Pennsylvania's
STATE SYSTEM
of Higher Education

ESU
EAST STROUDSBURG
UNIVERSITY
FOUNDED 1893

EAST STROUDSBURG UNIVERSITY
HAZARD MITIGATION PLAN

2015

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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 Environmental Health and Safety at East Stroudsburg University hereby certifies the review.

Annual Review Meetings			
YEAR	DATE OF MEETING	PUBLIC OUTREACH ADDRESSED?*	SIGNATURE
2009	To the best knowledge of the HMSC, there were no annual review meetings from 2009-2014. However, progress was made on mitigation actions, trainings, and other preparedness activities. See Section 6 for an accounting of mitigation progress from 2009-2014.		
2010			
2011			
2012			
2013			
2014			
2015			
2016			
2017			
2018			
2019			
**Confirm "Yes" here annually and describe on Record of Changes table.*			

Record of Changes

Record of Changes			
DATE	DESCRIPTION OF CHANGE MADE, MITIGATION ACTION COMPLETED, OR PUBLIC OUTREACH PERFORMED	CHANGED MADE BY (PRINT NAME)	CHANGE MADE BY (SIGNATURE)
Reminder: Please attach all associated meeting agendas, sign-in sheets, handouts, and minutes.			

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 over 100 statewide or county-specific gubernatorial and presidential disaster declarations since 1954, the Pennsylvania State System of Higher Education (the State System), along with the students, faculty, staff, and other stakeholders of East Stroudsburg University (University), located in the Borough of East Stroudsburg, 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 East Stroudsburg University Hazard Mitigation Planning Team (Planning Team), composed of University administrative officials and staff, emergency responders, faculty representatives, and student representatives, has updated this Hazard Mitigation Plan (HMP). On behalf of the University, the State System used a competitive process to select and contract the Michael Baker Jr., Inc. (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 will also 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 Planning Team 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 and amended October 2013). 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 Planning Team 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) and attendance by a department/organizational representative at a planning or public meeting conducted as part of the planning process.

1.4 Authority and References

Authority for this plan originates from the following federal sources:

- Robert T. Stafford Disaster Relief and Emergency Assistance Act, 42 U.S.C., Section 322, as amended;
- Code of Federal Regulations (CFR), Title 44, Parts 79.4, 201 and 206; and
- Disaster Mitigation Act (DMA) of 2000, Public Law 106-390, as amended.

Authority for this plan originates from the following Commonwealth of Pennsylvania sources:

- Pennsylvania Emergency Management Services Code. Title 35, Pa C.S. Section 101.
- Pennsylvania Municipalities Planning Code of 1968, Act 247 as reenacted and amended by Act 170 of 1988.
- Pennsylvania Stormwater Management Act of October 4, 1978. P.L. 864, No. 167.

The following FEMA guides and reference documents were used to prepare this document:

- FEMA 386-1: Getting Started. September 2002.
- FEMA 386-2: Understanding Your Risks: Identifying Hazards and Estimating Losses. August 2001.
- FEMA 386-3: Developing the Mitigation Plan. April 2003.
- FEMA 386-4: Bringing the Plan to Life. August 2003.
- FEMA 386-5: Using Benefit-Cost Review in Mitigation Planning. May 2007.
- FEMA 386-6: Integrating Historic Property and Cultural Resource Considerations into Hazard Mitigation Planning. May 2005.

- FEMA 386-7: Integrating Manmade Hazards into Mitigation Planning. September 2003.
- FEMA 386-8: Multijurisdictional Mitigation Planning. August 2006.
- FEMA 386-9: Using the Hazard Mitigation Plan to Prepare Successful Mitigation Projects. August 2008.
- FEMA. Building a Disaster-Resistant University. August 2003.
- FEMA. Local Mitigation Planning Handbook. March 2013.
- FEMA. Local Mitigation Plan Review Guide. October 1, 2011.
- FEMA National Fire Incident Reporting System 5.0: Complete Reference Guide. January, 2008.
- FEMA Hazard Mitigation Assistance Unified Guidance. June 1, 2010.
- FEMA. Integrating Hazard Mitigation Into Local Planning: Case Studies and Tools for Community Officials. March 1, 2013.
- FEMA. Mitigation Ideas. A Resource for Reducing Risk to Natural Hazards. January 2013.

The following Pennsylvania Emergency Management Agency (PEMA) guides and reference documents were used prepare this document:

- PEMA. *Hazard Mitigation Planning Made Easy!*
- PEMA. *Mitigation Ideas: Potential Mitigation Measures by Hazard Type; A Mitigation Planning Tool for Communities.* March 6, 2009.
- PEMA. *Pennsylvania's Hazard Mitigation Planning Standard Operating Guide.* October, 2013.
- PEMA. *Pennsylvania 2013 Standard State All-Hazard Mitigation Plan.* October, 2013.

Please note that that hazard mitigation falls within PEMA's Bureau of Recovery and Mitigation (BORM). PEMA's work is both guided by and regulated by additional federal and state guidance, including FEMA's Logistics Capability Assessment Tool; FEMA Comprehensive Preparedness Guidance 101 and 201; the Federal Critical Infrastructure Protection Act; the Patriot Act; Department of Homeland Security Directives; Presidential Directives 5 and 8; Code of Federal Regulations (CFR) Titles 10, 29, and 49; and the Pennsylvania State Emergency Operations Plan.

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, the University Emergency Operations Plan (EOP), and other relevant campus plans were incorporated into multiple aspects of this HMP. Information from the University's EOP, fact books, and other documents was used to formulate the University profile, to identify the history of individual hazards, and to detail the population projections in Millersville 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

East Stroudsburg University (ESU) is located mostly in East Stroudsburg Borough, Monroe County, Pennsylvania; the eastern portion of campus is located in Smithfield Township. The main campus occupies 256 acres just off Interstate 80; 43 acres are leased to University Properties, Inc., an affiliated non-profit corporation responsible for the construction of 541 student housing beds and three acres are leased to the Visiting Nurses Association for the operation of a hospice facility.

ESU's campus is part of the Blue Mountains section of Pennsylvania and the Delaware Water Gap section of Monroe County. The Borough of East Stroudsburg was incorporated in 1870 and is largely built out, though its character is that of a small town. Smithfield Township is more suburban and rural in character. The campus is approximately 70 miles from Philadelphia and 90 miles from New York City and is located in a fast-growing part of the Commonwealth of Pennsylvania. The general borders of campus are Prospect Street, East Brown Street, and Route 447.

Topographically, the highest elevation on campus is 604 feet at the University Ridge apartments on the eastern portion of campus while the lowest elevation is 484 at Prospect and Normal Street near the campus gateway. Generally, the western portions of campus are the most flat while the eastern end of campus has slopes of 15% and higher. However, there are steeper slopes throughout campus (ESU Campus Facilities Master Plan, 2010). In addition, the campus enjoys a large and mature tree canopy of native trees and shrubs. The campus is located approximately one-half mile away from Brodhead Creek, which runs to the west and south of campus.

In addition, ESU leases additional locations in the Lehigh Valley and in Center City Philadelphia for distance-learning. While not owned by ESU directly, Stony Acres is a 119 acre wildlife sanctuary and recreational facility owned by the students of ESU. This site is located in Marshalls Creek, Pennsylvania, and is set in the Blue Mountains approximately ten miles north of main campus.

2.2 University Facts and Institutional Trends

ESU was founded as the East Stroudsburg Normal School in 1893. From 1893-1920, the school was a private institution; in 1920, the school's ownership transferred to the Commonwealth of Pennsylvania and it became the East Stroudsburg State Normal School. In 1927, the school became the State Teacher's College at East Stroudsburg after being granted the right to confer Bachelor of Science degrees in Education and Health Education. The College's name changed to East Stroudsburg State College in 1960, and in 1962 the school received the right to confer graduate degrees. The College officially became East Stroudsburg University on July 1, 1983, joining the 14-university State System. In addition to the main campus, ESU has extended learning programs in Center City Philadelphia and in the Lehigh Valley. It also routinely sends students to the Wallops Island Research Field Station in Virginia, a marine sciences consortium.

Traditionally known as a teachers' college, ESU is a comprehensive university offering 57 undergraduate and 23 graduate programs in four major program areas: Arts and Sciences, Business and Management, Education, and Health Sciences. The most popular undergraduate programs are business management, biological sciences, psychology, exercise science, criminal justice, and athletic training. The University experienced record enrollment in 2011 with a corresponding increase in diversity and academic rigor. However, since 2011, enrollment has dropped slightly, as has the number of applicants. Approximately 28% of those offered admission enrolled at ESU in 2013, an increase over the previous incoming class. The retention rate for all classes stood at 71.3% in 2013, and approximately 58% of entering freshmen graduate within six years. Transfer student applications and enrollment also peaked in 2011 and has declined slightly. The official university enrollment for fall 2013 was 6,778 students (Office of Institutional Research, 2014).

ESU has been working on its Strategic Plan, ***Students First: Innovate ESU***, which is intended to act as a blueprint for the University's evolution as an institution. This document emphasizes ESU's vision to be "an innovative and entrepreneurial university… with an emphasis on quality and collaboration" (*Students First Strategic Plan Draft 4*, 2014). This document also stresses East Stroudsburg's role in the greater community and in the economy of the Poconos region.

2.3 Population, Occupancy, and Demographics

Population and demographic information provides baseline data about the University community. This community consists of 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 ESU is provided in the tables below.

Table 2.3-1 Baseline Demographic Information (ESU Office of Institutional Research 2014; Common Data Set 2013-14)

DEMOGRAPHICS	FULL-TIME	PART-TIME
Total Population	**5,794**	**984**
Male	2551	435
Female	3243	549
Student Enrollment		
First-time degree seeking freshmen	1143	69
Other first-year, degree seeking	685	92
All other degree-seeking undergraduates	3632	488
All other undergraduates enrolled in credit courses	35	42
Graduate	299	293

Table 2.3-2 Baseline Faculty Demographic Information (ESU Office of Institutional Research, 2014)

DEMOGRAPHICS	2012
Total employees	**829**

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

Table 2.3-2 Baseline Faculty Demographic Information (ESU Office of Institutional Research, 2014)

DEMOGRAPHICS	2012
Full-time	677
Part-Time	152
Position Type	
Faculty	336
Staff	493
Faculty Type	
Full-time	291
Adjunct	45

Table 2.3-3 below shows the race and ethnicity of ESU students. ESU's overall diversity has been growing in recent years, though the campus remains mostly white, non-Hispanic.

Table 2.3-3 Race and Ethnicity for ESU students, Fall 2013 (ESU Office of Institutional Research, 2014).

RACE AND ETHNICITY	UNDERGRADUATE	GRADUATE
American Indian and Alaska Native	13	2
Asian	89	4
Black, non-Hispanic	573	35
Hispanic	622	44
Pacific Islander	15	5
White, non-Hispanic	3897	435
Multi-Racial	123	14
Unknown	798	22
Non-Resident Alien	56	31
TOTAL	**6,186**	**592**

Based on figures from the Office of Institutional Research, ESU has a population of 6,778 students and 829 faculty and staff persons. Nearly all undergraduate students are traditional-aged (under 25). Additionally, according to the 2012 ACS 5-year estimates, the surrounding community of East Stroudsburg Borough has a population of 9,903 persons and a density of 3,487 persons per square mile; Smithfield Township has a population of 7,357 persons and a density of approximately 322 persons per square mile (US Census Bureau, 2012).

ESU has seven traditional residence halls as well as two residential properties reserved for upper-class students (University Apartments and University Ridge). Over 77% of first-time freshmen live on campus, but only 35.6% of all undergraduate students live in school owned, operated, or affiliated housing. 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 that 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.

The University and surrounding community have a variable population density, as the demographics quoted above are based off enrollment rates for an entire academic year. University populations fluctuate with both time of year and time of day. The majority of students are on campus during the fall/spring semesters, and the population of ESU radically shifts during the Winter session (typically mid-December to mid-January) and summer session (mid-May to early August) as students return to their primary residence. Many classes are held during the day, though classes may be held in the late afternoon and evening hours. 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. Adjunct faculty may only teach after 5:00 p.m., and part-time students will be on campus only for their courses. After 10 p.m. on weekday evening, the majority of the University population consists of resident students. During weekends, the majority of the population also consists of resident students.

A variable population density means 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, late summer hurricanes or tropical storms are less likely to cause course schedule disruptions than later in the fall. 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.

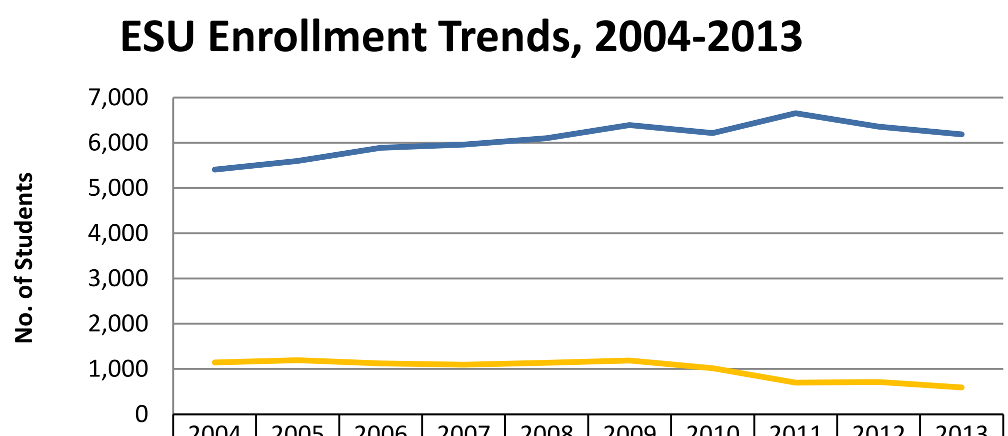
In contrast, periods of time where there are more people on campus and the University has a higher population density (i.e., fall/spring semesters and weekdays) can also lead to greater risk as utility interruptions, transportation accidents, and other events will disrupt a larger number of people. Another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

Age and student year are other key demographic trends. Faculty, staff, and/or students may have access and functional needs. For example, they may be unable to drive; therefore, special evacuation plans may need to be created for them. Older faculty and staff members may also have hearing or vision impairments that could make receiving emergency instructions difficult. As with older students, faculty, and staff, many first year students and 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. In addition, nearly a quarter of the undergraduate population is from out of state, which may mean they are more likely to remain on campus on weekends (Common Data Set 2013-14).

A large percentage of university employees are represented by a union. Management employees are 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, coaches, and athletic trainers belong to the Association of Pennsylvania State College and University Faculties (APSCUF). Members of the University Police are members of the Security, Police, and Fire Professionals of America (SPFPA). 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.

As demonstrated by Figure 2.3-1, ESU has experienced a growth in undergraduate students from 2004 to 2013 with a growth rate of 14%. At the same time, though, graduate student enrollment has dropped by 48%. It is important that the University properly maintains its existing infrastructure and has plans to manage or redevelop unused properties to ensure adequate housing, classrooms, and facilities related to changes in the student population.

Figure 2.3-1 Enrollment trends at ESU (ESU Office of Institutional Research, 2013).



	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Undergraduate	5,409	5,596	5,890	5,959	6,099	6,391	6,217	6,656	6,355	6,186
Graduate	1,144	1,197	1,123	1,094	1,135	1,185	1,015	697	709	592

2.4 Land/Building Use and Development

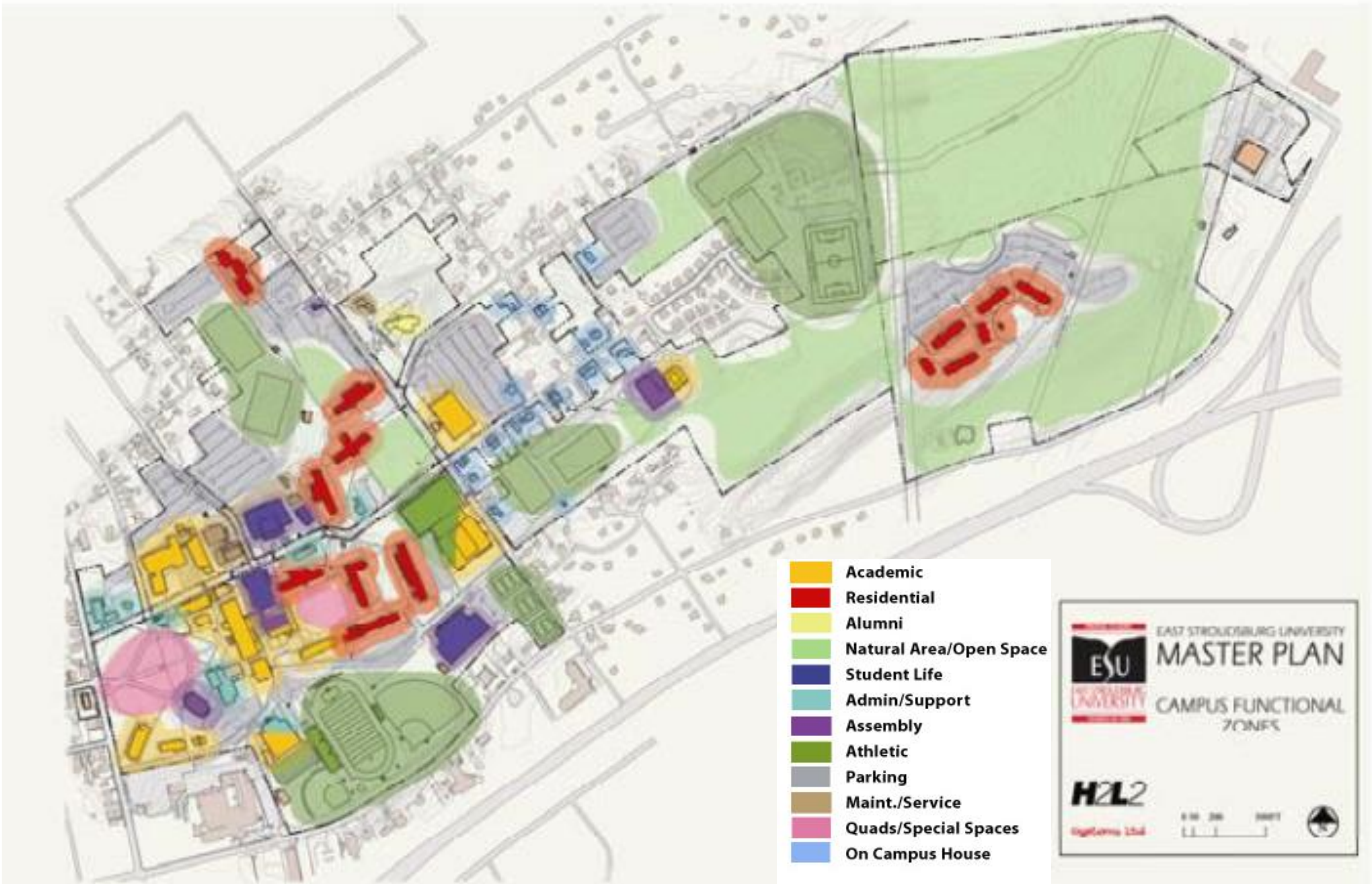
ESU's campus is organized into 12 functional zones:

- Academic
- Residential
- Alumni
- Natural/Open Space
- Student Life

- Administration/Support
- Assembly
- Athletics
- Parking
- Maintenance/Service
- Quads/Special Space
- On-campus Houses

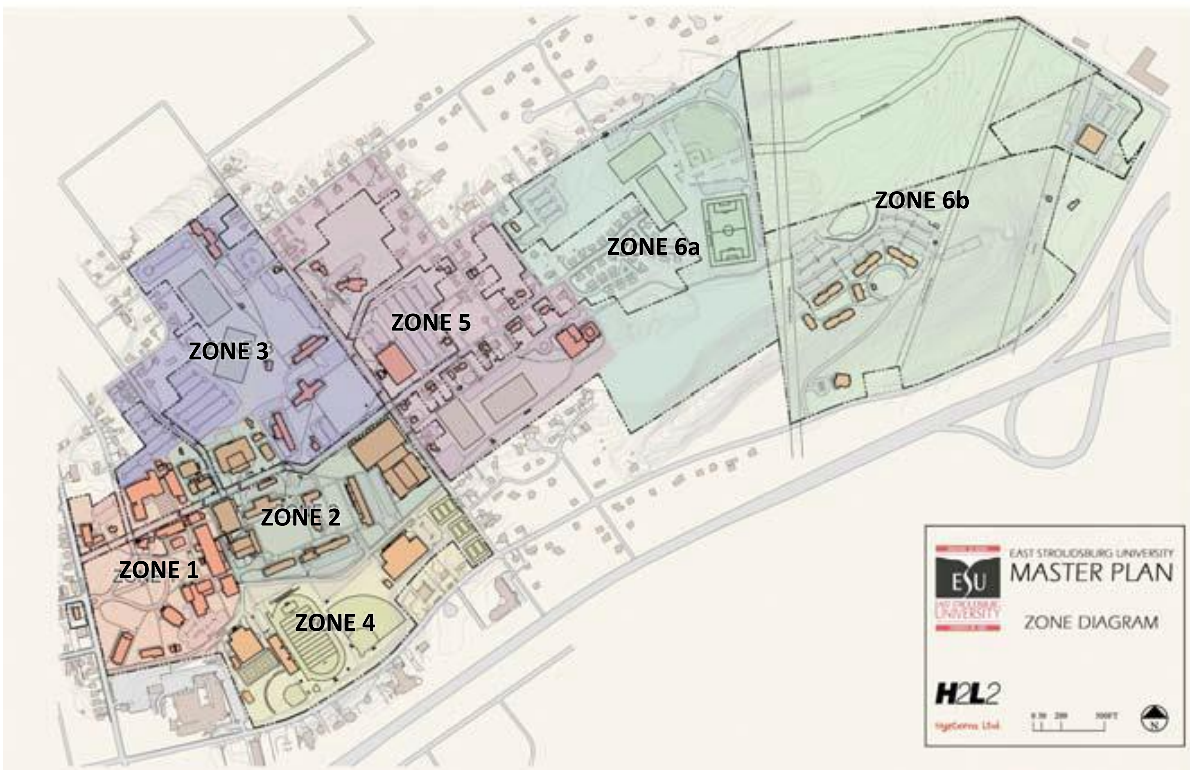
These functional land use zones as delineated in the Campus Master Plan are shown in Figure 2.4-1 below. In general, academic buildings are concentrated on the western end of campus near Prospect and Normal Streets. Most residence halls are located west of Smith Street; the exception is University Ridge, which is located on the eastern portion of campus in Smithfield Township. The area around University Ridge is largely open space and is the area with some of the steepest slopes on campus, as discussed in Section 2.1. Major athletic facilities are located along E. Brown Street and at the terminus of Mary Street on the East Stroudsburg-Smithfield Township border. There are some scattered on-campus houses also along Mary Street. Major non-athletic campus gathering spaces include College Circle (in pink on eastern edge of campus) and the Quad.

Figure 2.4-1 Functional land use zones (ESU Master Plan, 2006).



In addition, the Master Plan breaks down the campus into six "image zones" of common architecture, streetscaping, and unifying elements. Zone 1 is considered the campus gateway; it is perhaps the most heavily used area of campus and has a mix of old and new structures with impressive tree cover. Zone 2, is a mix of types of residences, parking, fields, and the Quad and is the active, bustling core of the residential campus. Zone 3 acts as an interface between the campus and East Stroudsburg Borough and includes some residences, parking, and athletic fields as well as the Graffiti Rocks, a campus tradition. Zone 4 is the athletic center of ESU and is home to the student recreation center, Eiler-Martin Stadium. Zone 5 has more spread out buildings and a lot of surface parking, which adds to the fragmented feel of this part of campus. Finally, Zone 6 is broken into 6a and 6b; Zone 6a includes intramural athletic fields and some vacant land while Zone 6b is considered the "Back 40" – a parcel that includes University Ridge Apartments and the Innovation Center but which is largely undeveloped.

Figure 2.4-2 Campus image zones (ESU Master Plan, 2006).



As shown on these campus maps, ESU is largely built-out with the exception of Zones 6a and 6b. Recent campus development projects have, for the most part, related to renovations rather than new construction. The exception to this is the continued demand for the development of on-campus, suite style housing.

2.5 Assets

Assets are defined as the physical resources of the University. ESU owns 60 buildings on main campus and leases another two buildings in East Stroudsburg. The leased buildings, Hawthorn and Hemlock Suites, are both leased to University Properties, Inc., an affiliated non-profit corporation of the University. In addition to the main campus assets, ESU leases space in the Lehigh Valley at the Bethlehem Extended Learning Site and Center City Philadelphia in the State System Urban Center. Some of the largest assets in terms of square footage are Hawthorn Suites, the Koehler Fieldhouse, and Hemlock Suites. The smallest assets are field storage facilities, which have small footprints. As an institution with a long history, the age of structures range from the late 1800s to 2012, with the majority of structures having been built between 1960 and 1980.

Table 2.5-1 ESU Building Inventory (The State System, 2014).

BUILDING NUMBER	BUILDING NAME	SITE	BUILDING TYPE	OWNED/LEASED	GROSS SQFT	YEAR OF CONST.	REPLACEMENT COST ($)	ASSET VALUE*	CURRENT USE	CONSTRUCTION TYPE (WHERE AVAILABLE)	FLOORS (WHERE AVAILABLE)	BASEMENT	HIGH OCCUPANCY	SAFETY-CRITICAL STAFF	CRITICAL ASSETS	CRITICAL INFO. STORED	HISTORICAL VALUE	HAZMAT STORAGE	EMERG. POWER
53	103 Smith St.	Main	Education and General	Owned	1,973	1910	502,649	Med	Religious Organizations	Wood/ Masonry	2	N							
42	106 Smith St. Barn and Storage	Main	Education and General	Owned	4,830	1878	869,052	Med	Building Maintenance		2	N							
76	145 Ridgeway Street	Main	Education and General	Owned	2,051	1947	600,582	Med	Academic and Institutional Effectiveness Office			N							
81	150 Mary Street	Main	Education and General	Owned	2,479	1963	775,471	Med	General Office Space			N							
64	162 Marguerite St.	Main	Education and General	Owned	1,394	1958	347,614	Med	General Office Space		1	N							
39	208 Smith St.	Main	Education and General	Owned	2,772	1941	724,226	Med	Economics Department	Wood/ Masonry	2	N							
55	216 Smith St.	Main	Education and General	Owned	1,664	1943	487,259	Med	Athletic Training Offices	Wood/ Masonry	1	N							
23	285 Normal St.	Main	Education and General	Owned	2,753	1916	776,955	Med	Upward Bound Program	Brick	1	N							

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72	403 Normal St.	Main	Education and General	Owned	1,822	1950	502,406	Med	DNA Laboratory		1	N							
62	411 Normal St.	Main	Education and General	Owned	2,234	1940	654,169	Med	General Administration & Logistics		1	N							
65	417 Normal St.	Main	Education and General	Owned	2,106	1940	616,687	Med	General Academic Instruction		1	N							
40	420 Normal St.	Main	Education and General	Owned	3,540	1947	822,236	Med	Economics Department	Wood/ Masonry	2	N							
63	427 Normal St.	Main	Education and General	Owned	3,400	1958	0	Med	Sociology Department		1	N							
73	428 Normal St.	Main	Education and General	Owned	3,072	1950	779,630	Med	Ancillary Support		1	N							
66	432 Normal St.	Main	Education and General	Owned	1,560	1950	371,420	Low	Multicultural Affairs Dept.		1	N							
61	434 Normal St.	Main	Education and General	Owned	2,971	1950	698,208	Med	General Academic Instruction		2	N							
78	75 Smith Street	Main	Education and General	Owned	3,354	1915	1,049,185	Med	Unknown			N							

Table 2.5-1 ESU Building Inventory (The State System, 2014).

BUILDING NUMBER	BUILDING NAME	SITE	BUILDING TYPE	OWNED/LEASED	GROSS SQFT	YEAR OF CONST.	REPLACEMENT COST ($)	ASSET VALUE*	CURRENT USE	CONSTRUCTION TYPE (WHERE AVAILABLE)	FLOORS (WHERE AVAILABLE)	BASEMENT	HIGH OCCUPANCY	SAFETY-CRITICAL STAFF	CRITICAL ASSETS	CRITICAL INFO. STORED	HISTORICAL VALUE	HAZMAT STORAGE	EMERG. POWER
60	96 Normal St.	Main	Education and General	Owned	2,633	1940	649,086	Med	Administrative Offices	Wood/ Masonry	2	N							
3	Abeloff Center for Performing Arts	Main	Education and General	Owned	11,855	1929	4,098,795	Med	On-campus meetings, concerts	Brick	1	N							
59	Beer's Lecture Hall	Main	Education and General	Owned	3,536	1997	1,101,959	Med	Lecture Hall	Brick	1	N							
L1	Bethlehem Extended Learning Site	Extension	Education and General	Leased	9,673	N/A-LEASED	3,016,845	Med	Classrooms		1 (in leased bldg)	N							
34	Carlyon Pavilion	Main	Education and General	Owned	1,920	1983	304,819	Low	Auxiliary Enterprises - Other		1	N							
14	Center for Hospitality Management	Main	Education and General	Owned	30,285	1941	8,677,689	Med	Hotel/Tourism Mgmt Department	Brick	2	N							
80	Center For Innovation & Entrepreneurship	Main	Education and General	Owned	51,092	2010	13,122,109	Med	General Office and Meeting Space		3	N							
8	Computer Center	Main	Education and General	Owned	7,450	1952	2,811,438	High	Administrative and Academic Computing	Brick	2	N			X	X			X

Table 2.5-1 ESU Building Inventory (The State System, 2014).

BUILDING NUMBER	BUILDING NAME	SITE	BUILDING TYPE	OWNED/LEASED	GROSS SQFT	YEAR OF CONST.	REPLACEMENT COST ($)	ASSET VALUE*	CURRENT USE	CONSTRUCTION TYPE (WHERE AVAILABLE)	FLOORS (WHERE AVAILABLE)	BASEMENT	HIGH OCCUPANCY	SAFETY-CRITICAL STAFF	CRITICAL ASSETS	CRITICAL INFO. STORED	HISTORICAL VALUE	HAZMAT STORAGE	EMERG. POWER
20	D.G.S. Field Office	Main	Education and General	Owned	1,629	1971	453,201	Low	Pennsylvania Department of General Se	Wood/ Masonry	1	N							
19	Dansbury Commons	Main	Auxiliary	Owned	48,090	1962	20,517,315	High	Dining Facility	Brick	2	N	X		X				X
1	DeNike Human Services	Main	Education and General	Owned	32,630	1937	10,345,770	Med	Classrooms and laboratories	Brick	2	N							
11	Eiler-Martin Stadium	Main	Education and General	Owned	7,393	1944	1,814,801	Low	Open-air Stadium		1	N							
21	Facilities Management Annex	Main	Education and General	Owned	3,244	1950	726,699	Med	Campus Carpentry and Painting depart	Wood/ Masonry	1	N							
16	Facilities Management Complex	Main	Education and General	Owned	5,657	1929	1,413,429	Med	Plant Maintenance and Development Dept.	Brick	2	N							

Table 2.5-1 ESU Building Inventory (The State System, 2014).

BUILDING NUMBER	BUILDING NAME	SITE	BUILDING TYPE	OWNED/LEASED	GROSS SQFT	YEAR OF CONST.	REPLACEMENT COST ($)	ASSET VALUE*	CURRENT USE	CONSTRUCTION TYPE (WHERE AVAILABLE)	FLOORS (WHERE AVAILABLE)	BASEMENT	HIGH OCCUPANCY	SAFETY-CRITICAL STAFF	CRITICAL ASSETS	CRITICAL INFO. STORED	HISTORICAL VALUE	HAZMAT STORAGE	EMERG. POWER
38	Fine & Performing Arts Center	Main	Education and General	Owned	60,629	1979	19,516,257	Med	Theaters, gallery, concert hall, rehearsal space	Brick	3	N							
22	Flagler-Metzger Center	Main	Education and General	Owned	15,714	1973	6,039,449	Med	University Health Services,	Brick	2	N							
6	Gessner Science Hall	Main	Education and General	Owned	27,515	1960	8,946,479	Med	Class rooms and Laboratories	Brick	3	N							
83	Hawthorn Suites	Main	Auxiliary	Leased	173,268	2012	53,127,616	High	Residence Hall	Brick	6	N	X						
82	Hemlock Suites	Main	Auxiliary	Leased	157,398	2012	48,022,247	High	Residence Hall	Brick	6	N	X						
68	Henry A. Ahnert Jr. Alumni Center	Main	Education and General	Owned	9,319	2003	2,728,827	Med	Alumni Association	Brick	2	N							
44	Hineline Field Storage	Main	Education and General	Owned	384	1983	69,092	Low	Ancillary Support		1	N							
18	Institutional Storeroom and Garage	Main	Education and General	Owned	8,266	1963	1,706,989	Med	Storeroom and Garage	Brick	1	N							
36	Kemp Library	Main	Education and General	Owned	92,810	1979	29,543,573	Med	Library	Brick	3	N							

Table 2.5-1 ESU Building Inventory (The State System, 2014).

BUILDING NUMBER	BUILDING NAME	SITE	BUILDING TYPE	OWNED/LEASED	GROSS SQFT	YEAR OF CONST.	REPLACEMENT COST ($)	ASSET VALUE*	CURRENT USE	CONSTRUCTION TYPE (WHERE AVAILABLE)	FLOORS (WHERE AVAILABLE)	BASEMENT	HIGH OCCUPANCY	SAFETY-CRITICAL STAFF	CRITICAL ASSETS	CRITICAL INFO. STORED	HISTORICAL VALUE	HAZMAT STORAGE	EMERG. POWER
33	Koehler Fieldhouse	Main	Education and General	Owned	165,955	1967	44,619,685	Med	Physical education department classrooms	Brick	2	N							
24	Laurel Residence Hall	Main	Auxiliary	Owned	49,917	1960	15,614,836	High	Residence Hall	Brick	3	N	X						
32	Lenape Residence Hall	Main	Auxiliary	Owned	72,212	1972	22,589,069	High	Residence Hall	Brick	7	N	X						
28	Linden Residence Hall	Main	Auxiliary	Owned	53,175	1963	16,633,991	High	Residence Hall	Brick	4	N	X						
50	Main Power Pad	Main	Education and General	Owned	800	1997	1,041,466	High	Utilities		1	N			X				X
10	McGarry Communication Center	Main	Education and General	Owned	15,459	1969	4,180,247	Med	Instructional Resources Department	Brick	2	N							
26	Minsi Residence Hall	Main	Auxiliary	Owned	48,300	1965	15,109,013	High	Residence Hall	Brick	4	N	X						
43	Mitterling Field Storage	Main	Education and General	Owned	1,764	1980	317,393	Low	Ancillary Support		1	N							

Table 2.5-1 ESU Building Inventory (The State System, 2014).

BUILDING NUMBER	BUILDING NAME	SITE	BUILDING TYPE	OWNED/LEASED	GROSS SQFT	YEAR OF CONST.	REPLACEMENT COST ($)	ASSET VALUE*	CURRENT USE	CONSTRUCTION TYPE (WHERE AVAILABLE)	FLOORS (WHERE AVAILABLE)	BASEMENT	HIGH OCCUPANCY	SAFETY-CRITICAL STAFF	CRITICAL ASSETS	CRITICAL INFO. STORED	HISTORICAL VALUE	HAZMAT STORAGE	EMERG. POWER
25	Monroe Hall	Main	Education and General	Owned	30,248	1941	10,026,905	High	Faculty Offices, computer labs, classrooms, auditorium	Brick	2	N	X						
37	Moore Biology	Main	Education and General	Owned	39,436	1976	12,896,753	Med	Biology Department, lecture hall	Brick	3	N							
4	President's Residence	Main	Education and General	Owned	7,419	1929	2,320,782	Med	President's Residence	Brick	2	N							
5	Reibman Administration	Main	Education and General	Owned	21,779	1972	6,377,414	Med	Admission offices and Presidents office	Brick	2	N							
12	Rosenkrans Hall East & West	Main	Education and General	Owned	31,806	1960	9,506,860	Med	Bursar's office, Media Communications	Brick	2	N							

Table 2.5-1 ESU Building Inventory (The State System, 2014).

BUILDING NUMBER	BUILDING NAME	SITE	BUILDING TYPE	OWNED/LEASED	GROSS SQFT	YEAR OF CONST.	REPLACEMENT COST ($)	ASSET VALUE*	CURRENT USE	CONSTRUCTION TYPE (WHERE AVAILABLE)	FLOORS (WHERE AVAILABLE)	BASEMENT	HIGH OCCUPANCY	SAFETY-CRITICAL STAFF	CRITICAL ASSETS	CRITICAL INFO. STORED	HISTORICAL VALUE	HAZMAT STORAGE	EMERG. POWER
70	Science & Technology Center	Main	Education and General	Owned	130,602	2008	43,847,884	High	Classrooms, Laboratories, office space, planetarium, auditorium		4	N						X	
27	Shawnee Residence Hall	Main	Auxiliary	Owned	48,595	1952	15,201,294	High	Residence Hall	Brick	3	N	X						
9	Stroud Hall Phase I and II	Main	Education and General	Owned	107,756	1968	33,350,910	High	Academic lecture halls, computer server	Brick	4	N	X		X				X
69	Student Recreation Center	Main	Auxiliary	Owned	59,930	2003	19,091,290	Med	Auxiliary Enterprises		2	N							
54	University Apartments	Main	Auxiliary	Owned	52,877	1970	16,540,772	High	Upper-class Apartments	Brick	4	N							
15	University Center	Main	Auxiliary	Owned	67,710	1968	29,843,953	High	Communications hub, food court	Brick	3	N			X				
Phila	Urban Center	Exten-sion	Education and General	Leased	2,668	N/A-LEASED	825,959	Med	Classrooms		1 (in leased bldg)	N							
17	Utility Plant	Main	Education and General	Owned	10,684	1929	13,908,773	High	Utilities		2	N			X				X

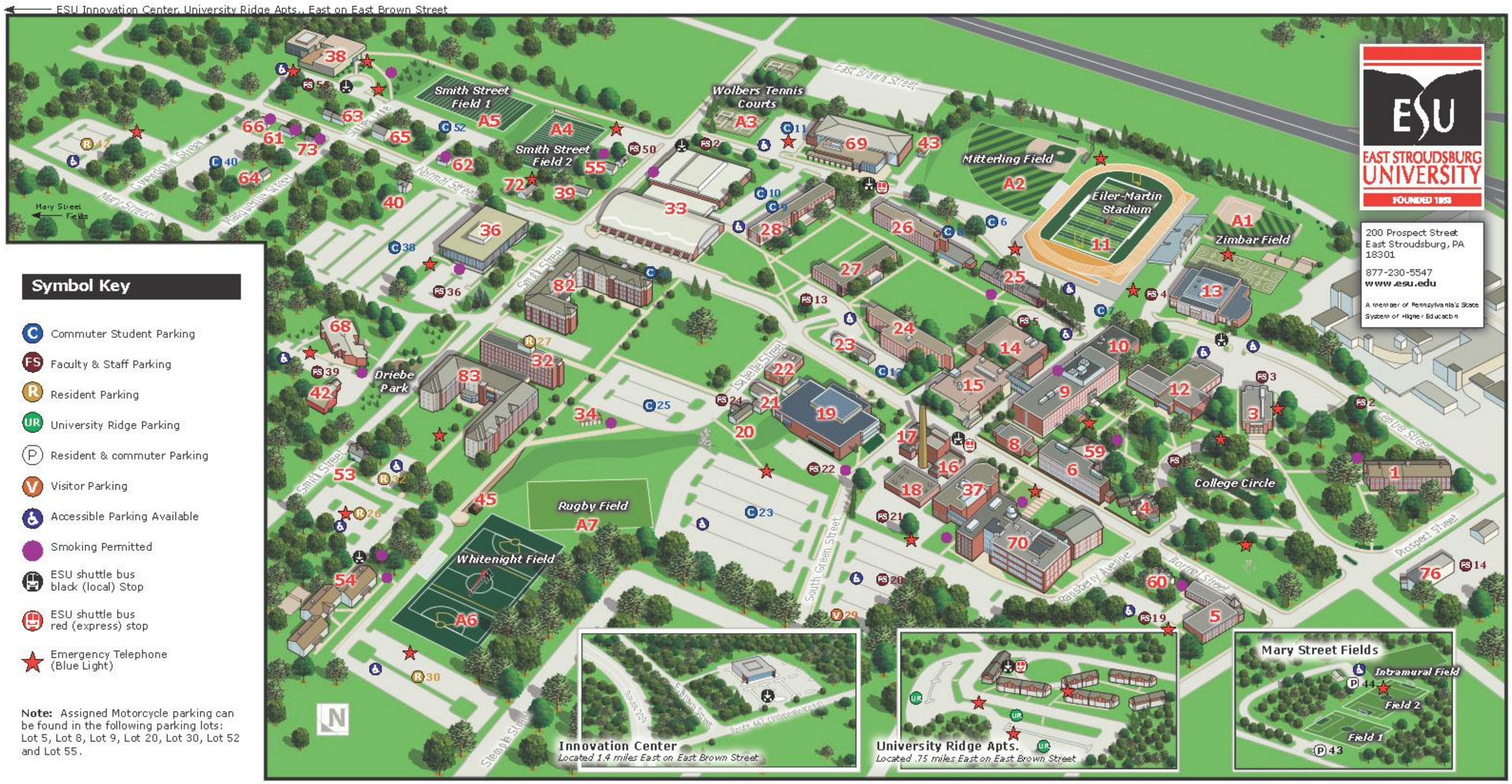
Table 2.5-1 ESU Building Inventory (The State System, 2014).

BUILDING NUMBER	BUILDING NAME	SITE	BUILDING TYPE	OWNED/LEASED	GROSS SQFT	YEAR OF CONST.	REPLACEMENT COST ($)	ASSET VALUE*	CURRENT USE	CONSTRUCTION TYPE (WHERE AVAILABLE)	FLOORS (WHERE AVAILABLE)	BASEMENT	HIGH OCCUPANCY	SAFETY-CRITICAL STAFF	CRITICAL ASSETS	CRITICAL INFO. STORED	HISTORICAL VALUE	HAZMAT STORAGE	EMERG. POWER
45	Whitenight Field Storage	Main	Education and General	Owned	600	1982	107,957	Low	Ancillary Support		1	N							
49	Zimbar Field Storage	Main	Education and General	Owned	80	1978	14,394	Low	Ancillary Support		1	N							
13	Zimbar-Liljenstein Hall	Main	Education and General	Owned	44,525	1938	12,995,014	High	Registrar. Bursar, Student Services	Brick	2	N			X	X			

*Replacement value does not include the value of contents of a building.

** Asset value relates to the ability of the university to continue critical functions to continue during and after a disaster.

Figure 2.5-1 Campus map



1. DeNike Center for Human Services
3. Abeloff Center for the Performing Arts
4. President's Residence
5. Reibman Administration Building
6. Gessner Science Hall
8. Computing Center
9. Stroud Hall
10. McGarry Communications Center
11. Eiler-Martin Stadium
12. Rosenkrans Hall
13. Zimbar-Liljenstein Hall [Financial Aid, Registration, Student Accounts, Graduate College]
14. Center for Hospitality Management
15. University Center
16. Facilities Management Complex
17. Utility Plant
18. Institutional Storeroom and Garage
19. Dansbury Commons
20. D.G.S. Field Office
21. Facilities Management Annex
22. Flagler-Metzgar Center
23. Upward Bound Center *[285 Normal Street]*
24. Laurel Residence Hall
25. Monroe Hall
26. Minsi Residence Hall
27. Shawnee Residence Hall
28. Linden Residence Hall
32. Lenape Residence Hall
33. Koehler Fieldhouse & Natatorium
34. Dave Carlyon Pavilion
36. Kemp Library
37. Moore Biology Hall
38. Fine and Performing Arts Center
39. Business Management Department *[208 Smith Street]*
40. Economics Department *[420 Normal Street]*
42. Spangenburg Farm Barn & Storage *[106 Smith Street]*
43. Mitterling Field Storage
45. Whitenight Field Storage
53. *103 Smith Street*
54. University Apartments
55. Athletics Department *[216 Smith Street]*
59. Joseph H. & Mildred E. Beers Lecture Hall
60. Conference Services *[96 Normal Street]*
61. Center for Computer Security *[434 Normal Street]*
62. *Frederick Douglas* Institute *[411 Normal Street]*
63. ROTC *[427 Normal Street]*
64. Facilities General Services *[162 Marguerite Street]*
65. Honors Program *[417 Normal Street]*
66. Multicultural House *[432 Normal Street]*
68. The Henry A. Ahnert Jr. Alumni Center
69. Mattioli Recreation Center
70. Warren and Sandra Hoeffner Science and Technology Center
72. Orientation & New Student Programs *[403 Normal Street]*
73. Philosophy & Religious Studies *[428 Normal Street]*
76. Academic & Institutional Effectiveness *[145 Ridgeway]*
80. ESU Innovation Center [Applied DNA Science *562 Independence Road]*
82. Hemlock Suites [Campus Police, Residence Life]
83. Hawthorn Suites [Fitness Center]

UR University Ridge Apartments

In addition to the properties listed in Table 2.5-1, which are owned by and fall under the jurisdiction of the State System and the Commonwealth of Pennsylvania, ESU operates Stony Acres. This recreational and wildlife sanctuary property is owned by the student body through the Student Activities Association and provides year-round outdoor activities and equipment to the university community and the public. Located in Marshalls Creek, PA, it includes a lodge with a capacity to house over 100 people, 6 rustic cabins which can each house 8 people, and many outdoor recreational facilities. A private home on the property houses the caretaker and his/her family.

3 PLANNING PROCESS

3.1 Update Process and Participation Summary

East Stroudsburg University developed its first hazard mitigation plan in 2008 using a 24-member Hazard Mitigation Planning Committee chaired by the University Environmental Health and Safety (EHS) Manager. Beginning in early 2014, the State System sought to update 14 University hazard mitigation plans through the Multi-University Hazard Mitigation Planning Project. The State System selected Michael Baker Jr., Inc. (a subsidiary of Michael Baker International, LLC) to update the hazard mitigation plans. The East Stroudsburg University HMP Update was completed in February 2015.

To begin the East Stroudsburg University Hazard Mitigation Plan update, a Hazard Mitigation Steering Committee (HMSC) was formed to guide the planning process and ensure the updated University plan was compliant with Federal Emergency Management Agency regulations and completed in a timely manner. The members of the HMSC comprised many of the departments involved in the 2008 plan, and the HMSC was again led by the EHS Manager. The planning process kicked off with a teleconference in December 2013, and the full HMSC met in January 2014. Representatives from different University departments were present and contact information was obtained from all meeting attendees to create a HMSC mailing list. While the first meeting was internal to members of the University Community, external stakeholders were invited to participate on the HMSC for the rest of the process. These external stakeholders were identified by the Steering Committee and included the Monroe County EMA, Pocono Medical Center, PEMA, East Stroudsburg Borough, the East Stroudsburg Chamber of Commerce, and the East Stroudsburg Area School District. Section 3.2 provides a discussion of the HMSC as well as a table of members with their corresponding organization.

Internal university stakeholders received notification regarding all HMP meetings via e-mail. External stakeholders were initially invited via letter and were subsequently in contact via email. A brief description of each meeting that was held is available in Section 3.3. In addition, meeting minutes, describing in detail, events of each meeting are available in **Appendix C**. Sign-in sheets for each meeting with individual names are shown in the figures below.

Figure 3.1-1 Kickoff Meeting sign-in sheets

East Stroudsburg University Hazard Mitigation Plan

Steering Committee Kickoff Meeting
January 28, 2014 – 2:00 PM
Innovation Center Conference Room 113

Name	Title	Email	Phone
Don Hagan	Chair of Extra-curricular Affairs Student Senate	dch7058@live.esu.edu	
Efia King	chair of student affairs-Student Senate	etk5610@live.esu.edu	
Maria Hackney	Director Health Services	maria.hackney@po-box.esu.edu	3073
Tom Tauer	Associate Provost	ttauer@esu.edu	x2720/x3539
Robin Olson	Chief of Police ESU	rolson@esu.edu	x3124
Jim Martin	Mgr of Campus Services	jmartin@esu.edu	3669
Scott Heinrich	Manager Utilities	sheinrich@esu.edu	x 3668
Syed Zaidi	Dir. Facilities Mgmt.	zaidi@esu.edu	3077
Pat Baylor	Interim Dir of SAA	pbaylor@esu.edu	x3256
Robert M. Moses	Director of Residence Life	bmoses@esu.edu	x 3132
Donna Bulzoni	Director of Financial Affairs	DBulzoni@esu.edu	x-3117
Denise Aylward	Purchase Agent	daylward@esu.edu	x 3203
Patricia L. Reich	Dir of Procurement + Contracting	preich@esu.edu	x 3595
Robert D'Averso	IT	rfd[illegible]@esu.edu	3114
Cynthia Hamill	IT	chamill@esu.edu	3605
Miguel Barbosa	Chief of Staff	mbarbosa@esu.edu	3545

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East Stroudsburg University Hazard Mitigation Plan

Steering Committee Kickoff Meeting
January 28, 2014 – 2:00 PM
Innovation Center Conference Room 113

Name	Title	Email	Phone
Jim Flannery	Asst Chief of Police/Dir EHS	jflannery@esu.edu	484-437-6633
Michael C. Sachs	AVP Student Affairs	msachs@esu.edu	x 4942
Brenda Friday	University Relations	bfriday@esu.edu	422-3455
Larry Beck	Chemistry	lbeck@po-box.esu.edu	423-3243
Ken Long	Admin & Finance	KenLong@esu.edu	422-3201
Christine Caggiano, AICP	Planner, MBI	ccaggiano@mbakercorp.com	215-486-6193

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Figure 3.1-2 Risk Assessment Meeting sign-in sheets

East Stroudsburg University Hazard Mitigation Plan

Risk Assessment Meeting
March 25, 2014 – 2:00 PM
Innovation Center Conference Room 113

Name	Title	Email	Phone
Thomas Tauer	Associate Provost and Dean of University College	Ttauer@esu.edu	(570)422-2720
Robert M. Moses	Director, Residence Life	bmoses@esu.edu	(570) 422-3732
Maria Hackney	Director, Health Services	mhackney@esu.edu	570-422-3073
Pat Baylor	Interim Ex Dir Student Activity	pbaylor@esu.edu	570-422-3256
Michael C. Sachs	Asst VP Student Affairs	msachs@esu.edu	570-422-3998

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East Stroudsburg University Hazard Mitigation Plan

Risk Assessment Meeting
March 25, 2014 – 2:00 PM
Innovation Center Conference Room 113

Name	Title	Email	Phone
Cindy Hamill	Comptg CntR	Chamill@esu.edu	570-422-3605
Robert D'Aversa	CIO	rfdb@esu.edu	3114
Jacob Bendixen	Student Senator	Jbendixe@live.esu.edu	
Hasim Papulchi	"		
J. Corcoran	staff EHS/ESUPD	jcorcoran@po-box.esu.edu	4223208
Jim Flannery	Director EHS	jflannery@po-box.esu.edu	4223208
Robin Olson	Police Chief	rolson@esu.edu	3064
Brenda Friday	Director, University Relations	bfriday@esu.edu	3455
Miguel Barbosa	Chief of Staff	mbarbosa@esu.edu	3545
Larry Beck	Chemistry Department	lbeck@po-box.esu.edu	3243

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East Stroudsburg University Hazard Mitigation Plan

Risk Assessment Meeting
March 25, 2014 – 2:00 PM
Innovation Center Conference Room 113

Name	Title	Email	Phone
Denise Aylward	Purchasing Agent	daylward@po-box.esu.edu	570-422-3203
Keith Vanic	Assoc Prof. Dept Athletic Training	kvanic@esu.edu	X 3314
Patricia Reich	Dir Procurement	preich@esu.edu	X 3595
Jim Martin	Mgr of Campus Services	jmartin@esu.edu	3669
Donna Bulzoni	Dir Fincl Affairs/Controller	dbulzoni@esu.edu	x-3117
Eric Forsyth	Dir. Adm. Svcs.	eric-forsyth@esasd.net	570 424 8500 x1620
Scott Heinrich	Manager Utilities	sheinrich@esu.edu	570-422-3668

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Figure 3.1-3 Geography Lecture sign-in sheets

East Stroudsburg University Hazard Mitigation Plan

Department of Geography Hazard Mitigation and GIS Lecture
March 25, 2014 – 4:00 PM
Beers Lecture Hall

Name	Title	Email	Phone
Karen Raptakis	secretary	kraptakis@esu.edu	
Mike Hughes	Student	mgh2683@live.esu.edu	
Jennifer Jordan	student	jjordan15@live.esu.edu	
[illegible]	[illegible]	[illegible]	
Kerry Daugherty	Student	kdaugher18@live.esu.edu	
Sarah Chamberlain	Student	Schamberla@live.esu.edu	
He Jin	student	hjin@live.esu.edu	
Xingkong Ma	Student	xma1@live.esu.edu	
~~Chris Schneider~~	~~Student~~	[illegible]	
VERONICA CAMACHO	student	vcamacho@live.esu.edu	
Jeff Hurley	Professor - Geography		
Dan Kurtzman	Student	dkurtzman@live.esu.edu	
COURTNEY STOTT	STUDENT	cstott@live.esu.edu	
Rachel Kulp	student	rkulp3@live.esu.edu	
Bart Rosol	student		
Pete Krupa	student	pjk5348@live..	

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East Stroudsburg University Hazard Mitigation Plan

Department of Geography Hazard Mitigation and GIS Lecture
March 25, 2014 – 4:00 PM
Beers Lecture Hall

Name	Title	Email	Phone
Shixiong Hu	Professor	sha@esu.edu	
Jennifer Jordan	student	jjordan15@live.esu.edu	
Lukasz Niewiaczynski	Student	lukeveus@yahoo.com	
Sarah Shaffer	Student		
Sara Rowe	Student		
Nicole Zapotocky	Student	nzapotocky@live.esu.edu	
Rachael Deery	Student		
ERIN PRUDENTE	Student		
Morgan Barry	Student		
Marius Kolb	Student		
Hannah Coulter	Student	hcoulter@live.esu.edu	[illegible]
Chris Schneider	Student	[illegible] Schniedsn7@hotmail.com	
Anthony Ruiz	Student	aruiz3@live.esu.edu	
Alyssa Gower	Student	agower@live.esu.edu	
Paula Shivock	Student	pshivock@live.esu.edu	
Charlotte Bolio	Student	cbolio@live.esu.edu	

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Figure 3.1-4 Mitigation Solutions Meeting sign-in sheet

Please Sign In - ESU Mitigation Soln's Mtg

NAME	Dept/ORG
Kevin D. Crain	Pocono Medical Center
ERIC D. FORSYTH	E.S.A.S.D.
Denise Aylward	E.S.U. Procurement
Michael Isaacs	Student Affairs
Brenda Friday	University Relations
R.M. Moses	Residence Life/ESU
	PEMA
Eric Szabo	
Jim Flannery	ESU PD
J. Corcoran	ESU Police/Safety
Cindy Hamill	ESU - IT
SCOTT HEINRICH	FACILITIES MNGT
LARRY BECK	CHEMISTRY DEPT.
Robin Olsen	ESU PD
Christine Caggiano	Planner, Michael Baker Intl.

Figure 3.1-5 Final Public Meeting sign-in sheet

East Stroudsburg University Hazard Mitigation Plan Update Project - Public Meeting
February 10, 2015
Lower Dansbury Commons – 2:00 PM

Name	Title	Email	Phone
Michael C. Sachs	Asst V.P. Stud Affairs/chr	MSACHS@ESU.EDU	x3798
Tom Tauer	Assoc. Provost and Dean of Univ. College	ttauer@esu.edu	x2720
Robin Olson	Chief of Police E.S.U.	rolson@esu.edu	x3124
Jennifer Corcoran	Univ. Police, admin	jcorcoran@po-box.esu.edu	x3208
Rich Stoddard	Parking + Transpo Mgr	rstoddard@esu.edu	x3127
Miguel Barbosa	Chief of Staff	Mbarbosa@esu.edu	3545
Patricia L Reich	Dr. Procurement + Contracting	preich@esu.edu	3595
Denise Aylward	Purchasing Agent	daylward@esu.edu	3203
SCOTT HEINRICH	MANAGER, UTILITIES	SHEINRICH@esu.edu	3668
SYED ZAIDI	Director Facilities Mgmt.	zaidi@esu.edu	3077
Marta Hackeney	Director Health Services	mhackeney@esu.edu	3073
Brenda Friday	Director, University Relations	BFRIDAY@esu.edu	(570) 422-3455

In order to obtain information from the HMSC and other stakeholders, forms and surveys were distributed and collected throughout the planning process. Most of the forms were completed during planning meetings, and members of the HMSC and other interested parties were invited to submit forms via email or via the project website, www.esuhmp.com. These forms were completed and returned in between scheduled meetings. Completed forms and surveys are included in **Appendix C**.

The 2015 HMP follows the outline defined by PEMA in its Standard Operating Guidance with minor modifications related to the difference in jurisdiction of the plans since the Standard Operating Guidance is geared towards local HMPs in the Commonwealth of Pennsylvania. As a result, the format of the 2015 East Stroudsburg University HMP contrasts with the 2008 East Stroudsburg University HMP, but all information that was still current has been carried over into the new plan. These changes are summarized in Table 3.1-1. Additional update summaries are provided for each section of the plan in Sections 4.1, 5.1, 6.1, and 7.1.

Table 3.1-2 Summary of changes to the format of the 2008 and 2015 versions of the ESU HMP

2008 HMP SECTION	2015 HMP SECTION
Introduction	Section 1
Purpose	Section 1.2
About East Stroudsburg University	Section 2
Planning Process	Section 3
Overview of Planning Process	Section 3.1
East Stroudsburg University HMPC	Section 3.2
Public Involvement	Section 3.4
Regulatory Compliance	Section 1.4
Review and Incorporation of Other Documents	Section 1.4, Section 5.3
About This Document	Section 1.1
Section 1 – Hazard Vulnerability Assessment	
1.1 – Floods	Section 4.3.2
1.2 – Severe Weather	Sections 4.3.5 and 4.3.6
1.3 – Human-Caused Hazards	Sections 4.3.4, 4.3.8, and 4.3.9
1.4 – Other Hazards	Sections 4.3.10 and 4.3.11
Section 2 – Mitigation Capabilities and Resources	
2.1 – Capabilities and Resources – East Stroudsburg University	Section 5.2
2.2 – Capabilities and Resources – East Stroudsburg Borough and Smithfield Township	Section 5.2
2.3 – Capabilities and Resources – Commonwealth of Pennsylvania	Section 5.2
2.4 – Capabilities and Resources – Federal Government	Section 5.2
2.5 – Conclusion	Section 5.2
Section 3 – Mitigation Goals and Objectives	
3.1 – Terminology	Section 6.1
3.2 – County and State Mitigation Goals	Section 6.2

Table 3.1-2 Summary of changes to the format of the 2008 and 2015 versions of the ESU HMP	
2008 HMP SECTION	**2015 HMP SECTION**
3.3 – University Mitigation Goals	Section 6.2
3.4 – University Mitigation Objectives	Section 6.2
Section 4 – Alternative Mitigation Actions	
4.1 – Introduction	Section 6.1
4.2 – Alternative Flood Mitigation Actions	Section 6.4
4.3 – Alternative Severe Weather Mitigation Actions	Section 6.4
4.4 – Alternative Hazmat Release Mitigation Actions	Section 6.4
4.5 – Alternative Terrorism Mitigation Actions	Section 6.4
4.6 – Alternative Pandemic Mitigations Actions	Section 6.4
4.7 – Alternative Nuclear Incidents Mitigations Actions	Section 6.4
4.8 – Mitigation Actions to Guide Future Development & Promote Public Awareness	Section 6.4
4.9 – Related Response and Recovery Issues	Section 6.4
4-10 – Conclusions	Section 6.4
Section 5 – Mitigation Plan & Implementation Strategy	
5.1 – Implementation Strategy	Section 6.4
5.2 – Monitoring and Evaluation of the Plan	Section 7.2
5.3 – Public Involvement	Section 7.3
5.4 – Incorporation into Existing Planning Mechanism	Section 7.4
5.5. – Updating the Plan	Section 7.2

3.2 The Planning Team

The 2008 HMPC was led by Roger Holcombe and subsequently, James Flannery, both of the EHS staff. In addition, the 2008 HMP was developed with the assistance of a broad-based planning team that included the following members:

- Conrad Bergo, Chemistry
- Adenike Bitto, Heath Services
- Richard Bull, Telecommunications
- Robert D'Aversa, Computing
- Megan Delp, Student
- James Emert, Computer Science
- James Flannery, University Police
- Brenda Friday, University Relations
- John Gold, Chemistry
- Maria Hackney, Health Services
- Leona Hughes, Library
- Pauline Lance, Lance
- Chris Langlois, Facilities Management

- Sharon Laverdure, East Stroudsburg Area Schools
- Robin Olson, University Police
- Jim Phillips, Borough of East Stroudsburg
- Bill Pierson, Facilities Management
- Dough Smith, University Relations
- Robert Smith, Campus Card Center
- Richard Staneski, Finance and Administration
- Denise Thompson, Political Science
- Doreen Tobin, Student Affairs
- Bob Werts, ARC/NEPRCTIF
- Syed Zaidi, Facilities Management

The 2015 HMP update was also spearheaded initially by James Flannery, Assistant Chief of Police and Director of EHS, and then by Michael C. Sachs, Assistant Vice President of Student Affairs. The HMSC re-convened with many of the same departments, offices and stakeholders represented. Table 3.2-1 provides a list of the HMSC organizations and representatives. Unless otherwise stated, the organizations and departments listed are part of East Stroudsburg University.

Table 3.2-1 Participants in the 2015 HMP Update.

DEPARTMENT/ORGANIZATION	PARTICIPANT(S)
Administration and Finance	Kenneth Long
Athletic Training	Keith Vanic
Business Office	Donna Bulzoni
Chemistry Department	Larry Beck
Computing & Communication Services	Robert D'Aversa; Cynthia Hamill
East Stroudsburg School District*	Eric Forsyth
Facilities Management	Scott Heinrich, James Martin, Syed Zaidi
Pennsylvania Emergency Management Agency*	Ernie Szabo
Pocono Medical Center*	Kevin Crain
President's Office	Miguel Barbosa
Procurement & Contracting	Denise Aylward; Patricia Reich
Residence Life & Housing	Robert Moses
Student Activity Association	Patricia Baylor
Student Affairs	Michael C. Sachs
Student Senate	Jacob Bendixen; Efia King, Daniel Hagan, Hasim Paputchi
University College	Thomas Tauer
University Health Services	Maria Hackney
University Police and Safety	Jennifer Corcoran, James Flannery, Robin Olson
University Relations	Brenda Friday
Michael Baker International*	Christine Caggiano, AICP
**Non-University stakeholders*	

The stakeholders listed above served on the 2015 HMSC and actively participated in the planning process through attendance at meetings, completion of assessment surveys, or submission of comments. The

HMSC worked throughout the process to plan and hold meetings, collect information and conduct public outreach.

3.3 Meetings and Documentation

This section describes the meetings held during the planning process. All invitations, agendas, sign-in sheets, and minutes for these meetings are included in **Appendix C: Meeting and Other Participation Documentation.**

January 28, 2014 – Kickoff Meeting: The meeting was held at the East Stroudsburg University Innovation Center. The agenda consisted of introductions of the members of the HMSC, an introduction to hazard mitigation, a review of the planning process, and the overall schedule. The HMSC also discussed stakeholder and public outreach techniques at this meeting. Finally, the HMSC conducted an evaluation of identified hazards and risk to determine which hazards to include in the HMP update. The Evaluation of Identified Hazards and Risk worksheet listed the 2008 hazards and meeting participants used the form to indicate whether any changes needed to be made to the list of hazards for the 2015 plan. Additionally, each hazard was assessed pertaining to frequency of occurrence, magnitude of impact/extent, and any additional comments. Forms were completed and collected from committee members. Twenty-one members of the University community attended this meeting.

March 25, 2014 – Risk Assessment Meeting: The meeting was held at the East Stroudsburg University Innovation Center. This meeting was geared towards discussing the hazards selected for inclusion in the 2015 HMP and on gathering university-specific information about the hazards being profiled. This meeting also introduced the Risk Factor Methodology and asked HMSC members to score the probability and impact of each hazard. Finally, attendees were asked to complete the HMP survey either at the lecture or on the plan website, www.esuhmp.com. Twenty-two members of the University community attended this meeting.

March 25, 2014 – Department of Geography Lecture: The Department of Geography hosted an open lecture in the Mildred Beers Lecture Hall on the HMP update and practical applications of GIS in hazard mitigation and emergency management. The lecture was advertised to the entire campus via an email blast. The lecture was intended to both show the students what they could do after graduation and to gather feedback from the students on the HMP. Attendees were asked to complete the HMP survey either at the lecture or on the plan website, www.esuhmp.com. Twenty-seven students, two professors, and one staff member attended this event.

April 29, 2014 – Mitigation Solutions Meeting: The meeting was held at the East Stroudsburg University Innovation Center. At this meeting, members of the HMSC reviewed the Risk Factor results but focused on a Mitigation Strategy Evaluation. The four categories of mitigation techniques accepted by FEMA were presented to participants followed by an evaluation of the 2008 Goals, Objectives, and Actions. The Committee also developed new mitigation actions to address changing risks and the new hazards identified. Thirteen members of the University community attended this meeting.

February 10, 2015 – Draft Plan Review / Public Meeting: The meeting was held at Lower Dansbury Commons. This meeting focused on providing an update for the public and the university community about the HMP update process and findings. The meeting highlighted the risk assessment portion of the plan as well as plan goals and mitigation actions from the 2015 plan. Attendees were informed about the timeline and their opportunity to review the entire plan on the HMP update website, www.esuhmp.com and provide written comments at or after the meeting. Twelve members of the University community attended this meeting. This meeting was announced via email blast to the entire campus and with a legal notice in the Pocono Record. In addition, a press release was prepared and sent out to the campus newspaper.

3.4 Public and Other Stakeholder Participation

As shown in Section 3.2, the HMSC included a broad spectrum of university and non-university stakeholders. In addition to the individuals having attended meetings, the following entities were invited to participate in the planning process: Monroe County Emergency Management Agency, East Stroudsburg Borough, and the Greater Pocono Chamber of Commerce.

The HMSC hosted a series of meetings during 2014 and 2015 to educate stakeholders about their risks, involve them in identifying issues, and educate them about alternative mitigation actions. The tools listed below were distributed with meeting invitations, at meetings, and on the HMP update website to solicit information, data, and comments from both University stakeholders and other key stakeholders. Responses to these worksheets and surveys are included in **Appendix C.**

- **Hazard Mitigation Fact Sheet:** While not a worksheet, a hazard mitigation fact sheet was distributed to the members of the HMSC and was posted to the hazard mitigation plan project website.
- **Evaluation of Hazards and Risk Form:** Collected information from the HMSC regarding whether there have been changes to the frequency of occurrence, magnitude of impact, or geographic extent of hazards identified in the 2008 HMP. In addition, the form asks members of the HMSC to select any additional hazards that they believe should be considered for inclusion in the HMP.
- **Hazard Impact and Prioritization Form:** Gathered university-specific impacts of the natural and man-made hazards selected for inclusion in the 2015 HMP. The form also asked attendees to score the probability and impact of each hazard to assist in the calculation of the Risk Factor.
- **Risk Factor Feedback Form:** Allowed stakeholders to adjust the risk factor rankings for each hazard profiled in the 2015 HMP.
- **Hazard Mitigation Plan Survey:** Distributed to University faculty, staff, and students to obtain feedback on hazards, preparedness, and mitigation projects that should be considered for the 2015 HMPU. Survey was available at meetings and online at www.esuhmp.com.
- **Mitigation Strategy Evaluation Form**: Gathered input on which goals, objectives, and actions to keep, change, or delete from the existing plan moving forward. Information on the status of each goal, objective, and action to include in the plan update is also collected.

- **Mitigation Action Form:** Allowed stakeholders to propose mitigation actions for the HMP and include information about each action such as a lead agency/department, implementation schedule, priority, estimated costs, and potential funding source(s).
- **HMP Comment Form:** Provided to stakeholders and the public at the public meeting and used to provide comments on the hazards, risk assessment, mitigation strategy, and any other topics of the users choice.

Community participation and comment was encouraged throughout the planning process, particularly through the project website, www.esuhmp.com. This site acted as a repository for the entire planning process, including presentations, agendas, minutes, and worksheets from each meeting as well as promulgating meeting dates, times, and important announcements. As of the March 2015, there were 1,099 unique page views of the HMP website.

Figure 3.4-1 Public Notice

PUBLIC NOTICE
DRAFT PLAN
Notice is hereby given that East Stroudsburg University intends to review the draft of the updated ESU Hazard Mitigation Plan (HMP) on Feb. 10, 2015 at 2 p.m.
This meeting is to be held at Lower Dansbury Commons, 280 Normal Street, East Stroudsburg, PA.
The HMP describes the hazards that can affect ESU and the surrounding community and the actions that can be taken to reduce hazard impact.
Questions may be directed to Christine Caggiano, AICP, consultant planner at ccaggiano@mbakerintl.com or 215-446-5193.
Interested persons may download and review an electronic copy of the Draft Plan at http://www.esuhmp.com/draft-plan from Feb. 11 to March 11, 2015.
P - Feb. 3

To advertise the public meeting, a legal notice was published in the Pocono Record, East Stroudsburg's local newspaper, to notify students, faculty, staff, and the general public of the date and time of the public meeting (see Figure 3.4-1). In addition, a press release was submitted to the Stroud Courier, the campus newspaper. Copies of the newspaper affidavit and the press release are included in **Appendix C**. In addition, the HMSC used "email blasts" because the email blast technology enabled the information about the HMP to be distributed to every member of the faculty, staff, and students with an ESU email address. The HMSC determined the email blasts would be the most effective way to get the message out across all campus stakeholders. Email blasts were sent to notify campus about the public meeting twice, once a week prior to the meeting and a reminder the day before it. Members of the HMSC were invited to the meeting via email, with a reminder email sent approximately two weeks prior to the meeting. Attendees at the public meeting were asked to record their comments about the draft plan on HMP Comment Forms. Two comment forms were received at the meeting.

In addition to the outreach that occurred during the plan development process, ESU will continue its public information and education campaign after the plan achieves Approval-Pending-Adoption status from FEMA (anticipated in September/October 2015). These outreach items include:

- Distribution of the **hazard mitigation fact sheet** to the entire campus community via an email blast for use as an education tool.
- Distribution of a **press release** announcing the APA plan to the Pocono Record, East Stroudsburg Borough, Smithfield Township, and Monroe County.
- Creation of a **hazard mitigation public service announcement** for the campus radio station, WESS.

Copies of the fact sheet, press release, and the script for the service announcement, along with accompanying announcement text, is included in Appendix C under the "Grant Compliance Outreach" bookmark.

4 RISK ASSESSMENT

4.1 Update Process Summary

The risk assessment provides a factual basis for activities proposed by the university in its mitigation strategy. Hazards that may affect East Stroudsburg University are identified and defined in terms of their location and extent, magnitude of impacts, previous events, and probability of future events. The Risk Assessment section of the East Stroudsburg University HMP update utilizes existing data and analysis from the previous Federal Emergency Management Agency (FEMA)-approved HMP as well as more recent data and analysis on hazards occurring since the last update.

In the 2008 HMP, East Stroudsburg University HMP profiled floods/flash flooding; tornadoes/windstorms, winter storms, and other severe weather; hazardous material releases; terrorism; and pandemics. The plan also briefly mentioned earthquakes, landslides/subsidence, wildfires, transportation accidents, and major utility accidents but did not provide full hazard profiles or mitigation actions for these events.

In the 2015 HMP, the HMSC decided to include all hazards with full profiles in the previous HMP. However, hazard names were changed to best match the Standard Operating Guidance. In addition, the HMSC evaluated the development, population, and growth trends of the University and surrounding community vis-à-vis the Pennsylvania Standard List of Hazards, the 2011 Monroe County HMP, and the 2013 Pennsylvania SSAHMP. The HMSC assessed the change in risk for all hazards identified in the 2008 plan and voted on which hazards not previously identified but included in the Pennsylvania Standard State List of Hazards had the potential to impact East Stroudsburg University using the Evaluation of Identified Hazard and Risk Form (found in **Appendix C**). The HMSC determined that ESU is not located in the inundation area of any high-hazard dams; the university is not underlain by karst topography; and the university is not in the protected area of the Stroudsburg/East Stroudsburg flood control system. After this hazard identification and evaluation, the HMSC agreed to add five new hazards to the 2015 HMP, as shown in Table 4.1-1.

Table 4.1-1 New hazards added to the 2015 East Stroudsburg University HMP

HAZARD NAME	REASON FOR INCLUSION
Extreme Temperature	• Incidences appear to be on the rise in Monroe County, both heat and cold • Concern for athletes and students relying on non-motorized transportation • Results in discomfort for students in residence halls during other hazard events
Hurricane, Tropical Storm, Nor'easter	• Hurricane Sandy and other tropical storms had a profound impact on the campus in recent years • East Stroudsburg is a designated regional shelter and has been deployed during past tropical storms
Civil Disturbance	• Minor past occurrences at East Stroudsburg University, and documented events at other campuses in Pennsylvania
Radon Exposure	• East Stroudsburg University and related distance-learning locations are located in areas of Pennsylvania classified as having high radon exposure levels.

Table 4.1-1 New hazards added to the 2015 East Stroudsburg University HMP

HAZARD NAME	REASON FOR INCLUSION
Transportation Accidents	• Ranked as a high hazard in the 2011 Monroe County HMP • Campus located in close proximity to Interstate 80 • Concern for high proportion of students who do not have vehicles on campus • Concern for pedestrian/vehicular conflicts around campus
Utility Interruptions	• Frequent occurrence in conjunction with other hazard events • Prevents university from functioning properly • Results in discomfort for students in residence halls during other hazard events

Hazard profiles were developed for all hazards in order to define the characteristics of each hazard as they apply to East Stroudsburg University. The stakeholders participating in the planning process then evaluated the probability and impact of hazard profiled using the University Impacts and Hazard Prioritization Exercise (see **Appendix C**). This evaluation, together with the research and analysis of each hazard, allowed for the calculation of the Risk Factor (see Section 4.4.2). Stakeholders had the opportunity to adjust and comment on the Risk Factor at the Mitigation Solutions Meeting.

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 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.

4.1.1 Data Sources and Risk Assessment Methodology

The risk assessment portion of the HMP is the most data-heavy portion of the plan. The State System provided a tabular inventory of all structural assets at ESU. These assets were then digitized by staff at Baker and used as the basis for the asset mapping throughout the risk assessment.

Additional information used to complete the risk assessment for this plan was taken from various government agency and non-government agency sources. Those sources are cited where appropriate throughout the plan and on each map with full references listed in **Appendix A – Bibliography**. It should be noted that numerous GIS datasets were obtained from the Pennsylvania Spatial Data Access (PASDA) website (http://www.pasda.psu.edu/) and from the National Map (http://nationalmap.gov/). PASDA is the official public access geospatial information clearinghouse for the Commonwealth of Pennsylvania. PASDA was developed by the Pennsylvania State University as a service to the citizens, governments, and businesses of the Commonwealth. PASDA is a cooperative project of the Governor's Office of Administration, Office for Information Technology, Geospatial Technologies Office and the Penn State Institutes of Energy and the Environment of the Pennsylvania State University. The National Map is hosted by USGS and provides nationwide-level base map and hazard data.

In order to assess the vulnerability of East Stroudsburg Borough, East Stroudsburg University, and Monroe County to the hazards, data on past occurrences of damaging hazard events was gathered. For a number of historic natural-hazard events, the National Climatic Data Center (NCDC) database was utilized. NCDC is a division of the US Department of Commerce's National Oceanic and Atmospheric Administration (NOAA). Information on hazard events is compiled by NCDC from data gathered by the National Weather Service (NWS), another division of NOAA. NCDC then presents it on their website in various formats. The data used for this plan came the US Storm Events database, which "documents the occurrence of storms and other significant weather phenomena having sufficient intensity to cause loss of life, injuries, significant property damage, and/or disruption to commerce" (NOAA, 2006). While NCDC is a useful tool to capture past hazard event data, events prior to the dates in which each database reports, are not available. While University, local, and County reports are in some cases available, a complete accounting of incidents for each hazard could not be developed.

Estimating potential losses that may occur as a result of hazard events requires a full range of information and accurate data. There are a number of site-specific characteristics that reduce a given structure's vulnerability and consequential losses. Examples include first-floor elevation, the number of stories, construction type, foundation type, and the age and condition of the structure. This type of information was not readily available; therefore, the risk and vulnerability assessments in this plan rely on an absence/presence analysis to describe where structures and critical facilities might be vulnerable to a particular hazard.

4.2 Hazard Identification

Natural disasters with the greatest impact on an area are classified as Presidential Disaster Declarations and have been recorded since 1955. While disasters are not declared for areas smaller than counties, looking at the disasters declared for Monroe County provide an indication of the kinds of events that may have been a concern in the past and may be an issue in the future.

4.2.1 Table of Presidential Disaster Declarations

When disaster events escalate to the point where state and local governments require assistance in response to the event, Presidential Major Disaster, Emergency, and Fire Management Assistance Declarations are issued. The table below displays the Presidential Disaster and Emergency Declarations that have been issued for Monroe Counties in Pennsylvania from 1955 through 2014. While East Stroudsburg may not have been directly impacted from each of these events, their size and scope indicates they were large enough to have a widespread impact.

Table 4.2-1 Presidential Major Disaster and Emergency Declarations affecting Monroe County (FEMA, 2014)

NUMBER	DATE	INCIDENT DESCRIPTION	DECLARATION TYPE
40	August 1955	Flood (Hurricane Diane)	Major Disaster Declaration
206	August 1965	Water Shortage	Major Disaster Declaration
273	August, 1969	Floods	Major Disaster Declaration
340	June, 1972	Tropical Storm Agnes	Major Disaster Declaration
400	July, 1973	Severe Storms, Flooding	Major Disaster Declaration
3105	March, 1993	Severe Snowfall and Winter Storm	Emergency Declaration

Table 4.2-1 Presidential Major Disaster and Emergency Declarations affecting Monroe County (FEMA, 2014)

NUMBER	DATE	INCIDENT DESCRIPTION	DECLARATION TYPE
1015	March, 1994	Winter Storm, Severe Storm	Major Disaster Declaration
1085	January, 1996	Blizzard	Major Disaster Declaration
1093	January, 1996	Flooding	Major Disaster Declaration
1219	June, 1998	Flooding, Severe Storms, Tornadoes	Major Disaster Declaration
1294	September, 1999	Hurricane Floyd	Major Disaster Declaration
1497	September, 2003	Tropical Storms Henri and Isabel	Major Disaster Declaration
1557	September, 2004	Tropical Depression Ivan	Major Disaster Declaration
1587	April, 2005	Severe Storms and Flooding	Major Disaster Declaration
3235	September, 2005	Hurricane Katrina Evacuation	Emergency Declaration
1649	June, 2006	Severe Storms, Flooding, and Mudslides	Major Disaster Declaration
4025	August, 2011	Hurricane Irene	Major Disaster Declaration
3339	August, 2011	Hurricane Irene	Emergency Declaration
4030	September, 2011	Tropical Storm Lee	Major Disaster Declaration
3340	September, 2011	Remnants of Tropical Storm Lee	Emergency Declaration
4099	October, 2012	Hurricane Sandy	Major Disaster Declaration
3356	October, 2012	Hurricane Sandy	Emergency Declaration

4.2.2 Summary of Hazards

As described in Section 4.1, at the initiation of the plan update process, the HMSC reviewed the Pennsylvania Standard List of Hazards to evaluate new and changing hazards. Following a review of the hazards considered in the 2008 HMP, the Standard List of Hazards, the 2013 SSAHMP, and Monroe County HMP, the HMPSC decided that the 2014 plan update should identify, profile, and analyze 11 hazards. The hazards include all hazards profiled in the 2008 plan and the addition of Extreme Temperature; Hurricane, Tropical Storm, and Nor'easter; Civil Disturbance; Transportation Accidents; and Utility Interruptions as hazards of concern. Table 4.2-2 contains a complete list of the 11 hazards identified for hazard profiling in the 2015 HMP update. Hazard profiles are included in Section 4.3 for each of these hazards.

Table 4.2-2 Summary of identified hazards

HAZARD NAME	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).

Table 4.2-2 Summary of identified hazards

HAZARD NAME	DESCRIPTION
Flood, 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. Winter flooding can include ice jams which occur when warm temperatures and heavy rain cause snow to melt rapidly. Snow melt 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 and tropical storms 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. A nor'easter is a cyclonic storm that moves along the east coast of North America. It is called "nor'easter" because the winds over coastal areas blow from a northeasterly direction (NOAA, 2013). 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. The majority of hurricanes and tropical storms form in the Atlantic Ocean, Caribbean Sea and Gulf of Mexico during the official Atlantic hurricane season which extends from June through November (FEMA, 1997).
Pandemic and Infectious Disease	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).

Table 4.2-2 Summary of identified hazards

HAZARD NAME	DESCRIPTION
Tornado, Windstorm	A wind storm 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. Based on NOAA Storm Prediction Center Statistics, the number of recorded F3, F4, & F5 tornadoes between 1950-1998 ranges from <1 to 15 per 3,700 square mile area across Pennsylvania (FEMA, 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).
Civil Disturbance	Civil disturbance hazards encompass a set of hazards emanating from a wide range of possible events that cause civil disorder, confusion, strife, and economic hardship. Civil disturbance hazards include the following: • Famine; involving a widespread scarcity of food leading to malnutrition and increased mortality (Robson, 1981). • Economic Collapse, Recession; Very slow or negative growth, for example (Economist, 2009). • Misinformation; erroneous information spread unintentionally (Makkai, 1970). • Civil Disturbance, Public Unrest, Mass Hysteria, Riot; group acts of violence against property and individuals, for example (18 U.S.C. § 232, 2008). • Strike, Labor Dispute; controversies related to the terms and conditions of employment, for example (29 U.S.C. § 113, 2008).

Table 4.2-2 Summary of identified hazards	
HAZARD NAME	**DESCRIPTION**
Environmental Hazards – Hazardous Material Incidents	Environmental hazards are hazards that pose threats to the natural environment, the built environment, and public safety through the diffusion of harmful substances, materials, or products. Environmental hazards for East Stroudsburg University focus mainly on: Hazardous material releases at fixed facilities or in transit; including toxic chemicals, infectious substances, bio-hazardous waste, and any materials that are explosive, corrosive, flammable, or radioactive (PL 1990-165, § 207(e)).
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.
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).

Table 4.2-2 Summary of identified hazards

HAZARD NAME	DESCRIPTION
Utility Interruptions	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 may 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). • 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 (U.S. 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 (US Department of Energy, 2000).

4.3 Hazard Profiles

NATURAL HAZARDS

4.3.1 Extreme Temperature

4.3.1.1 Location and Extent

ESU is subject to extreme temperatures, including both heat and cold. Extreme heat and extreme cold may result from natural causes like heat waves, winter storms, or unseasonable weather, or from manmade events like inadequate heating/cooling systems or exposure. These phenomena occur in the summer and winter months, and are a concern for ESU because of the effect they can have on human health and the well-being of students, faculty and staff. While college-aged individuals are often resilient to temperature extremes, these events have serious public health consequences. The elderly and infirm are most at-risk.

In general, extreme temperature events are large-scale and regional in scope. As a result, any extreme temperature event at ESU would also be felt across Monroe County and, in many cases, all of Northeastern Pennsylvania. The entire main campus is at equal risk to extreme temperatures, though residents of dormitories with older or outdated HVAC systems may feel the impacts of extreme temperature more than residents of newer buildings.

ESU and Monroe County are located in the southern portion of the Pocono Mountains region of Pennsylvania. In the East Stroudsburg Area, temperatures normally range from the upper teens in January to the low- and mid-80s in July. Ranges of daily temperature from maximum to minimum are commonly at or over 20°F during the summer and are a few degrees less during the winter. Extreme temperature hazards are not tied to a specific temperature threshold; instead, these hazards occur when the temperature is extremely high or extremely low.

Figures 4.3.1-1 and 4.3.1-2 show the average annualized (not seasonal) maximum and minimum temperatures in Pennsylvania. The annualized maximum temperature at ESU is 60-61°F, and the annualized minimum temperature at ESU is 38-39°F.

Figure 4.3.1-1 Average Annualized Maximum Temperature in Pennsylvania

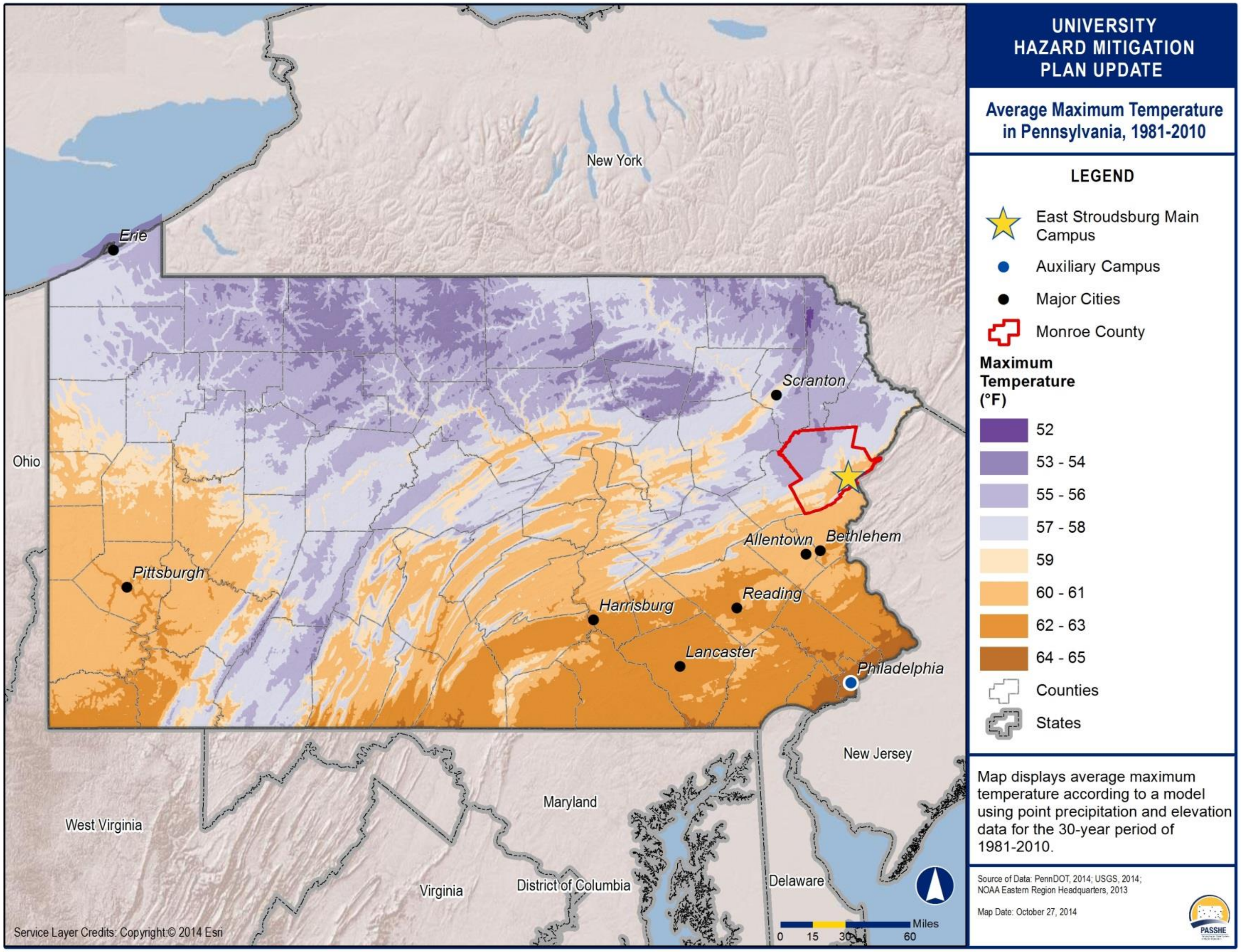
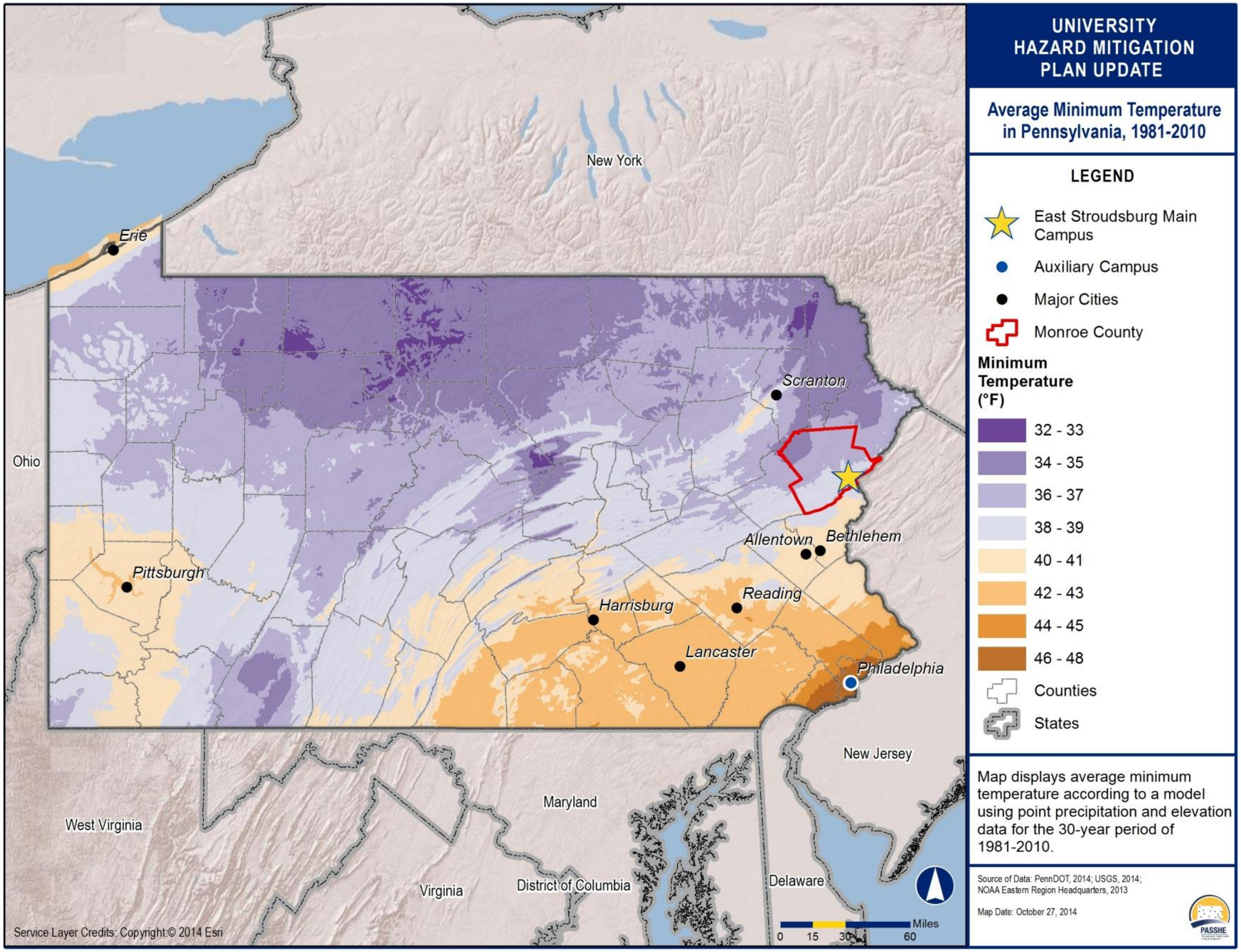


Figure 4.3.1-2 Average Annualized Minimum Temperature in Pennsylvania



4.3.1.2 Range of Magnitude

Extreme temperatures affect Eastern Pennsylvania every year, although the impacts vary considerably from one year to the next. Extremely high temperatures usually occur in the summer months when the campus population is at a minimum. The threat to the ESU community from extreme temperatures is less than for other natural hazards.

Extreme temperatures can cause a range of impacts to communities, including:

- **Health Impacts** – The health impacts of extreme cold are greater in terms of mortality in humans, but often after more prolonged exposure versus a cold snap. Extreme heat waves, however, can prove more deadly over a shorter duration. At greatest risk of death in heat waves are the urban-dwelling elderly without access to an air-conditioned environment for at least part of the day.
- **Transportation** – Cold weather can impact automotive engines, possibly stranding motorists, and stress metal bridge structures. Highways and railroad tracks can become distorted in high heat. Disruptions to the transportation network and accidents due to extreme temperatures represent an additional risk.
- **Agriculture** – Absolute temperature and duration of extreme cold can have devastating effects on trees and winter crops. Livestock is especially vulnerable to heat, and crop yields can be impacted by heat waves that occur during key development stages.
- **Energy** – Energy consumption rises significantly during extreme cold weather. Residents are placed in extreme danger when any fuel shortages or utility failures prevent the heating of a dwelling. Extreme heat also can result in utility interruptions, and sagging transmission lines due to the heat can lead to shorting out.

In terms of human health concerns, extremely high temperatures cause heat stress which can be divided into four categories: caution, extreme caution, danger, and extreme danger, shown in Figure 4.3.1-3. Each category is defined by apparent temperature which is associated with a heat index value that captures the combined effects of dry air temperature and relative humidity on humans and animals. Major human risks for these temperatures include heat cramps, heat syncope, heat exhaustion, heatstroke, and death. The temperatures serve as a guide for various danger categories, the impacts of high temperatures will vary from person to person based on individual age, health, and other factors. Contributing factors to heat stress can include pre-existing medical conditions, prescription drug and alcohol use, age, and obesity.

Figure 4.3.1-3 Categories of heat stress (NOAA-NWS, 2015).

NOAA's National Weather Service

Heat Index

Temperature (°F)

Relative Humidity (%)	80	82	84	86	88	90	92	94	96	98	100	102	104	106	108	110
40	80	81	83	85	88	91	94	97	101	105	109	114	119	124	130	136
45	80	82	84	87	89	93	96	100	104	109	114	119	124	130	137	
50	81	83	85	88	91	95	99	103	108	113	118	124	131	137		
55	81	84	86	89	93	97	101	106	112	117	124	130	137			
60	82	84	88	91	95	100	105	110	116	123	129	137				
65	82	85	89	93	98	103	108	114	121	128	136					
70	83	86	90	95	100	105	112	119	126	134						
75	84	88	92	97	103	109	116	124	132							
80	84	89	94	100	106	113	121	129								
85	85	90	96	102	110	117	126	135								
90	86	91	98	105	113	122	131									
95	86	93	100	108	117	127										
100	87	95	103	112	121	132										

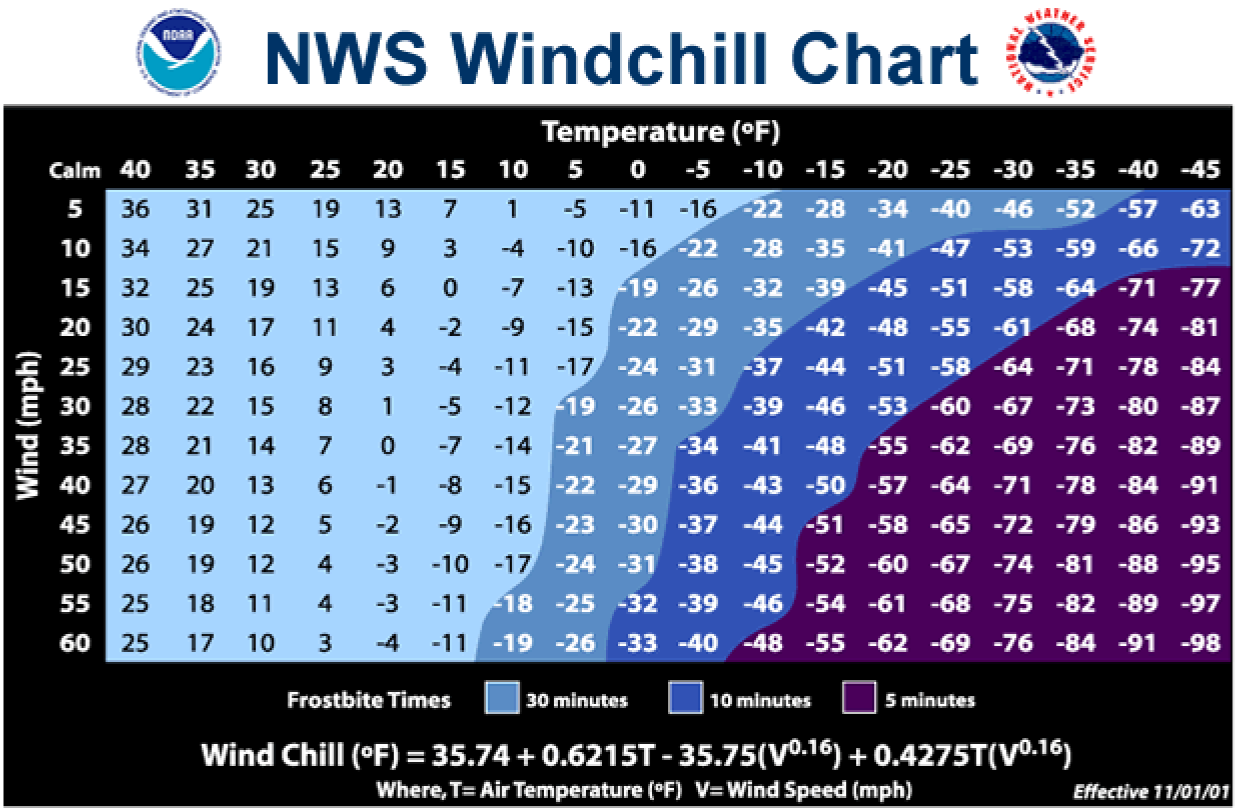
Likelihood of Heat Disorders with Prolonged Exposure or Strenuous Activity

Caution Extreme Caution Danger Extreme Danger

Temperature advisories, watches and warnings are issued by the National Weather Service relating the above impacts to the range of temperatures typically experienced in Pennsylvania. Exact thresholds vary across the Commonwealth, but in general *Heat Advisories* are issued when the heat index will be equal to or greater than 100°F, but less than 105°F, *Excessive Heat Warning*s are issued when heat indices will attain or exceed 105°F, and *Excessive Heat Watches*, are issued when there is a possibility that excessive heat warning criteria may be experienced within twelve to forty-eight hours (NOAA NWS, 2014).

Extreme cold can result in a cold wave or cold snap. Cold waves occur when there is a rapid temperature fall in a 24-hour period. The National Weather Service (NWS) 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 that lasts at least two days with temperatures below normal in at least fifteen 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. Figure 4.3.1-4 demonstrates wind chill calculations, as determined by the NWS and NOAA.

Figure 4.3.1-4 NOAA Wind Chill Index Chart



NWS Windchill Chart

Temperature (°F)

Wind (mph) / Calm	40	35	30	25	20	15	10	5	0	-5	-10	-15	-20	-25	-30	-35	-40	-45
5	36	31	25	19	13	7	1	-5	-11	-16	-22	-28	-34	-40	-46	-52	-57	-63
10	34	27	21	15	9	3	-4	-10	-16	-22	-28	-35	-41	-47	-53	-59	-66	-72
15	32	25	19	13	6	0	-7	-13	-19	-26	-32	-39	-45	-51	-58	-64	-71	-77
20	30	24	17	11	4	-2	-9	-15	-22	-29	-35	-42	-48	-55	-61	-68	-74	-81
25	29	23	16	9	3	-4	-11	-17	-24	-31	-37	-44	-51	-58	-64	-71	-78	-84
30	28	22	15	8	1	-5	-12	-19	-26	-33	-39	-46	-53	-60	-67	-73	-80	-87
35	28	21	14	7	0	-7	-14	-21	-27	-34	-41	-48	-55	-62	-69	-76	-82	-89
40	27	20	13	6	-1	-8	-15	-22	-29	-36	-43	-50	-57	-64	-71	-78	-84	-91
45	26	19	12	5	-2	-9	-16	-23	-30	-37	-44	-51	-58	-65	-72	-79	-86	-93
50	26	19	12	4	-3	-10	-17	-24	-31	-38	-45	-52	-60	-67	-74	-81	-88	-95
55	25	18	11	4	-3	-11	-18	-25	-32	-39	-46	-54	-61	-68	-75	-82	-89	-97
60	25	17	10	3	-4	-11	-19	-26	-33	-40	-48	-55	-62	-69	-76	-84	-91	-98

Frostbite Times: 30 minutes, 10 minutes, 5 minutes

$$\text{Wind Chill (°F)} = 35.74 + 0.6215T - 35.75(V^{0.16}) + 0.4275T(V^{0.16})$$

Where, T= Air Temperature (°F) V= Wind Speed (mph)

Effective 11/01/01

Cold temperatures can be extremely dangerous to humans exposed to the elements. Without heat and shelter, cold temperatures can cause hypothermia, frost bite, and death. Wind chill temperatures are often used in place of raw temperature values due to the effect of wind can have in drawing heat from the body under cold temperatures. These values represent what temperatures actually feel like to humans under cold, windy conditions. Similarly to high temperatures, the effect of cold temperatures will vary by individual.

Beyond the health impacts, extreme temperatures may affect electricity demands due to climate control and can result in increased fuel expenditures and rolling brownouts. Campus landscaping can also be stressed or killed by extreme temperatures, and pipes in campus buildings could burst due to low temperatures coupled with utility interruption.

A potential worst-case scenario for extreme temperatures would be a prolonged heat wave in late August/early September during the move-in period and beginning of the school year. At this point in the year, students would be overly exposed to the heat and would need to exert themselves more than usual to move in. In addition, numerous outdoor sports and activities could increase students' exposure to extreme temperatures.

4.3.1.3 Past Occurrence

Extreme temperatures tend to affect an entire region and not just ESU and Monroe County, so the NCDC reports extreme temperature events by county zones rather than individual jurisdictions or areas. NCDC reports include numerous events of extreme temperatures in Monroe County in the past 20 years, shown in Table 4.3.1-1. There was one temperature-related fatality in this time frame, but it was not on-campus. Of the 61 events recorded with the NCDC, over half occurred within the regular academic year when campus would have been full. There were no differing impacts on campus to these events, though with the high number of students using walking or biking as their main mode of transportation, a higher proportion of ESU's population was likely exposed during these events than the general public, especially for extreme cold events.

Table 4.3.1-1 History of extreme temperatures in Monroe County (NCDC, 2015)

DATE	EVENT	DURATION (IN DAYS)	DEATHS	INJURIES
2/4/1996	Cold/wind Chill	2	0	0
5/19/1996	Heat	3	0	0
1/17/1997	Cold/wind Chill	4	0	0
2/19/1997	Heat	4	0	0
2/26/1997	Heat	3	0	0
2/28/1997	Heat	1	0	0
3/1/1997	Heat	2	0	0
4/9/1997	Cold/wind Chill	3	0	0
5/31/1997	Cold/wind Chill	1	0	0
7/13/1997	Heat	6	0	0
1/4/1998	Heat	5	0	0
1/31/1998	Heat	1	0	0
2/28/1998	Heat	1	0	0
3/27/1998	Heat	5	0	0
11/28/1998	Heat	3	0	0
12/1/1998	Heat	7	0	0
7/4/1999	Heat	6	0	0
7/16/1999	Heat	4	0	0
7/17/1999	Heat	3	0	0
11/30/1999	Heat	1	0	0
1/2/2000	Heat	3	0	0
3/8/2000	Heat	3	0	0
3/31/2000	Heat	1	0	0
7/31/2000	Cold/wind Chill	1	0	0
5/2/2001	Excessive Heat	3	0	0
7/31/2001	Cold/wind Chill	1	0	0
8/8/2001	Heat	3	0	0
11/30/2001	Heat	1	0	0
12/1/2001	Heat	1	0	0
12/4/2001	Heat	3	0	0
12/31/2001	Heat	1	0	0
1/27/2002	Heat	4	0	0

Table 4.3.1-1 History of extreme temperatures in Monroe County (NCDC, 2015)

DATE	EVENT	DURATION (IN DAYS)	DEATHS	INJURIES
2/28/2002	Heat	1	0	0
8/1/2002	Heat	5	0	0
8/11/2002	Heat	10	0	0
1/14/2003	Cold/wind Chill	16	0	0
1/9/2004	Cold/wind Chill	3	0	0
1/15/2004	Cold/wind Chill	2	0	0
12/20/2004	Cold/wind Chill	1	0	0
1/18/2005	Cold/wind Chill	1	0	0
1/23/2005	Cold/wind Chill	2	0	0
1/28/2005	Cold/wind Chill	1	0	0
12/14/2005	Cold/wind Chill	1	0	0
1/26/2007	Extreme Cold/wind Chill	1	0	0
2/5/2007	Extreme Cold/wind Chill	1	0	0
2/6/2007	Extreme Cold/wind Chill	1	0	0
2/15/2007	Cold/wind Chill	1	0	0
2/16/2007	Cold/wind Chill	1	0	0
2/19/2007	Cold/wind Chill	1	0	0
3/6/2007	Cold/wind Chill	1	0	0
5/7/2007	Frost/freeze	2	0	0
5/14/2007	Frost/freeze	1	0	0
2/11/2008	Cold/wind Chill	1	0	0
6/7/2008	Excessive Heat	4	0	0
7/16/2008	Excessive Heat	7	0	0
12/22/2008	Cold/wind Chill	2	0	0
1/16/2009	Cold/wind Chill	3	0	0
1/3/2010	Cold/wind Chill	1	0	0
7/6/2010	Excessive Heat	1	0	0
1/24/2011	Cold/wind Chill	1	0	0
6/9/2011	Heat	1	0	0
7/21/2011	Excessive Heat	2	0	0
7/18/2012	Heat	1	0	0
1/22/2013	Cold/wind Chill	2	1	0
1/4/2014	Extreme Cold/wind Chill	1	0	0
1/7/2014	Extreme Cold/wind Chill	1	0	0
1/22/2014	Extreme Cold/wind Chill	1	0	0
2/27/2014	Cold/wind Chill	1	0	0
3/4/2014	Cold/wind Chill	1	0	0

4.3.1.4 Future Occurrence
The future occurrence of extreme temperature can be considered *likely* as defined by the Risk Factor methodology probability criteria (see Table 4.4-1). Members of the planning team indicated that extreme temperature events and significant temperature swings appear to be becoming more frequent. Due to its location and geography, ESU is more likely to encounter extreme cold than extreme heat events. Topography and vegetation can impact temperature differentials, and urban environments increase the effect of heat as the buildings and pavement retain more heat than vegetated areas. Therefore, students at ESU's additional instructional locations in the Lehigh Valley and Center City Philadelphia are more likely to experience excessive heat (when outside of climate controlled facilities) than the students at the main campus. Conversely, students at the auxiliary sites are less likely to experience extreme cold events.

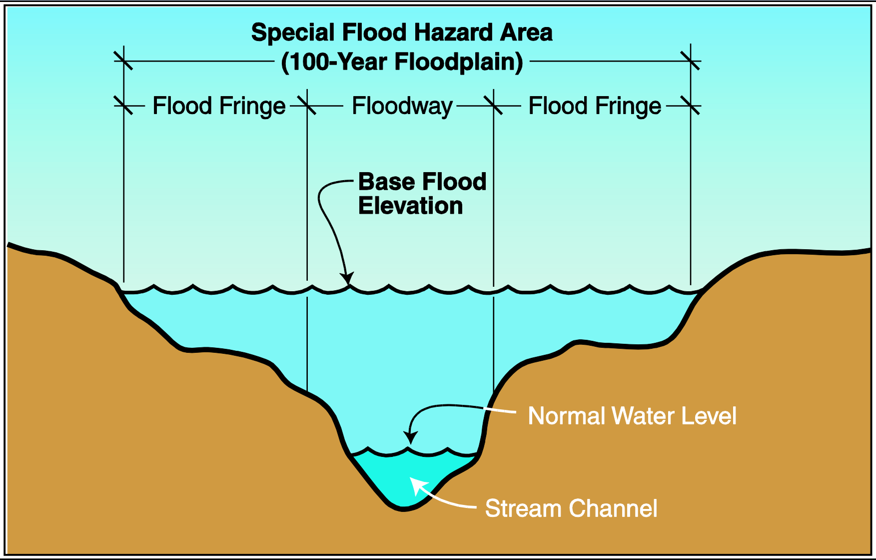
4.3.1.5 Vulnerability Assessment
All of ESU's main campus is equally vulnerable to extreme temperature events due to the large, regional scale of this hazard, as is Stony Acres. However, the central Philadelphia location is more likely to experience excessive heat events because it is located significantly farther south than main campus.

Utility interruptions like burst pipes (in the case of cold weather) and brownouts (in the case of heat waves) could impact student, faculty, and staff safety and the ability of ESU to continue operating normally. These impacts are expected to be worse in older buildings with aging HVAC systems or limited air conditioning.

ESU Student Health Services staff also noted that extreme temperatures are a serious concern for student athletes, who may be at heightened risk of heat cramps, heat exhaustion, and heat stroke during practices and games or frostbite/hypothermia during winter sports. In addition, the CDC cites one risk factor for hypothermia which may apply to any university community: adults under the influence of alcohol are at increased risk of hypothermia. Similarly, alcohol consumption could also be considered a risk factor for frost bite.

4.3.2 Flood, Flash Flood, Ice Jam

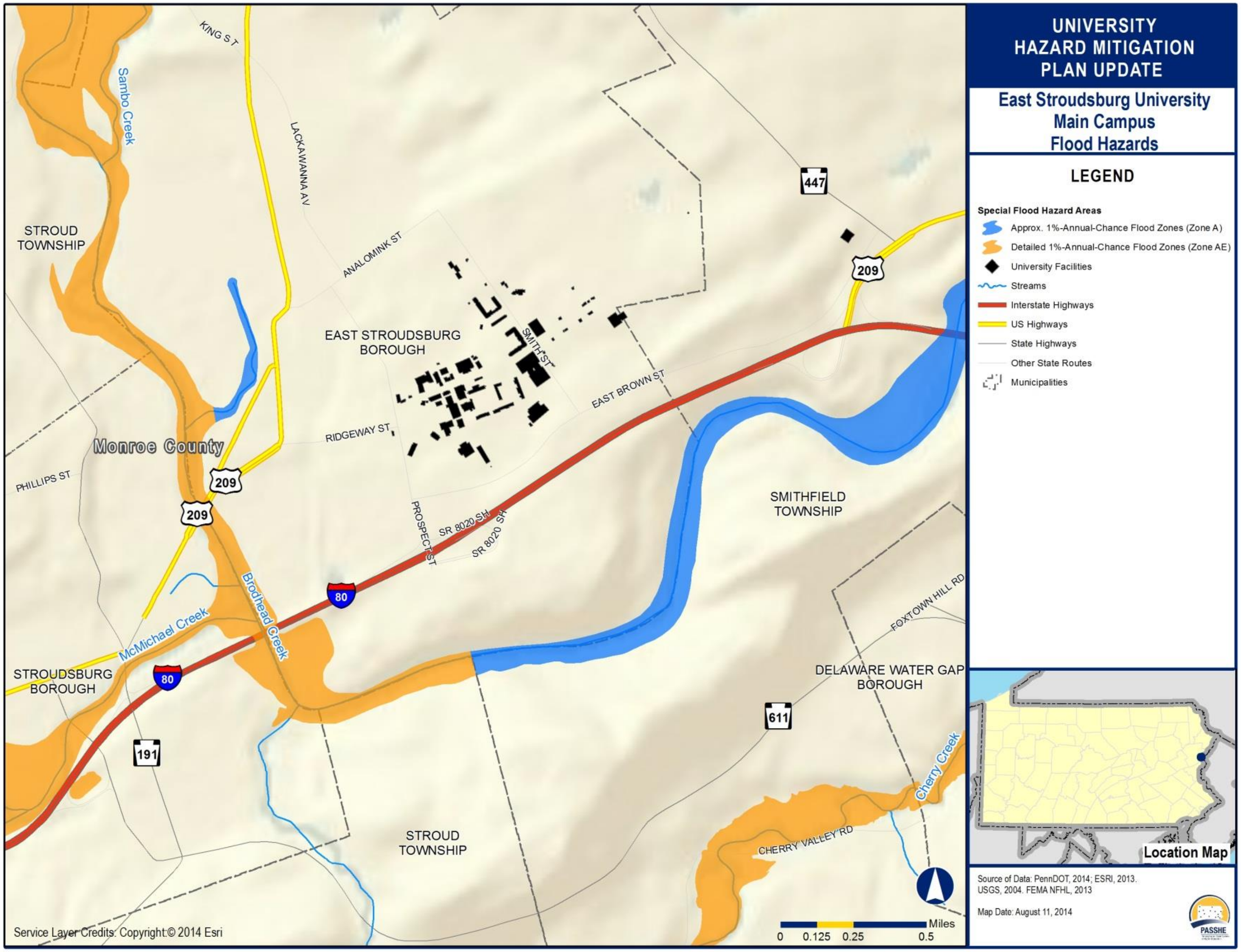
4.3.2.1 Location and Extent
A flood is a natural event for rivers and streams. For inland areas like Northeastern Pennsylvania, excess water from snowmelt or rainfall accumulates and overflows onto the stream banks and adjacent floodplains. As illustrated in Figure 4.3.2-1, floodplains are lowlands, 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 Section 4.3.2.4. However, in 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% annual chance of occurring.

Table 4.3.2-1 Diagram identifying Special Flood Hazard Area, 1% annual chance (formerly referred to as the 100-year) floodplain, floodway and flood fringe.


The National Flood Insurance Program (NFIP), for which Flood Insurance Rate Maps (FIRMs) are published, identifies the 1%-annual-chance flood which is used to delineate the *Special Flood Hazard Area* (SFHA) and identify *Base Flood Elevations*. The Special Flood Hazard Area serves as the primary regulatory boundary used by the Federal Emergency Management Agency (FEMA), the Commonwealth of Pennsylvania, Monroe County, and East Stroudsburg Borough and Smithfield Townships. ESU is located in the Delaware River Watershed, as is all of Monroe County. Figure 4.3.2-2 shows the SFHAs in the area of ESU in East Stroudsburg and Smithfield Township. As shown on the map, ESU is not located in the SFHA, and there are no streams on the ESU property. ESU is not a participant in the NFIP, as the Commonwealth is self-insured and all State System facilities fall under state jurisdiction. The entire campus is potentially susceptible to overland flash flooding during heavy rainfall events, but university officials indicate flash flooding is not a major threat or concern, especially since the storm sewer system was reconstructed in 2008 (see Section 4.3.2.5).

ESU's Center City Philadelphia and Lehigh Valley locations are not located in the floodplain and are generally not susceptible to flooding hazards, as they are located in larger office structures. Stony Acres is likewise not located in the floodplain. Flooding in the area may disrupt travel, prevent students from getting to class, and hamper the university's ability to get supplies onto campus (especially food for the residential population). It may also cause utility interruptions, which would hamper communications on and off campus.

Figure 4.3.2-1 SFHAs near East Stroudsburg University (FEMA, 2013)



4.3.2.2 Range of Magnitude

Floods are considered hazards when people and property are affected. Nationwide, hundreds of floods occur each year, making it one of the most common hazards in all 50 states and US territories. In Pennsylvania, flooding occurs commonly and can occur during any season of the year from a variety of sources. Every two to three years, serious flooding occurs along one or more of Pennsylvania's major rivers or streams, and it is not unusual for this to occur several years in succession. 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.

Several factors determine the severity of floods, including rainfall intensity and duration, topography, ground cover and rate of snowmelt. A large amount of rainfall over a short time span can result in flash flood conditions. A small amount of rain can also 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. Ice jams can occur over the winter when warm temperatures and heavy rain melt snow rapidly, causing frozen rivers to swell and break the ice layer on the river surface. The ice may break into large chunks which can pile up at bridges and dams, causing damage to infrastructure and/or exacerbating flooding conditions at the structure. Flooding may also occur as a result of dam failures. ESU's campus is not in the inundation area of any dam, but a dam failure elsewhere in the county could cause roadway closures and limit access to campus.

Summer floods have historically occurred in Monroe County 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 events. The worst-case scenario for flooding occurred in Monroe County in August 1955. Hurricane Diane brought heavy rains causing a massive flooding event in Brodhead Creek and its tributaries. The flood reached almost thirty feet above normal levels along the Brodhead Creek in Smithfield Township (though not near ESU). The discharge rates for Brodhead Creek were 3.5 times higher than the previously recorded maximum, McMichaels Creek rates were 1.5 times higher, and Pocono Creek rates were nine times higher. Damages from this flood were estimated at $10.6 million, in July 1961 prices. More than 40 highway and railroad bridges were washed away in the swift moving floodwaters, and many summer resorts and homes were destroyed. There were a total known amount of 70 fatalities in the entire Brodhead Creek Watershed (Monroe County HMP, 2011). While this kind of event is unlikely on ESU's campus, it does highlight the destruction that can occur from a large-scale flash flood event.

4.3.2.3 Past Occurrence

Monroe County has a history of flood events, Table 4.3.2-1 lists the flood occurrences recorded with the National Climatic Data Center from 1996 through October 2014. These events did not impact ESU's campus directly, but they may have resulted in road closures that impacted campus accessibility. Highlighted storms specifically occurred in/near East Stroudsburg and Smithfield Township.

Table 4.3.2-2 History of Flooding in Monroe County (NCDC, 2014),

LOCATION	DATE	TYPE	DEATHS	INJURIES	PROPERTY DAMAGE ($)
Countywide	1/19/1996	Flash Flood	0	0	0
Monroe (Zone)	1/19/1996	Flood	0	0	25,000,000
Countywide	1/27/1996	Flash Flood	0	0	0
Countywide	4/16/1996	Flash Flood	0	0	0
Southern	6/22/1996	Flash Flood	0	0	0
Countywide	10/19/1996	Flash Flood	0	0	0
Countywide	11/8/1996	Flash Flood	0	0	0
Countywide	12/2/1996	Flash Flood	0	0	0
Southeast Portion	9/9/1999	Flash Flood	0	0	0
Countywide	9/16/1999	Flash Flood	0	0	0
Countywide	12/17/2000	Flash Flood	0	0	0
Southeast Portion	7/25/2001	Flash Flood	0	0	0
North Portion	5/28/2002	Flash Flood	0	0	0
North Portion	6/26/2002	Flash Flood	0	0	0
Northwest Portion	7/23/2002	Flash Flood	0	0	0
South Portion	6/12/2003	Flash Flood	0	0	0
Monroe (Zone)	6/21/2003	Flood	0	0	0
Gilbert	8/16/2003	Flash Flood	0	0	0
Monroe (Zone)	9/23/2003	Flood	0	0	0
Monroe (Zone)	12/11/2003	Flood	0	0	0
Central Portion	8/12/2004	Flash Flood	0	0	0
Countywide	9/18/2004	Flash Flood	0	0	8,000,000
Monroe (Zone)	9/18/2004	Flood	0	0	8,000,000
Monroe (Zone)	1/14/2005	Flood	0	0	0
Monroe (Zone)	4/2/2005	Flood	0	0	40,000,000
Monroe (Zone)	10/8/2005	Flood	0	0	0
Countywide	1/18/2006	Flood	0	0	0
Countywide	6/27/2006	Flood	2	0	16,000,000
Countywide	6/27/2006	Flash Flood	0	0	0
Blakeslee	4/15/2007	Flood	0	0	0
East Stroudsburg	6/1/2007	Flash Flood	0	0	0
Cresco	6/14/2008	Flash Flood	0	0	0
Robin Hood Lakes	6/14/2008	Flash Flood	0	0	0
Bossardsville	8/15/2008	Flash Flood	0	0	0
Scot Run	7/29/2009	Flash Flood	0	0	0
Robin Hood Lakes	7/29/2009	Flash Flood	0	0	0
Blakeslee	9/30/2010	Flood	0	0	0
Fernridge	10/1/2010	Flood	0	0	0
Shoemakers	3/7/2011	Flood	0	0	0
Shoemakers	3/10/2011	Flood	0	0	0
Marshalls Creek	5/19/2011	Flash Flood	0	0	0
Blakeslee	8/28/2011	Flash Flood	0	0	0
Shoemakers	8/28/2011	Flood	0	0	175,000
East Stroudsburg	9/7/2011	Flood	0	0	0
Minisink Hills	9/8/2011	Flood	0	0	0
Mc Michaels	9/28/2011	Flash Flood	0	0	0
East Stroudsburg	5/26/2012	Flash Flood	0	0	0

Table 4.3.2-2 History of Flooding in Monroe County (NCDC, 2014),					
LOCATION	DATE	TYPE	DEATHS	INJURIES	PROPERTY DAMAGE ($)
Bartonsville	5/26/2012	Flash Flood	0	0	25,000
Pocono Manor	5/26/2012	Flash Flood	0	0	0
Brodheadsville	9/4/2012	Flash Flood	0	0	0
Stroudsburg	9/4/2012	Flash Flood	0	0	0
Kresgeville	9/18/2012	Flash Flood	0	0	0
Shoemakers	7/1/2013	Flash Flood	0	0	0
Hunkletown	7/2/2013	Flood	0	0	0
Hunkletown	7/28/2013	Flash Flood	0	0	0
Monroe Co.	8/9/2013	Flash Flood	0	0	0
Stroudsburg	1/11/2014	Flood	0	0	0
Totals:			**2**	**0**	**$97,200,000**

Of these storms, a few have had notable impacts near ESU. In September 2004, flooding damaged Main and Broad Streets in East Stroudsburg the most; several buildings, roads, and bridges in the borough were washed out. A number of students' driving commute had to change because of road closures. On October 8, 2005, a record 10 inches fell in East Stroudsburg Borough, resulting in flash flooding and road closures that impacted campus and community circulation. Countywide flooding in June 2006 led to a presidential disaster declaration. Heavy damages were reported along Brodhead Creek and the Delaware River, and four homes in the borough were completely destroyed. Two people lost their lives during the event. On June 1, 2007 successive severe thunderstorms produced three to four inches of rain and flash flooding in and around the East Stroudsburg area. Several roads were closed in Stroudsburg, East Stroudsburg, and Smithfield Townships. Smithfield Township also had a reported mudslide.

4.3.2.4 Future Occurrence

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.

A specific flood that is used for a number of purposes is called the "base flood", which has a one percent chance of occurring in any particular year. The base flood is often referred to as the "100-year flood" since its probability of occurrence suggests it should reoccur once every 100 years, although this is not the case in practice. Experiencing a 100-year flood does not mean a similar flood cannot happen for the next 99 years; rather it reflects the probability that over a long period of time, a flood of that magnitude has a one percent chance of occurring in any given year. Thus, this flood is referred to as the 1%-annual-chance flood.

Smaller floods occur more often than larger (deeper and more widespread) floods. Thus, a 10 percent-annual-chance flood has a greater likelihood of occurring at any given time than a 1 percent-annual-chance flood. Also referred to as the "special flood hazard area" (see Figure 4.3.2-2), the 1 percent-annual-chance floodplain boundary is a convenient tool for assessing vulnerability and risk in flood-prone communities, since many communities have maps available that show the extent of the base flood and the likely depths that will be experienced.

The probability of major flood damage to the ESU campus is low, as there are no buildings in the SFHA. There is, however, a potential for flash flooding (although there has been very little of this in the past). Probability of flash flooding is difficult to determine, although it can strike the University at any time.

The future occurrence of floods, flash floods, and ice jams at ESU can be considered *likely* as defined by the Risk Factor Methodology probability criteria (see Table 4.4-1).

4.3.2.5 Vulnerability Assessment

There are no structures or facilities at ESU located in the 1% annual-chance floodplain or the 0.2% annual-chance floodplain. At the same time, flooding in other parts of Monroe County could prevent commuter students, faculty, and staff from getting to campus. In addition, the entire campus is potentially susceptible to flash flooding. However, the University completed a $10 million upgrade of its stormwater system in 2008. This effort included the following stormwater construction projects:

- Prospect Street: construct new storm drain inlets and storm drains at Centre Street, College Circle, and Normal Street.
- Normal Street (Prospect Street to Knapp Street): construct new storm drains serving raised pedestrian crossings and raised intersections, and connect to Elk Street storm sewer.
- College Circle: construct new storm drains and connect to Elk Street storm sewer.
- Parking Lots “A” and “B”
    - Remove jersey barriers and pavement, and construct grass swales and landscaped islands.
    - Construct storm drains.
    - Seed grass swales and cut area at north side of Parking Lot “B.”
- Green Street: construct storm drains from crosswalks to Elk Street storm sewer.
- Knapp Street Closure
    - Construct storm drain serving raised intersection of Isabelle Street and Normal Street.
    - Construct new storm drains east and north of Shawnee Hall, connect to Elk Street storm sewer.
    - Remove and replace roof drain manholes and sewer east of Shawnee Hall. Connect to Centre Street storm water sewer.
- University Quad (Between Shawnee and Center for Hospitality Management)
    - Re-grade and re-seed eastern half of lawn for improved drainage.
    - Construct new storm drain, connect to Centre Street storm sewer.
- Centre Street
    - Replace and construct new storm sewer pipes and inlets along Centre Street from Smith Street to Prospect Street.
    - Replace storm sewer pipes and inlets at Rosenkrans parking lot.
    - Replace storm sewer pipes and inlets in Minsi Hall parking lot and connect to Centre Street storm sewer.
- Eiler-Martin Stadium and Baseball Field Area: construct new storm sewer and inlets.

- Hemlock Hall: construct storm drain inlets and sewer at repaved parking lot and along south side of Hemlock Hall. Connect to Elk Street storm water sewer.
- Smith Street
  - Construct storm drains at raised pedestrian crossing in front of Kemp Library and connect to Elk Street storm sewer. Construct storm drains at raised pedestrian crossing next to Koehler Field House and connect to Centre Street storm sewer.
  - Replace solid manhole cover with grate on existing storm sewer manhole north of Koehler Field House.
- Kemp Library
  - Construct storm water sewers and underground storm water storage facility at east parking lot. Connect to Elk Street storm sewer manhole at Smith Street.
  - Expand parking lot north of building (north parking lot). Construct grass swale and landscaped terminal islands. Seed grass swale.
  - Construct storm water sewer and inlets serving north parking lot. Connect to Elk Street storm sewer.
- Elk Street Storm Sewer: replace stormwater pipes and inlets from Smith Street to Parking Lot "B".
- Drake Street
  - Construct storm sewer and inlet serving repaved parking lot west of United Campus Ministry building on Smith Street.
  - Construct storm sewer and inlets serving repaved driveway and parking spaces between existing paved lot and Drake Street, north of University Apartments.
  - Repave Drake Street from Smith Street to parking lot on west side of University Apartments. Construct storm water inlets and sewers along repaved street.
  - Construct grass swale and terminal islands on parking lot west of University Apartments. Seed grass swale, cut slopes, and fill slopes, and mulch landscaped islands.
  - Construct storm sewer and inlets serving parking lot west of University Apartments.
- Slutter Lane/Fine Arts Building
  - Construct storm drain and inlets serving expanded Fine Arts Building parking lot and repaved parking lot south of 411 Normal Street.
  - Repave intersection on east side of Fine Arts Building to direct surface drainage into existing storm sewer inlets.
- Mary Street
  - Construct new storm sewer and inlets along south side of Mary Street from Adelaide Street to east side of University Material Storage Yard. Construct riprap outlet protection at downstream end of sewer.

This stormwater system upgrade has reduced the campus's vulnerability to flooding hazards.

4.3.3 Hurricane, Tropical Storm, Nor'easter

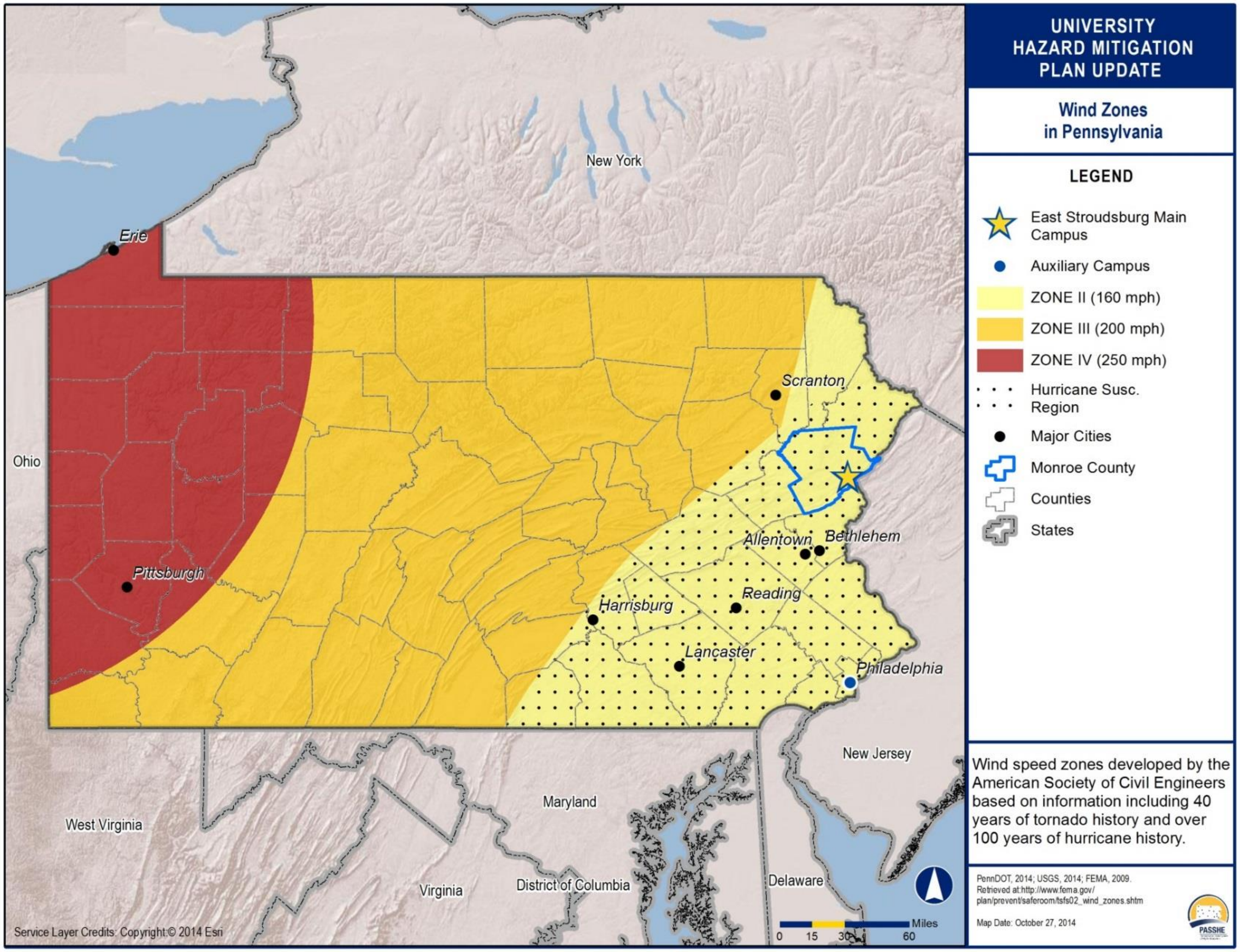
4.3.3.1 Location and Extent

Tropical storms impacting ESU and Monroe County develop in tropical or sub-tropical waters found in the Atlantic Ocean, Gulf of Mexico, or Caribbean Sea. 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 39-74 mph. These storms sometimes develop into hurricanes with wind speeds in excess of 74 mph. Nor'easters typically develop as extra-tropical storms which can produce winds equivalent to hurricane or tropical storm force as well as heavy precipitation, sometimes in the form of snow. These storms are regional events that can impact very large areas hundreds to thousands of miles across over the life of the storm.

While Monroe County is located about 80 miles from the Atlantic Coast, tropical storms can track inland causing heavy rainfall and strong winds. These storms are regional events that can impact very large areas hundreds to thousands of miles across over the life the storm. Therefore, all campus assets are equally subject to the impacts of hurricanes, tropical storms, and Nor'easters that track through or near ESU. Areas that are already subject to flooding, wind, and winter storm damage are particularly vulnerable.

Figure 4.3.4-1 shows wind speed zones developed by the American Society of Civil Engineers based on information including 40 years of tornado history and over 100 years of hurricane history. 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. ESU falls within Zone II, meaning design wind speeds for shelters and critical facilities should be able to withstand a 3-second gust of up to 160 mph, regardless of whether the gust is the result of a tornado, hurricane, tropical storm, or windstorm event. Monroe County also falls wholly within the identified Hurricane Susceptibility Region.

Figure 4.3.3-1 Design Wind Speeds for Shelters in the US.



4.3.3.2 *Range of Magnitude*

The impacts associated with hurricanes and tropical storms are primarily wind damage and flooding, which could impact campus buildings and accessibility. It is not uncommon for tornadoes to develop during these events. Historical tropical storm and hurricane events have brought intense rainfall, sometimes leading to damaging floods, as well as northeast winds, which, combined with waterlogged soils, can cause trees and utility poles to fall. These impacts threaten student and staff safety and may result in utility failures that interrupt campus operations (see Section 4.3.11).

The impact 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 (characteristic of tropical storms and hurricanes, but not a threat to of ESU's locations), which are combined to estimate potential damage. Table 4.3.3-1 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 comprise only 20 percent of all tropical cyclones making landfall, they account for over 70 percent of the damage in the United States.

Table 4.3.3-1 Saffir-Simpson Scale categories with associated wind speeds and damages (NHC, 2014).

STORM CATEGORY	WIND SPEED (MPH)	DESCRIPTION OF DAMAGES
1	74-95	**Very dangerous winds will produce some damage:** Well-constructed frame homes could have damage to roof, shingles, vinyl siding and gutters. Large branches of trees will snap and shallowly rooted trees may be toppled. Extensive damage to power lines and poles likely will result in power outages that could last a few to several days.
2	96-110	**Extremely dangerous winds will cause extensive damage:** Well-constructed frame homes could sustain major roof and siding damage. Many shallowly rooted trees will be snapped or uprooted and block numerous roads. Near-total power loss is expected with outages that could last from several days to weeks.
3	111-129	**Devastating damage will occur:** Well-built framed homes may incur major damage or removal of roof decking and gable ends. Many trees will be snapped or uprooted, blocking numerous roads. Electricity and water will be unavailable for several days to weeks after the storm passes.
4	131-155	**Catastrophic damage will occur:** Well-built framed homes can sustain severe damage with loss of most of the roof structure and/or some exterior walls. Most trees will be snapped or uprooted and power poles downed. Fallen trees and power poles will isolate residential areas. Power outages will last weeks to possibly months. Most of the area will be uninhabitable for weeks or months.
5	>155	**Catastrophic damage will occur:** A high percentage of framed homes will be destroyed, with total roof failure and wall collapse. Fallen trees and power poles will isolate residential areas. Power outages will last for weeks to possibly months. Most of the area will be uninhabitable for weeks or months.

It is important to recognize the potential for flooding events during hurricanes and tropical storms; the risk assessment and associated impact for these events is included Section 4.3.2. In addition, there may be wind impacts, described in more detail in Section 4.3.5. Wind impacts generally include downed trees and utility poles, which can spark widespread utility interruptions. The overarching impact of hurricanes, tropical storms, and nor'easters at ESU will be that the university may be deployed as a regional shelter open to the public. In addition, they may disrupt travel, prevent students from getting to class, and hamper the university's ability to get supplies onto campus (especially food for the residential population). It may also cause utility interruptions, which would hamper communications on and off campus.

ESU has been minimally impacted by hurricane, tropical storm, and nor'easter events in the past, largely because of its distance from the cost and location outside the floodplain. However, according to the County HMP, the worst case hurricane, tropical storm, or Nor'easter event in Monroe County was Hurricane Diane, which struck Pennsylvania in 1955 and resulted in a Presidential Disaster Declaration. Diane made landfall in North Carolina on August 17, taking a west-northwest track that cut through central Virginia, Maryland, southeast Pennsylvania, New Jersey, and New York. The storm never tracked into Pennsylvania, but brought extremely heavy rains to eastern Pennsylvania, including Monroe County. With the soil already saturated from Hurricane Connie a few days before, fast-moving water wreaked havoc in the Brodhead Creek Watershed (where ESU is located), demolishing dams, structures, and killing some 75 persons in the immediate area. The flood impacts led to water quality issues and an outbreak of dysentery in the County. This storm is considered the ninth most costly hurricane event (adjusted costs to 1994 dollars) with cumulative damages of $7 million in the Northeastern US.

4.3.3.3 Past Occurrence

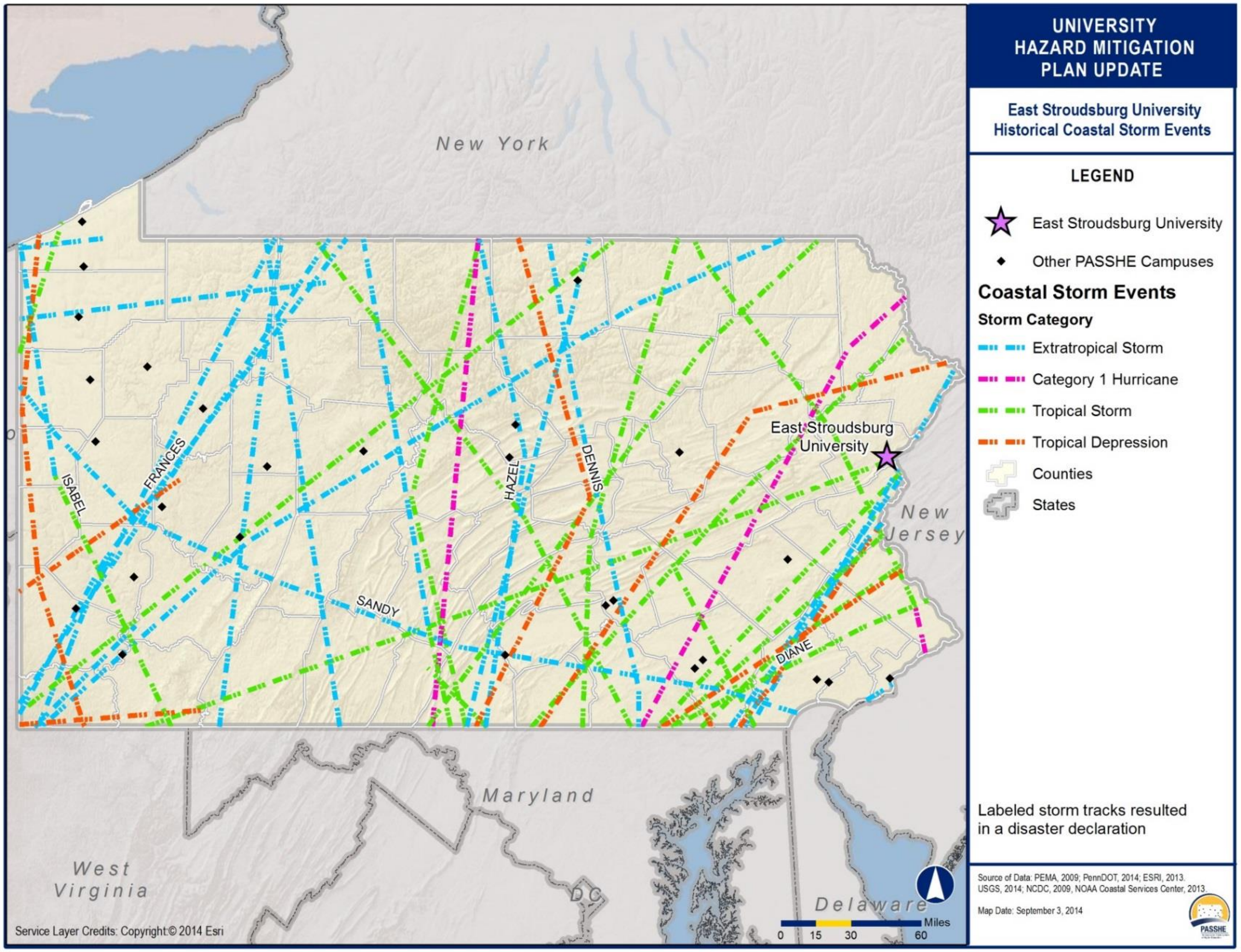
Previous occurrences of hurricanes, tropical storms, and nor'easters including those listed in Table 4.3.3-2, have brought intense rainfall, flooding (see Section 4.3.2), and strong winds, though they have not caused separate or differing impacts on campus, with the exception of Hurricane Sandy. These events have disrupted transportation and utilities throughout Monroe County. Hurricane Sandy in led to cancelled classes and ESU being used as a regional shelter for affected citizens from not only Pennsylvania but also New York and New Jersey.

Table 4.3.3-2 Hurricanes, Tropical Storms, and Tropical Depressions impacting Monroe County.

EVENT	YEAR	EVENT	YEAR
Tropical Able	1952	Tropical Depression Ivan	2004
Hurricane Diane	1955	Hurricane Irene	2011
Hurricane Agnes	1972	Tropical Storm Lee	2011
Hurricanes Dennis and Floyd	1999	Hurricane Sandy	2012
Tropical Storms Henri and Isabel	2003		

Historic coastal storm tracks are shown in relation to ESU in Figure 4.3.3-1. ESU has been located near the track of 12 storms, but all but three of those storms were unnamed events prior to 1950.

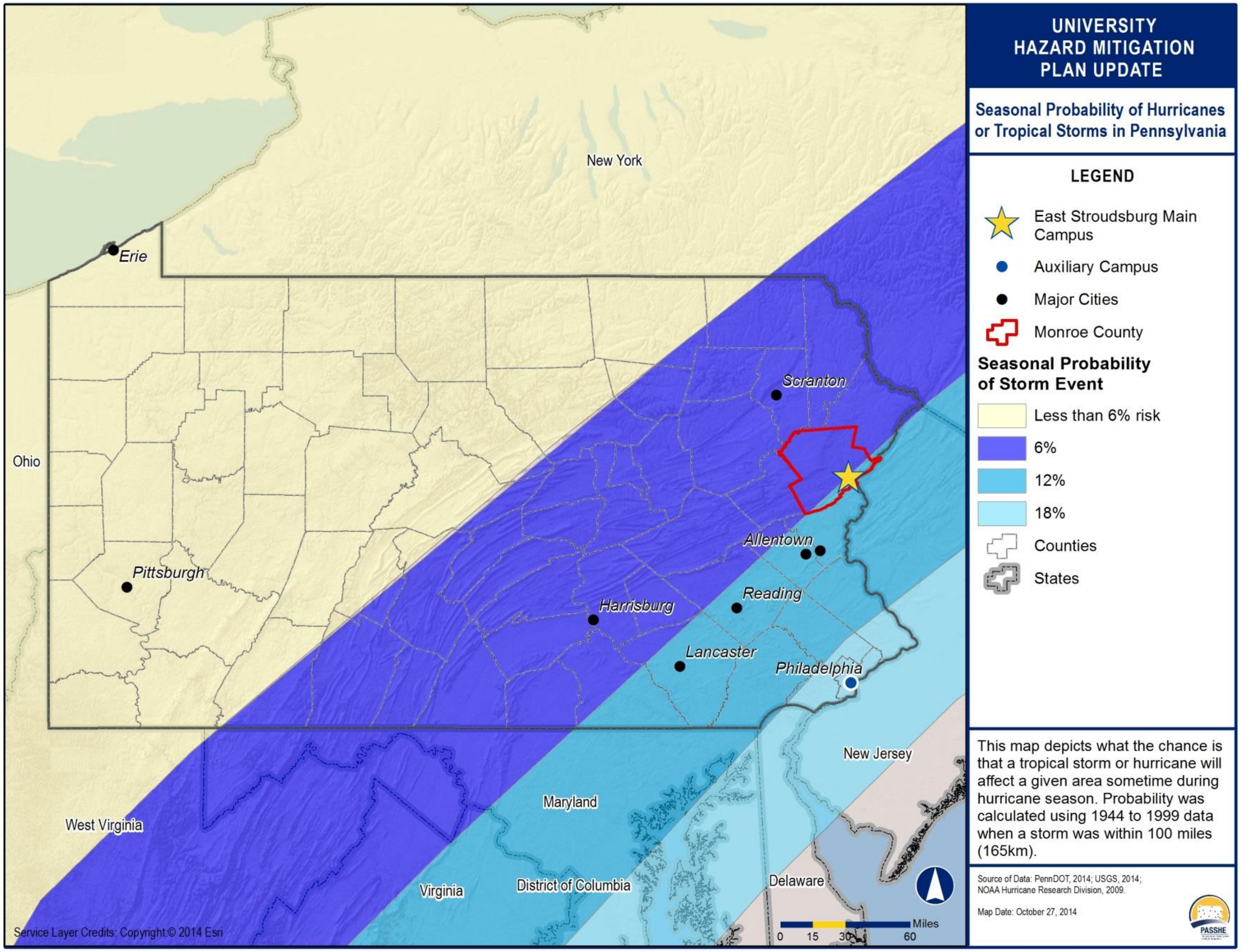
Figure 4.3.3-2 Historical coastal storms tracking near ESU.



4.3.3.4 Future Occurrence

The National Oceanic and Atmospheric Administration Hurricane Research Division provided the data for the map included as Figure 4.3.3-3 showing the chance that a tropical storm or hurricane will affect a given area during the entire Atlantic hurricane season spanning from June to November. Note that this figure does not provide information on the probability of various storm intensities. However, based on historical data between 1944 and 1999, this map reveals that there is a 12 percent chance of ESU experiencing a tropical storm or hurricane event between June and November of any given year.

Figure 4.3.3-3 Seasonal Probability of Hurricanes or Tropical Storms in Pennsylvania



Overall, the probability of future hurricanes, tropical storms, and Nor'easters can be considered *possible* according to the Risk Factor Methodology (see Table 4.4-1).

4.3.3.5 Vulnerability Assessment

ESU is not particularly vulnerable to immediate flooding and severe winds caused by hurricanes, tropical storms, and nor'easters, but can experience second-order effects like traffic and circulation challenges or power outages. Main campus and Stony Acres have generally the same vulnerability, as both are within close proximity to each other in Monroe County. Flood vulnerability is addressed in Section 4.3.2.5 and vulnerability to wind damage is addressed in Section 4.3.5.5. The University is also vulnerable to winter weather impacts caused by Nor'easters which are evaluated in Section 4.3.6.5. The Lehigh Valley Extended Learning Site in Bethlehem is located in the 12% annual seasonal probability band, meaning there may be a slightly larger risk to these hazards. The Center City Philadelphia site, which is located in the band of 18% seasonal probability of a storm event, is more vulnerable to the impacts of hurricane, tropical storm, and nor'easter events.

4.3.4 Pandemic and Infectious Disease

4.3.4.1 Location and Extent

A pandemic is a global disease outbreak. A flu pandemic occurs when a new influenza virus emerges for which people have little or no immunity, and for which there is no vaccine. The disease causes sudden, pervasive illness in all age groups on a global scale. 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 non-infected persons.

Pandemic and infectious disease events are, by their nature, large scale events that would impact the entire campus community. 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
- Human Immunodeficiency Virus (HIV)/Acquired Immune Deficiency Syndrome (AIDS) and other sexually transmitted infections (STIs)
- Malaria
- Tuberculosis

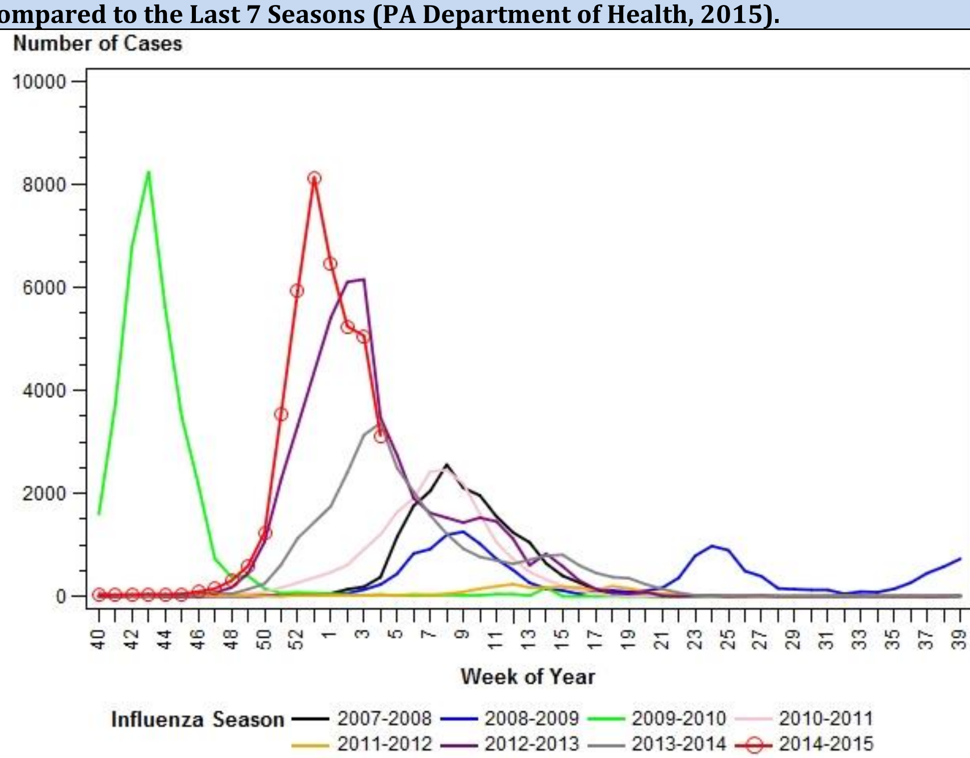
This hazard profile focuses specifically on the risk from novel influenza, mumps, measles, tuberculosis, and meningitis, as these are most likely to impact ESU.

In a pandemic, there is a high potential for colleges and universities to become explosive disease outbreak centers. Young adults living in close quarters and the tendency of young adults to not seek immediate medical attention contribute to this potential. Outbreak management is essential to reduce the impact in both the institution and the surrounding community. Universities have the potential to become explosive outbreak centers due to their large young adult population, high levels of close social contact, and permeable boundaries. 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 outbreak management in such institutions is 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.

4.3.4.2 Range of Magnitude

The magnitude of an epidemic or infectious disease threat for ESU and the surrounding communities 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 4.3.4-1 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 to the last seven seasons. This indicates the temporal aspect of influenza as well as highlights the years with definable spikes in cases. These spikes were notable in 2009-10 (the year of H1N1) and 2012-13.

Figure 4.3.4-1 Comparison of PA-NEDSS Influenza Cases Reported in Pennsylvania: Current Season Compared to the Last 7 Seasons (PA Department of Health, 2015).



The magnitude of a pandemic may be exacerbated by an influenza pandemic that causes 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, may be in short supply or will not be available when a disease reaches pandemic proportions.

A potential worst case scenario for pandemic and infectious disease at ESU would be a serious outbreak resulting in illness in a large percentage of the students and staff. Such an event may warrant the temporary suspension of classes and other measures to prevent undue contact with infected persons.

4.3.4.3 Past Occurrence

Influenza

Annually in the United States, influenza or influenza-like-illnesses (ILI) are responsible for a number of deaths. Historic influenza events include the Spanish Flu of 1918-1920, Asian Flu of 1957-1958, and Hong Kong Flu of 1968-1969. The Spanish Flu was responsible for 50 million deaths worldwide, with an estimated 350,000 cases in Pennsylvania.

Due to the unpredictability of influenza, it is difficult to pinpoint an annual case fatality rate. The Center for Disease Control (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.

Perhaps the most serious influenza event was the 2009-2010 season. 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 (CDC, 2010). The initial human cases were detected in two children.

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. ESU has developed a pandemic influenza plan in the past but Student Health staff report that it has never needed to be fully deployed.

Social distancing measures were put into effect upon the CDC receiving reports of an investigation into a cluster of ILI in a New York City high school and upon other school closures occurring as a result of the outbreak. Social distancing is the practice of increasing the distance between people to slow the spread of disease. CDC issued a Morbidity and Mortality Weekly Report Dispatch on the outbreak in the high school, that was, at the time, 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 followed their pandemic plans and did 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).

Measles (Rubeola) and Mumps

Measles is highly contagious and is spread by droplets (as are mumps). Measles was endemic in the US prior to 2000, but there are fewer than 150 cases reported annually across the country each year. According to the PA Department of Health, about half of all measles cases come from US residents returning from foreign nations. Incidences of the mumps in the US vary from year-to-year; in 2010, there were over 2,600 cases, but in 2012 there were only 229. The CDC reports outbreaks of the mumps in 2011-13, 2009-2010, and 2006. The outbreak in 2006 is especially applicable because it predominantly affected college students in the Midwest (CDC, 8 April 2014). Most children in the US are vaccinated against measles and mumps (along with rubella and varicella) together in the MMR or MMRV vaccination administered at 12 months of age. ESU has not had any recorded measles or mumps outbreaks.

Meningococcal meningitis

There are approximately 2,600 cases of bacterial meningitis per year in the United States, and on average 333,000 cases in developing countries. The case fatality rate ranges between 10-20%. Since 2000, the number of meningococcal disease incidences has decreased. From 2000-2004 to 2005-2009, the estimated annual number of cases of meningococcal disease decreased 74% among persons aged 11 through 14 years, but only 27% among persons aged 15 through 18 years. In the United States, meningococcal outbreaks account for less than five percent of the reported cases (95%-97% of cases are sporadic). Since 1991, the frequency of localized outbreaks has increased. Meningococcal vaccines have sharply reduced the incidence of the disease in developed countries. In Pennsylvania, all students residing in dorms or on-campus housing units are required to get the meningitis vaccine. This requirement has been in place since 2002. At ESU, there have been students with meningitis; ESU Health Services called each of the infected students' classmates, and 350 doses of the medication Cipro were administered to prevent the spread of the illness.

Norovirus

Norovirus is a very contagious gastrointestinal infection that causes stomach pain, nausea, diarrhea, and vomiting. It is the most common cause of gastroenteritis in the United States and the most common cause of foodborne-disease outbreaks in the US (CDC, 2013). In February 2015, approximately 200 students sought medical treatment for norovirus in a fast-moving outbreak; actual numbers of infected persons may have been higher. In response, ESU put a number of precautions in place:

- Common area sanitization;
- Hand sanitizer in place across campus in common areas (with bulletins to remind members of the campus community to use it);
- Distribution of disinfecting wipes to students in residence halls and high-traffic offices on campus to aid in keeping spaces clean and disinfected;
- Distribution of "wellness bags" with Gatorade, water, chicken broth, and saltines at Dansbury Commons and delivery of wellness bags to the residence halls (Herriman, 2015).

The outbreak eased after about two weeks.

Tuberculosis (TB)

In 2013, a total of 9,582 TB cases (a rate of 3.0 cases per 100,000 persons) were reported in the United States. The Pennsylvania Department of Health's data reports a decline in cases, from 238 state TB cases in 2010 to 234 in 2012 and 214 in 2013 (PA Department of Health, 2015). Since the 1922 TB resurgence peak in the United States, the number of cases reported annually has decreased. There have not been any large-scale outbreaks of TB on campus.

4.3.4.4 Future Occurrence

Influenza

Public health experts from the U.S. Department of Health and Human Services 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, any university in the State System may be affected by a non-seasonal pandemic outbreak at some time in the future. Mitigation efforts currently in place at the university 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, the University has already prepared a pandemic plan. As mentioned previously, ESU has done proactive pandemic influenza planning; this cannot reduce the future probability but can potentially limit impacts.

Measles (Rubeola) and Mumps

Measles is highly contagious and is spread by droplets (as are mumps). Since most people of college age in the US are vaccinated against measles and mumps, incidences in the immediate future are expected to be low. However, as recently as February 1, 2015, the director of the CDC has said his agency is very concerned about the small but growing number of people who have not been vaccinated. He specifically called out young adults as the population where the number of non-vaccinated people is growing. In Pennsylvania, 15% of kindergarteners have not been vaccinated with the MMRV vaccine. Over time, this may mean that ESU and other college campuses are more likely to see outbreaks (Kaplan, 2015).

Meningococcal meningitis

Meningococcus bacteria are spread through the exchange of respiratory and throat secretions like saliva (e.g., by living in close quarters, kissing). Close quarters include people in the same household, roommates, or anyone with direct contact with the patient's saliva (such as a boyfriend or girlfriend). Rates of meningococcal disease have been declining in the United States since the late 1990s. There are now fewer than 1,000 cases reported each year. Meningococcal disease is also seasonal: the number of cases generally peaks each year in December and January.

Anyone can get meningococcal disease, but rates of disease are highest in children younger than 1 year of age, followed by a second peak in adolescence typically around 16 years of age, and young adults. Almost all (98 out of 100) cases of meningococcal disease are sporadic. Very few (2 out of 100) cases occur as part of an outbreak. Outbreaks can occur in communities, schools, colleges, prisons, and other populations. The disease tends to spread quickly among large groups gathered together, making first-year college students living in residence halls at a slightly higher risk compared to other persons of the same age (CDC, 1 April 2014). ESU has a plan in place for handling meningitis outbreaks, which, combined with the vaccination requirements, should keep future outbreaks manageable in size and extent.

Norovirus

Norovirus is highly contagious and can be spread from an infected person, contaminated food or water, or by touching contaminated surfaces. The virus stays on surfaces for up to four weeks, and can stay in a person's system for two weeks after feeling better. Norovirus is most common between November and April in the US. Annually, norovirus causes 19-21 million illnesses and contributes to 570-800 deaths. The probability of another norovirus outbreak is difficult to predict, but because of the close quarters at ESU and other universities, if the norovirus is present it can spread rapidly. The best prevention for norovirus is hand washing and cleanliness.

Tuberculosis (TB)

TB is spread through the air from one person to another. The TB bacteria are put into the air when a person with TB disease of the lungs or throat coughs, sneezes, speaks, or sings. People nearby may breathe in these bacteria and become infected. Tuberculosis is one of the most common infectious diseases worldwide. Progress has been made towards the elimination of the disease in the United States but remains a constant problem in many other parts of the world. ESU has a TB testing service available for all students, especially foreign students. This has helped keep past occurrences of TB low on campus and will keep future occurrences low.

Overall, the probability of a true, widespread, future pandemic and infectious disease event can be considered *unlikely* according to the Risk Factor Methodology (see Table 4.4-1).University staff indicated that while there may be isolated cases of illness amongst students, the university is proactive in reducing the possibility of a pandemic event.

4.3.4.5 Vulnerability Assessment

ESU has 5,794 full-time and 984 part-time students and 829 employees, as discussed in Section 2.3. 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 ESU experiences lower population density, such as during the winter intersession and summer sessions, a pandemic is less likely to spread as quickly through human contact and the resident/working populations are less likely to be a 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.

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 that were younger than age 24 (CIDRAP, 2010). Campuses could turn out to be the epicenter of influenza outbreaks. In response to this, ESU Student Health Services actively coordinates with the state Department of Health and the CDC. They do signage and educational campaigns to reduce outbreaks of disease. However, Student Health Services has indicated that the students that may be at greatest risk are those that are international students and those that live far away, since the first line of pandemic protection is to send students home in the hope of easing the spread of a disease.

A dynamic and resourceful public health and medical response has the potential to save lives by delaying the occurrence of outbreaks, decreasing the proportion of the population who develop influenza or become critically ill, and reducing the burden on critical health care facilities. For such a response to occur, Federal, State, and local officials must ensure that all stakeholders understand their responsibilities and are adequately prepared to play their part, they must prioritize the use of scarce resources, and they must ensure the continuity of essential government, emergency, and medical services. Since September 11, 2001, significant investments have been made in all aspects of public health emergency preparedness. On campus, ESU's proactive public health planning, particularly for influenza and meningitis, will reduce future vulnerability. Vulnerability at Stony Acres and the Center City Philadelphia and Lehigh Valley sites is lower than at main campus because the population is non-residential and much smaller than on the main campus.

4.3.5 Radon Exposure

4.3.5.1 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, PA 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.

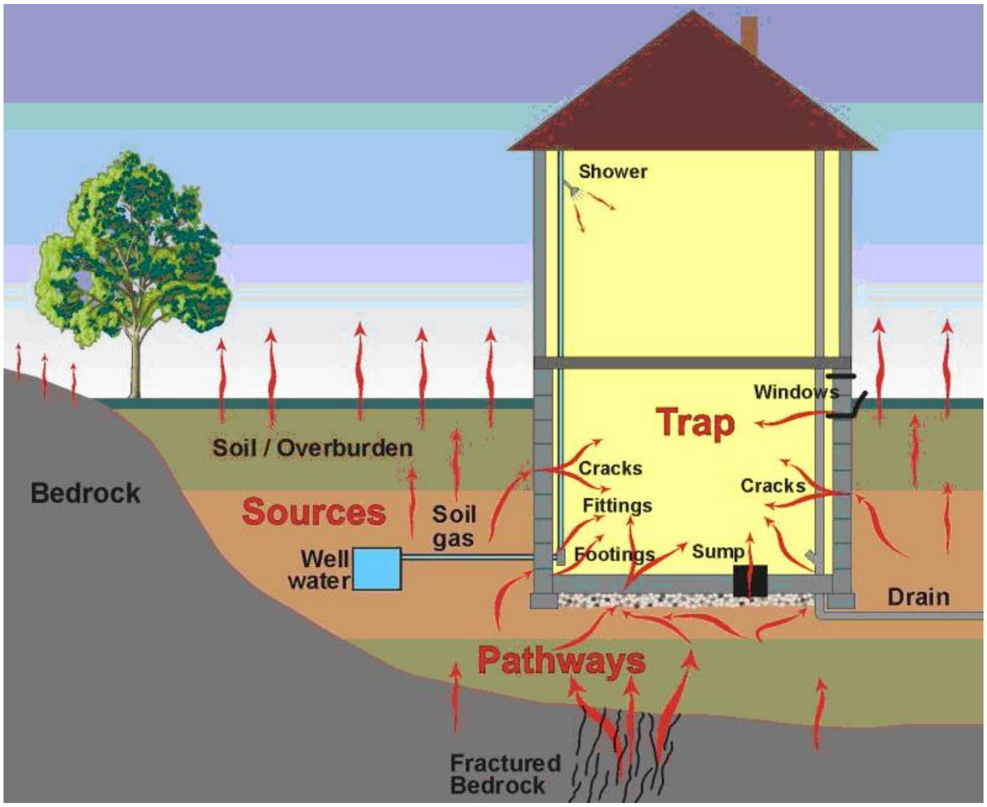
Subsequent testing of the employee's home in the Reading Prong section of Pennsylvania showed extremely high radon levels around 2,500 pCi/L (pico Curies per Liter). To put this amount in perspective, the Environmental Protection Agency (EPA) guidelines state that actions should be taken if radon levels exceed 4 pCi/L in a home, and uranium miners have a maximum exposure of 67 pCi/L. As a result of this event, 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 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. ESU's main campus and the Lehigh Valley Extended Learning Site are located in counties classified as having a high hazard, meaning there is a predicted indoor radon level greater than 4 pCi/L. ESU's City Center Philadelphia distance-learning location, located in Philadelphia County, is classified as having a low hazard, meaning there is a predicted indoor radon level less than than 2pCi/L (EPA, 1993). The subsequent paragraphs in this section outline typical points of entry and concentration levels of radon, as it relates to a home. ESU maintains some single-family residences, and it also uses some former single-family homes as small office buildings. In addition, it is assumed that these concentration levels and entry points for radon exposure would also be applicable for larger structures, such as university buildings.

Three sources of radon in houses are now recognized (shown in Figure 4.3.4-2):

- Radon in soil air that flows into the structure;
- Radon dissolved in water from private wells and exsolved during water usage (this is rarely a problem in Pennsylvania); and
- 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 4.3.5-1 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 air flow 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 (radon concentration 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 (see Figure 4.3.4-2). 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, ten to fifty 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 air flow, 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 counties that house ESU's main campus and Lehigh Valley location. The areas which encompass ESU's main campus and the Lehigh Valley Extended Learning Site have had high radon level test results. These areas in relation to ESU locations and test results are shown in more detail in Table 4.3.4-2.

4.3.5.2 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 non-smokers. 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.

Table 4.3.5-1 Radon risk for smokers and non-smokers (EPA, March 2010).

RADON LEVEL (CCI/L)	IF 1,000 PEOPLE WERE EXPOSED TO THIS LEVEL OVER A LIFETIME…*	RISK OF CANCER FROM RADON EXPOSURE COMPARES TO…**	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)	
NON-SMOKERS			
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.*

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 fixed 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 4.3.4-1 shows the relationship between various radon levels, probability of lung cancer, comparable risks from other hazards, and action thresholds. As is shown in Table 4.3.4-1, a smoker exposed to radon has a much higher risk of lung cancer.

The worst-case scenario for radon exposure would be that a large area of tightly sealed university buildings provided students and/or university staff with high levels of exposure over a prolonged period of time without the students or staff being aware of the exposure. This worst-case scenario exposure then could lead to a large number of students or staff with cancer attributed to the radon exposure.

4.3.5.3 Past Occurrence

Current data on abundance and distribution of radon as it affects individual houses in Pennsylvania in general and areas that encompass ESU's campus and distance-learning locations specifically 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 (PADEP, 2011).

The Pennsylvania Department of Environmental Protection 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 over 4 pCi/L, then the Bureau works to help the homeowners make repairs to their houses to mitigate against high radon levels. The total number 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 total were reported in order to best approximate the average for the area. In areas that encompass the ESU campus and distance-learning extensions, three zip codes had sufficient tests reported to the Bureau to report their findings, which are shown in Table 4.3.4-2. These results are largely in line with the EPA's radon zones wherein Monroe and Lehigh Counties are in an area of higher radon hazard with readings above the action level of 4.0 pCi/L and Philadelphia is well below the threshold of action. To date, ESU has not reported any incidences of radon exposure on campus, and no buildings have basements, where radon test results are generally higher.

Table 4.3.5-2 Radon level tests and results in East Stroudsburg University zip codes (PADEP, 2015).

ZIP CODE	ESU SITE	NUMBER OF TESTS	LOCATION OF TEST	MAXIMUM RESULT (PCI/L)	AVERAGE RESULT (PCI/L)
18018	Main Campus	1,769	Basement	152.1	5.9
18018	Main Campus	276	First Floor	25.5	2.8
18301	Lehigh Valley	3573	Basement	135.0	5.7
18301	Lehigh Valley	831	First Floor	239.2	3.5
19106	Philadelphia	405	Basement	23.0	1.9
19106	Philadelphia	143	First Floor	10.5	1.3

4.3.5.4 Future Occurrence

Radon exposure is inevitable given present soil, geologic, and geomorphic factors that span ESU's geographic presence, but the ubiquity of radon-related lung cancer is less certain. Future occurrence of high radon level hazards can be considered *possible* as defined by the Risk Factor Methodology probability criteria (see Table 4.4-1).

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.

4.3.5.5 Vulnerability Assessment

As Table 4.3.4-2 shows, university structures located on the main campus or the Lehigh Valley Extended Learning Site could be susceptible to high levels of radon. Smokers can be up to ten times more vulnerable to lung cancer from high levels of radon depending on the level of radon they are exposed to (see Table 4.3.4-1). Older houses that have crawl spaces or unfinished basements are more vulnerable as well because of the increased exposure to soils which could be releasing higher levels of radon gas. This is not a concern on ESU's campus, as none of the buildings have unfinished basements or crawl spaces in which gas could collect.

Proper testing for radon levels should be completed across university structures, especially in the areas of higher incidence levels, residence halls, and for those individuals and structures that face the contributing risks described above. This testing will determine the level of vulnerability that students face within ESU's main campus and distance-learning extensions. The Pennsylvania Department of Environmental Protection 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 can cost on average the same as regular house repairs: the average cost is $1,200 for a single-family home (KSU, 2015). Costs for larger structures may be correspondingly higher.

4.3.6 Tornado, Windstorm

4.3.6.1 Location and Extent

Tornadoes and windstorms can affect ESU, and have occurred in the Stroudsburg/East Stroudsburg area in the past. This hazard encompasses two related types of events: tornadoes and straight-line winds. A tornado, a violently rotating funnel-like vortex, is an extraordinary feature of severe thunderstorms. A condensation funnel does not need to reach to the ground for a tornado to be present; a debris cloud beneath a thunderstorm is all that is needed to confirm the presence of a tornado, even in the total absence of a funnel. While the extent of tornado damage is usually localized, the extreme winds of this vortex can be among the most destructive on earth when they move through populated, developed areas.

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. They are most likely to occur during the spring and early summer (March through June). Tornado movement is characterized in two ways: direction and speed of the spinning winds, and forward movement of the tornado, known as the storm track. Rotational wind speeds of the vortex can range from 100 mph to more than 250 mph. In addition, the speed of forward motion can be zero to 45 or 50 mph. Some tornadoes never touch the ground and are short-lived, while others may touch the ground several times.

On the other hand, straight-line winds create movement of air from areas of higher pressure to areas of lower pressure – the greater the difference in pressure, the stronger the winds. Windstorms are generally defined as sustained wind speeds of 40 mph or greater (35 knots) lasting for one hour or longer, or winds of 58 mph (50 knots) or greater for any duration.

4.3.6.2 Range of Magnitude

Each year, tornadoes account for $1.1 billion in damages and cause over 80 deaths nationally (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. The damage caused by a tornado is a result of the high wind velocity and wind-blown debris, also accompanied by lightning or large hail. The most violent tornadoes have rotating winds of 250 miles per hour 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. Tornadoes and high winds can not only damage university buildings, but can cause injury to building occupants and other members of the university community, especially those outdoors at the time of the event. As with floods, this impact can cause disruption of ESU's functions.

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," that was published in 1971. It classifies United States tornadoes into six intensity categories, as shown in Table 4.3.5-1, 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 4.3.5-1 since the magnitude of previous tornado occurrences is based on the F-Scale.

Table 4.3.6-1 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 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.

As discussed in Section 4.3.3.1, the American Society of Civil Engineers has identified 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. All of ESU falls within Zone II, meaning that design wind speeds for shelters and critical facilities should be able to withstand a three-second gust of up to 160 mph, 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.

The worst tornado in Monroe County history occurred not far from ESU in downtown Stroudsburg. This tornado occurred in March 1976; it was an F3 tornado 100 yards wide. It tracked through the downtown, and caused an estimated $2.5 million in damages (Monroe County HMP, 2011). While nearby, ESU staff who were employed in 1976 do not recall damages to the university from the tornado. For more information on past tornadoes in the area surrounding ESU, please see Section 4.3.5.3.

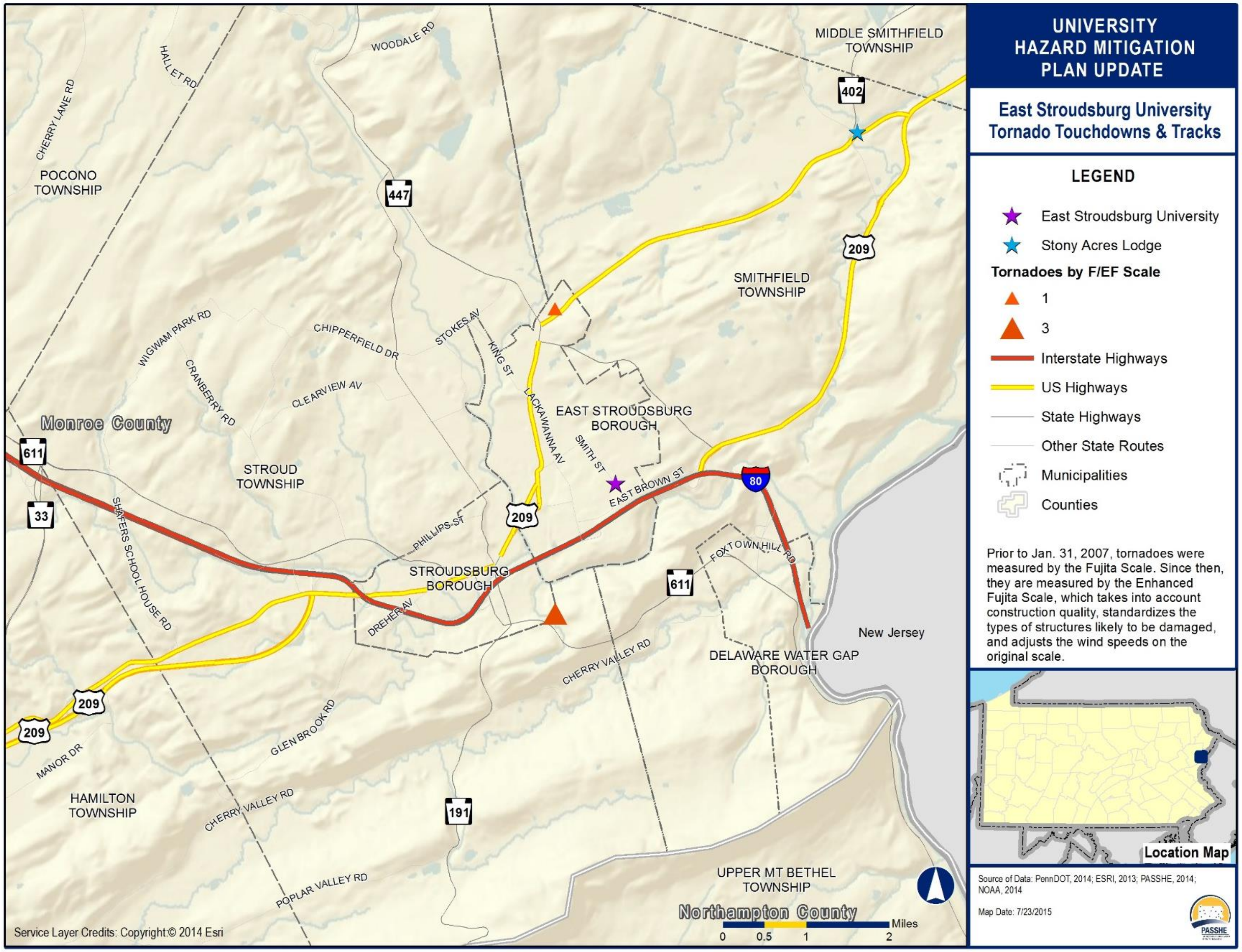
4.3.6.3 Past Occurrence

Tornadoes have occurred in Pennsylvania in all seasons and in all parts of the state, but the western and southeastern portions have been more frequently struck. Table 4.3.5-2 identifies reported tornadoes and funnel clouds in Monroe County, with events occurring near East Stroudsburg shaded.

Table 4.3.6-2 History of Tornadoes and Funnel Clouds in Monroe County (NCDC, 2015)						
LOCATION	DATE	ESTIMATED DISTANCE FROM ESU	ESTIMATED LENGTH	ESTIMATED WIDTH	F OR EF-SCALE NUMBER	PROPERTY DAMAGE ($)
Paradise Valley	4/5/1952	12	1.0 mi	33 yards	F1	3,000
Tobyhanna	9/13/1972	26	0.1 mi	100 yards	F2	3,000
Stroudsburg-East Stroudsburg	3/21/1976	<5	0.5 mi	100 yards	F3	2,500,000
Weisenberg	10/5/1979	55	0.3 mi	20 yards	F0	3,000
Hamilton Square	10/5/1979	11	0.3 mi	100 yards	F2	25,000
Parkside	10/5/1979	10	0.3 mi	80 yards	F1	3000
Tobyhanna	8/29/1983	26	1.0 mi	10 yards	F0	0
Tobyhanna	5/31/1985	26	0.2 mi	17 yards	F1	3000
Hamilton Square	6/3/1985	11	0.2 mi	17 yards	F1	25,000
East Stroudsburg	4/16/1994	2	0.5 mi	10 yards	F1	UNKNOWN
Kunkletown	11/8/1996	21	10.0 mi	67 yards	F1	400,000
Snydersville	7/18/1997	8	N/A	N/A	N/A	0
Buck Hill Falls	9/7/1998	17	3.0 mi	30 yards	F1	0
Snydersville	7/1/2001	8	0.2 mi	50 yards	F0	0
Bossardsville	7/29/2009	10	5.0 mi	100 yards	F2	1,000,000

In addition to these events, on May 29, 1995, a funnel cloud that was sighted over East Stroudsburg Borough did not touch down. Figure 4.3.5-1 shows the tornado history near ESU. None of these events impacted the campus.

Figure 4.3.6-1 Tornado events near ESU.



Windstorm events may be the result of thunderstorms, hurricanes, tropical storms, winter storms, or nor'easters. NCDC data indicates that between 1961 and 2014 there have been 205 high wind/strong wind/thunderstorm wind events over 30 knots (35 miles per hour) reported for Monroe County. Only seven of these specifically occurred in East Stroudsburg, and many were countywide events. There were no reported impacts on campus. These events most frequently occurred in conjunction with thunderstorms.

Table 4.3.6-3 Monroe County Wind History (NCDC, 2015).

LOCATION	DATE	TYPE	MAGNITUDE	DEATHS	INJURIES	PROPERTY DAMAGE
Monroe Co.	6/23/1961	Thunderstorm Wind	50 kts.	0	0	0
Skytop	5/19/1997	Thunderstorm Wind	50 kts.	0	0	0
Kresgeville	8/16/1997	Thunderstorm Wind	74 kts.	0	3	0
Stroudsburg	6/16/1998	Thunderstorm Wind	55 kts.	0	0	0
Countywide	6/30/1998	Thunderstorm Wind	50 kts.	0	0	0
Snydersville	9/2/1998	Thunderstorm Wind	50 kts.	0	0	0
Countywide	8/13/1999	Thunderstorm Wind	56 kts.	0	0	0
Snydersville	9/9/1999	Thunderstorm Wind	57 kts.	0	0	0
Monroe (Zone)	9/16/1999	High Wind	50 kts.	0	0	400,000
Monroe (Zone)	11/2/1999	High Wind	50 kts.	0	0	0
Blakeslee	5/10/2000	Thunderstorm Wind	50 kts.	0	0	0
Kunkletown	5/13/2000	Thunderstorm Wind	50 kts.	0	0	0
Pocono Lake	5/18/2000	Thunderstorm Wind	50 kts.	0	0	0
East Stroudsburg	5/18/2000	Thunderstorm Wind	57 kts.	0	0	0
Tannersville	5/24/2000	Thunderstorm Wind	50 kts.	0	0	0
Gilbert	6/2/2000	Thunderstorm Wind	52 kts.	0	0	0
Tannersville	6/11/2000	Thunderstorm Wind	52 kts.	0	0	0
Monroe (Zone)	12/12/2000	High Wind	50 kts.	0	0	20,000
Long Pond	4/9/2001	Thunderstorm Wind	52 kts.	0	0	0
Tannersville	6/11/2001	Thunderstorm Wind	50 kts.	0	0	0
Long Pond	7/1/2001	Thunderstorm Wind	50 kts.	0	0	0
Snydersville	7/10/2001	Thunderstorm Wind	52 kts.	0	0	0
Effort	7/11/2001	Thunderstorm Wind	56 kts.	0	0	0
Marshalls Creek	7/25/2001	Thunderstorm Wind	52 kts.	0	0	0
Countywide	3/10/2002	Thunderstorm Wind	50 kts.	0	0	0
Tobyhanna	6/26/2002	Thunderstorm Wind	52 kts.	0	0	0
Long Pond	6/26/2002	Thunderstorm Wind	52 kts.	0	0	0
Mt Pocono	6/26/2002	Thunderstorm Wind	52 kts.	0	0	0
Mt Pocono Arpt	7/23/2002	Thunderstorm Wind	52 kts.	0	0	0
Pocono Pines	7/23/2002	Thunderstorm Wind	52 kts.	0	0	0
Blakeslee	7/23/2002	Thunderstorm Wind	52 kts.	0	0	0
Tobyhanna	8/2/2002	Thunderstorm Wind	52 kts.	0	0	0
Blakeslee	8/5/2002	Thunderstorm Wind	52 kts.	0	0	0
Monroe (Zone)	2/4/2003	Strong Wind	40 kts.	0	0	1,000
Monroe (Zone)	2/12/2003	Strong Wind	40 kts.	0	0	100
Monroe (Zone)	2/23/2003	Strong Wind	40 kts.	0	0	100
Monroe (Zone)	5/12/2003	Strong Wind	40 kts.	0	0	100
Countywide	7/21/2003	Thunderstorm Wind	56 kts.	0	0	0

Table 4.3.6-3 Monroe County Wind History (NCDC, 2015).

LOCATION	DATE	TYPE	MAGNITUDE	DEATHS	INJURIES	PROPERTY DAMAGE
Kresgeville	8/16/2003	Thunderstorm Wind	56 kts.	0	0	0
Brodheadsville	8/16/2003	Thunderstorm Wind	56 kts.	0	0	0
Monroe (Zone)	9/18/2003	High Wind	50 kts.	0	0	1,000,000
Monroe (Zone)	10/15/2003	Strong Wind	42 kts.	0	0	40,000
Monroe (Zone)	11/13/2003	High Wind	50 kts.	0	0	50,000
Monroe (Zone)	11/19/2003	Strong Wind	40 kts.	0	0	5,000
Monroe (Zone)	11/29/2003	Strong Wind	40 kts.	0	0	10,000
Monroe (Zone)	1/16/2004	Strong Wind	40 kts.	0	3	11,000
Snydersville	8/12/2004	Thunderstorm Wind	52 kts.	0	0	0
Monroe (Zone)	11/5/2004	Strong Wind	40 kts.	0	0	100
Monroe (Zone)	11/28/2004	Strong Wind	40 kts.	0	0	2,000
Monroe (Zone)	12/1/2004	Strong Wind	45 kts.	0	0	10,000
Monroe (Zone)	12/19/2004	Strong Wind	40 kts.	0	0	1,000
Monroe (Zone)	12/23/2004	Strong Wind	42 kts.	0	0	1,000
Monroe (Zone)	3/8/2005	Strong Wind	41 kts.	0	0	1,000
Tannersville	6/6/2005	Thunderstorm Wind	52 kts.	0	0	0
Snydersville	6/9/2005	Thunderstorm Wind	56 kts.	0	0	0
Stroudsburg	7/27/2005	Thunderstorm Wind	52 kts.	0	0	0
Long Pond	8/12/2005	Thunderstorm Wind	50 kts.	0	0	0
Paradise Valley	8/14/2005	Thunderstorm Wind	52 kts.	0	0	0
Tobyhanna	8/14/2005	Thunderstorm Wind	50 kts.	0	0	0
Delaware Water Gap	8/14/2005	Thunderstorm Wind	50 kts.	0	0	0
Monroe (Zone)	11/10/2005	Strong Wind	40 kts.	0	0	1,000
Monroe (Zone)	11/22/2005	Strong Wind	40 kts.	0	0	1,000
Monroe (Zone)	1/14/2006	High Wind	53 kts.	0	0	100,000
Monroe (Zone)	1/18/2006	Strong Wind	45 kts.	0	0	3,000
Monroe (Zone)	2/17/2006	High Wind	50 kts.	0	0	100,000
Monroe (Zone)	2/17/2006	Strong Wind	40 kts.	0	0	1,000
Monroe (Zone)	2/24/2006	Strong Wind	40 kts.	0	0	2,000
Monroe (Zone)	3/14/2006	Strong Wind	45 kts.	0	0	1,000
Monroe (Zone)	3/15/2006	Strong Wind	40 kts.	0	0	1,000
Shawnee On Delaware	5/30/2006	Thunderstorm Wind	56 kts.	0	0	0
Long Pond	6/30/2006	Thunderstorm Wind	50 kts.	0	0	0
Pocono Pines	7/18/2006	Thunderstorm Wind	52 kts.	0	0	0
Countywide	7/27/2006	Thunderstorm Wind	50 kts.	0	0	0
Monroe (Zone)	10/20/2006	High Wind	53 kts.	0	0	5,000
Monroe (Zone)	10/29/2006	Strong Wind	44 kts.	0	0	2,000
Monroe (Zone)	11/16/2006	Strong Wind	42 kts.	0	0	5,000
Monroe (Zone)	12/1/2006	High Wind	50 kts.	0	0	10,000
Blakeslee	12/1/2006	Thunderstorm Wind	52 kts.	0	0	0
Monroe (Zone)	1/20/2007	Strong Wind	41 kts.	0	0	1,000
Monroe (Zone)	2/14/2007	Strong Wind	45 kts.	0	0	2,000
Monroe (Zone)	3/5/2007	Strong Wind	41 kts.	0	0	1,000
Monroe (Zone)	4/16/2007	Strong Wind	45 kts.	0	0	10,000
Echo Lake	6/1/2007	Thunderstorm Wind	50 kts.	0	0	0

Table 4.3.6-3 Monroe County Wind History (NCDC, 2015).

LOCATION	DATE	TYPE	MAGNITUDE	DEATHS	INJURIES	PROPERTY DAMAGE
Marshalls Creek	6/1/2007	Thunderstorm Wind	52 kts.	0	0	0
Shawnee On Delaware	6/1/2007	Thunderstorm Wind	52 kts.	0	0	0
Mt Pocono	6/19/2007	Thunderstorm Wind	52 kts.	0	0	0
Effort	6/19/2007	Thunderstorm Wind	52 kts.	0	0	0
Stroudsburg	6/19/2007	Thunderstorm Wind	52 kts.	0	0	0
Stroudsburg	6/27/2007	Thunderstorm Wind	52 kts.	0	0	0
Analomink	7/10/2007	Thunderstorm Wind	52 kts.	0	0	0
Tobyhanna	7/27/2007	Thunderstorm Wind	52 kts.	0	0	0
Marshalls Creek	8/3/2007	Thunderstorm Wind	50 kts.	0	0	0
Brodheadsville	8/25/2007	Thunderstorm Wind	50 kts.	0	0	0
Brodheadsville	8/25/2007	Thunderstorm Wind	50 kts.	0	0	0
Monroe (Zone)	12/3/2007	Strong Wind	43 kts.	0	0	1,000
Monroe (Zone)	12/16/2007	Strong Wind	40 kts.	0	0	10,000
Monroe (Zone)	12/23/2007	Strong Wind	40 kts.	0	0	4,000
Monroe (Zone)	1/9/2008	Strong Wind	41 kts.	0	0	1,000
Monroe (Zone)	1/30/2008	High Wind	50 kts.	0	0	10,000
Monroe (Zone)	2/10/2008	Strong Wind	42 kts.	0	0	2,500
Monroe (Zone)	3/8/2008	Strong Wind	47 kts.	0	0	5,000
Monroe (Zone)	3/20/2008	Strong Wind	40 kts.	0	0	1,000
Mountainhome	4/1/2008	Thunderstorm Wind	52 kts.	0	0	0
Swiftwater	5/31/2008	Thunderstorm Wind	52 kts.	0	0	0
Skytop	6/4/2008	Thunderstorm Wind	50 kts.	0	0	0
Tobyhanna	6/10/2008	Thunderstorm Wind	52 kts.	0	0	0
Saylorsburg	6/10/2008	Thunderstorm Wind	52 kts.	0	0	25,000
Stroudsburg	6/16/2008	Thunderstorm Wind	52 kts.	0	0	25,000
Paradise Vly	9/9/2008	Thunderstorm Wind	52 kts.	0	0	0
Monroe (Zone)	10/28/2008	Strong Wind	40 kts.	0	0	50,000
Monroe (Zone)	12/7/2008	Strong Wind	40 kts.	0	0	500
Monroe (Zone)	12/21/2008	Strong Wind	40 kts.	0	0	1,000
Monroe (Zone)	12/24/2008	Strong Wind	43 kts.	0	0	500
Monroe (Zone)	12/30/2008	Strong Wind	40 kts.	0	0	250
Monroe (Zone)	12/31/2008	Strong Wind	41 kts.	0	0	10,000
Monroe (Zone)	2/12/2009	Strong Wind	47 kts.	0	0	10,000
Monroe (Zone)	2/19/2009	Strong Wind	40 kts.	0	0	1,000
Monroe (Zone)	2/22/2009	Strong Wind	40 kts.	0	0	500
Monroe (Zone)	4/3/2009	Strong Wind	42 kts.	0	0	1,000
Delaware Water Gap	5/24/2009	Thunderstorm Wind	50 kts.	0	0	0
Tobyhanna	6/26/2009	Thunderstorm Wind	50 kts.	0	0	0
Kresgeville	6/26/2009	Thunderstorm Wind	50 kts.	0	0	0
Bossardsville	7/29/2009	Thunderstorm Wind	61 kts.	0	0	50,000
Tobyhanna	8/21/2009	Thunderstorm Wind	50 kts.	0	0	0
Rossland	8/21/2009	Thunderstorm Wind	52 kts.	0	0	0
Monroe (Zone)	10/7/2009	Strong Wind	40 kts.	0	0	1,000
Monroe (Zone)	11/27/2009	Strong Wind	43 kts.	0	0	1,000
Mt Pocono Arpt	12/3/2009	Thunderstorm Wind	52 kts.	0	0	0

Table 4.3.6-3 Monroe County Wind History (NCDC, 2015).

LOCATION	DATE	TYPE	MAGNITUDE	DEATHS	INJURIES	PROPERTY DAMAGE
Monroe (Zone)	12/29/2009	Strong Wind	46 kts.	0	0	1,000
Monroe (Zone)	1/3/2010	High Wind	51 kts.	0	0	10,000
Monroe (Zone)	1/25/2010	Strong Wind	40 kts.	0	0	1,000
Monroe (Zone)	3/13/2010	Strong Wind	41 kts.	0	0	5,000
Monroe (Zone)	5/8/2010	High Wind	50 kts.	0	0	0
Marshalls Creek	6/6/2010	Thunderstorm Wind	52 kts.	0	0	0
Monroe (Zone)	11/8/2010	Strong Wind	42 kts.	0	0	1,250
Monroe (Zone)	11/17/2010	Strong Wind	41 kts.	0	0	1,000
Monroe (Zone)	11/24/2010	Strong Wind	44 kts.	0	0	2,500
Monroe (Zone)	12/1/2010	Strong Wind	40 kts.	0	0	1,000
Monroe (Zone)	12/27/2010	High Wind	54 kts.	0	0	5,000
Monroe (Zone)	2/5/2011	Strong Wind	40 kts.	0	0	500
Monroe (Zone)	2/8/2011	Strong Wind	40 kts.	0	0	1,000
Monroe (Zone)	2/14/2011	Strong Wind	40 kts.	0	0	1,000
Monroe (Zone)	2/18/2011	Strong Wind	46 kts.	0	0	10,000
Monroe (Zone)	2/25/2011	Strong Wind	44 kts.	0	0	5,000
Monroe (Zone)	3/7/2011	Strong Wind	44 kts.	0	0	2,500
East Stroudsburg	4/26/2011	Thunderstorm Wind	52 kts.	0	0	0
Long Pond	4/28/2011	Thunderstorm Wind	52 kts.	0	0	0
Mc Michaels	4/28/2011	Thunderstorm Wind	52 kts.	0	0	10,000
East Stroudsburg	4/28/2011	Thunderstorm Wind	50 kts.	0	0	0
Brodheadsville	5/26/2011	Thunderstorm Wind	52 kts.	0	0	0
Mt Pocono Arpt	5/26/2011	Thunderstorm Wind	52 kts.	0	0	0
Mountainhome	6/9/2011	Thunderstorm Wind	50 kts.	0	0	0
Gilbert	6/9/2011	Thunderstorm Wind	52 kts.	0	0	0
Sun Valley	6/9/2011	Thunderstorm Wind	52 kts.	0	0	0
Bartonsville	6/9/2011	Thunderstorm Wind	50 kts.	0	0	0
Analomink	6/23/2011	Thunderstorm Wind	52 kts.	0	0	0
Monroe Co.	6/23/2011	Thunderstorm Wind	56 kts.	0	0	0
Mt Zion	6/24/2011	Thunderstorm Wind	50 kts.	0	0	0
Stroudsburg	6/24/2011	Thunderstorm Wind	50 kts.	0	0	0
East Stroudsburg	7/7/2011	Thunderstorm Wind	65 kts.	0	0	250,000
Mt Zion	7/7/2011	Thunderstorm Wind	56 kts.	0	0	100,000
East Stroudsburg	7/7/2011	Thunderstorm Wind	50 kts.	0	0	10,000
East Stroudsburg Arp	7/18/2011	Thunderstorm Wind	50 kts.	0	0	50,000
Tobyhanna	7/26/2011	Thunderstorm Wind	56 kts.	0	0	0
Monroe (Zone)	12/8/2011	Strong Wind	41 kts.	0	0	500
Monroe (Zone)	12/16/2011	Strong Wind	40 kts.	0	0	1,250
Monroe (Zone)	1/2/2012	Strong Wind	41 kts.	0	0	1,000
Monroe (Zone)	1/13/2012	Strong Wind	40 kts.	0	0	1,000
Monroe (Zone)	1/18/2012	Strong Wind	42 kts.	0	0	2,500
Monroe (Zone)	2/24/2012	Strong Wind	42 kts.	0	0	2,000
Monroe (Zone)	3/3/2012	Strong Wind	41 kts.	0	0	1,000
Monroe (Zone)	3/26/2012	Strong Wind	40 kts.	0	1	10,000
Monroe (Zone)	4/9/2012	Strong Wind	45 kts.	0	0	1,000

Table 4.3.6-3 Monroe County Wind History (NCDC, 2015).

LOCATION	DATE	TYPE	MAGNITUDE	DEATHS	INJURIES	PROPERTY DAMAGE
Snydersville	5/26/2012	Thunderstorm Wind	52 kts.	0	0	0
Brodheadsville	5/29/2012	Thunderstorm Wind	52 kts.	0	0	0
Appenzell	5/29/2012	Thunderstorm Wind	52 kts.	0	0	0
Pocono Arpt	7/23/2012	Thunderstorm Wind	56 kts.	0	0	100,000
Jonas	7/26/2012	Thunderstorm Wind	50 kts.	0	0	0
Paradise Valley	7/26/2012	Thunderstorm Wind	52 kts.	0	0	0
Saylorsburg	7/26/2012	Thunderstorm Wind	52 kts.	0	0	0
Delaware Water Gap	7/26/2012	Thunderstorm Wind	52 kts.	0	0	0
Monroe (Zone)	9/18/2012	Strong Wind	40 kts.	0	0	1,000
Shawnee On Delaware	9/22/2012	Thunderstorm Wind	50 kts.	0	0	0
Monroe (Zone)	10/29/2012	High Wind	57 kts.	0	0	930,000
Monroe (Zone)	12/22/2012	Strong Wind	40 kts.	0	0	1,000
Monroe (Zone)	12/30/2012	Strong Wind	45 kts.	0	0	4,000
Monroe (Zone)	1/20/2013	Strong Wind	44 kts.	0	0	2,500
Monroe (Zone)	1/31/2013	Strong Wind	46 kts.	0	0	1,000
Monroe (Zone)	3/14/2013	Strong Wind	40 kts.	0	0	1,000
East Stroudsburg	4/10/2013	Thunderstorm Wind	52 kts.	0	0	0
Effort	4/10/2013	Thunderstorm Wind	52 kts.	0	0	0
Stroudsburg	5/22/2013	Thunderstorm Wind	50 kts.	0	0	0
Bartonsville	11/1/2013	Thunderstorm Wind	50 kts.	0	0	0
Snydersville	11/1/2013	Thunderstorm Wind	52 kts.	0	0	0
Monroe (Zone)	11/24/2013	Strong Wind	40 kts.	0	0	100
Monroe (Zone)	1/6/2014	Strong Wind	40 kts.	0	0	100
Monroe (Zone)	3/12/2014	Strong Wind	46 kts.	0	0	2,000
Monroe (Zone)	4/15/2014	Strong Wind	42 kts.	0	0	2,500
Marshalls Creek	7/2/2014	Thunderstorm Wind	52 kts.	0	0	0
Mountainhome	7/3/2014	Thunderstorm Wind	52 kts.	0	0	0
Kresgeville	7/8/2014	Thunderstorm Wind	52 kts.	0	0	10,000
Appenzell	7/13/2014	Thunderstorm Wind	52 kts.	0	0	0
Stroudsburg	7/13/2014	Thunderstorm Wind	56 kts.	0	0	10,000
Canadensis	7/23/2014	Thunderstorm Wind	52 kts.	0	0	0
Monroe (Zone)	10/26/2014	Strong Wind	40 kts.	0	0	500
Totals:				**0**	**7**	**3,563,000**

4.3.6.4 Future Occurrence

According to the NWS, 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 can be devastating. An F4 tornado 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.

Monroe County has not had many tornadoes, and while windstorms are fairly routine occurrences, few have been focused on East Stroudsburg Borough. Overall, while this hazard is a frequent occurrence countywide, the probability of future tornado and windstorm events specifically at ESU can be considered *possible* according to the Risk Factor Methodology (see Table 4.4-1).

4.3.6.5 Vulnerability Assessment

The entire main campus is at essentially equal risk from tornadoes and high winds since they are not isolated events. However, there are a number of evaluation criteria to consider when discussing the vulnerability of structures and critical facilities. Age of structure, type of construction, and maintenance of structure will play a role in the resilience of individual structures. Of the 20 structures constructed prior to 1950, seven have not had any renovations. Depending on the building material and level of upkeep on these properties, they may be more vulnerable to tornado and windstorm events. These older, un-renovated structures include 103 Smith Street, 285 Normal Street, Abeloff Center for Performing arts, 411 Normal Street, 96 Normal Street, 417 Normal Street, and 145 Ridgeway Street. For most assets, this would require site-specific analysis. There are no mobile homes on campus, but any construction-related trailers on campus associated would be more vulnerable to tornado and windstorm events, as those structures are typically lightweight and are frequently unanchored. In addition, downed trees and wind-related utility interruptions may be more likely on the Back 40 parcel on campus, as it is more wooded and largely undeveloped. The auxiliary sites in Philadelphia and the Lehigh Valley are not generally vulnerable to tornado and windstorm events as they are leased spaces in modern office buildings. Stony Acres may be more vulnerable to the impacts of a tornado or windstorm because it is set in the woods, where downed trees would most likely be a more frequent occurrence.

East Stroudsburg Borough follows the requirements of the Pennsylvania Uniform Construction Code and requires inspections prior to the owner receiving a valid certificate of occupancy. This will improve the ability of new construction to resist design and wind loads. On-campus, the Department of Labor and Industry enforces the building code.

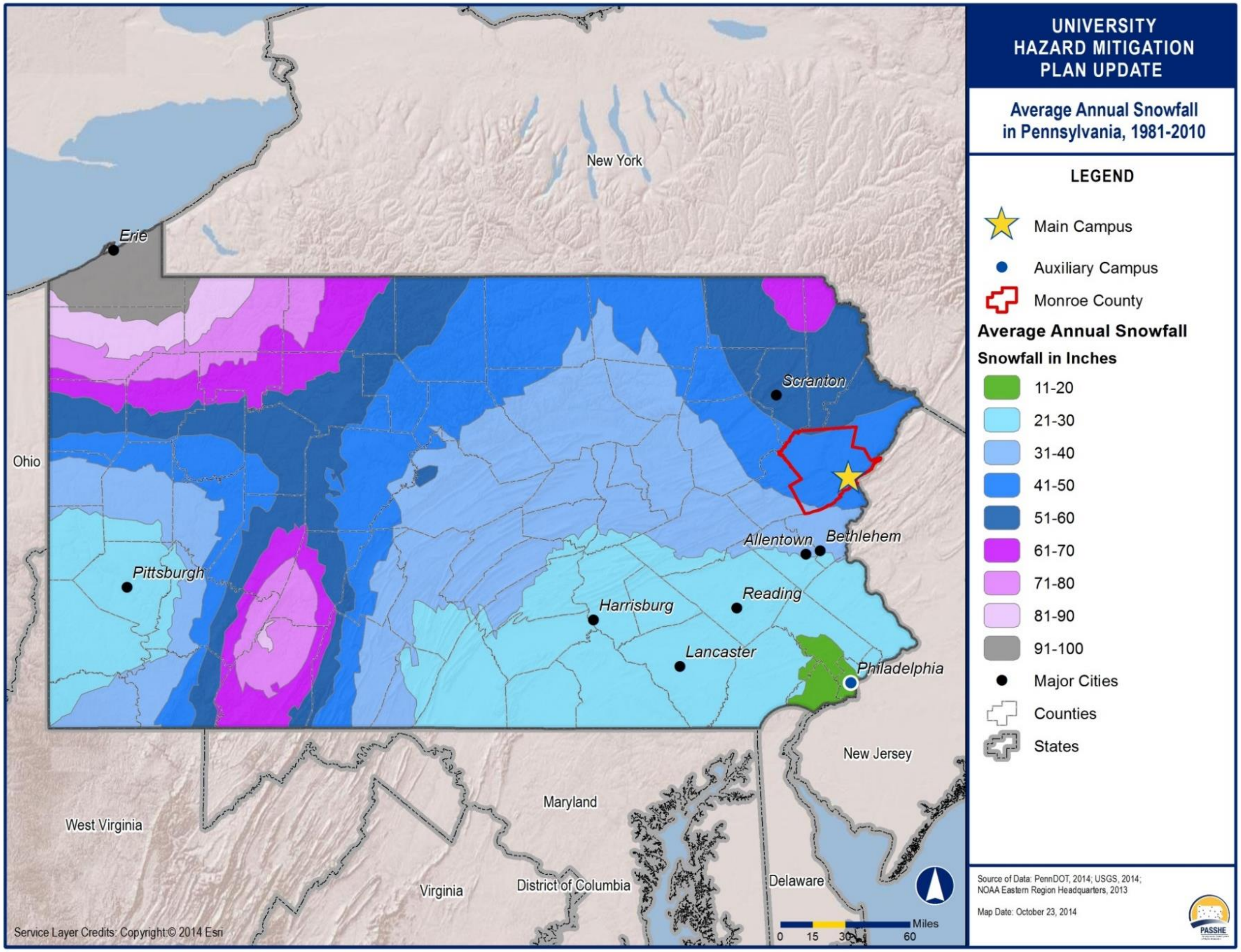
4.3.7 Winter Storm

4.3.7.1 Location and Extent

Winter storms are regional events that affect most of the Commonwealth on an annual basis. In many cases, surrounding states and even the larger northeastern U.S. region are affected. Winter storms are a serious concern for ESU and include blizzards and/or heavy snowfall, sleet, freezing fog, heavy snow, and ice storms. These storms are more prevalent in the northern and western regions of Pennsylvania and include ice and high wind.

Winter storms 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. The effects of these storms can sometimes last for weeks, bringing several inches or even feet of snow and ice in addition to cold temperatures. From 1981-2010, annual snowfall in Monroe County, including ESU, averaged between 41 and 50 inches, shown in Figure 4.3.6-1. ESU's Center City Philadelphia site falls in the part of Pennsylvania with the least annual snowfall and the Lehigh Valley site in Bethlehem is also expected to see less snow than main campus. Faculty, staff, commuting students, and suppliers traveling to the main campus and auxiliary sites cross through both zones and may be impacted by adverse travel conditions during winter storms.

Figure 4.3.7-1 Average Annual Snowfall in Pennsylvania, 1981-2010.



4.3.7.2 Range of Magnitude

Winter storms consist of cold temperatures, heavy snow or ice, and sometimes strong winds. Winter storms begin as low-pressure systems that move through Pennsylvania usually following the jet stream. Because winter storms are regular, annual occurrences in Pennsylvania, they are considered hazards when they result in damage to specific structures and/or overwhelm local capabilities to handle disruptions to traffic, communications, and utilities. Members of the HMSC specifically cited concerns with road closures, loss of power, ice damage, and slip-and-fall incidents. Mass snow and ice accumulations have impacted campus in the past and have ensured that the impact of a winter storm lingers after the event is over.

A winter storm can adversely affect roadways, utilities, and business activities and can cause loss of life, frostbite, or freezing. Winter storms can result in the closing of secondary roads, loss of utility service, and depletion of heating fuel. Winter storms may contain one or more of the following hazardous weather events:

- **Heavy Snowstorm**: Accumulations of four inches or more in a six-hour period, or six inches or more in a twelve-hour period.
- **Sleet Storm**: Significant accumulations of solid pellets which form from the freezing of raindrops or partially melted snowflakes causing slippery surfaces posing 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 prevailing 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 prevailing over an extended period of time.

The snowfall season is primarily November through April with the greatest monthly snowfalls in March, as moisture supply begins to increase with rising temperatures. In Monroe County, January and February are the months with the most winter storm events, followed closely by December. Winter storm events have occurred as early as October and as late as May in the NCDC's reporting period of 1996-2014.

During a winter storm event, ESU is susceptible to power and communication loss, as well as increased travel time for faculty, staff, and commuting students, during winter storms. During a particularly severe winter storm ESU may suspend some classes or close completely. The impact of these storms on ESU include costs of snow and ice removal, high heating bills, damage to buildings and landscaping, and injuries to members of the University community. There is also the potential for structure collapse if the weight of snow on the roof becomes too great. In the winter of 2012-13, heavy snow load caused damage to Koehler Fieldhouse. There are four vents on the roof of the building; they were dislodged from the amount of snow on the roof. When the snow pack shifted, it took off the vents and caused leaking inside the building. Sliding snow also required the university to block sidewalks around the building.

One of the worst-case winter storms for ESU was an ice storm that occurred on January 5-6, 2005 that was quickly followed by another ice storm on January 8. At one point, nearly 46,000 homes and businesses in Monroe County lost power. Thousands of trees were knocked down or damaged; at least 70 trees fell on vehicles and homes. Numerous roads were closed due to ice and trees. A state of emergency was declared by Monroe County.

4.3.7.3 Past Occurrence

The Commonwealth of Pennsylvania has a long history of severe winter weather, and event records with the NCDC indicate that since 1996, there have been approximately 19 winter weather events per year in Monroe County. Winter storms are a prevalent enough concern that when the university was last developing its master plan, stakeholders suggested designing parking lots with designated space to pile accumulated snow.

There are a few notable storms that occurred before the NCDC records began. In the winter of 1993-94, the Commonwealth was hit by a series of protracted winter storms. The severity and nature of these storms combined with accompanying record-breaking frigid temperatures posed a major threat to the lives, safety and well-being of Commonwealth residents and caused major disruptions to the activities of schools, businesses, hospitals, and nursing homes. The first of these devastating winter storms occurred in early January with record snowfall depths (in excess of 33 inches in the southwest and central portions of the Commonwealth), strong winds and sleet/freezing rains. Numerous storm-related power outages were 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, affecting the southeastern portion of the Commonwealth, which closed major arterial roads and downed trees and power lines. Utility crews from a five-state area were called to assist in power restoration repairs. Officials from PP&L stated that this was the worst winter storm in the history of the company, and related damage-repair costs exceeded $5,000,000.

Serious power supply shortages continued through mid-January because of record cold temperatures at 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 the facilities in which they resided. Power and fuel shortages affecting Pennsylvania and the East Coast power grid system required the 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 PA Department of Transportation storage sites.

During January and February 1994, Pennsylvania experienced at least 17 regional or statewide winter storms. The consequences of these disasters resulted in the need for intervention by the president in an effort to alleviate the severity of the hardship and to aid the recovery of the hardest-hit counties. Monroe County was part of this declared disaster.

In January 1996, another series of severe winter storms with 27- and 24-inch accumulated snow depths was followed by 50 to 60 degree temperatures resulting in rapid melting and flooding (see Section 4.3.2 for flooding discussion). The aforementioned winter storms all impacted ESU in varying ways, from transportation and utility issues to cancelled classes.

More recently, the February 16, 2003 blizzard dumped 24 inches of snow on East Stroudsburg, resulting in the closing of many roads and businesses, including ESU. The winter of 2012-13 caused multi-day class cancellations due to 20+ inches of accumulated snow, and ESU was used as a Pocono regional shelter during that winter. As of February 4, 2015, there were four days of cancelled classes that winter due to winter weather.

Table 4.3.6-1 lists all recorded winter storm events by type in Monroe County since 1996. Like extreme temperature events, NCDC records winter weather events by countywide zones rather than individual locales. Because these events are regional in scale, it can be assumed that each of them impacted the East Stroudsburg area, if only minimally.

Table 4.3.7-1 History of Blizzards, Heavy Snow, Ice Storms, Sleet, Winter Storms, and Winter Weather in Monroe County (NCDC, 2015)

DATE	TYPE	PROPERTY DAMAGE ($)	DATE	TYPE	PROPERTY DAMAGE ($)
1/2/1996	Winter Storm	0	12/22/2006	Winter Weather	0
1/7/1996	Blizzard	1,000,000	1/10/2007	Winter Weather	0
1/12/1996	Heavy Snow	0	1/15/2007	Winter Weather	0
3/7/1996	Winter Storm	0	1/19/2007	Winter Weather	0
3/28/1996	Ice Storm	0	1/25/2007	Winter Weather	0
4/9/1996	Winter Weather	0	2/2/2007	Winter Weather	0
12/5/1996	Heavy Snow	0	2/13/2007	Winter Storm	0
12/7/1996	Heavy Snow	0	2/25/2007	Winter Weather	0
12/13/1996	Heavy Snow	0	3/1/2007	Winter Weather	0
1/9/1997	Winter Weather	0	3/7/2007	Winter Weather	0
1/16/1997	Winter Storm	0	3/16/2007	Heavy Snow	0
1/24/1997	Winter Weather	0	4/11/2007	Winter Weather	0
1/27/1997	Winter Weather	0	4/15/2007	Winter Weather	0
2/4/1997	Winter Weather	0	5/7/2007	Frost/freeze	0
2/14/1997	Winter Storm	0	5/14/2007	Frost/freeze	0
3/3/1997	Heavy Snow	0	11/9/2007	Winter Weather	0
3/14/1997	Winter Weather	0	11/18/2007	Heavy Snow	0
3/31/1997	Heavy Snow	0	11/20/2007	Winter Weather	0
4/1/1997	Heavy Snow	0	12/1/2007	Winter Weather	0
11/13/1997	Winter Storm	0	12/2/2007	Winter Storm	0
12/10/1997	Heavy Snow	0	12/4/2007	Winter Weather	0
12/22/1997	Winter Storm	0	12/7/2007	Winter Weather	0

Table 4.3.7-1 History of Blizzards, Heavy Snow, Ice Storms, Sleet, Winter Storms, and Winter Weather in Monroe County (NCDC, 2015)

DATE	TYPE	PROPERTY DAMAGE ($)	DATE	TYPE	PROPERTY DAMAGE ($)
12/24/1997	Winter Weather	0	12/9/2007	Winter Weather	0
12/29/1997	Winter Storm	0	12/13/2007	Winter Weather	0
1/15/1998	Ice Storm	0	12/15/2007	Winter Storm	0
1/23/1998	Winter Storm	0	12/26/2007	Winter Weather	0
1/24/1998	Winter Weather	0	12/30/2007	Winter Weather	0
2/4/1998	Winter Weather	0	1/1/2008	Winter Weather	0
2/17/1998	Winter Weather	0	1/11/2008	Winter Weather	0
2/23/1998	Winter Storm	0	1/13/2008	Winter Weather	0
3/18/1998	Winter Weather	0	1/17/2008	Winter Weather	0
3/21/1998	Winter Storm	0	1/29/2008	Winter Weather	0
4/9/1998	Heavy Snow	0	1/29/2008	Winter Weather	0
12/29/1998	Winter Weather	0	2/1/2008	Winter Storm	0
1/2/1999	Winter Storm	0	2/4/2008	Winter Weather	0
1/8/1999	Winter Storm	0	2/9/2008	Winter Weather	0
1/13/1999	Winter Storm	0	2/10/2008	Winter Weather	0
2/1/1999	Winter Weather	0	2/10/2008	Winter Weather	0
2/7/1999	Heavy Snow	0	2/12/2008	Winter Storm	50,000
3/6/1999	Winter Weather	0	2/17/2008	Winter Weather	0
3/14/1999	Heavy Snow	0	2/21/2008	Winter Storm	0
3/22/1999	Heavy Snow	0	2/26/2008	Winter Weather	0
12/14/1999	Winter Weather	0	2/29/2008	Winter Weather	0
12/20/1999	Winter Weather	0	3/1/2008	Winter Weather	0
1/13/2000	Heavy Snow	0	3/18/2008	Winter Weather	0
1/20/2000	Heavy Snow	0	3/31/2008	Winter Weather	0
1/25/2000	Heavy Snow	0	4/3/2008	Winter Weather	0
1/30/2000	Heavy Snow	0	10/27/2008	Heavy Snow	0
2/3/2000	Heavy Snow	0	11/24/2008	Winter Weather	0
2/13/2000	Ice Storm	0	11/30/2008	Winter Weather	0
2/18/2000	Winter Storm	0	12/1/2008	Winter Weather	0
4/8/2000	Heavy Snow	0	12/6/2008	Winter Weather	0
4/9/2000	Heavy Snow	0	12/10/2008	Winter Storm	0
11/17/2000	Winter Weather	0	12/16/2008	Winter Weather	0
11/25/2000	Winter Weather	0	12/19/2008	Winter Storm	0
12/13/2000	Winter Storm	0	12/21/2008	Winter Weather	0
12/16/2000	Winter Weather	0	12/24/2008	Winter Weather	0
12/19/2000	Heavy Snow	0	12/26/2008	Winter Weather	0
12/30/2000	Heavy Snow	0	12/31/2008	Winter Weather	0
1/5/2001	Heavy Snow	0	1/6/2009	Winter Storm	0
1/8/2001	Heavy Snow	0	1/10/2009	Winter Storm	0
1/15/2001	Winter Weather	0	1/17/2009	Winter Weather	0
1/19/2001	Sleet	0	1/27/2009	Winter Storm	0
1/20/2001	Heavy Snow	0	2/3/2009	Winter Weather	0
1/20/2001	Winter Storm	0	2/18/2009	Winter Weather	0
1/30/2001	Winter Weather	0	3/2/2009	Winter Weather	0
2/5/2001	Heavy Snow	0	10/15/2009	Winter Weather	0
2/9/2001	Winter Weather	0	12/5/2009	Winter Weather	0

Table 4.3.7-1 History of Blizzards, Heavy Snow, Ice Storms, Sleet, Winter Storms, and Winter Weather in Monroe County (NCDC, 2015)

DATE	TYPE	PROPERTY DAMAGE ($)	DATE	TYPE	PROPERTY DAMAGE ($)
2/16/2001	Ice Storm	0	12/8/2009	Winter Storm	0
2/22/2001	Heavy Snow	0	12/13/2009	Winter Weather	0
2/25/2001	Winter Storm	0	12/19/2009	Winter Weather	0
3/4/2001	Winter Storm	0	12/25/2009	Winter Weather	0
3/9/2001	Heavy Snow	0	12/25/2009	Winter Weather	0
3/12/2001	Ice Storm	0	12/31/2009	Winter Weather	0
3/29/2001	Ice Storm	0	12/31/2009	Winter Weather	0
12/8/2001	Sleet	0	1/1/2010	Winter Weather	0
12/17/2001	Winter Weather	0	1/17/2010	Ice Storm	0
1/6/2002	Heavy Snow	0	1/24/2010	Winter Weather	0
1/7/2002	Heavy Snow	0	1/28/2010	Winter Weather	0
1/9/2002	Sleet	0	2/2/2010	Winter Weather	0
1/19/2002	Heavy Snow	0	2/5/2010	Winter Weather	0
1/31/2002	Winter Weather	0	2/9/2010	Winter Storm	0
2/1/2002	Winter Weather	0	2/22/2010	Winter Storm	0
2/4/2002	Winter Weather	0	2/25/2010	Winter Storm	0
3/17/2002	Sleet	0	3/30/2010	Winter Weather	0
3/20/2002	Heavy Snow	0	11/25/2010	Winter Weather	0
3/21/2002	Heavy Snow	0	12/2/2010	Winter Weather	0
3/26/2002	Ice Storm	0	12/11/2010	Winter Weather	0
10/29/2002	Heavy Snow	0	12/26/2010	Winter Weather	0
11/16/2002	Winter Storm	0	1/6/2011	Winter Weather	0
11/26/2002	Heavy Snow	0	1/8/2011	Winter Weather	0
12/5/2002	Heavy Snow	0	1/11/2011	Winter Weather	0
12/11/2002	Winter Storm	0	1/17/2011	Winter Storm	0
12/24/2002	Winter Storm	15,000	1/20/2011	Winter Weather	0
12/30/2002	Winter Weather	0	1/25/2011	Winter Weather	0
1/1/2003	Winter Weather	0	1/26/2011	Heavy Snow	0
1/2/2003	Winter Storm	0	1/29/2011	Winter Weather	0
2/1/2003	Winter Weather	0	2/1/2011	Winter Storm	0
2/6/2003	Heavy Snow	0	2/5/2011	Winter Weather	0
2/10/2003	Winter Weather	0	2/7/2011	Winter Weather	0
2/16/2003	Heavy Snow	1,000,000	2/20/2011	Heavy Snow	0
2/20/2003	Winter Weather	0	2/24/2011	Winter Weather	0
2/23/2003	Winter Weather	0	3/6/2011	Winter Weather	0
3/1/2003	Winter Weather	0	3/9/2011	Winter Weather	0
3/5/2003	Winter Weather	0	3/21/2011	Winter Weather	0
3/6/2003	Heavy Snow	0	3/22/2011	Winter Storm	0
3/13/2003	Winter Weather	0	3/30/2011	Winter Weather	0
3/19/2003	Winter Weather	0	4/1/2011	Winter Weather	0
4/1/2003	Winter Weather	0	10/29/2011	Heavy Snow	0
4/4/2003	Winter Weather	0	12/7/2011	Winter Weather	0
4/7/2003	Winter Weather	0	1/16/2012	Winter Weather	0
4/9/2003	Winter Weather	0	1/21/2012	Winter Weather	0
12/2/2003	Winter Weather	0	1/22/2012	Winter Weather	0
12/5/2003	Winter Storm	0	1/26/2012	Winter Weather	0

Table 4.3.7-1 History of Blizzards, Heavy Snow, Ice Storms, Sleet, Winter Storms, and Winter Weather in Monroe County (NCDC, 2015)

DATE	TYPE	PROPERTY DAMAGE ($)	DATE	TYPE	PROPERTY DAMAGE ($)
12/14/2003	Winter Storm	0	2/12/2012	Winter Weather	0
1/2/2004	Winter Weather	0	2/14/2012	Winter Weather	0
1/4/2004	Ice Storm	0	2/16/2012	Winter Weather	0
1/6/2004	Winter Weather	0	2/18/2012	Winter Weather	0
1/14/2004	Heavy Snow	0	2/23/2012	Winter Weather	0
1/17/2004	Winter Weather	0	2/29/2012	Winter Weather	0
1/27/2004	Winter Storm	0	3/1/2012	Winter Weather	0
2/3/2004	Winter Storm	0	11/27/2012	Winter Weather	0
2/6/2004	Winter Storm	0	12/7/2012	Winter Weather	0
2/20/2004	Winter Weather	0	12/20/2012	Winter Weather	0
2/24/2004	Winter Weather	0	12/24/2012	Winter Weather	0
3/8/2004	Winter Weather	0	12/26/2012	Winter Storm	0
3/9/2004	Winter Weather	0	12/29/2012	Winter Weather	0
3/16/2004	Winter Storm	0	1/15/2013	Winter Weather	0
3/18/2004	Heavy Snow	0	1/25/2013	Winter Weather	0
11/12/2004	Winter Weather	0	1/28/2013	Winter Weather	0
12/6/2004	Winter Weather	0	2/3/2013	Winter Weather	0
12/19/2004	Winter Weather	0	2/8/2013	Winter Storm	0
12/19/2004	Winter Weather	0	2/11/2013	Winter Weather	0
12/26/2004	Winter Weather	0	2/13/2013	Winter Weather	0
1/5/2005	Winter Storm	10,000,000	2/15/2013	Winter Weather	0
1/8/2005	Ice Storm	0	2/19/2013	Winter Weather	0
1/11/2005	Winter Weather	0	2/23/2013	Winter Weather	0
1/19/2005	Winter Weather	0	2/26/2013	Winter Weather	0
1/22/2005	Heavy Snow	0	3/7/2013	Winter Weather	0
1/24/2005	Winter Weather	0	3/16/2013	Winter Weather	0
2/14/2005	Winter Weather	0	3/18/2013	Winter Storm	0
2/17/2005	Winter Weather	0	3/25/2013	Winter Weather	0
2/20/2005	Winter Storm	0	11/26/2013	Winter Weather	0
2/24/2005	Winter Weather	0	12/6/2013	Winter Weather	0
2/28/2005	Heavy Snow	0	12/8/2013	Winter Weather	0
3/1/2005	Heavy Snow	0	12/10/2013	Winter Weather	0
3/8/2005	Winter Weather	0	12/14/2013	Winter Storm	0
3/11/2005	Winter Weather	0	12/17/2013	Winter Weather	0
3/20/2005	Winter Weather	0	12/24/2013	Winter Weather	0
3/23/2005	Winter Storm	0	12/26/2013	Winter Weather	0
3/27/2005	Winter Weather	0	1/2/2014	Heavy Snow	0
12/4/2005	Winter Weather	0	1/5/2014	Winter Weather	0
12/9/2005	Heavy Snow	0	1/10/2014	Winter Weather	0
12/16/2005	Winter Storm	0	1/11/2014	Winter Weather	0
12/23/2005	Winter Weather	0	1/15/2014	Freezing Fog	0
12/26/2005	Winter Weather	0	1/18/2014	Winter Weather	0
12/31/2005	Winter Weather	0	1/21/2014	Winter Weather	0
1/3/2006	Winter Storm	0	1/25/2014	Winter Weather	0
1/4/2006	Winter Weather	0	2/3/2014	Winter Weather	0
1/17/2006	Winter Weather	0	2/5/2014	Winter Storm	0

Table 4.3.7-1 History of Blizzards, Heavy Snow, Ice Storms, Sleet, Winter Storms, and Winter Weather in Monroe County (NCDC, 2015)

DATE	TYPE	PROPERTY DAMAGE ($)	DATE	TYPE	PROPERTY DAMAGE ($)
1/23/2006	Winter Storm	0	2/9/2014	Winter Weather	0
1/24/2006	Winter Weather	0	2/12/2014	Winter Storm	25,000
2/12/2006	Winter Storm	0	2/15/2014	Winter Weather	0
3/2/2006	Winter Storm	0	2/18/2014	Winter Weather	0
4/5/2006	Winter Weather	0	2/19/2014	Winter Weather	0
4/8/2006	Winter Weather	0	3/12/2014	Winter Weather	0
11/23/2006	Winter Weather	0	3/30/2014	Winter Weather	0
12/7/2006	Winter Weather	0	4/15/2014	Winter Weather	0
12/8/2006	Winter Weather	0		**TOTAL**	12,090,000

4.3.7.4 Future Occurrence

According to the NCDC, the probability of measureable snowfall at the Stroudsburg snow station is over 90% from December to March, with a 100% probability in February (NCDC, 2011). With an annual average snowfall of 41 to 50 inches and an average of 19 winter weather events per year, the probability of future occurrence of winter storms at ESU can be considered *highly likely* according to the Risk Factor Methodology (see Table 4.4-1).

4.3.7.5 Vulnerability Assessment

Winter storm events would affect the entire university, but the auxiliary learning sites are less vulnerable due to their geographic location. Wintertime snow accumulations are expected and normal in East Stroudsburg Borough and Smithfield Township. The most common, but potentially serious effect of very snowstorms with accumulations exceeding six inches in a 12-hour period are traffic accidents, interruptions in power supply and communications, and the failure of inadequately designed and/or maintained roofing systems. There are also concerns about supply chain interruptions, especially in food supply for residential students. With many students circulating around campus on foot, slip-and-fall accidents will continue to be an issue as well. Stony Acres is used year-round. Because of its more isolated location, the impact of a winter storm could be amplified; there would be limited access to the property, and students could potentially be snowed in for an extended period of time.

Similar to the discussion under tornadoes and wind storms (Section 4.3.5), vulnerability to the effects of winter storms on buildings is dependent on the age of the building (and what building codes may have been in effect at the time of building construction), type of construction, and condition of the structure (i.e., how well has the structure been maintained). Without individual detailed structural analysis it is difficult to determine the exact number and types of structures at ESU that have heightened vulnerability to winter-storm snow loading. It has, however, occurred in recent years at Koehler Fieldhouse, and that building was constructed 1967.

HUMAN-MADE HAZARDS

4.3.8 Civil Disturbance

4.3.8.1 Location and Extent

Universities are common sites where crowds and mobs may gather. The specific location of the event could be anywhere on campus or at ESU's auxiliary sites, but probable locations are on main campus and include College Circle, the Quad, Eiler-Martin Stadium, and other athletic facilities. Students of ESU in Center City Philadelphia may also experience civil disturbance events, as that site is located in downtown Philadelphia. Philadelphia is specifically identified in the PA State HMP as being more vulnerable to civil disturbance events. The scale and scope of civil disturbance events vary widely.

4.3.8.2 Range of Magnitude

Civil disturbances can take the form of small gatherings or large groups blocking or impeding access to a building, or disrupting normal activities by generating noise and intimidating people. They can range from a peaceful sit-in to a full scale riot, in which a mob burns or otherwise destroys property and terrorizes individuals. Even in its more passive forms, a group that blocks roadways, sidewalks, or buildings interferes with public order. There are two types of large gatherings typically associated with civil disturbances: a crowd and a mob. A crowd may be defined as a casual, temporary collection of people without a strong, cohesive relationship. Crowds can be classified into four categories (Juniata County, PA MJHMP, 2008):

- Casual Crowd: A casual crowd is merely a group of people who happen to be in the same place at the same time. Violent conduct does not occur.
- Cohesive Crowd: A cohesive crowd consists of members who are involved in some type of unified behavior. Members of this group are involved in some type of common activity, such as worshipping, dancing, or watching a sporting event. Although they may have intense internal discipline, they require substantial provocation to arouse to action.
- Expressive Crowd: An expressive crowd is one held together by a common commitment or purpose. Although they may not be formally organized, they are assembled as an expression of common sentiment or frustration. Members wish to be seen as a formidable influence. One of the best examples of this type is a group assembled to protest.
- Aggressive Crowd: An aggressive crowd is comprised of individuals who have assembled for a specific purpose. This crowd often has leaders who attempt to arouse the members or motivate them to action. Members are noisy and threatening and will taunt authorities. They may be more impulsive and emotional, and require only minimal stimulation to arouse violence. Examples of this type of crowd could include demonstrators and strikers, though not all demonstrators and strikers are aggressive.

A mob can be defined as a large disorderly crowd or throng. Mobs are usually emotional, loud, tumultuous, violent and lawless. Similar to crowds, mobs have different levels of commitment and can be classified into four categories (Juniata County, PA MJHMP, 2008):

- Aggressive Mob: An aggressive mob is one that attacks, riots and terrorizes. The object of violence may be a person, property, or both. An aggressive mob is distinguished from an aggressive crowd only by lawless activity. Examples of aggressive mobs are the inmate mobs in prisons and jails, mobs that act out their frustrations after political defeat, or violent mobs at political protests or rallies.

- Escape Mob: An escape mob is attempting to flee from something such as a fire, bomb, flood, or other catastrophe. Members of escape mobs are generally difficult to control can be characterized by unreasonable terror.
- Acquisitive Mob: An acquisitive mob is one motivated by a desire to acquire something. Riots caused by other factors often turn into looting sprees. This mob exploits a lack of control by authorities in safeguarding property.
- Expressive Mob: An expressive mob is one that expresses fervor or revelry following some sporting event, religious activity, or celebration. Members experience a release of pent up emotions in highly charged situations.

The worst case scenario for a civil disturbance event on a university campus was recently illustrated at Iowa State University. On April 8, 2014, thousands of people gathered during a weeklong spring celebration, flipping over at least two cars, pulling down two light poles, tearing out four stop signs, and throwing rocks and full beer cans at police officers. One student sustained severe head injuries when struck by a light pole, and emergency responders had trouble reaching him due to the unruly crowd. At least two arrests were made from the riot (Klingseis, 2014). While ESU has a much smaller campus population, civil disturbance events like this are not out of the question on any college campus.

4.3.8.3 Past Occurrence

There is no comprehensive list of civil disturbance events at ESU, but media searches yielded some example events:

- A small demonstration related to the Occupy Wall Street movement occurred in East Stroudsburg on October 11, 2007. Some students reportedly participated in the event, which was peaceful (Smith, 2011).
- In March 2011, ESU students held a rally to protest cuts to higher education funding proposed by Governor Tom Corbett's budget (Tatu, 2011).
- On October 29, 2013, students and staff held a rally in the face of faculty reassignments that would help with the budget deficit (Ondrusek, 2013).

Other past instances of civil disturbances on campus involved large, unruly crowds for homecoming, cooking/partying, or other events. Rallies and protests have occurred when contract negotiations with the university's unionized staff in the past. These events have generally been peaceful, but members of the HMSC cited concerns with disrupting normal campus activity, blocking access to paths or buildings, noise, and in rare cases, structural damage. Even small disturbances can have a big impact on the campus community and business of the school, and can draw limited campus security resources away from where they may otherwise be needed.

4.3.8.4 Future Occurrence

Civil disturbances are incredibly difficult to predict over the long term. They may occur at ESU in the future, and universities may be more likely to experience civil disturbance events in the form of protests, faculty union strikes, or sporting event revelry. It is more helpful to recognize the potential for civil disturbances in the short-term. Continuous monitoring of significant upcoming events will help the campus better prepare for large crowds and prevent peaceful activities from becoming public disturbances. On the whole, civil disturbance events can be considered *possible* as defined by the Risk Factor Methodology (see table 4.4-1).

4.3.8.5 Vulnerability Assessment

ESU proactively conducts strike contingency scanning and situation monitoring. In addition, demonstrations and strikes are addressed in ESU's Emergency Operations Plan. According to the EOP, most campus demonstrations such as marches, meetings, strikes, off-campus groups, picketing, and rallies are expected to be peaceful and non-obstructive. The Emergency Operations Plan directs faculty and staff to avoid disrupting the demonstration unless there is interference with normal operations, prevention of access to facilities, or threat of harm to persons or University facilities. Details are provided in the Emergency Operations Plan regarding how to react to various types of demonstrations ranging from peaceful and non-disruptive to violent and disruptive. Providing these guidelines to faculty, staff, and police helps to provide for free speech while still maintaining safety and order on campus.

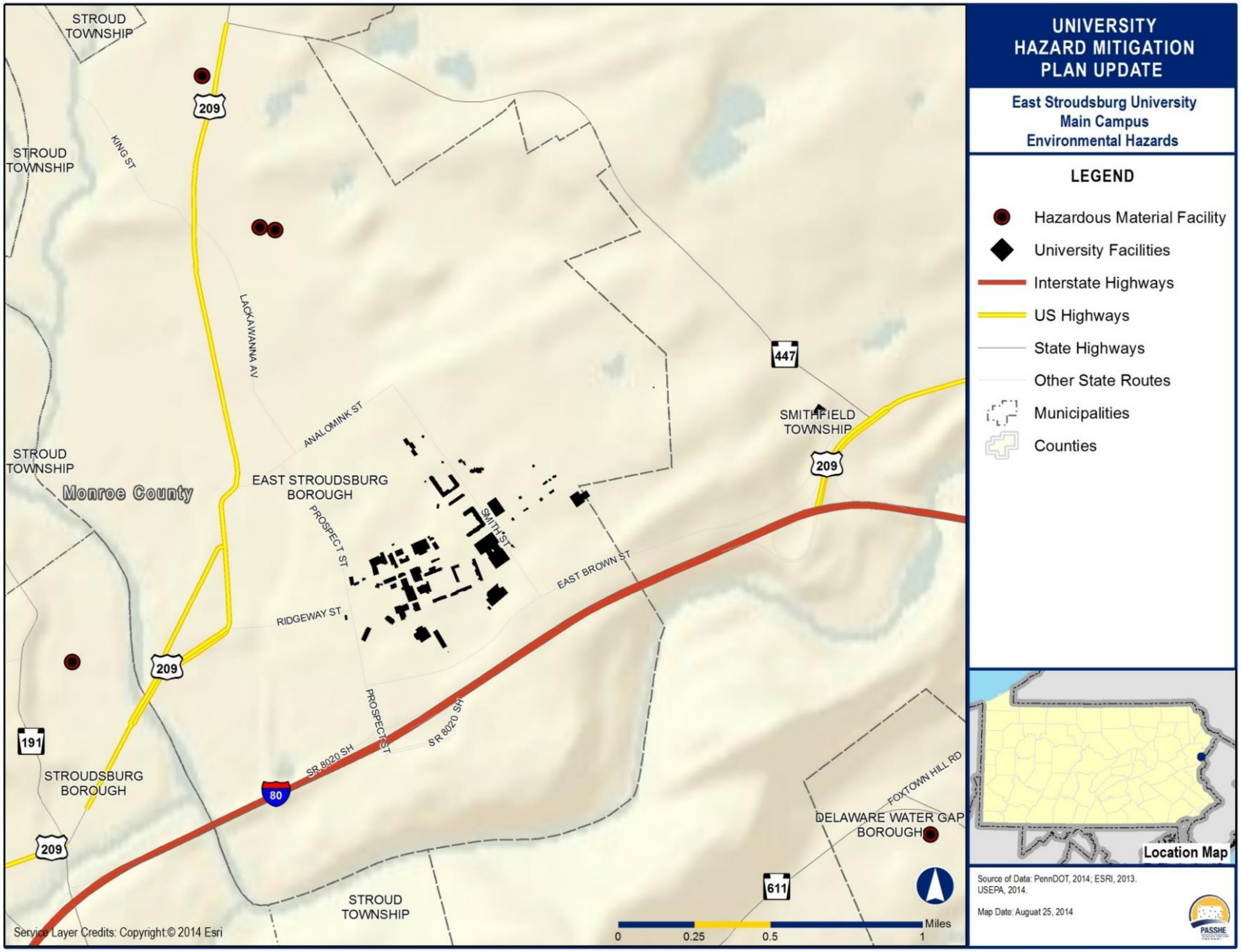
4.3.9 Environmental Hazards – Hazardous Materials Releases

4.3.9.1 Location and Extent

The constant production, storage, use, and transportation of hazardous materials pose a threat throughout Pennsylvania. The release of these materials from a facility is less dangerous than the release of them while being transported. Hazardous materials include flammable liquids, solids, and gases, combustible liquids, explosives, blasting agents, radioactive materials, oxidizing materials, corrosive materials, poisons, refrigerated liquids, hazardous waste/substances, infectious materials, and other regulated material.

Any facility in Pennsylvania that uses, manufactures, or stores hazardous materials must comply with Title III of the Superfund Amendments and Reauthorization Act (SARA). This is also known as the Emergency Planning and Community Right-to-Know Act (EPCRA). These facilities must also comply with the reporting requirements, as amended, in Pennsylvania's Hazardous Materials Emergency Planning and Response Act (1990-165). Information about the chemicals that are being manufactured or processed in facilities can be found in the U.S. Environmental Protection Agency's (USEPA) Toxic Release Inventory (TRI) database. Facilities which employ ten or more full-time employees and which manufacture or process 25,000 pounds or more, or otherwise use 10,000 pounds or more, of any SARA Section 313-listed toxic chemical in the course of a calendar year are required to report TRI information to the EPA, the federal enforcement agency for SARA Title III, and PEMA. There are six TRI sites within 1.5 miles of ESU. The facilities in closest proximity to ESU are shown in Figure 4.3.8-1. This plan focuses on the hazard posed by the EPA TRI facilities since TRI-reporting facilities handle potentially dangerous chemicals in potentially high quantities.

Figure 4.3.9-1 EPA TRI facilities near ESU.



Hazardous material releases can occur at facilities (fixed sites) or along transportation routes. They can occur as a result of human carelessness, intentional acts, or natural hazards. When caused by natural hazards, these incidents are known as secondary hazards. An accidental hazardous material release can occur wherever hazardous materials are manufactured, used, stored, or transported.

The major highways traversing the area near the University include Interstate 80, US 209 and State Routes 447 and 191. Interstate 80 is of particular concern, as it is a major cross-country trucking route. Transportation of hazardous materials on highways involves tanker trucks or trailers, and trucks are responsible for the greatest number of hazmat incidents. Hazmat releases from rail transport are also of concern due to collisions and derailments that result in large spills. There are rail tracks less than 0.5 miles from campus.

All ESU facilities on main campus are within 1.5 miles of at least one TRI facility. Additionally, some hazardous materials are stored on site for both property maintenance and scientific studies. The type, number, and quantity of chemicals stored on campus are managed by a number of different departments at ESU, including the Chemistry, Biology, and Fine Arts Departments, and Facilities Management but the quantities are generally lower than the Department of Homeland Security's screening threshold quantity for Chemical Facilities. There is currently not a single, central inventory of all chemicals on campus, but each of the aforementioned departments is compliant with OSHA regulations relating to chemical safety. A mitigation action to develop a centralized inventory of chemicals stored on campus is noted in the Mitigation Action Plan.

4.3.9.2 Range of Magnitude

At the lower end of the range of magnitude, a hazardous material release would trigger an evacuation of the area surrounding the spill and a subsequent cleanup. At the high end, this kind of event could be responsible for long-term human health and environmental damage. Hazardous material releases can contaminate air, water, and soils, possibly resulting in death and/or injuries. Dispersion can take place rapidly when transported by water and wind. Such releases can affect nearby populations and contaminate critical or sensitive environmental areas.

With a hazardous material release, whether accidental or intentional, there are several potentially exacerbating or mitigating circumstances that will affect its severity or impact. Mitigating conditions are precautionary measures taken in advance to reduce the impact of a release on the surrounding environment. Primary and secondary containment or shielding by sheltering-in-place protects people and property from the harmful effects of a hazardous material release. Exacerbating conditions, characteristics that can enhance or magnify the effects of a hazardous material release include:

- **Weather conditions:** affects how the hazard occurs and develops
- **Micro-meteorological effects of buildings and terrain:** alters dispersion of hazardous materials
- **Non-compliance with applicable codes (e.g. building or fire codes) and maintenance failures (e.g. fire protection and containment features):** can substantially increase the damage to the facility itself and to surrounding buildings

The severity of the incident is dependent not only on the circumstances described above, but also with the type of material released and the distance and related response time for emergency response teams. The areas within closest proximity to the releases are generally at greatest risk, yet depending on the agent, a release can travel great distances or remain present in the environment for a long period of time (e.g. centuries to millennia for radioactive materials), resulting in extensive impacts on people and the environment.

The environmental impacts of hazardous material releases include:

- Hydrologic effects – surface and groundwater contamination
- Other effects on water quality such as changes in water temperature
- Damage to streams, lakes, ponds, estuaries, and wetland ecosystems
- Air quality effects – pollutants, smoke, and dust
- Loss of quality in landscape
- Reduced soil quality
- Damage to plant communities – loss of biodiversity; damage to vegetation
- Damage to animal species – animal fatalities; degradation of wildlife and aquatic habitat; pollution of drinking water for wildlife; loss of biodiversity; disease

The worst possible hazardous materials incident would be a release in transit from a tanker truck hauling hazardous materials on Interstate 80 near the East Stroudsburg exit at rush hour. In this incident, students, faculty, and staff might need to shelter in place; there would be a cleanup and health screenings after the incident. In addition, a large release could snarl traffic and make it even more challenging for first responders to assist with the event or other concurrent events.

4.3.9.3 Past Occurrence

According to the EPA, the six TRI facilities within 1.5 miles of ESU have had the following reported releases of chemicals to the air (via both point and non-point sources) and water:

- Rock-Tenn Co Stroudsburg Mill – chemicals released include ammonia, ammonium sulfate, chlorine, ethyl acrylate, lead, and sulfuric acid;
- Cooper Power Systems – chemicals released include lead, sulfuric acid, zinc, zinc compounds;
- Patterson Kelly – chemicals released include chromium, copper, manganese, and nickel;
- Monroe Printing Hughes Printing Company Division – chemicals released include glycol ethers;
- Greif Brothers – chemicals released include 1, 1, 1-trichloroethane and trichloroethylene; and
- Vertellus Health and Specialty Products – chemicals released include acetamide, acetophenone, bromine, chlorine, formic acid, hydrochloric acid, methanol, phosphoric acid, ammonia,

dichloromethane, maleic anhydride, methyl ethyl ketone, methyl isobutyl ketone, methyl tert-butyl ether, n-butyl alcohol, propylene, sulfuric acid, toluene, zylene, and zinc compounds

The EPA tracks all releases regardless of size. Releases at these facilities have varied in size and scale, but most were small. They have not directly impacted the university. Table 4.3.8-1 lists the previous incidents in East Stroudsburg and Smithfield Township from the Monroe County 2011 HMP.

Table 4.3.9-1 Previous hazardous materials incidents in Monroe County.

DATE	LOCATION	MATERIAL INVOLVED	TYPE OF INCIDENT/DETAILS
5/2/2002	East Stroudsburg Borough	Unknown	Chemical Spill
4/19/2004	Smithfield Township	Bentonite	Chemical Spill - Two gallons of bentonite was spilled from a drill into Cherry Creek.
10/10/2005	Smithfield Township	Tar	Chemical Spill - Two hundred gallons of unknown tar were spilled on roadway.
4/16/2007	Smithfield Township	Renalyn	Chemical Spill - Three gallons of renalyn were spilled at a dialyses center, 14 persons were taken in for treatment.

According to the US Pipeline and Hazardous Materials Safety Administration, there have been five hazardous material releases in East Stroudsburg since 1984. All of these incidents were highway-related; there were no injuries or fatalities reported, but the events did cause minor damages. Three of the five incidents did not cause any monetary damages, but two did: in January 1994, a spill of hypochlorite solution caused $3,003 in damages and in August 2001, a fuel oil spill caused $210 in damages (PHMSA, 2015). To the best knowledge of the HMSC, none of these incidents impacted ESU.

4.3.9.4 Future Occurrence

While hazardous material release incidents in the area surrounding ESU have occurred in the past, they are generally considered difficult to predict. An occurrence is largely dependent upon the accidental or intentional actions of a person or group. Intentional acts are addressed under the terrorism hazard (see Section 4.3.9). Overall, the probability of hazardous materials releases impacting ESU can be considered *possible* according to the Risk Factor Methodology (see Table 4.4-1).

4.3.9.5 Vulnerability Assessment

All campus facilities are vulnerable to a hazardous material release, be it at a fixed facility or in transit. In general, areas with the closest proximity to the release are at greatest risk, but depending on the chemical and atmospheric conditions during the release, the material can travel great distances or exist over a long period of time. With campus being at a distance from streams, the most immediate concern will be threats to human health and the need to shelter in place.

Oil and hazardous materials response is covered briefly in ESU's Emergency Operations Plan. The Emergency Operations Plan also outlines the responsibilities of the Safety Officer, which includes several functions related to the routine inventory of hazardous materials onsite and response assistance in the event of an accidental release. It is stated that local responders will serve as incident commanders, unless a formal request is made by university officials for East Stroudsburg Borough or Monroe County personnel to assume command. Having a plan in place to routinely inventory hazardous materials onsite and to assist with response in the event of an accidental release reduces overall vulnerability to the potentially deadly effects of hazardous materials releases. This is because quick response minimizes the volume and concentration of hazardous materials that disperse through air, water, and soil.

4.3.10 Terrorism

4.3.10.1 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 ESU 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 ESU, 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.

4.3.10.2 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 ESU. 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 ESU, 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 ESU 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.

4.3.10.3 Past Occurrence

ESU has no reported terrorist incidents. However, in the past, there was a bomb threat at a children's daycare/play facility in East Stroudsburg Borough in 2006; no bomb was found. In addition, an individual released a substance into the air in the emergency room of Pocono Medical Center, which is immediately adjacent to campus. The substance was later determined to be pepper spray. The most common crime-related incidents on campus are petty theft and alcohol-related incidents. Other incidents have included a suspected anthrax incident that proved to be a false alarm. In September 2014, police responded to a sighting of alleged PA State Police shooter Eric Frein on ESU's campus. The suspect was not located on campus, and it did not disrupt campus activities or trigger a lockdown on campus (WFMZ News, 2014)

4.3.10.4 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 *unlikely,* as defined by the Risk Factor Methodology (see Table 4.4-1). ESU has established a Threat Assessment Team to assist in addressing situations where students, faculty, or staff are displaying disruptive or threatening behaviors that potentially impede their own or others' ability to function successfully or safely. The process is designed to help identify persons whose behaviors potentially endanger their own or others' personal health and safety. It is the responsibility of faculty, staff, and students to report any situation that could possibly result in harm to anyone at the University. If needed, information is forwarded to the Director of Public Safety. In addition, resident students are given information on crime and public safety at hall meetings. This messaging can help reduce future occurrences of suspicious activity.

Although there are no previous active shooter 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. It is often carried out by a single person with indiscriminate actions. In some cases, there is detailed planning involved and/or more than one shooter.

4.3.10.5 Vulnerability Assessment

An important consideration in estimating the likelihood of a terrorist incident is the existence of facilities, landmarks, or other buildings of national importance. ESU 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 ESU'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?

Table 2.5-1 (in Section 2.5) contains a listing of the structural assets of ESU. 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:

- The Computer Center;
- All residence halls, especially Hemlock Suites, which also hosts University Police;
- The Main Power Pad;
- Stroud Hall, the largest lecture hall on campus,
- Dansbury Commons, the main dining hall on campus; and
- The Utility Plant.

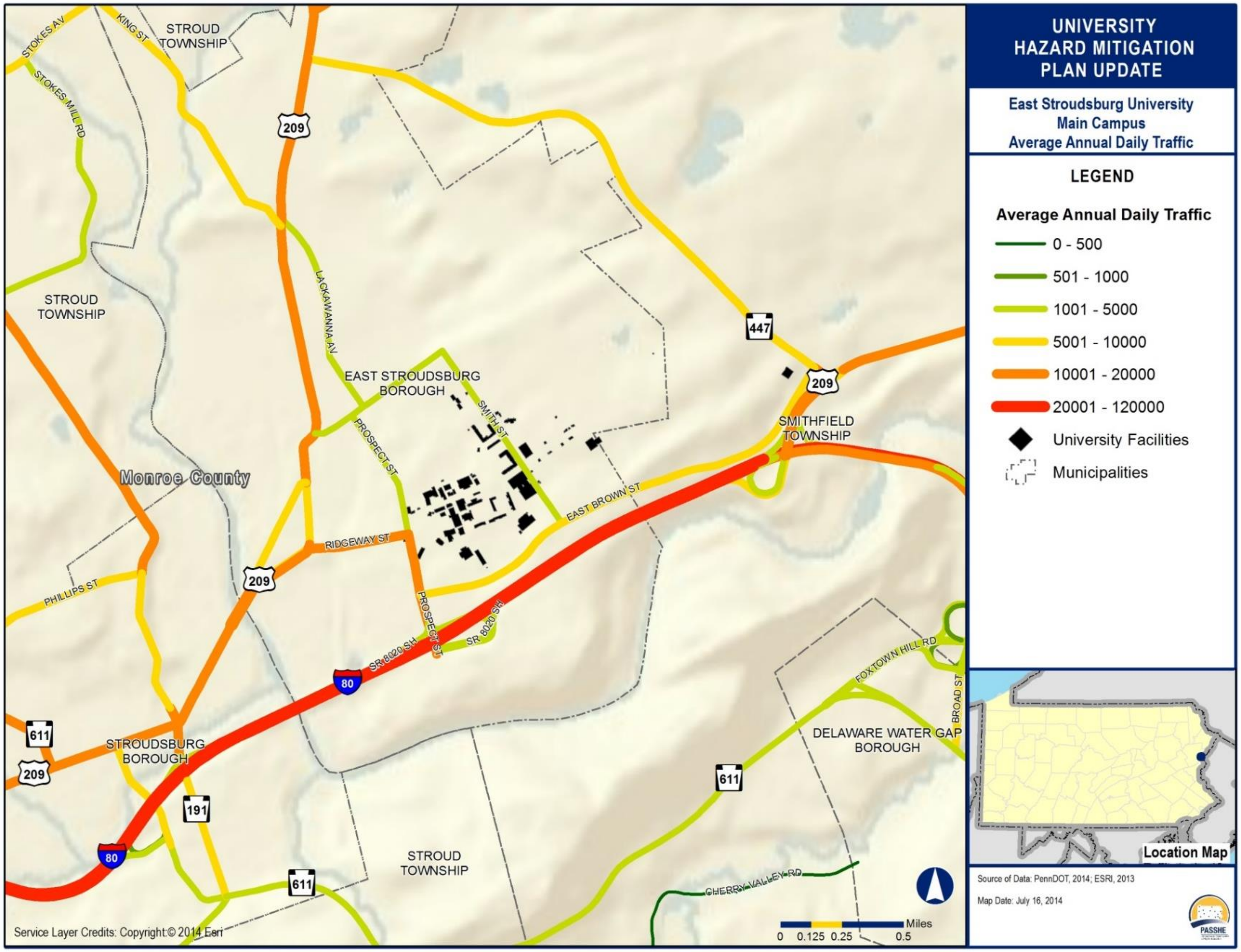
Low-risk buildings are generally garages, storage sheds, and small buildings. As previously discussed, vulnerability and determining what can be mitigated are described in terms of buildings, infrastructure, or critical facilities that are most vulnerable to the hazard. The nature of the terrorism hazard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

4.3.11 Transportation Accidents

4.3.11.1 Location and Extent

For the purpose of this plan, a transportation accident is defined as an incident involving highway travel resulting in death, serious injury, or extensive property loss or damage. In the traditional sense, transportation accidents can also include railroad accidents, but there are no rail facilities located in close proximity to campus. Accidents relating to hazardous material transport are considered in the Hazardous Materials Release section of this plan. The University is right beside I-80 which is a major cross-country highway stretching from New Jersey to California. Other key roadways in the area include US 209 and PA 447. Traffic counts were only available for roads under the jurisdiction of PennDOT. Figure 4.3.10-1 illustrates the traffic volume on key roadways around ESU. In comparison to the traffic volume on Interstate 80, the traffic volume of surface roads seems small, but transportation accidents can occur even on roadways with low traffic volumes and low speeds.

Figure 4.3.11-1 Traffic Volume of Key Roadways.



ESU is located within an established urban community. Most members of the University community reside outside the immediate area and travel to ESU by automobile; HMSC members stated that approximately 2/3 of students commute to campus. Transportation accidents can occur at any location on campus where vehicles interact with each other, with bicycles, and with pedestrians. In addition, there is an added incident potential on non-vehicular paths were bicycles and pedestrians share space.

4.3.11.2 Range of Magnitude

At a minimum, transportation accidents can result in damage to the vehicles and minor injuries to passengers and drivers. At worst, significant transportation accidents can result in death or serious injury or extensive property loss or damage coupled with business interruptions and hours of congestion. Road and railway accidents in particular have the potential to result in hazardous materials releases if the vehicle involved in an accident is hauling hazardous materials. The expected impacts of transportation accidents are amplified by the fact that there is often little warning of accidents.

Accidents in the surrounding or in-campus roadways have a potential to temporarily limit or restrict access to and from the University. In addition to property damage, the human cost is high. Transportation accidents would have direct and indirect impacts on ESU. The greatest problem associated with transportation accidents on main highways is the resultant traffic gridlock and the associated impact on faculty, staff, and students who must travel. The worst-case scenario would be this type of traffic problem at the same time that the ESU is being evacuated for other reasons. There are limited options for major traffic routes, and removing one or more of these would greater increase the time to evacuate the campus.

The ESU HMSC indicated that a primary concern is for pedestrian/vehicle incidents since ESU is a highly pedestrianized campus. Even with two-thirds of the students driving to campus, they must park their vehicles in a limited number of designated spaces and walk to their final destination. Also, Smith Street and Normal Street are Borough-owned two-way streets that traverse through the campus. Nearby off-campus roads are traversed by students, faculty and staff on their way to and from the University.

4.3.11.3 Past Occurrence

Transportation accidents are a regular occurrence in Pennsylvania. Across Pennsylvania, the most common type of accident is a vehicle straying from the road and striking a fixed object like a utility pole or mailbox. The vast majority of crashes are not fatal, and 71% of all crashes do not involve an injury. The PennDOT annual Crash Facts and Statistics for 2013 indicates that the 1,208 fatal crashes in that year represent the lowest number of fatalities in Pennsylvania in 68 years. At the same time, though, any fatal crash can be devastating for the campus community. In 2013, 24 crashes in Monroe County were fatal, and traffic deaths have fallen every year since 2010. In 2013, there were no pedestrian deaths in Monroe County.

A City Data search revealed four fatal accidents in the proximity of campus for 2010 – two of them on N Courtland Street, and two on I-80 (http://www.city-data.com/accidents/acc-East-Stroudsburg-Pennsylvania.html). While these are unfortunate occurrences, it illustrates that there is an equal risk of accidents occurring on both local, slower roads as well high-speed thoroughfares.

Pedestrian accidents within campus have occurred and nearby residents have stated that students ignore walkways and defy traffic by walking and jogging in the streets. According to the University, carelessness and neglect to look both ways prior to crossing the street is also a factor that can be responsible for accidents. Inclement weather can also be a factor. For example, in September 1992, two students were killed when a light truck hit them on Smith Street during a heavy rainfall.

4.3.11.4 Future Occurrence

The future occurrence of transportation accidents in ESU is considered *highly likely* according to the risk factor methodology. This ranking is due to a number of factors: the large number of students who live on-campus; the popularity of walking and biking in the campus; the presence of two-way Borough streets traversing the campus; and proximity to I-80.

Inclement weather is also expected to be a factor that can lead to accidents. Heavy rain and snowy/icy conditions can reduce visibility increasing the likelihood of pedestrian-vehicular conflicts.

4.3.11.5 Vulnerability Assessment

ESU's buildings are less vulnerable to structural damage from transportation accidents than many other structures in Monroe County because they are more likely to be situated proximate to internal, non-vehicular pathways than traditional surface streets. The most immediate areas of concern future accidents are for Smith Street and Normal Streets, followed by the rest of the in-campus roadways. The ESU Campus Facilities Master Plan notes that in general, the pedestrian circulation routes work well; however, there is no safe pedestrian circulation between the University Ridge and the main campus.

Off-campus, other major roads such as N Courtland Street, Independence Road, and North 5th Street are vulnerable areas, given the number of students, faculty, and staff who live near the University. Finally, I-80 and the nearby exits 306, 307, and 308 are also vulnerable to accidents.

The ESU additional locations in Center City Philadelphia and the Lehigh Valley are less vulnerable to transportation accidents as they are leased spaces in larger office buildings. Stony Acres, which is located off of a rural roadway, is less likely to feel the impact of a transportation accident.

4.3.12 Utility Interruption

4.3.12.1 Location and Extent

Utility interruptions include disruptions in fuel, water, steam, electrical, and telecommunications capabilities at ESU. Utility interruptions are caused primarily by electrical failures, which are a common 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. Other causes of power outages include fallen tree limbs, vehicular accidents, small animals that destroy wiring, blown transformers, or tripped circuit breakers. When power outages occur, they can be on a local or regional scale.

A major grid failure consists of an unplanned event affecting at least 1,000 people for a downtime of at least 1,000,000 hours. According to an article in the IEEE Reliability Society 2009 Annual Technology Report, the U.S. and Canada have experienced the following number of major grid failures over the past several decades:

- 1965-1988: 3 failures
- 1989-1994: 2 failures
- 1995-1999: 8 failures
- 2000-2005: 11 failures
- 2006-2009: 33 failures

The increase in the number of power failures, particularly in the last 20 years, is most likely due to increased demand and load on power grids and to an increased number of cable miles with higher interconnectedness on the grid. The same report noted above also identifies the primary reasons for major grid failures as the following:

- Snowstorm: 13 failures
- Summer storm: 11 failures
- Hurricane: 8 failures
- High winds: 8 failures
- Substation: 3 failures
- Transmission line: 3 failures
- Lightning strike: 2 failures
- Heat wave: 2 failures
- Other: 4 failures
- Unknown: 3 failures

The “other category” consists of causes such as earthquakes, brush fires, floods, lightning strikes, natural gas explosions, incidents of war, terrorist attacks, sandstorms, and cut undersea cables, depending upon the country in question.

4.3.12.2 Range of Magnitude

Most severe utility interruptions and power failures are regional events. Most utility interruptions are resolved quickly and do not lead to large-scale problems alone. Likewise, threats to human health are not typically impacts of utility interruptions, but because utility interruptions frequently occur as a secondary impact of severe weather, 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. Since ESU relies on East Stroudsburg Borough for its water supply and sewerage, an interruption or water main break in another area of the Borough would impact the supply of potable water on campus.

Additionally, even a small utility interruption can have a profound impact on ESU’s ability to ensure continuous normal operating conditions or conduct classes. An interruption in the steam system at ESU is a particularly important concern in the winter, since there are a number of buildings using steam heat, including Monroe Hall, Hemlock Suites, Hawthorne Suites, and some smaller, older structures on campus.

ESU has numerous essential functions that 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, and residence hall supervision. 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.

A loss of utilities can have numerous impacts including, but not limited to, food spoilage, loss of water supply (either because of a damaged pipeline or well pump failure), loss of heating or air conditioning, basement flooding (sump pump failure), lack of indoor lighting, and lack of telephone and internet service. These issues range from a minor nuisance to a full hazard event, but the degree of damage or harm depends on the population affected and the severity of the outage. For example, loss of heating and cooling capability is more dangerous in the winter and summer months, when heat sensitive populations count on utilities to maintain a safe temperature.

At a minimum, utility interruptions can cause short term disruption in the orderly functioning of business, government, and private citizen functioning and activities like traffic signals, elevators, and retail sales. The January 2005 ice storm, one of the worst on record in the Poconos, led to the worst case scenario for utility interruptions. During this event, nearly 46,000 homes and businesses in Monroe County alone lost power; system-wide, 238,000 Pennsylvania Power and Light customers lost power with an overall estimated repair cost of $25 million. It took eleven days for power to be fully restored in the Poconos.

4.3.12.3 Past Occurrence

Utility interruptions are usually routine events that last for short periods of time. They often occur in conjunction with winter storms and wind storms. There is no comprehensive list of utility interruption events for the county, but the 2011 Monroe County HMP noted between two and eight annual phone outages, power outages, and water main breaks from 2002 through 2009. None of these reported incidents were associated with ESU.

Other notable utility outages include:

- January 1994: statewide electrical energy crisis associated with severe cold led to rolling blackouts and extensive voluntary cutbacks. Schools, government offices, and private businesses responded by curtailing operations to reduce electricity consumption. There is no record of this event impacting ESU in particular.
- August 2003: widespread power outage occurred as a result of a disruption to the power grids in states to the north and east of Pennsylvania and then cascading into the Commonwealth. Some reports estimated the total number of customers affected in Pennsylvania at over 100,000. Some communities were without power for as long as 48 to 72 hours as a result of the blackout. There is no record of this event impacting ESU in particular.
- November 2012: brief outage occurred on campus due to Superstorm Sandy.

4.3.12.4 Future Occurrence

The probability of a large-scale, extended utility failure is low; however, small-scale failures lasting short periods of time occur annually. Iced power lines; fallen 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.

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.

Because of the frequency of utility interruptions, the probability of future occurrences can be considered *likely*, according to the Risk Factor methodology (See table 4.4-1).

4.3.12.5 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 University has some limited emergency power generation, but would not be able to maintain operations during an extended power outage. The following buildings have backup power supplies:

- Dansbury Commons: full backup power
- The Utility Plant Substation/Main Power Pad: lighting-only backup power.
- Stroud Hall: backup power for lighting and incidentals.
- The Computer Center: full backup power.

The status of backup power at the auxiliary locations is unknown at this time. PEMA and ESU are working to get a generator hookup for Koehler Fieldhouse to make ESU more generator-ready and to better enable the university to hook into existing backup power options.

4.4 Hazard Vulnerability Summary

4.4.1 Methodology

Risk Factor (RF) values were obtained by assigning varying degrees of risk to five categories for each of the eleven hazards profiled in the 2015 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 in Table 4.4-1. 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) + (Impact x .30) +
(Spatial Extent x .20) + (Warning Time x .10) + (Duration x .10)]

Table 4.4-1 summarizes each of the five categories used for calculating a RF for each hazard. According to the weighting scheme applied, the highest possible RF value is 4.0.

Table 4.4-1 Summary of Risk Factor approach used to rank hazard risk.

RISK ASSESSMENT CATEGORY	DEGREE OF RISK			WEIGHT VALUE
	LEVEL	CRITERIA	INDEX	
PROBABILITY *What is the likelihood of a hazard event occurring in a given year?*	**UNLIKELY**	LESS THAN 1% ANNUAL PROBABILITY	**1**	**30%**
	POSSIBLE	BETWEEN 1% & 49.9% ANNUAL PROBABILITY	**2**	
	LIKELY	BETWEEN 50% & 90% ANNUAL PROBABILITY	**3**	
	HIGHLY LIKELY	GREATER THAN 90% ANNUAL PROBABILITY	**4**	
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?*	**MINOR**	VERY FEW INJURIES, IF ANY. ONLY MINOR PROPERTY DAMAGE & MINIMAL DISRUPTION ON QUALITY OF LIFE. TEMPORARY SHUTDOWN OF CRITICAL FACILITIES.	**1**	**30%**
	LIMITED	MINOR INJURIES ONLY. MORE THAN 10% OF PROPERTY IN AFFECTED AREA DAMAGED OR DESTROYED. COMPLETE SHUTDOWN OF CRITICAL FACILITIES FOR MORE THAN ONE DAY.	**2**	
	CRITICAL	MULTIPLE DEATHS/INJURIES POSSIBLE. MORE THAN 25% OF PROPERTY IN AFFECTED AREA DAMAGED OR DESTROYED. COMPLETE SHUTDOWN OF CRITICAL FACILITIES FOR MORE THAN ONE WEEK.	**3**	
	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.	**4**	
SPATIAL EXTENT *How large of an area could be impacted by a hazard event? Are impacts localized or regional?*	**NEGLIGIBLE**	LESS THAN 1% OF AREA AFFECTED	**1**	**20%**
	SMALL	BETWEEN 1 & 10.9% OF AREA AFFECTED	**2**	
	MODERATE	BETWEEN 11 & 25% OF AREA AFFECTED	**3**	
	LARGE	GREATER THAN 25% OF AREA AFFECTED	**4**	
WARNING TIME *Is there usually some lead time associated with the hazard event? Have warning measures been implemented?*	**MORE THAN 24 HRS**	SELF-DEFINED	**1**	**10%**
	12 TO 24 HRS	SELF-DEFINED *(NOTE: Levels of warning time and criteria that define them may be adjusted based on hazard addressed.)*	**2**	
	6 TO 12 HRS	SELF-DEFINED	**3**	
	LESS THAN 6 HRS	SELF-DEFINED	**4**	
DURATION *How long does the hazard event usually last?*	**LESS THAN 6 HRS**	SELF-DEFINED	**1**	**10%**
	LESS THAN 24 HRS	SELF-DEFINED *(NOTE: Levels of warning time and criteria that define them may be adjusted based on hazard addressed.)*	**2**	
	LESS THAN 1 WEEK	SELF-DEFINED	**3**	
	MORE THAN 1 WEEK	SELF-DEFINED	**4**	

4.4.2 Ranking Results

Using the methodology described in Section 4.4.1, Table 4.4-2 lists the Risk Factor calculated for each of the 11 potential hazards identified in the 2015 HMP. Hazards identified as high risk have risk factors of 2.5 or greater. Risk Factors ranging from 2.0 to 2.4 were deemed moderate risk hazards. Hazards with Risk Factors less than 2.0 are considered low risk.

Table 4.4-2 ESU Risk Rankings

RISK	HAZARD	RISK ASSESSMENT CATEGORY					RISK FACTOR
		PROBABILITY (1-4)	IMPACT (1-4)	SPATIAL EXTENT (1-4)	WARNING TIME (1-4)	DURATION (1-4)	
HIGH	Winter Storm	4	2	4	1	3	3.0
	Extreme Temperature	3	2	4	1	3	2.7
	Utility Interruption	3	2	3	4	2	2.7
	Transportation Accidents	4	2	1	4	1	2.5
MODERATE	Hazardous Material Releases	2	3	2	4	1	2.4
	Flood, Flash Flood, Ice Jam	3	2	1	2	3	2.2
	Hurricane, Tropical Storm, Nor'easter	2	2	3	1	3	2.2
	Pandemic	1	2	4	1	4	2.2
	Tornado, Windstorm	2	2	2	3	1	2.0
LOW	Terrorism	1	3	1	4	1	1.9
	Civil Disturbance	2	1	2	4	1	1.8
	Radon Exposure	2	1	1	1	4	1.6

Based on these results, there are four high risk hazards, five moderate risk hazards and three low risk hazards at ESU.

The RF rankings express the overall risk of ESU to each hazard. However, the Center City Philadelphia auxiliary site is at a higher risk to Extreme Temperature and Hurricane, Tropical Storm, Nor'easter because of its location approximately 100 miles south of main campus. Additionally, its location in downtown Philadelphia may make it more susceptible to Terrorism and Civil Disturbance events since the City of Philadelphia itself is more likely to be a target for those kinds of hazards. Finally, the Center City location is less susceptible to Flooding because of its location in a high-rise structure outside the floodplain; Winter Storms because of its location in a much warmer part of Pennsylvania; Pandemic because of the relatively small, non-residential student population; and Radon Exposure because of its location in a zone classified with low radon exposure levels, low level of reported radon levels, and non-residential student population.

The Stony Acres property also can experience different levels of risk to these hazards. While it is located less than 10 miles north of main campus, the increased distance from major roads and utility services could mean that the impact will be higher in Winter Storm and Utility Interruption Events. However, lower amounts of daily traffic could reduce the risk of Transportation Accidents. Since a smaller population may be expected, the impacts of Pandemic hazards will likely be more limited. Stony Acres could be less vulnerable to Terrorism and Civil Disturbance events than main campus or the Center City Philadelphia location because of its reduced profile.

4.4.3 Potential Loss Estimates

The vulnerability assessment for each hazard profile (Section 4.3.x.5), discusses how University assets and people may be impacted by each hazard. This section looks at the potential losses that may be experienced by ESU. For most hazards at ESU, the primary losses will be business interruption losses, including cancelled classes and the inability of faculty, staff, and students to get to campus.

ESU is not in the 1%-annual-chance floodplain, and the campus went through an extensive overhaul of the stormwater system, so future flood losses are expected to 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 the structure. The structural assets of ESU are described in Section 2.5 and in Table 2.5-1 with details such as square footage, construction and renovation dates, condition, and replacement cost. Original construction dates range from 1878 (106 Smith Street) to 2012 (Hemlock Suites). Of the 64 structural assets, 14 are cited as being in satisfactory condition, 42 have a status of "remodeling," and only one, 150 Mary Street, is slated for demolition. In addition, any commercial or construction trailers that may be on campus for temporary on-site construction support could be lost in a high wind event, since they are frequently lightweight and unanchored.

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 ESU would experience an event where an entire asset would need to be completely replaced. That being said, events could cause losses of up to the replacement cost. Replacement costs for ESU's structural assets range from over $53 million for Hawthorn Suites to $0 for 427 Normal Street. In addition to the $596,294,847 total structural losses that the self-insured University could incur from a catastrophic event, the University could also lose many other assets such as computers, furniture, electronics, tuition payments, etc. These contents losses are usually estimated at 150% of the replacement cost of a structure. The age, condition, and value of most structures on 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 the hazard events described in Section 4.3 are not static. Risk will increase or decrease as ESU sees 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 (see Sections 2.3 and 2.5).

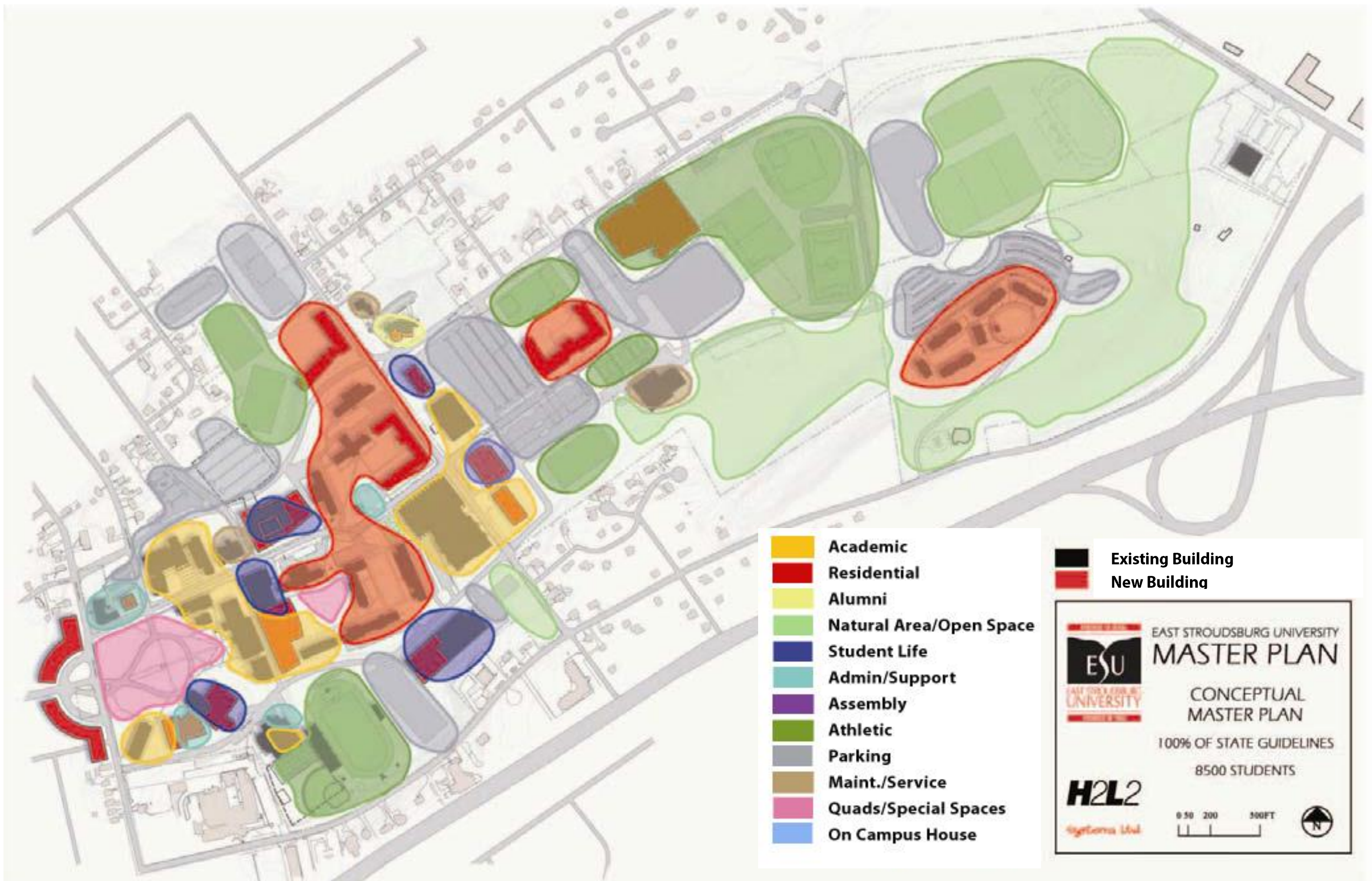
Future development is discussed in the ESU Campus Master plan, finalized in 2010. The Master Plan focuses on directing development and accommodating growth in the framework of "Campus as Town," whereby new buildings fit into the existing fabric and the campus edges and roadways are enhanced. This document plans for a future where ESU meets 100% of state guidelines and 8,500 students. The plan cites the following design objectives:

- Improve campus adjacencies;
- Accommodate space needs;
- Identify building upgrades;
- Upgrade pedestrian circulation;
- Improve the roadway system;
- Improve parking; and
- Increase athletics and recreation opportunities.

The Master Plan proposed an additional 13 substantial additions and new buildings, shown in red in Figure 4.5-1. The conceptual plan focuses on a densification of the core of campus rather than constructing new facilities on the Back 40 parcel, which is largely wooded and natural land. The future development planning also discusses the campus landscape. It proposes that large open lawn areas being reverted to a more natural state that could assist with absorption of stormwater and preventing stormwater flooding.

There are no areas slated for new development that are significantly more or less vulnerable than the rest of campus. The HMSC determined that reducing vulnerability in the future was less related to the specific location of a building and more related to ensuring that building orientation, siting, landscaping, and materials were resilient and more hazard-resistant. This will be particularly important for hazards that impact the entire campus, like extreme temperature, hurricane, tropical storm, and nor'easter, tornadoes and windstorms, and winter storms. The risk of pandemic and infectious disease may increase in the future with an expected increase in students and the projected construction of three new residence halls, which suggests a desire to increase the number of students in on-campus housing. Vulnerability to many of the human-made hazards is expected to stay static since they affect the entire campus at once and are either highly unpredictable (terrorism, civil disturbance, and hazardous material releases) or are considered routine (transportation accidents, utility interruptions).

Figure 4.5-1 Conceptual Master Plan for ESU.



5 CAPABILITY ASSESSMENT

5.1 Update Process Summary

The Capability Assessment takes inventory of the unique planning, regulatory, administrative, technical, financial, educational, and outreach capabilities present at East Stroudsburg University. The assessment aids the University in identifying strengths that may be capitalized on to reduce future risk and loss. Areas may also be identified where mitigation actions could be developed to bolster the current capabilities, to increase sustainability, and to reduce risk at the university.

The 2008 capability assessment was titled "Mitigation Capabilities and Resources." It was organized by level of authority and included a discussion of the basic capabilities of ESU, East Stroudsburg Borough and Smithfield Township, the Commonwealth of Pennsylvania, and the Federal Government. This assessment has been augmented with additional information and rearranged to match the Pennsylvania Standard Operating Guidance for 2015 to cover the planning and regulatory framework, administrative and technical capabilities, financial capabilities, and education and outreach capabilities. Perhaps the most notable difference, though, is the inclusion of plan integration. The goal of plan integration is to consider all existing planning mechanisms for ESU and how they relate to the HMP. Pertinent initiatives are highlighted from other mechanisms that contribute to reduction of loss or risk. Successes, gaps, and weaknesses are all identified through the capability assessment, so it serves as a guide for future mitigation actions.

The capability assessment demonstrates that East Stroudsburg University has a number of resources that it can access to implement hazard mitigation initiatives. These resources include both private and public assets at the local, state, and federal levels and are presented in the following sections.

5.2 Capability Assessment Findings

5.2.1 Planning and Regulatory Capability

This section summarizes the planning and regulatory capabilities and resources at ESU as well as those offered by East Stroudsburg Borough and Smithfield Township to facilitate the implementation of mitigation strategies. Some of the most important planning and regulatory capabilities that can be utilized for hazard mitigation include:

- HMPs at the university, county, or state level;
- Emergency Operations Plan (EOP)
- Campus Evacuation Plan (within ESU'S Emergency Action webpage);
- University Strategic Plans and Master Plans;
- Comprehensive plans;
- Building codes;
- Zoning ordinances;
- Subdivision and land development ordinances; and

- Floodplain ordinances.

These tools provide mechanisms for the implementation of adopted mitigation strategies. The following text summarizes these documents, and Section 5.3 discusses opportunities to strengthen and coordinate these plans in regard to hazard mitigation.

5.2.1.1 Emergency Management Capabilities

Hazard Mitigation Plan

A 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 Disaster Mitigation Act (DMA) of 2000, and having a FEMA-approved HMP makes the jurisdiction eligible for federal mitigation funding.

East Stroudsburg University is located mostly in East Stroudsburg Borough, Monroe County; the eastern portion is located in Smithfield Township. Monroe County completed its HMP update in 2011. The county HMP profile many of the same hazards identified in the University HMP (see Table 5.2-1), and many University students, faculty, and staff are residents of Monroe County. At the same time, the ESU HMP focuses on hazards and issues that are specifically related to a small, fairly densely populated area.

Table 5.2-1 Hazards Profiled in HMP

HAZARD	EAST STROUDSBURG UNIVERSITY	MONROE COUNTY
Droughts		✓
Earthquakes		✓
Extreme Temperature	✓	
Flood, Flash Flood, Ice Jam	✓	✓
Hurricane, Tropical Storm, Nor'easter	✓	✓
Landslide		
Pandemic and Infectious Disease	✓	✓
Tornado, Windstorm	✓	✓
Wildfire		✓
Winter Storm	✓	✓
Civil Disturbance	✓	
Dam Failure		✓
Environmental Hazards	✓	✓
Levee Failure		✓
Nuclear Incidents		✓
Terrorism	✓	
Transportation Accidents	✓	✓
Utility Interruption	✓	✓

Emergency Operations Plan

The Pennsylvania Emergency Management Services Code, Title 35, requires all political jurisdictions in the Commonwealth to have an EOP, an Emergency Management Coordinator (EMC), and an EOC. County EOP's are updated every two years at a minimum.

Monroe County, Smithfield Township, East Stroudsburg Borough and East Stroudsburg University each have an EOP. The EOP is formulated to comply 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. An EOP, or portions thereof, will be implemented as warranted by emergency circumstances. Monroe County provides planning guides to PEMA guides to child care facilities emergency planning, school safety, Emergency Action Plan (EAP), and local EOP toolkit. Smithfield Township provides contact information to ambulance, fire, fire chief and medical center locations. The University provides links to campus alerts, emergency actions and procedures, media links, a link to the 2008 HMP, weather, travel information, and University Police contact information from the emergency actions webpage (www4.esu.edu/emergency/actions.cfm).

Campus Evacuation Plan

Both the ESU emergency actions and the Campus Safety webpages provide a quick reference guide to inform students, faculty and staff on immediate responses to the most common emergency situations: hostile intruder, evacuation, or shelter in place (www4.esu.edu/emergency/actions.cfm). Users are to be informed of the situation via text message or other communication. Evacuation points are labeled in campus buildings.

Participation in the National Flood Insurance Program

As mentioned in Section 4.3.2, none of ESU's structures are located in the SFHA. In addition, as state-owned and operated buildings, all of ESU's physical assets are self-insured through the Department of General Services. Both East Stroudsburg Borough and Smithfield Township participate in the NFIP and have floodplain regulations in place. East Stroudsburg's floodplain ordinance prohibits the storage of certain kinds of chemicals in the floodplain, which will help reduce the possibility of a flood-related hazardous material release. Smithfield Township follows the Pennsylvania model floodplain ordinance with modifications to consider existing structures in the floodplain and floodway as conditional uses to be heard by the Board of Supervisors.

5.2.1.2 Other University Plans

University Strategic Plan

East Stroudsburg University is currently updating its Strategic Plan titled *Students First: Innovate ESU. (A Strategic Vision for 2014-2017)*. The fourth draft was issued in June, 2014. The proposed plan identifies the institution's overall priorities and initiatives, encapsulated as four strategic goals. The plan develops cost-efficient objectives and strategies to enhance and implement these strategic goals. ESU's Strategic Plan website provides useful information and updates to the strategic planning process, with the goal of engaging all stakeholders in the task of charting the future of the institution. A draft of the Academic

Affairs Strategic Plan is also available from the Strategic Plan website; it is a three-year plan aligned closely with the University Strategic Plan.

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 which 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.

East Stroudsburg University of Pennsylvania Campus Facilities Master Plan (CFMP) was completed in March 2010 and acts as a guide for the future development of the campus. The plan examined all aspects of the University’s facilities, including requirements for renovations, potential space reassignments, new facilities, circulation, athletic fields, landscaping and image. The plan assessed existing conditions in terms of site, land use and physical conditions, building inventory and condition, enrollment projection, space needs as determined by the PA Department of Higher Education, utilization rates of classrooms and laboratories, functional adjacencies, programmatic shortfalls, and planning issues.

The ESU CFMP provided a conceptual master plan defining new campus buildings and additions, building renovations, parking and road changes, as well as new fields and courts. The final master plan provided images that envisioned campus functional zones, improved pedestrian circulation, gateways, and streetscapes. Proposed development guidelines, together with the recommended urban design elements such as campus landscape treatment, outdoor furniture, and materials unify and organize the University properties in a coherent and visually pleasing manner.

5.2.1.3 County and Municipal Plans and Regulations

County/Municipal Comprehensive Plans

C 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. The Monroe County Comprehensive Plan Update, developed by the Monroe County Planning Commission is titled “*Monroe 2030 – The Challenge Continues”* and was issued in December 2014. According to the Plan, the goals, objectives, and recommendations of the previous comprehensive plan adopted in 1999 *(“Monroe 2020”)* remains viable, and emphasis is placed on implementation, sustainment and quality of life improvements. The plan update also recognizes current and future challenges that can impact the environmental, economic, and cultural assets of the County along with the corresponding recommendations designed to keep these assets within reach of its people. The plan specifically mentions continuing work between the Monroe County Planning Commission and Monroe County Emergency Management Agency to reduce vulnerabilities while respecting the needs of Monroe County Residents.

Both East Stroudsburg Borough and Smithfield Township have approved comprehensive plans but these may be due for plan updates. The Borough's comprehensive plan dates back to 1990 (Comprehensive Plan, 1990), and Smithfield Township's Comprehensive Plan was updated in 2001 (Comprehensive Plan Update – 2001). In both of these plans however, growth and activities by ESU is acknowledged as a factor in examining higher education, transportation, and zoning recommendations. Cooperation with ESU planning efforts is highlighted as an important way to coordinate planning efforts.

The Multi-Municipal Comprehensive Plan, covering Hamilton, Stroud, Pocono Townships, and Stroudsburg Borough (Multi-Municipal Comprehensive Plan, 2005) acknowledges recreation and community linkages between ESU and the municipalities, but makes no mention of hazard preparedness and disaster mitigation.

Building Codes

Building codes regulate construction standards for new construction and substantially renovated buildings. Standards can be adopted that require resistant or resilient building design practices to address hazard impacts common to a given community. Building codes are important in mitigation, because codes are developed for regions of the country in consideration of the hazards present within that region. Consequently, structures that are built to applicable codes are inherently resistant to many hazards like strong winds, floods, and earthquakes. The building code is increasingly recognized as an indispensable tool to promote public health, safety, and welfare through the establishment of minimum building/construction standards.

The building code is the basic regulation for new construction in a community. It also regulates the expansion, alteration, and repair of existing structures. It includes requirements for the various special facilities and equipment, which may be placed in buildings, such as air conditioning, electrical, plumbing, heating, elevators, and other facilities. Even though the building code appears to be complex, its adoption, implementation, and enforcement enhance solid community development. It is also beneficial to contractors in terms of requirement consistency. When properly adopted, administered, and enforced, the building code can increase the quality of construction and can also promote the improvement and rehabilitation of older sections of a community.

In 2004 the Commonwealth of Pennsylvania implemented the Uniform Construction Code (UCC), Act 45 of 1999 as amended by Act 43 of 2001 and Acts 13, 92, and 230 of 2004, a comprehensive building code that establishes minimum regulations for most new construction, including additions and renovations to existing structures. Local residential and non-residential code officials must register and obtain certification within three and five years, respectively.

East Stroudsburg Borough and Smithfield Township in Monroe County have both adopted the UCC as their building code, as have the rest of Monroe County's municipalities. Because ESU is a state entity, the Pennsylvania Department of Labor and Industry enforces the building code on campus.

Municipal Zoning Ordinance and Subdivision Ordinance

Subdivision and land development ordinances (SALDOs) are intended to regulate the development of housing, commercial, industrial or other uses, including associated public infrastructure, as land is subdivided into buildable lots for sale or future development. Within these ordinances, guidelines on how land will be divided, the placement and size of roads and the location of infrastructure can reduce exposure of development to hazard events.

The Subdivision Ordinance operates on a smaller scale than a Zoning Ordinance, but can be effective in achieving well planned new residential and commercial developments so as to ensure the provision of adequate community facilities, public utilities, streets, subdivision layout, and design. Zoning ordinances allow for local communities to regulate the use of land in order to protect the interested and safety of the general public. Zoning ordinances can be designed to address unique conditions or concerns within a given community. They may be used to create buffers between structures and high-risk areas, limit the type or density of development and/or require land development to consider specific hazard vulnerabilities. East Stroudsburg Borough and Smithfield Township in Monroe County have both zoning and subdivision regulations. ESU falls into the Borough's Institutional University District (I-U) and Institutional University A District (I-UA). Both of these districts are set aside as areas best suited for university activities, but the I-UA district is specifically for the administrative, cultural, and educational purposes of the university but not student housing, food services, and active recreational facilities. These districts are generally less restrictive than the other local zoning districts, and allow for a variety of uses that would support the university, like residential, administrative, educational, and cultural structures. ESU's back forty parcel falls into Smithfield Township's R-2 Moderate Density Residential district, where it is a conditional use.

5.2.2 Administrative and Technical Capability

Administrative capability is described by an adequacy of departmental and personnel resources for the implementation of mitigation-related activities. Technical capability relates to an adequacy of knowledge and technical expertise of local government employees or the ability to contract outside resources for this expertise in order to effectively execute mitigation activities. Universities are typically well-endowed with highly skilled administrative and technical staff and faculty.

University Planning Councils (UPC)

State System universities have many different steering committees and councils, each of which has a different focus, and its members are comprised of 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 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.

East Stroudsburg University has a Council of Trustees, comprised of 11 members appointed by the Governor, including one undergraduate student, with at least two members being alumni of the University. The Council's primary function is to make recommendations to the chancellor for the appointment and dismissal of the president and to approve the university budget, new academic programs, contracts and fees other than tuition. The Council of Trustees meets five times per year.

Campus Safety Committee

A university may also implement a planning committee specifically devoted to campus safety, in addition to all the standard, administrative and long-term planning councils. A campus safety committee 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 wellbeing and accidental losses.

ESU has a Campus Safety Committee that monitors all campus safety regulations and makes policy recommendations. From the *Annual Clery Crime and Fire Statistics Publication (2014)*: "…The committee is chaired by the Environmental Health and Safety (EHS) Director and is made up of various persons from all areas of the campus community. Safety violations can be reported directly to the EHS Director at (570) 422-3235. The EHS Director provides educational programs on campus safety routinely each semester to students and employees in areas such as fire safety, emergency planning and response and chemical/ biohazard safety."

The ESU Student Threat Assessment Response Team (START) is administered under the Office of Student Affairs. The START mission "… is to protect the health, safety, and welfare of ESU students and the other members of the campus community."

START is a multidisciplinary team designed to assess information and develop recommendations in response to inappropriate, disruptive or harmful student behavior. START recommendations are designed to mitigate threatening situations or other instances that may be harmful to the ESU community. (http://www4.esu.edu/about/administration/student_affairs/start/index.cfm)

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

Natural and human-caused 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 hazards. These staff members will then design the University and structures with hazard impacts in mind, resulting in more sustainable communities and stronger structures.

As described in Section 2.3, East Stroudsburg University has 37 departments which house both faculty and staff. Academic departments that would contain faculty with familiarity in hazard mitigation include the Geography, Leadership Studies & Military Science, and the Sociology, Social Work & Criminal Justice Departments.

Personnel skilled in GIS

Spatial and tabular data are linked in a computerized, visual format through the use of sophisticated geographic information system (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.

ESU's Geography Department offers a Minor at the undergraduate level, and a new interdisciplinary Master of Science (M.S.) Application of GIS and Remote Sensing in Environmental Science. Students learn the latest geotechnology (GIS, RS and GPS) and how to apply this technology to the environment-related fields and careers. Students of Geography and GIS participated in the development of this HMP and the department is amenable to lending its skills to further hazard mitigation on campus.

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 may need to 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. 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.

ESU's Division of Research and Economic Development has an Office of Sponsored Projects and Research (OSPR). The OSPR assists faculty and staff in the development and submission of proposals to external organizations (federal, state, and private-sector sponsors) to support research and scholarly activities. The OSPR also assists administrators with stewardship of grant-based funds. (www4.esu.edu/red/ospr/index.cfm)

Other Resources

East Stroudsburg University may need to rely on technical assistance from regional, state, and federal resources to effectively implement hazard mitigation actions over the next five years. The constraints facing the University include limited staff resources that can be directed to implementing hazard mitigation. During the development of this plan and from reviewing other recent planning initiatives, it is readily apparent that the University has the capability to bring together faculty, staff, and students to work closely together in crafting a better future for their community. That same cooperative effort, if joined with the appropriate technical assistance from regional, state, and federal resources, can be harnessed to implement hazard mitigation actions.

ESU may be able to access several of the resources offered by the Commonwealth of Pennsylvania. The PA Department of Conservation and Natural Resources (DCNR) provide a single point of contact for communities seeking state assistance in support of local conservation initiatives. This assistance can take the form of grants, technical assistance, information exchange, and training. A variety of programs are available, like the Pennsylvania Heritage Parks Program, Pennsylvania Recreational Trails Program, and the Technical Assistance Program which can help with public involvement.

There are several state training programs available for ESU which can better equip it to handle hazard mitigation activities. PEMA also offers training in conjunction with FEMA for emergency management and hazard mitigation activities with courses such as the "Hazardous Weather and Flooding Preparedness Course."

Through FEMA's Emergency Management Institute, the federal government offers training in all aspects of emergency management, including hazard mitigation. The courses available at the Institute (see http://training.fema.gov/).

Besides East Stroudsburg Borough and Smithfield Township, other local organizations that could act as partners for future mitigation actions include:

- Monroe County Emergency Management Agency;
- Non-profit environmental organizations like the Monroe County Conservation District;
- Business development organizations like the Chamber of Commerce and Rotary Club; and
- Historical and cultural agencies like the Monroe County Historical Association.

5.2.3 Financial Capability

Based on the 2013-2014 ESU Environmental Scan and 5-Year Budget Projections document, the Commonwealth of Pennsylvania's General Fund budget shows that funding for higher education was held level with FY2012-2013, while Key 93 dollars, which are used to fund deferred maintenance, was increased by $401,000 for the State System. The document also notes that ESU, although fiscally sound, is financially stressed due to declining state appropriation and enrollment. ESU enrollment had shown growth in Fall 2008 and Fall 2009, but since then has experienced declines, especially in graduate enrollment. Coupled with these declines is the increasing amount of student accounts receivable and declining new high school graduation rates.

Table 5.2-2 below shows previous year budget projections from the 2009-2014 Environmental Scan documents (ESU Budget Office). The amounts reflect a pattern of constant, if not decreasing State Appropriations. Federal Appropriation, specifically ARRA (American Recovery and Reinvestment Act of 2009) ceased after FY2010-2011. The University will need to consider the amount of funding available for mitigation activities, based off its current funding sources and any potential donations or other funding streams. More on funding opportunities and financial resources is discussed in Section 5 (Capability Assessment).

Table 5.2-2 FY2009 – 2013 Budget Projection (2012 ESU Budget Office)

REVENUE	FY 2009-2010	FY2010-2011	FY2011-2012	FY2012-2013	PERCENT CHANGE
Tuition, Instructional Support and Other Student Fees	$ 61,264,251	$ 62,710,289	$ 67,008,418	$ 67,176,225	9.6%
State Appropriations (Base, AFRP, and Performance Funding, Program Initiatives)	$ 26,024,638	$ 24,931,581	$ 20,389,252	$ 20,806,735	-20.0%
Federal Appropriation	$ 2,141,433	$ 2,130,663	$ -	$ -	-100.0%
Total	$ 89,430,322	$ 89,772,533	$ 87,397,670	$ 87,982,960	-1.6%

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."

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 the State System's 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 with 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*.

Community Development Block Grant (CDBG): Awards funds to communities 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. Although each grant program has specific eligibility criteria, universities can benefit from these grants either by applying themselves or by working with the respective local government to apply. For instance, the approvable applicants and sub-applicants for HMGP (per 44 Code of Federal Regulations, Section 206.434(a)) include the following:

> *"State and local governments; Private non-profit organizations or institutions that own or operate a private non-profit facility as defined in 44 Code of Federal Regulations (CFR) 206.221(e)…."*

This means that State school systems qualify as State government agencies, and individual schools (like East Stroudsburg University) would qualify as a sub-applicant as long as they are a non-profit.

Capital Improvement Programming

Most capital improvement projects involve the outlay of substantial funds, and universities can seldom budget for all of 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 the State System. 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.

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 for universities, 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, such as ESU's OSPR.

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. Finally, the State System's institutions receive a percentage of funds every year through their status as a state university.

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. The county or municipality may also be eligible for different grants than the University. A strong relationship between ESU and Monroe County and Smithfield

Township that the university occupies may provide ESU 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 has multiple resources available through the State System. The State System 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. (ESU has an education program in Center City Philadelphia.) Universities often share resources, both academically through joint programs, and physically/fiscally through sharing program opportunities, trainings, and mutual aid.

There are also potential 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). ESU is currently in a partnering arrangement with University Properties for the management of Hemlock and Hawthorne Suites.

Other Grants

Other potential sources of help from the Commonwealth include statewide program funding through the Chancellor's Office and various grant program such as those offered by DCNR. DCNR conducts pre-application workshops for "Growing Greener" and "Keystone" grants through their Community Conservation Partnerships Program. Although ESU may not be an eligible applicant for these funding programs, the University may be able to cooperate with Smithfield Township to take advantage of these programs.

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. A number of technological resources were available at ESU to aid in hazard mitigation, including a text message/e-mail alert system (E2 Campus uAlert system) and blue-light/emergency campus callboxes.

Informational resources include websites, brochures, pamphlets, workshops, and PSAs. The ESU Campus Police host an anonymous crime tip line, a Facebook page, a Twitter account, and a university webpage. The ESU police webpage includes trainings on how to react to an active shooter, fire drill evacuation plans, sick or injured persons, safety tips, and other relevant information at www4.esu.edu/emergency/procedures.cfm. The ESU police webpage also provides links to an anonymous crime tip line and a victim support resources page. (www4.esu.edu/about/offices/police/campus_tips.cfm) It provides useful webpage links on campus safety and security, emergency procedures, emergency action, environmental health and safety, police procedures, information on fire regulations and instructions on fire safety, personal safety and anti-crime programs, parking permits, staff contact information and victim support. Also, Commonwealth Law requires that evacuation drills be held regularly in University residence halls.

The Residence Life and Housing webpage (www4.esu.edu/students/residence_life/index.cfm) links its safety information back to the Campus Police webpage. Students are informed of emergency procedures at orientation, as are their parents. In addition, as a part of the Federal Clery Act implementation, safety and security issues are covered at regularly scheduled hall and floor meetings for residents at the beginning of each semester.

University Police officers offer a RAD (Rape Aggression Defense) (www.rad-systems.com) self-defense training multiple times per semester for women on campus. The police also work with student groups and staff to provide additional education and training in the areas of crime prevention, risk management, alcohol and drug prevention and bystander intervention as well as other topics upon specific request.

Downloadable information from the Campus Police webpage includes the annual Clery Crime and Fire statistics, Philadelphia Center City Annual Security Report, Safe Ride program, a Campus Security Authority (CSA) checklist and CSA training (PowerPoint format).

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. Some of the most important planning and regulatory capabilities that can be utilized for hazard mitigation include hazard mitigation plans, emergency operations plans, comprehensive plans, and master plans. The following sections discuss the scope of each of these plans in addition to how the University HMP relates to and strengthens each of these other plans.

5.3.1 County/Township Comprehensive Plans

Overview

County governments are required by law to adopt a comprehensive plan, while local municipalities may do so at their option. Municipal comprehensive plans must be reviewed at least every ten years.

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. The Pennsylvania Municipalities Planning Code, which governs comprehensive planning, requires that comprehensive plans be consistent with a number of laws and regulations that relate to hazard mitigation planning, including but not limited to the Pennsylvania Clean Streams Law, The Surface Mining Conservation and Reclamation Act, and the Oil and Gas Act. In some instances, the comprehensive plans already consider hazard mitigation.

East Stroudsburg University is situated in East Stroudsburg Borough and Smithfield Township within Monroe County, and all three entities have adopted comprehensive plans.

Plan Strengths and Alignment with ESU HMP

Integrating hazard mitigation into the county and township 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. The 2014 Monroe County Comprehensive Plan mentions the Monroe County Hazard Mitigation Plan Update not only to meet FEMA and PEMA requirements for funding assistance, but also "to develop a pre-disaster, multi-hazard mitigation plan that will not only guide the County toward greater disaster resistance, but will also respect the needs of the community."

Identified Gaps and Opportunities for Future Integration

The University has not previously worked with East Stroudsburg Borough and Smithfield Township to ensure that the HMP is in line with local comprehensive plans and HMPs. These plans have identified the value of cooperating with all surrounding municipalities on planning efforts and future developments at the University, as one of the two largest employment centers in the county, but an integration limitation is that they have not in the past specifically discussed the role of ESU in local community and economic development and disaster resilience.

Under the Monroe County Comprehensive Plan, one of the community objectives states, "Maintain and expand programs that protect and conserve land, air, and water resources and promote development that respects and enhances the county's natural lands and resources." The county should consider adding language directly tying conservation and protection projects to hazard mitigation principles since there is existing topical overlap.

The connections are stronger between the local and county comprehensive plans and the Campus Master Plan, as they are both documents that set out the vision and pattern of future development. That being said, in future plan updates, the University HMP and comprehensive plans may be useful data sources for one another.

5.3.2 County Hazard Mitigation Plan

Overview

As required by DMA 2000, counties maintain updated and FEMA-approved HMPs. As with the University HMP, the Monroe County HMP consist 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 HMPs follow the same maintenance schedule as the University HMP. They are updated and approved by FEMA on a five-year schedule, with annual maintenance updates in between each formal update. Monroe County's HMP was last formally updated in 2011; the 5-year updated is expected to begin in fall 2015.

Plan Strengths and Alignment with ESU HMP

As Monroe County's regulatory hazard mitigation plan, the 2011 HMP provided a solid baseline of information for the development and update of the 2015 ESU HMP. In particular, the County's risk assessment helped guide the hazard identification and vulnerability assessment of this HMP, especially with respect to hazards and vulnerabilities faced by East Stroudsburg Borough and Smithfield Township, both of which participated in the 2011 HMP. The HMSC reviewed the County HMP's identified hazards to determine those most appropriate for discussion in the ESU HMP. The top hazards in the county plan are flood, flash flood, ice jam; winter storms; environmental hazards; wildfire; and transportation accidents. The ESU HMP shares winter storms and transportation accidents as high-risk hazards, but has more of a focus on extreme temperatures and utility interruptions.

Identified Gaps and Opportunities for Future Integration

There is an opportunity for closer integration between the ESU HMP and the Monroe County HMP. The County HMP currently makes a minor reference to ESU as an institution of higher learning, but ESU was not a participant in the last county HMP update. As a result, while there are not contradictions between the County HMP and the ESU HMP, they should be more closely aligned. The next update of the county HMP should make additions to discuss the University as a population center and major economic facility, as well as to incorporate any vulnerabilities and mitigation strategies specific to ESU. The county HMP should also capture ESU's capabilities and opportunities for technical assistance identified at ESU. This will become important in the future as ESU will continue to be a partner in post-disaster response for the community and region as it was during Superstorm Sandy.

A final hazard mitigation plan integration activity is proposed in the ESU HMP: since the university leases property for additional learning sites and sends students to cooperative learning institutions like the Wallops Island Reserve in Virginia, Action 9 in the Mitigation Action Plan proposes that ESU coordinate and integrate not only with the Monroe County plan but also with the Philadelphia, Lehigh-Northampton, and Accomack County, VA HMPs.

5.3.3 ESU Emergency Operations Plan (EOP)

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.

Plan Strengths and Alignment with ESU HMP

Information from the existing EOP has been incorporated into this HMP throughout the Risk Assessment. For example, the EOP includes procedures the University employs to reduce the impact of civil disturbances and terrorism events. It was an invaluable tool in providing context, understanding, and procedures related to ESU's human-made disaster and incident response procedures.

Identified Gaps and Opportunities for Future Integration

ESU is in the process of reviewing its EOP concurrently with the HMP Update; this dual review and development process will ensure that the most up-to-date hazard and risk information is included in the EOP. ESU should ensure the types of hazard events identified in the HMP are discussed in the EOP. Most notably, the current EOP does not include incident-specific information for winter storms, which are the highest-ranked hazard in this HMP. This can be remedied during the next EOP's update.

5.3.4 ESU Campus Master Plan

Overview

A Campus Master Plan allows universities to identify short-term projects which align and further the long-term goals and plans of the institution. As documented in Volume VI-C: University Master Planning of the System's Facilities Manual, the Board of Governors (State System, BOG Policy 2000-02) requires all state institutions to maintain a current campus/facilities master plan, which should 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. The 2010 East Stroudsburg University Campus Facilities Master Plan proposed development in Phase I (2007-2012), Phase II (2012-2017), and Phase III (long term).

Plan Strengths and Alignment with ESU HMP

The 2010 Campus Facilities Master Plan has been incorporated into the 2015 University HMP in this chapter as well as in discussions of campus land uses (Section 2.4); hazard profiles (Section 4.3); and future development and vulnerability (Section 4.5). In its analysis of existing conditions, the master plan evaluated the presence of floodplains, steep slopes, wetlands, tree cover, and the condition of structures. This information was incorporated throughout the HMP in the hazard profiles for Flood, Flash Flood, Ice Jam; Hurricane, Tropical Storm, Nor'easter; Tornado, Windstorm; Civil Disturbance; and Transportation Accidents. The Master Plan identified that in general, there are not areas of ESU's main campus that are of a higher risk to hazards than others (i.e. floodplains, steep slopes, limestone bedrock, etc.). In addition, as the future land use and construction vision of the university, it allowed for a more complete discussion of future risks.

Identified Gaps and Opportunities for Future Integration

The next Campus Master Plan update should take the University HMP into consideration especially so that any areas designated as being at higher risk of hazards can be avoided. The Master Plan identified that the objective for future growth was in densifying the core of campus rather than constructing new buildings in the "Back 40" parcel, which has some steeper slopes and heavy tree cover that could be more hazard-prone. The next Master Plan should address improvements to campus design and planning that support hazard mitigation, like incorporating bicycle and pedestrian-friendly design that minimizes transportation accidents or burying overhead utility lines that could be impacted by winter storms, wind storms, or utility interruptions. In addition, the Campus Master Plan should include a discussion of safe and disaster-resistant building design to improve the future resilience of buildings. Building improvements that would serve to improve safety or resilience should be prioritized in future master plans.

5.3.5 Interagency Coordination with the County and Municipality

Overview

Interagency coordination ensures collaboration between various levels of authority and fosters idea-sharing as well as supports a cohesive strategy for emergency management and hazard mitigation.

Strengths and Alignment with ESU HMP

ESU, East Stroudsburg Borough, and Monroe County have been active partners during past emergency events. For example, ESU's Police Department used their contacts at the borough and the County Control Center to coordinate directly during Hurricane Sandy, especially with the on-campus shelter open to the general public during that event. The University Police Department has the capacity to communicate with the county and municipality via police radios, both handheld and in patrol vehicles.

Identified Gaps and Opportunities for Future Integration

Currently, while interagency coordination occurs as needed during hazard events, there is not a formal procedure for coordination between ESU, East Stroudsburg Borough, Smithfield Township, and Monroe County. It would be beneficial to include the County and municipalities in any future exercises that cover what to do in an emergency. ESU and the county/municipality should also coordinate on future grant funding proposals that will benefit both the university and the community. In addition, ESU should be invited to participate in future planning and emergency management processes as a significant stakeholder and as a possible source of implementation assistance or added capability.

6 MITIGATION STRATEGY

6.1 Update Process Summary

6.1.1 Mitigation Goals and Objectives Review

Mitigation *goals* are general guidelines that explain what the University wants to achieve. Goals are usually expressed as broad policy statements representing desired long-term results. Mitigation *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 can have a defined completion date. There were eight goals in the 2008 HMP. Each goal contained multiple objectives that outlined steps for achieving the desired outcome. The HMSC decided that the eight goals from the 2008 HMP should be refined to include newly identified hazards and reflect changes that have occurred at the University.

Perhaps the most significant change is that, instead of having many hazard specific goals, there is now one, single goals that addresses all natural and human-made hazards. This approach consolidates the goals and ensures that the mitigation strategy can reasonably accommodate any future hazards added to the HMP. Second, after the HMSC reviewed the risk assessment, they felt that Goal 6, promoting disaster-resistant future development and housing planning should be changed to disaster-ready future development because there are largely not areas of campus that are more susceptible to hazards than others. Instead of focusing on the geographic locations of buildings, the committee wanted to focus on actual building design and materials.

A list of the eight goals and corresponding objectives from the 2008 HMP as well as a review summary based on comments received from University representatives and other stakeholders who participated in the HMP update process is included in Table 6.1-1. These reviews are based on responses received from communities to the *Mitigation Strategy Evaluation Form* and the *Mitigation Action Form* as well as the extensive conversation held during the Mitigation Solutions Meeting.

Table 6.1-1 Review of 2008 ESU HMP Goals and Objectives.		
GOAL 1	**REDUCE POTENTIAL INJURY/DEATH AND DAMAGE TO EXISTING ASSETS AND THE UNIVERSITY COMMUNITY DUE TO FLOODS AND FLASH FLOODING.**	**COMMENTS**
Obj. 1-A	Evaluate protection of existing facilities in the flood-prone areas.	The HMSC decided that **Goal 1** should be edited to *"Reduce the potential injury/death and damage to existing assets and the university community due to natural and human-made hazards."* This condenses Goals 1-5 into one goal instead of having a separate goal for each hazard. **Objective 1.A** will be revised to "*Evaluate protection of existing facilities in hazard-prone areas"* to be more inclusive of other hazards. **Objective 1.B** is a project and not an objective; since the stormwater drainage project on campus is complete, so this has been removed. **Objective 1.C** is a project and not an objective, but since the HMSC reports that are no structures on campus that are floodprone, either from traditional riverine or from stormwater flooding, this action has been removed.
Obj. 1-B	Improve stormwater drainage around certain facilities.	
Obj. 1-C	Elevate certain structures or use either wet or dry floodproofing on lowest floors	
GOAL 2	**REDUCE POTENTIAL INJURY/DEATH AND DAMAGE TO EXISTING ASSETS AND THE UNIVERSITY COMMUNITY DUE TO SEVERE WEATHER.**	**COMMENTS**
Obj. 2-A	Identify the most vulnerable critical structures and infrastructure due to the effects of severe weather.	It was decided Goal 1 will be edited to *"Reduce the potential injury/death and damage to existing assets and the University due to natural and human-made hazards."* Therefore, this eliminates **Goal 2** and rolls it up into Goal 1. **Objective 2.A** will be reworded to "*Identify critical structures, infrastructure, and populations most vulnerable to the effects of natural and human-made hazards"* and moved under Goal 1 as Objective 1.B. **Objective 2.B, 2.C. and 2.D** will be continued into the 2015 plan and moved under Goal 1 as Objectives 1.C, 1.D, and 1.E. The wording of **Objective 2.C** will however be modified to change "severe weather" to "natural and human-made hazards."
Obj. 2-B	Reduce potential losses at critical facilities.	
Obj. 2-C	Identify members of the University community most vulnerable to severe weather.	
Obj. 2-D	Implement action plan to protect people.	
GOAL 3	**REDUCE POTENTIAL INJURY/DEATH AND DAMAGE TO EXISTING ASSETS AND THE UNIVERSITY COMMUNITY DUE TO HAZARDOUS MATERIAL RELEASES.**	**COMMENTS**
Obj. 3-A	Identify the most vulnerable facilities and people.	It was decided **Goal 1** will be edited to *"Reduce the potential injury/death and damage to existing assets and the University due to natural and human-made*

Table 6.1-1	Review of 2008 ESU HMP Goals and Objectives.	
Obj. 3-B	Develop comprehensive approach to reducing potential injury/damages from nearby storage facilities.	*hazards."* Therefore, this eliminates **Goal 3** and rolls it up into Goal 1. **Objective 3.A** will be deleted because the revision of Objective 2.A will achieve the same thing. **Objective 3.B** will be edited slightly to clarify that it addresses hazardous material storage and will be continued in the 2015 plan as Objective 1.F. **Objectives 3.C,** and **3.D** will be continued into the 2015 plan and moved under Goal 1 as Objectives 1.G and 1.H.
Obj. 3-C	Assess potential risk from hazmat transport on nearby roads.	
Obj. 3-D	Reduce risk from campus hazmat storage.	
GOAL 4	**REDUCE POTENTIAL INJURY/DEATH AND DAMAGE TO EXISTING ASSETS AND THE UNIVERSITY COMMUNITY DUE TO TERRORISM INCIDENTS.**	**COMMENTS**
Obj. 4-A	Evaluate vulnerability of the most critical structures and infrastructure relative to terrorism.	It was decided Goal 1 will be edited to *"Reduce the potential injury/death and damage to existing assets and the University due to natural and human-made hazards."* Therefore, this eliminates **Goal 4** and rolls it up into Goal 1. **Objective 4.A** will be eliminated because the revision of Objective 2.A will address the same objective. **Objectives 4.B** and **4.C** will be continued into the 2015 plan and moved under Goal 1 as Objectives 1.I and 1.J. **Objective 4.D** will be reworded to "*Increase University awareness of actions to take during a hazard event or emergency"* and will now become Objective 1.K in the 2015 plan.
Obj. 4-B	Assess the inherent and tactical vulnerability to terrorism of additional critical structures/infrastructure.	
Obj. 4-C	Enhance response capability of University emergency services.	
Obj. 4-D	Increase University awareness of actions to take during an emergency.	
GOAL 5	**REDUCE POTENTIAL INJURY/DEATH AND DAMAGE TO EXISTING ASSETS AND THE UNIVERSITY COMMUNITY DUE TO PANDEMIC.**	**COMMENTS**
Obj. 5-A	Identify the most-vulnerable populace relative to pandemics.	It was decided Goal 1 will be edited to *"Reduce the potential injury/death and damage to existing assets and the University due to natural and human-made hazards."* Therefore, this eliminates **Goal 5** and rolls it up into Goal 1. **Objective 5.A** is covered under the reviesed Objective 2.A which is being continued into the 2015 plan, so Objective 5.A will be removed. **Objective 5.2** is covered under the revised Objective 4.D and will be removed.
Obj. 5-B	Increase University awareness of actions to take during a pandemic.	
GOAL 6	**PROMOTE DISASTER-RESISTANT FUTURE DEVELOPMENT AND HOUSING PLANNING.**	**COMMENTS**

Table 6.1-1	Review of 2008 ESU HMP Goals and Objectives.	
Obj. 6-A	Encourage and facilitate the development or revision of Master Plan to limit development in high-hazard areas.	The HMSC revised **Goal 6** to state *'Promote disaster-ready future development and housing planning"* because the results of the risk assessment indicated that most hazard risk is campus-wide. IT will be continued in the 2015 HMP as Goal 2. **Objective 7.A** has been revised to state, *"Encourage and facilitate the development or revision of Master Plan to promote disaster-ready materials, design, and siting criteria for new buildings."* It is included in the 2015 HMP as Objective 2.A.
GOAL 7	**PROMOTE HAZARD MITIGATION AS A PUBLIC VALUE IN RECOGNITION OF ITS IMPORTANCE TO THE HEALTH, SAFETY, AND WELFARE OF THE POPULATION.**	**COMMENTS**
Obj. 7-A	Provide public education to increase awareness of hazards and opportunities for mitigation.	**Goal 7** and **Objectives 7.A, 7.B,** and **7.C** will be continued to the 2015 plan as Goal 3 and Objectives 3.A, 3.B, and 3.C.
Obj. 7-B	Continue to develop a University-wide approach to identifying and implementing mitigation actions.	
Obj. 7-C	Continue the promotion of disaster resistance in the University community via the hazard mitigation planning initiative.	
GOAL 8	**IMPROVE RESPONSE AND RECOVERY CAPABILITIES.**	**COMMENTS**
Obj. 8-A	Increase awareness by University community (i.e., through public outreach/education) of actions to take during an emergency.	**Goal 8** will be continued to the 2015 plan as Goal 4. **Objectives 8.A, 8.B, 8.C, and 8.D** will be continued to the 2015 plan as Objective 4.A, 4.B, 4.C, and 4.D.
Obj. 8-B	Enhance University emergency response teams.	
Obj. 8-C	Enhance response capability of University police and emergency medic al services personnel to special populations.	
Obj. 8-D	Improve back-up of critical files for recovery after an emergency.	

6.1.2 Mitigation Action Progress and Mitigation Successes

Actions provide more detailed descriptions of specific work tasks to help the University achieve the goals and objectives. The 2008 HMP identified eight mitigation actions for implementation. The HMSC reviewed and evaluated these actions as a part of the planning process; this section captures the progress and successes ESU has made towards becoming a safer campus community.

ESU has made progress on nearly all mitigation activities in the 2008 HMP, and many of the selected activities were/are ongoing in nature. For example, training and drills related to sheltering-in-place and evacuation are completed annually, and the EOP has been exercised since 2008. However, the University would like to expand its evacuation planning to address temporal procedures – that is, how evacuation procedures should change based on the time of day and time of year evacuation is needed. ESU has also improved its education and outreach efforts as they relate to preparedness and mitigation. The E2Campus alert system is fully functional, and since 2008, the campus siren and blue light systems have been expanded to cover more of the campus. Students are introduced to the campus emergency procedures early and the message is reinforced through videos and drills. Parents are also briefed on emergency procedures and can use the E2Campus system.

The University continues to focus on pedestrian safety, through both structural solutions like raised crosswalks and bus service and through signage and education. A shutdown of Normal Street has been proposed and, should it be completed, would mitigate many of the pedestrian-vehicular conflicts that result in injuries.

One of the higher-priority actions from 2008 was to purchase additional snow/ice removal equipment and increase associated staffing. The equipment purchase portion of the action was completed, but the University identified an ongoing need for on-call snow removal contracts. In addition, in recent winters, ESU saw that there did not seem to be a stated prioritization of what parts of campus were cleared of snow and ice first. This spurred a new aspect to this action which is included in the 2015 Action Plan: to identify which areas of campus are most essential for snow removal, like near residence halls and along major pathways.

Perhaps one of the biggest successes in mitigation ESU has seen is an improvement in the provision of backup power for critical campus facilities. This includes Stroud Hall, the Computer Center, the Utility Plant/Main Substation, and Dansbury Commons:

- Dansbury Commons: full backup power;
- The Utility Plant Substation/Main Power Pad: lighting-only backup power;
- Stroud Hall: backup power for lighting and incidentals;
- The Computer Center: full backup power.

In addition, during the development of this HMP, the consultant team assisted ESU in determining the generator load needed to power Koehler Fieldhouse, the next-highest priority facility for backup power. This facility is expected to be used as a large-scale, regional shelter during large disaster events. For example, it was used as a shelter for both on-and off-campus populations during Hurricane Sandy.

Many of the existing mitigation actions that are continuous, in progress, or not fully completed in the last five years have been carried over into the 2015 HMP. A list of all 2008 actions as well as a review and summary of their progress based on comments received from stakeholders involved in the HMPU process is included in Table 6.1-2.

Table 6.1-2 Review of 2008 Mitigation Actions Selected for Implementation.

2008 MITIGATION ACTION	COMPLETED	IN-PROGRESS / ONGOING	DISCONTINUE	DESCRIPTION OF PROGRESS
Provide campus-wide training on sheltering-in-place and conduct semi-annual drills related to the EOP.		X		This action has been addressed in multiple ways: online information on how to respond to an emergency has been redesigned this semester. Video training has been added. Drills are conducted annually for evacuation under the Cleary Act. ESU also uses tabletops as described in the EOP to evaluate response for multiple events. Action has been edited to reflect ongoing nature.
Develop a plan to improve campus-wide safety, accessibility, availability, and traffic flow to/from parking access points.		X		This action is in progress with the installation of raised crosswalks, shuttle service, pedestrian modifications, and signage. There are also plans to shut Normal Street down to vehicular travel. Action has been edited to reflect ongoing nature.
Develop designated campus evacuation routes and procedures based on using daily, full class, and residence hall enrollment numbers.		X		This action is in progress but is not complete. While ESU has identified evacuation routes and evacuation points in each building, there has not been temporal planning. Action has been edited to reflect that temporal planning is what will continue in the next five years.
Purchase additional snow/ice removal equipment; increase associated staffing.	X	X		New equipment has been purchased a few years ago. However, the university would like to keep a version of this action that discusses developing on-call removal contracts. In addition, the committee would like to identify high risk/high importance snow removal areas on campus and develop maps for training purposes for maintenance and facilities staff. Action has been edited to reflect that the snow removal is complete but staffing planning will continue in the next five years.
Continue to implement and expand the emergency alert/notification system, including training for university personnel and routine equipment and system testing.		X		This action is ongoing. ESU uses E2Campus for its emergency alerts. It is tested on an ongoing basis. Siren systems have been expanded as has the blue light system, especially in new residential areas. There are likely more places where these could be installed. The text alert system is geared to students and is mentioned at orientation. Parents are also aware of the system.

Table 6.1-2 Review of 2008 Mitigation Actions Selected for Implementation.

2008 MITIGATION ACTION	COMPLETED	IN-PROGRESS / ONGOING	DISCONTINUE	DESCRIPTION OF PROGRESS
Install emergency generators and lighting protection for identified critical buildings (Stroud Hall, Computer Center, Utility Plant/Main Substation, Dansbury Commons) to allow critical operations to continue.	X	X		Action has been completed for the identified buildings: Dansbury Commons has full backup power. The Substation has lighting-only backup power. Stroud Hall has backup power for lighting and incidentals. The Computer center has full backup power. Most are natural gas, but some are diesel. However, HMSC would like to focus on getting backup power/generator hookups at Koehler Field House in the next five years. In addition, according to the Vice President for Finance, all new construction at ESU will have generators, though it has not been determined whether the generators will be for full backup power or lighting and other essentials.
Establish a new Science Tech Safety subcommittee of key faculty and staff members to identify new hazards associated with the Science and Technology Center.		X		This action has been edited to reflect the need to expand it beyond the Science and Technology Center to all science and technology facilities on campus.
Resolve data deficiencies identified in 2008 HMP.		X		This action has been edited to specifically address the data deficiency identified in the 2015 HMP: the lack of hazard-specific information about individual structures.

6.2 Mitigation Goals and Objectives

While the 2008 HMP contained multiple objectives and goals that were specific to hazard mitigation planning, the HMSC decided to modify the 2009 goals and objectives to avoid redundancy and reflect current conditions at the University. Table 6.1-1 above explained how the existing goals were revised and below, Table 6.2-1 shows the newly established goals and objectives that will guide the 2015 HMPU. There are four goals and 19 objectives identified.

Table 6.2-1 Mitigation Goals and Objectives.

Goal 1	Reduce potential injury/death and damage to existing assets and the University community due natural and human-made hazards.
Objective 1.A	Evaluate protection of existing facilities in hazard-prone areas
Objective 1.B	Identify critical structures, infrastructure, and populations most vulnerable to the effects of natural and human-made hazards
Objective 1.C	Reduce potential losses at critical facilities.
Objective 1.D	Identify members of the University community most vulnerable to severe weather.

Table 6.2-1	Mitigation Goals and Objectives.
Objective 1.E	Implement action plan to protect people.
Objective 1.F	Develop comprehensive approach to reducing potential injury/damages from nearby hazardous material storage facilities.
Objective 1.G	Assess potential risk from hazardous materials transport on nearby roads.
Objective 1.H	Reduce risk from campus hazmat storage.
Objective 1.I	Assess the inherent and tactical vulnerability to terrorism of additional critical structures/infrastructure.
Objective 1.J	Enhance response capability of University emergency services.
Objective 1.K	Increase University awareness of actions to take during a hazard event or emergency
Goal 2	**Promote disaster-ready future development and housing planning.**
Objective 2.A	Encourage and facilitate the development or revision of Master Plan to promote disaster-ready materials, design, and siting criteria for new buildings.
Goal 3	**Promote hazard mitigation as a public value in recognition of its importance to the health, safety, and welfare of the population.**
Objective 3.A	Provide public education to increase awareness of hazards and opportunities for mitigation.
Objective 3.B	Continue to develop a University-wide approach to identifying and implementing mitigation actions.
Objective 3.C	Continue the promotion of disaster resistance in the University community via the hazard mitigation planning initiative.
Goal 4	**Improve response and recovery capabilities.**
Objective 4.A	Increase awareness by University community (i.e., through public outreach/education) of actions to take during an emergency.
Objective 4.B	Enhance University emergency response teams.
Objective 4.C	Enhance response capability of University police and emergency medic al services personnel to special populations.
Objective 4.D	Improve back-up of critical files for recovery after an emergency.

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 acquisition, 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.

Table 6.3-1 provides a matrix identifying the mitigation techniques used for the moderate and high risk hazards identified at ESU. The specific mitigation actions associated with these techniques are discussed in Section 6.4. These techniques were then used to help guide the development of the Mitigation Action Plan.

Table 6.3-1 Mitigation Strategy Matrix

MITIGATION CATEGORY	HAZARDS											
	EXTREME TEMPERATURE	FLOOD, FLASH FLOOD, ICE JAM	HURRICANE, TROPICAL STORM, NOR'EASTER	PANDEMIC AND INFECTIOUS DISEASE	RADON EXPOSURE	TORNADO, WINDSTORM	WINTER STORM	CIVIL DISTURBANCE	ENVIRONMENTAL HAZARDS: HAZARDOUS MATERIAL RELEASE	TERRORISM	TRANSPORTATION ACCIDENTS	UTILITY INTERRUPTION
Local plans and regulations	X	X	X	X	X	X	X	X	X	X	X	X
Structure and infrastructure	X	X	X			X	X					X
Natural systems protection		X	X									
Education and awareness	X	X	X	X	X	X	X	X	X	X	X	X

6.4 Mitigation Action Plan

Following the risk assessment stage of the update process, a mitigation workshop was held on April 29, 2014 to develop a framework for the ESU Mitigation Action Plan. At the workshop, the HMSC went over Mitigation Techniques using FEMA's *Mitigation Ideas* document and the mitigation actions from the existing 2008 HMP. The members of the HMSC were provided with a Mitigation Strategy Evaluation Form and asked to determine if each project in the 2008 HMP was completed, discontinued, is continuous, in progress/not yet complete, or if there has been no progress on the project. "Completed" actions were not carried over to the 2015 Action Plan; there were no "discontinued" actions. S In the course of reviewing the 2008 mitigation actions and discussing ESU's mitigation priorities for the next five years, several new mitigation actions/projects emerged. While all participants were given Mitigation Action Forms, the entire HMSC had a conversation about new actions and the consultant completed the action forms as ideas emerged from the conversation. These actions and discussion notes are included in **Appendix C**.

The final list of 22 mitigation actions is contained in Table 6.4-1. At least one mitigation action was established for each moderate and high risk 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.

Table 6.4-1 List of 2015 mitigation actions with information including action category, hazard addressed, action description, lead agency/department and general implementation schedule.

COMMUNITY: East Stroudsburg University **ACTION NO: 1**	**ACTION: Continue to provide campus-wide emergency training, which includes evacuation and shelter-in-place) and conduct semi-annual drills related to the EOP.**
Category:	Education and Awareness
Hazard(s) Addressed:	Extreme Temperature; Flood, Flash Flood, Ice Jam; Hurricane, Tropical Storm, Nor'easter; Pandemic and Infectious Disease; Tornado, Windstorm; Civil Disturbance; Environmental Hazards (Hazardous Material Release); Terrorism, Transportation Accidents; Utility Interruption
Lead Agency/Department:	University Police
Implementation Schedule:	Ongoing
Estimated Cost:	Staff Time
Funding Source:	Staff Time; ESU Budget
COMMUNITY: East Stroudsburg University **ACTION NO: 2**	**ACTION: Continue to develop plans to improve campus-wide safety, accessibility, availability, and traffic flow to/from parking access points.**
Category:	Plans and Regulations
Hazard(s) Addressed:	Extreme Temperature; Flood, Flash Flood, Ice Jam; Hurricane, Tropical Storm, Nor'easter; Pandemic and Infectious Disease; Tornado, Windstorm; Civil Disturbance; Environmental Hazards (Hazardous Material Release); Terrorism, Transportation Accidents; Utility Interruption
Lead Agency/Department:	University Police; Facilities
Implementation Schedule:	Ongoing
Estimated Cost:	Staff time and potential planning consultant at $50,000
Funding Source:	Staff Time; ESU Budget
COMMUNITY: East Stroudsburg University **ACTION NO: 3**	**ACTION: Develop campus evacuation procedures based on daily, full class, and residence hall enrollment numbers.**
Category:	Plans and Regulations
Hazard(s) Addressed:	Extreme Temperature; Flood, Flash Flood, Ice Jam; Hurricane, Tropical Storm, Nor'easter; Pandemic and Infectious Disease; Tornado, Windstorm; Civil Disturbance; Environmental Hazards (Hazardous Material Release); Terrorism, Transportation Accidents; Utility Interruption
Lead Agency/Department:	University Police

Table 6.4-1 List of 2015 mitigation actions with information including action category, hazard addressed, action description, lead agency/department and general implementation schedule.

Implementation Schedule:	3 years
Estimated Cost:	Staff time and potential planning consultant at $50,000
Funding Source:	ESU Budget; PEMA; FEMA
COMMUNITY: East Stroudsburg University **ACTION NO: 4**	**ACTION: Develop on-call snow removal contracts and identify high-risk/high-importance snow removal areas.**
Category:	Plans and Regulations
Hazard(s) Addressed:	Winter Storm
Lead Agency/Department:	Procurement; Facilities
Implementation Schedule:	2 years
Estimated Cost:	Staff Time
Funding Source:	Staff Time
COMMUNITY: East Stroudsburg University **ACTION NO: 5**	**ACTION: Continue to implement and expand the emergency alert/notification system, including training for university personnel and routine equipment and system testing.**
Category:	Education and Awareness
Hazard(s) Addressed:	Extreme Temperature; Flood, Flash Flood, Ice Jam; Hurricane, Tropical Storm, Nor'easter; Pandemic and Infectious Disease; Tornado, Windstorm; Civil Disturbance; Environmental Hazards (Hazardous Material Release); Radon Exposure; Terrorism, Transportation Accidents; Utility Interruption
Lead Agency/Department:	Facilities Department; University Police; IT Department
Implementation Schedule:	5 years
Estimated Cost:	Staff time and potential purchase of additional equipment of $5-10,000
Funding Source:	ESU Budget; PEMA; FEMA
COMMUNITY: East Stroudsburg University **ACTION NO: 6**	**ACTION: Install emergency generators, generator hook-ups, and/or lighting protection for Koehler Field House.**
Category:	Structure and Infrastructure
Hazard(s) Addressed:	Extreme Temperature; Flood, Flash Flood, Ice Jam; Hurricane, Tropical Storm, Nor'easter; Tornado, Windstorm; Winter Storm; Utility Interruption
Lead Agency/Department:	Facilities Department; University Police
Implementation Schedule:	5 years

Table 6.4-1 List of 2015 mitigation actions with information including action category, hazard addressed, action description, lead agency/department and general implementation schedule.	
Estimated Cost:	$117,700
Funding Source:	ESU Budget; the State System; PEMA; FEMA
COMMUNITY: East Stroudsburg University **ACTION NO: 7**	**ACTION: Widen the scope of the Science Tech Safety subcommittee of key faculty and staff members to identify new hazards associated with all science and technology facilities on campus.**
Category:	Education and Awareness
Hazard(s) Addressed:	Environmental Hazards
Lead Agency/Department:	Chemistry Department
Implementation Schedule:	2 years
Estimated Cost:	$10,000
Funding Source:	Staff Time
COMMUNITY: East Stroudsburg University **ACTION NO: 8**	**ACTION: Address identified data limitations regarding lack of detailed information about characteristics of individual structures. Develop the spatial data to allow future revisions of this plan to more easily incorporate information about construction type, age, condition, presence of basement, elevation, etc.**
Category:	Education and Awareness
Hazard(s) Addressed:	Extreme Temperature; Flood, Flash Flood, Ice Jam; Hurricane, Tropical Storm, Nor'easter; Pandemic and Infectious Disease; Tornado, Windstorm; Civil Disturbance; Environmental Hazards (Hazardous Material Release); Radon Exposure; Terrorism, Transportation Accidents; Utility Interruption
Lead Agency/Department:	Facilities; Geography Department
Implementation Schedule:	Annual
Estimated Cost:	$100,000
Funding Source:	Staff Time; ESU Budget
COMMUNITY: East Stroudsburg University **ACTION NO: 9**	**ACTION: Evaluate Hazard Mitigation Plans for jurisdictions with auxiliary ESU sites (Philadelphia and Northampton County) and for Wallops Island Research Field Station (Accomack County, VA) to identify relevant risk information for future inclusion in the ESU HMP and provide university HMP to those jurisdictions for future coordinated planning.**
Category:	Plans and Regulations

Table 6.4-1 List of 2015 mitigation actions with information including action category, hazard addressed, action description, lead agency/department and general implementation schedule.

Hazard(s) Addressed:	Extreme Temperature; Flood, Flash Flood, Ice Jam; Hurricane, Tropical Storm, Nor'easter; Pandemic and Infectious Disease; Tornado, Windstorm; Civil Disturbance; Environmental Hazards (Hazardous Material Release); Radon Exposure; Terrorism, Transportation Accidents; Utility Interruption
Lead Agency/Department:	Environmental Health and Safety Officer; Biological Sciences Department (for Wallops Island)
Implementation Schedule:	Annually
Estimated Cost:	Staff time
Funding Source:	Staff Time
COMMUNITY: East Stroudsburg University **ACTION NO: 10**	**ACTION: Continue to coordinate with Pocono Medical Center, the PA Department of Health and CDC on monitoring diseases with pandemic potential. Tailor signage and messaging campaigns to be flexible with new threats.**
Category:	Education and Awareness
Hazard(s) Addressed:	Pandemic and Infectious Disease
Lead Agency/Department:	Student Health Services
Implementation Schedule:	Annually
Estimated Cost:	Staff time
Funding Source:	Staff Time; ESU Budget
COMMUNITY: East Stroudsburg University **ACTION NO: 11**	**ACTION: Develop "Buddy System" program with Residence Life to improve students' ability to help each other during an emergency event.**
Category:	Plans and Regulations
Hazard(s) Addressed:	Extreme Temperature; Flood, Flash Flood, Ice Jam; Hurricane, Tropical Storm, Nor'easter; Pandemic and Infectious Disease; Tornado, Windstorm; Civil Disturbance; Environmental Hazards (Hazardous Material Release); Terrorism, Transportation Accidents; Utility Interruption
Lead Agency/Department:	Residence Life
Implementation Schedule:	3 years
Estimated Cost:	Staff time and $500-1,000 in advertising/materials to develop program
Funding Source:	Staff Time; the State System; ESU Budget
COMMUNITY: East Stroudsburg University **ACTION NO: 12**	**ACTION: Develop campus-wide prioritization methodology for determining which structures are highest-priority for receiving backup power.**
Category:	Plans and Regulations

Table 6.4-1 List of 2015 mitigation actions with information including action category, hazard addressed, action description, lead agency/department and general implementation schedule.

Hazard(s) Addressed:	Utility Interruption
Lead Agency/Department:	Facilities
Implementation Schedule:	2 years
Estimated Cost:	Staff time
Funding Source:	Staff Time
COMMUNITY: East Stroudsburg University **ACTION NO: 13**	**ACTION: Continue sending Facilities Management Staff to Crime Prevention through Environmental Design for Schools Training and consider sending members of University Police.**
Category:	Education and Awareness
Hazard(s) Addressed:	Terrorism, Civil Disturbance
Lead Agency/Department:	Facilities; University Police
Implementation Schedule:	Ongoing
Estimated Cost:	$500 per staff member attending training
Funding Source:	ESU Budget
COMMUNITY: East Stroudsburg University **ACTION NO: 14**	**ACTION: Complete a bicycle/pedestrian plan for main campus to identify the flow of non-motorized transportation, identify conflict locations or unsafe intersections, and develop strategies to improve bicycle and pedestrian safety.**
Category:	Plans and Regulations
Hazard(s) Addressed:	Transportation Accidents
Lead Agency/Department:	Facilities; University Police
Implementation Schedule:	3 years
Estimated Cost:	Staff time and potential planning consultant at $20,000
Funding Source:	ESU Budget; PennDOT
COMMUNITY: East Stroudsburg University **ACTION NO: 15**	**ACTION: Engage Geography and GIS students to develop qualitative evaluation process to determine relative vulnerability for university assets and identify those in need of upgrades.**
Category:	Plans and Regulations; Structure and Infrastructure
Hazard(s) Addressed:	Extreme Temperature; Flood, Flash Flood, Ice Jam; Hurricane, Tropical Storm, Nor'easter; Pandemic and Infectious Disease; Tornado, Windstorm; Civil Disturbance; Environmental Hazards (Hazardous Material Release); Radon Exposure; Terrorism, Transportation Accidents; Utility Interruption
Lead Agency/Department:	University Police; Facilities; Geography Department
Implementation Schedule:	2 years
Estimated Cost:	Staff and Geography/GIS Student Time

Table 6.4-1 List of 2015 mitigation actions with information including action category, hazard addressed, action description, lead agency/department and general implementation schedule.	
Funding Source:	Staff Time; Student Volunteers
COMMUNITY: East Stroudsburg University	**ACTION: Identify buildings most susceptible to being hit by falling trees and/or limbs and modify the buildings and/or the trees.**
ACTION NO: 16	
Category:	Structure and Infrastructure
Hazard(s) Addressed:	Hurricane, Tropical Storm, Nor'easter; Tornado, Windstorm
Lead Agency/Department:	Facilities
Implementation Schedule:	3 years
Estimated Cost:	$250,000
Funding Source:	Staff Time; ESU Budget
COMMUNITY: East Stroudsburg University	**ACTION: Continue to work with the Monroe County Conservation District on stormwater management through the installation of bioswales, meadows, and rain gardens to lessen the impacts of stormwater-related and flash flooding.**
ACTION NO: 17	
Category:	Natural Systems Protection
Hazard(s) Addressed:	Flood, Flash Flood, Ice Jam; Hurricane, Tropical Storm, Nor'easter
Lead Agency/Department:	Monroe County Conservation District; Facilities
Implementation Schedule:	Ongoing
Estimated Cost:	Approx. $12-30 per square foot for each low impact development practice
Funding Source:	PA Infrastructure Investment Authority (PENNVEST); Staff Time
COMMUNITY: East Stroudsburg University	**ACTION: Work with Monroe County EMA and the Local Emergency Planning Committee (LEPC) to understand the flow of hazardous materials near campus. Develop a risk management program that addresses ESU's risk and vulnerability to hazardous material incidents both at fixed facilities and in transit.**
ACTION NO: 18	
Category:	Plans and Regulations
Hazard(s) Addressed:	Environmental Hazards - Hazardous Material Releases
Lead Agency/Department:	University Police; Monroe County EMA; Monroe County LEPC
Implementation Schedule:	5 years
Estimated Cost:	Staff Time
Funding Source:	Staff Time; ESU Budget
COMMUNITY: East Stroudsburg University	**ACTION: Distribute and promote the inclusion of vulnerability analysis information as part of next master plan review/update.**
ACTION NO: 19	

Table 6.4-1 List of 2015 mitigation actions with information including action category, hazard addressed, action description, lead agency/department and general implementation schedule.	
Category:	Plans and Regulations
Hazard(s) Addressed:	Extreme Temperature; Flood, Flash Flood, Ice Jam; Hurricane, Tropical Storm, Nor'easter; Pandemic and Infectious Disease; Tornado, Windstorm; Civil Disturbance; Environmental Hazards (Hazardous Material Release); Radon Exposure; Terrorism, Transportation Accidents; Utility Interruption
Lead Agency/Department:	Facilities
Implementation Schedule:	By next master plan update (timing unknown)
Estimated Cost:	Staff Time
Funding Source:	Staff Time
COMMUNITY: East Stroudsburg University **ACTION NO: 20**	**ACTION: Conduct outreach directly to student athletes and their coaches on the warning signs of heat- and cold-related illnesses.**
Category:	Education and Awareness
Hazard(s) Addressed:	Extreme Temperature
Lead Agency/Department:	Student Health Services; Athletics
Implementation Schedule:	<3 years
Estimated Cost:	Staff Time
Funding Source:	Staff Time; ESU Budget
COMMUNITY: East Stroudsburg University **ACTION NO: 21**	**ACTION: Work with East Stroudsburg Area School District on getting emergency fuel access cards so ESU personnel can get fuel for generators.**
Category:	Plans and Regulations
Hazard(s) Addressed:	Extreme Temperature; Flood, Flash Flood, Ice Jam; Hurricane, Tropical Storm, Nor'easter; Tornado, Windstorm; Winter Storm; Utility Interruption
Lead Agency/Department:	University Police; Facilities; East Stroudsburg Area School District
Implementation Schedule:	3 years
Estimated Cost:	Staff Time
Funding Source:	Staff Time
COMMUNITY: East Stroudsburg University **ACTION NO: 22**	**ACTION: Implement a campus-wide bar code database inventory system to track all chemicals stored on campus.**
Category:	Plans and Regulations
Hazard(s) Addressed:	Hazardous Material Releases
Lead Agency/Department:	Facilities; Chemistry Department
Implementation Schedule:	3 years

Table 6.4-1 List of 2015 mitigation actions with information including action category, hazard addressed, action description, lead agency/department and general implementation schedule.	
Estimated Cost:	$500,000
Funding Source:	Staff Time; ESU budget
COMMUNITY: East Stroudsburg University **ACTION NO: 23**	**ACTION: Review and incorporate existing plans into this HMP, including Campus Master Plan, Campus EOP, County Hazard Mitigation Plan, and County Comprehensive Plan.**
Category:	Plans and Regulations
Hazard(s) Addressed:	Extreme Temperature; Flood, Flash Flood, Ice Jam; Hurricane, Tropical Storm, Nor'easter; Pandemic and Infectious Disease; Radon Exposure; Tornado, Windstorm; Winter Storm; Civil Disturbance; Environmental Hazards (Hazardous Material Release); Terrorism; Transportation Accidents; Utility Interruption
Lead Agency/Department:	University Police/Environmental Health and Safety Officer
Implementation Schedule:	Annually
Cost:	Staff Time
Funding Source:	Staff Time; ESU budget

Table 6.4-1 lists 22 mitigation actions, many of which will require substantial time commitment to implement. The HMSC believes these actions are attainable and can be implemented over the next five-years. While all activities will be pursued over the next five years, the reality of limited time and resources requires the evaluation and prioritization of mitigation actions.

Evaluating mitigation actions involves judging each action against certain criteria to determine whether or not it can be executed. The feasibility of each mitigation action was evaluated using the ten evaluation criteria set forth in the Mitigation Action Evaluation methodology. The methodology solicits input on whether each action is highly effective or feasible and ineffective or not feasible for the criteria. These criteria are listed below and aid in determining the feasibility of implementing one action over another.

- **Life Safety:** Will the action be effective in promoting public safety?
- **Property Protection:** Will the action be effective in protecting public or private property?
- **Technical:** How effective will the action be in avoiding or reducing future losses?
- **Political:** Does the action have public and political support?
- **Legal:** Does the community have the authority to implement the proposed measure?
- **Environmental:** Will the action provide environmental benefits and will it comply with local, state and federal environmental regulations?
- **Social:** Will the action be acceptable by the community or will it cause any one segment of the population to be treated unfairly?

- **Administrative:** Is there adequate staffing and funding available to implement the action in a timely manner?
- **Local Champion**: Is there local support for the action to help ensure its completion?
- **Other Community Objectives**: Does the action address any current or future community objectives either through municipal planning or community goals?

To evaluate the mitigation actions, each action as was identified as highly effective or feasible and ineffective and *favorable* and *less favorable* factors were identified for each action. For each criterion, the prioritization methodology assigned a "+" if the action was highly effective or feasible, a "-" if the action was ineffective or not feasible, and a "N" if no cost or benefit could be associated with the suggested action or the action was not applicable to the criteria. Results are included in Table 6.4-2 below. All actions received scores where their positive factors outweighed their negative factors.

Table 6.4-2 Feasibility evaluation of mitigation actions.

MITIGATION ACTION		MITIGATION ACTION EVALUATION CRITERIA (+) HIGHLY EFFECTIVE OR FEASIBLE (-) INEFFECTIVE OR NOT FEASIBLE (N) NEUTRAL OR NOT APPLICABLE										TOTAL SCORE
ACTION NO.	ACTION	LIFE SAFETY	PROPERTY PROTECTION	TECHNICAL	POLITICAL	LEGAL	ENVIRONMENTAL	SOCIAL	ADMINISTRATIVE	LOCAL CHAMPION	OTHER COMMUNITY OBJECTIVES	
1	Continue to provide campus-wide emergency training, which includes evacuation and shelter-in-place) and conduct semi-annual drills related to the EOP.	+	N	N	+	+	N	+	+	+	N	6 (+) 0 (-) 4 (N)
2	Continue to develop plans to improve campus-wide safety, accessibility, availability, and traffic flow to/from parking access points.	+	N	-	+	+	N	+	+	+	N	6 (+) 1 (-) 3 (N)
3	Develop campus evacuation procedures based on daily, full class, and residence hall enrollment numbers.	+	N	+	+	+	N	+	+	+	N	7 (+) 0 (-) 3 (N)
4	Develop on-call snow removal contracts and identify high-risk/high-importance snow removal areas.	+	N	N	-	+	N	+	+	+	N	5 (+) 1 (-) 4 (N)
5	Continue to implement and expand the emergency alert/notification system, including training for university personnel and routine equipment and system testing.	+	N	N	+	+	N	+	+	+	N	6 (+) 0 (-) 4 (N)

Table 6.4-2 Feasibility evaluation of mitigation actions.

MITIGATION ACTION		MITIGATION ACTION EVALUATION CRITERIA (+) HIGHLY EFFECTIVE OR FEASIBLE (-) INEFFECTIVE OR NOT FEASIBLE (N) NEUTRAL OR NOT APPLICABLE										TOTAL SCORE
ACTION NO.	ACTION	LIFE SAFETY	PROPERTY PROTECTION	TECHNICAL	POLITICAL	LEGAL	ENVIRONMENTAL	SOCIAL	ADMINISTRATIVE	LOCAL CHAMPION	OTHER COMMUNITY OBJECTIVES	
6	Install emergency generators, generator hook-ups, and/or lighting protection for Koehler Field House.		+	-	+	+	N	+	-	+	N	5 (+) 2 (-) 2 (N)
7	Widen the scope of the Science Tech Safety subcommittee of key faculty and staff members to identify new hazards associated with all science and technology facilities on campus.	N	N	N	+	+	N	N	+	+	N	4 (+) 0 (-) 6 (N)
8	Address identified data limitations regarding lack of detailed information about characteristics of individual structures. Develop the spatial data to allow future revisions of this plan to more easily incorporate information about construction type, age, condition, elevation, presence of basement, etc.	N	+	N	+	+	N	N	+	+	N	5 (+) 0 (-) 5 (N)

Table 6.4-2 Feasibility evaluation of mitigation actions.

MITIGATION ACTION		MITIGATION ACTION EVALUATION CRITERIA (+) *HIGHLY EFFECTIVE OR FEASIBLE* (-) *INEFFECTIVE OR NOT FEASIBLE* (N) *NEUTRAL OR NOT APPLICABLE*										TOTAL SCORE
ACTION NO.	ACTION	LIFE SAFETY	PROPERTY PROTECTION	TECHNICAL	POLITICAL	LEGAL	ENVIRONMENTAL	SOCIAL	ADMINISTRATIVE	LOCAL CHAMPION	OTHER COMMUNITY OBJECTIVES	
9	Evaluate Hazard Mitigation Plans for jurisdictions with auxiliary ESU Campuses (Philadelphia and Northampton County) and for Wallops Island Research Field Station (Accomack County, VA) to identify relevant risk information for future inclusion in the ESU HMP and provide university HMP to those jurisdictions for future coordinated planning.	N	N	N	+	-	N	+	+	+	N	4 (+) 1 (-) 5 (N)
10	Continue to coordinate with Pocono Medical Center, the PA Department of Health and CDC on monitoring diseases with pandemic potential. Tailor signage and messaging campaigns to be flexible with new threats.	+	N	+	+	+	N	N	+	+	N	6 (+) 0 (-) 4 (N)
11	Develop "Buddy System" program with Residence Life to improve students' ability to help each other during an emergency event.	+	N	+	+	+	N	-	+	+	N	6 (+) 1 (-) 3 (N)

Table 6.4-2 Feasibility evaluation of mitigation actions.

MITIGATION ACTION		MITIGATION ACTION EVALUATION CRITERIA (+) HIGHLY EFFECTIVE OR FEASIBLE (-) INEFFECTIVE OR NOT FEASIBLE (N) NEUTRAL OR NOT APPLICABLE										TOTAL SCORE
ACTION NO.	ACTION	LIFE SAFETY	PROPERTY PROTECTION	TECHNICAL	POLITICAL	LEGAL	ENVIRONMENTAL	SOCIAL	ADMINISTRATIVE	LOCAL CHAMPION	OTHER COMMUNITY OBJECTIVES	
12	Develop prioritization methodology for determining which structures are highest-priority for receiving backup power.	N	+	N	+	+	N	N	+	+	N	5 (+) 0 (-) 5 (N)
13	Continue sending Facilities Management Staff to Crime Prevention through Environmental Design for Schools Training and consider sending members of University Police.	+	+	+	+	+	N	N	-	+	N	6 (+) 1 (-) 3 (N)
14	Complete a bicycle/pedestrian plan for main campus to identify the flow of non-motorized transportation, identify conflict locations or unsafe intersections, and develop strategies to improve bicycle and pedestrian safety.	+	N	+	+	+	N	N	+	+	N	6 (+) 0 (-) 4 (N)
15	Engage Geography and GIS students to develop qualitative evaluation process to determine relative vulnerability for university assets and identify those in need of upgrades.	N	N	+	+	+	N	N	+	+	N	5 (+) 0 (-) 5 (N)

Table 6.4-2 Feasibility evaluation of mitigation actions.

MITIGATION ACTION		MITIGATION ACTION EVALUATION CRITERIA (+) HIGHLY EFFECTIVE OR FEASIBLE (-) INEFFECTIVE OR NOT FEASIBLE (N) NEUTRAL OR NOT APPLICABLE										TOTAL SCORE
ACTION NO.	ACTION	LIFE SAFETY	PROPERTY PROTECTION	TECHNICAL	POLITICAL	LEGAL	ENVIRONMENTAL	SOCIAL	ADMINISTRATIVE	LOCAL CHAMPION	OTHER COMMUNITY OBJECTIVES	
16	Identify buildings most susceptible to being hit by falling trees and/or limbs and modify the buildings and/or the trees.	+	+	+	+	+	-	N	+	+	N	7 (+) 1 (-) 2 (N)
17	Continue to work with the Monroe County Conservation District on stormwater management through the installation of bioswales, meadows, and rain gardens to lessen the impacts of stormwater-related and flash flooding.	N	N	+	+	+	+	N	+	+	N	6 (+) 0 (-) 4 (N)
18	Work with Monroe County EMA and the Local Emergency Planning Committee (LEPC) to understand the flow of hazardous materials near campus. Develop a risk management program that addresses ESU's risk and vulnerability to hazardous material incidents both at fixed facilities and in transit.	N	N	+	+	+	N	N	+	+	N	5 (+) 0 (-) 5 (N)

Table 6.4-2 Feasibility evaluation of mitigation actions.

MITIGATION ACTION		MITIGATION ACTION EVALUATION CRITERIA (+) *HIGHLY EFFECTIVE OR FEASIBLE* (-) *INEFFECTIVE OR NOT FEASIBLE* (N) *NEUTRAL OR NOT APPLICABLE*										TOTAL SCORE
ACTION NO.	ACTION	LIFE SAFETY	PROPERTY PROTECTION	TECHNICAL	POLITICAL	LEGAL	ENVIRONMENTAL	SOCIAL	ADMINISTRATIVE	LOCAL CHAMPION	OTHER COMMUNITY OBJECTIVES	
19	Distribute and promote the inclusion of vulnerability analysis information as part of next master plan review/update.	N	N	N	+	+	N	N	+	+	N	4 (+) 0 (-) 6 (N)
20	Conduct outreach directly to student athletes and their coaches on the warning signs of heat- and cold-related illnesses.	+	N	+	+	+	N	+	+	+	N	7 (+) 0 (-) 3 (N)
21	Work with East Stroudsburg Area School District on getting emergency fuel access cards so ESU personnel can get fuel for generators.	N	N	+	+	+	N	N	+	+	N	5 (+) 0 (-) 5 (N)
22	Implement a campus-wide bar code database inventory system to track all chemicals stored on campus.	+	+	+	N	N	+	N	-	+	N	5 (+) 1 (-) 4 (N)
23	Review and incorporate existing plans into this HMP, including Campus Master Plan, Campus EOP, County Hazard Mitigation Plan, and County Comprehensive Plan.	N	+	N	N	N	N	N	+	N	N	2 (+) 0 (-) 8 (N)

Actions were then compared with one another to determine a ranking or priority by applying the Multi-Objective Mitigation Action Prioritization criteria. Scores were assigned to each criterion using the following weighted, multi-objective mitigation action prioritization criteria.

- **Effectiveness** (weight: 20% of score): The extent to which an action reduces the vulnerability of people and property.
- **Efficiency** (weight: 30% of score): The extent to which time, effort, and cost is well used as a means of reducing vulnerability.
- **Multi-Hazard Mitigation** (weight: 20% of score): The action reduces vulnerability for more than one hazard.
- **Addresses High Risk Hazard** (weight: 15% of score): The action reduces vulnerability for people and property from a hazard(s) identified as high risk.
- **Addresses Critical Communications/Critical Infrastructure** (weight: 15% of score): The action pertains to the maintenance of critical functions and structures such as transportation, supply chain management, data circuits, etc.

Scores of 1, 2, or 3 were assigned for each multi-objective mitigation action prioritization criterion where 1 is a low score and 3 is a high score. Actions were prioritized using the cumulative score assigned to each. Each mitigation action was given a priority ranking (Low, Medium, and High) based on the following:

- Low Priority: 1.0 – 1.8
- Medium Priority: 1.9 – 2.4
- High Priority: 2.5 – 3.0

Table 6.4-3 presents the cumulative results of the prioritization of mitigation actions. Eight actions were ranked as high priority, nine were medium priority, and six scored as low-priority.

Table 6.4-3 Prioritization of mitigation actions.							
MITIGATION ACTIONS		MULTI-OBJECTIVE MITIGATION ACTION PRIORITIZATION CRITERIA					TOTAL SCORE
ACTION NO.	ACTION	EFFECTIVENESS	EFFICIENCY	MULTI-HAZARD MITIGATION	ADDRESSES HIGH RISK HAZARD	ADDRESSES CRITICAL COMMUNICATIONS/ CRITICAL INFRASTRUCTURE	
1	Continue to provide campus-wide emergency training, which includes evacuation and shelter-in-place) and conduct semi-annual drills related to the EOP.	2	3	3	3	1	2.5
2	Continue to develop plans to improve campus-wide safety, accessibility, availability, and traffic flow to/from parking access points.	2	2	3	2.5	1	2.125
3	Develop campus evacuation procedures based on daily, full class, and residence hall enrollment numbers.	3	3	3	2.5	1	2.625
4	Develop on-call snow removal contracts and identify high-risk/high-importance snow removal areas.	3	3	1	3	3	2.6
5	Continue to implement and expand the emergency alert/notification system, including training for university personnel and routine equipment and system testing.	3	3	3	2.5	1	2.625
6	Install emergency generators, generator hook-ups, and/or lighting protection for Koehler Field House.	3	3	2	3	3	2.8
7	Widen the scope of the Science Tech Safety subcommittee of key faculty and staff members to identify new hazards associated with all science and technology facilities on campus.	2	2	1	2	2.5	1.875

Table 6.4-3 Prioritization of mitigation actions.							
MITIGATION ACTIONS		MULTI-OBJECTIVE MITIGATION ACTION PRIORITIZATION CRITERIA					TOTAL SCORE
ACTION NO.	ACTION	EFFECTIVENESS	EFFICIENCY	MULTI-HAZARD MITIGATION	ADDRESSES HIGH RISK HAZARD	ADDRESSES CRITICAL COMMUNICATIONS/ CRITICAL INFRASTRUCTURE	
8	Address identified data limitations regarding lack of detailed information about characteristics of individual structures. Develop the spatial data to allow future revisions of this plan to more easily incorporate information about construction type, age, condition, elevation, presence of basement, etc.	3	2	3	2.5	1.5	2.4
9	Evaluate Hazard Mitigation Plans for jurisdictions with auxiliary ESU locations (Philadelphia and Northampton County) and for Wallops Island Research Field Station (Accomack County, VA) to identify relevant risk information for future inclusion in the ESU HMP and provide university HMP to those jurisdictions for future coordinated planning.	2	3	3	2	1	2.35
10	Continue to coordinate with Pocono Medical Center, the PA Department of Health and CDC on monitoring diseases with pandemic potential. Tailor signage and messaging campaigns to be flexible with new threats.	2	2	1	2	1	1.65
11	Develop "Buddy System" program with Residence Life to improve students' ability to help each other during an emergency event.	3		3	2.5	2	1.875
12	Develop prioritization methodology for determining which structures are highest-priority for receiving backup power.	3	3	1	3	3	2.6

Table 6.4-3 Prioritization of mitigation actions.

MITIGATION ACTIONS		MULTI-OBJECTIVE MITIGATION ACTION PRIORITIZATION CRITERIA					TOTAL SCORE
ACTION NO.	ACTION	EFFECTIVENESS	EFFICIENCY	MULTI-HAZARD MITIGATION	ADDRESSES HIGH RISK HAZARD	ADDRESSES CRITICAL COMMUNICATIONS/ CRITICAL INFRASTRUCTURE	
13	Continue sending Facilities Management Staff to Crime Prevention through Environmental Design for Schools Training and consider sending members of University Police.	2	2	1	1	2.5	1.725
14	Complete a bicycle/pedestrian plan for main campus to identify the flow of non-motorized transportation, identify conflict locations or unsafe intersections, and develop strategies to improve bicycle and pedestrian safety.	2	3	1	3	1	2.1
15	Engage Geography and GIS students to develop qualitative evaluation process to determine relative vulnerability for university assets and identify those in need of upgrades.	3	2	3	2.5	2.5	2.55
16	Identify buildings most susceptible to being hit by falling trees and/or limbs and modify the buildings and/or the trees.	3	3	1	2	2.5	2.375
17	Continue to work with the Monroe County Conservation District on stormwater management through the installation of bioswales, meadows, and rain gardens to lessen the impacts of stormwater-related and flash flooding.	3	3	2	2	1	2.35

Table 6.4-3 Prioritization of mitigation actions.

MITIGATION ACTIONS		MULTI-OBJECTIVE MITIGATION ACTION PRIORITIZATION CRITERIA					TOTAL SCORE
ACTION NO.	ACTION	EFFECTIVENESS	EFFICIENCY	MULTI-HAZARD MITIGATION	ADDRESSES HIGH RISK HAZARD	ADDRESSES CRITICAL COMMUNICATIONS/ CRITICAL INFRASTRUCTURE	
18	Work with Monroe County EMA and the Local Emergency Planning Committee (LEPC) to understand the flow of hazardous materials near campus. Develop a risk management program that addresses ESU's risk and vulnerability to hazardous material incidents both at fixed facilities and in transit.	3	3	1	2	2	2.3
19	Distribute and promote the inclusion of vulnerability analysis information as part of next master plan review/update.	3	3	3	2.5	2	2.775
20	Conduct outreach directly to student athletes and their coaches on the warning signs of heat- and cold-related illnesses.	2	2	1	3	1	1.8
21	Work with East Stroudsburg Area School District on getting emergency fuel access cards so ESU personnel can get fuel for generators.	3	2	2	2.5	2.5	2.35
22	Implement a campus-wide bar code database inventory system to track all chemicals stored on campus.	3	2	1	1.5	1	1.78
23	Review and incorporate existing plans into this HMP, including Campus Master Plan, Campus EOP, County Hazard Mitigation Plan, and County Comprehensive Plan.	3	2	3	3	0	2.25

7 PLAN MAINTENANCE

7.1 Update Process Summary

Monitoring, evaluation and updating of the Plan is critical to maintaining the relevance of the Plan. Ensuring effective implementation of mitigation activities paves the way for continued momentum in the planning process and gives direction for the future. This section explains who will be responsible for monitoring, evaluation and updating and what those responsibilities entail. The section also lays out the method and schedule of these activities and describes how the University community will be involved on a continued basis.

The development of the University's FEMA-approved 2015 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 2015 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 Section 7.4). Any potential modifications to the HMP that would impact those other documents were noted by the University HMP Steering Committee.

The previous HMP recommended the creation of a permanent Hazard Mitigation Committee that would oversee progress on mitigation actions and update the plan. It was proposed that the Committee meet quarterly to monitor mitigation activities with a semi-annual reporting structure. To the best knowledge of the HMSC, this has not occurred and there was no evaluation and update of the plan since 2008. However, progress was made on mitigation actions, as described in Section 6.1. In addition, ESU conducts training and drills related to campus emergency operations throughout the year and will continue to use these opportunities to make the students, faculty, and staff safer.

Changes made to the Plan Maintenance section for the 2015 HMPU include reducing the frequency of meeting by the HMSC to review the HMP from quarterly to annually as it was determined that quarterly reviews were too aggressive a schedule to maintain. The HMSC, 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 at ESU is the responsibility of all levels of the University (i.e., upper management, faculty, and staff), as well as the responsibility of the students. However, this Hazard Mitigation Plan itself requires a permanent entity to be in charge and responsible for the plan maintenance processes of monitoring, evaluation and updating. The ESU Hazard Mitigation Steering Committee (listed in Section 3 of this plan), under direction of ESU's Environmental Health and Safety Officer (located within the University Police Department), will oversee the progress made on the implementation of the identified action items and update the plan, as needed, to reflect changing conditions. The HMSC will also serve as the focal point for coordinating the University-wide mitigation efforts and will meet annually and following local declared emergencies to address to ensure the incident is properly reflected in the HMP. The HMSC will serve in an advisory capacity to the ESU Council of Trustees as needed on matters of mitigation.

The HMSC will monitor the mitigation activities by reviewing reports from the departments identified for implementation of the different mitigation actions. The Committee will request that the responsible agency or organization submit a semi-annual report that provides adequate information to assess the status of mitigation activities. The Committee will then provide their feedback to the individual departments.

Evaluation of the Plan will include checking on the implementation of mitigation actions and on reporting on the changing priorities for hazard mitigation at ESU. 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 HMSC.

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 HMSC will involve the ESU community during the evaluation and update of the Plan through annual public workshops and hearings. The ESU community will also have access to information via newsletters, mailings and the different departments implementing the plan. The University's website (www.esu.edu) will serve as a means of two-way communication by not only providing information about mitigation initiatives within the University, but also having feedback forms and other means for the public to express their views and comments. The HMSC will incorporate the public comments received in the next update of the Plan.

To promote public participation during the HMP's development, the ESU 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. For more information on the public comment period, see Section 3.4.

The University will continue to contact stakeholders, including students, faculty, and staff, via telephone, mail, and e-mail regarding mitigation projects. Any additional mitigation projects 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 East Stroudsburg University Hazard Mitigation Plan was granted Approval-Pending-Adoption Status on September 4, 2015. The following page is a template resolution available for use by the University and participating departments and organizations when formally adopting this HMP.

East Stroudsburg University Hazard Mitigation Plan

University Adoption Resolution

Resolution No. __________________

East Stroudsburg University, Pennsylvania State System of Higher Education

WHEREAS, East Stroudsburg University of East Stroudsburg Borough and Smithfield Township, Monroe County, 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 Police 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 East Stroudsburg 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 _________ day of ________________ <YEAR>.

ATTEST:

____

East Stroudsburg UNIVERSITY REPRESENTATIVES

By: _______________________________

By: _______________________________

By:_______________________________

9 APPENDICES

Appendix A Bibliography

Arizona Geological Survey. 2006. Arizona's Geologic Hazard Center – Radon. Retrieved at: http://www.azgs.state.az.us/hazards_radon.shtml.

Center for Infectious Disease Research and Policy (CIDRAP) at the University of Minnesota. H1N1 & Higher Ed Lessons Learned. November 2010. Retrieved at: http://www.cidrap.umn.edu/sites/default/files/public/downloads/big102webfinal_0.pdf

East Stroudsburg Borough. 1990. East Stroudsburg Borough Comprehensive Plan. Retrieved at: http://elibrary.pacounties.org/Documents/Monroe_County/1783;%20East%20Stroudsburg%20Borough/4208921872mcp.pdf.

East Stroudsburg Borough Floodplain Ordinance. 2013. Retrieved at: http://ecode360.com/12387196.

East Stroudsburg University. About ESU. Retrieved at: http://www4.esu.edu/about/index.cfm.

East Stroudsburg University Facilities Management Department. 2010. ESU Campus Facilities Master Plan. Retrieved at: http://www4.esu.edu/about/offices/facilities_management/master_plan.cfm/.

East Stroudsburg University Office of Institutional Research and Assessment. 2014. Common Data Set 2013-14. Retrieved at: http://www4.esu.edu/faculty_staff/oaie/common_data_set.cfm.

East Stroudsburg University Office of Institutional Research and Assessment. 2014. Fact Book 2013. Retrieved at: http://www4.esu.edu/faculty_staff/oaie/documents/pdf/Fact_Book_2013.pdf.

East Stroudsburg University Strategic Planning Steering Committee. 10 July 2014. *Students First Strategic Plan Draft 4.* Retrieved at: http://www4.esu.edu/about/administration/president/strategicplan/.

The Economist Newspaper Limited. "Glossary of Economic Terms." 2009. Retrieved at: http://www.economist.com/research/economics/alphabetic.cfm?letter=D

Federal Emergency Management Agency (FEMA). "General Information on Terrorism." April 2009. Retrieved at http://www.fema.gov/hazard/terrorism/info.shtm.

Federal Emergency Management Agency (FEMA). *Integrating Human-Caused Hazards into Mitigation Planning, FEMA 386-7.* September 2003. Retrieved at http://www.fema.gov/library/viewRecord.do?id=1915.

Federal Emergency Management Agency (FEMA). 1997. *Multi-Hazard Identification and Risk Assessment: A Cornerstone of the National Mitigation Strategy.* Washington, D.C.

Federal Emergency Management Agency. 2014. "National Flood Hazard Layer." Retrieved at: http://fema.maps.arcgis.com/home/webmap/viewer.html?webmap=cbe088e7c8704464aa0fc34eb99e7f30.

Federal Emergency Management Agency (FEMA). *Tornado Activity in the United States*. June 4, 2009. Retrieved at: http://www.fema.gov/plan/prevent/saferoom/tsfs02_torn_activity.shtm.

Herriman, Robert. 14 Feb 2015. "East Stroudsburg University GI outbreak affects 150, numbers declining." Outbreak News Today. Retrieved at: http://outbreaknewstoday.com/east-stroudsburg-university-gi-outbreak-affects-150-numbers-declining-60709/.

law, Eric and Brendan Kirby. 1996. *Ancillary Services*. Oak Ridge, TN: Oak Ridge National Laboratory.

Institute for Telecommunications Sciences, National Telecommunications and Information Administration of the United States Department of Commerce. "Electromagnetic Pulse (EMP)." 1996. Retrieved at: http://www.its.bldrdoc.gov/fs-1037/dir-013/_1938.htm

Juniata County, PA Multi-Jurisdictional Hazard Mitigation Plan (Juniata, PA MJHMP). July, 2008. *Appendix C – Hazard Profiles: Civil Disorder*.

Kansas State University (KSU). 2015. Reducing Radon in Your Home. Retrieved at: http://sosradon.org/reducing-radon-in-your-home.

Kaplan, Rebecca. 1 February 2015. "CDC 'very concerned' about potential for large measles outbreak." CBS News: Face the Nation. Retrieved at: http://www.cbsnews.com/news/cdc-very-concerned-about-potential-for-large-measles-outbreak/.

Klingseis, Katherine. Iowa University Student Fest Canceled after Riot. April 9, 2014. Retrieved at: http://www.usatoday.com/story/news/nation/2014/04/09/student-celebration-riot-iowa-state-university/7497989/

Lawrence County 2010 Hazard Mitigation Plan. February 24, 2010. Retrieved at: http://www.co.lawrence.pa.us/planning/Lawrence%20County%202010%20Hazard%20Mitigation%20Plan%20Update.pdf

Makkai, Adam. 1970. "Statistical Aspects of Phrasal Idioms in Modern English." *Proceedings of the 10th International Congress of Linguists, Bucharest, 1967*.

Martin, P.M.V. and E. Martin-Granel. "2500-year Evolution of the Term Epidemic." 2006. Retrieved at: http://www.cdc.gov/ncidod/EID/vol12no06/05-1263.htm.

Monroe County EMA. 2011. Monroe County All-Hazards Mitigation Plan Update.

Monroe County Planning Commission. 2014. Monroe 2030 Comprehensive Plan Draft.

Mercer County. 2005. *All Hazard Mitigation Plan.* Mercer County, PA.

National Center for Atmospheric Research (NCAR), Environmental and Societal Impacts Group, and the American Meteorological Society. 2001. *Extreme Weather Sourcebook 2001: Economic and Other Societal Impacts Related to Hurricanes, Floods, Tornadoes, Lightning, and Other U.S. Weather Phenomena*. National Center for Atmospheric Research: Boulder, CO.

National Hurricane Center (NHC). *Saffir-Simpson Hurricane Wind Scale*. 2014. Retrieved at: http://www.nhc.noaa.gov/aboutsshs.shtml.

National Climatic Data Center (NCDC). 2015. Storm Events Database. Retrieved at: http://www.ncdc.noaa.gov/stormevents/.

National Climatic Data Center (NCDC). 2011. United States Snow Climatology. Retrieved at: http://www.ncdc.noaa.gov/ussc/index.jsp.

National Oceanic and Atmospheric Administration. 7 February 2013. “Know the dangers of nor’easters.” Retrieved at: http://www.noaa.gov/features/03_protecting/noreasters.html.

National Oceanic and Atmospheric Administration (NOAA). 2009. *Comparative Climatic Data for the United States through 2009*.

National Oceanic and Atmospheric Administration – National Weather Service (NOAA NWS). NOAAWatch Themes: Excessive Heat. 2014. Retrieved at: http://www.noaawatch.gov/themes/heat.php.

National Oceanic and Atmospheric Administration – National Weather Service (NOAA NWS). NWS Windchill Chart. 2015. Retrieved at: http://www.nws.noaa.gov/om/winter/windchill.shtml.

National Research Council. 1986. *The Earth’s Electrical Environment.* Washington, DC: National Academy Press.

National Weather Service (NWS). December 1996. Service Assessment: Blizzard of ’96. Retrieved at: http://www.nws.noaa.gov/om/assessments/pdfs/bz-mrg.pdf

Ondrusek, Lynn. 29 October 2013. “East Stroudsburg University faculty and studnets rally in protest of department cuts.” Lehigh Valley Live. Retrieved at: http://www.lehighvalleylive.com/breaking-news/index.ssf/2013/10/east_stroudsburg_university_fa.html.

PA Department of Health. 2014-15 Influenza Season. Retrieved at: http://www.health.pa.gov/My%20Health/Diseases%20and%20Conditions/I-L/Pages/20142015-Influenza-Season.aspx#.VNE4vuHy6Ww.

PA Department of Health. 2015. Tuberculosis. Retrieved at: http://www.health.pa.gov/Your-Department-of-Health/Offices%20and%20Bureaus/Bureaus/Pages/Tuberculosis.aspx#.VNFBUOHy6Ww.

PA Department of Environmental Protection (PADEP). 2015. Radon Monitoring. Retrieved at: http://www.depreportingservices.state.pa.us/ReportServer/Pages/ReportViewer.aspx?/Radon/RadonZip.

Pennsylvania Department of Transportation. 2013. *Pennsylvania Crash Facts and Statistics: 2013.* Retrieved at: http://www.dot.state.pa.us/Internet/Bureaus/pdBHSTE.nsf/BHSTEHomepage?OpenFrameset.

Pennsylvania Public Utility Commission. Electric Service Reliability in Pennsylvania: 2011. September 2012. Retrieved at: http://www.puc.state.pa.us/general/publications_reports/pdf/Electric_Service_Reliability2011.pdf

Rainer Jr., Kelly Rex et al. June, 1991. "Risk Analysis for Information Technology." *Journal of Management Information Systems*. Vol. 8, Issue 1.

Smith, Chad. 10 October 2011. "Wall Street protest spreads to Poconos." Pocono Record. Retrieved at: http://www.poconorecord.com/article/20111010/News/110100322.

Smithfield Township and Shepstone Management Company. 2001. Comprehensive Plan Update. Retrieved at: http://www.shepstone.net/Smithfield/plan.pdf.

Tatu, Christina. 18 March 2011. "ESU looks at staff cuts, tuition hikes." Pocono Record. Retrieved at: http://www.poconorecord.com/apps/pbcs.dll/article?AID=/20110318/NEWS/103180349.

URS Corporation. East Stroudsburg University Emergency Operations Plan. June 2009.

U.S. Army Corps of Engineers Engineer Research and Development Center, Cold Regions Research and Engineering Laboratory. *Ice Jams and Ice Jam Flooding*. 2007. Retrieved at: http://www.crrel.usace.army.mil/icejams/.

United States Census Bureau. 2014. 2012 American Community Survey Five-Year Estimates. Retrieved at: http://www.factfinder2.census.gov.

United States Department of Energy. 2000. *Report of the US Department of Energy's Power Outage Study Team Findings and Recommendations to Enhance Reliability from the Summer of 1999.* Washington, D.C.

U.S. Department of Energy. 2005. *Liquefied Natural Gas: Understanding the Basic Facts*. Washington, D.C.

US Department of Transportation Pipeline and Hazardous Materials Safety Administration. Hazmat Incident Reports Database Search. Retrieved at: https://hazmatonline.phmsa.dot.gov/IncidentReportsSearch/.

US Centers for Disease Control and Prevention. 8 April 2014. "Mumps Outbreaks." Retrieved at: http://www.cdc.gov/mumps/outbreaks.html.

US Centers for Disease Control and Prevention (CDC). Meningococcal Disease. 1 April 2014. Retrieved at: http://www.cdc.gov/meningococcal/index.html

US Centers for Disease Control and Prevention. 26 July 2013. "Norovirus." Retrieved at http://www.cdc.gov/norovirus/about/overview.html.

US Centers for Disease Control and Prevention (CDC). The 2009 H1N1 Pandemic: Summary Highlights, April 2009-April 2010. June 16, 2010. Retrieved at: http://www.cdc.gov/h1n1flu/cdcresponse.htm

US Centers for Disease Control and Prevention (CDC). Tuberculosis (TB). July 14, 2014. Retrieved at: http://www.cdc.gov/tb/.

US Environmental Protection Agency (EPA). September 1993. EPA's Map of Radon Zones – National Summary. Document 402-R-93-071.

U.S. Environmental Protection Agency (EPA). 11 March 2010. "Radon Health Risks." Retrieved at: http://www.epa.gov/radon/healthrisks.html.

WFMZ News. 17 September 2014. "Police respond to reports of alleged cop killer near ESU's campus." Retrieved at: http://www.wfmz.com/news/Regional-Poconos-Coal/Local/police-respond-to-reports-of-alleged-cop-killer-near-esus-campus/28114752.

Appendix B Plan Review Tool

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Appendix C Meetings and Other Participation Document

Due to the size of this appendix, it is included as a separate PDF file.