, and Clarion University is currently seeking funding to ensure the pond is dredged as necessary.

Figure 4.3.11-2 Venango Dam Renovation Rendering



4.3.11.2 *Range of Magnitude*

Dam failures can pose a serious threat to communities located downstream from major dams. The impact of a dam failure is dependent on the volume of water impounded by the dam and the amount of population or assets located downstream. Catastrophic failures are characterized by the sudden, rapid, and uncontrolled release of impounded water or any other fluid or semi-fluid from a dammed impoundment or water body. The DEP defines a high hazard dam as "any dam so located as to endanger populated areas downstream by its failure" [Def. added May 16, 1985, P.L.32, No. 15]. High hazard dams receive two inspections each year – once by a professional engineer on behalf of the owner and once by a DEP inspector (DEP, 2008).

Dam failures may or may not leave enough time for evacuation of people and property, depending on their abruptness. Seepages in earth dams usually develop gradually, and, if the embankment damage is detected early, downhill residents have at least a few hours or days to evacuate. Failures of concrete or masonry dams tend to occur suddenly, sending a wall of water and debris down the valley at more than 100 mph. Survival would be a matter of having the good fortune not to be in the flood path at the time of the break. Dam failures due to the overtopping of a dam normally give sufficient lead-time for evacuation.

It has been recommended to dredge the dam at the Venango campus on a five-year recurring cycle to avoid significant sediment accumulation. Increased sediment in the pond will reduce the pond's volume and will have an adverse effect on the pond's flood mitigation capacity. As described in the West End Pond Renovation (2007–2009) Project scope of work, approximately 750 acres drains into the pond and related outlet structure. These areas were designed to control up to a 100-year storm and flooding event for the surrounding area. Without the dredging of the pond, flood and overtopping events can impact both the Venango campus and the Clarion Borough (i.e., specifically First Avenue). Preliminary drawings for the dredging and maintenance of the pond can be located in Appendix D.

4.3.11.3 *Past Occurrence*

The National Performance of Dams (NPD) Program[15] lists no occurrences of dam failure or major incidents occurring at the Venango Campus West End Dam. While dam failures are mostly minor and cause little damage, Pennsylvania has experienced severe dam failures. The National Performance of Dams Program lists 44 dam failures in Pennsylvania since 1800. The worst dam failure to occur in the U.S. took place in Johnstown, PA, in 1889, claimed 2,209 lives, and resulted in an estimated $3.5 million in damage. Another dam failure took place in Austin, PA, in 1911 and claimed 78 lives.

4.3.11.4 *Future Occurrence*

Although dam failures can occur at any time, given the right circumstances, the future occurrence of dam failures at the University can be considered unlikely if adequate engineering and maintenance measures, such as routine pond dredging, are maintained. The University has already shown a commitment to the maintenance and proper care of its dam, significantly decreasing the already low risk of a dam failure.

[15] http://npdp.stanford.edu/

The presence of structural integrity and inspection programs significantly reduces the potential for major dam failure events to occur. The DEP inventories and regulates all dams that meet or exceed the following criteria (PA DEP, 2008):

- Impound water from a drainage area of greater than 100 acres;
- Have a maximum water depth greater than 15 feet; and
- Have a maximum storage capacity of 50 acre-feet or greater.

The construction, operation, maintenance, modification, and abandonment of dams is reviewed and monitored by the Department's Division of Dam Safety. Dams are evaluated based on categories such as slope stability, undermining seepage and spillway adequacy.

4.3.11.5 *Vulnerability Assessment*

Property and populations located downstream from any dam are vulnerable to dam failures. The Pennsylvania Code (§ 105.91 Classification of dams and reservoirs) classifies both dams by size and the amount of loss of life and economic loss expected in a failure event. Table 4.3.11-2 displays the dam classification; although the size of a dam may result in varying impacts, the hazard potential classification of Category 1 dams are most important, since they will cause substantial loss of life and excessive economic loss.

Table 4.3.11-2 Dam Classification (The Pennsylvania Code)

DAM SIZE CLASSIFICATION		
CLASS	**IMPOUNDMENT STORAGE (ACRE FEET)**	**DAM HEIGHT (FEET)**
A	Equal to or greater than 50,000	Equal to or greater than 100
B	Less than 50,000 but greater than 1000	Less than 100 but greater than 40
C	Equal to or less than 1,000	Equal to or less than 40
DAM DAMAGE CLASSIFICATION		
CATEGORY	**LOSS OF LIFE**	**ECONOMIC LOSS**
1	Substantial	Excessive
2	Few	Appreciable
3	None Expected	Minimal

Based on this classification system, the Venango campus dam would be considered Class C, as it has a dam height of 15 feet and has less than 1,000 acres for drainage storage. The greatest threat to Clarion University and the surrounding municipality is if a 100-year storm event occurs prior to drainage of the pond, leading to a dam failure or overtopping event. Because flooding is the most common secondary effect of dam failure, if a failure is severe, a large amount of water will enter riverbeds and overflow the stream banks for miles. A dam failure at the West End dam would lead to flooding in the town of Clarion.

Dam failures may also cause significant environmental effects, as the resulting flood from a dam failure is likely to disperse debris and hazardous materials downstream that can damage local ecosystems. Debris carried downstream can block roads, cause traffic accidents, disrupt traffic patterns, and delay the delivery of essential services along major traffic corridors. Debris flow can also cause landslides along steep slopes and embankments. The economic and financial impact from damage and recovery can range from minimal to severe, depending on the magnitude of damage and scale of failure.

4.3.12 Transportation Accidents

Transportation accidents are defined as an accident involving air, rail, and roadway travel resulting in death or serious injury or extensive property loss or damage.

4.3.12.1 *Location and Extent*

Clarion University is serviced by the following major highways:

- U.S. Route 322, which runs east to west through the center of the state and runs through the University Campus.
- U.S. Route 80, which runs east to west and intersects with U.S. Route 322 at Exit 70
- Other major connector routes within the County include State Routes 28, 66, 68, and 338.

There is one public airport listed in Clarion County by the PennDOT Bureau of Aviation. The Clarion County Airport is located in Shippenville, PA. However, this low number of airports does not exclude the County from aviation accidents. All the counties bordering Clarion County, except for Forest County, are also home to one or more airports. These airports include the McVille Airport, Dubois Regional Airport, Punxsutawney Municipal Airport, Butler County Airport, Butler Farm Show Airport, Lakehill Airport, Titusville Airport, and Venango Regional Airport. The Titusville Airport and Venango Regional Airport are both in Venango County, where Clarion's satellite campus is located.

Regarding other forms of transportation, Clarion County is not currently serviced by any active rail lines, based off on the PennDOT Pennsylvania Railroad Map, last updated in January 2014. The Clarion Area Transit (CAT Bus) provides public transportation for the Clarion area. Passage is free for Clarion students with a student ID. In addition to fixed bus routes, Clarion residents can also use the Choice Cab Company, Clarion County Taxi, and Prime Time Limousine Service to get to their necessary destination.

4.3.12.2 *Range of Magnitude*

Significant transportation accidents can result in death or serious injury or extensive property loss or damage. Road and railway accidents in particular have the potential to result in hazardous materials release.

In addition, the Clarion County Transportation Plan, located within the County Comprehensive Plan, identifies two major transportation trends and potential concerns in the County. First, I-80 plays a pivotal role in continued economic development and growth in the County. Additionally, several roads in the County experience congestion issues, particularly the roads that lead to I-80.

Figure 4.3.12-1 shows the average annual daily traffic volume in and around the main campus. A substantial amount of traffic occurs on Route 322 and 68. Lower volumes, although still significant, occur

on Greenville Avenue, Heidrick Street, Eighth Avenue, and Grand Avenue. These streets surround Clarion's main campus.

Figure 4.3.12-1 Clarion University Main Campus–AADT

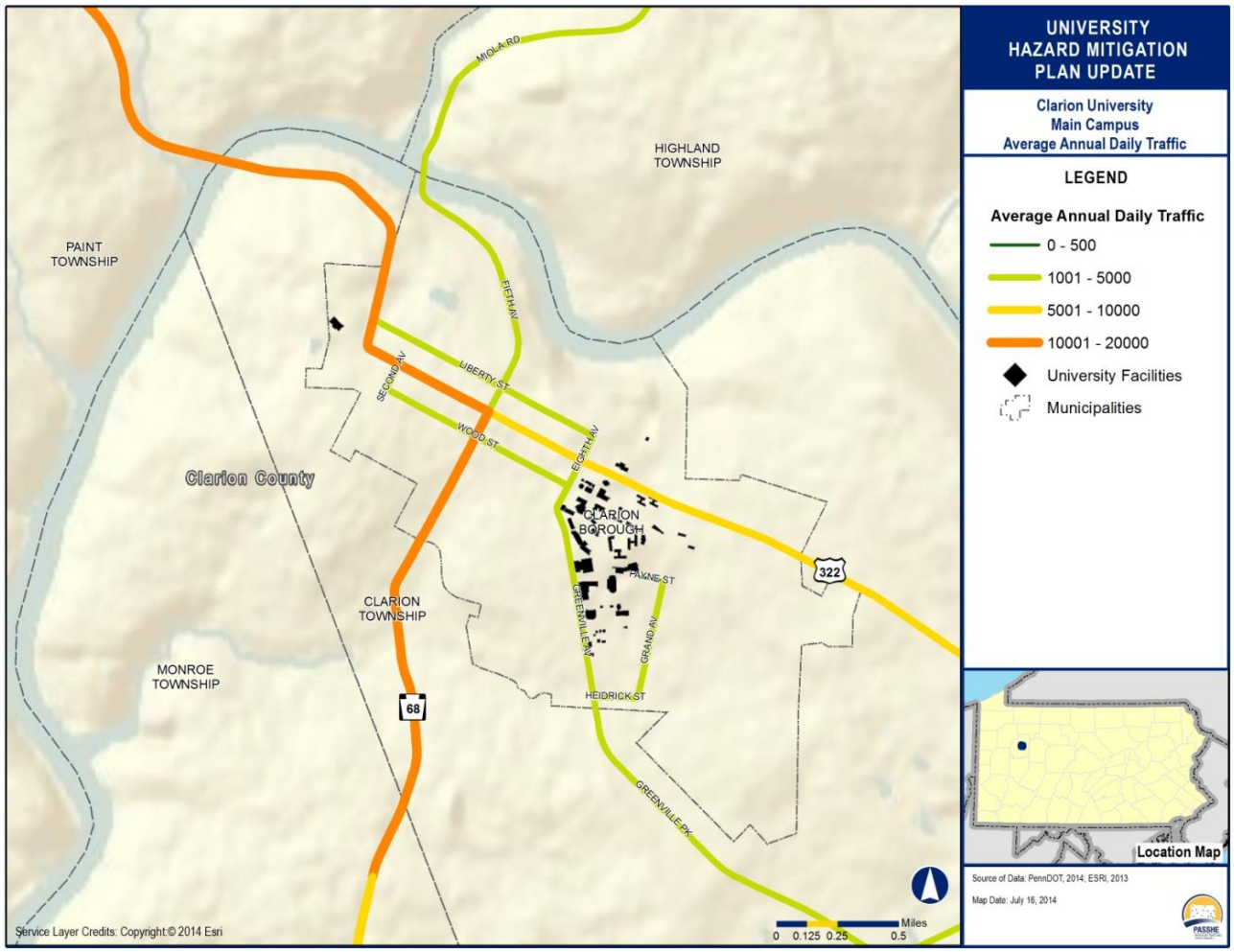
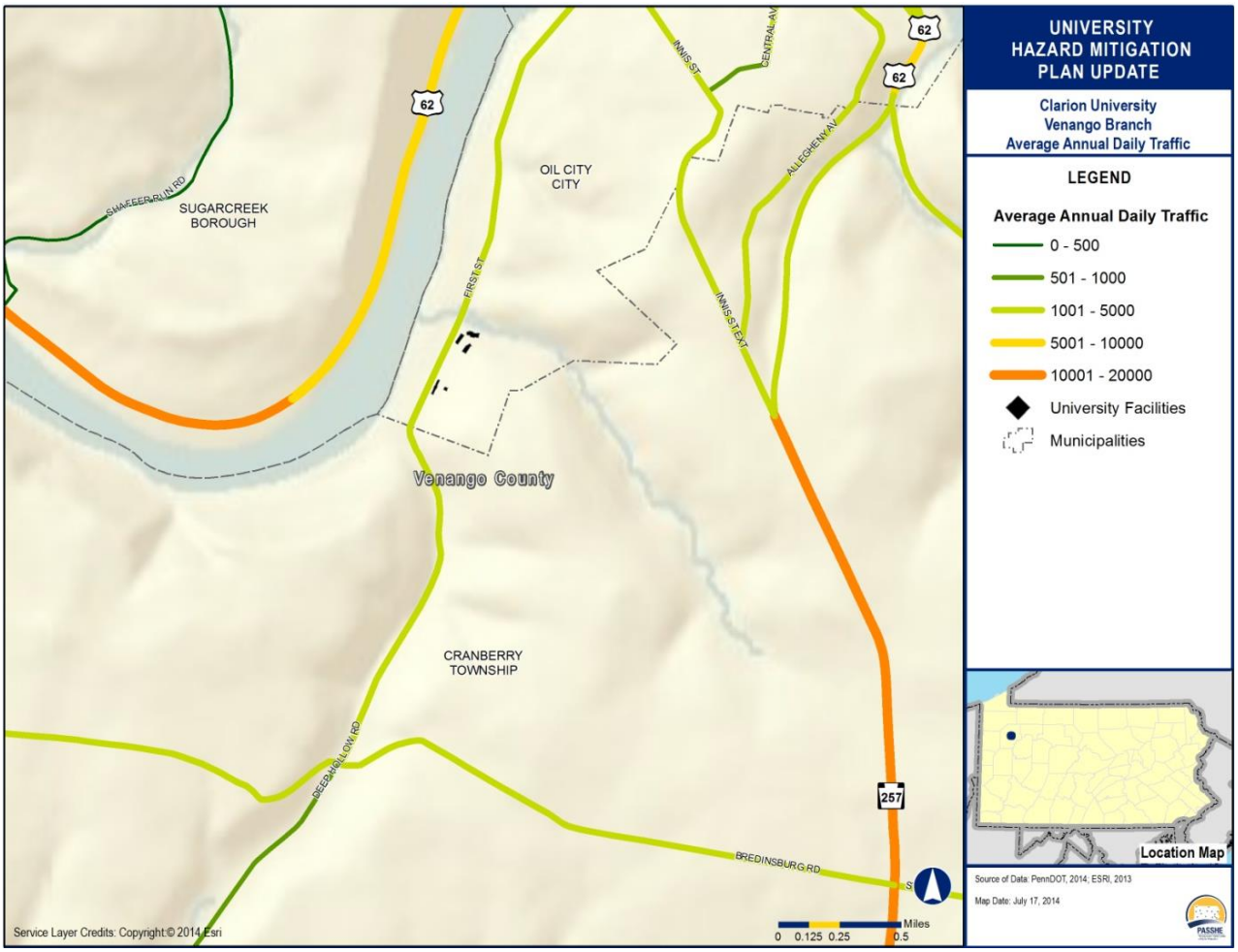


Figure 4.3.12-2 illustrates the average annual daily traffic activity occurring around the Venango branch campus. The majority of the campus traffic is isolated to First Street, averaging anywhere between 1,000 to 5,000 vehicles on a daily basis.

Figure 4.3.12-2 Clarion University–Venango Branch–AADT



4.3.12.3 *Past Occurrence*

The most common transportation accidents in the areas near Clarion University are highway incidents involving motor vehicles. Clarion County holds a relatively low rate in the Commonwealth for reported traffic crashes. In 2011, there were only nine fatal crashes, two less than the year before. Additionally, in the past five years, the County has not had more than 11 fatal crashes and one pedestrian death in a year. Clarion County's number of reported total crashes in 2011 totaled only 0.4 percent of the total number of traffic crashes in Pennsylvania. Crash facts and statistics were obtained from PennDOT and the National Highway Traffic Safety Administration's Fatality Analysis Reporting System (FARS).

Table 4.3.12-1 provides information on vehicle crashes and related fatalities between 2007 and 2011. Table 4.3.12-2 lists crash-related fatalities per year from 1988 to 2010. Although the population has increased in the state over the past two decades, crash fatality rates have remained about the same.

Table 4.3.12-1 Clarion County Crash Data from 2011 Pennsylvania Crash Facts & Statistics Report

CATEGORY	2007	2008	2009	2010	2011
Total Crashes	540 (0.4%)	564 (0.5%)	484 (0.4%)	479 (0.4%)	458 (0.4%)

Table 4.3.12-1 Clarion County Crash Data from 2011 Pennsylvania Crash Facts & Statistics Report					
CATEGORY	2007	2008	2009	2010	2011
Traffic Deaths	11 (0.7%)	10 (0.7%)	7 (0.6%)	11 (0.8%)	9 (0.7%)
Pedestrian Deaths	1	0	0	0	1

SOURCE: PENNDOT, 2011

Table 4.3.12-2 Crash-Related Fatalities by Year as Reported by National Highway Traffic Safety Administration (NHTSA)		
YEAR	PA CRASH-RELATED FATALITIES	US CRASH-RELATED FATALITIES
2009	1,256	30,862
2010	1,324	30,296
2011	1,286	29,757

SOURCE: PENNDOT, 2011

More specifically concerning the University, two Clarion students were killed in a motor vehicle accident on Route 50 in May 2010. Additionally, in 2009, a former Clarion football coach was killed and a former Clarion head football coach injured in a car accident in Clearfield County. More recently, in June 2013, a Clarion University student was killed on Route 68 in Butler County in an accident involving a car and tractor-trailer. Route 68 is one of the roads identified in the Clarion County Transportation Plan as a spot of concern for congestion due to being a major local road to I-80. The history of transportation accidents for Clarion University students, staff, and faculty demonstrates that accidents are more likely to occur off the main campus and on major local roads in Clarion and nearby counties.

Data obtained from the National Transit Safety Board (NTSB[16]) shows that there were a total of seven non-fatal aviation-related incidents reported from November 1982 through September 2014 that occurred at Clarion County Airport (see Table on next page for details).

[16] http://www.ntsb.gov/AviationQuery/index.aspx

Table 4.3.12-3 List of Aviation Incidents Reported in Clarion, PA

Current Synopsis	PDF Report(s) (Published)	Event Date	Estimated Release	Location	Make/Model	Regist. Number	NTSB No.	Event Severity	Type of Air Carrier Operation and Carrier Name (Doing Business As)
Probable Cause	Factual (11/05/2014) Probable Cause (02/11/2015)	09/20/2014	02/11/2015	Clarion, PA	BARGER JERRY L CHALLENGER II	N4017C	ERA14LA450	Nonfatal	
Probable Cause	Factual (05/16/1995) Probable Cause (10/26/1995)	04/23/1995	10/26/1995	CLARION, PA	STINSON 108-2	N978D	NYC95LA096	Nonfatal	
Probable Cause	Factual (09/19/1995) Probable Cause (10/19/1995)	01/16/1995	10/19/1995	CLARION, PA	CESSNA 310Q	N7943Q	BFO95LA027	Nonfatal	
Probable Cause	Factual (11/23/1994) Probable Cause (03/13/1995)	04/22/1994	03/13/1995	CLARION, PA	CESSNA 140	N76545	BFO94LA072	Nonfatal	
Probable Cause	Factual (02/06/1995) Probable Cause (02/06/1995)	04/18/1985		CLARION, PA	PIPER PA-23-250	N506AC	NYC85LA108	Nonfatal	
Probable Cause	Factual (02/06/1995) Probable Cause (02/06/1995)	05/26/1983		CLARION, PA	MCDONNELL DOUGLAS DC-10-40	N154US	CHI83IA228	Incident	NORTHWEST AIRLINES, INC. (DBA: NORTHWEST AIRLINES, INC.)
Probable Cause	Factual Probable Cause (11/06/1983)	11/06/1982	11/06/1983	CLARION, PA	CESSNA 172H	N2649L	NYC83LA022	Nonfatal	

Clarion County considers the airport a critical facility, as it may be needed during times of emergency and as it serves a strong economic resource for the County. Most students at the University, however, are more likely to travel by motor vehicle.

4.3.12.4 *Future Occurrence*

The number of transportation-related accidents is expected to rise with increased vehicular usage. Transportation incidents may increase slightly over the next five years without proper mitigation strategies in place. Therefore, based on this and past occurrences, the probability of transportation accidents is characterized as highly likely. Despite this, Clarion University works to reduce the frequency and potential severity of car accidents through education awareness programs, like Mock Car Accident/DUI Trials during Alcohol Awareness Week.

The average rate of aviation accidents nationwide is 8.47 accidents per 100,000 flight hours. Based on that statistic, as well as the prior history (or lack thereof) for aviation crashes, the likelihood of an aviation incident in the County is considered low.

4.3.12.5 *Vulnerability Assessment*

A transportation-related accident can occur on any stretch of road in Clarion County, and the University is slightly more vulnerable than the County as a whole, due to higher pedestrian numbers and greater daily traffic. Additionally, the County Transportation Plan notes that many of the sidewalks in place for pedestrian use are in deteriorated condition. This increases the potential risk of a pedestrian injury, such as tripping or falling into the road.

However, severe accidents are more likely along major highways such as the Interstate or State Routes, which experience heavier traffic volumes that include heavy freight vehicles. The overall impact of transportation accidents near or on the campus is likely to be low, barring a hazardous materials release or other unplanned circumstances, due to the relatively low percentage of crashes as compared to the rest of the Commonwealth and to the relatively low percentage of fatal crashes in the County as compared to total crashes in the State.

4.3.13 Utility Interruption

Utility interruptions are caused primarily by electrical failures, which are commonly a secondary effect of hazards such as severe weather and flooding. High winds, along with heavy snow, ice, and rain, can affect an electrical system's ability to function. Worker strikes at power generation facilities have also been known to cause minor power failures. Other causes of power outages include falling tree limbs, vehicular accidents, and small animals that destroy wiring. When power outages occur, they are typically on a regional scale.

4.3.13.1 *Location and Extent*

Power outages can happen anywhere that power is supplied. The causes for outages are usually downed power wires or utility poles as a result of inclement weather or vehicle accidents. Additionally, outages can be caused by blown transformers or tripped circuit breakers. Most often, there is no cause reported and power is restored within the hour.

Different utilities companies service different regions of Pennsylvania and the U.S. The breakdown of utilities' providers for the University is as follows:

Table 4.3.13-1 Clarion University Utility Providers

TYPE OF UTILITIES/PUBLIC WORKS	COMPANY NAME
Electric Companies	West Penn Power, Clarion Penelec–Venango
Cable TV	Comcast, Verizon
Gas Companies	National Fuel–Transportation / National Fuel Resources–commodity
Sewage Companies	PA American Water–Clarion / City of Oil City–Venango
Telephone Companies	Comcast, Verizon
Water Companies	PA American Water–Clarion / City of Oil City–Venango

4.3.13.2 *Range of Magnitude*

Utility interruptions do not typically lead to large-scale problems by themselves. Neither do direct human casualties typically result from outages; however, because many utility interruptions occur during storms or other severe weather events, they can have severe secondary consequences. Typical secondary effects from a power outage could be a delay in emergency response services from poor communication or a lack of potable water for drinking/health services. Additionally, even a small utility interruption can have a profound impact on the University's ability to ensure continuous normal operating conditions or conduct classes.

The University's worst-case scenario would be an extended power outage during a severe weather event, such as a winter storm or hurricane. Although the University reviews essential functions at the time of a disaster event, many of these essential functions remain the same for each event. Additionally, numerous essential functions are dependent on power in order to serve the needs of the campus, specifically those of resident students. These functions include grounds-keeping (snow, ice, water, or debris removal); University police (security, safety, and transportation of faculty, staff, and students); health services; food services; residence hall supervision; information desk (24-hour information provision to campus and emergency contact with police); and other necessary operations, as determined by the President or appropriate Vice President, dependent upon the nature of the event.

As per the University governance and policies on closing procedures, last revised in November 2010, campus staff that perform these functions are expected to report to work; however, a power failure could still impair these operations. Additionally, an extended power outage during a flood event or winter storm could also be extremely problematic as the other hazards would potentially delay essential employees' ability to get to campus and/or service providers' ability to restore power and service.

4.3.13.3 *Past Occurrences*

Utility outages have been caused by winter storms, wind, vehicle accidents, and other factors. The Pennsylvania Public Utilities Commission (PUC) tracks the reliability of electric distribution companies (EDC) and outages during the year. According to the PUC 2011 Electric Service Reliability report, eight of the 11 EDCs achieved compliance with the 12-month Customer Average Interruption Duration Index (CAIDI) performance, which concerns the time duration of power outages, while nine achieved compliance with the 12-month System Average Interruption Frequency Index (SAIFI), which focuses on the frequency of outages.

More than 3.8 million electric outages from extreme weather events were reported in Pennsylvania during 2011, ranking at the highest number of customer electric outages in the past nine years. Many PA residents experienced outages greater than 72 hours. The events leading to so many outages included the following:

- Heavy snow and some ice in February
- Strong thunderstorms in late May
- Hurricane Irene in late August
- Tropical Storm Lee in early September
- Early-season heavy, wet snow in late October

Table 4.3.13-2 below compares the customers affected by power outages in Pennsylvania during 2011 as broken down by EDC. This information was shared with the PUC by the EDCs and compiled into the

Summary Report of Outage Information Reported by EDCs, which investigates and analyzes the outage reports in other categories.

Table 4.3.13-2 2011 Power Outages by EDC

EDC	CUSTOMERS AFFECTED (TOTAL OUTAGES)	CUSTOMERS AFFECTED (OUTAGES GREATER THAN 72 HOURS)	PERCENTAGE OF CUSTOMERS AFFECTED FOR GREATER THAN 72 HOURS TO TOTAL OUTAGES
Met Ed	159,360	50,476	31.7%
PECO	129,407	4,036	3.1%
Penelec	25,999	2,023	7.8%
Penn Power	221	0	0
Pike County Electric	1,552	861	55.5%
PPL	275,758	43,197	15.7%
UGI Electric	16,036	9,921	61.9%
Wellsboro	249	1	0.4%
West Penn Pwr	1,637	108	6.6%
Totals	610,219	11,623	18.1%

SOURCE: PUC, 2011

4.3.13.4 *Future Occurrence*

Minor power outages can be expected at any time of year, on a nearly monthly basis, with minimal impact. Iced power lines; falling tree limbs due to ice, wind, or lightning strikes; and vehicle accidents damaging power lines or their support poles can all be reasons for power outages. The University should consider the probability of future utility interruptions as *likely*.

Larger power outages will probably occur every 5–10 years and as a secondary hazard to another weather event. As these are often the result of extreme weather events, they can often be anticipated, and first responders and service providers should be prepared in advance.

4.3.13.5 *Vulnerability Assessment*

Resources such as electricity, communications, gas, and water supply are critical to ensure the health, safety, and general welfare of the University community. Power outages can cause even greater detriment to at-risk and vulnerable populations, such as resident students or students without transportation. All essential operations are vulnerable to the effects of a power outage. The probability of a large-scale, extended utility failure is low; however, small-scale failures lasting short periods of time occur annually.

4.3.14 Terrorism

4.3.14.1 *Location and Extent*

Following several serious international and domestic terrorist incidents during the 1990's and early 2000's, citizens across the United States paid increased attention to the potential for deliberate, harmful actions of individuals or groups. The term "terrorism" refers to intentional, criminal, malicious acts, but the functional definition of terrorism can be interpreted in many ways. Officially, terrorism is defined in the Code of Federal Regulations as "...the unlawful use of force and violence against persons or property to intimidate or coerce a government, the civilian population, or any segment thereof, in furtherance of political or social objectives." (28 CFR §0.85)

The Federal Bureau of Investigation further characterizes terrorism as either domestic or international, depending on the origin, base, and objectives of the terrorist organization. However, the origin of the terrorist or person causing the hazard is far less relevant to mitigation planning than the hazard itself and its consequences.

Terrorism refers to the use of weapons of mass destruction, including biological, chemical, nuclear, and radiological weapons; arson, incendiary, explosive, and armed attacks; industrial sabotage and intentional hazardous material releases; and cyberterrorism. Within these general categories, however, there are many variations - particularly in the area of biological and chemical weapons.

Terrorism can take many forms:

- Arson/incendiary attack,
- Armed attack,
- Biological agent,
- Chemical agent,
- Cyberterrorism,
- Conventional bomb,
- Intentional hazardous materials or radiological releases, or
- Nuclear bombs.

The types of terrorism which may be the most relevant to Clarion include armed attack (active shooter), cyberterrorism, and conventional bomb (mainly bomb threats). University campuses present a significant security challenge as they are intended to have an open atmosphere, and their size and complexity are similar to that of a small town. The intent of campus security provisions is to prevent/deter an act from occurring. However, in the event prevention measures fail, the university must be able and prepared to respond effectively to an emergency situation.

Armed attack is considered to be the most likely threat to Clarion University, and it is also the most difficult to defend against. In recent years, this has manifested itself in active shooter incidents. An active shooter is an individual actively engaged in killing or attempting to kill people in a confined and populated area with firearms. There is no pattern or method to the selection of their victims, although the crime may begin with a specific target. Active shooter events are unpredictable and evolve quickly. The situations

are often over within 10 to 15 minutes of the initial shooting. Individuals must be prepared both mentally and physically to deal with an active shooter situation if one were to occur. Active shooters have caused a paradigm shift in law enforcement response, training, and tactics.

Active shooter incidents occur most often at a "soft" target or area. A soft target or area is defined as a place with limited active security measures or armed personnel to provide protection for members of the public. These places can be common, everyday locations where people shop, learn, and work. Examples include shopping malls, schools, and office buildings. Confinement gives active shooters the advantage of killing as many people as possible before being stopped. A "hard" target or area is guarded by armed personnel, such as at a military base or a police station.

Active shooters will continue to move throughout a building or area until stopped by law enforcement, until they commit suicide, or until some other intervention stops them. The deployment of law enforcement may be required to stop the shooting and to prevent further harm to victims. The rampage ends swiftly with the engagement of law enforcement or other forms of aggression.

4.3.14.2 *Range of Magnitude*

The severity of terrorist incidents depends upon the type of method used, the proximity of the device to people or assets, and the duration of exposure to the incident or device. For example, chemical agents are poisonous gases, liquids, or solids that have toxic effects on people, animals, or plants. Many chemical agents can cause serious injuries or death. Severity of injuries depends on the type and amount of the chemical agent used and the duration of exposure.

Biological agents are organisms or toxins that have illness-producing effects on people, livestock, and crops. Because some biological agents cannot be easily detected and may take time to develop, it is difficult to know that a biological attack has occurred until victims display symptoms. In other cases the effects are immediate. Those affected by a biological agent require the immediate attention of professional medical personnel. Some agents are contagious, and victims may need to be quarantined.

Active shooters are a viable threat due to the simplicity of the attack and high impact it delivers. This combination is achieved in a relatively short amount of time. For example, in Aurora, Colorado, on July 20, 2012, James Holmes killed 12 people and left 70 others injured in less than seven minutes during his shooting spree at a movie theater. On April 16, 2007, at Virginia Polytechnic Institute and State University in Blacksburg, Virginia, Sueng-Hui Cho killed 31 people, including himself, and wounded 13 more in less than 10 minutes. More than half of active shooter incidents are terminated within 12 minutes, which corresponds to the average initial police response time.

According to the New York City Police Department, 46 percent of active shooter incidents are ended by the application of force by police or security. The shooter commits suicide 40 percent of the time. In 14 percent of the situations, the shooter surrenders. In only one percent of cases, the attacker flees the area. In a vast majority of cases, the shooter committed suicide when also challenged with the initial confrontation with law enforcement.

While this type of event does not occur often, it has occurred on several occasions at other college and university campuses, making it a serious planning and security consideration. The direct impacts of an active shooter event are serious injury or death on a large scale for the university. The negative political, media, and community press associated with this type of event could greatly impact the reputation of Clarion University. The mental health of the university and surrounding community would need to be monitored. Feelings of safety to the campus population would need to be carefully managed and could require counseling and increased security presence.

Cyberterrorism is another threat that could potentially cripple administrative and academic operations for a period of hours or days through the introduction of a virus into the network. Other examples of cyberterrorism could include defacing websites or capturing personal information about students and faculty. Such activities could be costly in terms of both dollars spent for IT staff to remove viruses or in terms of damage to reputation due to website defacement and accidental release of personal information.

Bombs can also be a problem for Clarion, most often in terms of bomb threats that can disrupt classes and frighten students and faculty.

A worst-case scenario for a terrorist attack at Clarion University would be an attack involving a chemical or biological agent release at a large event like homecoming or commencement. An incident during a high-profile event could lead to a mass casualty incident and would be devastating to campus morale.

4.3.14.3 *Past Occurrence*

There has been a high consciousness of terrorist activity in the press with only few catastrophic events. The most significant terrorist attack on U.S. soil occurred on September 11, 2001 when over 3,000 people were killed. Within the last five years, there have been at least 14 prominent high-casualty active shooter incidents throughout the country. However, there have been no terrorist incidents at Clarion University to date.

4.3.14.4 *Future Occurrence*

The probability of terrorism occurring cannot be quantified with as great a level of accuracy as that of many of the natural hazards described in this HMP. Further, these incidents generally occur at a specific location, such as a campus building, rather than a wide area.

The likelihood of a terrorist attack is considered *likely,* as defined by the Risk Factor Methodology (see Table 4.4-1). Although there have been no previous active shooter or terrorist events, the potential for a future incident cannot be ignored. One of the major concerns with active shooters is that the act can be carried out with minimal planning or effort and that active shooter events at schools are dramatically on the rise. These events are often carried out by a single person with indiscriminate actions. In some cases, there is detailed planning involved and/or more than one shooter.

4.3.14.5 *Vulnerability Assessment*

Another important consideration in estimating the likelihood of a terrorist incident is the existence of facilities, landmarks, or other buildings of national importance. Clarion University does not have facilities,

landmarks, or buildings of national significance, though some buildings are of a local historical interest. Of greater concern may be intentional hazardous material releases, especially with Clarion's proximity to Interstate 80. However, terrorism takes many forms, and terrorists have a wide range of local, state, and national political interests or personal agenda, making the identification of potential targets especially difficult.

As a result, planning for terrorism must be asset-specific, identifying potentially at-risk facilities and infrastructure on campus. The list of critical assets should be prioritized so that efforts can be directed to protect the most important assets first. Then, beginning with the highest-priority assets, the vulnerabilities of each facility or system to each type of hazard should be assessed.

For the purpose of developing a realistic prioritization of terrorism hazard mitigation projects, three elements should be considered in concert:

- Relative importance of the various facilities and systems in the asset inventory,
- Vulnerabilities of those facilities, and
- Threats that are known to exist.

Critical assets and infrastructures are systems whose incapacity or destruction would have a debilitating effect on the University; this includes:

- Administration services
- Public safety/emergency services
- Utility supply systems (water, electricity, natural gas)
- Information technology and telecommunications infrastructure

FEMA's Integrating Manmade Hazards into Mitigation Planning (2003) encourages site-specific assessments that should be based on the relative importance of a particular site to the surrounding community or population, threats that are known to exist, and vulnerabilities including:

- Inherent vulnerability:
    - Visibility – How aware is the public of the existence of the facility?
    - Utility – How valuable might the place be in meeting the objectives of a potential terrorist?
    - Accessibility – How accessible is the place to the public?
    - Asset mobility – is the asset's location fixed or mobile?
    - Presence of hazardous materials – Are flammable, explosive, biological, chemical and/or radiological materials present on site? If so, are they well secured?
    - Potential for collateral damage – What are the potential consequences for the surrounding area if the asset is attacked or damaged?
    - Occupancy – What is the potential for mass casualties based on the maximum number of individuals on site at a given time?

- Tactical vulnerability:

Site Perimeter

- Site planning and Landscape Design – Is the facility designed with security in mind – both site-specific and with regard to adjacent land uses?
- Parking Security – Are vehicle access and parking managed in a way that separates vehicles and structures?

Building Envelope

- Structural Engineering – Is the building's envelope designed to be blast-resistant? Does it provide collective protection against chemical, biological and radiological contaminants?

Facility Interior

- Architectural and Interior Space Planning – Does security screening cover all public and private areas?
- Mechanical Engineering – Are utilities and Heating, Ventilating and Air Conditioning (HVAC) systems protected and/or backed up with redundant systems?
- Electrical Engineering – Are emergency power and telecommunications available? Are alarm systems operational? Is lighting sufficient?
- Fire Protection Engineering – Are the building's water supply and fire suppression systems adequate, code-compliant and protected? Are on-site personnel trained appropriately? Are local first responders aware of the nature of the operations at the facility?
- Electronic and Organized Security – Are systems and personnel in place to monitor and protect the facility?

Any asset can be a target for terrorist attacks. The most critical are facilities that host administrative functions, large classroom space, utility distribution, IT functionality, and those that are high-occupancy. With this in mind, some of the most at-risk facilities include:

- Still Hall (Business Administration and Computer Center)
- Suites on Main Street North
- Suites on Main Street North
- Hilltop Suites
- Reinhard Villages
- Science and Technology Center
- Gemmell Student Center

Low-risk buildings are generally garages, storage sheds, and small buildings. As previously discussed, vulnerability and determining what can be mitigated are described in terms of buildings, infrastructure, or critical facilities that are most vulnerable to the hazard. The nature of the terrorism hazard is that the entire University can be affected.

Another consideration is that Clarion University's campus is a soft target, and active shooter events are dramatically on the rise. The Clarion University campus police provide law enforcement and security services on University-owned property, which helps reduce the campus's vulnerability to terrorism and active shooter events. All Clarion University Police officers are commissioned police officers in the Commonwealth of Pennsylvania, and all officers carry firearms and are granted powers of arrest through the Governor of the Commonwealth. Clarion University's Department of Public Safety operates under the Division of Finance and Administration and has 11 full-time commissioned police officers. The Department's sworn police officers have received police training and regularly attend in-service training. Uniformed officers patrol the campus on foot and by vehicle 24 hours per day, seven days per week. The campus police section provides law enforcement and security services on University-owned property as well as the Clarion University Foundation property of Reinhard Villages, west of campus on Route 322 in Clarion Township. The Department is equipped with a telecommunications system to contact and exchange information with surrounding local and state police (as the need arises). Clarion University also maintains a working relationship with the Clarion Borough Police Department, the Clarion County Sheriff's Department, the Pennsylvania State Police, and the Clarion County District Attorney's Office.

4.4 Hazard Vulnerability Summary

4.4.1 Methodology

Ranking hazards helps communities set goals and priorities for mitigation based on their vulnerabilities. A Risk Factor (RF) is a tool used to measure the degree of risk for identified hazards in a particular planning area. The RF can also be used to assist both local community officials and university officials in ranking and prioritizing those hazards that pose the most significant threat to their area, based on a variety of factors deemed important by the Steering Committee and other stakeholders involved in the HMP process. The RF system relies mainly on historical data, local knowledge, consensus opinions from the Steering Committee, and information collected through development of the hazard profiles included in this section. The RF approach produces numerical values that allow identified hazards to be ranked against one another: the higher the RF value, the greater the hazard risk.

RF values were obtained by assigning varying degrees of risk to five categories for each of the 14 hazards profiled in this HMP. Those categories include probability, impact, spatial extent, warning time, and duration. Each degree of risk was assigned a value ranging from 1 to 4. The weighting factor is shown below. To calculate the RF value for a given hazard, the assigned risk value for each category was multiplied by the weighting factor. The sum of all five categories equals the final RF value, as demonstrated in the example equation:

> Risk Factor Value = [(Probability x .30) + Vulnerability (Human, Economic, and Environmental) + Human Impact (Residential and Non-residential Populations) + Community Impact + Institutional Impact (Continuity of Operations, Economic, Infrastructure, and Delivery of Services) + Environmental Impact]

Table 4.4.1-1 summarizes each of the five categories used for calculating an RF for each hazard. According to the weighting scheme applied, the highest possible RF value is 4.0.

Table 4.4.1-1 Summary of Risk Factor Approach Used to Rank Hazard Risk

RISK ASSESSMENT CATEGORY	DEGREE OF RISK			POINT VALUE
	LEVEL	CRITERIA	INDEX	
PROBABILITY What is the likelihood of a hazard event occurring in a given year?	UNLIKELY	LESS THAN 20 YEARS	1	15 points
	INFREQUENT	20 YEARS OR GREATER	2	
	POSSIBLE	10 YEARS OR GREATER	3	
	LIKELY	5 YEARS OR GREATER	4	
	HIGHLY LIKELY	ANNUAL EVENT	5	

Table 4.4.1-1 Summary of Risk Factor Approach Used to Rank Hazard Risk

RISK ASSESSMENT CATEGORY	DEGREE OF RISK			POINT VALUE
	LEVEL	CRITERIA	INDEX	
VULNERABILITY In terms of human, economic, and environmental factors, how susceptible are you to damage and injury? This response depends on an asset's construction, contents, and economic value of its functions.	LOW	Very low vulnerability. Many measures already in place to ensure structural integrity, security, safety, and continuity.	1	15 points (three categories)
	MODERATE	Some vulnerability only. More than 20% of property in affected area damaged or destroyed. Complete shutdown of critical facilities for more than one day could occur.	2	
	HIGH	Low number of deaths and injuries expected. More than 28% of affected area with potential damage. Complete shutdown of facilities for more than one week could occur.	3	
	EXTENSIVE	Multiple deaths/injuries possible. More than 35% of property in affected area damaged or destroyed. Complete shutdown of critical facilities for more than two weeks could occur.	4	
	CATASTROPHIC	High amount of destruction from an event probable. More than 50% of property likely to be damaged or destroyed. Complete shutdown of facilities for more than 30 days could occur.	5	
HUMAN IMPACT In terms of injuries, damage, or death, would you anticipate impacts to be minor, limited, critical, or catastrophic when a significant hazard event occurs? Populations include students, faculty, staff, and visitors. The RF score is determined off residential and non-residential (i.e., commuting) population impact.	LOW	Very few injuries, if any. Only minimal disruption of quality of life. Complete shutdown of critical facilities for less than one day.	1	10 points (two categories)
	MODERATE	Minor injuries only. Complete shutdown of critical facilities for more than one day.	2	
	HIGH	Significant deaths/injuries possible. Complete shutdown of critical facilities for more than one week.	3	
	EXTENSIVE	Multiple deaths/injuries possible. Complete shutdown of critical facilities for more than two weeks.	4	
	CATASTROPHIC	High number of deaths/injuries possible. More than 50% of property in affected area damaged or destroyed. Complete shutdown of critical facilities for 30 days or more.	5	

Table 4.4.1-1 Summary of Risk Factor Approach Used to Rank Hazard Risk

RISK ASSESSMENT CATEGORY	DEGREE OF RISK			POINT VALUE
	LEVEL	CRITERIA	INDEX	
COMMUNITY IMPACT Does the local community (County, municipalities, or private industries) have procedures in place to aid in University recovery? Does the University have agreements with external partners that would increase the demand on the University during a disaster event?	LOW	Extensive regulations and support structures (such as mutual aid agreements) in place, or university does not have any ongoing projects or service requirements that need to be maintained during an event.	1	5 points
	MODERATE	Large number of regulations and support structures in place, or university has 1-2 projects or service requirements that would continue in event of a disaster.	2	
	HIGH	Some regulations and support structures in place, or university has 3-4 projects or service requirements that would continue in event of a disaster.	3	
	EXTENSIVE	Few regulations and support structures in place, or university has 5-6 projects or service requirements that would continue in event of a disaster.	4	
	CATASTROPHIC	Minimal or no regulations and support structures available, or university has over 6 projects that need ongoing support.	5	
INSTITUTIONAL IMPACT What institutional functions have the potential to be impacted by the disaster? Would the University be able to continue operations? Would delivery of services be affected (including any impact to the reputation)? What are the financial and infrastructure damage thresholds?	LOW	Continuity of operations likely to continue. Economic and infrastructure impact minimal to non-existent. No delay or long-term effects to delivery of service.	1	20 points (four categories)
	MODERATE	Complete shutdown of critical facilities or inability to operate for more than one day. Some damage to financial resources and infrastructure.	2	
	HIGH	Complete shutdown of critical facilities or inability to operate for more than one week. Significant damage to financial resources and infrastructure.	3	
	EXTENSIVE	Complete shutdown of critical facilities or inability to operate for more than two weeks. Severe damage to financial resources and infrastructure.	4	
	CATASTROPHIC	Complete shutdown of critical facilities or inability to operate for more than 30 days. Financial resources and infrastructure irrecoverable without outside aid.	5	

Table 4.4.1-1 Summary of Risk Factor Approach Used to Rank Hazard Risk

RISK ASSESSMENT CATEGORY	DEGREE OF RISK			POINT VALUE
	LEVEL	CRITERIA	INDEX	
ENVIRONMENTAL IMPACT What are the long-term environmental implications of the event? Were response and recovery strategy decisions made with environmental implications in mind?	LOW	Responses and policy implications consider the impact of the environment and mitigate against potential damage.	1	5 points
	MODERATE	Responses and policy implications consider the impact of the environment and mitigate against potential damage but may miss certain situational factors.	2	
	HIGH	Responses and policy implications consider the impact of the environment to a minor extent.	3	
	EXTENSIVE	Responses and policy implications rarely consider the impact of the environment, mitigate against potential damage, or such concern is only identified post-event.	4	
	CATASTROPHIC	Responses and policy implications do not at all consider the impact of the environment nor do they mitigate against potential damage.	5	

SOURCE: DELTA DEVELOPMENT GROUP, INC.

4.4.2 Ranking Results

Using the methodology described above, Table 4.4.2-1 lists the RF calculated for each of the 14 potential hazards identified in this HMP. Hazards identified as high risk have risk factors greater than or equal to 2.5. RFs ranging from 2.0 to 2.4 were deemed moderate risk hazards. Hazards with RFs of 1.9 and less are considered low risk. Due to the small geographical coverage that the university has, all risk levels should be equal across the campus.

Table 4.4.2-1 Ranking of Hazard Types Based on Risk Factor Methodology

Hazard	Probability	Vulnerability			Human Impact		Community Impact	Institutional Impact				Environmental Impact	
	Frequency of Occurrence	Human	Economic	Environmental	Health and safety of resident populations (student/staff) in the area at the time of the incident (injury and death)	Health and safety of non-resident/ commuting populations	External Obligations	Continuity of business operations	Economic and financial condition	Property, facilities, and infrastructure	Delivery of services	The environment	Adjusted Risk
Score	0 =N/A 1 = > 20 years 2 = 20 years or < 3 = 10 years or < 4 = 5 years or < 5 = Annual Event	0 =N/A 1 = Low 2 = Moderate 3 = High 4 = Extensive 5 = Catastrophic	0 =N/A 1 = Low 2 = Moderate 3 = High 4 = Extensive 5 = Catastrophic	0 =N/A 1 = Low 2 = Moderate 3 = High 4 = Extensive 5 = Catastrophic	0 =N/A 1 = Low 2 = Moderate 3 = High 4 = Extensive 5 = Catastrophic	0 =N/A 1 = Low 2 = Moderate 3 = High 4 = Extensive 5 = Catastrophic	0 =N/A 1 = Low 2 = Moderate 3 = High 4 = Extensive 5 = Catastrophic	0 =N/A 1 = Low 2 = Moderate 3 = High 4 = Extensive 5 = Catastrophic	0 =N/A 1 = Low 2 = Moderate 3 = High 4 = Extensive 5 = Catastrophic	0 =N/A 1 = Low 2 = Moderate 3 = High 4 = Extensive 5 = Catastrophic	0 =N/A 1 = Low 2 = Moderate 3 = High 4 = Extensive 5 = Catastrophic	0 =N/A 1 = Low 2 = Moderate 3 = High 4 = Extensive 5 = Catastrophic	0 - 100%
Dam Failure	1	4	4	4	3	3	3	3	3	3	2	3	54%
Earthquake	1	2	1	1	1	1	1	1	1	2	1	1	23%
Extreme Temperatures	5	4	3	3	4	3	2	2	3	3	3	2	67%
Flood, Flash Flood, Ice Jam	4	3	4	4	2	3	1	3	3	3	3	4	64%
Hurricane/ Tropical Storm	2	3	2	3	2	2	2	3	2	2	3	3	47%
Lightning	5	1	1	1	1	1	1	1	1	1	1	1	37%
Pandemic	5	4	3	1	3	2	3	2	2	1	2	1	56%
Radon Exposure	4	2	1	2	2	2	1	0	1	0	0	1	34%
Subsidence	3	1	3	2	1	2	1	1	2	2	1	2	39%

Table 4.4.2-1 Ranking of Hazard Types Based on Risk Factor Methodology

Hazard	Probability	Vulnerability			Human Impact		Community Impact	Institutional Impact				Environmental Impact	
	Frequency of Occurrence	Human	Economic	Environmental	Health and safety of resident populations (student/staff) in the area at the time of the incident (injury and death)	Health and safety of non-resident/ commuting populations	External Obligations	Continuity of business operations	Economic and financial condition	Property, facilities, and infrastructure	Delivery of services	The environment	Adjusted Risk
Tornado	3	3	3	3	2	2	2	3	3	3	2	2	53%
Winter Storm	5	4	3	3	4	3	3	4	4	3	4	3	76%
Transportation Accidents	5	2	1	2	1	3	2	2	1	1	1	1	46%
Utility Interruption	5	3	3	2	2	2	3	3	2	2	3	1	59%
Terrorism	5	3	2	1	3	2	4	2	4	1	3	1	59%
Average Score Risk = Probability* Severity	2.94	2.17	1.89	1.78	1.72	1.72	1.61	1.67	1.78	1.50	1.61	1.44	

SOURCE: DEVELOPED BY DELTA DEVELOPMENT GROUP, INC.

Table 4.4.2-2 Ranking of Hazard Types Based on Risk Factor Methodology		
NATURAL OR HUMAN-CAUSED (N OR H)	HAZARD	ADJUSTED RISK
N	Winter Storm	76%
N	Extreme Temperatures	67%
N	Flood/Flash Flood/Ice Jam	64%
H	Terrorism	59%
H	Utility Interruption	59%
N	Pandemic	56%
H	Dam Failure	54%
N	Tornado/Windstorm	53%
N	Hurricane/Tropical Storm/Nor'easter	47%
H	Transportation Accidents	46%
N	Subsidence/Sinkhole	39%
N	Lightning Strike	37%
N	Radon Exposure	34%
N	Earthquake	23%

SOURCE: DELTA DEVELOPMENT GROUP, INC.

4.4.3 Potential Loss Estimates

The vulnerability assessment for each hazard profile (Section 4.3 – Hazard Profiles and Vulnerability Analysis), discusses how University assets and people may be impacted by each hazard. This section looks at the potential losses that may be experienced by Clarion University. For most hazards at Clarion, the primary losses will be businesses interruption losses, including cancelled classes and the inability of faculty, and students to get to campus.

Clarion University is not in the 1%-annual-chance floodplain, so flood losses should be minimal. It is more likely that the university experience business interruption losses and functional downtime (the time in days, during which a function is unable to provide services), where there might not be physical damage but the university would be prevented from operating normally. Displacement time, or the time, in days,

during which a building's occupants must operate from a temporary location while repairs are made to the original building, can also add to the cost of a disaster event.

For other hazards, such as hurricane, tropical storm, and nor'easter, tornadoes and windstorms, and winter storms, vulnerability is based on age of the building (and what building codes may have been in effect at the time it was built), type of construction, and condition of structure. The structural assets of Clarion University are described in Table 4.4.3-1 with details such as square footage, construction and renovation dates, building name and function, and the number of rooms. Original construction dates range from 1894 (Founders Hall) to 2010 (a residential property at 961 Corbett).

Table 4.4.3-1 Clarion University Building Inventory

BLDG NO.	BUILDING NAME	FUNCTION	YEAR COMPLETED / RENOVATED	NO. OF ROOMS	GROSS SQ. FT.
CLARION CAMPUS					
1	Boiler Plant	Central Steam Plant	1951	12	8,876
2	Foundry	Instructional Lab	1930	8	2,888
5	President's Residence	Residence	1997	38	7,569
6	Carrier Administration Building	Administrative Offices	1971	83	20,634
10	Admissions Building	Administrative Offices	1950 / 1995	29	5,140
16	McEntire Maintenance Building	Maintenance/Physical Plant	1971	47	22,516
17	McEntire Wrhs	Maintenance Storage Areas	1971	12	5,790
18	Thorn 1 Building	Public Safety Offices	1955 / 1993	13	2,636
19	Thorn II Building	Administrative Offices	1955	24	2,569
20	Still Hall	Multi-Instructional	1979	113	53,168
24	915 Corbett St.	Residence	2004	9	1,901
26	215 Greenvlle Ave.	Warehouse	2000	2	3,958
27	963 Corbett St.	Residence	2005	17	2,128
28	959 Corbett St.	Residence	2000	15	2,944
30	206 Wilson Ave.	Residence	2009	8	768
31	Egbert Hall	Administrative Offices	1938	59	17,894
33	Central Services Building	Printing Plant & Mail Room	1938 / 1995	10	9,413
34	Rhea Buildings	Offices/Maintenance Storage Areas	2009	10	21,210
35	Hart Chapel	Auditorium Theater	1902 / 1990	31	12,887
39	Ceramics Lab	Instructional Lab	1940	8	2,432
42	Eagle Commons	Student Dining Facility	2008	34	32,599
43	Keeling Health Center	Student Health & Comm. Science Disorders Clinic	1971	60	3,444
45	Gemmell Student Union	Student Center	1991	89	72,968
47	Recreation Center	Student Recreation Center	1999	23	48,664
48	Becker Hall	Multi-Instructional	1973	103	53,119
50	Givan Hall	Student Residence Hall	1960	195	65,512
51	Ralston Hall	Administrative Offices	1963	173	59,544
52	Ballentine Hall	Student Residence Hall	1951	104	26,680
53	Nair Hall	Student Residence Hall	1971	363	99,285
54	Valley View	Student Residence Hall	2009	90	50,473
55	Campus View	Student Residence Hall	2009	115	52,509

Table 4.4.3-1 Clarion University Building Inventory

BLDG NO.	BUILDING NAME	FUNCTION	YEAR COMPLETED / RENOVATED	NO. OF ROOMS	GROSS SQ. FT.
59	Becht Hall	Student Residence & Faculty Offices	1908	179	54,248
60	Wilkinson Hall	Student Residence Hall	1971	362	101,526
72	Carlson Library	Library	2002	69	115,008
74	Davis Hall	Multi-Instructional	1938	75	32,298
75	Stevens Hall	Multi-Instructional	1929	44	21,054
76	Special Ed Annex Building	Multi-Instructional	1962	35	11,985
77	Tippin Gym & Natatorium	Indoor Athletics	1968	116	101,995
78	Founders Hall	Multi-Instructional	1894 / 1998	78	31,943
79	Harvey Hall	Multi-Instructional	1931/ 1999	39	21,828
80	Marwick Boyd Fine Arts Center	Auditorium Theater	1969	150	87,502
81	Gruenwald STC	Multi-Instructional	2009	236	95,171
82	Moore Hall	Conference/Meeting Areas	1890 / 1982	37	10,283
86	961 Corbett	Residence	2010	12	1,792
88	957 Corbett	Residence	2009	10	1,008
89	Pole Barn	Storage Building	1976	3	4,630
90	Stadium/Lckr Rm	Outdoor Athletics	1965 / 1980	20	26,506
93	Speech and Hearing	Multi-Instructional	1997 Renovation	25	10,814
96	962 Corbett St.	Storage Building	2000	13	2,864
98	Center for Advancement Development	Administrative Offices	2004	50	8,649
Clarion Campus Totals (Number of Buildings = 50)				**3,450**	**1,513,22**
VENANGO CAMPUS					
950	Montgomery Hall	Multi-Instructional	1998	127	31,351
970	Frame	Multi-Instructional	1965	36	16,380
971	Rhoades Hall	Student Center & Classroom Building	1976	41	21,765
972	Suhr Library	Library	1976	21	10,140
974	Pole Barn	Maintenance & Storage	2004	3	2,400
Venango Campus Totals (Number of buildings = 5)				228	82,036
University Totals (Number Buildings = 55)				**3,678**	**1,595,259**

Hazardous material releases and utility interruptions will likely cause short-term, temporary losses related to loss of use of buildings, but are not expected to cause structural damage.

For hazards like extreme temperatures, pandemic and infectious disease, civil disturbance, transportation accidents, and terrorism, losses are unfortunately likely to be in the form of lives lost and people injured rather than physical losses. These human losses cannot be quantified or underestimated. They could have a devastating effect on the campus community

It is unlikely that Clarion University would experience an event where an entire asset would need to be completely replaced. However, events could cause losses of up to the replacement cost. Replacement costs for Clarion University's structural assets range from $237,000 for a University-owned residence on Wilson Avenue to over $36 million for the Carlson Library. In addition to the $484 million in structural losses (i.e., Carrier Administration, Still Hall (IT center), Boiler Plant, etc.) that the University could incur from a catastrophic event, the University could also lose many other assets such as computers, furniture, electronics, etc. The age, condition, and value of most structures on the main campus indicate that potential losses could be significant in the event of a disaster.

4.5 Future Development and Vulnerability

Risk and vulnerability to natural and human-caused hazard events are not static. Risk will increase or decrease as universities see changes on both a short-term scale (e.g., transient populations whose levels change throughout the course of the year) and a long-term scale (e.g., enrollment changes, development changes). The University is expected to experience a variety of factors that will, in some areas, increase vulnerability to hazards, while in other areas, vulnerability may stay static or even be reduced.

Population change and the age of campus buildings are the main indicators of vulnerability change in the University. As discussed in the Community Profile, the total population of the University fluctuates on a daily, weekly, and seasonal basis. At peak times, such as a Monday at 1 p.m. during the spring or fall semester, the University population can exceed 7,200 people. At other times of the year, such as intersession periods or on the weekends, the University campus will be almost empty.

Due to the relatively small amount of land that a university campus occupies, universities typically have very high-density populations. This high population density is even more apparent when compared with a County population density. For instance, Clarion University has a population density of 36,045 people per square mile, while Clarion County, the county in which it is located, has a population density of 67 people per square mile. Because of its high population density, the University faces an increased vulnerability and higher potential loss estimates from hazard events. Additionally, the University also experiences a higher risk to hazard events themselves, such as drought, wildfire, environmental hazards, utility interruption, transportation accidents, and winter storms.

On the other hand, during times when the University has a lower population density (i.e., on the weekend, at night, or during intersession periods), it also faces increases to hazard vulnerability, albeit for different causes. Potential barriers to communication and a potential lack of on-campus authority or response teams can all contribute toward a greater loss estimate and disaster impact. Additionally, if the campus is

located in a County or municipality with a low population density, it can face increased travel time and isolation (either due to distance or lack of available, qualified responders/health personnel).

The age of campus buildings is another source of current and future vulnerability in many hazard events. Campus buildings include dormitories, academic buildings, administrative buildings, and student activity areas, such as dining halls. According to data from the Campus Master Plan, buildings on campus can be divided into three general eras of construction. Era I buildings were constructed between 1890–1908; Era II buildings were constructed in the 1920s and 1930s; and Era III buildings are from the 1960s and 1970s. These older building structures may be at risk during winter storm events and other hazards if the materials are either not strong enough to withstand the pressure or weight of the precipitation or are liable to leak, causing further risk of destruction to the building. In addition, windstorms and tornados can have typical wind speeds of up to 150 miles per hour. The structure of these older buildings may be more at risk of destruction under strong wind conditions, such as these. The buildings on campus that are most vulnerable to these hazards, due to their relative age, include the following:

- Moore Hall (1890)
- Founders Hall (1894)
- Hart Chapel (1902)
- Becht Hall (1908)

The most recent version of the Campus Master Plan was adopted in 1998; however, it was updated again 2007 and in 2014. One of the primary goals identified in the update of this plan concerns office locations, based on most effective space utilization and structural integrity (versus planned renovation). Because a majority of the buildings on the campus were built no later than the 1970s and are now at least 40 years old, these buildings often require one or more significant financial investments to bring them to compliance with current codes and standards. The lack of modernization puts these structures at greater risk to damage during a hazard event, as they are not necessarily as structurally sound as newer buildings. The University's plan to improve the quality of services and features on campus will serve an additional purpose toward mitigating against disasters as it will reduce risk to both human-caused and natural hazards.

Additionally, because the University has a variable density population, the University will also promote buildings and safe areas for more vulnerable populations. These more vulnerable populations may include the elderly, those with functional and access needs, and those with Limited English Proficiency, among others. Ensuring sufficient, appropriate, and quality shelter and dormitory options for these more vulnerable populations will help reduce the potential loss and impact of a disaster on these students, faculty, or staff members.

5 CAPABILITY ASSESSMENT

The capability assessment serves as an important tool for formulating a viable University mitigation strategy by evaluating the University's administrative management and political structure, financial and fiscal status, legal jurisdiction, policies and programs, regulations and ordinances, and resource availability. The capability assessment comprises two components: (1) an inventory of the University's missions, programs, and policies, and (2) an analysis of its capacity to execute them. The assessment process helps identify existing gaps, conflicts, and/or areas for improvement that may need to be addressed through future mitigation planning goals, objectives, and actions. It also highlights the measures already in place or under development that merit continued support and enhancement through future mitigation efforts.

The evaluation of the categories listed above – administrative management and governmental structure, legal jurisdiction, fiscal status, policies and programs, regulations and ordinances, and resource availability – allows the Steering Committee to determine the viability of certain mitigation actions. The capability assessment analyzes what the University has the capacity to implement, based on local resources, and provides an understanding of what must be changed to mitigate loss.

5.1 Update Process Summary

Working with University and local County/municipal officials, the Steering Committee identified available resources. The Steering Committee examined university capabilities, as compared to those of the surrounding municipality and County. The Steering Committee identified the following list of capability needs.

5.1.1 Human Resources

Human resources include local fire, police, ambulance, and emergency management and response personnel. The University maintains its own campus police and medical staff. Additionally, the University has Mutual Aid Agreements with the County and with Clarion Borough, the local municipality in which the campus is based.

Clarion County, where the University is located, has approximately 8 law enforcement agencies, 19 fire departments/stations, 8 EMS stations eight basic response ambulances,[17] seven advanced life support units,[18] and three quick-response squads in the County and from surrounding counties. These units are dispatched by the County's 9-1-1 center, headquartered in Clarion Borough.

[17] Exact number of BLS rigs unknown for operating departments

[18] Exact number of ALS rigs unknown for operating departments. ALS figures include Mobile Intensive Care Units (MICUs) and chase vehicles only

5.1.2 Physical Resources

Physical resources include the equipment, vehicles, public lands, facilities, and buildings available to the University. The University maintains a Center for Health, Wellness, & Counseling, which employs eight medical professionals consisting of contracted physicians, registered nurses (RNs), and certified nurse practitioners. For medical emergencies or during times where the medical center is not open, including weekends and holidays, the University encourages students, faculty, and staff to visit their personal physician or the local hospital. The County has one hospital: Clarion Hospital. The two next closest hospitals are UPMC Northwest, located in Venango County (a half-hour away), and Brookville Hospital, located in Jefferson County (15 minutes away).

The University also has numerous academic and administrative facilities and land that may be available in various times of need. These properties are described in Table 5.1.2-1.

Table 5.1.2-1 University-Owned Property

FUNCTION	BUILDING NAME	DESCRIPTION	OTHER RELEVANT DETAILS
Administrative Buildings	Boiler Plant	Central Steam Plant	
	215 Greenville Ave. Warehouse	Maintenance	Warehouse
	962 Corbett St.	Maintenance	Storage Building
	Admissions Building	Admission	Administrative offices
	Alumni House	General	Administrative Offices
	Carrier Administrative Building	General	Administrative offices
	Center for Advancement Development	General	Administrative offices
	Central Services Building	Multi Use	Printing Plant and Mail Room
	Egbert Hall	General	Administrative offices
	Keeling Health Center	Medical	Medical and Counseling Facility
	McEntire Maintenance Building	General	Maintenance/Physical Plant
	McEntire Warehouse	Maintenance	Maintenance Storage Area
	Moore Hall	Conference/Meeting Areas	Administrative offices and meeting areas
	Pole Barn	Maintenance	Storage Building
	Pole Barn*	Maintenance	Storage Building
	Ralston Hall	General	Administrative offices, day care center for children of students and employees
	Rhea Buildings	Multi Use	Administrative Offices and Maintenance Storage Area
	Special Projects Bldg	General	Offices for Grant Programs
	Thorn Building 1	Maintenance	Public Safety offices
	Thorn Building 2	General	Administrative offices

Table 5.1.2-1 University-Owned Property

FUNCTION	BUILDING NAME	DESCRIPTION	OTHER RELEVANT DETAILS
Academic Buildings	Becht Hall	Residence Hall/Multi Use	Houses department and offices for the International Programs, Academic Counseling, and the Honors Program
	Becker Hall	Computer Information Science	Houses the Computer Information Science department as well as the university radio and television station
	Ceramics Lab	Instructional Lab	
	Davis Hall	General	Academic offices for English department and Writing Center
	Founders Hall	College of Arts and Sciences	Houses the College of Arts and Sciences, classrooms, offices, and labs. Historic building
	Foundry	Studio	Sculpture studio
	Frame Hall*	Multi Use	Administrative offices, academic offices, and labs
	Grunewald Science and Technology Center	Sciences	Houses many departments such as earth sciences, geography, anthropology, and biology
	Hart Chapel	Auditorium	
	Harvey Hall	Psychology	Houses the Psychology department and Women and Gender Studies Program
	Marwick Boyd Fine Arts Center	Multi Use	1600-person auditorium, classrooms, studios, labs, exhibit areas, and offices
	Montgomery Hall*	Nursing and Allied Health	Academic offices, classrooms, and student support services for the Venango campus
	Special Education Annex Building	Special Education and Rehab Sciences	Houses the departments of Special Education, Early Education, and Rehabilitative Sciences along with classrooms, offices, and labs.
	Stevens Hall	Education Department	Education department classrooms and offices
	Still Hall	Business Administration & Computer Center	Information Center, departments of Accounting, Administrative Science, Economics, Finance/Real Estate, and Marketing

Table 5.1.2-1 University-Owned Property

FUNCTION	BUILDING NAME	DESCRIPTION	OTHER RELEVANT DETAILS
Residences	Ballentine Hall	Residence Hall	Capacity: 116
	Becht Hall	Residence Hall/Faculty Offices	Capacity: 160
	Campus View	Residence Hall	Capacity: 361
	Givan Hall	Residence Hall	Capacity: 250
	Nair Hall	Residence Hall	Capacity: 400
	President's Residence	Personal Residence	
	Reinhard Villages	University Affiliated Housing	Capacity: 656
	Valley View	Residence Hall	Capacity: 361
	Wilkinson Hall	Residence Hall	Capacity: 400
Student Areas	Carlson Library	Library	Houses the Art Gallery and Library Sciences
	Eagle Commons	Dining Facility	Main dining facility
	Gemmell Student Union	Multi Use	Classrooms, Student Center, and food court
	Rhoades Hall*	Library	Social center for Venango Campus student offices, fitness center, bookstore, and auditorium
	Student Recreation Center	Multi Use	Social center for campus. Includes the bookstore, the student newspaper, student organizations, a multi-purpose room, ball courts, and lounges
	Suhr Library*	Multi Use	Gymnasium and student social center
Athletic	Tippin Gym & Natatorium	General	Indoor athletic facility
	Memorial Stadium	General	Outdoor athletic facility, capacity: 6,500
**Venango Campus, Oil City, Venango County*			

SOURCE: CLARION.EDU FALL 2013

5.1.3 Technological Resources

Technological resources include early warning systems, stream-level monitoring gauges, computer systems, the Internet, and 9-1-1 communications systems. When the HMP was updated, a number of technological resources were available to aid in hazard mitigation, including the following:

- University Technological Resources
    - Text message/E-mail alert system
    - Campus shuttle system
    - Police escort system

  - Campus Emergency Response Team (CERT)
  - Blue Light Emergency Phones
- County Technological Resources
  - 9-1-1 communication system, located in Clarion County, Pennsylvania
  - Stream-level monitoring gauge, located in Clarion County, Pennsylvania
  - GIS and other computer systems

5.1.4 Informational Resources

Informational resources include websites, brochures, pamphlets, workshops, and PSAs.

- University Informational Resources
  - The University Emergency Management Department has an informational website located at http://www.clarion.edu/about-clarion/offices-and-administration/public-affairs/marketing-and-communication/emergency-information/
  - The University's website is located at http://clarion.edu/
- County Informational Resources
  - The Clarion County of Emergency Services has an informational website located at http://www.clarioncountyoes.com
  - The County's website is located at http://www.co.clarion.pa.us/
- State and Federal Informational Resources
  - Information on hazard mitigation and how to protect yourself and your home from common hazards was referenced at the websites for FEMA (https://www.fema.gov/) and PEMA (http://www.pema.pa.gov/Pages/Default.aspx#.VSVN59zF98E)

5.1.5 Financial Resources

Some sources of funding are deemed difficult for Universities to secure. Known available federal and state funds include the following:

- Performance-based Funding: Pennsylvania utilizes a performance-based funding system for PASSHE institutions, where 2.4 percent of funding can come from education and general appropriations. Institution performance metrics include the mandatory factors of student success (i.e., degree conferral), access (i.e., closing the access gap and faculty diversity), and stewardship, as well as optional factors, such as deep learning scale results, senior surveys, faculty career advancement, student diversity, and faculty productivity.
- Pennsylvania Department of Education (PA DOE) Grants: The PA DOE provides licensed education agencies and community-based programs the opportunity to apply for a wide variety of education-focused grants, such as *Classrooms for the Future, Career and Technical Education,* and *Enhancing Education through Technology*.
- Transportation Improvement Program (TIP): Provides funding for transportation improvement projects.
- Pennsylvania's Growing Greener Watershed Protection Program: Provides funding to protect and restore natural resources by cleaning up source pollution.

- North West Central Task Force: Regional task force formed to integrate federal/state/county response to terrorism, institutionalize mutual aid, establish standing regional response groups, and encourage regional networking and communication. Homeland Security grants can be utilized through this group.
- Community Development Block Grant (CDBG): Awards funds to municipalities through the Pennsylvania Department of Community and Economic Development (DCED). Provides funding to benefit low- to moderate-income persons for community development purposes.
- Hazard Mitigation Grant Program (HMGP), Flood Mitigation Assistance (FMA) Program, and Pre-Disaster Mitigation (PDM) Program: Provide hazard mitigation funding to communities. University representatives will be able to take advantage of these funds directly through PASSHE and PEMA, in addition to the County soliciting funds on their behalf.

5.2 Capability Assessment Findings

5.2.1 Planning and Regulatory Capability

The Steering Committee was surveyed to determine University participation in emergency management and other preparedness/planning measures to ensure accurate findings for the capability assessment. The Steering Committee's responses to this survey can be found in the tables throughout the rest of this section. Following each table are descriptions of the items listed in the Capabilities Assessment Survey.

Table 5.2.1-1 Planning and Regulatory Capability Survey Results

Tool/Program	Status			Dept./Agency Responsible	Comments
	In Place	Date Adopted or Updated	Under Development		
Hazard Mitigation Plan	X	4/1/2008		Office of Emergency Management (OEM)	
Emergency Operations Plan	X	4/1/2008		OEM	
Campus Evacuation Plan	X	4/1/2013		OEM	
Continuity of Operations Plan			X	OEM	
Campus Master Plan	X			Office of the President	
University Strategic Plan	X			Office of the President	
Firewise	X	4/1/2008		Department of Public Safety (DPS)	

Table 5.2.1-1 Planning and Regulatory Capability Survey Results					
TOOL/PROGRAM	STATUS			DEPT./AGENCY RESPONSIBLE	COMMENTS
	IN PLACE	DATE ADOPTED OR UPDATED	UNDER DEVELOPMENT		
Other					

SOURCE: SURVEYS DEVELOPED BY DELTA DEVELOPMENT GROUP, INC.

5.2.1.2 *Participation in Emergency Management Plans*

Emergency management is a comprehensive, integrated program of mitigation, preparedness, response, and recovery for emergencies/disasters of any kind. No public or private entity is immune to disasters, and no single segment of society can meet the complex needs of a major emergency or disaster on its own.

Hazard Mitigation Plan

An HMP describes, in detail, the hazards that may affect the community, the community's vulnerability to those hazards, and an action plan for how the community plans to minimize or eliminate that vulnerability. HMPs are governed by the DMA 2000, and having a FEMA-approved HMP makes the jurisdiction eligible for federal mitigation funding. Prior to this update, Clarion University's HMP was last updated in 2008.

Emergency Operations Plan

The Pennsylvania Emergency Management Services Code, Title 35, requires all political jurisdictions in the Commonwealth to have an Emergency Operations Plan (EOP), an Emergency Management Coordinator (EMC), and an Emergency Operations Center (EOC).

The County's EOP is reviewed at least biennially and updated every two years. The University also maintains an EOP, which was last updated in 2009. The EOP complies with the National Incident Management System (NIMS) and serves as the basis for a coordinated and effective response to any disaster that may affect lives and property in the University. The EOP, or portions thereof, would be implemented when emergency circumstances warrant it.

Evacuation Plan

Evacuation is one of the most widely used methods of protecting the public from hazard impacts. The easiest way to minimize death and injury due to a hazard event is to remove as many people as possible from its path. Evacuation plans include descriptions of the area(s) being evacuated, the demographics and characteristics of people within those area(s), transportation routes to safe areas, and how the community will support those individuals who do not have access to their own transportation. Clarion University's Campus Evacuation Plan was adopted in 2013.

Continuity of Operations Plan

Continuity of Operations (COOP) is a critically important planning principle for emergency managers as well as for university officials. National Fire Protection Association (NFPA) 1600 provides those with the responsibility for disaster, emergency management, and COOP planning programs with the criteria to assess current programs and/or to develop, implement, and maintain a program to mitigate, prepare for, respond to, and recover from disasters and emergencies. The Clarion University OEM is currently developing a COOP.

5.2.1.3 *University-Level Planning and Regulatory Participation*

Pennsylvania universities have the authority to govern more restrictively than local, state, and County minimum requirements, assuming they are in compliance with all criteria established in the Pennsylvania Municipalities Planning Code (MPC) and their surrounding municipality's municipal codes. Universities can develop their own policies and programs, as well as implement their own rules and regulations to protect and serve their students, faculty, and staff. Local policies and programs are typically identified through strategic goals, implemented via a university planning council, and enforced by various administrative departments.

Universities regulate land use via the adoption and enforcement of a campus master plan, which identifies facilities development goals. Universities also follow local zoning, subdivision and land development ordinances, building codes, building permit ordinances, floodplain, and/or stormwater management ordinances. When effectively prepared and administered, these regulations can lead to hazard mitigation. For example, the adoption of the National Flood Insurance Program (NFIP) and the Pennsylvania Flood Plain Management Act (Act 166 of 1978) established minimum floodplain management criteria. A municipality must adopt and enforce these minimum criteria to be eligible for participation in the NFIP. A university does not have the option to participate in the NFIP if its surrounding municipality does not participate.

Campus Master Plan

A Campus Master Plan serves as the physical manifestation for implementing a university's strategic goals. This plan allows universities to identify short-term projects that align and further the long-term goals and plans of the institution by ensuring that the campus environment meets the needs of the university community, provides an effective space for work and study, and welcomes both the local community and students. Projects and plans specifics typically focus on infrastructure, space needs, and other key aspects that influence the campus setting. A strong, effective Campus Master Plan operates as a road map or guide for the future development of a campus. As with the development of a HMP, the Campus Master Plan is usually written and planned with the help of a Steering Committee that represents the diverse interests of the students, faculty, staff, and local community. The 2015 Clarion University Facilities Master Plan included input from a planning team that included over twenty participants.

University Strategic Plan

A University Strategic Plan identifies an institution's overall priorities and initiatives, often known as strategic goals. The plan develops cost-efficient objectives and actions to enhance and implement these strategic goals. Many universities identify goals in several common areas, including excellence in scholarship, the quality of

faculty, a dedication to research, a student-centered approach, a commitment to diversity and creativity, and organizational stewardship, among others. A successful University Strategic Plan views the university as a single entity, even while mobilizing the different schools and departments within the university toward achieving long-term goals and overcoming anticipated challenges. The 2014 Clarion University Strategic Directions Report outlines how the University will encourage success, thrive financially, encourage engagement, and create equitable and diverse environments.

Firewise

Firewise is a national program that brings together the response community, community planners, and homeowners to minimize the risk of wildfires. The program is co-sponsored by the U.S. Department of Agriculture's (USDA) U.S. Forest Service, the U.S. Department of the Interior, and the National Association of State Foresters. The program focuses on development that is compatible with the natural environment.

StormReady

Clarion County is a Storm Ready County StormReady is a program administered by the National Weather Service (NWS). To be certified as StormReady, a community must create links to the NWS's warning systems, develop relationships with NWS staff, establish a 24-hour warning point, ensure sufficient capability to respond to severe weather events, and provide public outreach and education.

5.2.2 Administrative and Technical Capability

The University Steering Committee was also surveyed to determine their administrative and staffing resources to ensure accurate findings for the administrative and technical capability assessment. The responses to this survey can be found in Table 5.2.2-1. Following this table are descriptions of the items listed in the Capabilities Assessment Survey.

Table 5.2.2-1 Administrative and Technical Capability Survey Results

TOOL/PROGRAM	AVAILABILITY		DEPT./AGENCY RESPONSIBLE	COMMENTS (PERMANENT OR TEMPORARY)
	YES	NO		
University Planning Council	X			
Campus Safety Committee	X		DPS	
Occupational Health and Safety Staff/Environmental Health and Safety Staff	X		DPS	

Table 5.2.2-1 Administrative and Technical Capability Survey Results				
TOOL/PROGRAM	AVAILABILITY		DEPT./AGENCY RESPONSIBLE	COMMENTS (PERMANENT OR TEMPORARY)
	YES	NO		
Emergency Manager	X		OEM	
Scientists, faculty, or staff familiar with the hazards of the community	X			Emergency Management Coordinator
Personnel skilled in GIS and/or FEMA's Hazus program	X		Department of the Arts and Sciences	
Grant writers or fiscal staff to handle large/complex grants	X			
Other				

SOURCE: SURVEYS DEVELOPED BY DELTA DEVELOPMENT GROUP, INC.

University Planning Councils

PASSHE universities have many different Steering Committees and councils, such as the University Planning Council (UPC), Strategic Planning Steering Committee, Dean's Council, etc. Each Steering Committee has a different focus, and its members are university subject matter experts and upper administrative officials. A Steering Committee or council may be temporary or permanent, depending upon the goal and responsibility of the team in question.

The Steering Committee or council also often acts as an advisor to the university governing body on matters of student growth and retention, safety, development, and transportation. The university governing body may appoint additional duties and responsibilities to the Steering Committee or council, as determined necessary. It may also appoint authority to the team to carry out proposed policies and changes, or it may require the Steering Committee or council to seek approval from the governing body.

Campus Safety Planning Council

A university may also implement a planning council specifically devoted to campus safety, in addition to all the standard, administrative, and long-term planning councils. A Campus Safety Council will focus campus priorities on developing and maintaining a campus safety program that promotes employee

safety, student safety, and protection of the general public. Safety measures typically also consider employee well-being and accidental losses.

Occupational Health and Safety Administration (OSHA)/ Environmental Health and Safety Staff

OSHA and/or Environmental Health and Safety staff are responsible for ensuring safe and healthful working conditions and for ensuring compliance with federal safety regulations through training, outreach, education, and assistance. These staff members may have a dual expertise in emergency management and often chair safety-related programs or councils. A University may also employ OSHA or Environmental Health and Safety faculty members and academic programs, which can provide supplemental expertise to the administrative staff member, as necessary.

Emergency Manager (alternatively known as EMC)

A university Emergency Manager or EMC is responsible for all aspects of emergency management (i.e., prevention, protection, response, recovery, and mitigation) within his/her respective Authority Having Jurisdiction (AHJ). The responsibilities of the EMC are outlined in PA Title 35 §7503 and include the following:

- Prepare and maintain a current disaster emergency management plan
- Establish, equip, and staff an EOC
- Provide individual and organizational training programs
- Organize and coordinate all locally available manpower, materials, supplies, equipment, and services necessary for disaster emergency readiness, response, and recovery
- Adopt and implement precautionary measures to mitigate the anticipated effects of a disaster
- Cooperate and coordinate with any public and private agency or entity
- Provide prompt information regarding local disaster emergencies to appropriate Commonwealth and local officials or agencies and to the general public
- Participate in all tests, drills, and exercises, including remedial drills and exercises, and those scheduled by a Commonwealth agency or by the federal government

Scientists, faculty, or staff familiar with the hazards of the community

Natural and human-made hazard characteristics and impacts can be highly technical. Meteorology, aerodynamics, fluid dynamics, physics and health physics, chemistry, and several other scientific fields are involved in determining the impacts of a hazard event. Having access to a scientist or faculty member with subject matter expertise who can describe the technical aspects of hazards in lay terms is important to having a sound mitigation strategy.

Additionally, scientists, faculty, and other responsible staff can more effectively enhance the University when they coordinate with emergency managers and/or are familiar with potential area hazards. These staff members will then design the University and structures with hazard impacts in mind, resulting in more sustainable communities and stronger structures.

Personnel skilled in GIS and/or FEMA's Hazus program

Spatial and tabular data are linked in a computerized, visual format through the use of sophisticated GIS technology. Through GIS projects, it is possible to accomplish environmental restoration, economic

development, “smart growth” land use planning, infrastructure development, and training to use GIS for decision support.

Hazus is a nationally applicable standardized methodology and software offered through FEMA that contains models for estimating potential losses from earthquakes, floods, and hurricanes. Hazus uses GIS technology to estimate physical, economic, and social impacts of disasters. It graphically illustrates the limits of identified high-risk locations due to earthquake, hurricane, and floods. Users can then visualize the spatial relationships between populations and other more permanently fixed geographic assets or resources for the specific hazard being modeled, a crucial function in the pre-disaster planning process. Hazus is used for mitigation and recovery as well as preparedness and response.

Grant writers or fiscal staff to handle large/complex grants

The University may not have the financial resources that are required to implement all of its potential programs (e.g., mitigation measures). Therefore, they must rely on grants and other fundraising opportunities to obtain the money necessary to perform mitigation projects. Many grants are competitive, and individuals can provide donations to a vast array of causes, so the University must demonstrate that it can use those funds better than other applicants can. This may be difficult, but having a specialist on staff will likely increase the University’s chances of receiving funding.

Additionally, many of the funding streams that can be used for hazard mitigation have substantial management and reporting requirements. Employing or having access to staff specializing in grants management will help the University ensure that it does not lose a grant opportunity because it did not meet the administrative requirements of that grant.

5.2.3 Fiscal Capability

A strong fiscal capability is important to the implementation of hazard mitigation activities. Every university must operate within the constraints of limited financial resources. During the 1960s and 1970s, state and federal grants-in-aid were available to finance a large number of programs, including streets, water and sewer facilities, airports, and parks and playgrounds. During the early 1980s, there was a significant change in federal policy, based on rising deficits and a political philosophy that encouraged states and local governments to raise their own revenues for capital programs. The result has been a growing interest in "creative financing."

The University was surveyed to determine its financial resources and financing abilities to ensure accurate findings for the fiscal capability assessment. Responses to this survey can be found in Table 5.2.3-1. Following this table are descriptions of the various financial assistance programs pertinent to hazard mitigation.

Table 5.2.3-1 Fiscal Capability Survey Results

TOOL/PROGRAM	AVAILABILITY		DEPT./AGENCY RESPONSIBLE	COMMENTS (PERMANENT OR TEMPORARY)
	YES	NO		
Capital Improvement Programming	X			
Community Development Block Grants	X			
State or Federal Department of Education Grants	X			
University Tuition/Other General Income Allocations	X			
County/Municipal Funding Sources	X			
Partnering Arrangements	X			
Other – Internal grants for the community	X			
Other – Research grants	X			
Other – Contracts	X			

SOURCE: SURVEYS DEVELOPED BY DELTA DEVELOPMENT GROUP, INC.

Capital improvement programming

Most capital improvement projects involve the outlay of substantial funds, and universities can seldom budget for all these desired improvements in the annual operating budget. Therefore, numerous

techniques have evolved to enable universities to finance for capital improvements over an extended time period (i.e., greater than one year). Public finance literature and state laws classify the techniques that are allowed to financially support capital improvements, particularly for state-sponsored institutions like PASSHE. The University typically budgets a specific amount for renovation and repair projects throughout the year while engaging in targeted fundraising and donor financing for larger development projects.

Community Development Block Grants

Community Development Block Grants (CDBG) is a program that awards funds to municipalities through the Pennsylvania Department of Community and Economic Development (DCED). These grants provide funding to benefit low- to moderate-income persons for community development purposes.

State or Federal Education Grants

Competitive grants are available to universities and institutions of higher education through state and federal resources. The PA DOE is probably the largest or most well-known grant provider, as it provides licensed education agencies and community-based programs the opportunity to apply for a wide variety of education-focused grants. Grants.gov is the primary forum for locating and applying for federal level grants; however, many of the education-based grants focus primarily on research. Universities typically maintain a Development Department or office to identify opportunities and secure relevant funding as able.

University Tuition/Other General Income Allocations

Universities also receive direct income through the sale of their services, i.e., tuition costs. Additionally, some universities may receive additional income through the provision of student services, including lodging, food, the student store, etc. Additionally, PASSHE institutions receive a percentage of funds every year through their status as a state university. University general income, tuition, and other economic characteristics are available in Table 2.3.1-7, under the University Profile section. This income and other allocations are used to help fund each campus department's yearly operational budget.

County/Municipal Funding Sources

Counties and municipalities may have access to additional funding sources unavailable to the University. These sources may include special purpose taxes; utility fees; development impact fees; or general obligation, revenue, and/or special tax bonds. In addition, the County or a municipality may be eligible for different grants than the University. A strong relationship between the University and the County or surrounding municipality may provide the University with additional funding streams, particularly for structural or mitigation projects.

Partnering Arrangements

Cooperation with outside entities is one manner of accomplishing common goals, solving mutual problems, and reducing expenditures. The University is located within Clarion County, which comprises 40 municipalities. The County and each municipality conduct daily operations and provide various community services, according to local needs and limitations. Each municipality varies in staff size, resource availability, fiscal status, service provision, constituent population, overall size, and vulnerability to the identified hazards.

Additionally, the University has multiple resources available through PASSHE. PASSHE consists of 14 institutions and two multi-university centers. The two multi-university centers are located in Harrisburg, PA, and Philadelphia, PA, while the universities are situated throughout the state. Universities often share resources, both academically through joint programs, and physically/fiscally through sharing program opportunities, trainings, and mutual aid.

The University has partnering arrangements and resources available through relationships with private industries, such as nearby apartment complexes/residential facilities, local industries, local school districts, and a Student Services/Lodging organization (university-dependent).

5.2.4 Education and Outreach Capability

Education and outreach capabilities include both the technological information systems in-place and the informational resources available to the campus community.

Technological resources include early warning systems, computer systems, the Internet, and 9-1-1 communications systems. The existing technological resource available at Clarion University to aid in hazard mitigation include a text message/e-mail alert system (Eagle Alert) and blue-light/emergency campus callboxes.

Informational resources include websites, brochures, pamphlets, workshops, and PSAs. Clarion University has a Facebook page, a Twitter account, and a University webpage. The campus police also hosts an anonymous crime tip hot line, and the campus safety page includes anonymous crime tip forms, a daily crime log, the annual safety report, and public safety contact information. Online informational resources on Clarion University's website include the Emergency Procedures Guidelines for Employees, Students, and Visitors and web pages that discuss procedures for medical emergencies, active shooter events, and lockdown events. The Clarion University OEM also had a webpage that includes information about emergency procedure guidelines, the Clarion University HMP, the Clarion University EOP, and the Clarion University Evacuation Plan. The OEM also organizes trainings for active shooter events, bomb threats, and severe weather.

5.3 Plan Integration

Plan integration recognizes that hazard mitigation is most effective when it works in concert with other plans, regulations, and programs. Plan integration promotes safe, resilient growth, effective emergency management, and an overall reduction of risk by ensuring that the goals and actions of hazard mitigation are included in comprehensive planning efforts so they can affect future land use and development. Some of the most important areas of planning and regulatory capabilities to integrate hazard mitigation goals and actions into include comprehensive plans, the hazard mitigation plans from all surrounding or encompassing areas, emergency operations plans, building codes, floodplain ordinances, subdivision and land development ordinances, and zoning ordinances. All of these tools provide mechanisms for the implementation of adopted mitigation strategies. The following sections discuss the scope of each of these plans, how the University HMP relates to and strengthens each of these plans, and how these plans can be updated to further integrate hazard mitigation goals and reduce Clarion University's vulnerability to hazards.

5.3.1 County Hazard Mitigation Plan

Overview

As required by DMA 2000, Counties maintain updated and FEMA-approved HMPs. As with the University HMP, the County HMP consists of a current hazard vulnerability analysis and risk assessment, a capabilities assessment, and a mitigation strategy that assesses projects and action items for cost-benefit and utility.

The County HMP follows the same maintenance schedule as the University HMP. They are updated and approved by FEMA on a five-year rotational schedule, with annual maintenance updates in between each formal update. Clarion County's HMP was last formally updated in 2013.

Plan Strengths and Alignment with Clarion University HMP

The Clarion County HMP discusses Clarion University as a population center and major facility in the county. The County HMP also references the vulnerability of the Clarion University campus and community to several identified hazards, including earthquake, subsidence, and tornado. The planning team also included representation from Clarion University. The HMP also specifies a mitigation action of working with county school districts and Clarion University to promote hazard mitigation education and awareness, provide information on emergency alert systems, and discuss ways to better integrate mitigation into curriculums.

The Clarion University HMP emphasizes the following County HMP goals and objectives most closely related to HMP activities:

- **Preventative Measures:** Attempt to reduce the current and future risk of damage from natural hazards in Clarion County
- **Property Protection:** Reduce the potential impact of natural disasters on public and private property.
- **Structural Projects:** Reduce or redirect the impact of natural disasters (especially floods) away from at risk population areas
- **Natural Resources Protection:** Protect existing natural resources and open space, including parks and wetlands, within the floodplain and watershed to improve their flood control function.
- **Public Information Program:** Protect public health, safety and welfare by increasing the public awareness of existing and potential hazards and by fostering both individual and public responsibility in mitigating risks due to those hazards.

Identified Gaps and Opportunities for Future Integration

During the next update of the County HMP, the risk assessment should incorporate a discussion of the vulnerability of Clarion University to other identified hazards, such as flood and winter storms. The County HMP should also incorporate mitigation actions identified in the Clarion University HMP.

Additionally, as Clarion University maintains this HMP and begins to implement actions from the Mitigation Strategy, they should work with Clarion County to determine if there are risks and vulnerabilities, or mitigation actions, identified in their HMPs that may impact Clarion University assets in these areas.

5.3.2 Emergency Operations Plan

Overview

The Pennsylvania Emergency Management Services Code (35 PA C.S. Sections 7701-7707, as amended) requires all political jurisdictions to prepare, maintain, and keep current an EOP. Clarion County EMA is responsible for preparing and maintaining the County EOP, while the Clarion University OEM prepares and maintains the university EOP. Clarion University's EOP was last updated in 2009, and the Clarion County EOP was updated in April 2014. The Clarion University EOP is reviewed regularly, as well as after an emergency event or training exercise, and changes are made where necessary. These changes are then distributed to all relevant stakeholders.

Plan Strengths and Alignment with Clarion University HMP

The University EOP was incorporated into several sections of the Clarion University HMP, particularly in assessing the University's capabilities for emergency preparedness and response in in Section 5.2.2 and the Pandemic hazards profile in Section 4.3.6.

The Clarion University EOP includes a section on hazard vulnerability, which lists hazards that the university is most vulnerable to and discusses how training and response checklists are based on this vulnerability assessment. The Clarion County EOP cites the County Hazard Mitigation Plan as a supporting resource, lists hazards that the county is vulnerable to as identified in the HMP, and discussions the

relationship between response, recover, and mitigation. However, the Clarion County EOP does not discuss the University HMP.

Identified Gaps and Opportunities for Future Integration

The University, along with Clarion County, should consider the University's HMP when reviewing their respective EOPs. The risk assessment information presented in the Clarion University HMP can inform future updates to the hazard vulnerability assessment of the University's EOP and to further detail the hazard vulnerability assessment of the County EOP. The hazard profiles of the HMPs can also help update the incident-specific plans of the EOPs. Likewise, the University HMP may need to be updated based on any changes made to the University or County EOP.

5.3.3 Clarion University Facilities Master Plan

Overview

A Campus Master Plan serves as the physical manifestation for implementing a university's strategic goals. This plan allows universities to identify short-term projects that align and further the long-term goals and plans of the institution by ensuring that the campus environment meets the needs of the university community, provides an effective space for work and study, and welcomes both the local community and students. As documented in Volume VI-C: University Master Planning of the System's Facilities Manual, the Board of Governors (BOG Policy 2000-02) requires all state institutions to maintain a current campus/facilities master plan, to address the renovation and development of facilities projects for the University and any secondary campuses. The Campus Master Plan should consider short-term (0 to 5 years), mid-term (5 to 10 years), and long-term (10+ years) planning.

As with the development of an HMP, the Campus Master Plan is usually written and planned with the help of a Steering Committee that represents the diverse interests of the students, faculty, staff, and local community. The Clarion University Facilities Master Plan included input from a planning team that included over twenty participants when it was last updated in 2015.

Plan Strengths and Alignment with Clarion University HMP

The Clarion University Facilities Master Plan is divided into three standalone phases of development: 2013 - 2018, 2018 - 2023, and 2023 - 2033. This plan aligns with some overall principles of risk reduction, such as by removing aging buildings, but it does not include any areas of hazard, risk, or vulnerability identification in developing the project areas, projects, or implementation strategies. The Campus Master Plan was integrated into the HMP in Section 4.5 regarding the University's future development and vulnerability and was consulted for the plan update as referenced in Section 7.3.

Identified Gaps and Opportunities for Future Integration

A strong, effective Campus Master Plan operates as a road map or guide for the future development of a campus. Therefore, the next Campus Master Plan update should incorporate findings form the University HMP so that construction in areas at high risk to the impacts of hazards can be avoided.

5.3.4 County and Municipality Comprehensive Plans

Overview

Integrating hazard mitigation into the county and municipality comprehensive plans helps to guide the community's development in a way that does not lead to increased hazard vulnerability. For instance,

future development can be guided away from areas with known hazards, and design standards to withstand potential hazards can be created for new or improved construction. Furthermore, Comprehensive Plans promote sound land use and regional cooperation among local governments to address planning issues. These plans serve as the official policy guide for influencing the location, type, and extent of future development by establishing the basis for decision-making and review processes on zoning matters, subdivision and land development, land uses, public facilities, and housing needs over time.

Clarion County's Comprehensive Plan was adopted on November 9, 2004 and Clarion Borough's was adopted in July 1, 1986. Both jurisdictions have maintained and implemented the plan since adoption, but the date for an update of the plans is unknown. The Plans promotes orderly growth and development in appropriate areas throughout the county as a means to diversify the economy and increase quality of life. To promote the implementation of the County Comprehensive Plan, Clarion County recommends that non-zoned communities adopt zoning ordinances and that zoned communities utilize their land use controls to promote revitalization efforts and preserve rural areas.

Plan Strengths and Alignment with Clarion University HMP

Both the Clarion County and Clarion Borough Comprehensive Plans acknowledge that Clarion University is a development of regional impact and significance and discuss the university in the context of economic development and housing. The County Plan also identified that the need for better coordination between the county, Clarion University, and local governments as a result of the planning process. The County Comprehensive Plan also briefly discusses flood hazards in the natural resources element of the plan.

Identified Gaps and Opportunities for Future Integration

Neither plan discusses hazard mitigation, nor do they address the vulnerability of Clarion University to hazard events. Clarion University should coordinate with the county to ensure that the specific impact of these hazards, and the resulting vulnerability of the campus community, is considered in any plans for implementation in the Clarion University area. Additionally, if opportunities arise to participate in updates to the Clarion County or Clarion Borough Comprehensive Plan, the University participate on the planning teams to ensure that risks and vulnerabilities to Clarion University assets and students are identified and integrated into the future land use and development plans.

5.3.5 Other Opportunities for Plan Integration

When developing this University HMP, certain sections of the County HMP; University EOP, strategic plan, and master plan; and the Clarion County and Clarion Borough Comprehensive Plans, provided key information and data. Moving forward, each of these documents should not be treated as unrelated and should not be updated separately. The University, county, and municipalities are responsible for incorporating the specific mitigation actions recommended in this HMP into the necessary planning documents, including the appropriate HMP, Comprehensive Plan, and EOP. Clarion Borough, which houses and surrounds the University, should review its land use ordinances, zoning ordinances, floodplain ordinances, and building codes to incorporate findings of the Clarion University HMP and to evaluate whether local planning tools adequately address risk assessment results, especially for those hazards identified as having high or moderate levels of risk.

To that end, the University must ensure that the components of the HMP are integrated into existing community planning mechanisms and are generally consistent with goals, policies, or recommended actions. The University and the Steering Committee will utilize the existing maintenance schedule of each plan to incorporate the goals, policies, or recommended actions as each plan is updated.

Additionally, the Clarion University Foundation offers opportunities for integration. The Clarion University Foundation is an alumni organization that works with the State System and receives and manages private sector gifts, which have been used to construct facilities such as the Seifert-Mooney Center. The Steering Committee should ensure that the Clarion University Foundation is aware of the vulnerability findings of the assets on campus. Additionally, the Clarion University Foundation should ensure that their facilities are maintained according to the findings of the HMP.

6 MITIGATION STRATEGY

This section of the HMP identifies the goals, objectives, actions, and the Mitigation Action Plan for mitigating against the impacts of hazards.

Goals are general guidelines that explain what the University wants to achieve and are usually expressed as broad policy statements representing the desired long-term results.

Objectives describe strategies or implementation steps to attain the identified goals. Objectives are more specific statements than goals; the described steps are usually measurable and may have a defined completion date.

Actions provide more detailed descriptions of specific work tasks to help the University achieve the goals and objectives. For each objective statement, there are alternatives for mitigation actions that must be evaluated to determine the best choices for each situation.

The Mitigation Action Plan includes a listing and description of the preferred mitigation actions and the strategy for implementation (e.g., who is responsible, how will they proceed, when actions should be initiated and/or completed).

6.1 Update Process Summary

Mitigation goals are general guidelines that explain what the University wants to achieve and are usually expressed as broad policy statements representing desired long-term results. Mitigation objectives describe strategies or implementation steps to attain the identified goals, while mitigation actions and mitigation projects are specific and measurable. There were five goals and 15 objectives identified during the HMP development process.

The previous goals listed in the HMP were first examined during a Steering Committee meeting and in review of previous plans. During this review, the Steering Committee members were afforded the opportunity to comment on the goals and actions that were listed in the existing HMP. In addition, throughout the course of the update, the HMP was posted on a website established specifically for this HMP update (http://www.clarionuniversityhmp.com/). All public correspondence included references to the website and welcomed comments on the HMP to the Clarion University, the Steering Committee, or to Delta.

The following are the goals found in the previous HMP, as reviewed by the Steering Committee:

1. Reduce possibility of injury/death to the University Community and reduce potential damage to existing assets (including critical facilities and infrastructure) due to:
    a. Flooding
    b. Severe weather (Tornados/Windstorms, Winter Storms, Other Severe Weather)
    c. Hazardous Materials Releases
    d. Terrorism
    e. Pandemics
    f. Major Utility Outages

2. Promote disaster-resistant future development
3. Promote hazard mitigation as a public value in recognition of its importance to the health, safety, and welfare of the population
4. Improve response and recovery capabilities

In addition to reviewing the previous goals, the Steering Committee reviewed specific action items addressed in the previous HMP and provided comments on the status of these items. All projects either are in progress or are implemented on a continuous basis.

Table 6.1.1-1 Disposition of Previous University Mitigation Activities

Previous Mitigation Actions (2008 HMP)	Status						Comments
	No Progress	Unknown	In Progress/Not Yet Complete	Continuous	Completed	Discontinued	
Increase awareness by University community of actions to take during a severe weather emergency				X			
Implement notification systems to protect University community from severe weather				X			
Reduce risks from severe weather by providing redundancy in key functions /services			X				
Identify members of University community with highest relative vulnerability to the effects of severe weather				X			
Prepare and implement action plan for reducing potential damage and loss of function from severe weather/major utility outage			X				

SOURCE: CLARION UNIVERSITY HAZARD MITIGATION PLAN, 2008

6.2 Mitigation Goals and Objectives

After reviewing the goals and objectives of the previous HMP, the Steering Committee recognized that certain goals previously identified were no longer relevant and vital to the University. As such, the Steering Committee decided to revise the goals for hazard mitigation to coincide with University strategic plans. The table below captures the goals and objectives for the plan update.

Table 6.2.1-1 Mitigation Actions
Goal 1: Increase public education and awareness of existing and potential hazards in the University.
***Objective 1.1*:** Promote public education about hazards at the University.
***Objective 1.2*:** Provide training on hazard mitigation techniques and processes.
Goal 2: Protect the students, faculty, staff, and visitors of the University as well as public and private property from the impacts of natural and human-caused hazards.
***Objective 2.1*:** Ensure all new growth and development conforms to current safety standards.
***Objective 2.2*:** Direct new growth away from hazard-prone areas.
***Objective 2.3*:** Encourage the renovation of older buildings in a timely manner to maintain consistency with current safety standards.
***Objective 2.4*:** Lessen impacts on natural resources and open space areas from natural and human-caused hazards.
***Objective 2.5*:** Assess and analyze the strengths and weaknesses of critical facilities in regards to the impacts of natural and human-caused hazards.
Goal 3: Encourage proper information management of data related to natural and human-caused hazards in the University.
***Objective 3.1*:** Develop data management tools to ensure adequate data management.
***Objective 3.2*:** Ensure adequacy of equipment and technology.
***Objective 3.3*:** Continue to foster development of information and resources for subsequent HMPs.
Goal 4: Increase local and University government awareness of hazard mitigation programs.
***Objective 4.1*:** Encourage participation in the HMP update process.
***Objective 4.2*:** Improve coordination and communication between academic departments, administrative departments, and other university offices.
***Objective 4.3*:** Improve coordination and communication between the University, the County and the Borough.
Goal 4: 5. Improve emergency services and capabilities in the University to protect citizens from natural and human-caused hazards.
Objective 5.1: Ensure adequate training and resources for those involved in emergency response, services, relief, or hazard mitigation.
Objective 5.2: Ensure that students, faculty, and staff receive relief and are evacuated as quickly as possible in the event of a disaster.

6.3 Mitigation Techniques

This section includes an overview of alternative mitigation actions based on the goals and objectives identified above. There are four general techniques to reducing hazard risks:

- **Plans and Regulations:** Government administrative or regulatory actions and processes influence the way land and buildings are developed and built. These actions include public activities to reduce hazard losses. Examples include planning, zoning, building codes, subdivision regulations, hazard-specific regulations (such as floodplain regulations), capital improvement programs, and open space preservation and stormwater regulations.
- **Structure and Infrastructure Projects:** Projects that are intended to lessen the impact of a hazard by modifying the environment using structures. Such structures include stormwater controls (culvert), dams/dikes/levees, beach nourishment, and safe rooms. These actions can also involve the modification of existing buildings or infrastructure to protect them from a hazard, or removal from the hazard area. Examples include elevation, relocation, structural retrofits, flood proofing, storm shutters, and shatter resistant glass. Most of these techniques are considered "sticks and bricks"; however, this category also includes insurance.
- **Natural Systems Protection:** Actions that, in addition to minimizing hazard losses, also preserve or restore the functions of natural systems. These actions include sediment and erosion control, stream corridor restoration, forest and vegetation management, wetlands restoration/preservation, slope stabilization, and historic properties and archeological site preservation.
- **Education and Awareness Programs:** Actions to inform and educate citizens, elected officials, and property owners about potential risks from hazards and potential ways to mitigate them. Such actions include hazard mapping, outreach projects, library materials, real estate disclosures, hazard information centers, and school age/adult education programs. Education and awareness programs are considered mitigation actions when they are long-term programs, not a single-time event.

The participants of the Public Stakeholder Kick-off meeting and the Steering Committee identified the techniques indicated in Table 6.3.1-1 as useful for mitigating specific hazards to the University.

Table 6.3.1-1 Mitigation Technique Matrix

MITIGATION TECHNIQUE	PLANS AND REGULATIONS	STRUCTURE AND INFRASTRUCTURE PROJECTS	NATURAL SYSTEMS PROTECTION	PUBLIC EDUCATION AND AWARENESS PROGRAMS
Dam Failure	X	X	X	
Earthquake	X	X		X
Extreme Temperature		X		X
Flooding/Flash Flood/Ice Jam	X	X	X	X
Hurricane/Tropical Storm/Nor'easter	X			X
Lightning Strike	X	X		X
Pandemic	X		X	X
Radon Exposure	X	X		X
Subsidence/Sinkhole	X	X	X	X
Tornado/Windstorm	X	X		X
Transportation Accidents	X			X
Utility Interruption	X	X		X
Terrorism	X			X
Winter Storm	X	X		X

SOURCE: DELTA DEVELOPMENT GROUP, INC.

6.4 Mitigation Action Plan

6.4.1 Identification of Mitigation Actions

The final list of 30 mitigation actions is contained in Table 6.4-1. At least one mitigation action was established for each hazard. More than one action is identified for several hazards. Each mitigation action is intended to address one or more of the goals and objectives identified in Section 6.2.

The table also includes a prioritization of the identified actions using the results of the PA STEEL Evaluation of Mitigation Actions detailed in Section 6.4.2. The number of unfavorable ratings was subtracted from the number of favorable ratings to determine each action's ultimate score. Actions that received scores of 15 or higher were assigned high priority. Those that received scores of 13 or 14 were assigned medium priority. All others were assigned low priority.

Table 6.4-1 List of 2016 mitigation actions with information including action category, hazard addressed, action description, lead agency/department, general implementation schedule, and Prioritization.

COMMUNITY: Clarion University **ACTION NO: 1**	**ACTION**: Increase advertisement of existing University resources, including severe weather and other current training initiatives.
Category:	Public Education and Awareness
Hazard(s) Addressed:	All
Lead Agency/Department:	Public Safety, Emergency Management
Implementation Schedule:	On-going
Estimated Cost:	Staff Time
Funding Source:	University
Priority:	High (score 19)
Comments:	Updated website and addition of information stations at key areas on Campus. Additionally, e-mail will be sent out at the start of semester.
COMMUNITY: Clarion University **ACTION NO: 2**	**ACTION**: Develop and post hazard mitigation information, along with other public University resources, plans, and links to outside agency resources, on the University website.
Category:	Public Education and Awareness
Hazard(s) Addressed:	All
Lead Agency/Department:	Emergency Management
Implementation Schedule:	On-going
Estimated Cost:	Staff Time
Funding Source:	University
Priority:	High (score 15)
Comments:	Emergency Management has added information station to Becht Hall & Gemmell as well as one at Venango to disseminate Emergency response information; website will be updated summer 2016.

Table 6.4-1 List of 2016 mitigation actions with information including action category, hazard addressed, action description, lead agency/department, general implementation schedule, and Prioritization.	
COMMUNITY: Clarion University **ACTION NO: 3**	**ACTION**: Provide information on evacuation and shelter-in-place procedures for the campus community (both residential and non-residential) and COOP plans and procedures on the University website.
Category:	Public Education and Awareness
Hazard(s) Addressed:	All
Lead Agency/Department:	Emergency Management
Implementation Schedule:	On-going
Estimated Cost:	Staff Time
Funding Source:	University
Priority:	High (score 15)
Comments:	Emergency Management has added information station to Becht Hall & Gemmell as well as one at Venango to disseminate Emergency response information; website will be updated summer 2016.
COMMUNITY: Clarion University **ACTION NO: 4**	**ACTION**: Disseminate informational pamphlets and include information on the University website for the campus community that explain the risk of hazards and outline precautionary measures that can be taken to help reduce impacts of disaster to themselves and their property.
Category:	Public Education and Awareness
Hazard(s) Addressed:	All
Lead Agency/Department:	Emergency Management
Implementation Schedule:	On-going
Estimated Cost:	$5,000. Staff Time
Funding Source:	University
Priority:	Medium (score 12)
COMMUNITY: Clarion University **ACTION NO: 5**	**ACTION**: Increase advertisement of public meetings on hazard mitigation, disaster preparation, or relevant training.
Category:	Public Education and Awareness
Hazard(s) Addressed:	All
Lead Agency/Department:	Emergency Management
Implementation Schedule:	1 year
Estimated Cost:	$500; Staff Time
Funding Source:	University
Priority:	Medium (score 13)

Table 6.4-1 List of 2016 mitigation actions with information including action category, hazard addressed, action description, lead agency/department, general implementation schedule, and Prioritization.	
COMMUNITY: Clarion University **ACTION NO: 6**	**ACTION**: Conduct training sessions on hazard mitigation during the President's Executive Council Meetings and other strategic/administrative meetings.
Category:	Public Education and Awareness
Hazard(s) Addressed:	All
Lead Agency/Department:	Emergency Management
Implementation Schedule:	On-going
Estimated Cost:	$5,000/year
Funding Source:	University
Priority:	High (score 19)
Comments:	Regular Tabletop Exercises are Planned with this group beginning in 2016.
COMMUNITY: Clarion University **ACTION NO: 7**	**ACTION**: Conduct training sessions on hazard mitigation open to students, staff, faculty, and relevant stakeholders.
Category:	Public Education and Awareness
Hazard(s) Addressed:	All
Lead Agency/Department:	Emergency Management
Implementation Schedule:	2 years
Estimated Cost:	$10,000/year
Funding Source:	University, HMPG
Priority:	Low (score 9)
COMMUNITY: Clarion University **ACTION NO: 8**	**ACTION**: Encourage the development of safety buffers between residential areas and any buildings utilizing chemicals or other hazardous materials.
Category:	Structure and Infrastructure
Hazard(s) Addressed:	Dam Failure; Earthquake; Extreme Temperatures; Flood, Flash Flood, Ice Jam; Hurricane, Tropical Storm, Nor'Easter; Lightning Strike; Radon Exposure; Subsidence, Sinkhole; Tornado, Windstorm; Utility Interruption; Winter Storm
Lead Agency/Department:	Facilities Planning and Management; Emergency Management
Implementation Schedule:	On-going
Estimated Cost:	Staff Time
Funding Source:	University
Priority:	High (score 19)
Comments:	Safety Inspector conducts regular evaluation of areas utilizing any hazardous materials of chemicals. These areas are limited to reduce exposure to residential areas both on & off campus.

Table 6.4-1 List of 2016 mitigation actions with information including action category, hazard addressed, action description, lead agency/department, general implementation schedule, and Prioritization.	
COMMUNITY: Clarion University **ACTION NO: 9**	**ACTION**: Ensure that the University construction and growth plans are consistent with County and Borough ordinances and regulations.
Category:	Plans and Regulations
Hazard(s) Addressed:	Dam Failure; Earthquake; Extreme Temperatures; Flood, Flash Flood, Ice Jam; Hurricane, Tropical Storm, Nor'Easter; Lightning Strike; Radon Exposure; Subsidence, Sinkhole; Tornado, Windstorm; Transportation Accidents; Utility Interruption; Winter Storm
Lead Agency/Department:	Facilities Planning and Management; Emergency Management
Implementation Schedule:	On-going
Estimated Cost:	Staff Time
Funding Source:	University
Priority:	High (score 26)
Comments:	All plans are reviewed by planning & in conjunction with Facilities are reviewed to ensure compliance with borough regulations.
COMMUNITY: Clarion University **ACTION NO: 10**	**ACTION**: Coordinate with the County and Borough planning departments to prevent growth in flood prone areas.
Category:	Plans and Regulations
Hazard(s) Addressed:	Flood, Flash Flood, Ice Jam
Lead Agency/Department:	Facilities Planning and Management
Implementation Schedule:	1 year
Estimated Cost:	Staff Time
Funding Source:	University
Priority:	Medium (score 13)
COMMUNITY: Clarion University **ACTION NO: 11**	**ACTION**: Encourage the review of planned infrastructure and strategic growth to ensure that new buildings will be developed outside of hazard-prone areas.
Category:	Plans and Regulations
Hazard(s) Addressed:	Dam Failure; Earthquake; Extreme Temperatures; Flood, Flash Flood, Ice Jam; Hurricane, Tropical Storm, Nor'Easter; Lightning Strike; Radon Exposure; Subsidence, Sinkhole; Tornado, Windstorm; Transportation Accidents; Utility Interruption; Winter Storm
Lead Agency/Department:	Facilities Planning and Management
Implementation Schedule:	1 year
Estimated Cost:	Staff Time
Funding Source:	University

Table 6.4-1 List of 2016 mitigation actions with information including action category, hazard addressed, action description, lead agency/department, general implementation schedule, and Prioritization.	
Priority:	Medium (score 13)
COMMUNITY: Clarion University **ACTION NO: 12**	**ACTION**: Review and conduct hazard vulnerability assessments on buildings and infrastructure older than 30 years.
Category:	Plans and Regulations
Hazard(s) Addressed:	Dam Failure; Earthquake; Extreme Temperatures; Flood, Flash Flood, Ice Jam; Hurricane, Tropical Storm, Nor'Easter; Lightning Strike; Radon Exposure; Subsidence, Sinkhole; Tornado, Windstorm; Transportation Accidents; Utility Interruption; Winter Storm
Lead Agency/Department:	Facilities Planning and Management; Emergency Management
Implementation Schedule:	On-going
Estimated Cost:	$50,000
Funding Source:	University, HMGP
Priority:	High (score 18)
Comments:	The University schedules regular evaluations of all facilities on campus.
COMMUNITY: Clarion University **ACTION NO: 13**	**ACTION**: Coordinate with Facility Maintenance, Student Affairs, and Athletics to implement mitigation strategies in natural and open space areas.
Category:	Natural Systems Protection
Hazard(s) Addressed:	Dam Failure; Earthquake; Extreme Temperatures; Flood, Flash Flood, Ice Jam; Hurricane, Tropical Storm, Nor'Easter; Lightning Strike; Pandemic; Radon Exposure; Subsidence, Sinkhole; Tornado, Windstorm; Winter Storm
Lead Agency/Department:	Facilities Planning and Management; Emergency Management; Athletics
Implementation Schedule:	On-going
Estimated Cost:	TBD (depending on identified projects)
Funding Source:	University; HMGP
Priority:	High (score 19)
Comments:	Facility plans are reviewed on a regular basis; concerns that are identified by athletics or EM are addressed as identified on a continual basis.
COMMUNITY: Clarion University **ACTION NO: 14**	**ACTION**: Develop informational workshops on risk and mitigation for staff members who work in areas of campus prone to repetitive hazard events.
Category:	Public Education and Awareness
Hazard(s) Addressed:	All
Lead Agency/Department:	Public Safety; Emergency Management

Table 6.4-1 List of 2016 mitigation actions with information including action category, hazard addressed, action description, lead agency/department, general implementation schedule, and Prioritization.	
Implementation Schedule:	On-going
Estimated Cost:	$10,000
Funding Source:	University
Priority:	High (score 20)
COMMUNITY: Clarion University **ACTION NO: 15**	**ACTION**: Conduct a thorough critical facilities vulnerability assessment and impact analysis.
Category:	Plans and Regulations
Hazard(s) Addressed:	All
Lead Agency/Department:	Facilities Planning and Management; Emergency Management
Implementation Schedule:	3 years
Estimated Cost:	$50,000
Funding Source:	University, HMGP
Priority:	Medium (score 12)
COMMUNITY: Clarion University **ACTION NO: 16**	**ACTION**: Update and implement a COOP Plan for University operations and services.
Category:	Plans and Regulations
Hazard(s) Addressed:	All
Lead Agency/Department:	Emergency Management
Implementation Schedule:	2 years
Estimated Cost:	$30,000
Funding Source:	University, State System
Priority:	Medium (score 12)
COMMUNITY: Clarion University **ACTION NO: 17**	**ACTION**: Implement a University-wide damage assessment management tool to increase the efficiency of University damage survey and reporting.
Category:	Plans and Regulations
Hazard(s) Addressed:	All
Lead Agency/Department:	Public Safety; Emergency Management
Implementation Schedule:	3 years
Estimated Cost:	$50,000
Funding Source:	University; State System
Priority:	High (score 22)
Comments:	Prior model had Clarion University working alone with recovery. With new head of Emergency Management, a better response has been formulated with Facilities & County personnel.

Table 6.4-1 List of 2016 mitigation actions with information including action category, hazard addressed, action description, lead agency/department, general implementation schedule, and Prioritization.	
COMMUNITY: Clarion University **ACTION NO: 18**	**ACTION**: Update an Information Technology COOP Plan to ensure ongoing access to data management and damage assessment during hazard events.
Category:	Plans and Regulations
Hazard(s) Addressed:	All
Lead Agency/Department:	Emergency Management
Implementation Schedule:	4 years
Estimated Cost:	$50,000
Funding Source:	University
Priority:	High (score 20)
Comments:	Emergency Management has been adding technology that will enable responders to access information databases during incidents. Working through remote access to systems.
COMMUNITY: Clarion University **ACTION NO: 19**	**ACTION**: Coordinate with the County and the Borough to determine consistency of data management and information sharing needs.
Category:	Plans and Regulations
Hazard(s) Addressed:	All
Lead Agency/Department:	Emergency Management
Implementation Schedule:	On-going
Estimated Cost:	Staff Time
Funding Source:	University
Priority:	Medium (score 12)
COMMUNITY: Clarion University **ACTION NO: 20**	**ACTION**: Conduct an audit of information systems and technology. Update the technology and information systems when new alternatives become available.
Category:	Plans and Regulations; Structure and Infrastructure
Hazard(s) Addressed:	All
Lead Agency/Department:	Emergency Management; Computing Systems
Implementation Schedule:	2 years
Estimated Cost:	$20,000 (audit)
Funding Source:	University
Priority:	Medium (score 12)
COMMUNITY: Clarion University **ACTION NO: 21**	**ACTION**: Continue to work with relevant University stakeholders to identify mitigation projects to address identified vulnerabilities in the HMP.
Category:	Plans and Regulations
Hazard(s) Addressed:	All
Lead Agency/Department:	Emergency Management

Table 6.4-1 List of 2016 mitigation actions with information including action category, hazard addressed, action description, lead agency/department, general implementation schedule, and Prioritization.	
Implementation Schedule:	On-going
Estimated Cost:	Staff Time
Funding Source:	University
Priority:	Medium (score 12)
COMMUNITY: Clarion University **ACTION NO: 22**	**ACTION**: Collect and analyze data on the specific impacts identified in the HMP.
Category:	Plans and Regulations
Hazard(s) Addressed:	All
Lead Agency/Department:	Emergency Management
Implementation Schedule:	5 years
Estimated Cost:	$50,000
Funding Source:	University; HMGP
Priority:	Medium (score 12)
COMMUNITY: Clarion University **ACTION NO: 23**	**ACTION**: Promote HMP outreach opportunities with students, faculty, and staff on campus.
Category:	Public Education and Awareness
Hazard(s) Addressed:	All
Lead Agency/Department:	Emergency Management
Implementation Schedule:	On-going
Estimated Cost:	Staff Time
Funding Source:	University
Priority:	Medium (score 12)
COMMUNITY: Clarion University **ACTION NO: 24**	**ACTION**: Encourage the involvement of relevant academic and administrative departments with plan revisions.
Category:	Plans and Regulations; Public Education and Awareness
Hazard(s) Addressed:	All
Lead Agency/Department:	Emergency Management
Implementation Schedule:	On-going
Estimated Cost:	Staff Time
Funding Source:	University
Priority:	High (score 19)
COMMUNITY: Clarion University **ACTION NO: 25**	**ACTION**: Continue to provide participation opportunities in the HMP for all campus community members.
Category:	Plans and Regulations; Public Education and Awareness
Hazard(s) Addressed:	All
Lead Agency/Department:	Emergency Management
Implementation Schedule:	On-going

Table 6.4-1 List of 2016 mitigation actions with information including action category, hazard addressed, action description, lead agency/department, general implementation schedule, and Prioritization.	
Estimated Cost:	Staff Time
Funding Source:	University
Priority:	Medium (score 19)
COMMUNITY: Clarion University **ACTION NO: 26**	**ACTION**: Integrate the five-year maintenance cycle of the HMP with the review and maintenance cycles of the County HMP, County Comprehensive Plan, and County/municipal EOPs.
Category:	Plans and Regulations
Hazard(s) Addressed:	All
Lead Agency/Department:	Emergency Management
Implementation Schedule:	1 year
Estimated Cost:	Staff Time
Funding Source:	University
Priority:	Medium (score 12)
COMMUNITY: Clarion University **ACTION NO: 27**	**ACTION**: Locate and secure funding streams for emergency response and support services.
Category:	Plans and Regulations
Hazard(s) Addressed:	All
Lead Agency/Department:	Emergency Management
Implementation Schedule:	On-going
Estimated Cost:	Staff Time
Funding Source:	University
Priority:	Low (score 9)
COMMUNITY: Clarion University **ACTION NO: 28**	**ACTION**: Continue to work with Student Affairs to encourage University exercises and drills.
Category:	Public Education and Awareness
Hazard(s) Addressed:	All
Lead Agency/Department:	Emergency Management; Student Affairs
Implementation Schedule:	On-going
Estimated Cost:	Staff Time
Funding Source:	University
Priority:	High (score 19)
Comments:	Emergency Management will send out resources to enable students to better prepare for emergencies, provide addition workshops, & training sessions.
COMMUNITY: Clarion University **ACTION NO: 29**	**ACTION**: Complete all necessary research and background work for hazard mitigation and disaster grant funding in advance to facilitate time-based grant/funding releases.
Category:	Plans and Regulations

Table 6.4-1 List of 2016 mitigation actions with information including action category, hazard addressed, action description, lead agency/department, general implementation schedule, and Prioritization.	
Hazard(s) Addressed:	All
Lead Agency/Department:	Emergency Management
Implementation Schedule:	On-going
Estimated Cost:	$5,000
Funding Source:	University
Priority:	Medium (score 13)
COMMUNITY: Clarion University **ACTION NO: 30**	**ACTION**: Maintain an inventory of the University's at-risk and residential populations to strengthen emergency response and evacuations.
Category:	Plans and Regulations
Hazard(s) Addressed:	All
Lead Agency/Department:	Public Safety; Student Services
Implementation Schedule:	1 year
Estimated Cost:	Staff Time
Funding Source:	University
Priority:	High (score 26)
Comments:	This can include designation of Emergency waiting areas and compiling list of students or staff with disabilities that may hinder response/ evacuation. University has recently added a staff position to address issues concerning persons with disabilities.
COMMUNITY: Clarion University **ACTION NO: 31**	**ACTION:** Evaluate, implement, and perform mitigation projects identified in this and other planning mechanisms, including acquisition, elevation, removal, floodproofing, securing access to generator power, and other mitigation methods to flood damaged structures should grant funding become available.
Category:	Structure and Infrastructure
Hazard(s) Addressed:	Flooding/Flash Flood/Ice Jam; Hurricane, Nor'easter
Lead Agency/Department:	Facilities Planning and Management; Emergency Management
Implementation Schedule:	Ongoing
Estimated Cost:	TBD
Funding Source:	HMA with match from University
Priority:	High (score 18)
Comments:	This action provides the university the opportunity to consistently review and evaluate mitigation needs and apply for funding as risks and needs change.

SOURCE: DEVELOPED BY DELTA DEVELOPMENT GROUP AND APPROVED BY HMP STEERING COMMITTEE

6.4.2 Evaluation of Mitigation Actions

The preceding list includes 31 action items, many of which will require substantial commitments of time by University staff. It is unrealistic to assume that the individuals working for these entities will have the time and resources to pursue all of these activities within the planning horizon for this HMP (i.e., over the next five years). To focus the energies of these individuals and related organizations, it was necessary to determine the priority of each action.

The first step in prioritizing these actions was to evaluate them based on their technical feasibility, social effects on the community, and the support of students, faculty, staff, and administration. The Political, Administrative, Social, Technical, Economic, Environmental, and Legal (PA-STEEL) Evaluation Method (see Table 6.4.2-1 below) categorizes the evaluation criteria. Using these criteria, the mitigation actions were evaluated, as shown in Table 6.4.2-2, and ranked for priority as shown in Tables 6.4-1 and 6.4.2-2.

Table 6.4.2-1 PA-STEEL Criteria

CRITERIA	CONSIDERATIONS
Political	• Who are the stakeholders in this proposed action? • Have all of the stakeholders been offered an opportunity to participate in the planning process? • How can the mitigation goals be accomplished at the lowest cost to the stakeholders? • Is there public support to implement and maintain this measure? • Is the political leadership willing to propose and support the favored measure?
Administrative	• Does the community have the capability to accomplish the action (i.e., can it implement the mitigation action)? • Can the community provide any necessary maintenance? • Are there enough staff, technical experts, and funding? • Can it be accomplished in a timely manner?
Social	• Will it cause any one segment of the population to be treated unfairly? • Will the action disrupt the community? • Is the action compatible with present and future community values? • Will the measures adversely affect cultural values or resources?
Technical	• How effective is the measure in avoiding or reducing future losses? • Will it create more problems than it solves? • Does it solve a problem or only a symptom? • In light of other community goals, is it the most useful?
Economic	• What are the costs and benefits of this measure? • How will the implementation of this measure affect the pocketbook of the community?
Environmental	• Is the action consistent with the community's environmental goals?

Table 6.4.2-1 PA-STEEL Criteria	
CRITERIA	**CONSIDERATIONS**
Legal	• Does the community have the authority to implement the proposed measure? • Is there a clear legal basis for the mitigation action? Is an ordinance or resolution necessary? • What are the legal side effects? • Will the community be liable for the actions or support of actions, or lack of action? • Is it likely to be challenged?

SOURCE: ALL-HAZARD PLANNING MITIGATION STANDARD OPERATING GUIDE

Table 6.4.2-2 PA-STEEL Evaluation of Mitigation Actions

ACTIONS	PA STEEL Criteria Considerations (+ Favorable - Less Favorable N Not Applicable)																						Summary (Equal Weighting)		Summary (Benefits and Costs Prioritized)	
	P			A			S		T			E				E					L					
	Political Support			Administrative			Social		Technical			Economic				Environmental					Legal					
	Political Support	Local Champion	Public Support	Staffing	Funding Allocation	Maintenance / Operations	Community Acceptance	Effect on Segment of Population	Technically Feasible	Long-Term Solution	Secondary Impacts	Benefit of Action (x3)	Cost of Action (x3)	Contributes to Economic Goals	Outside Funding Required	Effect on Land / Water	Effect on Endangered Species	Effect on HAZMAT / Waste	Consistent w/ Community Environmental Goals	Consistent w/ Federal Laws	State Authority	Existing Local Authority	Potential Legal Challenge				
Action 1 - Increase advertisement of existing University resources, including severe weather and other current training initiatives.	+	+	+	+	-	+	+	+	+	+	-	+	+	+	N	N	N	N	+	N	+	+	N	15 2 6	(+) (-) (N)	19 2 6	(+) (-) (N)
Action 2 - Develop and post hazard mitigation information, along with other public University resources, plans, and links to outside agency resources, on the University website.	+	+	+	-	N	-	+	+	+	+	+	+	+	+	N	N	N	N	N	N	N	N	N	11 2 10	(+) (-) (N)	15 2 10	(+) (-) (N)
Action 3 - Provide information on evacuation and shelter-in-place procedures for the campus community (both residential and non-residential) and COOP plans and procedures on the University website.	+	+	+	-	N	-	+	+	+	+	+	+	+	+	N	N	N	N	N	N	N	N	N	11 2 10	(+) (-) (N)	15 2 10	(+) (-) (N)
Action 4 - Disseminate informational pamphlets and include information on the University website for the campus community that explain the risk of hazards and outline precautionary measures that can be taken to help reduce impacts of disaster to themselves and their property.	+	+	+	-	-	-	+	+	+	+	+	+	-	+	-	N	N	N	N	N	N	N	N	10 5 8	(+) (-) (N)	12 7 8	(+) (-) (N)
Action 5 – Increase advertisement of public meetings on hazard mitigation, disaster preparation, or relevant training.	+	+	+	+	-	+	+	+	+	+	+	+	-	-	-	N	N	N	N	N	N	N	N	11 4 8	(+) (-) (N)	13 6 8	(+) (-) (N)
Action 6 - Conduct training sessions on hazard mitigation during the President's Executive Council Meetings and other strategic/administrative meetings.	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	N	N	N	N	N	N	N	N	15 0 8	(+) (-) (N)	19 0 8	(+) (-) (N)

Table 6.4.2-2 PA-STEEL Evaluation of Mitigation Actions

ACTIONS	PA STEEL Criteria Considerations (+ Favorable - Less Favorable N Not Applicable)																						Summary (Equal Weighting)	Summary (Benefits and Costs Prioritized)
	P			A			S		T			E				E					L				
	Political Support			Administrative			Social		Technical			Economic				Environmental					Legal				
	Political Support	Local Champion	Public Support	Staffing	Funding Allocation	Maintenance / Operations	Community Acceptance	Effect on Segment of Population	Technically Feasible	Long-Term Solution	Secondary Impacts	Benefit of Action (x3)	Cost of Action (x3)	Contributes to Economic Goals	Outside Funding Required	Effect on Land / Water	Effect on Endangered Species	Effect on HAZMAT / Waste	Consistent w/ Community Environmental Goals	Consistent w/ Federal Laws	State Authority	Existing Local Authority	Potential Legal Challenge		
Action 7 - Conduct training sessions on hazard mitigation open to students, staff, faculty, and relevant stakeholders.	+	+	-	-	-	-	-	+	+	+	+	+	-	-	-	N	N	N	N	N	N	N	N	7 (+) 8 (-) 8 (N)	9 (+) 10 (-) 8 (N)
Action 8 - Encourage the development of safety buffers between residential areas and any buildings utilizing chemicals or other hazardous materials.	+	+	+	+	-	-	+	+	-	+	+	+	-	+	-	+	-	+	+	+	+	+	+	17 (+) 6 (-) 0 (N)	19 (+) 8 (-) 0 (N)
Action 9 - Ensure that the University construction and growth plans are consistent with County and Borough ordinances and regulations.	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	-	22 (+) 1 (-) 0 (N)	26 (+) 1 (-) 0 (N)
Action 10 - Coordinate with the County and Borough planning departments to prevent growth in flood prone areas.	-	-	-	-	-	-	-	-	+	+	+	+	-	-	-	+	+	+	+	+	+	+	-	11 (+) 12 (-) 0 (N)	13 (+) 14 (-) 0 (N)
Action 11 - Encourage the review of planned infrastructure and strategic growth to ensure that new buildings will be developed outside of hazard-prone areas.	-	-	-	-	-	-	-	-	+	+	+	+	-	-	-	+	+	+	+	+	+	+	-	11 (+) 12 (-) 0 (N)	13 (+) 14 (-) 0 (N)
Action 12 - Review and conduct hazard vulnerability assessments on buildings and infrastructure older than 30 years.	+	+	+	-	-	-	+	+	+	+	+	+	-	+	-	N	N	+	+	+	+	+	+	16 (+) 5 (-) 2 (N)	18 (+) 7 (-) 2 (N)

Table 6.4.2-2 PA-STEEL Evaluation of Mitigation Actions

ACTIONS	PA STEEL Criteria Considerations (+ Favorable - Less Favorable N Not Applicable)																							Summary (Equal Weighting)		Summary (Benefits and Costs Prioritized)	
	P			A			S		T			E				E						L					
	Political Support			Administrative			Social		Technical			Economic				Environmental						Legal					
	Political Support	Local Champion	Public Support	Staffing	Funding Allocation	Maintenance / Operations	Community Acceptance	Effect on Segment of Population	Technically Feasible	Long-Term Solution	Secondary Impacts	Benefit of Action (x3)	Cost of Action (x3)	Contributes to Economic Goals	Outside Funding Required	Effect on Land / Water	Effect on Endangered Species	Effect on HAZMAT / Waste	Consistent w/ Community Environmental Goals	Consistent w/ Federal Laws	State Authority	Existing Local Authority	Potential Legal Challenge				
Action 13 – Coordinate with Facility Maintenance, Student Affairs, and Athletics to implement mitigation strategies in natural and open space areas.	+	+	+	-	-	-	+	+	-	+	+	+	-	+	-	+	+	+	+	+	+	+	+	17 6 0	(+) (-) (N)	19 8 0	(+) (-) (N)
Action 14 - Develop informational workshops on risk and mitigation for staff members who work in areas of campus prone repetitive hazard events.	+	+	+	-	-	-	+	+	+	+	+	+	+	+	-	N	N	N	+	+	+	+	+	16 4 3	(+) (-) (N)	20 4 3	(+) (-) (N)
Action 15 - Conduct a thorough facilities vulnerability assessment and impact analysis	+	+	+	-	-	-	+	+	+	+	+	+	-	+	-	N	N	N	N	N	N	N	N	10 5 8	(+) (-) (N)	12 7 8	(+) (-) (N)
Action 16 – Update and implement a COOP Plan for University operations and services.	+	+	+	-	-	-	+	+	+	+	+	+	-	+	-	N	N	N	N	N	N	N	N	10 5 8	(+) (-) (N)	12 7 8	(+) (-) (N)
Action 17 - Implement a University-wide damage assessment management tool to increase the efficiency of University damage survey and reporting.	+	+	+	+	-	+	+	+	+	+	+	+	-	+	-	+	+	+	+	+	+	+	+	20 3 0	(+) (-) (N)	22 5 0	(+) (-) (N)
Action 18 – Update an Information Technology COOP Plan to ensure ongoing access to data management and damage assessment during hazard events.	+	+	+	-	-	-	+	+	+	+	+	+	-	+	-	+	+	+	+	+	+	+	+	18 5 0	(+) (-) (N)	20 7 0	(+) (-) (N)

Table 6.4.2-2 PA-STEEL Evaluation of Mitigation Actions

ACTIONS	PA STEEL Criteria Considerations + Favorable - Less Favorable N Not Applicable P: Political Support — Political Support	Local Champion	Public Support	A: Administrative — Staffing	Funding Allocation	Maintenance / Operations	S: Social — Community Acceptance	Effect on Segment of Population	T: Technical — Technically Feasible	Long-Term Solution	Secondary Impacts	E: Economic — Benefit of Action (x3)	Cost of Action (x3)	Contributes to Economic Goals	Outside Funding Required	E: Environmental — Effect on Land / Water	Effect on Endangered Species	Effect on HAZMAT / Waste	Consistent w/ Community Environmental Goals	Consistent w/ Federal Laws	L: Legal — State Authority	Existing Local Authority	Potential Legal Challenge	Summary (Equal Weighting)	Summary (Benefits and Costs Prioritized)
Action 19 - Coordinate with the County and the Borough to determine consistency of data management and information sharing needs.	+	+	+	-	-	-	+	+	+	+	+	+	-	+	-	N	N	N	N	N	N	N	N	10 (+) 5 (-) 8 (N)	12 (+) 7 (-) 8 (N)
Action 20 - Conduct an audit of information systems and technology. Update the technology and information systems when new alternatives become available.	+	+	+	-	-	-	+	+	+	+	+	+	-	+	-	N	N	N	N	N	N	N	N	10 (+) 5 (-) 8 (N)	12 (+) 7 (-) 8 (N)
Action 21 - Continue to work with relevant University stakeholders to identify and incorporate hazard mitigation project opportunity forms to include in the five-year update of the HMP.	+	+	+	-	-	-	+	+	+	+	+	+	-	+	-	N	N	N	N	N	N	N	N	10 (+) 5 (-) 8 (N)	12 (+) 7 (-) 8 (N)
Action 22 - Collect and analyze data on the specific impacts identified in the HMP.	+	+	+	-	-	-	+	+	+	+	+	+	-	+	-	N	N	N	N	N	N	N	N	10 (+) 5 (-) 8 (N)	12 (+) 7 (-) 8 (N)
Action 23 - Promote HMP outreach opportunities with students, faculty, and staff on campus.	+	+	+	-	-	-	+	+	+	+	+	+	-	+	-	N	N	N	N	N	N	N	N	10 (+) 5 (-) 8 (N)	12 (+) 7 (-) 8 (N)
Action 24 - Encourage the involvement of relevant academic and administrative departments with plan revisions.	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	N	N	N	N	N	N	N	N	15 (+) 0 (-) 8 (N)	19 (+) 0 (-) 8 (N)
Action 25 - Continue to provide participation opportunities in the HMP for all campus community members	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	N	N	N	N	N	N	N	N	15 (+) 0 (-) 8 (N)	19 (+) 0 (-) 8 (N)

Table 6.4.2-2 PA-STEEL Evaluation of Mitigation Actions

ACTIONS	PA STEEL Criteria Considerations (+ Favorable - Less Favorable N Not Applicable)																						Summary (Equal Weighting)		Summary (Benefits and Costs Prioritized)	
	P			A			S		T			E				E					L					
	Political Support			Administrative			Social		Technical			Economic				Environmental					Legal					
	Political Support	Local Champion	Public Support	Staffing	Funding Allocation	Maintenance / Operations	Community Acceptance	Effect on Segment of Population	Technically Feasible	Long-Term Solution	Secondary Impacts	Benefit of Action (x3)	Cost of Action (x3)	Contributes to Economic Goals	Outside Funding Required	Effect on Land / Water	Effect on Endangered Species	Effect on HAZMAT / Waste	Consistent w/ Community Environmental Goals	Consistent w/ Federal Laws	State Authority	Existing Local Authority	Potential Legal Challenge				
Action 26 - Integrate the five-year maintenance cycle of the HMP with the review and maintenance cycles of the County HMP, County Comprehensive Plan, and County/municipal EOPs.	+	+	+	-	-	-	+	+	+	+	+	+	-	+	-	N	N	N	N	N	N	N	N	10 5 8	(+) (-) (N)	12 7 8	(+) (-) (N)
Action 27 - Locate and secure funding streams for emergency response and support services.	-	-	-	-	-	-	+	+	+	+	+	+	-	+	-	N	N	N	N	N	N	N	N	7 8 8	(+) (-) (N)	9 10 8	(+) (-) (N)
Action 28- Continue to work with Student Affairs to encourage University exercises and drills	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	N	N	N	N	N	N	N	N	15 0 8	(+) (-) (-)	19 0 8	(+) (-) (-)
Action 29 - Complete all necessary research and background work for hazard mitigation and disaster grant funding in advance to facilitate time-based grant/funding releases.	+	+	+	-	-	-	+	+	+	+	+	+	-	+	+	N	N	N	N	N	N	N	N	11 4 8	(+) (-) (N)	13 6 8	(+) (-) (N)
Action 30 - Maintain an inventory of the University's at-risk and residential populations to strengthen emergency response and evacuations.	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	N	22 0 1	(+) (-) (N)	26 0 1	(+) (-) (N)
Action 31 - Evaluate, implement, and perform mitigation projects identified in this and other planning mechanisms, including acquisition, elevation, removal, floodproofing, securing access to generator power, and other mitigation methods to flood damaged structures should grant funding become available.	+	+	+	-	-	-	+	+	+	+	+	+	-	+	-	+	N	+	+	+	+	+	-	16 6 1	(+) (-) (N)	18 8 1	(+) (-) (N)

7 PLAN MAINTENANCE

7.1 Update Process Summary

The development of the University's FEMA-approved 2016 HMP was a comprehensive effort that utilized a variety of sources and data for trend analysis, reviewed a vulnerability and risk assessment for local hazards, created a fluid process to streamline future updates to the HMP, and identified the hazard mitigation measures needed to limit the effects of local hazards.

The 2016 HMP states that it will be updated every five years. The HMP will actually be reviewed and evaluated more frequently, as it will be consulted in the creation and/or update of other University planning documents (see further down in this section, under "Incorporation into Other Planning Mechanisms"). Any potential modifications to the HMP that would impact those other documents were noted by the University HMP Steering Committee.

This Plan Maintenance section was created based on discussions with the Steering Committee regarding how the HMP would be monitored, evaluated, and updated over the next five years. The HMP's relationship with the University Campus Master Plan and EOP, along with the County HMP, was discussed and documented below under "Incorporation into Other Planning Mechanisms." The Steering Committee, local government representatives, and other stakeholders were offered the opportunity to review and comment on this section, along with the rest of the HMP, during the public comment period.

7.2 Monitoring, Evaluating, and Updating the Plan

Hazard mitigation planning in the University is the responsibility of all levels of the University (i.e., upper management, faculty, and staff), as well as the responsibility of the students. As listed in *Bringing the Plan to Life: Implementing the Hazard Mitigation Plan* (FEMA 386-4), the Steering Committee must continuously monitor and document the progress of the HMP's recommended actions. The Steering Committee, listed in Section 3 (Planning Process), under the direction of the University's Emergency Management Director, will be responsible for monitoring, evaluating, and updating this HMP. The Steering Committee will serve as the focal point for coordinating the University-wide mitigation efforts by overseeing progress made on the implementation of the identified action items and updating the plan, as needed, to reflect changing conditions.

The Director of the University's Emergency Management Department will lead the Steering Committee for annual reviews of the HMP. The Steering Committee will i hold the annual review meeting each May to institutionalize this review. Prior to the annual review, the Steering Committee will request that responsible agencies or organizations submit a semi-annual report that provides adequate information to assess the status of mitigation activities. At these annual reviews, the Steering Committee will monitor progress with mitigation activities by reviewing the reports from the departments identified for implementation of the different mitigation actions. The Committee will then provide their feedback to the individual departments. In preparation for the annual review, the Steering Committee will also solicit new projects from relevant stakeholders by sending Project Opportunity Forms and informing other University departments about the opportunity to update their mitigation measures.

In addition to meeting annually, the Steering Committee will also meet following each emergency declaration to address to ensure the incident is properly reflected in the HMP. The Steering Committee will also serve in an advisory capacity to the Clarion University Council of Trustees as needed on matters of mitigation.

Evaluation of the Plan will include checking on the implementation of mitigation actions and on reporting on the changing priorities for hazard mitigation at Clarion University. These will then be compared to the goals and objectives the Plan set out to achieve. The Committee will also evaluate mitigation actions if they need to be discontinued, or modified in any way in light of new developments in the University community. The progress will be documented by the Steering Committee.

Each review process will ensure that the risk assessment reflects current conditions in the University, that the capability assessment accurately reflects local circumstances, and that the hazard mitigation strategy is updated based on the University's damage assessment reports and local mitigation project priorities. The Steering Committee will complete a Progress Report to evaluate the status and continued accuracy of the HMP, as well as record the Steering Committee's findings. Clarion University's Emergency Management Director will maintain a copy of these records.

As directed in *Bringing the Plan to Life: Implementing the Hazard Mitigation Plan* (FEMA 386-4), the Progress Report will include the following information:

- The objectives of the hazard mitigation action
- Identification of the lead and supporting departments/personnel responsible for implementation
- The length of time that the project should take, including a delineation of the various stages of work and detailed timelines with milestones
- Whether the resources needed for implementation, funding, staff time, and technical assistance are available, or if other arrangements must be made to obtain them
- The types of permits or approvals necessary to implement the action
- Details on the ways the actions will be accomplished within the organization, and whether the duties will be assigned to agency staff or contracted out
- The current status of the project, including the identification of any issues that may hinder implementation

The Plan will be updated every five years, as required by the Disaster Mitigation Act, 2000. Before every five-year update, the Committee might choose to update the plan due to another reason, e.g. in the aftermath of a major disaster. The updated Plan will account for any new developments in the community or special circumstances (e.g. post-disaster). Issues that come up during monitoring and evaluation that require changes in mitigation strategies and actions will be incorporated in the Plan at this stage.

7.3 Continued Public Involvement

The University's Emergency Management Department will ensure that the HMP is posted and maintained on the University's website (http://www.clarion.edu/), and will continue to encourage public review and comment on the HMP through information posted to the website and public notices in local newspapers. All comments received will be maintained and considered by the Steering Committee when updating the HMP.

To promote public participation during the HMP's development, the University welcomed comments on sections of the HMP for a 30-day period. This period offered the public the opportunity to share their comments and observations.

The University will continue to contact stakeholders, including students, faculty, and staff, via telephone, mail, and e-mail regarding mitigation projects. Any additional Project Opportunity Forms received during the life of this five-year HMP will be incorporated into the HMP on an interim basis and will then be updated and included in the next five-year HMP update.

8 PLAN ADOPTION

The following page shows the university's adoption of the HMP.

Clarion University Hazard Mitigation Plan

University Adoption Resolution

Clarion University, Pennsylvania State System of Higher Education (State System)

WHEREAS, Clarion University of Clarion Borough, Pennsylvania, is most vulnerable to natural and human-caused hazards, which may result in loss of life and property, economic hardship, and threats to public health and safety, and

WHEREAS, Section 322 of the Disaster Mitigation Act of 2000 (DMA 2000) recommends institutions for higher education to develop and submit for approval to the President a mitigation plan that outlines processes for identifying their respective natural hazards, risks, and vulnerabilities, and

WHEREAS, the University acknowledges the recommendation of Section 322 of DMA 2000 to have an approved Hazard Mitigation Plan (HMP) as a prerequisite to receiving post-disaster Hazard Mitigation Grant Program funds, and

WHEREAS, the University's HMP has been developed by the University's Emergency Management Department in cooperation with other University academic departments; administrative departments; and students, faculty, and staff of the University, and

WHEREAS, a public involvement process consistent with the requirements of DMA 2000 was conducted to update the University's HMP, and

WHEREAS, the University's HMP recommends mitigation activities that will reduce losses to life and property affected by both natural and human-caused hazards that affect the University and its students, faculty, staff, and members of the general public.

NOW THEREFORE BE IT RESOLVED by the governing body for the University that:

- The University's HMP is hereby adopted as the official HMP of Clarion University, and
- The respective officials and departments identified in the implementation strategy of the University's HMP are hereby directed to implement the recommended activities assigned to them.

ADOPTED, this 2ND day of MAY 2016.

Karen M. Whitney

Dr. Karen M. Whitney
University President

9 APPENDICES

Appendix A Authorities and References

Appendix B Meeting and Other Participation Documents

Appendix C Deep Mining Maps

Appendix D Venango West End Pond Dredging & Remediation Drawings

Appendix E Plan Review Tool