Hazard Mitigation Plan for
Mississippi University for Women (MUW)
Columbus, Mississippi
Lowndes County

The five year update
with guidance and assistance by
MUW's Crisis Action Team

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Adoption by Mississippi University for Women

Upon the recommendation of the Mississippi University for Women (MUW) Crisis Action Team and approval by the Federal Emergency Management Agency and the Mississippi Emergency Management Agency, I accept this Hazard Mitigation Plan update and its contents on behalf of Mississippi University for Women. Furthermore, it is my intent that this plan become functional guidance for the University in order to mitigate the effects that accompany stated hazards.

Nora R. Miller   July 15, 2025

Nora Miller, President   Date

Photos from the November 2002 Tornado

Hazard Mitigation Plan Background

In 2002, the United States Department of Homeland Security's Federal Emergency Management Agency (FEMA) initiated the Disaster Resistant University Program. Administered by Mississippi Emergency Management Agency (MEMA), the DRU Program assists universities and colleges to implement a sustained pre-disaster hazard mitigation program to reduce risk to students, faculty, staff, facilities and research assets. On March 27, 2008, the Mississippi Institutions of Higher Learning, Office of Risk Management, entered into a contract with MEMA to produce hazard mitigation plans on all campuses, with the exception of the University of Mississippi, who already has one. MUW was notified of the DRU award in a letter dated April 4, 2008 from Mississippi Institutions of Higher Learning's Office of Insurance and Risk Management; however the grant, in the amount of $84,600 (95%/5%) was not signed by IHL until October 20, 2008. The contract requires the plan to be completed and approved by MEMA and FEMA no later than March 20, 2010. The MUW Plan was developed and adopted November 2010. On December 9th 2014 MEMA notified MUW that our Hazard Mitigation plan would expire December 5 2015 and that the plan must be reviewed, updated, and submitted for approval every 5 years.

In January of 2015 MUW applied for financial assistance to review and update the 2010 Hazard Mitigation Plan. On January 29, 2015 MUW was notified pursuant to Hazard Mitigation Grant State Program DR-MHGP-MS-002, funds in the amount of $45,000 were awarded for the hazard mitigation plan review and update with stipulations that $40,000 would be the State cost share and $5000 would be Local cost Share. The plan was updated with additional hazards identified hazards reconsidered for risk and mitigation priority.

In January of 2023 MUW began a review of the plan for the 5 year update. The coordination of the update was delayed from 2020 due to COVID-19 and delayed again to due change in personnel at the university. The 5 year update was adopted on July 15, 2025.

Hazard Mitigation plan Summary

On April 4, 2008, Mississippi Institutions of Higher Learning notified MUW that the University had been approved for a multi-jurisdiction Disaster Resistant University (DRU) grant as announced by FEMA in the amount of $80,370 (95%/5%). The funding from this grant will finance 95% of the cost of assembling the hazard mitigation project. MUW will provide a matching commitment of $4,230 for a total of 84,600. The goal of the project is to produce and implement a sustained pre-disaster natural hazard mitigation plan for MUW to reduce the overall risk to students, faculty, and staff, surrounding community, facilities and research assets. The ultimate goal is simply a safer university.

The MUW Hazard Mitigation Plan was developed, reviewed and approved by IHL, MEMA and FEMA and Adopted by MUW in November of 2010, thus MUW became qualified for pre-disaster financial assistance to help initiate the mitigation actions outlined in the plan. The original mitigation plan, written by Angela L. Jones, project coordinator, with guidance and assistance of MUW's DRU Planning Team will be reviewed and updated every 5 years.

Description of the Planning Process - 44 CFR Parts 201.6(b) and 201.6 (c)(1)

The DRU Planning Team was composed of a cross-section of University staff, representatives from city government, community organizations, Columbus Air Force Base (CAFB), IHL, MEMA and Affiliated FM, Commercial Property Insurance Specialists. The DRU Planning Team provided guidance and advice in order to complete the plan and will continue to provide communication to ensure continuing mitigation work into the future. The team served as the overall guiding organization for the development of the mitigation plan. All members were allowed direct input into the process of the plan. As each phase of the plan was completed, each member was given a chance to review the plan and offer feedback. As the narrative was being written, the DRU Planning Team was advised of progress via emails as well as at scheduled committee meetings. The DRU Team also provided overall guidance and assistance in the locating data specific to the University. Individual members of the team were involved throughout the planning process and were engaged until its completion. In 2024/2025, an update of the plan was completed by the University Crisis Action Team (CAT). The mission of the CAT planning team is to identify, review and update potential hazards (natural and man-made), critical assets and resources that will minimize vulnerabilities to the University while estimating monetary losses that could incur due to these hazards.

Public Involvement

The Mayor and the County Board of Supervisors were made aware of this project via letters dated January 23, 2009, in which they were told they would be updated on its progress. These parties were mailed DRU drafts in July half-way through the project and once again when the draft was 8 completed. A news released was sent out by MUW Director of Public Affairs Anika Perkins about the planning efforts on March 5, 2009. This release was sent to all of campus as well as all the primary listing of local media outlets – within a 50 mile radius. Another release was sent out on August. 21, 2009, at the half-way mark of the project. An announcement about the project and DRU information sheets were made available at the University's fall convocation on August 10, 2009, in which many public officials attended. A DRU website was also set up to solicit public input as well as keep them informed of the process. It can be found at http://muw.edu/vpfa/dru.html. In addition to this four public hearings were scheduled during the drafting phase to allow the public an opportunity to review the plan prior to adoption. Email blasts were sent to campus listserve; a press release was done and a notice of these public review and comment opportunities was placed in the local newspaper. Any comments received will be reviewed by the DRU planning team and possibly incorporated into the plan as appropriate.

The initial five year Hazard Mitigation Plan review and update notifications were made via Public Affairs press release of May 25, 2015 and e-mail notifications to the Planning team. A Web site was developed to solicit input for the Plan. The Mayor and County Board of supervisors were notified by Letter of June 19, 2015 of the Plan review and update. The latest five year update was delayed due to COVID and changes in personnel. The kickoff of the review began on January 10, 2023 and concluded in 2025. The updated plan was published on the DRU website on 8/28/2025 and an email was sent to campus for public input.

Crisis Action Team Members

Name	2023	2025	Name	2023	2025
Nora Miller, President	X	X	Marty Brock, Incident Command & Faculty	X	X
Donnie Cook, MSMS Exec. Dir.	X		Karen Clay, Legal	X	
Jennifer Claybrook, Athletic Dir.	X		Mark Ellard, VPFA	X	
Jess Harpole, VP Student Affairs	X	X	Jody Kennedy, Dir of Facilities	X	X
Carla Lowery, Emergency Mgmt/VPO	X	X	Anika Perkins, Exec. Dir. Univ. Relations	X	X
Scott Tollison, Provost	X	X	Randy Vibrock, Chief of Police	X	X
Tyler Warnat, Asst. Police Chief	X	X	Tyler Wheat, Dir. of Communications	X	X

University Disasters

Disasters are costly! The following are examples of how natural disasters have cost colleges and universities directly and indirectly in ways of time and research capabilities. In April 1997, the Red River flooded the University of North Dakota forcing the university to close for a month and to relocate critical functions; damages totaled $46 million. California State University sustained damages estimated at $380 million due to the Northridge earthquake in January 1994; and a windstorm on Labor Day of 1998 cost Syracuse University more than $4,000,000 (FEMA, 2003). More recently, in August of 2005, Hurricane Katrina hit Tulane University in Louisiana with a devastating $200 million blow that left the campus closed for the entire fall semester (ABC News: Katrina Wallops Tulane University, 2005).

Mississippi disasters are no exception. The Gulf Coast Research Laboratory, located in Ocean Springs, and a research facility of the University of Southern Mississippi, was virtually destroyed by Hurricane Camille's wind and coastal flooding in 1969. Destroyed structures cost an estimated $1.5 million while destroyed equipment and instrumentation is estimated to have cost another $1 million (Mississippi Academy of Sciences, 2005). In August 2005, Hurricane Katrina again virtually destroyed the Gulf Coast Research Lab leaving behind $115 million in damages to Gulf Park. Classes were closed for six weeks (University of Southern Mississippi, Wikipedia). On September 25, 2005, a tornado spawned by the remnants of Hurricane Rita ripped through the campus of Mississippi State University in Starkville causing significant damage to campus buildings. Officials on the campus provided initial damage estimates of $3 million, including about $2 million in damage to the Life Sciences and Biotechnology Institute. No serious injuries were reported (Chronicle of Higher Education, 2005). The University of Mississippi incurred extensive losses due to the1994 ice storm, a regional event that did extensive damage at the University of Mississippi as well as to all of North Mississippi. While cost damages specifically for the University of Mississippi were not found, NOAA Satellites and Information (February Ice Storm) stated total damage and costs for the state of Mississippi was at nearly $2 billion!

MUW Background

MUW is located in Columbus, Mississippi--home to approximately 24,000 people (http://factfinder.census.gov). The campus covers more than 114 acres within the historic district of Central Columbus. Twenty-three of more than 60 buildings are listed on the National Register of Historic Places. Plymouth Bluff Center, located in the heart of the Golden Triangle area of east-central Mississippi, is ten minutes away from historic Columbus and is considered part of the MUW campus. Columbus has a total area of 22.3 sq mi.

As of Fall 2024, MUW had 2,193 students; 358 full-time employees; and 102 part-time employees. As of the most recent U.S. Census data available (November 2024), Columbus contains 10,500 total housing units whereas the University has a total 60 structures for the entire campus, some are vacant; while others are used for academic, administrative or support services. While MUW structures appear to make up a small percentage, its location in the historic district and proximity to nearby homes and business have to be taken into consideration. Thus, it is safe to say that the occurrence of a hazard on campus could effect a large population concentrated in a small area and that mitigation should be an essential part of the campus' standard operating procedure.

MUW Disasters

Like many other universities, MUW has had its share of disasters. On October 10, 1992, a level 2 tornado struck campus leaving behind badly damaged buildings, particularly those on the historic-front campus including the famous Callaway Hall clock tower. Damages totaled $3 million. On February 16, 2001, straight-line winds tracked through the campus leaving behind over 20 damaged roofs, downed canopies, uprooted trees and $1.3 million in damages. A level 3 tornado hit MUW on November 10, 2002, with damages totaling over $22 million. The tornado completely destroyed the physical education building and left the Art & Design building without a third floor. The campus was closed for a week. On August 29, 2005, Hurricane Katrina caused approximately $28,000 worth of damages to MUW, mainly roof damage. Included in this total were supplies, items and meals needed as MUW's residence halls served as a temporary shelter for over 150 Katrina evacuees.

While Lowndes County has experienced several notable disasters since 2015, MUW had no physical damage.

Common Disaster Types in Lowndes County

- Severe Weather Events: Including tornadoes, hailstorms, and high winds.
- Flooding: Especially in low-lying areas and near the Tombigbee River.
- Winter Storms: Occasional ice and snow events disrupting power and transportation.
- Man-made Incidents: Such as chemical spills or industrial accidents.

Notable Disasters Since 2015

- February 23, 2019 Tornado – A powerful EF-3 tornado struck Columbus, causing one fatality, dozens of injuries, and significant structural damage to homes, churches, and businesses.
- March 2023 Severe Weather – MEMA reported widespread damage across Mississippi, including Lowndes County, due to tornadoes and straight-line winds.
- April 2024 Severe Weather Outbreak – MEMA listed Lowndes County among the affected areas during a multi-day storm system that brought tornadoes and flooding.

Risk Assessment - Hazard Identification and Evaluation

This plan will only highlight hazards that are likely to be of concern to the MUW campus and the potential monetary losses that may be associated with the hazards. The listing below in Table 2 includes all hazards considered. Table 2 also contains a column with an estimate of the likelihood of occurrence. This ranking is relative and was determined by MUW members of the DRU Planning Team in 2009 and 2015, then again in 2024 by the Crisis Action Team (CAT). The 2023 Mississippi Hazard Mitigation Plan, the 2015 MEMA District 4 Regional Plan, and the 2024 MEMA District 4 Regional Hazard Mitigation Plan Annex E: Lowndes were reviewed in identifying hazards. The fourth column ranks the mitigation priority. This ranking is also a relative measure and was also derived from the judgment of the MUW Team.

Since the risk ranking typically goes hand-in-hand with the likely occurrence, all hazards are ranked as either low, medium or high. A hazard with a low rating (rare occurrence) is expected to have little to no impact upon the university. The hazard poses very minimal health and safety consequences to the campus and is expected to cause little to no property damage. A hazard with a medium rating (slight chance of occurrence) is expected to have a moderate impact upon the university. The hazard poses minor health and safety consequences with minor injuries expected and few to no fatalities. The hazard may cause minor damage and/or destroy some property. A hazard with a high rating (more likely than not) is expected to have a significant impact upon the university. The hazard poses high health and safety consequences with numerous injuries and

Table 1 – List of Hazards Considered

Hazard	**Accept Hazard**	**Risk/Likely Occurrence Low, Medium, High**	**Mitigation Priority Low, Medium , High**
Avalanche	No	N/A	N/A
Civil Disturbance	Yes	High	High

Coastal Erosion/Storm	No	N/A	N/A
Computer Crime or Attack	Yes	High	High
Dam Failure	Yes	Low	Low
Disease (Epidemic or otherwise)	Yes	Medium	Medium
Drought	Yes	Low	Low
Earthquake	Yes	Low	Low
Expansive Soils	Yes	N/A	N/A
Explosive Devices	Yes	Medium	Medium
Explosions	Yes	Medium	Medium
Extreme Heat	Yes	High	Medium
Fire/Arson	Yes	High	Medium
Flooding	Yes	High	High
Hail	Yes	High	Medium
Hazardous Material Incidents/Chemical Spills	Yes Yes	Medium	Medium
Hurricanes and Tropical Storms	Yes	Medium	High
Landslides and Subsidence	No	N/A	N/A
Lightning	Yes	High	Medium
Loss of Lifelines (Utilities)	Yes	High	Medium
Nuclear Power Plant Emergency	No	N/A	N/A
Radiological Accident	No	N/A	N/A
Straight-line winds	Yes	High	High
Terrorist Acts	Yes	Low	Medium
Threat/Violence	Yes	High	High
Tornado	Yes	High	High
Transportation Accidents	Yes	Medium	Medium
Tsunami	No	N/A	N/A
Volcano	No	N/A	N/A
Water/Food Contamination	Yes	Low	Low
Workplace Violence	Yes	Medium	Medium
Wildfire	Yes	Low	Low
Windstorm	Yes	High	High
Winter Storm	Yes	High	High

fatalities possible. The hazard may cause major damage and/or destroy property.

During the hazard identification process it was determined that because of geographic location of MUW, some hazards such as avalanche, coastal erosion/storm, tsunami and volcano were immediately rejected as they pose no threat to the university. Other hazards such as expansive soils, landslides, land subsidence, nuclear power plant, radiological accident, tsunami, and volcano were ruled out because of no or very little occurrence in the past and/or the low likelihood of that hazard happening on campus. Therefore no further discussion of these hazards is needed for this mitigation plan. However, this does not prevent these hazards from being included in future updates if necessary.

While MUW is vulnerable to a wide array of natural and man-made disasters, for purposes of this plan we had to keep in mind that we were looking at a historical review of hazards that have occurred on campus as well as those that could happen and cause the greatest amount of destruction and potential loss of life. After receiving feedback from all team members, reviewing news articles, National Oceanic & Atmospheric Administration (NOAA) weather/damage reports, university history (news releases, publications), MEMA disaster declarations and the MEMA District 4 Regional Hazard Mitigation Plan, it was decided the following hazards pose the greatest threat to MUW. However, this does not prevent omitted hazards from being included in future updates if necessary. But for the purpose of this plan the hazards profiled are in Table 3 and have been broken divided into 2 categories: natural and man-made which includes accidental and medical. There is no significance to the order of their appearance.

Table 2 - Hazards Profiled	
Natural Hazards	**Risk Rank**
Dam Failure	Low
Drought/Extreme Heat	High
Earthquake	Medium
Flooding	Medium
Hail	High
Hurricanes and Tropical Storms	Medium
Lightning	Medium
Tornado/Straight-line winds/Windstorm	High
Wildfire	Low
Winter Storm	Medium
Man-Made Hazards/Accidental/Medical	
Civil Disturbance	Low
Computer Crime or Attack	High
Disease (Epidemic or otherwise)	Medium
Fire/Arson	Medium
Loss of Lifelines (Utilities)	Medium
Terrorist Acts/Explosive Devices	Medium
Transportation Accidents/ Explosions/HazMat/ Chemical Spills	High
Water/Food Contamination	Medium
Threat/Violence	Medium
Workplace Violence	Low

Profiles of Hazards of Concern to the University

The hazards described below represent those considered to be the greatest concern/threat to MUW. Natural hazards are discussed first, followed by man-made hazards. The intent of this section is to develop characteristics of the hazards that will have the potential to damage structures on campus and/or inflict injuries to the students, faculty, staff or visitors. Many of the hazards discussed below have relied heavily on information produced by the NOAA National Climatic Data Center (NCDC) . Supplemental sources include records maintained by MUW, MEMA District 4 Hazard Mitigation Plan, newspaper articles, other internet sources, and individuals. These profiles use numerous technical and non-technical information. For easier reference, sources are listed throughout the plan.

NATURAL HAZARDS

Dam Failure

According to the Mississippi Department of Environmental Quality, a dam is defined as "any man-made barrier or obstruction, together with appurtenant works, if any, across a stream or channel, watercourse, or natural drainage area which impounds or diverts water. All structures necessary to impound a single body of water shall be considered a dam." Columbus is located in Lowndes County, which has a total of 87 dams (*National Inventory of Dams)*. The dam located closest to MUW is Columbus Lock and Dam, about seven miles from campus.

All regulated dams are divided into one of three hazard classifications, high, significant and low, based on the threat to life and property downstream, should dam failure occur. The hazard classification of a dam may change as residential development or other land use changes occur downstream.

> **High Hazard –** Dam failure may cause loss of life, serious damage to homes, industrial or commercial buildings, important public utilities, main highways or railroads. Dams constructed in existing or proposed residential, commercial or industrial areas will be classified as high hazard dams, unless the applicant presents clear and convincing evidence to the contrary.
> **Significant Hazard-** Dam failure may cause significant damage to main roads, minor railroads, or cause interruption of use or service of relatively important public utilities.
> **Low Hazard-** Dam failure may cause damage to farm buildings (excluding residences), agricultural land, or county or minor roads.

According to the Mississippi Division of Environmental Quality, there are 12 high hazard dams in the MEMA District 4 Region, with two in Lowndes County. Pennington Lake Number 4 Dam and Prairie Waters Number 2 Dan both fall into the High hazard category, and is ranked a low hazard for MUW. Given the current dam inventory and historic data, a dam breach is unlikely (less than 1 percent annual probability) in the future. However, as has been demonstrated in the past, regular monitoring is necessary to prevent these events. *Source MEMA District 4 Regional Hazard Mitigation Plan*

Drought/Extreme Heat

A drought is defined as a period of abnormally dry weather sufficiently prolonged for the lack of water to cause serious hydrologic imbalance in the affected area (Glossary of Meteorology 1959). The National Weather Service (NWS) defines it as a period of unusually persistent dry weather that persists long enough to cause serious problems such as crop damage and/or water supply shortages. The severity of the drought depends upon the degree of moisture deficiency, the duration, and the size of the affected area.

The NWS defines drought in four ways:

Meteorological-a measure of departure of precipitation from normal. Due to climatic differences, what might be considered a drought in one location of the country may not be a drought in another location.
Agricultural-refers to a situation where the amount of moisture in the soil no longer meets the needs of a particular crop.
Hydrological-occurs when surface and subsurface water supplies are below normal.
Socioeconomic-refers to the situation that occurs when physical water shortages begin to affect people.

Drought conditions are categorized as:

Abnormally Dry --This is the condition of going into drought: short-term dryness slowing planting, growth of crops or pastures. Coming out of drought: some lingering water deficits; pastures or crops not fully recovered.
Moderate Drought --Some damage to crops, pastures; streams, reservoirs, or wells low, some water shortages developing or imminent; voluntary water-use restrictions requested.
Severe Drought --Crop or pasture losses likely; water shortages common; water restrictions imposed.
Extreme Drought --Major crop/pasture losses; widespread water shortages or restrictions occur.
Exceptional Drought--This results in exceptional and widespread crop/pasture losses; shortages of water in reservoirs.

Research shows that droughts in Mississippi can be traced back to the 1800s. According to the Encyclopedia of Mississippi History by Dunbar Rowland, there was a severe drought that caused much damage in Mississippi the summer and autumn of 1838. The drought extended to the head waters of the tributaries of the Mississippi river, both east and west, south of 42 degrees of latitude. All the rivers were at an extreme low water mark, and the smaller streams were completely dried up by September 1. The lower Mississippi became so low that only small boats, drawing less than five feet of water, could pass.

Drought of 1940-1944: This drought affected the entire State, and resulted in stream flow deficits ranging from 15 to 25 years in the Southern portion of the State. Stream flow deficits were determined to have recurrence intervals exceeding 50 years in the northern portion of the State.

Drought of 1962-1971: This drought affected the entire State, and resulted in severe drought conditions in a large portion of the State. As with the drought of the 1950's, stream flows receded to minimum discharge levels.

Drought of 1980-1982: For the first time in history the term "heat wave" was used to describe conditions across the State. Record high temperatures were blamed for approximately 135 deaths across the State, and rainfall deficiencies had a devastating effect on crop production.

Drought of 1983: As with the previous drought extreme temperatures covered the State, and resulted in eleven heat related deaths. Fifty-two counties were declared disaster areas due to the extreme drought conditions

Drought of 1995: This drought had an effect on the entire State. It resulted in fifty counties being declared disaster areas due to the extreme drought, heat, and crop conditions.

Drought of 1999: From March 1, 1999, through November 18, 1999, the State experienced extreme drought conditions and excessive heat. The lingering conditions resulted in 81 of Mississippi's 82 counties receiving some form of disaster designation. Hancock County was the only county ineligible for assistance.

Drought of 2000: On September 7, 2000, all 82 counties in the State were designated to receive disaster assistance. This was due to the extreme drought conditions across the State and excessive heat conditions as well.

Drought of 2006: There were five drought events that impacted this county and several others in the State. The severity of these events ranged from moderate to severe conditions. During the month of July the drought condition started as moderate and grew as severe by early September. Later it came down to moderate condition for a few days and rose to the magnitude of severe and extreme by mid October.

Drought of 2007: As in the previous year, this year also had five drought events that impacted this county and several others in the State. The severity of these events ranged from severe exceptionally drought conditions. Severe drought conditions existed from February through mid-May and grew worse to extreme and exceptional drought magnitude by July.

Drought 2012

Part of a major national drought affecting much of the U.S. Mississippi experienced significant agricultural losses and water stress. Lowndes County reported dry soil conditions and reduced crop yields.

Mississippi River Drought 2022–2023

Caused by persistent dry weather across the Lower Mississippi Valley. Resulted in record-low water levels in the Mississippi River. Disrupted barge traffic and impacted agriculture and water supply.

Severe Drought 2023-2024

Lowndes County met USDA disaster criteria:

- At least 8 consecutive weeks of D2 (Severe Drought), or
- Any period of D3 (Extreme Drought) or worse.

Significant impacts on agriculture, livestock, and water resources.
Local authorities encouraged water conservation and drought mitigation.

Extreme Heat

FEMA defines a heat wave (extreme heat) as a prolonged period of excessive heat, often combined with excessive humidity. The Weather Channel (weather.com) defines a heat wave as a period of abnormally and uncomfortably hot weather. It could last from several days to several weeks. The Weather Channel uses the following criteria for a heat wave: a minimum of ten states must have 90°F plus temperatures and the temperatures must be at least five degrees above normal in parts of that area for at least two days or more. The NWS in Jackson will initiate alert procedures when the Heat Index is expected to exceed 105 degrees F.

NWS states heat kills by taxing the human body beyond its abilities. In a normal year, about 175 Americans succumb to the demands of summer heat. From 1936 through 1975, NWS estimates nearly 20,000 people were killed in the United States by the effects of heat. The heat wave of 1980 claimed the lives of 1,700 people and caused agricultural damages to reach $20 billion (Wikipedia).

The NOAA's NCDC lists two heat / drought disasters that included the state - in 1986 and 1998. These disasters had associated costs of $2.3 billion and $8.3 billion respectively (http://www.ncdc.noaa.gov/pub/data/special/billion2004.pdf) .

Events of extreme heat have been reported in Lowndes County in recent years (LCHMP).

July 23, 2005: A five day "heat wave" occurred across most of the region between July 23rd and 27th. A combination of the actual air temperature and relative humidity values combined to produce heat index values near 110 degrees each day. Additionally, each of these days had high temperatures ranging from 95 to 99 degrees with overnight lows in the middle 70s. This turned out to be the warmest stretch of weather, this region has seen since July 2001.

August 17, 2005: A "HOT" stretch of weather occurred during the middle to later part of August 2005. This "Heat Wave" covered a large portion of the south and lasted for a period of about 10 days. Each of these days had high temperatures consistently between 95 and 100 degrees, with 1 or 2 of these days actually reaching 100 degrees or more. Additionally, overnight lows remained warm with lower and middle 70s recorded. This is the first time since August 2000 where 100 degree temperatures were reached in this area as well as having such an extended period of "HOT" weather.

July 15, 2006: A small "heat wave" gripped the region during the middle of July with high temperature ranging from the upper 90s to around 100 degrees for five days with overnight lows only reaching the middle 70s. The hottest temperatures during this period occurred from the Mississippi Delta, across northern Mississippi and then down to the Jackson Metro and toward Meridian. This area peaked between 100 and 102 degrees for at least two days during the hot five day stretch. An area particularly hard hit was in Leake County just outside Carthage. Here a chicken farmer lost 9,000 laying hens. The chickens died because of oxygen depletion when the air ventilation fans broke. With outside air temperatures at 100 degrees and no ventilation, the birds only have about 30 minutes then the air temperature gets too hot, oxygen is used up and the birds perish. The lost of these 9,000 chickens cost the farmer 76,500 dollars.

August 5, 2007: During the first half of August, a heat wave took hold of the region and brought some of the warmest temperatures since the summer of 2000. This heat wave began around August 5th and lasted until the 16th. Between August 10th and 15th, the entire area reached 100 degrees or higher. Twenty three record highs were also set during this time with one location, Greenwood, tying their all time highest temperature at 106 degrees. In addition to the plain hot temperatures, humidity levels were quite high as well.

June 2010: A prolonged heat wave occurred during the middle to latter part of June across the region. Heat index readings ranged from 100 to 110 degrees

August 2010: The combination of high humidity and above normal temperatures produced heat index readings ranged between 105 and 109 degrees during the afternoon hours in the middle part of August.

Regional Heat Wave 2016: Prolonged high temperatures across the Southeast. Heat advisories issued for vulnerable populations. Increased energy demand and heat-related health concerns.

Extreme Heat Event 2023: One of the hottest years on record in Mississippi. NOAA ranked Mississippi among the warmest states for the year. Local emergency management issued heat advisories and opened cooling centers.

Because Columbus is located in a humid, subtropical region characterized by extreme heat in the summer, drought and extreme heat are ranked as high hazards to MUW.

Earthquake

The Center for Earthquake Research and Information (CERI) and the University of Memphis defines an earthquake as the sudden, sometime violent movement of the earth's surface from the release of energy in the earth's crust. In simpler terms earthquakes are the result of movement along faults.

In the U.S., Alaska has more earthquakes per year than the combined total of the rest of the U.S. As many as 4,000 are recorded there every year. In 1811 and 1812 a series of earthquakes near the New Madrid, Missouri area was felt in Mississippi as far south as the Gulf Coast. This series caused the banks of the Mississippi River to cave in as far as Vicksburg, more than 300 miles from the epicentral region (United States Geological Survey USGS). That zone consists of a series of faults that cross the Mississippi and Ohio Rivers, stretching 40 miles wide and 200 miles long, which affects parts of seven states including Mississippi (Mike Womack, former Director of MEMA, in WLBT's Earthquakes pose threat to Mississippi, February 1, 2009)

Earthquakes are measured by seismometer/seismographs, instruments that measure and record motions of the ground; Richter Scale (RS) or the Modified Mercalli Intensity Scale which uses Roman Numerals from I to XII to describe different levels.

Table 3 - Ritcher Scale

Magnitude	**Earthquake Effects**
Less than 3.5	Generally not felt, but recorded
3.5-5.4	Often felt, but rarely causes damage
Under 6.0	At most slight damage to well-designed buildings. Can cause major damage to poorly constructed buildings over small regions
6.1-6.9	Can be destructive in areas up to about 100 kilometers across where people live
7.0-7.9	Major earthquake. Can cause serious damage over larger areas
8 or greater	Great earthquake. Can cause serious damage in areas several hundred kilometers across

Table 4 - Modified Mercalli Intensity Scale

SCALE	INTENSITY	DESCRIPTION OF EFFECTS	CORRESPONDING RICHTER SCALE MAGNITUDE
I	INSTRUMENTAL	Detected only on seismographs.	
II	FEEBLE	Some people feel it.	< 4.2
III	SLIGHT	Felt by people resting; like a truck rumbling by.	
IV	MODERATE	Felt by people walking.	
V	SLIGHTLY STRONG	Sleepers awake; church bells ring.	< 4.8
VI	STRONG	Trees sway; suspended objects swing, objects fall off shelves.	< 5.4
VII	VERY STRONG	Mild alarm; walls crack; plaster falls.	< 6.1
VIII	DESTRUCTIVE	Moving cars uncontrollable; masonry fractures, poorly constructed buildings damaged.	
IX	RUINOUS	Some houses collapse; ground cracks; pipes break open.	< 6.9
X	DISASTROUS	Ground cracks profusely; many buildings destroyed; liquefaction and landslides widespread.	< 7.3
XI	VERY DISASTROUS	Most buildings and bridges collapse; roads, railways, pipes and cables destroyed; general triggering of other hazards.	< 8.1
XII	CATASTROPHIC	Total destruction; trees fall; ground rises and falls in waves.	> 8.1

Source: Federal Emergency Management Agency

While Mississippi is not typically associated with earthquakes, there is historical record of earthquake epicenters (the ground surface location directly above where the earthquake originated in the subsurface) in 24 of Mississippi's counties including Mississippi Gulf Coast (Charles T. Swann, Mississippi Mineral Resources Institute, Summary of the Investigation of the May 10, 2008, Belden MS Earthquake Pontotoc, Lee and Union Counties Mississippi). Swann further states the perception is that the New Madrid Seismic Zone (NMSZ) is the only source of earthquake hazard in Mississippi and this is not totally true because Mississippi has a number of faults that are not associated with the NMSZ as local faults may have movement histories that are not tied to the same processes that govern NMSZ faults. Another consideration is that damage from an earthquake is often linked to the distance from the epicenter – the closer the epicenter, the greater the shaking and potential damage to surface structures.

Mike Womack, former MEMA Director, stated in a WLBT February 2009 interview (Earthquakes pose threat to Mississippi) that the northern part of the state is at a much greater risk and that scientists estimate there is a 25 to 40 percent chance of a moderate earthquake which means around a 6 on the scale in the next 50 years. He added "a six is gonna cause quite a bit of damage, we think, to utilities, such as water and sewer and gas pipe lines; damage in a home, but not to the extent that most structures would fall apart."

The earliest and strongest earthquake reported within Mississippi was on December 16, 1931, in Charleston. According to the USGS, the walls and foundation of the agricultural high school cracked and several chimneys were thrown down. At Belzoni, plaster fell and several chimneys were damaged. The shock was felt over a 65,0000 square mile area including the northern two-thirds of Mississippi.

Another earthquake that was strongly felt happened on February 1, 1955, along the Mississippi Gulf Coast. In Gulfport, houses shook, windows rattled and rumblings were heard. In June 1967, two earthquakes happened about 18 miles northeast of Greenville. The first on June 4 measured a 3.8 on the RS and was felt over 25,000 square miles – affecting the Northwest quadrant of the state and parts of Arkansas, Louisiana and Tennessee. The second earthquake, which happened on June 29, occurred in the same region measuring a 3.4 on the RS. Shock was felt to limited parts of Bolivar, Sunflower and Washington Counties. March 29, 1972, marked the date of another earthquake felt in the state. This shock, centered in the New Madrid region, was felt in the state at Hillhouse, Mineral Wells and Pleasant Grove. (Abridged from Earthquake Information Bulletin, Volume 6, Number 1, March- April 1974, by Carl A. von Hake).

The most recent state earthquake information was recorded in northern Mississippi on May 10, 2008, by components of the Advanced National Seismic System (ANSS) at 12:52 p.m. The epicenter of the event was fixed at latitude 34.350 N, longitude 88.830 W, which is less than a mile south of the town of Sherman, Mississippi in Pontotoc County. The earthquake's magnitude was determined to be 3.1 on the duration magnitude scale. No damage was reported; however it was felt over a rather large area. Accounts of the earthquake referred to the event as centered in or near Belden, Mississippi (Lee County) but the instrumentally determined epicenter was near Sherman. (Charles T. Swann, Mississippi Mineral Resources Institute, Summary of the Investigation of the May 10, 2008, Belden MS Earthquake Pontotoc, Lee and Union Counties Mississippi).

The White River Fault Zone (WRFZ) is another source of earthquake hazard. This zone extends 280 km from near Newport, Arkansas on the northwest end to near Grenada, Mississippi on the southeast end. In Panola County, Mississippi, the Mississippi River bluff line for 20 km has the same N 40 W orientation as the overall WRFZ. This zone is generally represented as about 15 km wide. In the past 25 years some 15 earthquakes have been recorded within or closely adjacent to the WRFZ, most in the range of magnitude 1 to 3. The December 1931 magnitude 5 earthquake near Charleston was the largest earthquake in the state and located within the WRFZ (Seismicity in the White River Fault Zone, Mississippi and Arkansas, Terry Panhorst and Charles Swann).

The county mitigation plan states that our county is in line with this fault zone. Based on the Mercalli Intensity Scale, Lowndes County is expected to experience an intensity level of V from a magnitude 8 earthquake occurring along the NMSZ. In addition to this, according to the Mid-America Earthquake Center, the line quadrant of the state that is labeled as critical counties ends at Monroe County, which is about 15 miles north of MUW, making this a medium-ranked hazard to MUW.

Earthquake Events in North Mississippi and Lowndes County based on historical and USGS data:

April 28, 2008 – Near New Albany, MS

- Magnitude: 3.1
- Felt across parts of North Mississippi.
- No damage reported, but widely noticed due to shallow depth.

March 30, 2013 – Near Calhoun County, MS

- Magnitude: 2.8
- Light tremor felt in surrounding counties including parts of Lowndes.
- No structural damage.

May 1, 2015 – Near Booneville, MS

- Magnitude: 3.2

- Shaking felt in several counties in Northeast Mississippi.
- Minor reports of rattling windows and household items.

November 2018 – Near Amory, MS

- Magnitude: 2.5
- Light tremor felt in Monroe and Lowndes Counties.
- No damage or injuries reported.

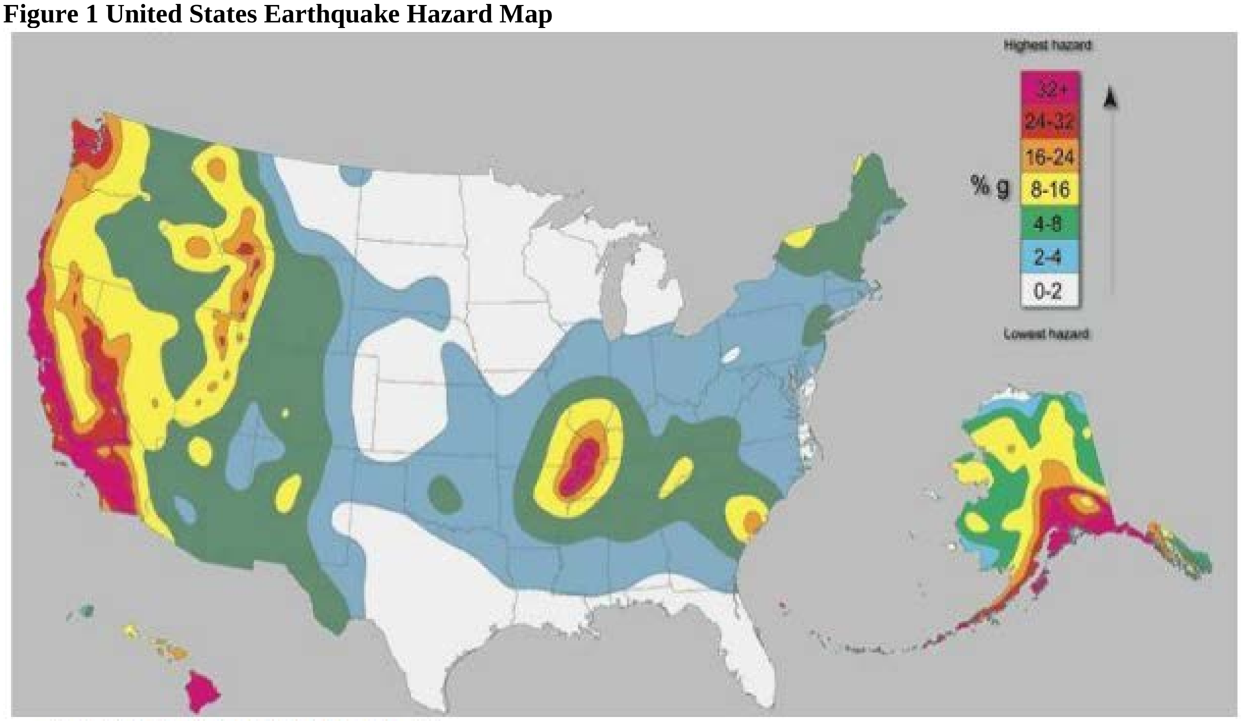
February 2020 – Near Tupelo, MS

- Magnitude: 2.7
- Felt in Lee, Itawamba, and Lowndes Counties.
- Considered a minor seismic event.

Ongoing Minor Seismic Activity

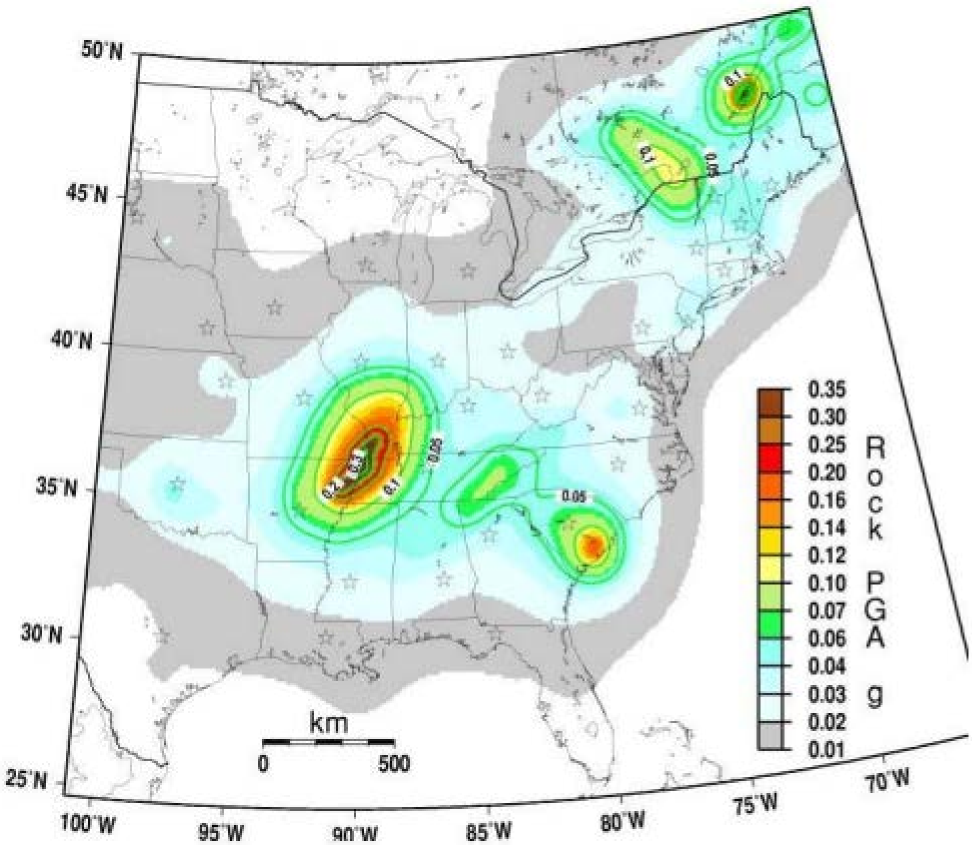
- The USGS has recorded multiple microearthquakes (magnitude <2.5) in North Mississippi over the past decade.
- These are typically not felt but are monitored by regional seismographs.

Figure 1 United States Earthquake Hazard Map



Source: United States Geological Survey

Figure 2 Peak Acceleration with 10 Percent Probability of Exceedance



Source: USGS, 2008

Flood

MEMA defines a flood as any general or temporary condition of partial or complete inundation of normally dry land areas from the overflow of inland or tidal waters; the unusually and rapid accumulation or runoff of surface waters from any source. Flooding is a natural and inevitable occurrence. Floods occur seasonally with general or torrential rains associated with tropical storms that later drain into river basins and fill them with an abundance of water. Rivers, lakes and other water bodies have always overflowed their normal beds to inundate nearby land. The land adjacent to these bodies of water is called the floodplain. There are generally four types of flooding – River Flooding, Flash Flooding, Coastal (Tidal) Flooding, and Drainage Flooding.

Floods are typically identified by the Flood Insurance Studies (FIS) and their accompanying Flood Insurance Rate Maps (FIRM). They provide a means to identify the probability of future flooding. Another means of prediction is the examination of past events as this establishes a probability of reoccurring floods.

According to GIS analysis, of the 505 square miles that make up Lowndes County, there are 160 square miles of land in zones A and AE (1-percent annual chance floodplain/100-year floodplain) and 12 square mile of land in the 0.2-percent annual chance floodplain (500-year floodplain).

These flood zone values account for 33.1 percent of the total land area in Lowndes County. It is important to note that while FEMA digital flood data is recognized as best available data for planning purposes, it does not always reflect the most accurate and up-to-date flood risk. Flooding and flood-related losses often do occur outside of delineated special flood hazard areas. (Annex E Lowndes County).

Repetitive Loss

No updates to this section can be provided at this time. Information normally used to update this section is not currently accessible. As a result, this information will remain the same for historical purposes. Artesia, Caledonia, and Crawford are all outside of the Special Flood Hazard Area (SFHA) and have either not received past flood damages or have received very few/minor flood damages.

As of May 2023, there are 123 non-mitigated repetitive loss properties located in Lowndes County which accounted for losses and approximately $3.9 million in claims payments under the NFIP. The average claim amount for these properties is $8,609. Of the 123 properties, 85 are single family residential, 6 are 2-4 family, 2 are assumed condominiums, 1 is other residential, and 29 are non-residential. Without mitigation these properties will likely continue to experience flood losses.

Probability Of Future Occurrences

There has been only one significant events during the past five years. However, due to the unpredictable nature of this hazard, flood events will remain a threat in Lowndes County, and the probability of future occurrences will remain likely (between 10 and 100 percent annual probability). The participating jurisdictions and unincorporated areas have risk to flooding, though not all areas will experience flood. The probability of future flood events based on magnitude and according to best available data is illustrated in the figures above, which indicates those areas susceptible to the 1-percent annual chance flood (100-year floodplain) and the 0.2-percent annual chance flood (500-year floodplain).

It can be inferred from the floodplain location maps, previous occurrences, and repetitive loss properties that risk varies throughout the county. For example, the central portion of the county has more floodplain and thus a higher risk of flood than the remainder of the county. Flood is not the greatest hazard of concern but will continue to occur and cause damage. Therefore, mitigation actions may be warranted, particularly for repetitive loss properties.

As the climate continues to change, the chance of heavy rain leading to flash flooding could increase in frequency, intensity, and magnitude. With the increasing frequency and intensity, heavy rains and flash flooding can lead to cascading effects and can also lead to flooding in areas that do not usually flood.

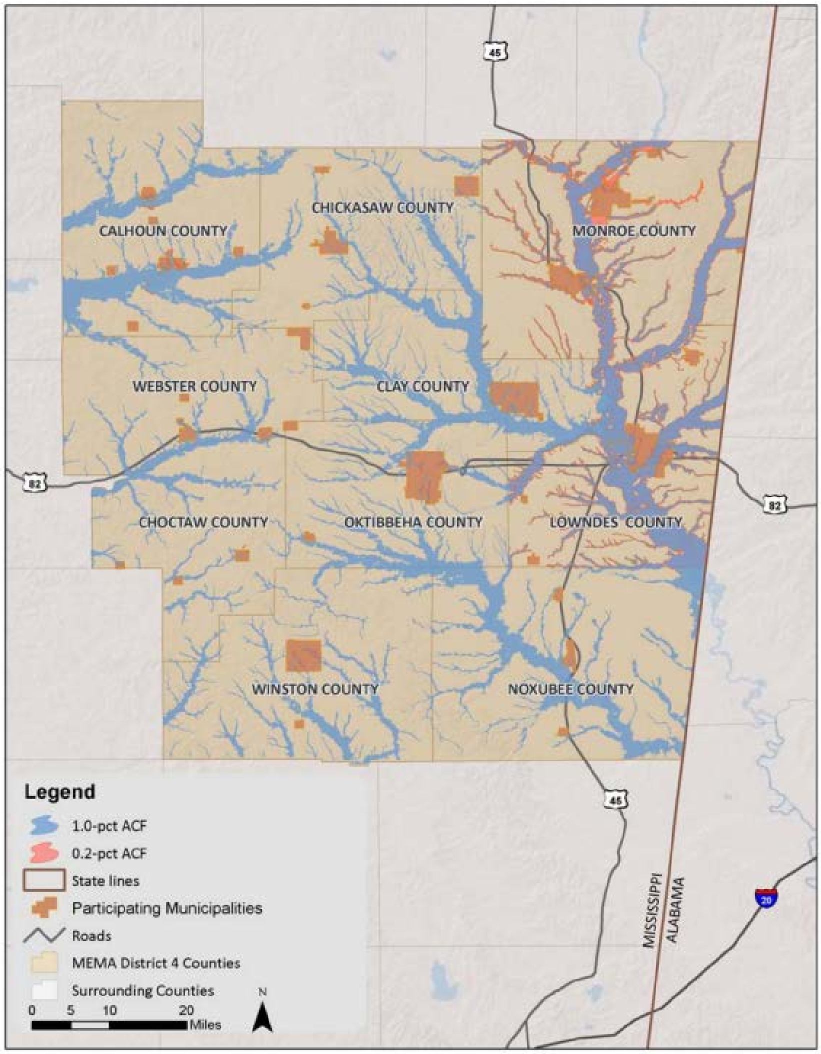
Table 5 Historical Flood Events

Date	Event Name/Description	Affected Areas	Impact Details
March 14–15, 2025	Mississippi Severe Storms, Straight-line Winds, Tornadoes, and Flooding (DR-4874-MS)	Lowndes County and surrounding counties	Major Disaster Declaration by FEMA on May 21, 2025. Flooding caused road closures and property. Estimated flood depth between 3-6 inches.
April 8–11, 2024	Mississippi Severe Storms, Straight-line Winds, Tornadoes, and Flooding (DR-4790-MS)	Lowndes County and eastern Mississippi	Declared a Major Disaster on June 10, 2024. Flooding led to evacuations and infrastructure damage. Estimated flood depth between 12-14 inches.
June 14–19, 2023	Mississippi Severe Storms, Straight-line Winds, and Tornadoes (DR-4727-MS)	Lowndes County and Northeast Mississippi	FEMA declaration on August 12, 2023. Flooding from heavy rain caused localized damage. Estimated flood depth information is not available,

Flood season in Mississippi is considered to primarily occur between the months of November through June, while the months of March and April are considered to be the months of greatest flood frequency. The flood of record within the state is the flood that occurred on the Mississippi River in 1927. This flood left a disastrous impact upon the entire 1,250,000 mile river drainage. At that time the flood caused 246 deaths, left 650,000 people homeless and caused $284.1 million in property damages. The flood of 1973, the most severe since 1927, resulted in damages over $117 million. (Floods on the Lower Mississippi: An Historical Economic Overview, Paul S. Trotter, G. Alan Johnson, Robert Ricks, David R. Smith, NWSFO, New Orleans/Baton Rouge, Louisiana; Donnel Woods, WSO/COE, Vicksburg, Mississippi).

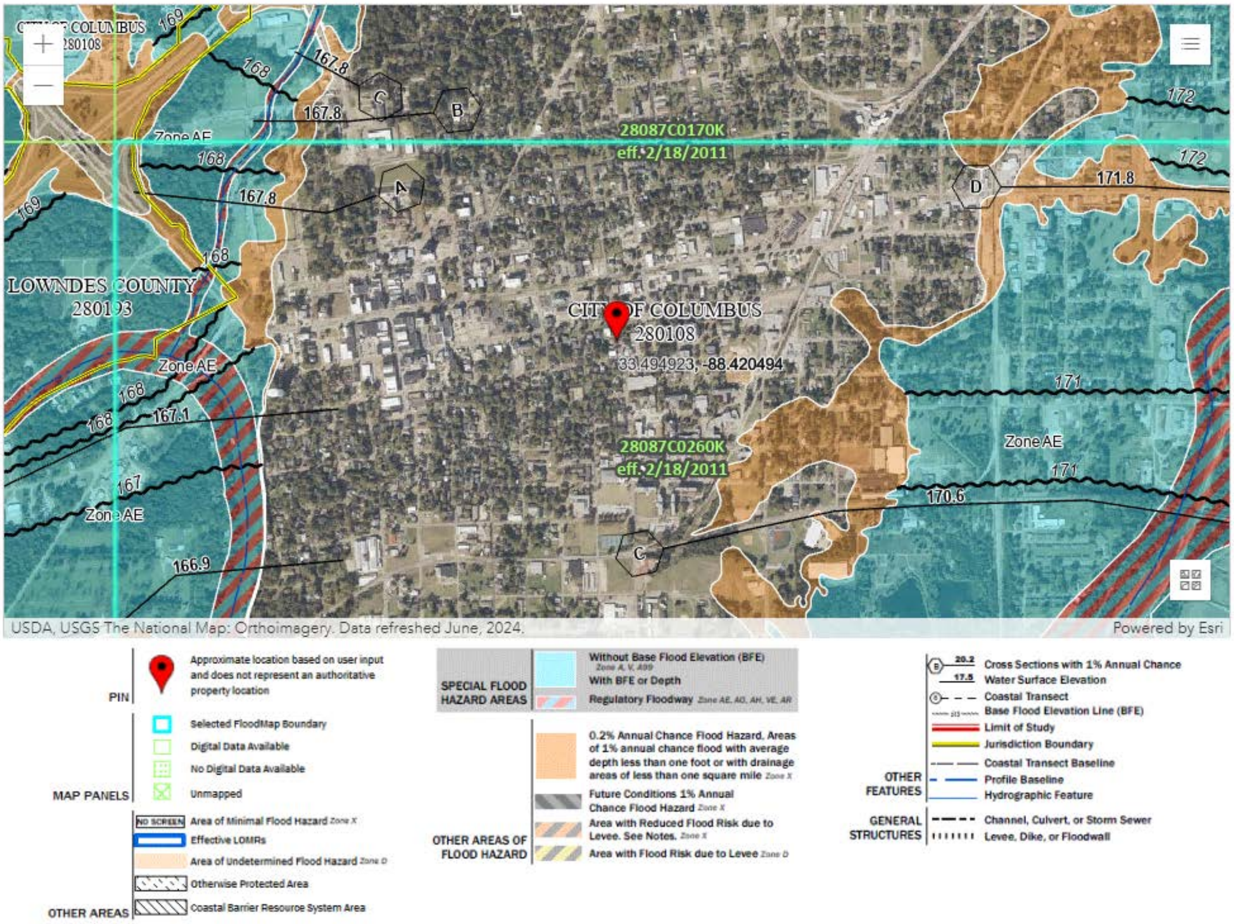
While Lowndes County has experienced flooding, the MUW campus has not been affected. It is unlikely that the campus will be affected in the future.

Figure 3 Special Flood Hazard Areas in MEMA District 4 Region



Source: Federal Emergency Management Agency; Monroe County map from FEMA's Hazus-MH 2.1

Figure 4 FIRM Map of Lowndes County Source: FEMA



Hail

The Weather Channel (weather.com) defines hail as precipitation that originates in convective clouds, such as cumulonimbus, in the form of balls or irregular pieces of ice, which comes in different shapes and sizes. Hail is considered to have a diameter of 5 millimeter or more; smaller bits of ice are classified as ice pellets, snow pellets, or graupel. Individual lumps are called hailstones. It is reported as "GR" in an observation and on the METAR. Small hail and/or snow pellets is reported as "GS" in an observation and on the METAR.

Hail is often associated with thunderstorms and is not an uncommon occurrence during summer thunderstorms. Although hail seldom causes death, it can cause extensive property damage-- most often causing damage to roofs, vehicles, and can cause extensive damage to trees. The NOAA records a Lowndes County hail event in April of 2006 that resulted in $100,000 worth of property damage. The event began five miles southwest of Caledonia and ended four miles southeast of Caledonia. It was described as a super cell thunderstorm that developed between CAFB and Caledonia and produced a swath of quarter to hen-egg sized hail. A hail event in April 2001 caused $25,000 worth of property damage in Columbus when golf ball sized hail damaged roofs and cars just west of the city. Another hail event in April of 2001 in New Hope resulted in $8,000 worth of property damage when golf ball sized hail damaged homes and cars.

While MUW has no evidence of property damage specifically caused by hail, it is ranked as a high risk hazard because it is associated with thunderstorms which occur often in Columbus.

Historical Hail Events in Lowndes County, MS
April 13, 2022: Hail Size: Up to 1.75 inches (golf ball-sized)
Impact: Damaged vehicles, roofs, and windows in parts of Columbus.
Source: NOAA Storm Reports

March 24, 2021: Hail Size: 1.25 inches
Impact: Minor property damage; hail accompanied by strong winds and lightning.

April 19, 2009: Hail Size: 2.00 inches (hen egg-sized)
Impact: Significant damage to vehicles and residential roofing in northern Lowndes County.

May 3, 2007: Hail Size: 1.75 inches
Impact: Widespread hail reports across Columbus; insurance claims filed for roof and siding damage.

April 6, 2005: Hail Size: 1.50 inches
Impact: Agricultural damage reported in rural areas; minor structural damage in city limits.

Note: Thunderstorms were not selected as a hazard because the effects of thunderstorms (hail, lightning, flooding, etc) are addressed in other categories.

Hurricanes/Tropical Storms
FEMA defines hurricane as a type of tropical cyclone, the generic term for a low pressure system that generally forms in the tropics. A typical cyclone is accompanied by thunderstorms, and in the Northern Hemisphere, a counterclockwise circulation of winds near the earth's surface. Hurricanes are typically considered coastal hazards, but these large storms move inland generating large amounts of rainfall and may spawn tornados and damaging straight-line winds. A storm surge is the onshore rush of sea or lake water caused by high winds associated with a land-falling cyclone and secondarily by the low pressure of the storm.

Columbus is located 250 miles north of the Gulf of Mexico and is not very susceptible to hurricanes. Only eight hurricanes have struck the Mississippi coast since 1895. The major concerns regarding hurricanes at MUW are the winds, tornados and large rainfall amounts which makes homes, businesses, universities, vulnerable. Natural resources are vulnerable to hurricanes – fallen trees become a target for infestation from insects and water quality may be affected due to unwanted debris and vegetation blown in.

Hurricanes are categorized by the Saffir/Simpson Hurricane Scale found in Table 5.

CAT	Table 6 – Saffir/Simpson Hurricane Scale Winds & Effects	Surge
1	74-95 mph (64-82 kt)	4-5 ft
	No real damage to building structures. Damage primarily to unanchored mobile homes, shrubbery, and trees. Also, some coastal flooding and minor pier damage.	
2	96-110 mph (83-95 kt)	6-8 ft
	Some roofing material, door, and window damage. Considerable damage to vegetation, mobile homes, etc. Flooding damages piers and small craft in unprotected moorings may break their moorings.	
3	111-130 mph (96-113 kt)	9-12 ft
	Some structural damage to small residences and utility buildings, with a minor amount of curtainwall failures. Mobile homes are destroyed. Flooding near the coast destroys smaller structures with larger structures damaged by floating debris. Terrain may be flooded well inland.	
4	131-155 mph (114-135 kt)	13-18 ft
	More extensive curtainwall failures with some complete roof structure failure on small residences. Major erosion of beach areas. Terrain may be flooded well inland.	
5	155 mph+ (135+ kt)	18 ft +
	Complete roof failure on many residences and industrial buildings. Some complete building failures with small utility buildings blown over or away. Flooding causes major damage to lower floors of all structures near the shoreline. Massive evacuation of residential areas may be required.	

The Saffir-Simpson Scale is a five-category wind speed / storm surge classification scale used to classify Atlantic hurricane intensities. The Saffir-Simpson values range from Category 1 to Category 5. The strongest SUSTAINED hurricane wind speeds correspond to a strong F3 (Severe Tornado) or possibly a weak F4 (Devastating Tornado) value. Whereas the highest wind gusts in Category 5 hurricanes correspond to moderate F4 tornado values, F5 tornado wind speeds are not reached in hurricanes.
Source: Louisiana Homeland Security and Emergency Preparedness

Hurricane Camille, August 17, 1969, was the strongest storm to ever enter the U.S. mainland on record, with winds up to 190 mph and a 25 -foot storm surge. Although the damage in all of southern Mississippi was appalling, within about ½ mile from the ocean, most of the structures seemed to have just vanished, including plumbing systems. According to Major Hurricanes to enter the Gulf Coast, 1900 - 2007 by Michael A. Grammatico, the best estimates on the death toll is 255 people and 8,900 injured; some were never found. More than 14,000 housing units were damaged while 6,000 were totally destroyed. The total damage from Camille, a category 5 hurricane, was $4.2 billion (in 1969 dollars).

On September 16, 2004, Hurricane Ivan made landfall near Gulf Shores, Alabama as an upper category 3 hurricane. A large portion of eastern Mississippi was affected – thousands of trees and hundreds of power lines were blown down. Downed trees accounted for several hundred homes, mobile homes, and businesses to be damaged or destroyed. The strongest winds reported occurred in Newton, Lauderdale and Oktibbeha counties. Oktibbeha County is about 20 miles from MUW. Total damage from Ivan was estimated at $200 million.

Tropical Storm Arlene made landfall near Alabama/Florida state line on June 11, 2005. The western periphery of the tropical storm affected far eastern Mississippi and brought gusty winds and heavy rains, three to five inches, to that portion of the state. Peak wind gusts were reported up to 40 mph and the combination of wet soils allowed for a few hundred trees to get blown down or uprooted. Some trees fell on power lines while others caused damage to homes. The total property damage was estimated at almost $450,000.

The hurricane in which effects were felt on the MUW campus happened on August 29, 2005. Hurricane Katrina which is likely to go down as the worst and costliest natural disaster in the U.S. history as the devastation was not only confined to the coastal region, but widespread and significant damage occurred well inland. This storm began as a tropical depression 12 on August 23; upgraded to a tropical storm on August 24 and became a Category 1 hurricane on August 25. During the early hours on August 28, Katrina underwent rapid intensification and be became a Category 5 hurricane, by that afternoon she had reached her maximum intensity, sustaining winds up to 175 mph. Katrina remained a hurricane as it crossed Interstate 20 near Newton, Mississippi. She was downgraded to a tropical storm around 6 p.m. on August 29. The center of the storm passed near neighboring Starkville and West Point before exiting the region around 10:45 on August 29. Katrina was responsible for 10 tornados and 15 direct fatalities across inland Mississippi and 19 indirect. Crop damages as well as property damage for the state totaled $7.4 billion.

According to Wikipeida, at least 1,836 people lost their lives in the actual hurricane and in the subsequent floods, making it the deadliest U.S. hurricane since the 1928 Okeechobee Hurricane. The storm is estimated to have been responsible for $81.2 billion (2005 U.S. dollars) in damage, making it the costliest tropical cyclone in U.S. history.

MUW received minor damages from the effects of Hurricane Katrina -- approximately $28,000. This was mainly roof damage; however debris removal and clean up is included. Also included are supplies, items and meals needed as MUW's residence halls served as a temporary shelter for over 150 Katrina evacuees for over two months. Due to minor damages in the past, MUW ranks this hazard as medium.

Table 7 Historical Hurricane/Tropical Storm events in Lowndes County

Date	Storm Name	Storm Type	Impact Summary	FEMA Declarations / Damage Reports
August 29, 2005	Hurricane Katrina (remnants)	Hurricane (remnants)	Heavy rain and gusty winds; localized flooding and power outages.	FEMA DR-1604-MS; widespread damage across Mississippi.
September 1–2, 2008	Hurricane Gustav (remnants)	Hurricane (remnants)	3–5 inches of rain; minor flooding in low-lying areas.	FEMA DR-1794-MS; emergency response activated in multiple counties.
August 30–31, 2012	Hurricane Isaac (remnants)	Hurricane (remnants)	Over 4 inches of rain; flash flood warnings issued.	FEMA DR-4081-MS; damage assessments conducted in eastern Mississippi.
October 28–29, 2020	Hurricane Zeta (remnants)	Hurricane (remnants)	Wind gusts up to 40 mph; scattered power outages and tree damage.	FEMA DR-4576-MS; statewide emergency declared.
June 19–20, 2021	Tropical Storm Claudette	Tropical Storm	2–4 inches of rain; localized flooding in Columbus area.	No FEMA declaration; monitored by MEMA and NWS.

Lightning
NAOO defines lightning as generally, any and all of the various forms of visible electrical discharge produced by thunderstorms. However, according to National Geographic, lightning is not confined to thunderstorms. It's been seen in volcanic eruptions, extremely intense forest fires, surface nuclear detonations, heavy snowstorms, and in large hurricanes.

The National Weather Service (NWS) and NOAA maintain official records for lightning activity. Mississippi has had 20 lightning related deaths from 2006 to 2023, ranking it among the top 20 states for lightning fatalities in that period. The state continues to experience frequent lightning activity, especially during the spring and summer thunderstorms. Recreation is the activity most people are involved in when struck by lightning. Thunderstorms are common in Mississippi, with the majority of them occurring between April and October. Lightning damage is not uncommon and the lightning hazard is present during every thunderstorm event. The damage posed by the hazard includes physical damage to buildings, electrical shock to persons in the vicinity of a lightning strike; lightning can cause fires and nonstructural damage to equipment due to the electrical surge generated by the lightning bolt. A lightning strike will, for example, only damage one building leaving adjacent structures unscathed. It is a myth that lightning never strikes in the same place twice. Lightning will strike in more than one place about a third of the time (NASA, Lighting Really Does Strike More Than Twice, January 14, 2003).

Table 8 Historical Lightning Damage in Lowndes County

Date	Description of Event	Type of Damage	Emergency Response / Insurance Impact
June 15, 2011	Lightning struck a home in Columbus, igniting a fire in the attic.	Structural, Fire	Fire department responded; homeowner filed insurance claim for roof and smoke damage.
July 22, 2014	Lightning hit a utility pole, causing a power outage in parts of the county.	Electrical	Utility crews restored power within 4 hours; no major insurance claims reported.
August 10, 2017	Lightning struck a tree which fell onto a house in rural Lowndes County.	Structural	Emergency services cleared debris; homeowner filed insurance claim for roof and siding damage.
May 4, 2020	Lightning caused a fire at a commercial building in Columbus.	Fire, Structural	Firefighters extinguished blaze; business filed insurance claim for fire and smoke damage.
June 18, 2023	Lightning damaged HVAC and electrical systems at a school facility.	Electrical	School district filed insurance claim; temporary closure for repairs.

While no records indicate any past occurrences of this hazard, lightning is retained a medium hazard due to the large number of thunderstorms in Columbus.

Tornado/Straight-line winds/Wind

The word "tornado" comes from the Latin *tonare*, meaning "to thunder." The Spanish developed the word into *tornear*, to turn or twist. These are good descriptions of tornadoes, which are formed by rotating or twisting air. This is why they are also called twisters or cyclones. A tornado is a powerful column of winds spiraling around a center of low atmospheric pressure. It looks like a large black funnel hanging down from a storm cloud. The narrow end will move over the earth, whipping back and forth like a tail. (Forces of Nature: ThinkQuest 2000)

The swath of damage can be over one mile wide and 50 miles long. Some tornadoes are clearly visible, while rain or nearby low-hanging clouds obscure others. Occasionally, tornadoes develop so rapidly that little, if any, advance warning is possible. Before a tornado hits, the wind may die down and the air may become very still. A cloud of debris can mark the location of a tornado even if a funnel is not visible. Tornadoes generally occur near the trailing edge of a thunderstorm. It is not uncommon to see clear, sunlit skies behind a tornado.

The winds inside a twister can spin around at speeds up to 500 miles an hour, but usually travels at roughly 300 miles an hour. This makes the tornado the most dangerous storm known to mankind. Because of the earth's unique weather system, twisters rotate counterclockwise in the Northern Hemisphere and move eastward. They rotate clockwise in the Southern Hemisphere. Tornadoes also often come with hailstorms.

A tornado can form very quickly, sometimes in a minute or less. It can travel across the ground at high speeds, then just as suddenly vanish. They can kill in a matter of seconds. Every year, about $500 million worth in damage is done by twisters in the U.S. Most tornadoes last less than twenty minutes and travel less than 15 miles. However, superstorms sometimes occur, traveling over 100 miles before they are exhausted. Although they don't occur very often, they are responsible for 20% of all tornado casualties. (Forces of Nature: ThinkQuest 2000)

Unlike hurricanes, which produce wind speeds of similar values over relatively widespread areas (when compared to tornadoes), the maximum winds in tornadoes are often confined to extremely small areas, and vary tremendously over very short distances, even within the funnel itself. The tales of complete destruction of one house next to one that is totally undamaged are true and well documented. In 1971, Dr. T. Theodore Fujita of the University of Chicago devised a six-category scale to classify U.S. tornadoes into six intensity categories, named F0-F5. These categories are based upon the estimated maximum winds occurring within the funnel.

The new Enhanced Fujita Scale continues to use F0-F5 ratings (shown below) but is based on a additional calculations of wind and damage. It was implemented in the U.S. on February 1, 2007.

Table 9 Enhanced Fujita Scale

EF SCALE	
EF Rating	3 Second Gust (mph)
0	65-85
1	86-110
2	111-135
3	136-165
4	166-200
5	Over 200

IMPORTANT NOTE ABOUT ENHANCED F-SCALE WINDS: *The Enhanced F-scale still is a set of wind estimates (not measurements) based on damage. Its uses three-second gusts estimated at the point of damage based on a judgment of 8 levels of damage to the 28 indicators listed below. These estimates vary with height and exposure.* ***Important****: The 3 second gust is not the same wind as in standard surface observations. Standard measurements are taken by weather stations in open exposures, using a directly measured, "one minute mile" speed.*

Tornadoes having been causing devastation, property damage and fatalities in Mississippi for many years. According to a listing of the U.S. Worst Tornadoes, a tornado on April 25, 1880 killed 23 people and left 72 injured and swept away 20 homes in the northwest half of Macon in Noxubee County, which is about 30 miles from Columbus. On April 20, 1920, a tornado caused 22 fatalities in Aberdeen in nearby Monroe County. On April 5, 1936, a tornado devastated the northern half of Tupelo as 216 people were killed and 700 injured (www.**tornado**project.com/alltorns/mstorn.htm*)*. A New York Times articled date April 17, 1921 stated a tornado was responsible for five deaths in Steens, a small town about 10 miles from Columbus. This tornado event swept through five states- Texas, Mississippi, Arkansas, Alabama and Georgia-- leaving 75 people dead.

Table 10 Historical Events in Lowndes County

Date	Event Type	EF Rating	Wind Speed	Affected Areas	Impact Summary	Damage Estimate
March 14, 2025	Straight-line Wind	N/A	70–80 mph	Columbus and surrounding areas	Widespread tree damage, minor structural damage	$500,000–$1 million
April 8, 2024	Tornado	EF-1	95 mph	Eastern Lowndes County	Damage to mobile homes and outbuildings; no fatalities	$1–2 million

Date	Event Type	EF Rating	Wind Speed	Affected Areas	Impact Summary	Damage Estimate
April 13, 2022	Straight-line Wind	N/A	60–70 mph	Northern Lowndes County	Downed trees and power lines; minor roof damage; localized power outages	$250,000–$500,000
February 23, 2019	Tornado	EF-3	140 mph	Columbus, MS	Major damage to homes, churches, and businesses; 1 fatality, dozens injured	$10–15 million
April 27, 2011	Tornado	EF-2	115 mph	Caledonia area	Damage to homes and infrastructure; multiple injuries reported	$2–3 million

Compared with other states, Mississippi ranks number 13 for frequency of Tornadoes according to the NOAA Storm Prediction Center. Mississippi averages 44 tornadoes per year and the peak season is between March and May, with a secondary peak in November. 2024 was one of the most active tornado years nationally, with Mississippi experiencing multiple outbreaks.

NOAA records indicate 36 tornadoes have been reported in Lowndes County from September 1, 1950 until July 1, 2025. A tornado recorded for the county happened on January 10, 2008 in Caledonia, about 15 miles from Columbus. The event began three miles east of Kolola Springs and ended six miles northeast of Caledonia This tornado set its sights on the center of town and Caledonia schools. The tornado started by damaging a home and shed along with some trees and power pole damage. Next, a shed was damaged and a combine harvester that was in the shed was thrown into some trees. After moving through a wooded area, the tornado moved into a neighborhood with new, well-built homes. Around 8 homes were damaged in this neighborhood, with around five of them being severely damaged. Roofs were ripped off, walls collapsed, and a few were even moved off their foundations. The tornado moved through another wooded area and emerged into the Caledonia school complex. It was here that the tornado reached its maximum intensity causing significant damage to the entire school campus including two overturned school buses. The tornado then left the school complex and moved across the south side of Caledonia damaging homes**.** The tornado moved along the road for several miles. Along this part of the path, numerous single family homes were severely damaged. The roofs were ripped off and the walls were collapsed on several homes. Numerous hard wood trees were snapped, several of which fell on cars and homes. A horse stable was completely destroyed and a high tension medal truss tower was snapped. Further along the road, several mobile homes were completely destroyed. The tornado then entered another wooded area causing some tree damage and then weakened before crossing the state line into Lamar County, Alabama. The total path length in Lowndes County was 8.7 miles with an EF3 Enhanced Fujita Scale rating. The total path length for the entire tornado, including each county, was 13.2 miles. The school complex was occupied by over 2,100 students and faculty at the time of the tornado. Yet, the tornado warning lead time of 41 minutes allowed the school to place students at the best possible locations. No injuries or fatalities occurred at the school. Also, a day care center with 15 children and faculty was severely damaged, but all had taken cover in an underground storm shelter, so there were no injuries at that location either. In total, there were 15 injuries of which only three were considered serious. The three serious injuries occurred in the mobile home that was ripped apart with the body moving downwind and the frame in the opposite direction. This tornado had no effect on the MUW campus, but other ones did!

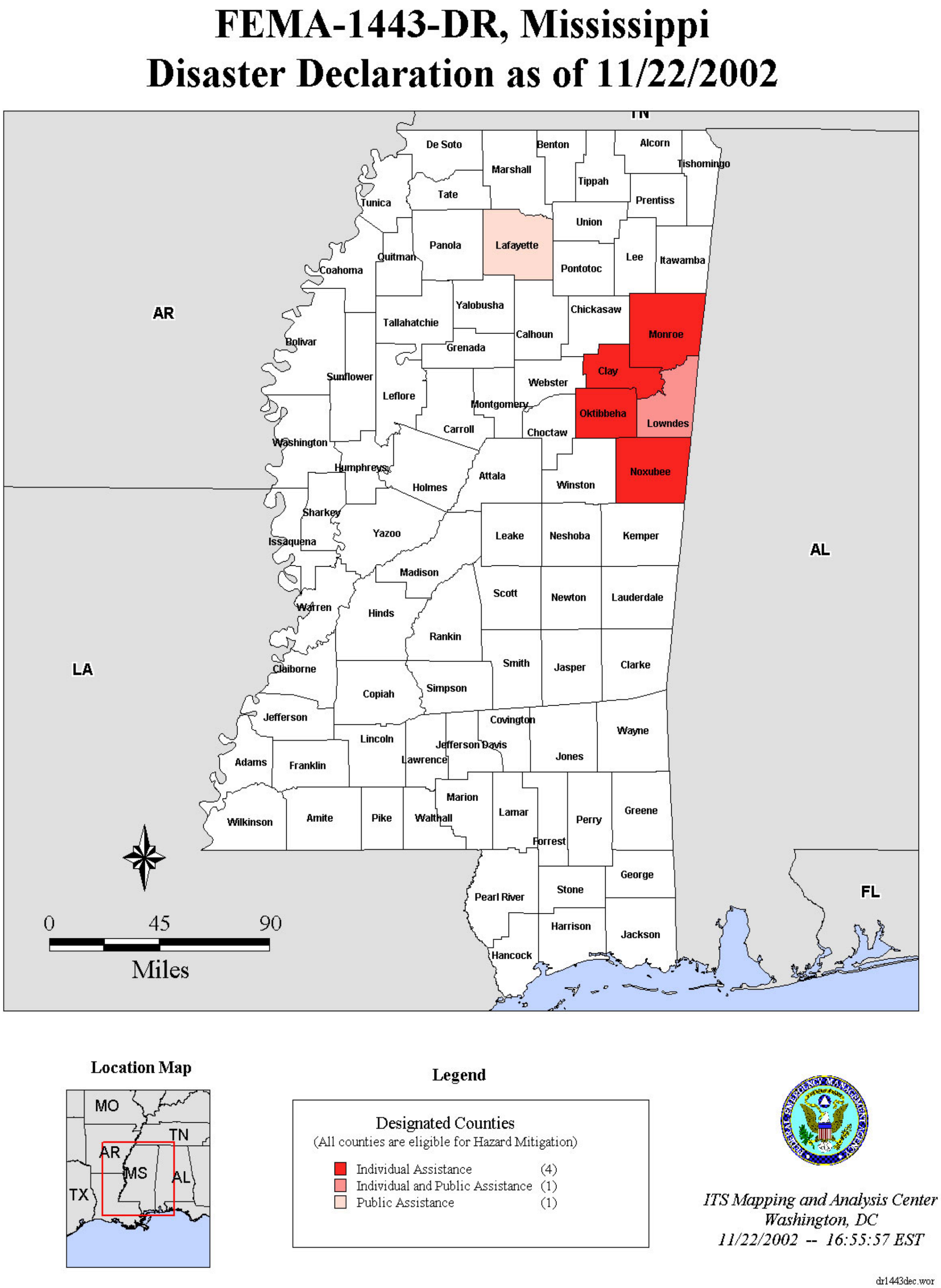
On November 10, 2002, a level 3 tornado formed in Lowndes County, about three miles southeast of Artesia. It moved 22 miles across the county, resulting in numerous injuries but no loss of life. This event hit MUW with damages totaling over $22 million. The tornado completely destroyed the physical education building and left the Art & Design building without a third floor leaving the university with a complete loss of two academic buildings. Twenty-six of 60 buildings were damaged and the campus was closed for a week. Additional damages included uprooted trees, downed power lines, downed fences, imploded windows, water damage, etc., There was no loss of life or injuries requiring medical attention and the cafeteria didn’t miss serving a single meal to students, faculty, staff and volunteers on campus.

Various Pictures from the 2002 tornado

Figure 5 The Nov. 10, 2002 tornado left the Art & Design Building without a third floor

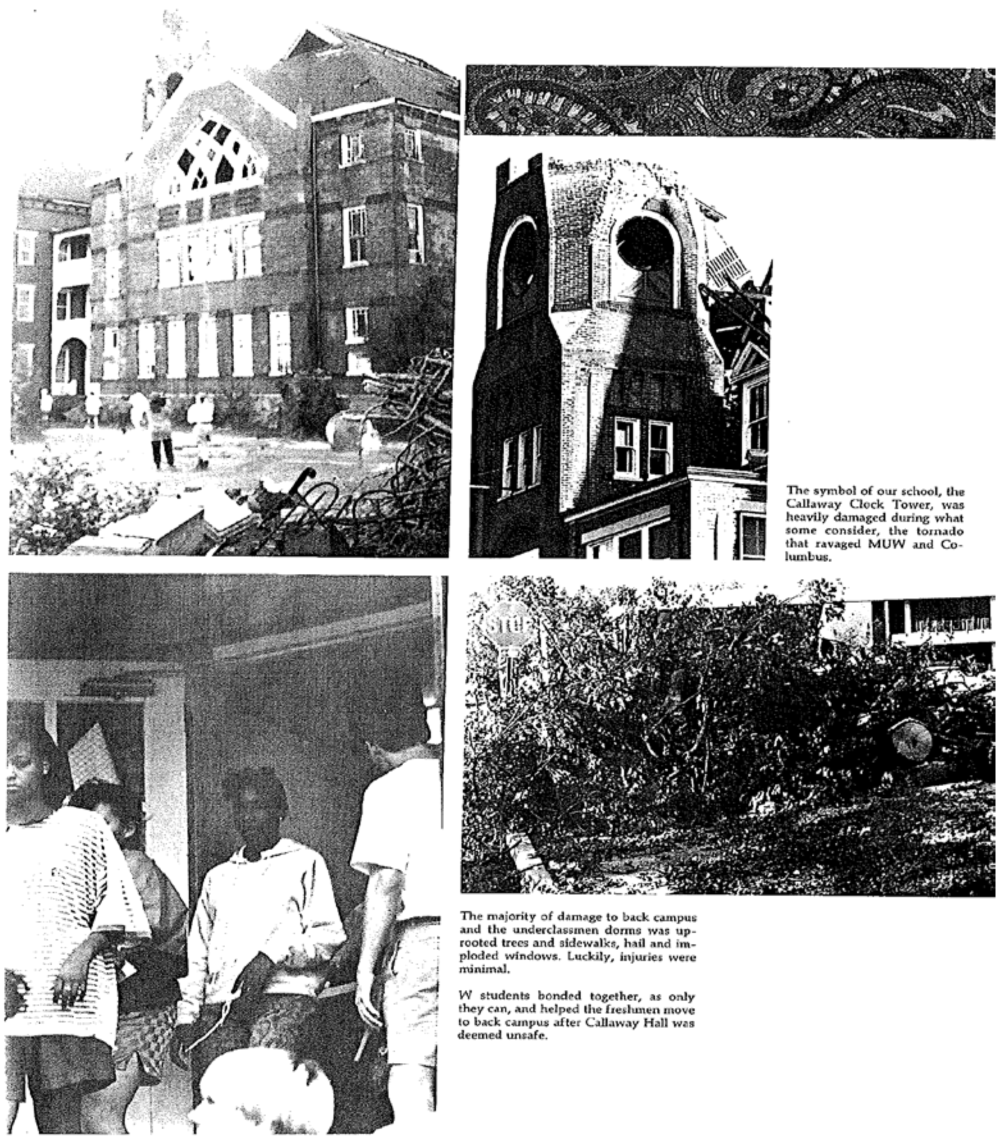
Figure 6 The Physical Education & Assembly Building (PEAB) was totally destroyed by the tornado on Nov. 10, 2002

Figure 7 FEMA Disaster 2002



About ten years prior to this event, the campus felt the sting of another tornado. On October 10, 1992, a level 2 tornado came through and left behind damages estimating over $3 million. University resources state the front campus looked like the aftermath of a war. Power lines were down and students had to wade through several inches of water. Damage was sustained to most of the historic front campus buildings including the famous Callaway Hall Clock Tower as well as the Old Maid's Gate. The cost to repair the clock tower was $318,000. The majority of the damage to back campus was uprooted trees and imploded windows. The freshmen residents of Callaway Hall were moved to back campus after Callaway Hall was deemed unsafe. There were no major injuries. (Pictures below from Meh Lady Yearbook, 1993, Volume 84)

Figure 8 1992 Level 2 Tornado



The symbol of our school, the Callaway Clock Tower, was heavily damaged during what some consider, the tornado that ravaged MUW and Columbus.

The majority of damage to back campus and the underclassmen dorms was uprooted trees and sidewalks, hail and imploded windows. Luckily, injuries were minimal.

W students bonded together, as only they can, and helped the freshmen move to back campus after Callaway Hall was deemed unsafe.

Straight-line winds/Wind

NOAA defines straight-line winds as generally any wind that is not associated with rotation, used mainly to differentiate them from tornadic winds. Meteorologist Jeff Haby says straight-line wind is wind that comes out of a thunderstorm. If these winds meet or exceed 58 miles per hours then the storm is classified as severe by the NWS. These winds are produced by the downward momentum in the downdraft region of a thunderstorm. An environment conducive to strong straight-line wind is one in which the updrafts and thus downdrafts are strong, the air is dry in the middle troposphere and the storm has a fast forward motion (weatherprediction.com). Wikipedia defines wind as the flow of air or other gases that compose an atmosphere (including, but not limited to, the Earth's). In short terms-wind is air molecules in motion.

NOAA records indicate 249 thunderstorms and high wind events have been reported in Lowndes County from September 1, 1950 until July 1, 2025. The wind event that comes to mind happened on February 16, 2001, when a major storm moved eastward across much of the northern half of Lowndes County. The storm caused extensive damage across the county including: $500,000 in damage to the East Mississippi Community College in Mayhew, $1 million to Columbus public schools, and over $1 million in damages to the MUW campus. Damage reports indicated 17 houses and 21 mobile homes were destroyed, 512 houses and 16 mobile homes sustained major damage, and 1,732 houses and 110 mobile homes received minor damage. There were two apartment units that were destroyed, six units had major damage, and 63 apartment units sustained minor damage. The Columbus-Lowndes Recreational authority estimated $200,000 in damage to city and county parks. Many buildings also had roof and sign damage. One business located in the corner of a strip mall shopping center had a wall collapse after the winds lifted up the roof. Despite the widespread damage in the county, no serious injuries were reported.

The sudden and violent storm that lasted approximately 20 minutes and caused major damage to both the city and the university. The storm carried tornado-like winds estimated to be in excess of 100 mph; it was later decided the storm consisted of straight-line winds caused by the highly unusual confluence of two vastly different weather fronts. The nature of the storm accounted for the fact there was virtually no warning given to the community. While MUW was hosting a regional student journalism conference at the time, no fatalities or injuries resulted from the storm. However there was devastating property damage throughout the area with many homes and businesses destroyed. MUW suffered significant damage, especially to roofs and trees, but no buildings were structurally damaged.

Over 20 buildings suffered significant roof damage. There were 41 large, older trees completely uprooted on campus as well as Plymouth Bluff Environmental Center seven miles away. Additional damage included fallen trees, destroyed fences, snapped power lines, etc. Damages totaled $1.3 million. (MUW records Storm 2001)

A prediction of the likelihood of a tornado/straight-line winds tracking across the MUW campus would be difficult as tornado tracks are random within the path of the thunderstorm and the path of the thunderstorm is also somewhat random. Because the consequences of these events can be catastrophic and based on numerous past occurrences, we consider tornados/straight-line winds/wind not only a high risk hazard(s), but the primary hazard(s) at the University.

Wildfire

The county mitigation plan states a wildfire is any fire that burns uncontrollably in a natural setting such as, grasslands, forest, and brush land. Prescribed burnings are the only exception to a wildfire. Wildfires can be either man-made or natural. The typical cause of natural wildfires is lightning. Prescribed burning, also known as controlled burning is the deliberate use of fire under specified and controlled conditions. Prescribed burns are used by forest management professionals and individual landowners.

Wildfire is often associated with high air temperatures and dry conditions, although not exclusively. Wildfire differs from controlled burns in that they are destructive to the woodland / grasslands habitat in which they occur and lack the controlling factors which make controlled burns beneficial. Wildfire is most often a hazard in woodlands or grasslands during dry, hot weather. Often wildfire has man-made origins such as burning trash in dry, windy conditions but natural origins such as lightning can also start wildfires.

Wildfire typically becomes problematic when dry windy weather prevails for an extended period of time. These conditions result in dry vegetation (fuel) and make ideal conditions for small man-made or natural fires to expand rapidly, burn intensely, and become uncontrollable. Wildfire, as opposed to controlled or prescribed burns, damages the woodland environment and potentially destroys the built environment. Although most often associated with the more arid west, they can also pose hazards in Mississippi.

Table 11: Historical wildfire activity in Mississippi **from** 2015 to 2025**, based on data compiled from the** National Interagency Fire Center (NIFC)**:**

Year	Number of Wildfires	Acres Burned
2015	1,872	28,456
2016	2,143	31,002
2017	1,998	29,874
2018	2,301	33,210
2019	2,112	30,765
2020	2,045	29,980
2021	2,210	31,450

Year	Number of Wildfires	Acres Burned
2022	2,389	34,112
2023	2,501	35,890
2024	2,634	37,204
2025	2,712	38,115

The main cause of wildfires is incendiary, followed by debris burning. Other causes are campfires, children, equipment use, lightning, miscellaneous, railroads, re-ignition and smoking.

NOAA lists no wild or forest fire events for Lowndes County. However the county mitigation plans states Lowndes County had a total of 63 wildfires between 2002 and 2007 that were recorded by the MFC. These fires do not include events that were responded by the local voluntary fire departments. The MFC recorded fires alone make up about 611 acres of burning.

There is no evidence to indicate that the MUW campus has been effected by wildfire. But due to numerous thunderstorms that produce lightning; high risk of drought/ heat extreme and trees on the south end of campus, this hazard is retained as a low risk.

Winter Storm
A winter storm is an event in which the dominant varieties of precipitation are forms that only occur at cold temperatures, such as snow or sleet, or a rainstorm where ground temperatures are cold enough to allow ice to form (i.e. freezing rain). In temperate continental climates, these storms are not necessarily restricted to the winter season, but may occur in the late autumn and early spring as well. (Wikipedia)

FEMA uses the following terms to identify a winter storm hazard:

> **Freezing Rain --**Rain that freezes when it hits the ground, creating a coating of ice on roads, walkways, trees, and power lines.
> **Sleet --** Rain that turns to ice pellets before reaching the ground. Sleet also causes moisture on roads to freeze and become slippery.
> **Winter Storm Watch--** A winter storm is possible in your area. Tune in to NOAA Weather Radio, commercial radio, or television for more information.
> **Winter Storm Warning--** A winter storm is occurring or will soon occur in your area.
> **Blizzard Warning--**Sustained winds or frequent gusts to 35 miles per hour or greater and considerable amounts of falling or blowing snow (reducing visibility to less than a quarter mile) are expected to prevail for a period of three hours or longer.
> **Frost/Freeze Warning --** Below freezing temperatures are expected.

The NWS associates the following conditions with winter storms that can be extremely hazardous.

Storms with Strong Winds –Sometimes winter storms are accompanied by strong winds creating blizzard conditions with blinding wind-driven snow, severe drifting, and dangerous wind chill. Strong winds with these intense storms and cold fronts can knock down trees, utility poles, and power lines. Storms near the coast can cause coastal flooding and beach erosion as well as sink ships at sea.
Extreme Cold -- Extreme cold often accompanies a winter storm or is left in its wake. Prolonged exposure to the cold can cause frostbite or hypothermia and become life-threatening. Infants and elderly people are most susceptible. What constitutes extreme cold and its effect varies across different areas of the U.S. In areas unaccustomed to winter weather, near freezing temperatures are considered "extreme cold." Freezing temperatures can cause severe damage to citrus fruit crops and other vegetation. Pipes may freeze and burst in homes that are poorly insulated or without heat. In the north, below zero temperatures may be considered as "extreme cold." Long cold spells can cause rivers to freeze, disrupting shipping. Ice jams may form and lead to flooding.
Ice Storms -- Heavy accumulations of ice can bring down trees, electrical wires, telephone poles and lines, and communication towers. Communications and power can be disrupted for days while utility companies work to repair the extensive damage. Even small accumulations of ice may cause extreme hazards to motorists and pedestrians.
Heavy Snow Storms -- Heavy snow can immobilize a region and paralyze a city, stranding commuters, stopping the flow of supplies, and disrupting emergency and medical services. Accumulations of snow can collapse buildings and knock down trees and power lines. In rural areas, homes and farms may be isolated for days, and unprotected livestock may be lost. In the mountains, heavy snow can lead to avalanches. The cost of snow removal, repairing damages, and loss of business can have large economic impacts on cities and towns.

The impact of a winter storm includes strong winds creating blizzard conditions, blinding, wind-driven snow, severe snowdrift and dangerous "wind chill". Extreme cold causes damage to crops, freezes pipes and creates the conditions necessary for heavy snow, ice storms, and winter storms.

The NWS in Jackson, Mississippi advises there are three categories of winter weather events. The criteria for winter events are classified as follows:

Heavy Snow - Two inches or more in a 12-hour period for the southern two thirds of the state and two to four inches or more in 12-hours for the northern one-third of the state.
Ice Storm - Any accumulation of ice one-quarter inch or more within a 12-24 hour period.
Winter Storm - Any combination of the ice or snow above. A mixture of snow and freezing rain would trigger a winter storm warning issued by the NWS in Jackson.

Winter storms are capable of causing severe damage in Mississippi. The 1994 ice storm comes to mind as it caused about 2 billion in damages in Mississippi alone. No evidence was found that indicated Lowndes County was severely affected by the 1994 winter storm. MUW records a as well as several staff members from that time recall the campus was not affected by this storm. Records show that Northern Mississippi was probably the area of the southeast hardest hit by the storm. Ice thicknesses of 7-14 cm were common and caused catastrophic damage in many areas. Over 120 mm of rainfall at some locations produced considerable flooding in addition to the ice damage. Approximately 750,000 customers were without power at some point, with about the same number also without water. Electricity to some locations was not restored for one month. The University of Mississippi campus in Oxford was closed for several days because of a lack of electrical power and public water supply which significantly disrupted the class scheduling. (The February 1994 Ice Storm in the Southeastern U.S. J Neal Lott and Matthew C. Sittel)

NOAA records show a winter storm in Lowndes County on January 27, 2000, that brought a swath of heavy snow across central Mississippi. The snow began falling over western portions of the area during the early morning on the 27th and spread eastward during the day. The snow was heavy at times and did not end until the morning of the 28th. Snowfall amounts generally ranged from four to ten inches. The heaviest amounts fell along the Highway 82 corridor from Greenville to Starkville where isolated snow depths of 12 inches were reported. Damage from the heavy snow was relatively minimal with reports limited to a few collapsed roofs and downed trees. Power outages were sporadic, but traveling was more than just an inconvenience as numerous reports of vehicles running off the road were received. This event affected 17 counties and caused over $1 million in damages. There is no record to show damage or injuries were at MUW. The 2000 Meh Lady Yearbook states classes were cancelled. The yearbook also states that the last heavy snow was four years ago which is a reference to the February 1, 1996, winter storm in which a mix of snow, sleet and freezing rain that covered much of North Mississippi. Between two and five inches of snow and ice accumulated across the area. Numerous trees and power lines were knocked down due to ice and snow accumulations. Many roads were closed due to the icy conditions. In Lee County, a metal canopy collapsed at the Saltillo Elementary School. Property damages totaled $500,000.

Winter storms occur irregularly and can be associated with some costs to the University. These events are not expected to do structural damage, but could cause extensive damage to lifelines and debris clean-up costs can be significant. The University may be expected to be closed one to several days depending on the severity of the storm. While winter storms are not likely to pose a major threat to the University, it is retained as a medium hazard because of past occurrences.

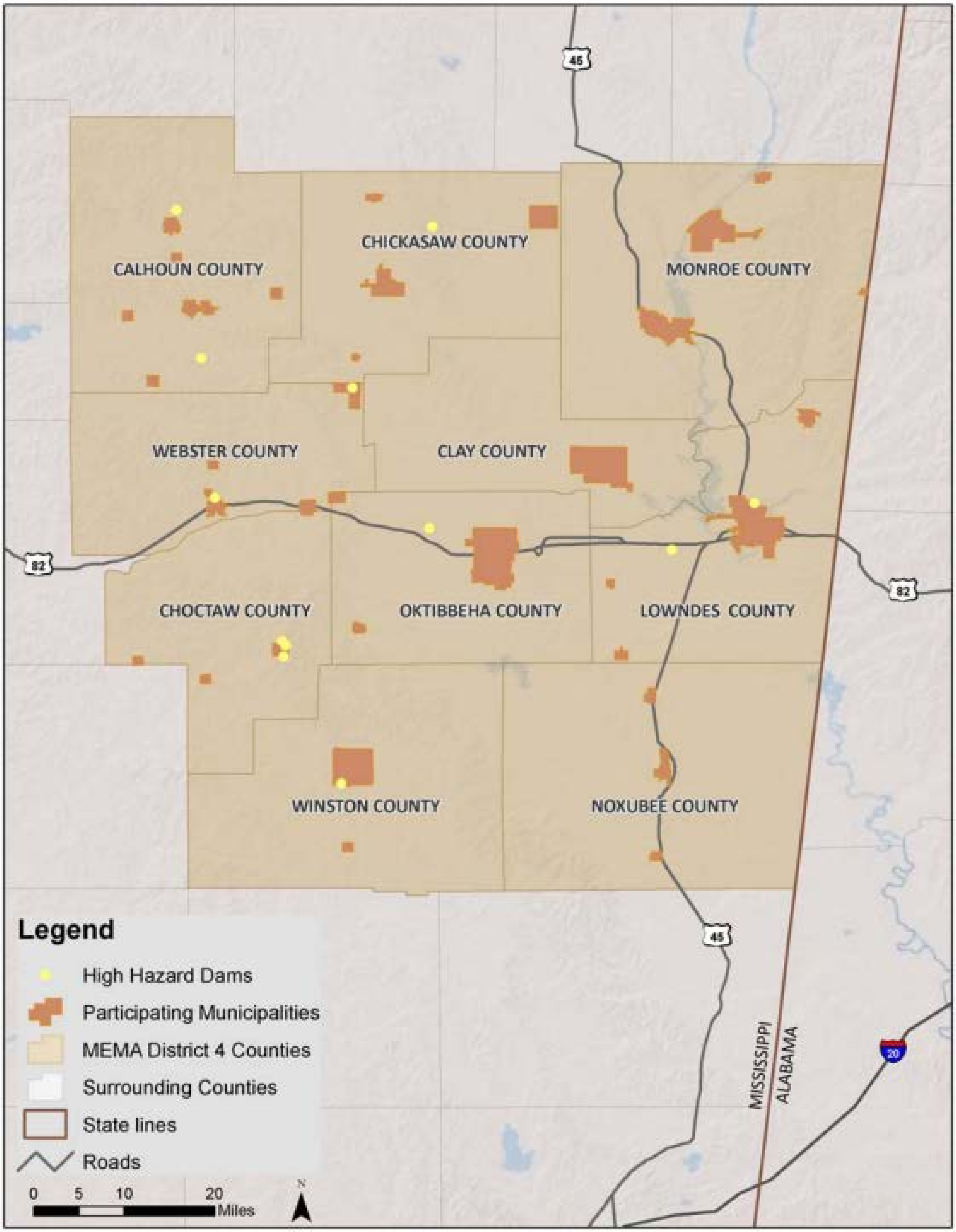
MUW PROFILE OF REQUIRED NATURAL HAZARDS

While the plan profiles 10 natural hazards (described in the previous section), seven of these are required by MEMA – dam failure, drought, earthquake, flooding, hurricanes, tornado and wildfire. Dam failure, drought, earthquake and wildfire were assigned a low risk/likely occurrence and low mitigation priority ranking.

Dam Failure

MUW is located about 7 miles from the nearest dam, Columbus Lock & Dam. This dam is classified as a significant hazard which means dam failure may cause damage to main roads, minor railroads, or cause interruption of use or service of relatively important public utilities. There is no evidence to support dam failure in the past and there is no reason to believe failure should occur in the future. Thus, dam failure is ranked a low hazard for MUW.

Figure 9 Dam Hazards



Source: Mississippi Division of Environmental Quality

Drought

A drought is defined as a period of abnormally dry weather sufficiently prolonged for the lack of water to cause serious hydrologic imbalance in the affected area (Glossary of Meteorology 1959). The National Weather Service (NWS) defines it as a period of unusually persistent dry weather that persists long enough to cause serious problems such as crop damage and/or water supply shortages. The severity of the drought depends upon the degree of moisture deficiency, the duration, and the size of the affected area. Below are the five most recent drought events in Lowndes County.

Drought of 1995: This drought had an effect on the entire State. It resulted in fifty counties being declared disaster areas due to the extreme drought, heat, and crop conditions.

Drought of 1999: From March 1, 1999, through November 18, 1999, the State experienced extreme drought conditions and excessive heat. The lingering conditions resulted in 81 of Mississippi's 82 counties receiving some form of disaster designation. Hancock County was the only county ineligible for assistance.

Drought of 2000: On September 7, 2000, all 82 counties in the State were designated to receive disaster assistance. This was due to the extreme drought conditions across the State and excessive heat conditions as well.

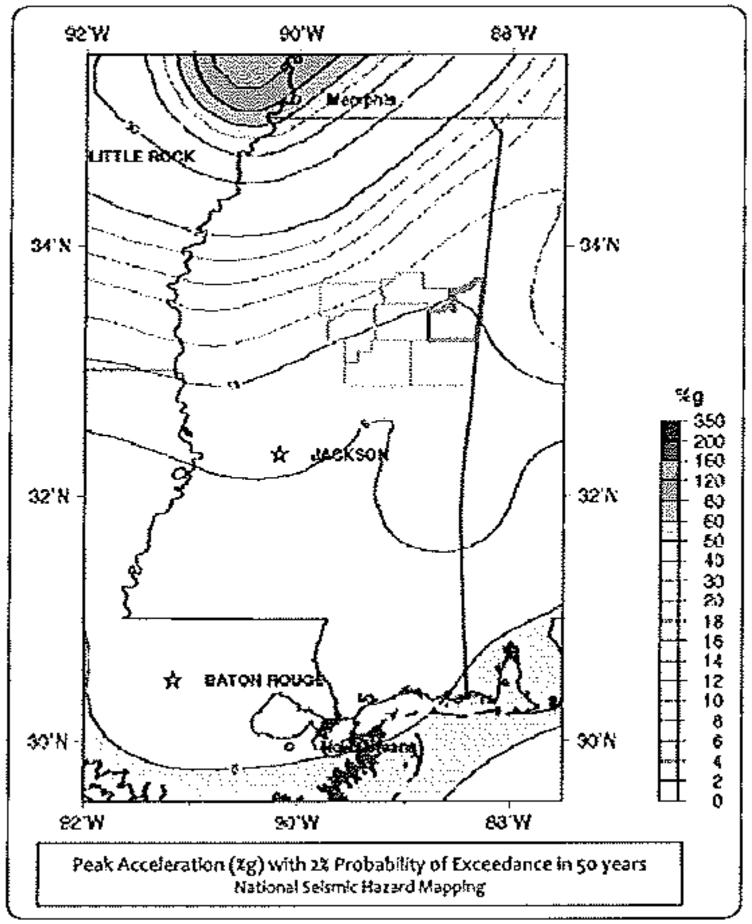
Drought of 2006: There were five drought events that impacted this county and several others in the State. The severity of these events ranged from moderate to severe conditions. During the month of July the drought condition started as moderate and grew as severe by early September. Later it came down to moderate condition for a few days and rose to the magnitude of severe and extreme by mid October.

Drought of 2007: As in the previous year, this year also had five drought events that impacted this county and several others in the State. The severity of these events ranged from severe exceptionally drought conditions. Severe drought conditions existed from February through mid-May and grew worse to extreme and exceptional drought magnitude by July. Drought events occur often in the state and Lowndes County is no exception; but there is no evidence to show that damages to the MUW campus resulted from drought events. While MUW is located in a humid, subtropical region characterized by extreme heat in the summer, drought (aside from extreme heat) and is ranked as low hazards because despite the high probability of future occurrences, a drought is not expected to cause damage to the campus.

Earthquake

The Center for Earthquake Research and Information (CERI) and the University of Memphis defines an earthquake as the sudden, sometime violent movement of the earth's surface from the release of energy in the earth's crust. In simpler terms earthquakes are the result of movement along faults.

The Lowndes County mitigation plan states that our county is in line with this fault zone. Based on the Mercalli Intensity Scale, Lowndes County is expected to experience an intensity level of V from a magnitude 8 earthquake occurring along the New Madrid Seismic Zone (NMSZ). A level V means almost everyone feels movement; sleeping people are awakened; doors swing open or close; dishes are broken; pictures on the wall move; small objects move or are turned over; trees might shake; and liquids might spill out of open containers. An earthquake with a magnitude of 8 is considered a great earthquake that can cause serious damage in areas several hundred kilometer across. In addition to this, according to the Mid-America Earthquake Center, the line quadrant of the state that is labeled as critical counties ends at Monroe County, which is about 15 miles north of MUW. While MUW has not experienced an earthquake in the past, it is possible that the campus could experience an earthquake or after-shocks given the prediction and proximity to Monroe County, making this a medium-ranked hazard to MUW.



Source: Lowndes County Hazard Mitigation Plan

Flood

MEMA defines a flood as any general or temporary condition of partial or complete inundation of normally dry land areas from the overflow of inland or tidal waters; the unusually and rapid accumulation or runoff of surface waters from any source. Flooding is a natural and inevitable occurrence. Floods occur seasonally with general or torrential rains associated with tropical storms that later drain into river basins and fill them with an abundance of water.

According to the FIRM, MUW is located in Zone X, which is defined as other flood areas, areas of 500-year flood; areas of 100-year flood with average depths of less than 1 foot or with drainage area less than 1 square mile. According to MEMA's Flood Hazard and Repetitive Loss Risk Properties by Planning and Development District Area, Table 3.3.17, Lowndes County has no state buildings in a flood plain. Therefore there is no need for MUW to participate in the National Insurance Flood Program (NFIP).

According to Tommy Alexander, a retired physical plant employee who started at MUW in 1977, flooding was a major problem on campus. He stated that stopped up ditches and drains, not necessarily a big rain, would cause flooding. Therefore just about every time it rained, there was flooding on campus. He recalled how water got into the basements of Magnolia Dorm (now demolished) and the old Laundry Building (located on south campus, a very low-lying area) as well as the Art & Design building and Fant Library (both centrally located on campus). In addition to these buildings, water would also get in the basement of Welty Hall (located on front campus) even after the renovation in 1991. University records indicate that in 1993 and in 1999 water was waist deep in certain places on south campus. Many cars were unable to make it through the flood waters. (Meh Lady Yearbook, 1993, Volume 84 and Meh Lady Yearbook 2000, Volume 90). The straight-line wind event on February 16, 2001 also caused flooding on south campus as well as several buildings.

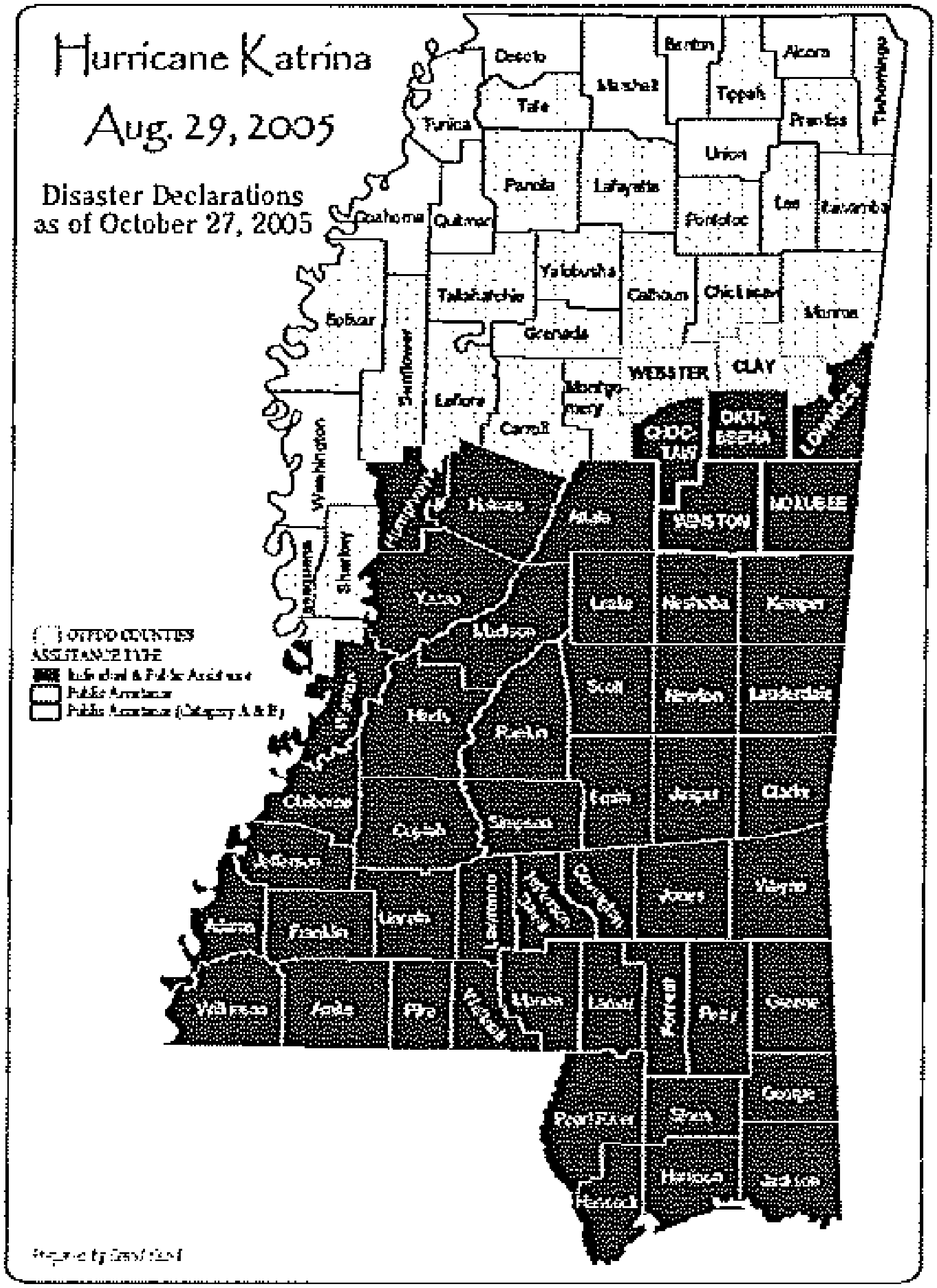
Since these instances, a storm and drainage project has been initiated and has ceased flooding on campus. This is evident from two very recent flood events in Columbus. On January 6, 2009, when nearly six inches of rain fell in and MUW had no flooding. On February 27, 2009, more than five inches of rain came down and yet again, MUW experienced no flooding. Alexander said if we didn't get any flooding from these two events, we probably won't. However, the university ranks this hazard with a medium risk based on past occurrences.

Hurricanes & Tropical Storms

FEMA defines hurricane as a type of tropical cyclone, the generic term for a low pressure system that generally forms in the tropics. A typical cyclone is accompanied by thunderstorms, and in the Northern Hemisphere, a counterclockwise circulation of winds near the earth's surface. Hurricanes are typically considered coastal hazards, but these large storms move inland generating large amounts of rainfall and may spawn tornados and damaging straight-line winds.

The hurricane in which effects were felt on the MUW campus happened on August 29, 2005. Hurricane Katrina which is likely to go down as the worst and costliest natural disaster in the U.S. history as the devastation was not only confined to the coastal region, but widespread and significant damage occurred well inland. MUW received minor damages from the effects of Hurricane Katrina -- approximately $28,000. This was mainly roof damage; however debris removal and clean up is included. Also included are supplies, items and meals needed as MUW's residence halls served as a temporary shelter for over 150 Katrina evacuees for over two months. Due to this one past occurrence and the distance MUW is from the coast, hurricanes are ranked as medium.

Figure 10 Hurricane Katrina Disaster Declarations



Source: Lowndes County Hazard Mitigation Plan

Tornado
A tornado is a powerful column of winds spiraling around a center of low atmospheric pressure. It looks like a large black funnel hanging down from a storm cloud. The narrow end will move over the earth, whipping back and forth like a tail. The swath of damage can be over one mile wide and 50 miles long. Some tornadoes are clearly visible, while rain or nearby low-hanging clouds obscure others. Occasionally, tornadoes develop so rapidly that little, if any, advance warning is possible. Before a tornado hits, the wind may die down and the air may become very still. A cloud of debris can mark the location of a tornado even if a funnel is not visible. Tornadoes generally occur near the trailing edge of a thunderstorm. It is not uncommon to see clear, sunlit skies behind a tornado.

On October 10, 1992, a level 2 tornado came through and left behind damages estimating over $3 million. University resources state the front campus looked like the aftermath of a war. Power lines were down and students had to wade through several inches of water. Damage was sustained to most of the historic front campus buildings including the famous Callaway Hall Clock Tower as well as the Old Maid's Gate. The cost to repair the clock tower was $318,000. The majority of the damage to back campus was uprooted trees and imploded windows. The freshmen residents of Callaway Hall were moved to back campus after Callaway Hall was deemed unsafe. There were no major injuries. Damages totaled $3 million. (Meh Lady Yearbook, 1993, Volume 84)

A little over 10 years after the 1992 tornado, another devastating tornado rocked the campus. On November 10, 2002, a level 3 tornado hit MUW leaving behind damages totaling over $22 million. The tornado completely destroyed the physical education building and left the Art & Design building without a third floor leaving the university with a complete loss of two academic buildings. Twenty six of 60 buildings were damaged and the campus was closed for a week. Additional damages included uprooted trees, downed power lines, downed fences, imploded windows, water damage, etc., There was no loss of life or injuries requiring medical attention.

Likelihood of future occurrence is hard to predict as tornado tracks are random within the path of the thunderstorm and the path of the thunderstorm is also somewhat random. However, based on the possible catastrophic consequences of this event and based on past occurrences, we consider tornados not only a high risk hazard, but the primary hazard at the University as they can occur at anytime with or without warning.

Figure 11 Fine Arts Building 2002.

Wildfire

The county mitigation plan states a wildfire is any fire that burns uncontrollably in a natural setting such as, grasslands, forest, and brush land. Prescribed burnings are the only exception to a wildfire. Wildfires can be either man-made or natural. The typical cause of natural wildfires is lightning. Prescribed burning, also known as controlled burning is the deliberate use of fire under specified and controlled conditions. Prescribed burns are used by forest management professionals and individual landowners. Wildfire is often associated with high air temperatures and dry conditions, although not exclusively. Wildfire differs from controlled burns in that they are destructive to the woodland / grasslands habitat in which they occur and lack the controlling factors which make controlled burns beneficial. Wildfire is most often a hazard in woodlands or grasslands during dry, hot weather. Often wildfire has man-made origins such as burning trash in dry, windy conditions but natural origins such as lightning can also start wildfires.

The county mitigation plans states Lowndes County had a total of 63 wildfires between 2002 and 2007 that were recorded by the Mississippi Forestry Commission. There is no evidence to indicate that the MUW campus has been effected by wildfire. But due to numerous thunderstorms that produce lightning; low risk of drought, high risk of heat extreme and trees on the south end of campus, this hazard is retained as a low risk with a low probability of future occurrence.

MAN-MADE DISASTERS

Profiled below are man-made disasters that may threaten MUW. While little or no evidence supports occurrences of these on campus, they were retained as hazards primarily because safety is the ultimate goal; but secondarily most of these are covered in the University's emergency response and preparedness plan and allows co-mingling of the two plans.

Civil Disturbance

Most campus demonstrations such as marches, meetings, picketing and rallies will be peaceful and non-obstructive. A student demonstration should not be disrupted unless one or more of the following conditions exists as a result of the demonstration:

- Interference with the normal operations of the University
- Prevention of access to office, buildings or other university facility
- Threat of physical harm to persons or damage to university facilities

If any of these conditions exist, the MUW Police should be notified and will be responsible for contacting the President. Depending on the nature of the demonstration the appropriate procedures listed below should be followed:

Non-disruptive Demonstrations

Generally, demonstrations of this kind should not be interrupted. Demonstrations should not be obstructed or provoked and efforts should be made to conduct university business as normally as possible. If demonstrators are asked to leave, but refuse to leave by regular facility closing time, arrangements will be made by the Chief of Police to monitor the situation during non-business hours, or a determination will be made to treat the violation of regular closing hours as a disruptive demonstration.

Disruptive Demonstrations

In the event that a demonstration blocks access to the university facilities or interferes with the operation of the university, demonstrators will be asked to terminate the disruptive activity by the Chief of Police or designee. If demonstrators persist in the disruptive activity they will be apprised that failure to discontinue may result in disciplinary action including suspension, expulsion or arrest. Except in extreme emergencies the President will be consulted before such disciplinary actions are taken.

Efforts should be made to secure positive identification of demonstrators in violation to facilitate later testimony, including photographs/video if deemed necessary. After consultation with the President, Chief of Police, and Vice President for Student Services, the need for an injunction and arrest will be determined. If determination is made to arrest the demonstrators, they should be so informed and warned of the intention of arrest.

MUW has had high profile visitors to campus – President W.H. Taft in 1911; Vice President Dick Cheney on October 27, 2003; and most recently President Barack Obama on March 10, 2008 (President-elect at the time of visit). These visits could have sparked a civil disturbance, but no such actions were reported ranking this a low hazard.

Computer Crime or Attack

It is no secret that institutions are bearing the brunt of today's malicious software attacks. Phishing emails and data breaches are rampant in the educational space, especially in colleges and universities. Many institutions are implementing a variety of security technologies, including antivirus software, network access or authentication control, quarantine systems, network segmentation, multi-factor authentication and other technologies to help secure their networks. The technologies have their place and go a long way toward mitigating the problem. However, technology is not the source of the problem and therefore won't be the ultimate solution.

In today’s technology driven environment, computer related threats are frequent occurrences that require vigilant awareness. MUW systems and networks experiences computer related threats and attacks on a daily basis. Thousands of Internet-connected wired/wireless devices are employed every day on MUW’s campus networks which in turn increases exposure for computer hackers to exploit potential vulnerabilities. Though it is impossible to protect against every threat, mitigating risks from computer related threats and attacks can be achieved by providing awareness, training, and maintaining system controls.

MUW systems are susceptible to basic web application attacks (BWAA), system intrusions, Denial of Service attacks and miscellaneous errors. These types of breaches represent 80% of the attacks. Threat actors are targeting universities both internally and externally and the most common motive is financial. The higher education system is seeing a dramatic increase in ransomware attacks resulting in over 30% of the breaches. These breaches are initiated most often through stolen credentials and phishing attacks where authorized users unknowingly give away their username and password.

User awareness and training is the greatest common denominator in mitigating risks that involve personal computers and servers. MUW engages many hardware and software security applications to help protect against computer crime and attack. Network perimeter security, anti-malicious software applications, access controls, and network design are many tools used at MUW to successfully mitigate security risks. However, even with many levels of security, some MUW systems have been compromised in the past. Nonetheless, as like many other institutions with a significant presence on the Internet, MUW will remain a target for entities with malicious intent. The rank for this hazard category should have a high rating.

Disease/Epidemic/Pandemic

A disease or medical condition is an abnormal condition of an organism that impairs bodily functions, associated with specific symptoms and signs. It may be caused by external factors, such as invading organisms, or it may be caused by internal dysfunctions, such as autoimmune diseases (Wikipedia). The Second College Edition of The American Heritage Dictionary defines an epidemic as spreading rapidly and extensively by infection among many individuals in an area.

What causes infectious diseases? Germs, or microorganisms, as they are called by scientists. The most common microorganisms are bacteria and virus, but others are fungi, protozoans, and worms. Bacteria, which are one-celled organisms, and viruses, which are even smaller, are mainly (parasites) that multiply sometimes with astonishing speed.

Although vaccine-preventable diseases have declined to record-low levels in the United States, infectious disease "epidemics" on college campuses continue. A large student body with variable immunization status makes a college campus fertile ground for the spread of communicable diseases. The presence of international students and an increasingly large number of students traveling abroad make it essential that individuals charged with defining and instituting health-related policies for the university have knowledge about health issues occurring in foreign countries as well. Several safe and effective vaccines are available that offer protection to young adults from a variety of infectious diseases in the United States. Because vaccine-preventable diseases can cause both human and economic problems for colleges and universities, administrators should take steps to assure that the students on college campuses benefit from these vaccines. (A. Kumar, Department of Pediatrics and Human Development, College of Human Medicine, Michigan State University)

Pandemic

A pandemic is a global outbreak of disease. Pandemics happen when a new virus emerges to infect people and can spread between people sustainably. Because there is little to no pre-existing immunity against the new virus, it spreads worldwide. The virus that causes COVID-19 infected people and spread easily from person-to-person. In development of this profile, a review was conducted of the guidelines stated in “Public Health Emergency Preparedness and Response Capabilities: National Standards for State, Local, Tribal and Territorial Public Health”, a document produced by the Center for Disease Control (CDC) in October of 2018 and updated in January 2019.

On March 11, 2020, the Mississippi State Department of Health (MSDH) confirmed the first presumptive case of the novel coronavirus (COVID-19) in the state of Mississippi. This was followed by a State of Emergency Declaration issued by Governor Tate Reeves on March 14, 2020.

On April 1, 2020, Governor Tate Reeves signed Executive Order No. 1466, declaring that beginning at 5:00pm on April 3 through April 20 at 8:00am, all individuals currently living in the State of Mississippi are ordered to stay at home or in their place of residence unless otherwise exempted in the Executive Order. Testing sites were provided by local medical providers as well as drive thru testing in select areas. Home isolation became mandatory for those that have tested positive the virus per a statewide order issued by State Health Officer Thomas Dobbs. Various Executive Orders from Governor Reeves instituted restrictions on public gatherings and events, limitations of customers for select businesses, mask mandates and other requirements throughout the ongoing COVID-19 pandemic. To date, there have been just under a million cases of COVID-19 in Mississippi and 21,511 cases in Lowndes County. Deaths attributed to COVID-19 in Mississippi total 13,474 and 259 in Lowndes County

Sexually Transmitted Diseases (STDs)

According to Health Services at Columbia University, 20-25 percent of college students across the country have either been infected with a STD or transmitted an STD to their sexual partners. Two thirds of all individuals with STDs are under the age of 25.

STDs are generally divided into two classes. Viral STDs include genital warts, herpes, hepatitis and HIV and bacterial STDs include gonorrhea, chlamydia and syphilis. Bacterial infections are generally easier to cure with a round of antibiotics but will still take their toll on the individual. Viral infections are very serious and cannot be cured, only treated. Unlike most ailments, STDs are tricky in that individuals may be asymptomatic. As such, these individuals may continue having sexual relations and unknowingly transmit the disease to others.

According to the Centers for Disease Control and Prevention (CDCP), the most commonly contracted STD in recent years has been Human Papilloma Virus (HPV), also known as genital warts. Four to six million cases of HPV are seen each year, and it has been termed as the most common STD on college campuses across the country. The American Social Health Association (ASHA) claims that there are over 100 different types of HPV, 30 of which cause genital warts. HPV is spread primarily through skin-infected skin contact, and it manifests itself as warts around the genitals. In rare cases, HPV has the potential to cause cervical cancer in women. Although individuals may be affected with genital warts, HPV can remain dormant, which makes it difficult to diagnose and treat.

Meningitis

Meningitis is inflammation of the protective membranes covering the brain and spinal cord, known collectively as the meninges. The inflammation may be caused by infection with viruses, bacteria, or other microorganisms, and less commonly by certain drugs. Bacterial meningitis, and some other causes are life-threatening because of the inflammation's proximity to the brain and spinal cord; therefore it is a medical emergency (Wikepedia).

Meningococcal disease is contagious and progresses very rapidly. The bacteria are spread person-to-person through the air by respiratory droplets (e.g., coughing, sneezing). The bacteria also can be transmitted through direct contact, such as kissing, with an infected person.

The American College Health Association (ACHA) recommends all first-year students living in residence halls receive the meningococcal vaccine. The ACHA recommendations further state that other college students under 25 years of age may choose to receive meningococcal vaccination to reduce their risk for the disease. Because disease rates begin to climb earlier in adolescence and peak between the ages of 15 and 20 years, the vaccine is also recommended for all adolescents 11 through 18 years of age (ACHA article Vaccination Recommendations for College Students).

These recommendations, coupled with ample supply of a vaccine that may provide longer duration of protection, will help increase rates of immunization against meningococcal disease and will give college health professionals the guidance needed to help protect college students against meningococcal disease. (ACHA article Transmission and Symptoms of the Disease).

According to an article on woodtv.com, a noro-like virus, caused Hope College in Holland, Michigan to close in 2008. An order from Ottawa County health officials came down after more than 120 Hope College students became ill from a noro-like virus. The campus health clinic noticed the beginning of the outbreak in which symptoms included diarrhea, nausea and vomiting, which pointed to the highly contagious norovirus. As the number of patients closed in on 120, county health officials ordered the campus shut down. Classes, sporting events, any gathering of people on the campus was prohibited. All dining facilities were closed and didn’t reopen until they were disinfected. All common areas in dorms, classroom buildings and other public facilities were cleaned as well. Because of Hope's close proximity to downtown Holland, campus officials didn't take any chances as campus security and Holland police were asked to break up any parties or other student gathering both on, and off, campus. The virus is also spread through contact with surfaces, like tables, computer keyboards, phones or any number of sources. (woodtv.com, Perfect storm' shuts down Hope campus, November 7, 2008, Joe LaFurgey)

The recent pandemic of the swine flu raised concerns but did not cause alarm on the MUW campus; however it did increase awareness about the importance of hand washing, sanitizing, etc. and caused for review of the pandemic emergency plan.

According to Amy Wallace, an MUW campus health center official, since 1998 there have been 10 positive STD tests with the particular STD being Chlamydia and a couple of positive genital herpes screens. Since that same time there has only been one documented case of meningococcal meningitis. While the documented cases are low, because of the unpredictable campus environment, MUW ranks this hazard with medium severity.

Fire/Arson

Fire is the oxidation of a combustible material releasing heat, light, and various reaction products such as carbon dioxide and water (Wikipedia). Each year, more than 4,000 Americans die and more than 25,000 are injured in fires, many of which could be prevented. Direct property loss due to fires is estimated at $8.6 billion annually.

In an average year, 1,800 fires hit college campuses, killing some, injuring many more and causing millions of dollars in property damage, according to the U.S. Fire Administration. The potential threat of college dormitory fires is often not taken seriously enough by students until it is too late. Campus authorities and students sometimes let their guard down because of the high frequency of pranks and false alarms.

On April 12, 1987, in Williams Hall of Wesley College in Dover, Delaware, and fire caused by smoke bombs killed an 18-year-old one student and injured four others, one critically. Incidents involving smoke bombs had occurred before, and students apparently thought the smoke this time "was just another smoke bomb." As a result the fire department was not immediately notified. There had been frequent false alarms, and students considered them annoying. The fire alarm in the dormitory did not operate on the day of the tragic fire, apparently because the fire alarm bell had been stolen from the first-floor hallway after a false alarm the previous day.

A fire on April 28, 1987, in Frazer Dormitory of Longwood College in Farmville, Virginia, was apparently caused by an unauthorized overloaded, multi-outlet extension cord. Fifteen students were injured in this event. As in the Wesley College incident, the fire alarm failed to work. In this case, activation was delayed about 10 minutes because the breaker switch was off. In addition, the majority of in-room smoke detectors were disconnected or failed to operate. Similar to those at Wesley College, the Longwood College students apparently did not evacuate immediately because they thought it was "just another fire drill." Both these incidents point out the importance of enforcing fire safety policies and procedures in residence halls and encouraging use of the 911 emergency number for reporting emergencies to appropriate authorities (U.S. Fire Administration/Technical Report Series, College Dormitory Fire, Dover, Delaware, and Farmville, Virginia, USFA-TR-006/April 1987).

There were 3,300 college housing fires in 2005, up from 1,800 in 1998, according to a report by the National Fire Protection Association (NFPA). From 2002 to 2005, there were 39 deaths and close to 400 injuries from fires in residences that include dormitories, fraternities, sororities and barracks. Federal officials said the increase comes as students cram more electrical equipment into their dorm rooms, with microwaves and hot plates responsible for a majority of the fires. Most of the fatalities, however, were blamed on fires started by smoking or unattended candles.

On Tuesday, May 6, 2008, a fire broke out in the Main Building on the Our Lady of the Lake University (OLLU) campus in San Antonio, Texas at 7:30 p.m. The fire continued until the early morning hours of Wednesday, May 7. All occupants safely evacuated the building and no one was injured in the fire. While the fire did cause significant damage to the historic Main Building, the fire was contained to that building. No other building sustained fire damage. In what was the city's first four-alarm fire in nine years, more than 100 firefighters from the San Antonio Fire Department battled the blaze. The San Antonio Police Department and campus police from surrounding areas arrived to assist. Reports stated that the roof, attic and most of the fourth floor suffered significant fire damage. The first, second and third floors sustained substantial water and smoke damage. After a thorough investigation by forensics experts and the Arson Unit, the cause of the fire was deemed accidental by San Antonio Fire Department officials. Fire Department investigators determined the fire began in the attic of Main and was probably electrical (www.ollu.edu, Our Lady of the Lake University).

MUW has records of two fires on campus: One in Shattuck Hall on front campus on July 14, 1953 in which the top two floors were destroyed rendering the dining hall and other residential space useless. The other fire was in 1991 at two faculty apartments located on south campus with damages totaling $80,000.

Arson
Arson, the act of deliberately setting fire to a building, car or other property for fraudulent or malicious purposes, is a crime in all states (Insurance Information Institute III).

Arsonists set fires that destroyed $878 million worth of property in 2007, down 1.2 percent from $889 million in 2006. These fires include factories, residential buildings, churches and motor vehicles, according to the National Fire Protection Association (NFPA). Unfortunately, college campuses are not exempt from arson.

On February 18, 2009, there was a fire, caused by arson, that totaled up to $1 million in damages at Lorain County Community College in Elyria, Ohio. No one was injured but the blaze sent heavy smoke through underground tunnels that connected several buildings. In all nine buildings were damaged due to heavy smoke. A 24-year-old student with a long criminal record including another arson case was arrested. (Chronicle of Higher Education, Student Charged With Arson That Shut Down Community College in Ohio, February 20, 2009).

On March 4, 2009, arson was the cause of five fires in two buildings at College of Mount St. Joseph in Cincinnati, Ohio resulting in the death of a student, who suffered a seizure, and smoke inhalation injuries to another. Delhi Township Fire Chief William Zoz said three fires were set in the Arts Building and two more on the fifth floor of Seton Hall, where 400 students live. Four were in bathrooms and one was in a stairwell. All the blazes were small and were extinguished by sprinklers in the buildings. Damage was set at less than $20,000 and was mostly due to water used to extinguish the blazes. An 18-year-old resident student was charged with two counts of aggravated arson (Kypost.com, MSJ Fires Ruled Arson, Student Dies After Seizure, March 5, 2009).

The University ranks hazard of medium severity.

Loss of Lifelines (Utilities)
MUW's utilities are provided by the following:

Electric – Columbus Light & Water Department
Plymouth Bluff's electric is provided by 4-County
Water – Columbus Light & Water Department
Gas – Atmos Energy
Communications – CSpire provides all telephone services and is the university's internet service provider.

Electric/Water
Severe weather is one of the greatest causes of power loss. Snow, ice, high winds, and lightning can cause damage to electric power grid infrastructure. Other causes of power outages include flooding; fallen tree limbs, vehicle accidents involving utility poles, and small animals climbing the lines and shorting out power supply. Other hazards resulting from power outages include temperature extremes, unsafe drinking water, electrical shock from downed power lines, and carbon monoxide poisoning. Power outages can also be and often are a secondary effect of severe weather.

Gas
Most of the buildings on MUW campus are on natural gas.

Communications
While MUW has several ways of maintaining communication, they are all still vulnerable to communication failures.

The probability of a large-scale and extended period of utility failure is low. However, small scale and shorter periods of utility failure may occur more frequently. The maximum utilities failure threat to MUW is a loss of electricity, water and communications. These resources help ensure the health, safety, and general welfare of the campus. While the University is vulnerable to a loss of utilities, the greatest threat is a loss of utilities for prolonged periods of time. The longer the breakdown, the worse the impact will be. A loss of natural gas can negatively impact the University, but it will not have the impact, when compared with the loss of other utilities, such as electricity, water and communications. A loss of electricity can also negatively impact emergency responders as well.

MUW has not had a major utility failure that resulted in damages thus far; but because this could be the result of a natural or man-made disaster, it is rated with medium severity.

Terrorist Acts/Explosive Devices
The Free Dictionary says a terrorist act is the calculated use of violence (or the threat of violence) against civilians in order to attain goals that are political or religious or ideological in nature; this is done through intimidation or coercion or instilling fear.

The tragic events that occurred on September 11, 2001 caused people to rethink security strategies for nearly every profession in the U.S. College campuses are no exception. Terrorist attacks must be considered due to their random and unpredictable nature. The risk is always present for various extremist individuals to be displeased with university research, policies, or happenings and to show this displeasure with violence.

One terrorist act that would be of great concern to MUW would be explosive devices. Most acts of terrorism in the U.S. are directed toward government buildings and officials. The most notable of these terrorist acts would be the terrorist attacks on September 11, 2001, otherwise known at the "9/11 attacks," in which about 3,000 people were killed when four airline jets were hijacked. Two planes were intentionally crashed into the twin towers of the World Trade Center, one crashed into the Pentagon, and the last plane was unintentionally crashed into a field in Pennsylvania. While most terrorism acts are not this severe and are focused on government, some have occurred in schools and universities. There have been 23 shootings in colleges and universities throughout the U.S. Some of the more damaging school shootings in U.S. history are as follows:

> **August 1, 1966 --** University of Texas, Charles Whitman killed 14 people and wounded 31, while shooting a rifle from an observation deck. He killed his wife and mother before going on his shooting rampage, which ended in him being killed by police. During his autopsy it was discovered that he had a brain tumor, which some believe caused his mental instability. This incident led a movement toward the creation of modern SWAT teams.
>
> **January 26, 1995 --** University of North Carolina, Chapel Hill, a schizophrenic law student killed two and injured two others with a rifle.
>
> **April 20, 1999** -- Columbine High School, two students went on a shooting rampage in Colorado, killing 13 people and wounding 24 others before both committing suicide. They used various shotguns, handguns, rifles, and bombs during their massacre. The cause of the rampage is thought to be due to many things including feelings of isolation, being outcasts and bullied, depression, and previous violent natures.
>
> **October 28, 2002 --** University of Arizona, a 41-year-old nursing student who was failing the nursing program shot and killed three nursing professors before committing suicide.
>
> **April 26, 2007 --** Virginia Tech University, a 23-year-old South Korean immigrant and Virginia Tech student Seung-Hui Cho killed 32 people and wounded 25 others before committing suicide while on a shooting massacre. This was the deadliest shooting in modern U.S. history. It is unclear as to why Cho went on his killing rampage, but some speculate his tendency to be a loner, his hatred of the wealthy, and his past occurrences of mental illness (he had undergone psychiatric treatment previously) contributed to his decision to go on a killing rampage.
> Source: University of Tennessee at Knoxville Hazard Mitigation Plan

Terrorist acts, whether foreign or domestic have become a significant topic of concern in the past few years. To counteract the threat of terrorism on campus all faculty and staff must be attuned to the signs of possible terrorist activity. Some signs of possible terrorist activity occurring includes but is not limited to white powder substances found in or on campus property/facilities; suspicious mail or packages received with no return address or package is moist, wet or weathered; international or foreign students demonstrating or voicing hatred for Americans; unlawful computer website access by foreign students and/or tracking of packages/mail delivery via college computers.

There are approximately 4,000 Title IV institutions of post-secondary education in the U.S. serving 15 million students, and several million faculty, staff and visitors. According to the Bureau of Justice Statistics, there are roughly 30,000 campus police and security officers protecting these institutions and individuals. (Campus Public Safety: Weapons of Mass Destruction Terrorism Protective Measures Office for Domestic Preparedness, U.S. Department of Homeland Security, April 2003)

Explosive Devices
Free Dictionary defines an explosive device (bomb) as a container filled with explosive or chemical material and generally used in warfare. An improvised explosive device (IED) is a bomb constructed and deployed in ways other than in conventional military action. They may be partially comprised of conventional military explosives, such as an artillery round, attached to a detonating mechanism (Wikepedia).

It appears as though bomb threats may be on the rise on campuses all across the U.S. In August 2007 Middle Tennessee State University (MTSU) in Murfreesboro was among five universities across the country to receive bomb threats on the first day of the fall semester. Three MTSU employees received e-mails saying there were explosive devices on campus. Authorities said they checked several buildings, but didn't find anything. Princeton University, Clemson University, Carnegie Mellon University and the University of Alaska at Anchorage also received bomb threats. (News Channel5.Com, Bomb Threat Raises Concern on Local College Campus, August 27, 2007)

On March 12, 2008, administrators and police at the Levelland campus of South Plains College in Texas evacuated three buildings after an unknown person made two phone calls to Levelland police saying there were bombs in three on-campus buildings. South Plains College administrators and local police evacuated the administration building, science building and technical arts building in response to the threat. Police, however, did not find bombs after a thorough search of the buildings, said Tom McCain, assistant chief of the Levelland Police Department. Though all three buildings had been cleared by the Lubbock Sheriff's Department's bomb squad and bomb-sniffing dogs, administrators canceled afternoon classes in the buildings. (The Daily Toreador, Bomb threat causes evacuations, class cancellations at South Plains College by Matt McGowan, March 12, 2008)

On January 26, 2009, fire fighters say a plastic bottle containing chemicals exploded in a dormitory stairwell at Wittenberg University in Springfield, Ohio. No one was injured when the homemade device exploded in a residence hall. Assistant Springfield Fire Chief Nick Heimlich said the device consisted of a plastic water bottle containing over-the-counter ingredients such as drain cleaner, and the bottle exploded when the combined ingredients created an expanding gas. (WDTN2.Com, Bottle bomb explodes on college campus, January 27, 2009).

According to University police secretary Sherry Honsinger, since 1999 there has been one bomb threat on campus; however no bomb was found. Initially because of the low number of past incidents, MUW ranked this a low hazard, but due to more terrorists acts on college campuses, it has been moved to a medium hazard.

Transportation Accidents/Explosions/Chemical Spills/Hazardous Materials
Because all these hazards are somewhat related, MUW decided to bundle them. The University has a railroad track that runs near the campus thus putting the university at a high risk for all these hazards. Certain academic courses such as chemistry as well as products used by the custodial department also put the University at a high risk for explosions and incidents dealing with hazardous materials, chemicals and chemical spills.

Since the plan already addressed explosive devices in the previous section, explosions in this section are related to those as a result of transportation accidents, equipment, hazardous materials, chemicals or chemical spills. Unfortunately, college campuses are not exempt from these hazards.

On Monday, January 11, 2009, A Black Hawk helicopter performing training exercises on the Texas A&M campus in College Station crashed on takeoff, killing a 2008 A&M graduate and injuring four Army guardsmen on board. No students were on the aircraft.

In October 2004 at Texas A&M, the Physical Plant's $5.8 million on-campus boiler caused an explosion. No one was injured, but had someone been standing at the wrong place at the wrong time, an injury would have been sustained said Lee McQueen, assistant director for utilities. It was said the explosion involved a piece of machinery inside the boiler (On Campus Boiler Explosion Still Under Investigation, The batt.com Independent student voice of Texas &M, October 29, 2004, Pammy Ramaji).

Chemicals are found everywhere and can be hazardous to humans or the environment if used or released improperly. Hazards can occur during production, storage, transportation, use, or disposal. Hazardous materials in various forms can cause death, serious injury, long-lasting health effects, and damage to buildings, homes, and other property. Many products containing hazardous chemicals are used and stored in homes routinely. These products are also shipped daily on the nation's highways, railroads, waterways, and pipelines.

In June 2005 a chemical reaction in Glenn L. Martin Hall at the University of Maryland sparked an explosion that burned one student and forced others to evacuate. A second-year graduate student was working with about a liter of nitric acid in a first-floor electronics packaging laboratory. He mixed the acid with an unknown compound, also with a nitric acid base, and accidentally triggered a minor explosion. The student suffered first- and second-degree burns to his face and upper body -- the burns were not life-threatening. A Hazardous Materials Team also worked to decontaminate the student and the building after students evacuated. Some property damage, including broken beakers, were reported (Chemical reaction causes small explosion, injures one, Diamondback, University of Maryland's Independent Daily Student Newspaper, Megha Rajagopalan, June 16, 2005).

Chemical manufacturers are one source of hazardous materials, but there are many others, including service stations, hospitals, and hazardous materials waste sites. Hazardous materials come in the form of explosives, flammable and combustible substances, poisons, and radioactive materials. These substances are most often released as a result of transportation accidents or because of chemical accidents in plants (FEMA).

The Occupational Safety and Health Act of 1970 (OSH Act) is the regulatory vehicle that ensures that the safety of workers, in firms larger than ten employees, is addressed. It sets standards of safety that help prevent injury or sickness among workers. The key factors of the OSH Act are regulating employee exposure and informing workers of the dangers of certain materials. About 500,000 different chemical products are used in the workplace. Many of these chemicals can cause health effects if overexposure should occur. They also pose safety hazards and have the potential to cause fires, explosions and other severe accidents.

Because of these potentially serious problems and because there was little information available from chemical manufacturers, the federal Occupational Safety and Health Administration (OSHA) legislated the "Hazard Communication Standard" (HCS). The HCS is more commonly referred to as the "Right to Know" Law. The "Right to Know" Law requires chemical manufacturers and importers to develop information on the possible hazards of their chemicals and provide that information on a form called a Material Safety Data Sheet (MSDS) to companies that buy their chemicals. MSDS's provide information about the chemical substances within a product, safe handling procedures, first aid measures if exposed, and procedures to be taken when the product is accidentally released or spilled.

While no evidence was found to indicate any the aforementioned hazards have occurred, MUW retains this a high risk due to the nearby railroad tracks and number of various chemicals located on campus.

Water/Food Contamination

The Dictionary of Military and Associated Terms, US Department of Defense 2005, defines contamination as the deposit, absorption, or adsorption of radioactive material, or of biological or chemical agents on or by structures, areas, personnel, or objects and as food and/or water made unfit for consumption by humans or animals because of the presence of environmental chemicals, radioactive elements, bacteria or organisms, the byproduct of the growth of bacteria or organisms, the decomposing material (to include the food substance itself), or waste in the food or water.

There are many forms and causes of contamination of water. In general water contamination can be categorized in the following subjects:

- Water pollution
- Bacterial water contamination -- water disinfection
- Surface water contamination
- Well water contamination (groundwater contamination)
- Mineral water impurities
- Water turbidity
- Waste water contamination
- Non-biodegradable water contamination

Water contamination can occur naturally, by human error or intentionally. Water supplies along transportation routes may be affected by hazardous materials spills. Water distribution can be affected in three ways: the amount of water available; the quality of the water; and the viability of the physical components of the distribution systems. The quantity of water usually depends on nature. Humans, on the other hand, are primarily responsible for the maintenance of water quality. Water contamination is more prevalent on college campuses than many realize.

East Carolina University (ECU) dealt with a water contamination incident in 2008. ECU personnel posted "don't drink" signs on water fountains throughout the campus. The university's dining hall remained open using paper and plastic plates. The only food that was prepared was food that didn't require rinsing. All food services employees had to use hand sanitizer. Any food that was prepared prior to the water contamination alert was thrown away and signs were posted at all possible water sources alerting students and employees not to drink the water (witn.com, ECU Takes Steps Because Of Water Contamination, June 26, 2008, Bill Wilson)

Food contamination is no different. An incident involving Hope College was referenced in a previous section (Disease /Epidemic). This same incident is used again because the source was thought to have been caused by food contamination which resulted in an epidemic.

An outbreak of the vomiting, diarrhea and stomach cramp-inducing Norovirus caused Hope College's campus in Michigan to be shut down for three days in November of 2008. More than 400 students reported flu-like symptoms throughout the weekend, according to an article by The Grand Rapids Press. The outbreak on the campus of 3,200 prompted Hope to close for an investigation by the Ottawa County Health Department. Tests from that investigation indicated it was a Noro-like virus, not the flu, that caused the illnesses. The Norovirus, and other viruses like it, induces low fever, vomiting, diarrhea, stomach cramping and other flu-like symptoms. It is extremely contagious and often caused by food contamination from an infected handler, according to the Central Michigan Health Department's Web site. Infection usually occurs from contact with or ingestion of fecal matter on food or in water. However, no cause had been determined at the conclusion of the investigation (cm-life.com, Independent Voice of Central Michigan University, Hope College closes after 400 fall ill, November 12, 2008, Lindsay Holt)

MUW has no records of food/water contamination; however because of the contamination can occur naturally, by human error or intentionally we deem this a medium hazard.

Threat/Violence

Violence affects the safety of everyone at the college and in the surrounding community. Violence is a complex behavior with determinants rooted in childhood experience/trauma, community norms, social and economic conditions. Violence on campus today takes on many forms including but not limited to the following: hate crimes, hazing, rape, stalking, suicide, and vandalism. Violence can start with one person but have a trickle effect on campus. Violence can have long-term consequences to others that may lead to social or academic problems.

Workplace Violence Workplace violence is violence or the threat of violence against workers. It can occur at or outside the workplace and can range from threats and verbal abuse to physical assaults and homicide, one of the leading causes of job-related deaths.

Assessing Vulnerability

MUW campus includes almost 59 buildings, 26 of which are listed on the National Register of Historic Places, with a total building value of $343,000,000. These numbers include one building off-site, Plymouth Bluff Center.

Equally important is the contents contained within these facilities. These contents may include, for example, furniture in residence halls, equipment in laboratories, power generation equipment and computers. The total acquired value of contents is $76,000,000 which includes $29,000,000 for library contents and collections. Adding the value of the structures, the value of the contents (including library collections) yields a total dollar exposure for the structures and equipment of $419,000,000.

The methodology for assessing vulnerability was based on a hazard vulnerability analysis chart done by DRU team member Pauline Redmond of The American Red Cross, and past occurrences. MUW ranks earthquakes as low on our hazards while flooding and windstorms are ranked high; however flooding has been somewhat eliminated with the recent storm drainage project. The last straight-line wind event was in 2001. MUW also used an old facilities master plan, the campus master plan, the master plan notebook, insurance information and the facility capital action plan (FCAP) as other resources to determine vulnerability and estimate losses. MUW ordered FEMA’s HAZUS-MH disk, which focuses on earthquake, wind and flood, however according to Larry Jones, Former Director of ITS and planning team member, the disk was too large to load on any of the university’s personal computers.

Classification of Structures

The campus structures were initially classified by MUW members of the DRU Planning Team in 2010 and updated in 2025 by the Crisis Action Team according to their importance and criticality to the campus operations.

DRU Planning Team classification used the following criteria to group buildings.

1) usefulness to the continuance of campus operations and response during a crisis event
2) usefulness to recovery operations after a natural disaster
3) amount of dollar exposure due to the structure and / or its contents
4) does the structure contain unique records or research data

5) does the structure contain particularly expensive equipment, research, or cultural material that warrants special consideration
6) does the structure house large numbers of students or staff representing a concentration of people.

The campus structures were classified as the following:

Critical structures: critical to operations and recovery in the event of a natural disaster

High priority structures: structures important because they contain high concentrations of people, they contain important records or equipment, the structure contains high potential dollar loss because of cultural or scientific materials, or the structure may be of use in a crisis management / recovery event.

Medium priority: contain significant investment of research funds, a significant concentration of people, or is a structure of historic value.

Low priority: those of lesser importance to the functioning of the university during or after an event.

The critical structures group included those structures which were deemed critical to operations and recovery in the event of a natural disaster. Nine structures are included into this class. The building containing the campus police department which is the first source of emergency response is included in the critical structures class. Building value information was obtained from a statement of values from our property insurance carrier, Affiliate FM, underwritten by Willis of North Carolina.

Table 12 – Listing of Critical Structures 2025

Structure	**Function**	**Concerns/Comments**	**Building Value** (in millions)
Hogarth Cafeteria	Primary Food Distribution	Lots of glass	8.1
Eckford Hall	Houses Health Center	Renovated 2 years ago	0.7
Stark Recreation Center	Potential Shelter	High dollar value structure	8.9
Emma Ody Building	Potential Shelter	High dollar value structure	11.3
McDevitt Hall	Houses ITS and Police	Built in 1927	5.2
Culinary Arts Building	Secondary Food Distribution	Lots of glass	19.8
Physical Plant Admin	Houses all PP offices		1.4
Martin Chiller Plant	Chillers, boilers, towers		2.0
Pohl Chiller Plant	Chillers, boilers, towers		2.0
		TOTAL	**$59.4**

The DRU Planning Team identified the high priority class as those structures (including lifelines) that may be useful in recovery efforts, but less of a factor in helping the University survive and recover from a natural disaster than the critical facilities, or it represents a significant investment in monies or in research or would represent a high potential loss structure. High priority structures were considered important because they contain high concentrations of people, they contain important records or equipment, the structure contains high potential dollar loss because of cultural or scientific materials, or the structure may be of use in a crisis management / recovery event. Twenty two structures are included in this class.
Fant Memorial Library, with its total dollar building value of approximately $18,144,650 and an even higher content value of $30,082,758 is an example of a structure with a significant, high potential loss value that is included in this class. Also included are the residence halls on campus.

These dormitories were included because of the concentration of people that could be contained in one structure, which ranges from 60 to 225 students at one time. Because student safety is a high priority on the MUW campus, it was decided that all residence halls would be included in the high priority listing as shown in Table 13.

Table 13 – Listing of High Priority Structures 2025			
Structure	**Function**	**Concerns/Comments**	**Building Value**
Whitfield Hall	Houses Career Services and the Honor's College.	Built in 1927	6.0
Welty Hall	Administration Building	Numerous student records	10.5
Fant Memorial Library	Library	High dollar value/ contents	12.8
Callaway Hall	Residence Hall	4 story/accommodates 134	5.4
Columbus Hall	Residence Hall	Accommodates 60	9.0
Faculty Apartments 1	Dwelling	Built in 1960	6.2
Faculty Apartments 2	Dwelling	Built in 1967	7.9
Art & Design	Academic Building	In use again after 02 storm	12.2
Hogarth Student Center	Houses Police Dept.	No elevator/lots of glass	14.9
Frazier Hall	Residence Hall, MSMS	5 story/accommodates 220	12.1
Goen Hall	Residence H all , MSMS	5 story/accommodates 220	12.1
Hastings/Simmons Hall	Residence Hall	4 story/accommodates 112	6.6
Hooper Science Building	MSMS class/offices	High dollar value/contents	11.4
Kincannon Hall	Residence Hall	5 story/accommodates 225	8.9
Jones Hall	Residence Hall	5 story/accommodates 225	12.3
Parkinson Hall	Academic Building	High dollar value/contents	17.3
Poindexter Hall	Academic Building	High dollar value/contents	19.0
Martin Hall	Academic Building	High dollar value/contents	13.9
Shattuck Hall	HR	High dollar value/contents	11.9
Shackleford Hall	MSMS	Elevator added in 2007	1.5
Cromwell Hall	Academic Building	High dollar value/contents	16.8
Grossnickle Hall	Residence Hall, Honors	2 story w/22 suites	4.1
		TOTAL	**$232.8**

The Medium priority structures class consists of facilities and buildings that are important, but are not critical to the continuity of the university during the recovery phase of a disaster. However, these structures contain significant information, a significant concentration of people, or is a structure of historic value. Twelve structures were included in the medium priority class. There is no majority in this class as Table 14 shows the different type of buildings classified as medium priority.

Table 14 – Listing of Medium Priority Structures 2025			
Structure	**Function**	**Concerns/Comments**	**Building Value**
Painter Hall	Academic Building	No elevator	6.4
Reneau Hall	Academic Building	High dollar value/contents	8.9
Stovall House	University Relations		1.0
Cochran Hall	Student Services Offices	Renovated 4 years ago	3.6
Plymouth Bluff Center	Environmental Center		5.0
Plymouth Bluff House	PBC Dwelling		150,000
Education/Human Science	Academic Building	High dollar value/contents	11.4
Turner Hall	Academic Building		10.2
G&A Warehouse	Built in 2006		500.000
Mary Wilson Home	MSMS Administration		1.8
President's Home	Dwelling		1.0
Old Fitness Center	MSMS Fine/Perf. Arts		718,000
		TOTAL	**$50.7**

Low priority buildings were considered to be of lesser importance to the functioning of the University during or after an event. This group is primarily made up of vacant buildings. However the committee deemed it necessary to include these buildings as they provide the university with optional space in case of a disaster. There are 15 structures in this group.

Table 15– Listing of Low Priority Structures 2025			
Structure	**Function**	**Concerns/Comments**	**Building Value**
Fant Hall	Vacant	In planning phase	12.2
Franklin Hall	Vacant		2.2
Orr Building	Vacant		5.1
Peyton Hall	Vacant		10.6
Whitfield Hall	Auditorium		6.6
Pohl Gym	Vacant		6.8
Puckett House	Receptions, lodging		1.0
Barrow School Annex	Vacant		2.0
Barrow School	Vacant		1.0
Residence	Vacant, dwelling		350,000
		TOTAL	**$47.8**

VULNERABILITY TO NATURAL HAZARDS

When assessing the vulnerabilities in the midst of the economic situation, it was important to establish a threshold amount that would be considered a problem for the university from a budgetary perspective. It was determined that $980,000 would be the threshold amount that would be considered problematic from a budgetary perspective. This amount is equivalent to 2% of the university's FY 2025 estimated $49,000,000 budget.

Dam Failure Vulnerability

The closest dam to MUW is about seven miles from the campus and it is classified as a low hazard dam meaning failure may cause damage to farm buildings (excluding residences), agricultural land, or county or minor roads. MUW feels vulnerability from this hazard is minimal to the University and costs would not be expected to exceed the $980,000 threshold that would be considered problematic from a budgetary perspective.

Drought/Extreme Heat Vulnerability

While MUW retains drought/extreme heat as a high hazard, there are no recorded losses to the university because of this event. The biggest concern would be conditions would become so dry as to spark a fire which is covered another category. Therefore, MUW considers vulnerability from this hazard minimal to the university as costs would not be expected to exceed the $980,000 threshold that would be considered problematic from a budgetary perspective.

Earthquake Vulnerability

MUW ranks earthquake as a medium hazard based on the fact that the Lowndes County Mitigation plan says our county is in line with a fault zone. Based on the Mercalli Intensity Scale, Lowndes County is expected to experience an intensity level of V from a magnitude 8 earthquake occurring along the NMSZ. In addition to this, according to the Mid-America Earthquake Center, the line quadrant of the state that is labeled as critical counties ends at Monroe County, which is about 15 miles north of MUW. According to the Modified Mercalli Intensity Scale, an intensity level of V means everyone would feel movement; people are awakened; doors swing open or close; dishes are broken; pictures on wall move; small objects move or are turned over; trees might shake and liquids might spill out of open containers. On this basis, MUW would look to experience some minor content damage as opposed to major content and/or structural damage thus making an earthquake event a minimal vulnerability to the campus. Contents value for all insured buildings on campus totals $49,500,000; however costs associated with this event would not be expected to exceed the $980,000 threshold that would be considered problematic from a budgetary perspective

Flood Vulnerability

Columbus has had several floods to devastate the city, but there are no recorded losses on the MUW campus from riverine floods. While MUW is not in a flood plain, it has had its share of flooding in the past. However, the flooding was not necessarily due to the amount of rainfall but rather was a result of design flaws in drainage systems as it did not take a lot of rain in order for flooding to occur. The drainage system is now being repaired. In the past, the southern part of campus would flood with water waist deep. Cars have been flooded as well, but again that was a result of outdated, poorly designed drainage systems which are now being repaired. Because of this project and the fact that the campus is not located in a flood plain, we feel the vulnerability from this hazard is minimal and any associated costs would not be expected to exceed the $980,000 threshold that would be considered problematic from a budgetary perspective

Hail Vulnerability

Because hail is often associated with thunderstorms and because thunderstorms happen often in our area, hail is ranked as a high hazard. While no evidence of property damage specifically caused by hail was found, we realize typically hail tends to damage roofs. Roof damage is likely to occur if the roofing material is of a vulnerable type, such as asphalt shingle.

To evaluate the vulnerability of the university to hail damage, the type of roof materials was the primary consideration. Buildings with roofs made of tile shingles or metal were excluded. A total of 24 buildings were identified with asphalt shingle roofs. According to Jody Kennedy, Director of Facilities Management at MUW, the total estimated replacement costs for all asphalt shingle roofs on campus would cost $2.5 million. Contents value for these same buildings total $4,244,363. Five percent (taken from University of Mississippi's plan) was also calculated to cover water damage to interior contents ($212,200), making the total vulnerability $2,732,200 which includes 24 asphalt roofs and contents loss. Building value was not considered because hail typically causes damage to the roofs not the structure. Potential costs resulting from this hazard exceeds the $980,000 threshold used by the University as a point at which loss become problematic from a budget perspective, particularly doing these lean economic times. The potential loss is unlikely to occur during a single event, but because of the numerous thunderstorms in Lowndes County, is considered a long-term vulnerability.

Hurricane and Tropical Storm Vulnerability

Hurricanes are typically considered coastal hazards, but these large storms move inland generating large amounts of rainfall and may spawn tornados and damaging straight-line winds. Columbus is located 250 miles north of the Gulf of Mexico and is very susceptible to hurricanes. The main threats regarding hurricanes at MUW are winds and tornadoes. MUW felt the effects of Hurricane Katrina in 2005 as approximately $28,000 worth of damage was done to the campus. This mainly consisted of roof damage, debris clean up and removal. This amount also included meals, supplies and items needed as MUW's residence halls served as a temporary shelter for over 150 Katrina evacuees for over two months.

Because hurricanes don't typically affect our area, the determination of the vulnerability is based the 2005 event. During this event seven roofs were damaged. They were asphalt shingle roofs and the total was $7,000. Again, we look at the 24 buildings that have asphalt shingle roofs. Total replacement of all these roofs total 1.8 million. Based on repair damage from 2005, the University today would be looking at roughly $1,500 per roof for repairs which equals $36,000. Debris clean up and removal totaled $4,700 in 2005. That averages out to roughly $700 per building. The university estimates debris clean up/removal cost would not change that much – putting the total debris removal cost for all 24 buildings at $16,800, bringing the hurricane/tropical storm vulnerability total for the university to $52,800 for repairs/clean up and $1,816,000 for roof replacement and clean up. Potential costs, depending on the damages, resulting from this hazard may or may not exceed the $580,000 threshold used by the University as a point at which loss becomes problematic from a budget perspective. Estimated potential loss was included because information was available. However, because the damage on campus from this event was not actually caused by a hurricane, but the effects of it such as hail and/or wind, MUW feels the vulnerability from this hazard is minimal, but will be addressed more in the Tornado/Straight-line Winds/Windstorm section.

Lightning Vulnerability

MUW has no records indicating any damage due to this event. In reviewing the vulnerability, the initial assessment was to review wood frame structures as those of masonry construction are seldom significantly damaged from lightning. Wood frame structures, however, are vulnerable to lightning-generated fires. The initial evaluation identified six campus structures of wood construction representing a building value of $6,068,289 of exposure to the hazard. Four other structures are partially wood, representing a building value of $19,770,843 for a total building vulnerability of $25,839,132. The contents of the same buildings (10) adds in another $1,397,600 putting the university at a possible $27,236,732 vulnerability for this event. Mark Hagan, senior account engineer for Affiliated FM, stated many variables play into estimations such as whether cost damages are for total exposure, value of buildings, location of building, etc. Affiliated always shows their damage calculations that include replacement cost building and contents values. Nevertheless he suggested a 30% minimum loss per building, which does not include contents, as a reasonable estimation for vulnerability. He added there is no standard percent for contents unless it is based upon occupancy class. With that being the case, we randomly used 10 percent for content losses realizing this may not be accurate but it will provide us with a figure as 10 percent was used in the University of Mississippi's plan.

The potential loss to lightning-generated fire was estimated at $27,236,732. Damage to the contents of the structures was estimated at 10 percent of the content value. This potential loss amounts to $139,760 while an overall 30 percent loss equals $8,171,019. Total potential loss from damage to the structure and its content value totals to $8,310,779. Potential costs resulting from this hazard exceeds the $580,000 threshold used by the University as a point at which loss become problematic from a budget perspective, particularly doing these lean economic times.

As lightning would not be expected to generate fires in all vulnerable structures in any given time frame, the potential loss figure represents a long-term vulnerability and not a vulnerability likely to be realized within seconds or minutes, such as may result from earthquakes and tornados.

Tornado/Straight-line winds/Windstorm Vulnerability

Unlike an earthquake, the destructive effect of a tornado does not radiate from a source such as a point along a fault, but rather follows the direction of the tornados' path. Unlike a hurricane this path does not cover an area about the center of the vortex that can be measured in miles, but rather feet or yards. A review of the tornado hazard profile suggests that the likelihood of an F3 tornado is significant enough to consider it as a possibility in both the near and long term. The potential damage that tornados can cause in a densely populated university campus is illustrated by the destruction caused by the 1992 and 2002 tornadoes that hit campus. These tornados caused an estimated $3 million and $22 million worth of damage, respectively.

The tornado/straight-line wind hazard is considered the primary hazard for the campus and is likely to be the most costly in terms of money and casualties. While MUW has had no casualties, it has had its share of damages from tornadoes. The most recent one being the Nov. 10, 2002 tornado that the University finally recovered from earlier this year with the completion of the Art and Design building. That storm caused over $22 million in damages. It completely destroyed the physical education building and left the Art and Design Building without a third floor. Twenty six buildings were damaged along with downed power lines, uprooted trees, imploded windows, water damage, roof repairs, downed fences.

Because tornadoes are so destructive, the types of construction really have no bearing on what type of damage to expect as the Art and Design and physical education buildings were both brick/masonry constructions yet received the most damage in the 2002 tornado. Debris removal and clean up from these building alone were a chore, not to mention the other 24 buildings that were damaged at this time coupled with power issues.

MUW's campus covers 114 acres, but for the most part our campus is compacted. And with the unpredictable path of a tornado, no building is safe. Since this is the University's primary hazard, we reviewed the damages and costs from the 2002 and 1992 tornadoes. The 1992 tornado primarily did its worst damage on front campus while the tornado in 2002 did most of its damage on south campus. Based on this assessment and the unpredictable path of a tornado, it was best to assume a worst case scenario in which every critical, high and medium priority building would be affected by a tornado. Table 17 shows the critical structures included in the tornado scenario. The 18 critical structures are considered essential for the campus to manage a tornado disaster and then to recover from it. Some structures are included because they are crucial to the academic mission of the university while others contain very high potential dollar loss because of academic materials, equipment, etc. Other structures may be of great use in a crisis management/ recovery event.

Table 16– Critical Structures in Tornado Scenario

Structure	**Date Built/Most Recent Renovation**	**Stories**
Art & Design Building	1961/2009	3
Eckford Building	1929/2007	1
Frazier Hall	1965/1997	5
Goen Hall	1963/1995	5
Hooper Science Building	1955/2002	2
McDevitt	1927/1995	1
Old Fitness Center, MSMS PFA	1963/1975	1
Martin Hall	1929/2005	3
Parkinson Hall	1951/2003	2
Poindexter Hall	1904/2002	4
Shattuck Hall	1910/2001	2
Shackelford Hall	1963/2007	2
Whitfield Hall	1927/1996	2
Fant Memorial Library	1969/2002	2
Martin Chiller Plant		1
Hogarth Cafeteria	1969/2002	2
Cromwell Communications	1977/2002	2
Stark Recreation Center	2007	2
Emmy Ody Pohl Building	2007	2
Culinary Arts Building	2023	2
Turner Hall	1929/2020	2
Physical Plant Admin Building	2018	1

Table 18 lists the high priority structures for a tornado event. High priority structures were considered important because they contain high concentrations of people, they contain important records or equipment, or the structure may be of use in a crisis management / recovery event.

Table 17 – Listing of High Priority Structures for Tornado Event

Structure	Date Built/Most Recent Renovation	Stories
Callaway Hall	1860/1993	4
Columbus Hall	1896/2001	4
Faculty Apartments 1	1960/2001	2
Faculty Apartments 2	1967	2
Hastings/Simmons Hall	1900-1996	5
Jones Hall	1964/1993	5
Welty Hall	1929/1991	3
Grossnickle Hall	1922-1996	2

Table 19 lists the medium priority structures for a tornado event. The medium priority structures class consists of facilities and buildings that are important, but are not critical to the continuity of the university during the recovery phase of a disaster. However, these structures contain significant information, a significant concentration of people, or is a structure of historic value.

Table 18 – Listing of Medium Priority Structures for Tornado Event

Structure	Date Built/Most Recent Renovation	Stories
Painter Hall	1922/1995	2
Heating Plant	1964	1
President's Home	1969/2002	1
Reneau Hall	1929/1997	4
Cochran Hall	1908/2005	4
Stovall House	1910/1995	2
Student Center	1961/2002	2
Grounds & Automotive		1
Plymouth Bluff House	1968	1
Education Building	1974/2002	4
Plymouth Bluff Center	1994/2005	1
Grounds & Automotive Warehouse	2005	1
Mary Wilson Home	1929	2

In this worst case scenario, the total dollar loss estimation for building value for all critical, high and medium priority structures is $182 million while the replacement value for the same structures is $225 million. Add in $49.5 million for contents and that brings to the totals to $228 and $271 million respectively. Low priority structures are not included in this damage estimate. Other likely costs such as potential damage to infrastructure, debris removal, cost of security services and damage to other University property are excluded as we have no way of measuring that need. Potential costs resulting from this scenario far exceed $580,000 threshold used by the University as a point above which loss become problematic from a budget perspective.

Straight line winds are those that come out of a thunderstorm. If these winds meet or exceed 58 mph then the storm is classified as severe by the NWS. On Feb. 16, 2001, a sudden and violent storm hit campus that lasted approximately 20 minutes and caused major damage to both the city and the university. The storm carried tornado-like winds estimated to be in excess of 100 mph; it was later decided the storm consisted of straight-line winds caused by the highly unusual confluence of two vastly different weather fronts. The nature of the storm accounted for the fact there was virtually no warning given to the community. While MUW was hosting a regional student journalism conference at the time, no fatalities or injuries resulted from the storm. The campus suffered significant damage, especially to roofs and trees, but no buildings were structurally damaged. Over 20 buildings suffered significant roof damage. There were 41 large, older trees completely uprooted on campus as well as Plymouth Bluff Environmental Center seven miles away. Additional damage included fallen trees, destroyed fences, snapped power lines, etc. Damages totaled $1.3 million.

Upon review of the documentation from the 2001 wind event, the greatest amount of damage occurred to roofs. Upon further review, it was determined these roofs were made of asphalt shingles. It has already been established MUW has 24 buildings with asphalt shingle roofs. It would cost 1.8 million to replace the roofs on these buildings, including the 5% loss for contents that makes the total vulnerability $1,846,500 for roofs only. However, a prediction of the likelihood of straight-line winds tracking across the MUW campus would be difficult as tornado tracks are random within the path of the thunderstorm and the path of the thunderstorm is also somewhat random. Therefore we use the same method for loss estimation as we did with tornadoes—a total building value vulnerability (including contents) of $228 million and a total replacement vulnerability (including contents) of $271 million. Again, potential costs resulting from this scenario far exceed $580,00 threshold used by the University as a point above which loss become problematic from a budget perspective.

Wildfire Vulnerability

MUW has never had a documented wildfire. The campus does have numerous trees on the south part of campus and due to the number of thunderstorms that produce lightning, the hazard does exist. Vulnerable structures are considered those close to the trees on the south campus. Although we feel that the wildfire hazard exists, we feel the potential for significant loss due to wildfire is minimal.

Winter Storm Vulnerability

There are no records indicating damages or injuries at MUW related to a winter storm event. In 2000 a winter storm brought a swath of heavy snow across central Mississippi. While some parts of the state saw four to 10 inches, Columbus did not receive that much. The 2000 Meh Lady Yearbook states classes were cancelled. The yearbook also stated that the last heavy snow was four years ago which is a reference to the February 1, 1996, winter storm in which a mix of snow, sleet and freezing rain that covered much of North Mississippi in which between two and five inches of snow and ice accumulated across the area.

Winter storms occur irregularly and can be associated with some costs to the University. These events are not expected to do structural damage, but could cause damage to lifelines and debris clean-up costs may be expected. The University may be expected to be closed one to several days depending on the severity of the storm. Winter storms are not likely to pose a major threat to the University. Therefore, MUW considers vulnerability from this hazard minimal to the university.

VULNERABILITY TO MAN-MADE HAZARDS

MUW has identified the following as man-made hazards that could pose a threat to the campus community:

Civil Disturbance
Computer Crime or Attack

Disease/Epidemic
Fire/Arson
Loss of Lifelines
Terrorist Acts/Explosive Devices
Transportation Accidents/Explosions/Chemical Spills/Hazardous Materials
Water/Food Contamination
Threat/Violence
Workplace Violence

Because the University has no records of past occurrences and predicts a low likelihood of future occurrence, MUW feels vulnerability from civil disturbance and water/food contamination is very minimal to the university and warrant no further discussion in this plan at this time. However, these hazards are addressed in the university's emergency response and preparedness plan. As for disease/epidemic and loss of lifelines, again based on past occurrence and the likelihood of future occurrence, the university feel vulnerability from these hazards to be minimal. The disease/epidemic hazard is not seen as a threat because of the recent evaluation of the university's pandemic plan and the education to the campus community about it. It is also not seen a major threat because it doesn't pose a monetary loss to campus. Due to the number of generators on campus to supply back up power to several key buildings and the professional business relationship maintained with utilities suppliers, loss of lifelines is not seen as a major threat to the university. These two hazards warrant no further discussion in this plan at this time. However, these hazards are addressed in the university's emergency response and preparedness plan.

Computer Crime or Attack Vulnerability
University Business reported that higher education institutions were targeted by an average of 1,065 cyberattacks per week in 2021, a 75% increase from 2020. Cyber attacks on higher education have been soaring in recent years. The Federal Student Aid Post-Secondary Institution Cyber Team found that "actual and potential cyber incidents" rose by 2,880% between 2015 and 2019. Higher education institutions shouldn't expect cyber attacks to become less frequent or destructive in the coming years. Verizon's 2022 Data Breach Investigations Report determined that 82% of breaches involve a human element and that institutions need to protect themselves against stolen credentials and phishing attacks that potentially expose personal information of its employees and students.

MUW has had two major cyber incidents in 2018 and 2020. Each time the university implemented additional controls to mitigate future attacks. However, cyber criminals are constantly finding new ways to invoke harm to higher education institutions. Cyber attacks to MUW is a hazard that can drastically affect the university and will remain a hazard with long-term vulnerability. MUW's Information Technology Services (ITS) already has an incident response plan in place to deal with such hazards. Computer crime or attacks can result in a loss of critical business information, personal identifiable information, loss of productivity, or results in an extortion claim. The likelihood of this kind of situation at MUW is always a possibility with the constant changing of technology and new ways cyber criminals are using to commit crimes. However, personnel must be trained to detect such situations and react to each situation in the proper manner

MUW is at risk of a natural disaster, a hazard that could also drastically affect the university. ITS is responsible for the planning, implementation, and support of on-premise administrative information systems throughout the university which include Ellucian's Banner. This system maintains employee and student information as well has payroll and federal financial aid information. An incident resulting from an emergency or disaster, poses at best a severe inconvenience to the university community and at worst could keep the university from fulfilling its mission.

Since the majority of the university's critical information is concentrated, ITS must take special care to back up our work and protect these backups at all cost. However, a viable and effective Disaster Recovery Plan must support these precautions. The current Disaster Recovery plan is under review for update in FY2024.

The primary objective of the Disaster Recovery Plan is to ensure the survival of the university. ITS must be able to meet obligations and supply the critical services and information to the university community. To accomplish these goals, ITS must: 1) minimize the time required to respond effectively to an emergency or disaster; 2) facilitate effective coordination of recovery tasks and 3) reduce the complexity of the recovery effort.

Supervisors should understand assessment of a disaster, and obtain proper authorization to notify needed personnel and mobilize for Disaster Recovery. Restoration procedures must be followed at the backup site to assure the safety and accuracy of our data. Finally, management to return MUW to a normal processing environment must initiate reconstruction procedures. The study and understanding of these procedures must be an on-going concern to all personnel in order to affect successful recovery from a variety of disasters and ensure the survival of the university. Due to changing technology and the reality of how dependent we are on computers, this hazard is seen as one with long-term vulnerability to the campus measured not necessarily by money, but by productivity.

Fire/Arson Vulnerability

MUW has records of two fires on campus and no records of arson. The fire in Shattuck Hall on front campus on July 14, 1953, destroyed the top two floors. A fire in 1991 damaged two faculty apartments with damages totaling $80,000. In order to assess these incidents we looked that current building and contents values for Shattuck Hall and all apartments on campus. Both buildings along with contents totals over $9 million. All buildings are capable of fire/arson, but we focused on structures constructed of wood. While the likelihood of all wood structures being destroyed by fire/arson is low, the same method used for evaluating lightning vulnerability is applied here as well. The initial evaluation identified five campus structures of wood construction representing a building value of $7M of exposure to the hazard. Four other structures are partially wood, representing a building value of $19M for a total building vulnerability of $26M. The contents of the same buildings (10) adds in another $1.4M putting the university at a possible $28.4M vulnerability for this event. Again, many variables play into loss estimations such as whether cost damages are for total exposure, value of buildings, location of building, etc. Damage to the contents of the structures was estimated at 20 percent of the content value. This potential loss amounts to $280,000 while an overall 30 percent loss equals $8M. Total potential loss from damage to the structure and its content value totals to $8M. Potential costs resulting from this hazard exceeds the $980,000 threshold used by the University as a point at which loss become problematic from a budget perspective, particularly doing these lean economic times.

Terrorist Acts/Explosive Devices Vulnerability

As mentioned earlier the one terrorist act that is of concern to MUW is explosive devices. Because there is no rhyme or reason in the mind of a terrorist, the planning team found the best way to assess the vulnerability of this hazard is to assume an explosive devise is targeted for all critical and high priority buildings. These are random buildings consist of the cafeteria, all academic buildings and all residence hall, along with other buildings that could be a target such as the administration building. While it is highly unlikely all buildings would be destroyed by this hazard, we have to assume a worst case scenario in which all critical and high structures are destroyed, leaving the university with a $252 million vulnerability from his hazard. Add in another $65 million for contents and brings the total to $317 million.

Transportation Accidents/Explosions/Chemical Spills/Hazardous Materials Vulnerability
Because these hazards are related, MUW bundled them. There is a railroad track that runs through campus which puts MUW at a high risk for all of these hazards. In this section explosions relate to those that are a result of transportation accidents, chemicals, chemical spills, equipment or hazardous materials. While chemicals are used by various departments on campus (science, art, custodial) and put the university at a high risk, based on past occurrences and stricter rules for distribution, labeling and storage, we do not see chemical spills, explosions, or hazardous materials as a high vulnerability to campus. However, when these hazards are the result of a traffic accident, that poses another situation. For the sake of clarity, we will estimate loss potential from these hazards only as a result of a transportation accident because of the railroad truck that runs through the campus.

When assessing the loss to campus, we looked at which hazards are most likely to cause the most the damage. The result was transportation accidents and explosions as these two are the most likely ones that could not be predicted or contained. Chemical spills and hazardous materials would most likely pose a productivity and minor threat to campus as the Police Department, local law enforcement and Facilities Management are more equipped to handle and contain these while accidents and explosions are more complicated as we have no control over containment. It’s a possibility there would be some clean-up fees, but those are minor.

While there are other transportation accidents that could happen on campus, the most likely to happen is a railroad accident because of the proximity of the railroad tracks; however the mitigation actions would be the same for all other transportation accidents. To estimate loss, we had to review the location of the tracks and its proximity to campus buildings. The train track enters the campus on the south side bypassing some buildings before cutting directly through the central east side of campus and exiting on a nearby street. Because the tracks are very close to several buildings on the east side, all of these buildings are in a critical path. Because accidents and explosions are not controlled, it was determined that all buildings within a block are in a critical path too. The most common scenario would be a vehicle of some type crashing into the train causing a wreck and/or explosion. Taking that into consideration, we looked at all buildings within one block of the track to estimate potential loss for an initial assessment. Fourteen buildings – one of which is vacant --are included in this assessment. The total building and contents value is $177 million. The likelihood of an accident totally destroying all these buildings and contents is highly unlikely but the university felt it was better to use this worse case scenario. In addition, depending on the chemicals, smoke, hazardous material released, it is very likely some contents could be damaged while a building stays intact. Potential costs resulting from this scenario far exceed $980,000 threshold used by the University as a point above which loss become problematic from a budget perspective.

1. Culinary Arts Facility
2. Fant Memorial Library
3. Frazier Hall
4. Goen Hall
5. Hogarth Cafeteria
6. Hooper Science Building
7. Jones Hall
8. Kincannon Hall
9. Laundry Building
10. Stark Recreation Fac
11. McDevitt
12. Peyton Hall
13. Shackelford
14. Hogarth Student Center

Map of MUW campus

Mitigation Strategy

The DRU Planning Team ultimately identified and prioritized 35 mitigation action measures that will reduce the University's vulnerability to these hazards. The mitigation measures include proposed changes to policy and operational procedure as well as structural evaluations and construction to address specific vulnerabilities. The mitigation goals and objectives identified in this section were derived from descriptions of damage reported in the hazard profile section, discussions with the MUW Facilities Management personnel, discussions with various University personnel not associated with the Facilities Management (professors, deans, etc.), and the members of the DRU Planning Team. Sources used for background information and guidance included FEMA's Building a Disaster Resistant University (August 2003), the Lowndes County Hazard Mitigation Plan (2014), FEMA's Multi-hazard Mitigation Planning Guidance (2007) and information from the Mitigation Planning Workshop including FEMA's Developing the Mitigation Plan (April 2003, FEMA 386-3).

The mitigation goals and objectives included were derived by considering the following criteria: the typical damage caused by a hazard based on past occurrence, life safety, operational criticality, overall vulnerability and a structure's value to emergency operations and recovery. The benefit-cost-analysis approached (BCA) was considered but was not used for this plan. Consideration was also given to certain goals of the university's strategic plan, particularly goals 4 and 5 found in Table 15

Table 19: MUW Strategic Priorities and Goals

1. Academic Excellence
2. Advancement Excellence
3. Community Connections
4. Degree Completion
5. Financial Sustainability

Thought was given to the county's mitigation plan in hopes of mutual benefits for the campus and surrounding community. Potential mitigation projects were discussed as there has been some past efforts made but for funding reasons were not completed.

Prioritization of University Hazards

The hazards profiles, described earlier, illustrated that hazards do not have the potential to affect the University with equal severity. For purposes of this document, mitigation actions for natural hazards will be focused on while man-made hazards will be incorporated as needed. These hazards have been prioritized, based disaster analysis and feedback from the planning team, to provide guidance to potential mitigation actions. The priority listing was based on past occurrences, the likelihood of a future occurrence, the typical damage caused by a hazard based on past occurrence, life safety, operational criticality, overall vulnerability and a structure's value to emergency operations and recovery life safety. Natural hazards are listed in order of decreasing importance while man-made hazards are in no particular order as they were all ranked as medium mitigation priority. Again, mitigation actions for man-made hazards will be incorporated as needed.

Natural Hazards:
Tornado/Straight-line winds/Windstorm
Hurricanes/Tropical Storms
Winter Storm
Flooding
Hail
Lightning
Extreme Heat/Drought
Earthquake
Wildfire
Dam Failure

Man-made Hazards*:
Computer Crime or Attack
Fire/Arson
Terrorist Acts/Explosive Devices
Transportation Accidents/Explosions/HazMat/Chemical Spills
*As previously stated, civil disturbance, disease (epidemic or otherwise), loss of lifelines (utilities), water/food contamination warrant no further discussion and are not included in the mitigation process, however these hazards are included in the university's emergency preparedness plan.

Mitigation Goals, Objectives and Actions *Considered* to Reduce Vulnerabilities

The DRU planning team has identified the following goals and objectives in order to provide guidance and direction in the development of the mitigation plan. The mitigation goals and objectives listed below are broad, but provide general guidance that defines long-term direction of the mitigation planning process. Mitigation actions are often categorized in six groups: prevention, property protection, public education and awareness, natural resource protection, emergency services protection and structural projects. In setting goals, current plans, projects, hazard mitigation requests, facilities reports, etc. were reviewed in reference to emergency preparedness and recovery methods. Each goal statement has two or more objectives that provide a more specific framework for actions to be taken. This is initial list that was later downsized to suit the needs of the university.

Goal 1:
Introduce, enhance and maintain hazard mitigation as a part of the University's standard operating procedure in order to reduce / eliminate future vulnerabilities for campus and community

Objectives:

- **a.** Introduce and increase awareness of hazard mitigation plan
- **b.** Increase campus DRU planning team members
- **c.** Implement a process to tie in hazard with future construction projects
- **d.** Develop student groups, outreach programs to inform citizens of the efforts of mitigation planning and programs
- **e.** More involvement with local emergency officials and government
- **f.** Partner with public and private sectors to promote hazard mitigation programs

Actions:

a. Invite more deans, administrative assistants and facilities employees to serve on committee; revise current emergency notification process to designate certain people for certain responses.
b. Use emails, website, meetings, manuals, press releases to increase awareness of plan
c. Transfer mitigation measures to future construction by linking the hazard mitigation plan to the campus master plan. This includes building codes and various provisions. Hold meetings with DRU planning team and facilities planning staff.
d. Work with Student Services, particularly community services department, to incorporate hazard mitigation into their programs
e. Work closely with emergency management personnel and keep city officials abreast of changes and updates as well as seek their input
f. Expand on the relationship with Affiliated FM who provides valuable knowledge concerning buildings and hazard mitigation and seek out other sources of knowledge to establish partnerships

Goal 2:
Eliminate/reduce vulnerabilities to existing university property and critical resources from natural and man-made hazards

Objectives:
a. Identify buildings and structures at risk to prevent further damage
b. Establish project professional criteria for future developments
c. Look for ways to fund more generators
d. Enhance current campus warning/siren system
e. Enhance communications between Police Department, Facilities and other personnel
f. Reduce wind vulnerabilities from the tornado/straight-line wind and windstorm & hurricane tropical storm hazard
g. Reduce hail vulnerabilities from tornado/straight-line wind and windstorm
h. Reduce winter storm vulnerabilities
i. Reduce fire vulnerabilities (fire/arson, lightning, wildfire, explosion)
j. Reduce flood and dam failure vulnerabilities
k. Reduce earthquake vulnerabilities
l. Reduce vulnerabilities from man-made hazards

Actions:
a. Look at buildings/structures that received the most damage in the past; look at those made of wood; look at those that house functions that are critical to the mission and vision of the university as well as those that are older and vacant
b. Consult with FM Affiliated to establish a criteria for project professionals to ensure we are using materials, codes, processes that will lead to the best outcome for hazard mitigation, this includes environmental aspects as well .
c. Seek funding methods for more generators on campus as the university currently has eight.
d. Seek funding to add on to current warning/siren system (voice-overs)
e. Ensure communications/channels/towers are working properly

f. Wind:
- Install wind warning system component to augment the existing warning system.
- Install safety film on all large glass panes to prevent the glass from shattering into shards and causing injuries.
- Inspect, repair roof flashing, roof covering, roof drains and gutters
- Reduce and/or eliminate openings
- Retrofit structures to strengthen resistance to damage

- Reinforce window glass and frames
- Shut down operations that depend on outside power sources
- Strengthen exterior elements to resist air pressure and impact
- Secure outdoor equipment
- Improve roof-wall-foundation connections
- Install shutters
- Install and/or improve back-up systems
- Inform campus personnel or risks and strategies

g. Hail
- Improve roofing material
- Install safety film on all large glass panes to prevent the glass from shattering
- Reinforce window and glass frames
- Install and/or improve back-up systems
- Inform campus personnel of risks and strategies

h. Winter Storm
- Monitor amount of accumulation, particularly on roofs
- Drain all idle pumps and compressors
- Lubricate equipment for cold weather operation
- Verify instrumentation lines and other in-service equipment are insulated
- Drain and blowout seasonal equipment
- Inspect all boilers and other heating equipment
- Check all steam traps for proper operation
- Verify adequate heat
- Install and/or improve back-up systems
- Inform campus personnel or risks and strategies

i. Fire (fire/arson, lightning, wildfire, explosion)
- Improve sprinkler systems
- Install seismic gas shut-off valves on all university buildings with natural gas connections
- Install/improve fire hydrants
- Improve roof materials
- Reduce number of wood structures
- Require the use of fire-retardant materials in new constructions
- Determine each building’s fire code requirements
- Develop pre-incident plan with local fire department
- Review the configuration of offices
- Review campus fire safety particularly in residence halls
- Increase use of fireproofing and/or fire-resistant building materials
- Train staff in firefighting techniques
- Ensure adequate water supplies for fire protection
- Control ignition sources
- Maintain site setups such as keeping chemicals and hazardous materials properly stored away; proper maintenance of grounds in reference to ditches, clear paths, etc.
- Install and/or improve back-up systems
- Inform campus personnel or risks and strategies

j. Flood & Dam Failure
- Elevation or flood proofing of buildings
- Elevate or relocate highly valuable items

- Improve drainage system
- Close emergency valves to sewer drains
- Check sump pumps for proper operation
- Prevent water from entering key areas by using flood gates, stop logs, water barriers
- Fill empty storage tanks to prevent floating
- Keep fire protection equipment operational
- Install and/or improve back-up systems
- Inform campus personnel or risks and strategies

k. Earthquake
- Install steel moment frames, shear wall and cross bracing
- Strengthen floor systems with shotcrete fiber materials
- Reinforce columns with fiber wraps/steel jackets
- Add tension/shear anchors and vibration dampers
- Brace bookshelves and other high mounted items
- Secure expensive equipment
- Retrofit structures to strengthen resistance to damage
- Examine fuel-fired equipment
- Control ignition sources
- Install and/or improve back-up systems
- Inform campus personnel or risks and strategies

l. Man-made (computer crime/attack (cca), terrorists acts/explosive devices (taed), hazardous materials/chemical spills (hazmat/chemspill)
- Maintain and update university's disaster and contingency planning document (cca)
- Minimize the time required to respond effectively to an emergency or disaster (cca)
- Facilitate effective coordination of recovery tasks (cca)
- Reduce the complexity of the recovery effort (cca)
- Become more observant of students' unusual behavior, patterns, etc. (tead)
- Report unusual, peculiar packages, mail, devices immediately (tead)
- Strengthen security controls on campus (tead)
- Review and evaluate department chemical safety rules (tead/hazmat/chemspill)
- Ensure all chemistry labs have spill kits and fire blankets (hazmat/chemspill)
- Enforce all safety rules
- Perform and review results of safety audits (hazmat/chemspill)
- Ensure proper labeling and storage of chemicals and hazardous materials (hazmat/chemspill)
- Keep accurate inventory/filing system of chemicals (hazmat/chemspill)
- Properly train all staff, students, personnel (hazmat/chemspill)
- Increase awareness of Chemical Hazards Communication Plan ((hazmat/chemspill)
- Remain OSHA compliant (hazmat/chemspill)

Goal 3:
Protect the health, safety and welfare of students, faculty, staff and visitors at MUW

Objectives:

a. Enhance the communication and warning capabilities needed before and during a natural hazard
b. Continue to increase awareness of university's emergency preparedness plan

c. Identify emergency traffic routes
d. Identify "safest place" in each building
e. Seek funding for storm shelters for selected areas on campus and Plymouth Bluff
f. Determine building code compliance
g. Continue safety inspections
h. Properly train employees

Actions:

a. Build upon siren system by looking for ways to fund voice activated sirens which will allow a pre-record message for emergencies as they have greater penetration on campus and can be heard in the surrounding community. Also look at emergency notification system enhancement such as installing emergency alert monitors in all campus buildings.
b. Expand on DRU planning team; utilize student groups particularly those performing community service; make everyone aware of university's plan by email, websites, press releases, etc.
c. Establish and identify emergency traffic routes by posting signs on campus routes and working closely with local law enforcement agencies. This will aid in traffic flow in and out of campus during an event.
d. Build upon the "safest place" program already in progress--add this information to the university emergency plan and post these areas in highly visible places in each office.
e. Continue to look for ways to fund tornado/storm shelters for certain areas of campus and Plymouth Bluff- possibly prefabricated shelters can be used.
f. Survey campus buildings to determine their compliance with ADA, fire and other codes and specific requirements.
g. Utilize Sodexo's safety audit and continue to work with fire marshal's office – possibly reintroduce the environmental health and safety committee
h. Be sure all employees, particularly those in Police Department and Facilities Management, are properly trained in the procedures, operation, maintenance, or emergency response of equipment, processes, or physical hazards in a facility. Administration will need to be abreast of policies and procedures in times of an emergency event and/or disaster.

Goal 4:

Reduce vulnerabilities to campus lifelines from hazards and minimize interruption of mission performance

Objectives:

a. Review electrical configuration and consumption
b. Stay abreast of utilities updates
c. Establish back up system

Actions:

a. Check to see if any above electrical power lines can be replaced with underground ones; monitor electrical consumption to eliminate overload.
b. Maintain healthy professional relationships with Columbus Light & Water , Cspire, AT&T and Atmos Energy and Cable One.
c. Ensure generators are working properly and enough fuel is on hand and seek funding for more generators and maintenance of generators on campus

Goal 5:

Reduce / eliminate vulnerabilities to equipment, investments, unique research data and administrative records.

Objectives:

a. Evaluate university's current record retention policy
b. Review Analysis By Space Classification booklet to make sure all stated items are kept in the safest location
c. Expand on the policy to include safer storage locations (individual departments will know the safest locations)
d. Establish guidance on means of archiving data
e. Try to reduce the amount of paper used/stored
f. Establish alternate location of the backbone of the campus, ITS
g. Analysis of equipment location in each office

Actions:

a. Review current record retention policy to see if there are changes in the amount of time records are to be housed
b. Review Analysis by Space information to see if records are housed in the safest place
c. After analysis of space is complete, possibly include in policy that records retained will be housed in the safest location in each particular building
d. Establish policy for university departments to ensure data is properly archived and stored
e. Use emails as much as possible, back up information on computer, disks, CDs, etc.
f. Continue to seek funding for alternate ITS site
g. Ensure equipment in offices is not placed in hazard zones (i.e. office equipment is not placed directly underneath sprinklers or near objects that could cause fire).

Goal 6:

Continue to improve upon MUW's DRU plan

Objectives:

a. Initiate DRU planning activities at other Mississippi institutions and local schools
b. Continue to seek input from individuals, agencies, organizations from the community

Actions:

a. Visit local schools, nearby community colleges and universities to discuss disaster resistance and exchange ideas, using MUW's DRU project as a model, particularly for local schools
b. Be mindful of responses from individuals, agencies, organization who are dealing with an emergency and/or disaster recovery as this plan is a living document.

Mitigation Goals, Objectives and Actions *Chosen* to Reduce Vulnerabilities

After reviewing the above information, the DRU planning team ranked each mitigation action using the following criteria: past occurrences, the likelihood of a future occurrence, the typical damage caused by a hazard based on past occurrence, life safety, operational criticality, overall vulnerability and a structure's value to emergency operations and recovery. While we recognize there are costs associated with mitigation actions, we did not utilize the benefit cost analysis (BCA) in prioritizing mitigation actions; however costs are provided in the implementation section. We felt our experience from the 2002 tornado well equipped us with the knowledge to prioritize actions based on the multiple criteria stated above. In addition to this, most of our actions require change in behavior, habits, policies and administrative processes, not that of a monetary nature. The 98 mitigation actions described in the previous section were distributed to all members of the DRU planning team for review and input. Each mitigation action was ranked on a 1 to 5 priority scale with 1 being top priority and 5 being the lowest priority. Some actions may qualify for an alternative mitigation action. Again, when ranking actions planning team members were asked to please consider following: past occurrences, life safety, operational criticality, overall vulnerability and a structure's value to emergency operations and recovery. MUW used the numerical voting method suggested in FEMA's Developing the Mitigation Plan, April 2003, FEMA 386-3. In this ranking all of the mitigation actions are listed and the planning team members reviews and ranks the given action as stated above. The ranks for each action are added and then divided by the number of votes. As time would not allow for all 98 mitigation goals listed above to be included in this plan, those actions receiving rankings from 2.5 to 1.0 are used in this plan as they are considered high priority. Five (5) goals and thirty-five (35) actions were ranked high priority and will be included in this plan; however some may ultimately be listed as alternative mitigation actions while others may be combined for a more effective result. Actions that ranked medium and low priority will be kept on file for future evaluation and possible implementation.

Goal 1: Enhance and maintain hazard mitigation as a part of the University's standard operating procedure in order to reduce/ eliminate future vulnerabilities for campus and community

Objective 1.1: More involvement with local emergency officials and government

Action 1.1.1: Work closely with emergency management personnel and keep city officials abreast of changes and updates as well as seek their input

Which hazard(s) does this action address: All
Implementing office/ department: Vice President for Operations (VPO)
Estimated cost: N/A
Funding Source: N/A
Implementation Schedule: On-going
Notes: Utilize Lowndes Emergency Planning Committee, Red Cross, etc meeting, increase awareness on campus as well

Goal 2: Eliminate/reduce vulnerabilities to existing university property and critical resources from natural and man-made hazards

Objective 2.1: Continue to look for ways to fund more generators

Action 2.1.1: Seek funding methods for more or replace aging generators on campus as the university currently has eleven.

Which hazard(s) does this action address: Natural
Implementing office/ department: VPO
Estimated cost: $750,000
Funding Source: MEMA/University Funds
Implementation Schedule: July 2025- July 2030
Notes:
Can this be an alternative mitigation action, if so, why?

Objective 2.2: Enhance communications between Police Department, Facilities and other personnel

Action 2.2.1: **Ensure communications/channels/towers are working properly**
Which hazard(s) does this action address: All
Implementing office/ department: Facilities Management
Estimated cost: $50,000
Funding Source: MEMA/University Funds
Implementation Schedule: Ongoing
Notes: Assessments and testing
Can this be an alternative mitigation action, if so, why?

Objective 2.4: Reduce wind vulnerabilities from the tornado/straight-line wind and windstorm & hurricane tropical storm hazard

Action 2.4.1: Inspect, repair roof flashing, roof covering, roof drains and gutters
Which hazard(s) does this action address: tornado/straight-line wind, windstorm, hurricane, tropical storm and hail
Implementing office/ department: Facilities Management
Estimated cost: N/A
Funding Source: N/A
Implementation Schedule: Ongoing
Notes: Part of routine maintenance
Can this be an alternative mitigation action, if so, why?

Objective 2.5: Reduce winter storm vulnerabilities

Action 2.5.1: Inspect all boilers and other heating equipment
Which hazard(s) does this action address: winter storm, fire, explosions
Implementing office/ department: Facilities Management
Estimated cost: N/A
Funding Source: N/A
Implementation Schedule: Ongoing
Notes: Part of routine maintenance
Can this be an alternative mitigation action, if so, why?

Action 2.5.2: Check all steam traps for proper operation
Which hazard(s) does this action address: winter storm, fire
Implementing office/ department: Facilities Management
Estimated cost: N/A
Funding Source: N/A
Implementation Schedule: Ongoing
Notes: Part of routine maintenance
Can this be an alternative mitigation action, if so, why?

Action 2.5.3: Verify adequate heat
Which hazard(s) does this action address: winter storm
Implementing office/ department: Facilities Management
Estimated cost: N/A
Funding Source: N/A
Implementation Schedule: As needed
Notes:
Can this be an alternative mitigation action, if so, why?

Objective 2.6: Reduce fire vulnerabilities (fire/arson, lightning, wildfire, explosion)

Action 2.6.1: Ensure sprinkler systems are working properly
Which hazard(s) does this action address: fire, arson, lightning, explosion
Implementing office/ department: Facilities Management
Estimated cost: N/A
Funding Source: State Funds
Implementation Schedule: Ongoing

Can this be an alternative mitigation action, if so, why?

Action 2.6.2: Require the use of fire-retardant materials in new construction
Which hazard(s) does this action address: fire/arson, lightning, explosion
Implementing office/ department: Facilities Management
Estimated cost: N/A
Funding Source: N/A
Implementation Schedule: July 2025 - Ongoing
Notes: Include this in planning phase of design
Can this be an alternative mitigation action, if so, why?

Action 2.6.3: Determine each building's fire code requirements
Which hazard(s) does this action address: fire/arson, chemical spill, hazmat, explosion, lightning
Implementing office/ department: Facilities Management
Estimated cost: N/A
Funding Source: N/A
Implementation Schedule: Ongoing
Notes: Continue to work with State Fire Marshal's office
Can this be an alternative mitigation action, if so, why?

Action 2.6.4: Review the configuration of offices
Which hazard(s) does this action address: fire/arson, flood, explosions, hazmat, chemical spills, earthquake,
Implementing office/ department: Facilities Management/Health & Safety Committee
Estimated cost: N/A
Funding Source: N/A
Implementation Schedule: January 2025- ongoing
Notes:
Can this be an alternative mitigation action, if so, why?

Action 2.6.5: Review campus fire safety particularly in residence halls
Which hazard(s) does this action address: fire/arson, lightning, explosion
Implementing office/ department: Community Living
Estimated cost: N/A
Funding Source: N/A
Implementation Schedule: Ongoing
Notes:
Can this be an alternative mitigation action, if so, why?

Action 2.6.6: Increase use of fireproofing and/or fire-resistant building materials
Which hazard(s) does this action address: fire/arson, wildfire, explosion, hazmat, chemical spills
Implementing office/ department: Facilities Management
Estimated cost: N/A
Funding Source: N/A
Implementation Schedule: July 2025; Ongoing
Notes:
Can this be an alternative mitigation action, if so, why?

Action 2.6.7: Ensure adequate water supplies for fire protection
Which hazard(s) does this action address: fire/arson, lightning, explosions, chemical spills, hazmat, wildfire, earthquake, extreme heat/drought, transportation accidents
Implementing office/ department: Facilities Management
Estimated cost: $10,000
Funding Source: University Funds
Implementation Schedule: July 2025-ongoing
Notes: Testing

Can this be an alternative mitigation action, if so, why?

Action 2.6.8: Control ignition sources
Which hazard(s) does this action address: fire/arson, explosions, chemical spills, hazmat
Implementing office/ department: Facilities Management
Estimated cost: N/A
Funding Source: N/A
Implementation Schedule: July 2025- Ongoing
Notes: Routine inspection
Can this be an alternative mitigation action, if so, why?

Objective 2.7: Reduce flood and dam failure vulnerabilities

Action 2.7.1: Improve drainage system
Which hazard(s) does this action address: flood, dam failure, tornado, hurricane
Implementing office/ department: Facilities Management
Estimated cost: $3,000,000
Funding Source: ARPA
Implementation Schedule: January 2024-September 2025
Notes: Storm & drainage project currently underway
Can this be an alternative mitigation action, if so, why?

Action 2.7.2: Prevent water from entering key areas by using flood gates, stop logs, water barriers
Which hazard(s) does this action address: flood, dam failure, hurricanes/tropical storms, tornado
Implementing office/ department: Facilities Management
Estimated cost: $5,000
Funding Source: University Funds
Implementation Schedule: As needed
Notes:
Can this be an alternative mitigation action, if so, why?

Action 2.7.3: Install and/or improve back-up systems
Which hazard(s) does this action address: All
Implementing office/ department: Facilities Management
Estimated cost: $10,000
Funding Source: University Funds
Implementation Schedule: July 2025- Ongoing
Notes: Begin with a comprehensive plan to see if installation or improvements are needed

Objective 2.8: Reduce vulnerabilities from man-made hazards (computer crime/attack (cca), terrorists acts/explosive devices (taed), hazardous materials/chemical spills (hazmat/chemspill)

Action 2.8.1: Maintain and update university's disaster and contingency planning document
Which hazard(s) does this action address: computer crime attack, terrorists acts
Implementing office/ department: Information Technology Services (ITS)
Estimated cost: N/A
Funding Source: N/A
Implementation Schedule: Ongoing
Notes:
Can this be an alternative mitigation action, if so, why?

Action 2.8.2: Minimize the time required to respond effectively to an emergency or disaster
Which hazard(s) does this action address: computer crime attack
Implementing office/ department: ITS
Estimated cost: N/A

Funding Source: N/A
Implementation Schedule: Ongoing
Notes:
Can this be an alternative mitigation action, if so, why?

Action 2.8.3: Facilitate effective coordination of recovery tasks
Which hazard(s) does this action address: computer crime attacks
Implementing office/ department: ITS
Estimated cost: $200,000
Funding Source: University Funds
Implementation Schedule: January 2025; ongoing
Notes:
Can this be an alternative mitigation action, if so, why?

Action 2.8.4: Reduce the complexity of the recovery effort
Which hazard(s) does this action address: computer crime attack
Implementing office/ department: ITS
Estimated cost: N/A
Funding Source: N/A
Implementation Schedule: July 2025; ongoing
Notes:
Can this be an alternative mitigation action, if so, why?

Action 2.8.5: Report unusual, peculiar packages, mail, devices immediately
Which hazard(s) does this action address: terrorist acts, explosive devices
Implementing office/ department: VPO
Estimated cost: N/A
Funding Source: N/A
Implementation Schedule: Ongoing
Notes:
Can this be an alternative mitigation action, if so, why?

Action 2.8.6: Strengthen security controls on campus
Which hazard(s) does this action address: arson, terrorist acts, explosive devices
Implementing office/ department: Police Department
Estimated cost: $2,050,000
Funding Source: State Funds/Grant Opportunities/University Funds
Implementation Schedule: July 2025; ongoing
Notes: contract for security audit, update all perimeter gate operators/card readers; replace north campus fencing; installing camera system at front gate, residence hall parking lots and other buildings as identified
Can this be an alternative mitigation action, if so, why?

Action 2.8.7: Ensure all chemistry labs have spill kits and fire blankets
Which hazard(s) does this action address: hazmat, chemical spills, explosions
Implementing office/ department: Vice President for Academic Affairs
Estimated cost: $20,100
Funding Source: University Funds
Implementation Schedule: January 2026; ongoing
Notes: All labs currently have spill kits and fire blankets
Can this be an alternative mitigation action, if so, why?

Action 2.8.8: Enforce all safety rules
Which hazard(s) does this action address: All hazards
Implementing office/ department: VPO
Estimated cost: N/A
Funding Source: N/A
Implementation Schedule: Ongoing

Notes:
Can this be an alternative mitigation action, if so, why?

Goal 3: Protect the health, safety and welfare of students, faculty, staff and visitors at MUW

Objective 3.1: Enhance the communication and warning capabilities needed before and during a natural hazard

Action 3.1.1: Build upon emergency notification system
Which hazard(s) does this action address: All
Implementing office/ department: VPO/Facilities Management
Estimated cost: $250,000
Funding Source: State Funds/MEMA
Implementation Schedule: January 2026- December 2030
Notes:
Can this be an alternative mitigation action, if so, why?

Objective 3.2: Identify "safest place" in each building

Action 3.1.2: Build upon the "safest place" program already in progress--add this information to the university emergency plan and post these areas in highly visible places in each office.
Which hazard(s) does this action address: Natural
Implementing office/ department: Police Department
Estimated cost: N/A
Funding Source: N/A
Implementation Schedule: January 2026; ongoing
Notes:
Can this be an alternative mitigation action, if so, why?

Objective 3.3: Determine building code compliance

Action 3.1.3: Survey campus buildings to determine their compliance with ADA, fire and other codes and specific requirements.
Which hazard(s) does this action address: fire, flood, earthquake
Implementing office/ department: Facilities Management
Estimated cost: $80,000
Funding Source: State Funds/Grant Opportunities
Implementation Schedule: July 2025-December 2026
Notes:
Can this be an alternative mitigation action, if so, why?

Objective 3.4: Properly train employees

Action 3.1.4: Be sure all employees, particularly those in Police Department and Facilities Management, are properly trained in the procedures, operation, maintenance, or emergency response of equipment, processes, or physical hazards in a facility. Administration will need to be abreast of policies and procedures in times of an emergency event and/or disaster.
Which hazard(s) does this action address: All
Implementing office/ department: Police Department/VPO
Estimated cost: N/A
Funding Source: N/A
Implementation Schedule: Ongoing
Notes:
Can this be an alternative mitigation action, if so, why?

Goal 4: Reduce vulnerabilities to campus lifelines from hazards and minimize interruption of mission performance

Objective 4.1: Stay abreast of utilities situations and updates

Action 4.1.1: Maintain healthy professional relationships with Columbus Light & Water and Atmos Energy and CSpire/AT&T.
Which hazard(s) does this action address: All

Implementing office/ department: VPO/Facilities Management
Estimated cost: N/A
Funding Source: N/A
Implementation Schedule: Ongoing
Notes:
Can this be an alternative mitigation action, if so, why?

Objective 4.2: Enhance back up system

Action 4.1.2: Ensure generators are working properly and enough fuel is on hand
Which hazard(s) does this action address: Natural
Implementing office/ department: Facilities Management
Estimated cost: $25,000
Funding Source: University Funds
Implementation Schedule: Ongoing
Notes:
Can this be an alternative mitigation action, if so, why?

Goal 5: Reduce / eliminate vulnerabilities to equipment, investments, unique research data and administrative records.

Objective 5.1: Establish guidance on means of archiving data

Action 5.1.1: Establish policy for university departments to ensure data is properly archived and stored
Which hazard(s) does this action address: All
Implementing office/ department: VPO
Estimated cost: N/A
Funding Source: N/A
Implementation Schedule: July 2025; ongoing
Notes: Administrative Review
Can this be an alternative mitigation action, if so, why?

Objective 5.2: Analysis of equipment location in each office

Action 5.1.2: Ensure equipment in offices is not placed in hazard zones (i.e. office equipment is not placed directly underneath sprinklers or near objects that could cause fire).
Which hazard(s) does this action address: fire/arson, flood, explosions, hazmat, chemical spills, earthquake,
Implementing office/ department: Facilities Management/Health & Safety Committee
Estimated cost: N/A
Funding Source: N/A
Implementation Schedule: January 2026
Notes:
Can this be an alternative mitigation action, if so, why?

Prioritizing Action Measures for Implementation

In this section, the action measures described above will be prioritized to establish a guideline for order of implementation. The DRU planning team again reviewed all action measures and ranked them from 1 to 35 with 1 being top priority and 35 being low priority. As the DRU planning team includes representatives from a cross-section of local, state and national level, all concerned parties were able to review the mitigation strategy / plan and had the opportunity to participate. The STAPLEE (social, technical, administrative, political, legal, economic and environment) criteria is suggested by FEMA (FEMA, 2003(b)) as a guide to evaluate and prioritize potential mitigation actions. While the STAPLEE criteria may not be applicable to all aspects of a university setting, it was considered in the prioritization of the mitigation actions. Those that didn’t fit the university model were discounted while the ones that did apply were used. To

complement the STAPLEE criteria the prioritization process considered the hazard profiles, vulnerabilities, project costs and potential benefits. Social aspects of the mitigation actions were also considered. The major component of the university population is the student body. The student body is a diverse group of people from different origins that change as students come and go from the university. One particular group, disabled persons, remains fairly constant on campus and this group was identified as one where mitigation measures would be particularly useful. Many of the structures on campus were constructed prior to the Americans with Disabilities Act, and so continued improvement of facilities to better protect this group from hazards is priority. Table 20, below, reflects the prioritized listing agreed upon by members of the DRU planning team. The actions were ranked from 1 to 35 with 1 being top priority and 35 being low priority. The responses were then averaged. Those actions with the lowest averaged points were given priority. While the table below is a prioritized listing, it merely serves as an overall guideline for implementation. Because of different variables, such as funding, time, etc., actions may not necessarily be implemented in this order.
Note: No actions were listed as alternative mitigation actions.

Table 20—Prioritized Listing of Mitigation Actions by DRU Planning Team

Priority	Action Measure Number/Action Measure Hazard(s) addressed	Affects existing structures	Affects future structures	Estimated Implementation
1	2.2.1/Ensure communications working properly Hazard(s) addressed: All hazards	N/A	N/A	Ongoing
2	3.1.4/Ensure all employees are properly trained in emergency response procedures Hazard(s) addressed: All hazards	N/A	N/A	Ongoing
3	2.6.5/Review campus fire safety especially residence halls Hazard(s) addressed: fire/arson, lightning, explosion	No	No	Ongoing
4	4.1.2/Ensure generators are working properly/enough fuel on hand Hazard(s) addressed: All hazards	Yes	Yes	Ongoing
5	2.6.1/Ensure sprinkler systems are working properly Hazard(s) addressed: fire, arson, lightning, explosion, explosive devices	Yes	Yes	Ongoing
6	3.1.1/Build upon emergency notification system Hazard(s) addressed: All hazards	No	No	7/2025-Onging
7	3.1.2/Build upon “safest place” program Hazard(s) addressed: Natural hazards	No	No	1/2026-Ongoing
8	2.8.8/Enforce all safety rules Hazard(s) addressed: All hazards	No	No	Ongoing
9	1.1.1/Work closely w/EM personnel/keep city officials updated Hazard(s) addressed: All hazards	N/A	N/A	Ongoing
10	2.8.2/Minimize time required to respond effectively to emergency Hazard(s) addressed: computer crime attack	N/A	N/A	Ongoing
11	3.1.3/Determine ADA, fire, codes for campus buildings Hazard(s) addressed: fire/arson, flood, earthquake, explosive devices, hazmat, chemical spills	Yes	Yes	7/2025-12/2026
12	2.1.1/Seek funding for more/replace aging generators Hazard(s) addressed: Natural	No	No	7/2025-7/2030
13	2.8.1/Maintain/update university disaster/planning document Hazard(s) addressed: computer crime attack, terrorists acts	No	No	Ongoing
14	2.6.7/Ensure adequate water supplies for fire protection Hazard(s) addressed: fire/arson, lightning, explosions, chemical spills, hazmat, wildfire, earthquake, extreme heat/drought, transportation accidents	Yes	Yes	7/2025-ongoing
15	2.4.1/Inspect, repair roof flashing, covering, drain and gutters Hazard(s) addressed: tornado/straight line wind, hurricane, tropical storm, hail	No	No	Ongoing

16	2.8.3/Facilitate effective coordination of recovery tasks Hazard(s) addressed: computer crime attacks	N/A	N/A	7/2026-ongoing
17	2.6.2/Require use of fire-retardant materials in new constructions Hazard(s) addressed: fire, arson, lightning, explosion	No	Yes	7/2025-ongoing
18	2.5.2/Check all steam traps for proper operation Hazard(s) addressed: winter storm, fire	No	No	Ongoing
19	2.8.7/Ensure all chemistry labs have spill kits and fire blankets Hazard(s) addressed: hazmat, chemical spills, explosions	N/A	N/A	1/2026-ongoing
20	2.6.3/Determine each building's fire code requirements Hazard(s) addressed: fire/arson, explosion, chemical spill, lightning, hazmat	Yes	Yes	Ongoing
21	2.6.6/Increase fire proofing and fire-resistant building materials Hazard(s) addressed: fire/arson, wildfire, explosion, hazmat, chemical spills	Yes	Yes	7/2025-ongoing
22	4.1.1/Maintain good relationship with utilities providers Hazard(s) addressed: All hazards	N/A	N/A	Ongoing
23	2.8.6/Strengthen security controls on campus Hazard(s) addressed: arson, terrorists acts, explosive devices	N/A	N/A	7/2025-ongoing
24	2.5.1/Inspect all boilers and other heating equipment Hazard(s) addressed: winter storm, fire, explosions	No	No	Ongoing
25	2.8.4/Reduce the complexity of the recovery effort Hazard(s) addressed: computer crime attack	N/A	N/A	7/2025-ongoing
26	2.7.3/Install and/or improve back up systems Hazard(s) addressed: All hazards	Yes	Yes	7/2025-ongoing
27	2.8.5/Report unusual packages, mail devices immediately Hazard(s) addressed: terrorists acts, explosive devices	N/A	N/A	Ongoing
28	5.1.1/Establish policy to ensure date is stored/archived properly Hazard(s) addressed: All hazards	N/A	N/A	1/2026-ongoing
29	2.7.1/Improve drainage system Hazard(s) addressed: flood, dam failure, tornado, hurricane	No	No	1/2024-9/2025
30	5.1.2/Ensure office equipment is not places in hazard zones Hazard(s) addressed: fire/arson, flood, explosions, hazmat, chemical spills, earthquake,	N/A	N/A	1/2026
31	2.7.2/Prevent water from key areas using flood gates, stop logs,etc Hazard(s) addressed: flood, dam failure, tornado, hurricane	N/A	N/A	As needed
32	2.6.8/Control ignition sources Hazard(s) addressed: fire/arson, explosions, chemical spills, hazmat	N/A	N/A	7/2025-ongoing
33	2.5.3/Verify adequate heat Hazard(s) addressed: winter storm	N/A	N/A	As needed
34	2.6.4/Review configuration of offices Hazard(s) addressed: fire/arson, flood, explosions, hazmat, chemical spills, earthquake	N/A	N/A	1/2026-ongoing
35				

Implementation of Action Measures

Again, because of different variables, such as funding, time, etc., some actions will be implemented quicker than others and not necessarily in the order shown in Table 16. Those mitigation actions that benefit the most people were given top priority. For example, mitigation actions that would add a measure of protection to a residence hall where 200 plus students reside would be more advantageous than a measure that would add additional protection to a structure with only 50 students. Minimal cost mitigation actions, which involve the addition of mitigation measures to existing plans and design guidance, will be implemented upon approval of the plan. Because of the funding needs for some of the action measures, it was determined that the overall lead administrative department for implementation of DRU-related mitigation work will be the Office of the Vice President for Operations (VPO). This office will assign work to the appropriate departments and will ensure all applicable federal and state laws, rules and regulations are adhered to throughout the process of project completion. Priority for implementation of action measures has been established by the DRU planning team. The VPO office will ensure all proposed work will include the identification of work to be completed, the location of the proposed work, time of performance, estimated cost of the project, and the identification of potential funding sources. Standard accounting procedures will be followed. The VPO office will also assign quality control and assurance responsibilities to the proper department. Some of the proposed mitigation actions will not require procurement of additional funds. These action measures can be implemented without the delay associated with seeking external funding.

Plan Adoption and Implementation

The original plan was approved by the U.S. Department of Homeland Security, FEMA Region IV on November 10, 2010, and was adopted by Interim President Allegra Brigham on November 18, 2010. This plan was modified and brought up to date in July 2025 by the campus Crisis Action Team and adopted by the President Nora Miller.

Plan Monitoring, Evaluating and Revising

In accordance with 44 CFR 201.6 (c)(4) (i), this plan will be periodically updated. As the Crisis Action Team (CAT) is responsible for plan maintenance, monitoring and evaluation, the team has decided to review the plan at least once annually, but will be encouraged to review and evaluate the plan quarterly. The purpose of the evaluation is to identify changes in the plan that may be necessary to make it a more efficient planning document or to improve on the execution of the mitigation measures. The team will consider the following when evaluating the plan:

1. new construction or conditions that may require plan updates
2. identify areas where the plan has been successful and areas where additional work is needed
3. identify any new mitigation measures that should be added or existing measures that should be deleted from the plan,
4. new legislation or rule making that may influence the operation and implementation of the plan, and adequacy of funding to implement measures,
5. review the current mitigation action prioritizations
6. results from on-going plan monitoring

The chair of the CAT planning team may also call special meetings of the team to evaluate the plan should a significant event occur on campus. Natural hazard-related events on campus and the influence (or lack thereof) that mitigation work had on the damage caused by the event will be evaluated. The chair may also appoint subcommittees to investigate and evaluate special aspects of the plan and report back to the team as a whole. Problem areas or successful mitigation will also be identified during this evaluation. The CAT planning team may decide that the plan needs no major update, it needs immediate updating, or updating is needed, but can wait to the end of the five year cycle.

If immediate update is required, the update will be approved by the CAT planning team and then submitted to MEMA and FEMA for their concurrence. At the end of every five year period the CAT planning team will evaluate and make any major updates needed to the plan or add updates identified earlier. MEMA and FEMA will be notified if major upgrades to the plan are required and the plan will be submitted for their concurrence. This plan will be provided to the university administration and any concerned government agency or member of the public.

The plan was sent to the DRU planning team as well as the campus community on August 29, 2011 and August 29, 2012 for revisions. Minor revisions have been made. It appears scheduling a review of this document around the time of the annual university-wide disaster drill is best. The CAT planning team reviewed the document in the fall of 2024 and edits were compiled in the spring of 2025.

NOTIFICATION UPDATES: The planning team felt it was necessary to include social media in the plan as it has become one of the best ways to notify the campus community, especially students, of any weather alerts, updates, etc. Alerts are posted on the university's main webpage, Facebook and Twitter. The campus community has been strongly encouraged to sign up for W Alerts (Get Connected) which sends a text or email message. Also, emergency sirens have been strategically erected on campus.

Other Planning Documents

The mitigation measures identified in this plan will interface with the 2023 State of Mississippi Standard Hazard Mitigation Plan, the 2015 MEMA District 4 Regional Hazard Mitigation Plan, the 2024 MEMA District 4 Regional Hazard Mitigation Plan Annex E: Lowndes County, the university's emergency response and preparedness plan and the campus master plan. Interfacing with the campus master plan covers all planning for future campus construction and alerts design engineers to specific mitigation issues the university wishes to incorporate into future campus design. The process by which aspects of the mitigation plan are incorporated into other university plans, such as the university's emergency response and preparedness guide, is not complex. For an action measure to be incorporated into another university plan requires only the approval of the department director which administers the plan. If, for example, an action measure was to be included in the emergency response and preparedness guide, the approval of the chief of police would be required. Approval of the director assures inclusion of the measure. All business of the university is, of course, subject to oversight of the appropriate President Cabinet member.

Continued Public Involvement

The mitigation plan can be made available in digital or hard copy by request. A hard copy will be kept on file at MUW's Fant Memorial Library.

Appendix A
Lowndes County Capability Assessment

Source
2024 MEMA District 4 Regional Hazard Mitigation Plan
Annex E: Lowndes County

E.4 LOWNDES COUNTY CAPABILITY ASSESSMENT

This subsection discusses the capability of Lowndes County to implement hazard mitigation activities. More information on the purpose and methodology used to conduct the assessment can be found in *Section 7: Capability Assessment.*

E.4.1 Planning and Regulatory Capability

Table E.32 provides a summary of the relevant local plans, ordinances, and programs already in place or under development for Lowndes County. A checkmark (✓) indicates that the given item is currently in place and being implemented. An asterisk (*) indicates that the given item is currently being developed for future implementation. Each of these local plans, ordinances, and programs should be considered available mechanisms for incorporating the requirements of the MEMA District 4 Regional Hazard Mitigation Plan.

TABLE E.32: RELEVANT PLANS, ORDINANCES, AND PROGRAMS

Planning/Regulatory Tool	Lowndes County	Artesia	Caledonia	Columbus	Crawford
Hazard Mitigation Plan	✓	✓	✓	✓	✓
Comprehensive Land Use Plan				✓	
Floodplain Management Plan	✓				
Open Space Management Plan					
Stormwater Management Plan/Ordinance	✓			✓	
National Resource Protection Plan					
Flood Response Plan	✓				
Emergency Operations Plan	✓	✓	✓	✓	✓
Continuity of Operations Plan	✓				
Evacuation Plan					
Disaster Recovery Plan	✓				
Capital Improvements Plan				✓	
Economic Development Plan	✓	✓	✓	✓	✓
Historic Preservation Plan				✓	
Flood Damage Prevention Ordinance	✓			✓	
Zoning Ordinance	✓			✓	
Subdivision Ordinance	✓			✓	
Unified Development Ordinance					
Post-Disaster Redevelopment Ordinance					
Building Codes	✓			✓	
Fire Codes	✓	✓	✓	✓	✓
National Flood Insurance Program (NFIP)	✓	✓	✓	✓	✓
National Community Rating System					

A more detailed discussion on the county's planning and regulatory capabilities follows.

EMERGENCY MANAGEMENT

Hazard Mitigation Plan

Lowndes County has previously adopted a hazard mitigation plan. The Town of Artesia, the Town of Caledonia, the City of Columbus, and the Town of Crawford were also included in this plan.

Emergency Operations Plan

Lowndes County maintains an emergency operations plan through its Emergency Management Agency. The Town of Artesia, the Town of Caledonia, the City of Columbus, and the Town of Crawford are each covered by this plan.

GENERAL PLANNING

Comprehensive Land Use Plan

Lowndes County adopted a county comprehensive plan in 1976. This plan also includes the Town of Artesia, the Town of Caledonia, and the Town of Crawford. The City of Columbus adopted a separate city comprehensive plan in 2012.

Zoning Ordinance

Lowndes County adopted a zoning ordinance in 1972. The City of Columbus also adopted a zoning ordinance in 1986.

Subdivision Ordinance

Lowndes County adopted subdivision regulations in 1975. The City of Columbus also adopted subdivision regulations in 1975.

Building Codes, Permitting, and Inspections

Lowndes County and the City of Columbus have each adopted a building code.

FLOODPLAIN MANAGEMENT

Table E.33 provides NFIP policy and claim information for each participating jurisdiction in Lowndes County. Due to data limitations, and new regulations which only allow local jurisdictions to request NFIP information, this remains the best available data at the time of the 2024 plan update.

T ABLE E.33: NFIP POLICY AND CLAIM INFORMATION

Location	Date Joined NFIP	Current Effective Map Date	NFIP Policies in Force	Insurance in Force	Closed Claims	Total Payments to Date
Lowndes County†	11/15/19	2/18/11	448	$65,418,900	463	$3,121,871
*Artesia**	--	--	--	--	--	--
*Caledonia**	--	--	--	--	--	--
Columbus	7/13/1976	2/18/2011	865	$115,321,000	451	$3,147,710
*Crawford**	--	--	--	--	--	--

†Includes unincorporated areas of county only
**Community does not participate in the NFIP*

Flood Damage Prevention Ordinance

All communities participating in the NFIP are required to adopt a local flood damage prevention ordinance. Lowndes County and the City of Columbus both participate in the NFIP and have adopted flood damage prevention ordinances.

Flood Damage Prevention Ordinance

All communities participating in the NFIP are required to adopt a local flood damage prevention ordinance. Lowndes County and the City of Columbus both participate in the NFIP and have adopted flood damage prevention ordinances.

Stormwater Management Plan

Lowndes County has not adopted a stormwater management plan. However, the City of Columbus includes stormwater quality protection measures in the city code of ordinances.

Flood Damage Prevention Ordinance

All communities participating in the NFIP are required to adopt a local flood damage prevention ordinance. Lowndes County and the City of Columbus both participate in the NFIP and have adopted flood damage prevention ordinances.

Stormwater Management Plan

Lowndes County has not adopted a stormwater management plan. However, the City of Columbus includes stormwater quality protection measures in the city code of ordinances.

E.4.2 Administrative and Technical Capability

Table E.34 provides a summary of the capability assessment results for Lowndes County with regard to relevant staff and personnel resources. A checkmark (✓) indicates the presence of a staff member(s) in that jurisdiction with the specified knowledge or skill.

TABLE E.34: REVLEVANT FISCAL RESOURCES

Staff/Personal Resource	Lowndes County	Artesia	Caledonia	Columbus	Crawford
Planners with knowledge of land development/ land management practices				✓	
Engineers of professionals trained in construction practices related to buildings and/or infrastructure	✓	✓	✓	✓	✓
Planners or engineers with an understanding of natural and/or human-caused hazards.	✓	✓	✓	✓	✓
Emergency Manager	✓	✓	✓	✓	✓
Floodplain Manager	✓	✓	✓	✓	✓
Land Surveyors	✓			✓	
Scientists familiar with the hazards of the community.	✓	✓	✓	✓	✓
Staff with education or expertise to assess the community's vulnerability to hazards.	✓	✓	✓	✓	✓
Personnel skilled in GIS and/or HAZ-US	✓	✓	✓	✓	✓
Resource development staff or grant writers	✓	✓	✓	✓	✓

E.4.3 Fiscal Capability

Table E.35 provides a summary of the results for Lowndes County with regard to relevant fiscal resources. A checkmark (✓) indicates that the given fiscal resource is locally available for hazard mitigation purposes (including match funds for state and federal mitigation grant funds) according to the previous county hazard mitigation plan.

TABLE E.35: RELEVANT FISCAL RESOURCES

Fiscal Tool/Resource	Lowndes County	Artesia	Caledonia	Columbus	Crawford
Capital Improvement Programing	✓			✓	
Community Development Block Grants (CDBG)	✓			✓	✓
Special Purchase Taxes (or taxing districts)					
Gas/ Electric Utility Fees					
Water/ Sewer Fees					
Stormwater Utility Fees					
Development Impact Fees					
General Obligation, Revenue, and/or Special Tax Bonds					
Partnering Arrangements or Intergovernmental Agreements	✓	✓	✓	✓	✓

E.4.4 Political Capability

During the months immediately following a disaster, local public opinion in Lowndes County is more likely to shift in support of hazard mitigation efforts.