

Mitigation Strategies

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Introduction

Disasters have affected university and college campuses with disturbing frequency in the history of campus preparedness. Sometimes those events cause death and injury, but always impose monetary loss and disruption of the institution's teaching, research, and public service mission. The effects from natural, human-made and technological hazards directly impact the safety and well-being of university faculty, staff, students and visitors.

Depending on the degree of severity, disasters can result in loss of educational time for students and economic hardship for the university and community. Significant losses can result from damage to campus buildings and infrastructure as well as interruption to the institutional mission. These losses can be measured by faculty and student departures, decreases in research funding, and increases in insurance premiums. While most hazards cannot be eliminated, the effects and losses can be substantially reduced through comprehensive pre-disaster planning and mitigation actions.

This section presents mitigation actions for the University to reduce potential exposure and losses identified as concerns in the risk assessment portion of a Hazard Identification, Risk Assessment and Mitigation Plan being developed by MSU. The mitigation strategies were developed through a collaborative group process and consist of goals, objectives, and mitigation actions. Hazard mitigation reduces the potential impacts of, and costs associated with, emergency and disaster related events. Mitigation actions address a range of impacts, including impacts on the population, property, business, environment, and emergency operations of MSU. Mitigation actions can include activities such as: revisions to and enforcement of best practices in building and land use, training, education, and structural or nonstructural safety measures.

Michigan State University Mitigation Goals

The purpose of this paper is to provide an outline for Michigan State University to follow to become less vulnerable to hazards. MSU's mitigation goals were derived from descriptions of potential damage from hazards discussed with University Infrastructure Planning and Facilities (IPF) personnel, members of the Emergency Management Accreditation Program (EMAP) Planning and Advisory Team, and City/County emergency management representatives. Through the preparation of the mitigation plan, emergency management considered MSU's overall risk and capacity to mitigate the effects of identified hazards. There was careful consideration of undertaking feasible mitigation projects.

The mitigation goals provide an outline for Michigan State University to follow to become less vulnerable to identified hazards. MSU’s mitigation goals are broad statements, but are achieved through more specific objectives and implementation steps. They are based upon the results of the risk assessment and a review of goals and objectives from other state and local plans, specifically, the Michigan Multi-Hazard Mitigation Plan, the Tri County Hazard and Mitigation Plan and the City of Lansing Hazard Mitigation Plan.

The goals are listed, but not prioritized, below:

Goal 1: Create a safe and secure environment for students, faculty, staff and visitors.
Objective 1-1: Implement mitigation actions that will assist in protecting lives and property by making buildings, infrastructure, critical facilities and individuals more resistant to hazards.
Objective 1-2: Better characterize hazard events by conducting additional hazard studies.
Objective 1-3: Review existing university policies, plans and procedures, safety inspection procedures, and other processes to help ensure that they address the most recent and generally accepted standards for the protection of buildings and environmental resources.
Objective 1-4: Implement mitigation actions that encourage environmental stewardship and protection of the environment.

Goal 2: Enhance emergency communications systems to provide the campus community with appropriate protective action and mitigation information.
Objective 2-1: Harden communications capabilities to ensure post event functionality.
Objective 2-2: Establish and maintain good working relationships with external agencies and departments in identifying warning sources and coordinating emergency notifications.

Goal 3: Strengthen University continuity of operations through integration with emergency operations plan, Continuity of Government plan and Disaster Recovery plan.
Objective 3-1: Encourage the establishment of policies to help ensure the prioritization and implementation of mitigation actions and/or projects designed to benefit essential facilities, services, and infrastructure.
Objective 3-2: Implement mitigation actions that enhance the technological capabilities of the Emergency Operations Center (EOC) to better track and assess exposure to hazards.

Goal 4: Enhance emergency preparedness, increase awareness, and promote risk reduction activities through education of and outreach to the campus community.
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Objective 4-1: Develop and implement additional education and outreach programs to increase campus community awareness of the risks associated with hazards and to educate the public on specific, individual preparedness activities.
Objective 4-2: Provide information on tools, partnership opportunities, funding resources, and current initiatives to assist in implementing mitigation activities.
Objective 4-3: Provide comprehensive information to the campus community, local emergency service providers, the media and the public during and following disaster and hazard events.

Table 1.1: Goals and Objectives in Mitigation Tables

Identification and Analysis of Mitigation Actions

Mitigation strategies have been developed and prioritized to address the risks identified. Going through the process, the University was guided by four principles for mitigation. These four principles provide a foundation for mitigation by establishing the key elements by which mitigation aims to manage risk with the goal of reducing risk and increasing resilience throughout the campus community.

1. *Resilience and Sustainability*

Preparing the campus community, its property and critical infrastructure resources to absorb the impact of a threatening event and bounce back in a manner that sustains its mission and functions in the aftermath of a disaster, makes it more resilient. Sustainability employs a longer-term approach through plans, policies, and actions that reflect a comprehensive understanding of the economic, social, and environmental systems within the campus community and its host communities.

2. *Leadership and Campus-focused Implementation*

Mitigation empowers university leaders and members to embrace their ownership of building a resilient and sustainable campus. Effective, ongoing mitigation is led by the campus community, working together to identify, plan for, and reduce vulnerabilities and promote long-term personal and community resilience and sustainability. Everyday discussions and actions can have unexpected implications for risk management and therefore should be viewed through the mitigation lens.

3. *Partnerships and Inclusiveness*

Mitigation is advanced through the collective actions of many groups. No one entity can accomplish these goals. These partnerships may include: staff, faculty, students, local/County/State government, the private sector and area non-profit organizations. Establishing trusted relationships prior to a disaster is essential to campus resilience and sustainability. These relationships enhance and strengthen day-to-day mitigation efforts and are critical for timely and effective response and recovery activities during and after a disaster event.

4. *Risk-conscious Culture*

The campus community is bolstered and made more resilient by anticipating, communicating, and preparing for internal and external threats/hazards through comprehensive and deliberate risk management. The value of a risk management

approach or strategy to decision makers is not in the promotion of a particular course of action, but rather in the ability to distinguish between various risk management choices for accepting, avoiding, reducing, or transferring the risk within the larger context.

A risk-conscious culture involves providing clear, meaningful, consistent, accessible (including for those with limited English proficiency and individuals with functional needs) messaging, so that the whole campus community embraces mitigation and reduces its exposure and vulnerability to risk.

A wide range of mitigation actions can be considered in order to help achieve established mitigation goals to create a feasible mitigation strategy and action plan.

Mitigation activities can fall into a number of categories, including preventative measures, property protection, public education and awareness, environmental protection, emergency operations, and structural projects.

The following is an overview of potential activities by category:

1. Preventative Measures

Preventative measures protect new development from hazards and ensure that potential loss is not increased. Preventative measures are guided through University programs and policies or external enforcement actions that influence the way campus open space is developed, buildings are constructed, or how people respond.

Prevention activities can be particularly effective where development has not yet occurred or where capital improvements have not been significant. Preventative mitigation activities include:

- Planning and Design
- Storm-water Management
- Public Safety
- Facilities Construction
- Capital Improvement Programming

2. Property Protection

Property protection measures prevent a hazard from damaging a building. Property protection measures are typically implemented by the university, but government can often provide technical and sometimes financial assistance. There are five general activities that can be classified as property protection:

- Building Relocation/Building Elevation
- Retrofitting (security enhancements, wind-proofing, fireproofing, etc.)
- Insurance Coverage
- Demolition
- Barriers (safe rooms, impact resistant glass)

3. Public Education and Awareness

Public education and awareness is a mitigation strategy that has a broad reaching impact across both the university and community. Activities that provide university faculty, staff, students, visitors and the off-campus community with information on how to protect themselves and others from potential hazards that may have the greatest impact on people to protect their own property and lives. Examples of public education

include:

- Outreach Projects
- Speaker Series
- Training & Exercises
- Hazard Map Information

4. Environmental Protection

Environmental protection mitigation activities are a way to enable land to function in a natural way. Because many natural areas have been affected by development and will be affected by development in the future; there are a number of ways to protect and restore the environment. This measure is important when considering activities for the outdoor locations MSU conducts research upon and the areas south of Mt. Hope Road where a great deal of research involves animal and plant life studies.

Resource protection activities can include:

- Wetlands Protection
- Erosion and Sedimentation Control
- Watershed Management
- Best Forest and Vegetation Management Practices
- Habitat Preservation

There are many benefits to naturally functioning watersheds, floodplains, and wetlands and they can include:

- Reduction in runoff from rainwater and snowmelt
- Infiltration and velocity control during overland flow
- Filtering of excess nutrients, pollutants and sediments
- Floodwater storage
- Water quality improvement
- Groundwater recharge
- Habitat availability
- Recreation and aesthetic qualities

5. Emergency Operations

A thorough emergency operations program addresses all hazards and involves all response departments and facilities, including those beyond the university in the community. While not typically considered a “mitigation” technique, emergency operation measures do minimize the impact of a hazard event on people and property.

There are a number of components to emergency services and they include:

- Threat Recognition
- Warning
- Response
- Critical Facilities Protection
- Post-Disaster Recovery & Mitigation

6. Structural Projects

Structural projects are intended to protect people and infrastructure from damage due to natural hazards. The complexity and cost of structural projects can vary greatly and are dependent on individual circumstances. Structural projects are undertaken where non-structural measures would not be effective. Structural projects may include:

- Reservoirs and Detention Areas
- Roadway & Pedestrian Pathway Improvements
- Drainage and Storm-water Improvements/Maintenance

Recommendation and Prioritization of Mitigation Actions

The mitigation strategy includes a wide range of mitigation actions that will reduce vulnerabilities to hazard events. Mitigation actions are typically presented in general terms without specific project details. Developing a mitigation project from these mitigation actions may require a great deal of effort. Not all mitigation actions identified in the plan will necessarily become fully developed projects. Some actions may be deleted from the mitigation strategy or deferred for implementation when the plan is updated.

After plan approval and implementation, when mitigation opportunities arise, the University will follow a seven-step process for developing proposed mitigation actions into well-defined mitigation projects.

1. The first step in the process is a review of the actions specified in the mitigation strategy and the information contained in the risk assessment section of the Hazard Identification, Risk Assessment and Mitigation Plan to identify opportunities to develop mitigation projects.
2. The second step in the process is to specify the problem and identify alternative projects that will solve the problem.
3. The third step is to conduct a feasibility review to identify obstacles to implementing the project and to determine the best alternative for the community. The feasibility review should include a preliminary evaluation of mitigation funding opportunities to determine whether funding beyond existing community resources might be available. Potentially negative environmental impacts of the proposed project should be identified at this stage of the process.
4. The fourth step is to select a project and to fully develop the project scope of work by establishing the exact specifications and costs of the project.
5. The fifth step is to obtain sufficient funding to implement and maintain the proposed mitigation project. This step may entail completing and submitting an application for funding to FEMA or another agency.
6. The sixth step is to implement, manage, and maintain the mitigation project. Communities receiving FEMA Hazard Mitigation Assistance must also comply with all reporting and administrative requirements.
7. The seventh and final step is to update the community's Hazard Identification, Risk Assessment and Mitigation Plan. Selected mitigation actions will be evaluated using various criteria as recommended by FEMA. This includes using the "STAPLEE"

evaluation criteria.¹

Social	<p>Is the proposed activity socially acceptable?</p> <p>Will the action adversely affect any one segment of the population?</p> <p>What effects will the action have on the social, historic, and cultural environment of the community?</p>
Technical	<p>Is the proposed action technically feasible and does it provide the appropriate level of protection?</p> <p>What types of technical/professional expertise will be required to plan and implement the project?</p> <p>Will the action create more problems than it solves?</p> <p>How long will it take to complete the project? Is this a reasonable timeframe</p>
Administrative	<p>Does the community have the capability (staff, expertise, time, funding) to implement the action?</p> <p>Can the community provide the necessary maintenance of the project?</p>
Political	<p>Is the mitigation action politically acceptable?</p> <p>Will the general public support or oppose this project?</p>
Legal	<p>Does the community have the authority to implement the proposed action?</p> <p>Will the action comply with local, State, and Federal environmental regulations?</p> <p>Is the action likely to be challenged by stakeholders whose interests may be adversely affected?</p>
Economic	<p>Do the costs of the action seem reasonable for the size of the problem and the likely benefits?</p> <p>What burden will be placed on the local economy to implement and maintain the action?</p> <p>Will the action generate additional jobs locally?</p>
Environmental	<p>Is the proposed action in a floodplain or wetland or will it indirectly impact the natural and beneficial functions of a floodplain or wetland?</p> <p>How will the action affect the natural environment?</p> <p>How will the action affect utility and transportation systems</p>

Table 1.2: STAPLEE Evaluation Criteria

¹ Using the Hazard Mitigation Plan to Prepare Successful Mitigation Projects: State and Local Mitigation Planning Guide. FEMA 386-9. August 2008, pp. 6-7 and 16-18. Retrieved from [https://www.fema.gov/media-library-data/20130726-1635-20490-7447/how to 9 aug08.pdf](https://www.fema.gov/media-library-data/20130726-1635-20490-7447/how_to_9_aug08.pdf) on January 29, 2016.

After examining the STAPLEE criteria, the goals and objectives reviewed in this section were prioritized based on the risk scores associated with hazards identified. Mitigation actions are listed in Table 7.3 and are based on building sufficient support to the overall emergency management all-hazards outlook.

Mitigation Actions	Goals/Objectives	Responsible Party
Provide outreach and awareness campaigns to the campus community to promote mitigation and preparedness efforts.	Goal 4: Obj.4-1, 4-3	Communications and Brand Strategy
Expand Mass Notification capabilities to external audiences.	Goal 1: Obj.1-1 Goal 2: Obj.2-2	Emergency Management Unit
Identify Unit Level plans for each hazard identified in the Risk Score Result Rankings from Section V of this plan.	Goal 3: Obj.3-1	Emergency Management Accreditation Program Planning and Advisory Team
Mitigation Actions	Goals/Objectives	Responsible Party
Develop Fire/Hazardous Materials response protocols for critical infrastructure and high risk facilities including updated emergency alerts.	Goal 2: Obj.2-2 Goal 3: Obj.3-1 Goal 4: Obj.4-1, 4-3	Emergency Management Unit East Lansing Fire Department Environmental Health and Safety
Identify mitigation actions to take relevant to public health situations.	Goal 1: Obj.1-1, 1-2 Goal 3: Obj.3-1 Goal 4: Obj.4-1	University Physician's Office Emergency Management Unit
Identify opportunity for educating the University community on active violence safety.	Goal 1: Obj.1-1 Goal 3: Obj.3-1 Goal 4: Obj.4-1, 4-3	Provost's Office Executive Vice President's Office MSU Police Department
Identify needs in MSU critical infrastructure related to power failures, cybersecurity and physical security; implement mitigation actions, i.e., network protection, access control, CCTV to prevent criminal activity.	Goal 1: Obj.1-1, 1-2 Goal 3: Obj.3-1, 3-2	Infrastructure Planning and Facilities MSU Police, Access Control Chief Information Security Office

Review and revise winter storm and summer severe weather policies; enhance communication platforms related to mitigation, response and recovery.	Goal 1: Obj.1-1, 1-2, 1-3, 1-4 Goal 2: Obj.2-1, 2-2 Goal 3: Obj.3-2 Goal 4: Obj.4-1, 4-2, 4-3	Emergency Management Unit IPF CABS Residential and Hospitality Services/Residential Educational Housing Services
Identify storm water projects such as rain gardens and detention areas to help reduce and control runoff and to promote protection from flooding	Goal 1:Obj.1-1,1-3,1-4 Goal 3: Obj.3-1, 3-2 Goal 4: Obj.4-2	IPF Emergency Management Unit Risk Management

Table 1.3: Mitigation Action Prioritization List

Potential Funding Sources

A number of governmental and non-governmental sources provide funding assistance for qualifying mitigation projects. Each funding source has its own criteria for eligibility and evaluative criteria for awarding funds. The following list is intended to provide examples of funding sources for future mitigation projects and should not be considered comprehensive. New sources for mitigation funding will be added as they are identified.

Creative financing is encouraged and is made possible when partnering with other agencies or businesses to achieve common or complementary goals. There may be opportunities for mitigation funding through foundations or philanthropic organizations.

- Department of Homeland Security, Homeland Security Grant Program and Law Enforcement Terrorism Prevention Program: these grants are delivered to state government and administered by the Michigan State Police, Emergency Management and Homeland Security Division. The HSGP and LETPP grants are competitive at the regional level in Michigan and voted on by a Regional Planning Board (Region One Homeland Security Planning Board-R1HSPB). MSU has a liaison (non-voting) role on that board.
- The Pre-Disaster Mitigation (PDM) Program: is a competitive grant program developed to assist communities implement hazard mitigation related activities in order to avert future disasters. PDM is a proactive program that aims to reduce natural and technological risks to populations and structures before a disaster occurs.
- Flood Mitigation Assistance (FMA) Program: A federal program that provides annual funding for projects to protect flooded structures that are insured by the National Flood Insurance Program.
- Hazard Mitigation Grant Program (HMGP) - A federal, post-disaster program that funds projects to protect public or private property from future disasters.
- Emergency Watershed Protection (USDA/NRCS) – Provides emergency technical and financial assistance to install or repair structures that reduce runoff and prevent soil

erosion to safeguard life and property.

- Watershed Protection and Flood Prevention (USDA/NRCS) – Provides technical and financial assistance in planning and executing works of improvement to protect, develop, and use land and water resources in small watersheds.

Mitigation Resources

Each community has a unique set of capabilities, including authorities, policies, programs, staff, funding, and other resources available to accomplish mitigation and reduce long-term vulnerability. Specific mitigation strategies and actions take into consideration how these local capabilities may be improved to reduce losses in the future. This information is especially useful in the planning process where local capabilities vary.

While local community leaders may be aware of the capabilities within their jurisdiction, this consideration serves to inform neighboring communities and involved agencies of capabilities that may be shared in joint mitigation efforts.

National Flood Insurance Program

As a participant in the National Flood Insurance Program (NFIP), a community develops capabilities for conducting flood mitigation activities. As such, the plan describes each jurisdiction's participation in and compliance with the NFIP.

Safe Growth

The planning team will identify gaps in the communities' growth guidance instruments and improvements that could be made to reduce vulnerability to future development.