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1.0 EXECUTIVE SUMMARY

Delta State University's (DSU) Disaster Resistant University (DRU) planning process began on April 9, 2009, with grant funding provided by the Federal Emergency Management Agency (FEMA) through the Pre-disaster Mitigation Grant Program. The Mississippi Institutions of Higher Learning (IHL) was the primary grant recipient and provided sub-grants to each of the public four-year universities in Mississippi for the purpose of preparing campus-specific Hazard Mitigation Plans using FEMA's Disaster Resistant University (DRU) planning model. The goal of the project and planning process was to identify specific areas in which DSU could increase its resilience to natural disasters and minimize the potentially costly impacts of natural disasters to the University. This plan represents the first step of the hazard mitigation planning process. Upon successful review and approval from FEMA, the Mississippi Emergency Management Agency, and IHL, the University will become eligible to apply for FEMA Hazard Mitigation Grant assistance and other funding to financially assist in the implementation of mitigation measures outlined in the plan.

The goals of this process are three-fold. First, to provide a safer environment for the University community by implementing measures designed to protect human health and safety. Secondly, to protect the assets of the University that represents a very significant investment on the part of the taxpayers of the State of Mississippi. The final goal is to implement measures that will ensure continuity of operations and to ensure the University continues to fulfill its mission prior to, during, and after a significant natural disaster event.

The University executed a professional services agreement with Eco-Systems, Inc. (Eco-Systems) to guide the planning process. Eco-Systems worked under the guidance of the DRU Committee. The DRU Committee is comprised of representatives from various divisions, departments, and functions of the University and also included representatives from Bolivar County. The DRU provided valuable guidance and insight into University operations and the planning process and will continue to exist as an Ad Hoc committee to guide implementation of the plan.

The plan provides information relative to eight natural hazards that have the highest probability of affecting the University including:

- Earthquakes,
- Flooding/Flash Flooding,
- Hailstorms,
- Hurricanes and Coastal Storms,
- Severe Winter Storms,
- Thunderstorms, Lightning, and Wind,
- Tornados, and
- Fires.

Through the planning process, the DRU Committee also eliminated eight hazards that had limited or no probability of affecting the University, including:

- Avalanche,
- Coastal Erosion,
- Dam Failure,
- Drought/Extreme Temperatures,
- Expansive Soils,
- Land Subsidence,
- Tsunami, and
- Volcano.

In addition to addressing natural hazards, the DRU Committee, at the request of IHL addressed manmade hazards. Because of previous planning efforts addressing a variety of man-made hazards, the level of detail applied to man-made hazards in this plan is less than applied to natural hazards. However, many of the mitigation strategies selected for inclusion in the plan have potential benefits to man-made hazards.

The plan development process resulted in the University selecting and prioritizing twenty mitigation measures designed to reduce the University's vulnerability to probable natural hazards. The mitigation measures selected and prioritized range from policy actions, to planning initiatives, to actual physical improvements to select structures and buildings on campus and are all designed to address specific vulnerabilities.

2.0 Introduction and Background Information

Delta State University (DSU), through a grant from the Federal Emergency Management Agency (FEMA) and the Mississippi Institutions of Higher Learning (IHL) received funding assistance in 2009 for the purpose of conducting a planning process designed to provide the University with a campus-specific Hazard Mitigation Plan. This planning process, commonly referred to as the Disaster Resistant University Plan (DRU), is designed to analyze the University's vulnerability to a variety of hazard types and to determine mitigation projects and actions that have the potential to minimize those vulnerabilities. The grant was funded through FEMA's Hazard Mitigation Grant Program and is being administered through the Mississippi Emergency Management Agency (MEMA) and IHL. The timeline for completion of the plan calls for a draft plan to be completed and submitted to IHL, FEMA, and MEMA for review by January 2011 with anticipated approval and final adoption of the plan by the end of the March 2011. The scope of the Mitigation Plan includes the campus of DSU located in Cleveland, Mississippi. The initial planned scope called for analysis and assessment of natural disasters only. However, at the request of IHL, manmade hazards are also being considered through the planning process.

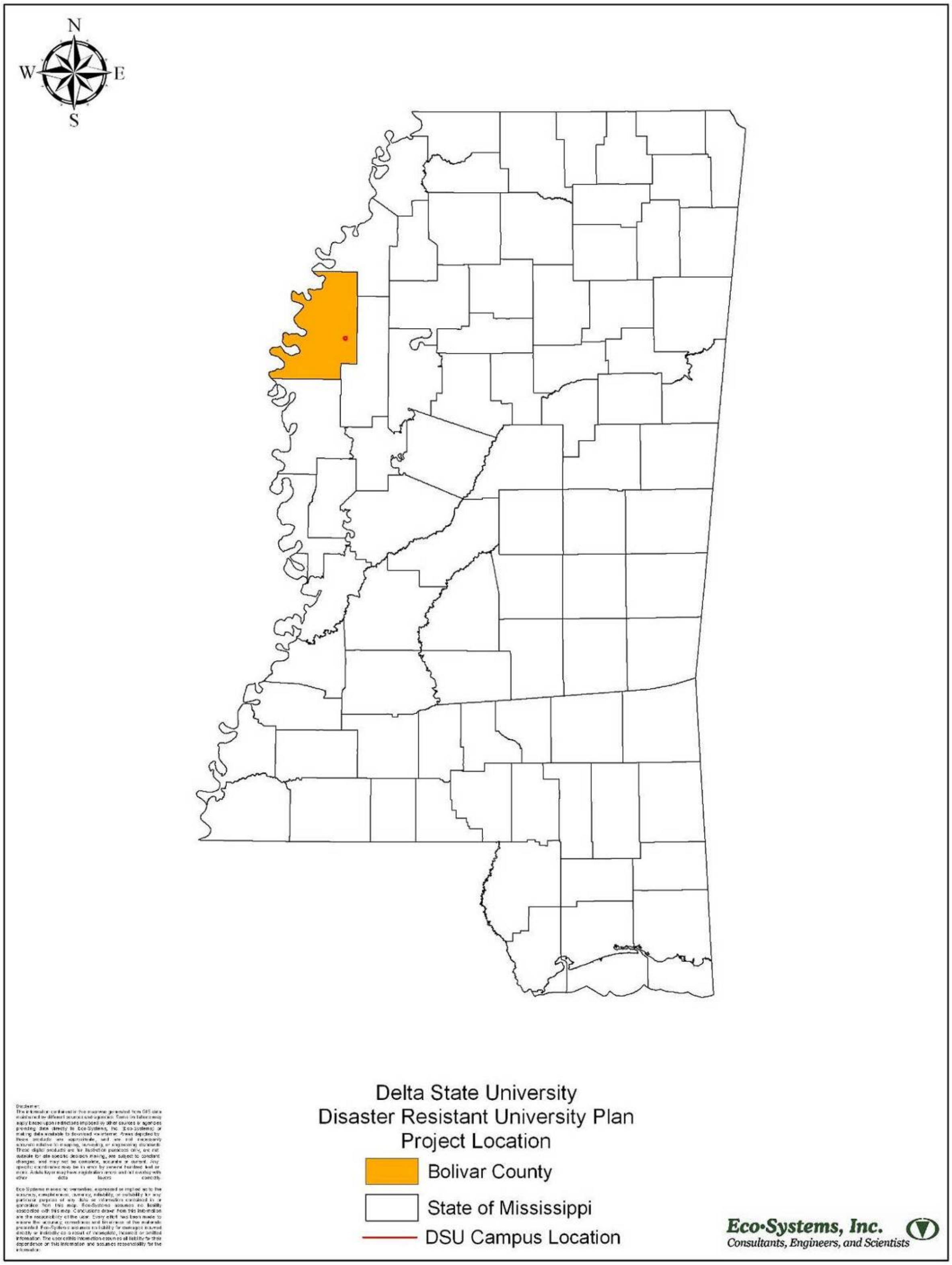
DSU was recently involved in the development of the Bolivar County Hazard Mitigation Plan that included the City of Cleveland, Bolivar County, and DSU as planning participants. The University also has a current emergency response plan. Although the University does maintain these plans as part of an overall readiness and response strategy, this DRU plan is the first planning effort specific to the University that addresses the incorporation of mitigation strategies designed to limit vulnerability to critical facilities within the University. Organizationally, this plan will reference other existing plan documents and it is anticipated that those existing plans will be modified to reference this plan upon completion and adoption.

There are numerous examples and case studies of natural and manmade disasters that have had significant impacts to universities both in direct costs (damage to facilities and university assets) and indirect costs (loss of time and research capabilities). Mississippi and neighboring coastal states have recently experienced significant losses of university assets due to hurricane and tropical weather activity. In 1969, Hurricane Camille caused catastrophic damage to the Mississippi Gulf Coast and the University of Southern Mississippi's Gulf Coast Research Lab. The Gulf Coast Research Lab and the USM Long Beach Campus were virtually destroyed in 2005 from the ravages of Hurricane Katrina. In November, 2004, a tornado caused significant damage to the Mississippi University for Women.

The DSU campus represents a significant concentration of population. The DSU campus community includes approximately 4,200 students and approximately 500 faculty and staff for a total campus population of approximately 4,700, equating to a population density of approximately 9,000 persons per square mile. In contrast, the overall population density of the City of Cleveland is approximately 1,892 persons per square mile. The high population density of the University suggests that any given hazard event could potentially impact a large population located within a relatively small land area. In addition, the University represents a significant investment on the part of the taxpayers of the State of Mississippi not only in terms of brick and mortar infrastructure but also in terms of the University's economic impact and benefit to the region and the State as well as the value of research conducted within the University and intangible assets such as archival collections that are virtually irreplaceable. With these considerations, efforts related to mitigation planning and the mitigation strategies themselves are a critical element in ensuring that the University is resilient to potential future disaster events. **Figure 2.0** provides the geographical context for the University's location within the State of Mississippi. [1]

Figure 2.0 - Area Map

[1] GIS Shapefiles and Data provided by the Mississippi Automated Resources Information System (MARIS), www.maris.state.ms.us


N
W
E
S
Delta State University
Disaster Resistant University Plan
Project Location
Bolivar County
State of Mississippi
DSU Campus Location
Eco-Systems, Inc.
Consultants, Engineers, and Scientists

3.0 DESCRIPTION OF THE PLANNING PROCESS

In the early stages of the planning process, DSU identified and communicated a seven-step planning process that would be followed to direct and organize planning activities. The primary steps in this process include:

1. Establishment of the planning process to include:
    a. Setting up the planning team and organizing a DRU Advisory Committee
    b. Coordinating and communicating with project stakeholders and resource agencies
    c. Reviewing existing plans and other materials to plan for incorporation into the DRU Plan
    d. Providing opportunities for public input into the plan and the planning process.
2. Assessment of risks:
    a. Identification of potential hazard types
    b. Assessment of the risks associated with identified hazards
    c. Development of an inventory of University assets
    d. Determining the vulnerability of identified assets to identified hazards
3. Prioritization of Critical infrastructure, facilities, and University functions:
    a. Analysis of existing University infrastructure, facilities, and services
    b. Determination of those critical assets that must remain operational prior to, during, and immediately after a hazard event
    c. Consideration of mitigation measures and actions that will ensure continuity of service.
4. Development of mitigation strategies:
    a. Definition of goals and objectives
    b. Identification and analysis of a comprehensive range of possible mitigation measures
    c. Development of an action plan for implementation of mitigation measures.
5. Plan assembly:
    a. Incorporation of all plan elements into a single, consolidated document
    b. Conduct multiple levels of review including peer review, review on the University level, public review, and agency review
    c. Refinement of the plan to a final draft stage
6. Plan adoption:
    a. Obtain broad consensus on plan elements and recommendations
    b. Solicit stakeholder and public input
    c. Formal adoption of the plan by the University.
7. Plan maintenance:
    a. Develop methods and schedules for regular monitoring, review, evaluation, and updates of the adopted plan
    b. Incorporation of the Mitigation Plan into other planning efforts such as the Campus Master Plan and capital improvement plans
    c. Provide a mechanism for continued public involvement[2]

[2] FEMA, Building a Disaster Resistant University, August 2003

The DRU Advisory Committee provided critical oversight for the planning process and provided valuable input into plan development. The DRU Committee is comprised of representatives from the University, the City of Cleveland, and the Bolivar County Emergency Management Agency. Other agency representation on the Committee was provided through IHL and MEMA. The Committee was engaged early in the planning process and participated in all elements of plan development including identification of critical facilities, infrastructure, and functions; identification of potential hazards; and identification of priority mitigation measures. The overall function of the Committee is critical to the long-term success and implementation of the plan to the extent that the Committee will be relied upon periodically throughout the implementation process to monitor progress of implementation and to ensure that the plan is updated regularly to maintain the relevance of the plan to existing conditions at the University. **Table 3.0** provides a listing of Committee members and their affiliation. A full record of agendas from all Committee meetings is provided in **Appendix A.** In the early stages of the planning process, DSU executed a contract with Eco-Systems, Inc. Eco-Systems' role in the project included coordination of the planning process, assistance with organization of the committee and other planning resources, data gathering, analysis, and interpretation, and plan development and assembly.

Table 3.0 DRU Advisory Committee Membership

Name	Organization	Affiliation
Lynn Buford	DSU	DSU Chief of Police
Michael Gann	DSU	Dir. of Comm. and Marketing
Dr. Bob Neal	IHL	Emergency & Fire Safety Coordinator
Wayne Blansett	DSU	Vice President of Student Affairs
Julie Jackson	DSU	Dir of H and R L
Michael Lipford	DSU	H and R L
Brad Horton	City of Cleveland	Assistant Chief of Fire Department
Robin Boyles	DSU	Grants
Katie Bradshaw	DSU	Payroll
Benne Walker	DSU	Assistant Chief of Police
Matt Logan	DSU	Technical Director
Chris Giger	DSU	Dir. of Administrative Services
Beverly Fratesi	DSU	Chief Information Officer
Richard Houston	DSU	Director of Counseling
Gene Bishop	City of Cleveland	Fire Inspector
Beverly Lindsey	DSU	Dir. of Procurement/Auxiliary
Linda Smith	DSU	Dir. of Facilities Management
Jay Estes	Eco-Systems, Inc.	Contract Consultant
Zach Young	Eco-Systems, Inc.	Contract Consultant
Bruce Laird	Eco-Systems, Inc.	Contract Consultant

4.0 RISK ASSESSMENT

4.1 INTRODUCTION TO THE RISK ASSESSMENT

The process of determining appropriate mitigation actions and strategies begins with an identification of the types of hazards that have the greatest potential of impacting the identified University assets and conducting an analysis and evaluation of the potential significance of each hazard. **Table 4.0** provides a listing and preliminary evaluation of the probability of occurrence of each hazard type as well as priority ranking for mitigation measures based on the probability of impacts and the likelihood of occurrence. The hazards listed in **Table 4.0** are consistent with the hazards identified by FEMA for hazard mitigation planning efforts.

Table 4.0 List of Natural Hazards to be Evaluated[3]

Hazard	Accept as Hazard	Likely Occurrence	Mitigation Priority
Avalanche	No	N/A	N/A
Coastal Erosion	No	N/A	N/A
Coastal Storm	No	N/A	N/A
Dam Failure	No	N/A	N/A
Extreme Temperature/Drought	**Yes**	**High**	**Low**
Earthquake	**Yes**	**Low**	**Low**
Expansive Soils	No	N/A	N/A
Flood/Flash Flooding	**Yes**	**Medium**	**Medium**
Hailstorm	**Yes**	**Medium**	**Low**
Hurricane	**Yes**	**Medium**	**Medium**
Land Subsidence	No	N/A	N/A
Severe Winter Storm	**Yes**	**Low**	**Medium**
Tornado	**Yes**	**Medium**	**Medium**
Tsunami	No	N/A	N/A
Volcano	No	N/A	N/A
Fire	**Yes**	**Low**	**Low**
Windstorm	**Yes**	**High**	**High**
Lightning	**Yes**	**Low**	**Medium**

In addition to an analysis of natural hazards, IHL requested that the DRU Plans consider manmade hazards as they relate to potential impacts to the University. The listing of manmade hazards is also consistent with FEMA requirements. **Table 4.1** provides a listing of manmade hazards, their potential for impacts to the University and the mitigation priority of each.

[3] FEMA, Understanding Your Risks: Identifying Hazards and Estimating Losses, August 2001

Table 4.1 List of Manmade Hazards to be Evaluated

Hazard	Accept as Hazard	Likely Occurrence	Mitigation Priority
Chemical	Yes	Medium	Medium
Civil Disturbance	Yes	Low	Low
Hazardous Materials Accident	Yes	Medium	Medium
Power Failure	Yes	Medium	High
Terrorism	Yes	Low	Low
Transportation Incident	Yes	High	High
Health Incident / Infectious Disease	Yes	Medium	Low

Probability of occurrence as High, Medium or Low is based on a number of factors including historical occurrence data included in Section 6.0, general climate data for the region, topography, and geography (i.e. proximity to coastal zones, earthquake zones, etc.). A high probability of occurrence indicates that a hazard of this type will occur at some point in the future. A medium probability of occurrence indicates a history of occurrence but considers the random and unpredictable nature of the event type. A low probability of occurrence indicates a general lack of historical occurrences and also factors in the random and unpredictable nature of the event (i.e. lightning). In similar fashion, mitigation priorities for each hazard type were listed as High, Medium, and Low. A high mitigation priority is one that would address and imminent threat or a hazard that has a high probability for occurrence. A medium mitigation priority is one that would address a hazard determined to have a medium probability of occurrence. A low mitigation priority is one that would address a hazard determined to have a low probability of occurrence or that would have a particularly low relative cost-benefit ratio. Likewise, low potential severity of an event is one that would not cause significant damage or interruption of services and activities on campus. An event with medium potential severity is one that would cause moderate damages and would potentially disrupt campus services and activities for a short-term period of time, generally a day or two. An event with high potential severity is one that would cause significant damage to the university and would disrupt services and activities on campus for an extended or long-term period (a week or more).

4.2 IDENTIFICATION OF HAZARDS NOT CONSIDERED A CONCERN TO THE UNIVERSITY

4.2.1 Avalanche

An avalanche typically refers to the slope failure of a mass of snow and ice on a mountainside that moves swiftly down to lower elevations, growing in size as it descends and collecting debris such as rocks, boulders and vegetation along the way. This type of event can occur on slopes exceeding 20 to 30 degrees. Since the campus of DSU is located in the Mississippi River Delta, the topographical elevation variance is naturally only a few feet for miles in any direction. Additionally, the campus is located at a latitude that typically does not experience heavy snow accumulation or large snow events, therefore the hazard potential posed by an avalanche is considered to be zero.

4.2.2 Coastal Erosion

The campus of DSU is located approximately 250 miles from the Gulf Coast of Mississippi and is therefore not subject to coastal erosion. This hazard poses no potential threat to the University.

4.2.3 Dam Failure

According to the MDEQ, there have been at least 25 dam failures resulting in 318 deaths in the United States since 1960.[4] Numbers of dams are breached each year in Mississippi, including both unintentional failures and intentional breaches. Records indicate that there have been no dam failures in the Bolivar County area in recent years. There have been no reported deaths from dam breaches in the State of Mississippi to date. There are no dams located within a three-mile radius of the main campus of DSU. The nearest dam to the DSU campus is located approximately four miles from campus. Based on the topographic conditions and the mean distance of the dams from the University, none of these dams pose a significant hazard to the University. Due to the absence of potentially hazardous dams within the vicinity of the university, dam failure is considered to pose no threat and was given no further consideration.

4.2.4 Drought / Extreme Temperatures

There have been eight major droughts in the past 60 years that affected the area of Mississippi that would include the campus of DSU[5]. Since the campus of DSU doesn't rely on precipitation for the normal operation and function of the university, drought would not be expected to impact the functional capacity of any critical facilities.

4.2.4 Expansive Soils

Soils differ in their ability to absorb and retain moisture. Generally, as a soil absorbs more moisture, it has a tendency to expand. Soils with higher clay content typically absorb and retain very high levels of moisture. These soils also tend to have higher linear extensibility (shrink-swell potential). The majority of the DSU campus is underlain by the Brittain silt loam soil (approximately 83%). The remaining 17% of soils underlying the campus are composed from two soil types, the Pearson silt loam (11%) and the Waverly silt loam (6%). The Brittain silt loam soil has a linear extensibility of 4.5%, a 18.0% plasticity index and a 39.0% liquid limit. These attributes mean that the soil has a medium plasticity and has some potential to cause damage to structures due to its shrink-swell potential. It is therefore retained as a potential

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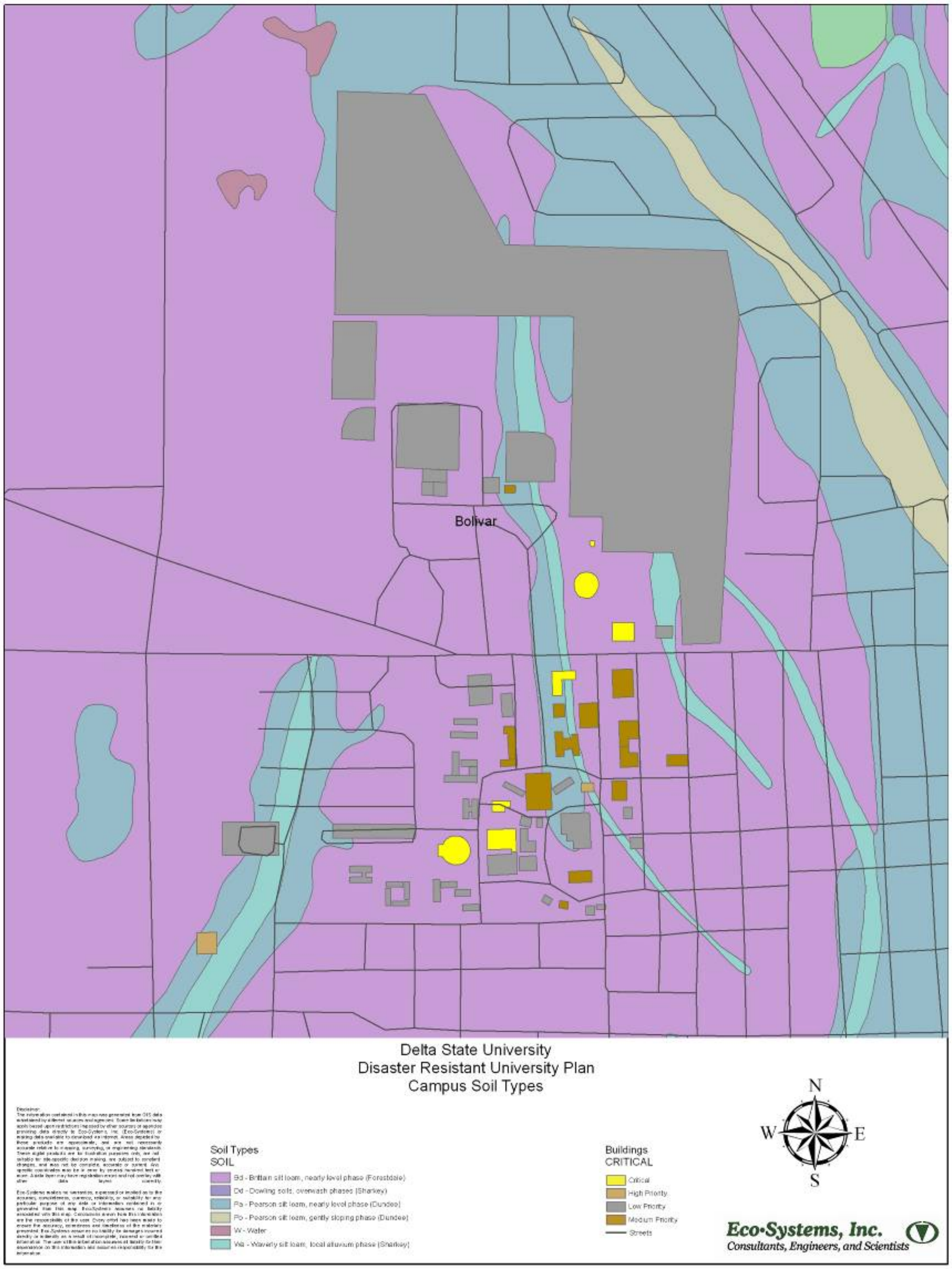
[4] Mississippi Department of Environmental Quality, Dam Safety Division, http://www.deq.state.ms.us/MDEQ.nsf/page/L&W_Dam_Safety?OpenDocument
[5] NOAA National Climatic Data Center

hazard to the university. **Figure 4.0** below depicts the soil types and approximate locations found on campus. [6]

Figure 4.0 - Soil Types



[6] MARIS

4.2.5 Land Subsidence

The subsidence of land is the sinking of land elevation due to consolidated materials or the collapse of a section of land due to large subsurface voids. In the case of large sinking land masses, the cause is generally the extraction of subsurface fluids such as groundwater or petroleum. Some examples of this type of subsidence include, the City of New Orleans, Houston, Texas and San Joaquin Valley, California. Additionally, subsurface caverns resulting from mining or from the natural dissolution of certain rock types (gypsum and limestone) can suddenly collapse and create a surface sinkhole.[7] Bolivar County, and more specifically, the campus of DSU is located in an area that consists of primarily of silt, loam and clay soils. The City of Cleveland and the university utilize groundwater wells that mean depth of 974 feet and pull water from the Sparta Sand aquifer. Based upon the history and geology of Bolivar County, it is highly unlikely that subsidence would pose a hazard to the university and it is therefore dismissed from further consideration.

4.2.6 Tsunami

A tsunami is a series of waves typically generated by the sudden displacement of large volumes of ocean water. Tsunamis are usually the result of earthquakes with epicenters that are located miles off-shore but can be caused by other forces such as volcanic eruptions or landslides.[8] While these events are destructive, they are generally a hazard for locations in close proximity to the coastline. The campus of DSU is located approximately 250 miles from the Mississippi Gulf Coast and rests at an elevation of approximately 140 feet above mean sea level. For this reason, the hazard potential posed to the campus of DSU by a tsunami is considered to be zero.

4.2.7 Volcano

The closest known volcano to the DSU campus is the extinct Jackson Volcano located approximately 100 miles south of the University. The Jackson Volcano lies approximately 2,900 feet below Jackson, Mississippi and is believed to have been extinct for approximately 65 million years. Consequently, it is unlikely that volcanic activity poses a hazard to the university and is therefore given no further consideration.

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[7] USGS, Land Subsidence, http://water.usgs.gov/ogw/subsidence.html
[8] Federal Emergency Management Agency (FEMA), Types of Disasters: Tsunami, http://www.fema.gov/hazard/tsunami/index.shtm

5.0 VULNERABILITY ASSESSMENT

The Delta State University campus includes approximately 84 structures with an estimated replacement value of $351,086,956 million.[9] For the purposes of this plan, University facility structures have been classified according to functional classifications including Academic, Campus Services, Athletic, and Housing. In addition, these structures have been classified according to their relative importance and value for the purpose of determining those structures and facilities that are important in terms of their function before, during, and after a hazard event. Each University building has been classified as Critical, High Priority, Medium Priority, and Low Priority. In assigning a hazard classification to each building the replacement value of the structure itself was not given as high a priority as the building or facility's potential value to the University in preparation or response to a hazard event. Those buildings or systems with usefulness to the continuance of campus operations and response during a crisis event or those buildings useful to recovery operations after a hazard event were classified as Critical. Buildings and systems with high exposure in terms of the building value or value of contents including research data and special collections were classified as High Priority. Also classified as High Priority structures were those buildings housing high concentrations of the University population such as buildings designated as shelters or those buildings providing services related to human sustainability such as dining halls. Buildings containing particularly expensive equipment, research or cultural materials warranting special consideration were classified as Medium Priority. All other structures were classified as Low Priority. **Tables 5.0 - 5.3** provide an overview of identified critical facilities.

Table 5.0 Critical Facilities

Building Name	Function	Classification
Forest Earl Wyatt Gymnasium	Shelter	Critical
H.L. Nowell Student Union		Critical
Kent Wyatt Hall		Critical
Caylor-White/Walters Hall		Critical
O.W. Reily Student Health Center		Critical
Central Mechanical Plant & 2 Sewer Lift Stations		Critical
Walter Sillers Coliseum		Critical
Young-Mauldin Dining Hall	Food Service	Critical
Thomas L. Bailey Hall		Critical
Water Tower/Well		Critical
W.M. Kethley Hall	Data Center	Critical

[9] Mississippi Bureau of Buildings

Table 5.1 High Priority Facilities

Building Name	Function	Classification
Charles W. Capps, Jr. Archives & Museum		High
Aquatics Center		High
George B. Walker Natatorium		High
Hugh Cam Smith, Jr. Physical Plant		High
Bologna Performing Arts Center		High
Delta Music Institute (DMI)		High

Table 5.2 Medium Priority Facilities

Building Name	Function	Classification
Cassity Hall		Medium
E.R. Jobe Hall		Medium
Eleanor Boyd Walters Hall		Medium
Fielding L. Wright Art Center/Holcombe-Norwood Hall		Medium
Gibson-Gunn Aviation Building		Medium
Hamilton-White Child Development Center		Medium
James M. Ewing Hall		Medium
James W. Broom Hall/Kathryn Keener Hall		Medium
Robert L. Crawford Center & Dave "Boo" Ferriss Museum		Medium
Roberts-LaForge Library		Medium

Table 5.3 Low Priority Facilities

Building Name	Function	Classification
Administrative Housing	Housing	Low
Administrative Housing	Housing	Low
Administrative Housing	Housing	Low
Billy Dorgan, Jr. Student Performance Center		Low
Brewer Residence Hall - Men	Housing	Low
Brumby-Castle Residence Hall - Women	Housing	Low
Bryce Griffis Practice Center		Low
Cain Residence Hall – Women (Closed)	Housing	Low
Chadwick Dickson Intercollegiate Athletic Building		Low
Clark Residence Hall - Men	Housing	Low
Cleveland Residence Hall - Women	Housing	Low
Darrell Foreman Golf Course	Athletics	Low
David "Boo" Ferriss Field - Baseball	Athletics	Low
Delta State Soccer Field	Athletics	Low
E.B. Hill/Canal Street Student Apartments	Housing	Low
Foundation Hall	Housing	Low
Fugler Residence Hall - Women	Housing	Low
Hammett Residence Hall – Women (Closed)	Housing	Low

Building Name	Function	Classification
Harkins Residence Hall - Women	Housing	Low
Hugh Ellis Walker Alumni Foundation House		Low
Humphreys Street/Cafeteria Student Apartments	Housing	Low
J.A. "Bud" Thigpen, Jr. Baseball Annex		Low
Lawler Residence Hall - Women	Housing	Low
Lena Roberts Sillers Chapel		Low
Longino Residence Hall - Men	Housing	Low
New Men's Residence Hall - Men	Housing	Low
Noel Residence Hall - Men	Housing	Low
Odealier J. Morgan Laundry		Low
President's Home		Low
Tatum Residence Hall – Women (Closed)	Housing	Low
Travis E. Parker Field - Football	Athletics	Low
University Field - Softball	Athletics	Low
Ward Hall – Administration		Low
University Apartments		Low
William H. Zeigel Music Center		Low

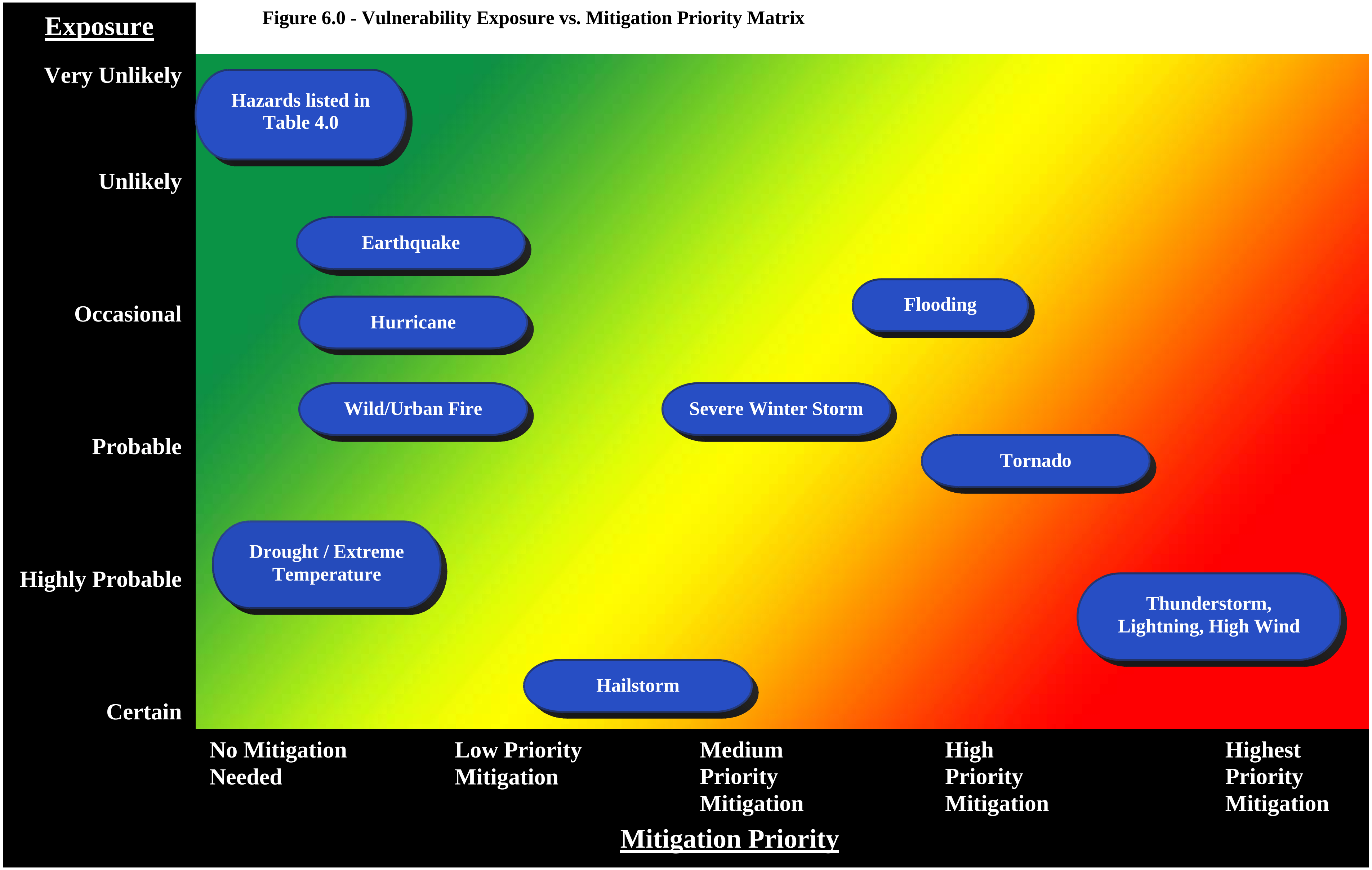
6.0 PROFILES OF POTENTIAL HAZARDS OF CONCERN

The following sections provide details related to each identified hazard of concern including general information, historic occurrence data for each hazard type, the University's relative vulnerability to each hazard type and potential impacts to the University from each hazard. This section, combined with the previous section identifying critical, high, medium, and low priority facilities is intended to serve as the basis for development of appropriate and comprehensive mitigation strategies designed to minimize risk, reduce vulnerability, reduce costs associated with recovery from natural hazards, and protect life and property. The specific hazards identified in this section as well as their relative priority for mitigation is included in **Table 6.0** below:

Table 6.0 Mitigation Priority by Hazard Type

Hazard	Likely Occurrence	Potential Severity	Mitigation Priority
Earthquake	Low	Low	Low
Hailstorm	Medium	High	Low
Hurricane and Costal Storms	Medium	Low	Low
Severe Winter Storm	Low	Medium	Medium
Thunderstorms, Lightening, Wind	High	High	High
Tornados	Medium	High	Medium
Drought/Extreme Temperature	High	Low	Low
Flooding/Flash Flooding	Medium	Medium	Medium
Urban Fire	Low	Medium	Low

Figure 6.0 - Vulnerability Exposure vs. Mitigation Priority Matrix



6.1 NATURAL HAZARDS

6.1.1 Earthquakes – General Information

Earthquakes can be described as the positive and negative acceleration of the ground over a relatively short period of time; fractions of a second or seconds. Earthquake shaking may last from just a few seconds to several minutes and the effect of the shaking can be very destructive to buildings and other structures, particularly in areas of the United States where the intensity of the acceleration is severe. In an effort to quantify the severity of an earthquake, seismographs are used to measure the magnitude of earthquakes. An earthquake can have only one magnitude but may have many intensities based upon a number of factors. That intensity can be influenced by the proximity of the local area to the epicenter of the earthquake, local site geology and many other factors. The Modified Mercalli Intensity Scale describes the expected effects of various intensities and can be related to ranges of earthquake magnitudes. The intensity scale is included as Table 6.1.

Table 6.1 Modified Mercalli Intensity Scale

Rating	Description
I.	Not felt except by a very few under especially favorable conditions.
II.	Felt only by a few persons at rest, especially on upper floors of buildings.
III.	Felt quite noticeably by persons indoors, especially on upper floors of buildings. Many people do not recognize it as an earthquake. Standing motor cars may rock slightly. Vibrations similar to the passing of a truck. Duration estimated.
IV.	Felt indoors by many, outdoors by few during the day. At night, some awakened. Dishes, windows, doors disturbed; walls make cracking sound. Sensation like heavy truck striking building. Standing motor cars rocked noticeably.
V.	Felt by nearly everyone; many awakened. Some dishes, windows broken. Unstable objects overturned. Pendulum clocks may stop.
VI.	Felt by all, many frightened. Some heavy furniture moved; a few instances of fallen plaster. Damage slight.
VII.	Damage negligible in buildings of good design and construction; slight to moderate in well-built ordinary structures; considerable damage in poorly built or badly designed structures; some chimneys broken.
VIII.	Damage slight in specially designed structures; considerable damage in ordinary substantial buildings with partial collapse. Damage great in poorly built structures. Fall of chimneys, factory stacks, columns, monuments, walls. Heavy furniture overturned.

Rating	Description
IX.	Damage considerable in specially designed structures; well-designed frame structures thrown out of plumb. Damage great in substantial buildings, with partial collapse. Buildings shifted off foundations.
X.	Some well-built wooden structures destroyed; most masonry and frame structures destroyed with foundations. Rails bent.
XI.	Few, if any (masonry) structures remain standing. Bridges destroyed. Rails bent greatly.
XII.	Damage total. Lines of sight and level are distorted. Objects thrown into the air.

To gain some perspective on the magnitude of earthquake required to produce the effects described by Table 6.1, Table 6.2 has been included for comparison. Since the described intensity of an earthquake can vary greatly depending upon distance to the epicenter, the intensities listed in Table 6.2 assume that the measured intensity is very near the epicenter of the earthquake.

Table 6.2 Magnitude vs. Intensity Comparison

Magnitude	Intensity
1.0 - 3.0	I
3.0 - 3.9	II - III
4.0 - 4.9	IV - V
5.0 - 5.9	VI - VII
6.0 - 6.9	VII - IX
7.0 and higher	VII or higher

A secondary effect of earthquake shaking is called liquefaction. Liquefaction occurs when the vibrations and shaking caused by the earthquake cause the surface soils to behave more like a fluid than a solid material. This causes the soil to lose its ability to properly support heavy loads from buildings and other infrastructure. Liquefaction can result in damage to building foundations and other structures.

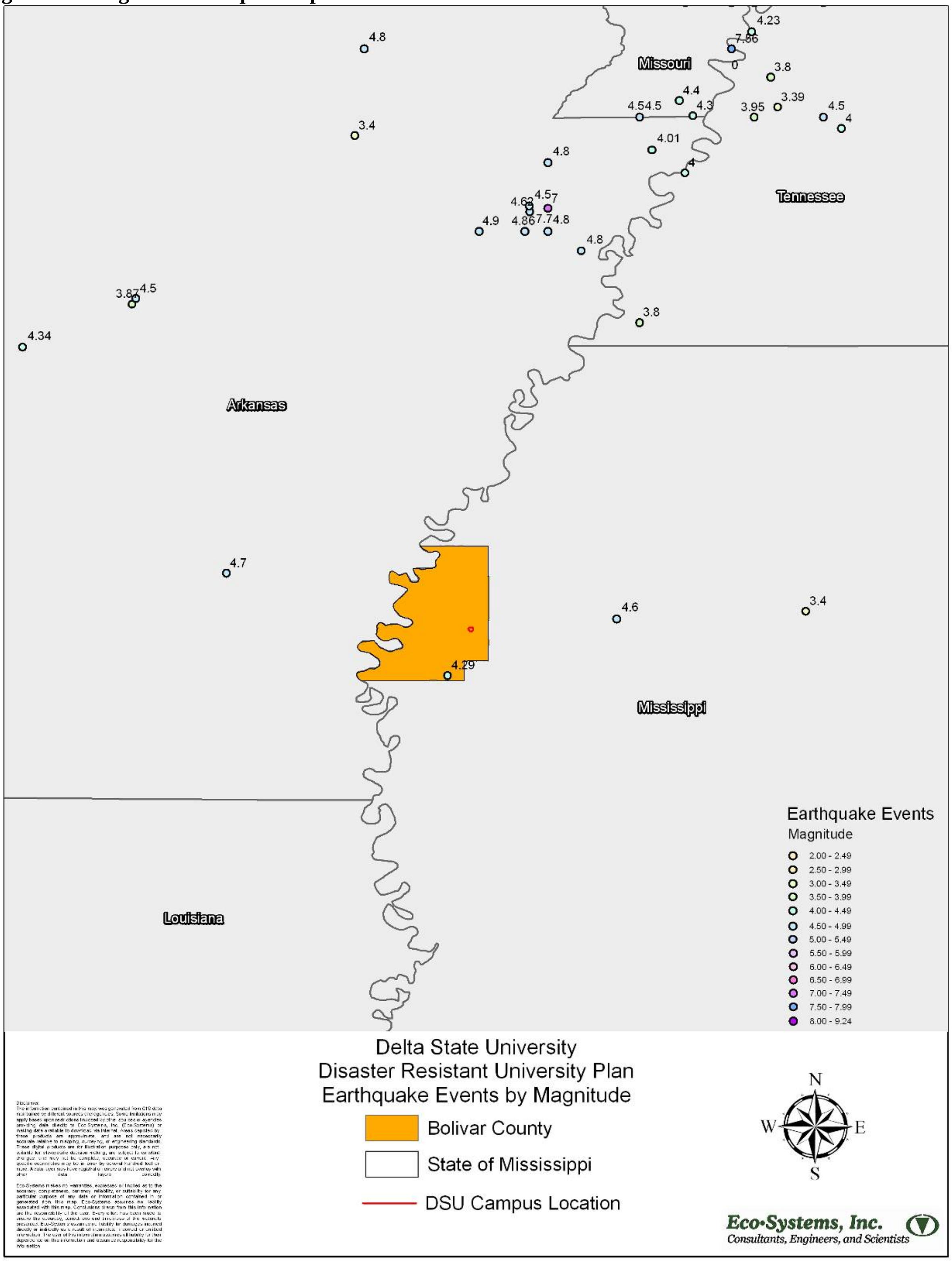
6.1.1a Historic Occurrence Data – Earthquakes

Fortunately, the incidence of earthquake occurrence is somewhat rare in Mississippi and when earthquakes have occurred, they have caused very little damage. The majority of the earthquakes occurring in Mississippi are centered in the northwestern areas of the state. However, there was at least one earthquake that was centered as far south as the Gulf Coast. It occurred on February

1, 1955 and was perceptible across the coastal counties but was not reported to have caused damage to any structures.[10] The most severe earthquake recorded in Mississippi occurred on December 17, 1931 near Charleston in Tallahatchie County, Mississippi. This earthquake had a magnitude of 4.6. Some damage was reported to chimneys and foundations in Charleston. According to data obtained from the United States Geological Survey (USGS), one earthquake occurred in Bolivar County in 1967 and it measured 4.29 in magnitude. The epicenters of regionally occurring earthquakes have been mapped and included as Figure 6.1. [11]

[10] United States Geologic Survey (USGS), Mississippi Earthquake History, http://earthquake.usgs.gov/earthquakes/states/mississippi/history.php
[11] MARIS

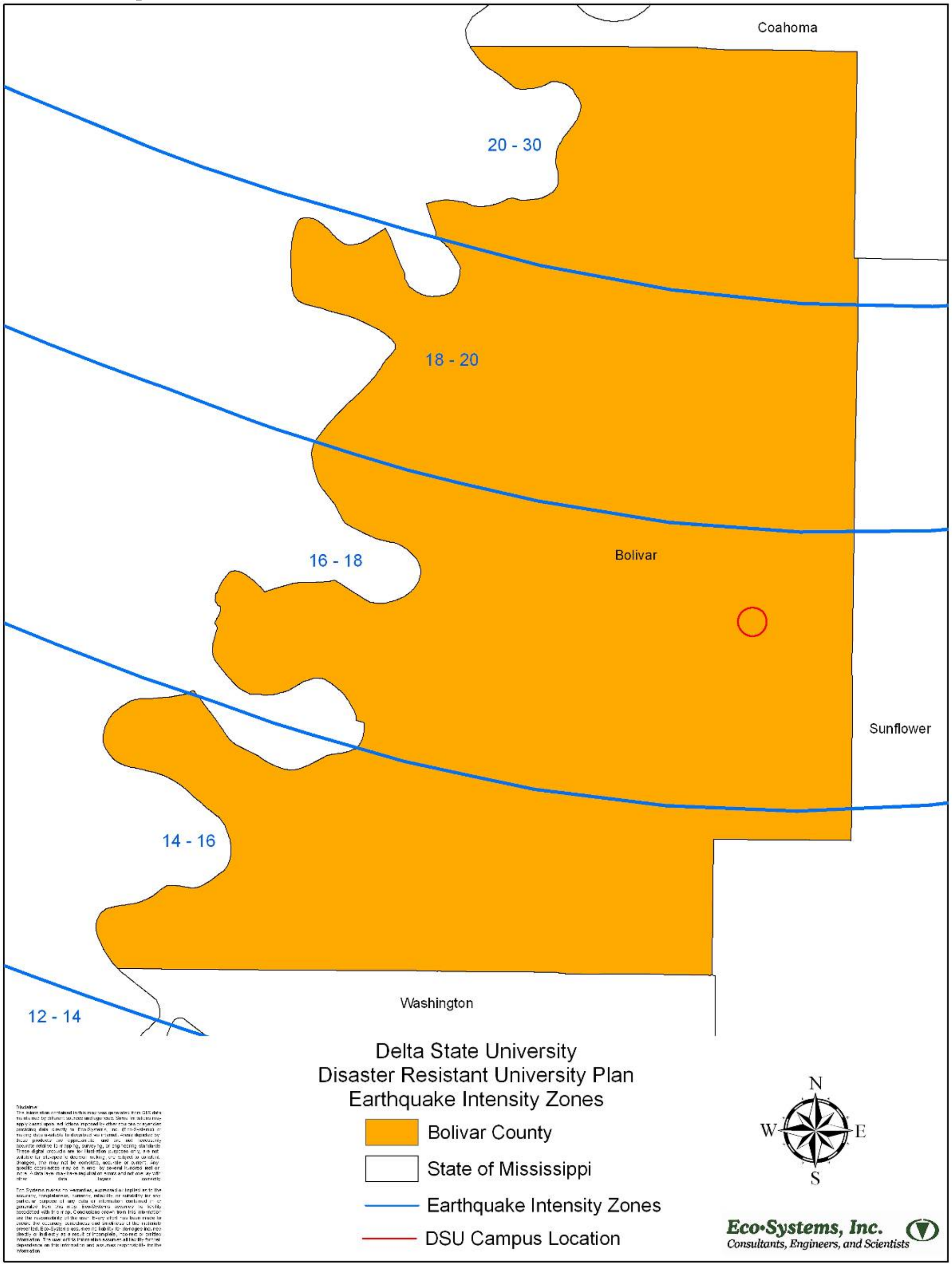
Figure 6.1 - Regional Earthquake Epicenter Locations



6.1.1b DSU's Vulnerability to Earthquakes

The campus of DSU is located in an area described by the USGS as having a ***%g*** rating of 16-18. This means that the expected acceleration due to an earthquake occurring at or near the campus of DSU would be approximately 16-18% of the acceleration due to gravity. For perspective, there are certain areas of California with a rating of 350% and thousands of square miles of California near the coastline classified within the 120% rating zone. Additionally, there is a 2% chance that an earthquake occurring in the region would cause ground acceleration ratings in excess of 16 - 18%g in the next 50 years. A seismic hazard map of the Bolivar County area is shown indicating that the University may be considered to be located with an area of consideration for mild earthquake hazards.

Figure 6.1 - Earthquake Zone



6.1.1c Potential Earthquake Impacts to the University

The absence of a history of significant earthquakes in proximity to the DSU campus makes prediction of potential impacts difficult. However, assuming the majority of buildings on campus are not constructed to a high standard with respect to seismic activity, one can assume that an earthquake in near proximity to DSU would cause some level of damage to buildings. Through the analysis and assessment process, the FEMA HAZUS-MH model was executed for earthquakes. **Table 6.3** provides results of that analysis and indicates probabilities of damage to select buildings on campus. Structures designated as "Critical", "High Priority", or "Medium Priority" are indicated in red text.

Table 6.3 HAZUS-MH Earthquake Results

Name	None	Slight	Moderate	Extensive	Complete	At Least Slight	At Least Moderate	At Least Extensive
Kethley Hall	1%	2%	11%	22%	64%	99%	97%	86%
Fielding L. Wright Art Center	1%	1%	8%	33%	58%	99%	99%	91%
Broom-Keener Hall	1%	2%	11%	26%	60%	99%	97%	87%
Bailey Hall	1%	2%	11%	26%	60%	99%	97%	87%
Young-Mauldin Cafeteria	1%	2%	11%	26%	60%	99%	97%	87%
Cassity Hall	1%	2%	11%	22%	64%	99%	97%	86%
Sillers Coliseum	1%	2%	11%	26%	60%	99%	97%	87%
O. W. Reily	1%	2%	11%	22%	64%	99%	97%	86%
Roberts Library	1%	2%	11%	22%	64%	99%	97%	86%
E. R. Jobe Hall	1%	3%	15%	33%	48%	99%	96%	81%
R. L. Caylor Hall	1%	2%	11%	22%	64%	99%	97%	86%
E. Walters Hall	1%	2%	11%	22%	64%	99%	97%	86%
H. L. Nowell Union	1%	1%	8%	33%	58%	99%	99%	91%
Hugh C. Smith	1%	2%	12%	23%	63%	99%	97%	86%
Ewing Hall	1%	1%	8%	33%	58%	99%	99%	91%
F. E. Wyatt Physical	1%	2%	11%	26%	60%	99%	97%	87%
School of	1%	2%	11%	26%	60%	99%	97%	87%

Name	None	Slight	Moderate	Extensive	Complete	At Least Slight	At Least Moderate	At Least Extensive
Nursing								
Gibson-Gunn Commercial	1%	2%	11%	26%	60%	99%	97%	87%
Charles W. Capps Archives and Museum	2%	3%	15%	33%	47%	98%	96%	80%
Kent Wyatt Hall	2%	3%	15%	33%	47%	98%	96%	80%
Robert L. Crawdford	1%	1%	12%	35%	51%	99%	98%	87%
Hamilton-White Child Development Center	1%	2%	11%	26%	60%	99%	97%	87%
City Water Tower	0%	1%	19%	43%	38%	100%	99%	80%

6.1.2 Flooding / Flash Flooding – General Information

The campus is located within the levee protected 100 year flood plain according to the most recent version of the Flood Insurance Rate Map (FIRM) for the City of Cleveland and Bolivar County, Mississippi.[12] There are no streams, creeks or rivers that transect or border the campus. However, the campus is located in an area of the state that has a very flat topography and some flooding from the overtopping of natural, improved or manmade surface water drainage channels could occur. Localized rainstorms having intensities greater than the 25-year, 24-hour storm may cause flash flooding concerns for certain areas of the campus, particularly if the area stormwater systems are blocked or in need of repair. Flood producing storms may occur any month of the year but are more prevalent during the winter and spring months.

Since no lands associated with the University are located within FEMA-designated flood hazard areas, the application of the HAZUS-MH model to predict potential impacts from flooding is not particularly useful. However, the HAZUS-MH flood model was performed for the Cleveland area and the campus of DSU. The model indicated that one building on campus may potentially be impacted.

[12] MDEQ Office of Geology, Geospatial Resources Division, Mississippi Map Modernization Program, http://geology.deq.ms.gov/floodmaps/

6.1.2a Historic Occurrence Data – Flooding and Flash Floods

Mound Bayou incurred a flash flood condition on December 9, 2008 which inundated several homes with water depths as much as 5 feet.[13] Mound Bayou is located in Bolivar County approximately 11 miles north of the DSU campus. Flood producing storms may occur any month of the year but are more prevalent during the winter and spring months. Past records indicate that floods and flash floods have occurred in Bolivar County during the months of December, January, February, March, April and May. NOAA has recorded 26 flood events in Bolivar County between 1993 and February 2009. The overall total represents approximately 1 flood event in Bolivar County each year.

Table 6.4 Area Historic Flooding Events[14]

Location	Date	Type	Property Damage	Crop Damage
Mound Bayou	8/6/1993	Flood		
MSZ018 - 034 - 040 - 047 - 053 - 059>060	3/9/1997	Flood	$7,300,000	
Shaw	5/29/1998	Flash Flood		
Countywide	1/29/1999	Flood	$50,000	
Cleveland	8/10/2001	Flash Flood	$40,000	
Countywide	10/11/2001	Flash Flood	$10,000	
Countywide	11/29/2001	Flash Flood		
Countywide	11/29/2001	Flash Flood	$600,000	
Countywide	12/12/2001	Flash Flood	$1,000	
Countywide	12/13/2001	Flash Flood		
Countywide	1/24/2002	Flash Flood	$1,000	
Cleveland	10/10/2002	Flash Flood	$2,000	
Countywide	12/19/2002	Flash Flood	$20,000	
Rosedale	12/23/2002	Flash Flood	$5,000	
Shelby	6/11/2003	Flash Flood	$5,000	
Cleveland	6/11/2003	Flash Flood	$10,000	
Cleveland	6/17/2003	Flash Flood	$10,000	
Cleveland	11/18/2003	Flash Flood	$20,000	
Cleveland	6/2/2004	Flash Flood		
Cleveland	4/11/2005	Flash Flood	$10,000	
Cleveland	9/25/2005	Flash Flood	$30,000	
MSZ018	1/22/2006	Flood	$300,000	
Central Portion	5/10/2006	Flash Flood	$100,000	
Deeson	5/2/2008	Flash Flood		$500,000
Duncan	7/5/2008	Flash Flood		$5,000

[13] The Bolivar Commercial, http://www.bolivarcom.com/
[14] NOAA National Weather Service

Location	Date	Type	Property Damage	Crop Damage
Cleveland	2/27/2009	Flash Flood	$50,000	
TOTALS:			**$8,564,000**	**$505,000**

6.1.2b DSU's Vulnerability to Flooding and Flash Floods

The campus of DSU is located inside the levee protected 100 year flood plain according to the most recent version of the Flood Insurance Rate Map (FIRM) for Bolivar County, Mississippi. While there are no streams, creeks or rivers that transect or border the campus of DSU, the University is located in the Mississippi River Delta where land topography is generally very flat. This topography can easily lead to localized flash flooding during heavy rain events.

Table 6.5 Area Average Rainfall

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Avg. Precipitation (inches)	6.4	4.8	6.4	5.8	5.5	4.6	4.2	3.1	3.4	3.6	5.1	5.8

6.1.2c Potential Flooding and Flash Flooding Impacts to the University

It is anticipated that the DSU campus would be affected by flooding from the overtopping of natural, improved or manmade surface water drainage channels. However, localized rainstorms that have intensities greater than the 25-year, 24-hour storm may cause flash flooding concerns for certain areas of the campus, particularly if the area stormwater systems are blocked or in need of repair. There was no record found that flash flooding had caused damage to any University buildings and it is believed that there are no repetitive loss properties due to flash flooding.

6.1.3 Hailstorms – General Information

Hail, a form of precipitation, usually develops in severe thunderstorms and could be characterized as spheroids of ice. The spheres typically range in size from 1/4 inch in diameter to 4 ½ inches in diameter.

6.1.3a Historic Occurrence Data - Hailstorms

NOAA has recorded 117 reports of hail in Bolivar County between 1970 and 2008.[15] This represents approximately 3 reported hail event in Bolivar County each year. However, the data suggests that hail events have either increased dramatically over the past decade or the number of

[15] NOAA, National Climatic Data Center, http://www4.ncdc.noaa.gov/cgi-win/wwcgi.dll?wwevent~storms

reported incidents has increased dramatically over the past decade. For instance, the year 2006 saw a reported 13 incidents of hail in Bolivar County while there were no reported hail events for the years 1950-1969, 1971-1983 and 1982-1985, to list a few. The average size hailstone for the 117 reported incidents was most nearly 1 inch in diameter, or, about the same diameter as a quarter. The largest hailstone on record in Bolivar County fell on Aril 27, 1998 in Scott and measured 2.75 inches in diameter. The storm that produced the large hailstone caused $100,000 in damage to area rooftops and vehicles.

Table 6.6 Bolivar County Hail Events

Location	Date	Size (inches)	Property Damage
BOLIVAR	3/25/1970	0.75	Data not available
BOLIVAR	3/19/1974	0.75	Data not available
BOLIVAR	3/12/1975	0.75	Data not available
BOLIVAR	4/9/1975	1.75	Data not available
BOLIVAR	4/30/1978	1.75	Data not available
BOLIVAR	5/25/1980	1.75	Data not available
BOLIVAR	3/4/1981	1.75	Data not available
BOLIVAR	2/17/1986	1.75	Data not available
BOLIVAR	6/3/1987	1	Data not available
BOLIVAR	9/10/1987	0.75	Data not available
BOLIVAR	3/20/1989	0.75	Data not available
BOLIVAR	5/9/1989	0.75	Data not available
BOLIVAR	5/9/1989	0.75	Data not available
BOLIVAR	6/5/1989	0.75	Data not available
BOLIVAR	6/13/1989	0.75	Data not available
BOLIVAR	6/13/1989	0.75	Data not available
BOLIVAR	3/22/1991	1.75	Data not available
BOLIVAR	3/22/1992	1.75	Data not available
BOLIVAR	3/22/1992	1.75	Data not available
BOLIVAR	4/24/1992	1.25	Data not available
BOLIVAR	6/3/1992	1	Data not available
BOLIVAR	6/10/1992	0.75	Data not available
Cleveland	4/25/1993	0.75	Data not available
Skene	4/30/1994	0.88	Data not available
Shelby	5/14/1994	0.75	Data not available
Shelby	5/14/1994	0.75	Data not available
Shaw	6/5/1994	0.75	Data not available
Rosedale	6/7/1994	0.75	Data not available
Cleveland	1/27/1995	1	Data not available
BOLIVAR	5/15/1995	1.75	Data not available
BOLIVAR	5/15/1995	1.75	Data not available
Gunnison	2/10/1996	0.75	Data not available
Symonds	3/6/1996	0.75	Data not available
Cleveland	3/30/1996	0.88	Data not available

Location	Date	Size (inches)	Property Damage
Cleveland	4/14/1996	1.75	Data not available
Pace	4/20/1996	0.88	Data not available
Shaw	4/21/1996	1.75	Data not available
Benoit	5/2/1997	0.75	Data not available
Shaw	5/2/1997	0.75	Data not available
Beulah	10/25/1997	0.75	Data not available
Cleveland	4/2/1998	0.88	Data not available
Cleveland	4/2/1998	0.88	Data not available
Skene	4/16/1998	1.75	Data not available
Cleveland	4/16/1998	0.88	Data not available
Scott	4/27/1998	2.75	Data not available
Shaw	4/27/1998	0.75	Data not available
Mound Bayou	2/17/2000	0.75	Data not available
Cleveland	2/24/2001	1.75	$30,000.00
Cleveland	5/27/2001	1	$25,000.00
Cleveland	5/27/2001	0.75	Data not available
Pace	11/26/2001	0.75	Data not available
Scott	4/29/2002	0.75	Data not available
Rosedale	5/2/2002	1	Data not available
Shelby	5/2/2002	0.88	Data not available
Beulah	3/13/2003	1	$2,000.00
Cleveland	5/5/2003	0.75	$1,000.00
Benoit	5/5/2003	1	$1,000.00
Cleveland	5/5/2003	1	$1,000.00
Duncan	5/5/2003	1	$1,000.00
Winstonville	5/5/2003	1.75	$20,000.00
Benoit	5/5/2003	0.75	$1,000.00
Merigold	5/5/2003	0.88	$1,000.00
Cleveland	5/5/2003	0.75	$1,000.00
Duncan	5/7/2003	0.88	$1,000.00
Pace	5/16/2003	0.75	$1,000.00
Skene	6/11/2003	0.75	$1,000.00
Beulah	4/29/2004	0.88	Data not available
Cleveland	3/13/2005	0.75	Data not available
Cleveland	3/26/2005	0.88	Data not available
Rosedale	4/6/2005	0.75	Data not available
Duncan	4/6/2005	0.75	Data not available
Shaw	4/29/2005	1	Data not available
Benoit	11/15/2005	1	Data not available
Gunnison	12/4/2005	0.88	Data not available
Benoit	12/4/2005	1	Data not available
Duncan	3/31/2006	1	Data not available

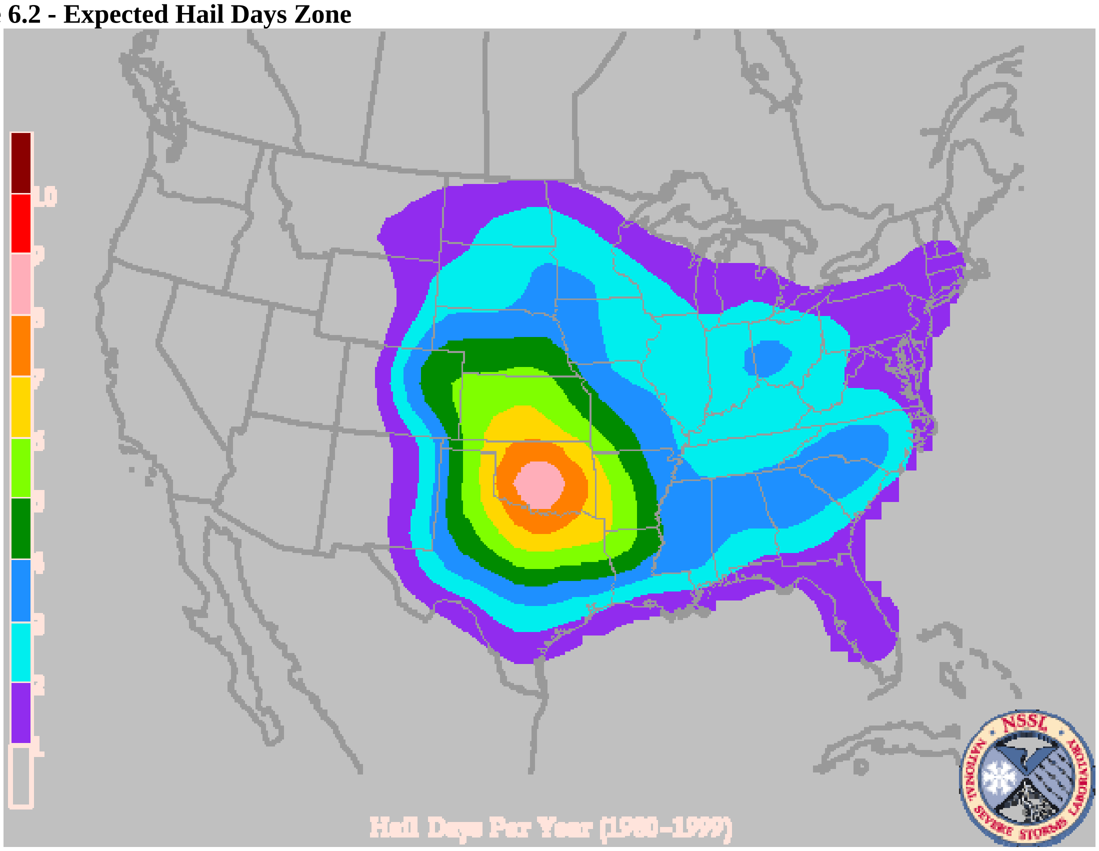
Location	Date	Size (inches)	Property Damage
Shaw	4/7/2006	1.75	$300,000.00
Benoit	4/7/2006	1	$50,000.00
Cleveland	4/7/2006	1	Data not available
Lamont	4/7/2006	1.75	$50,000.00
Shaw	4/7/2006	0.88	Data not available
Rosedale	5/9/2006	1	$20,000.00
Alligator	5/10/2006	0.75	Data not available
Gunnison	5/10/2006	0.75	Data not available
Pace	5/10/2006	0.75	Data not available
Cleveland	5/10/2006	0.75	Data not available
Cleveland	6/21/2006	1	Data not available
Hushpuckena	10/31/2006	0.75	Data not available
Shaw	2/24/2007	0.88	Data not available
Benoit	5/9/2007	0.88	Data not available
Benoit Vly Fld	5/15/2007	0.75	Data not available
Shaw	5/15/2007	0.88	Data not available
Rosedale	6/19/2007	0.75	Data not available
Beulah	11/14/2007	1.75	Data not available
Pace	11/14/2007	1	Data not available
Lamont	11/14/2007	0.75	Data not available
Merigold	12/28/2007	1	Data not available
Eutaw	2/5/2008	1.75	$100,000.00
Gunnison	2/5/2008	0.75	Data not available
Shelby	5/2/2008	1	Data not available
Alligator Booga Fld	5/2/2008	0.75	Data not available
Francis	5/2/2008	1	Data not available
Waxhaw	5/2/2008	1	Data not available
Shelby	5/2/2008	0.75	Data not available
Lamont	5/2/2008	0.75	Data not available
Eutaw	5/2/2008	0.75	Data not available
Benoit	5/24/2008	0.75	Data not available
Alligator	6/25/2008	0.75	Data not available
Benoit Vly Fld	8/2/2008	0.88	Data not available
Bolivar	8/2/2008	0.75	Data not available
Turners Flat	8/2/2008	0.75	Data not available
Turners Flat	8/3/2008	0.88	Data not available
Perthshire Rvrsde Ar	8/3/2008	1.25	Data not available
Duncan	12/9/2008	0.75	Data not available
Eutaw	2/27/2009	0.75	Data not available
Victor	2/27/2009	0.88	Data not available
Stringtown	2/27/2009	1	Data not available
Cleveland	2/27/2009	0.88	Data not available

Location	Date	Size (inches)	Property Damage
TOTALS:			**$732,000.00**

6.1.3b DSU's Vulnerability to Hailstorms

The National Severe Storms Laboratory (NSSL) compiles data on severe storms and has developed the map included below (Figure 6.2) based upon some of that data. This data was derived from empirical data collected from 1980-1999.[16] Figure 6.2 depicts the average number of days that hail should be expected per year for each of the color coded regions. DSU is located very close to the border that depicts between 2 and 3 hail days per year; therefore hailstorms are retained for mitigation consideration.

Figure 6.2 - Expected Hail Days Zone



[16] National Oceanographic and Atmospheric Administration (NOAA), National Severe Storms Laboratory, A Severe Weather Primer: Questions and Answers About Hail: http://www.nssl.noaa.gov/primer/hail/hail_basics.html

Figure 6.3- Historic Hailstorm Events

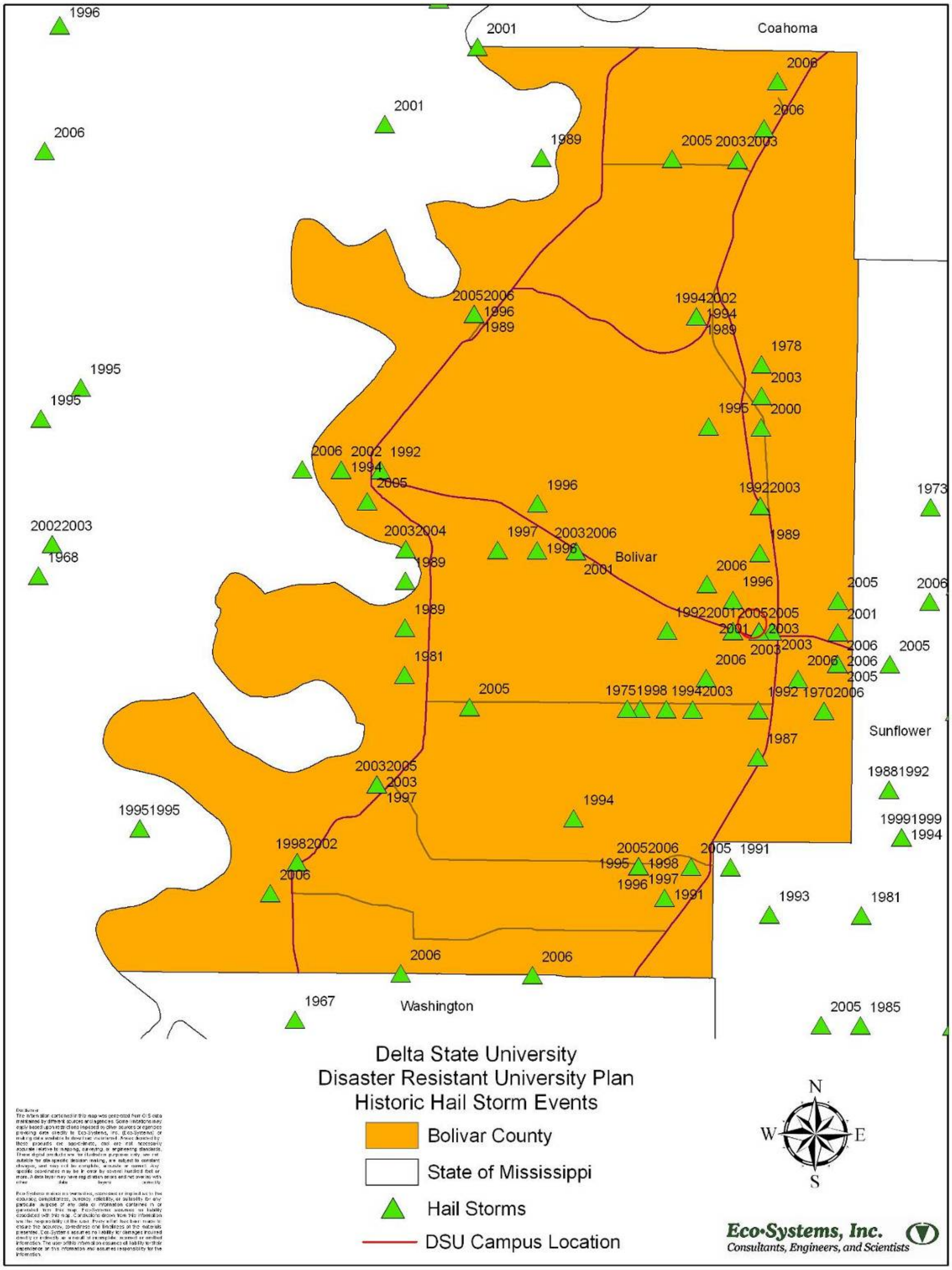
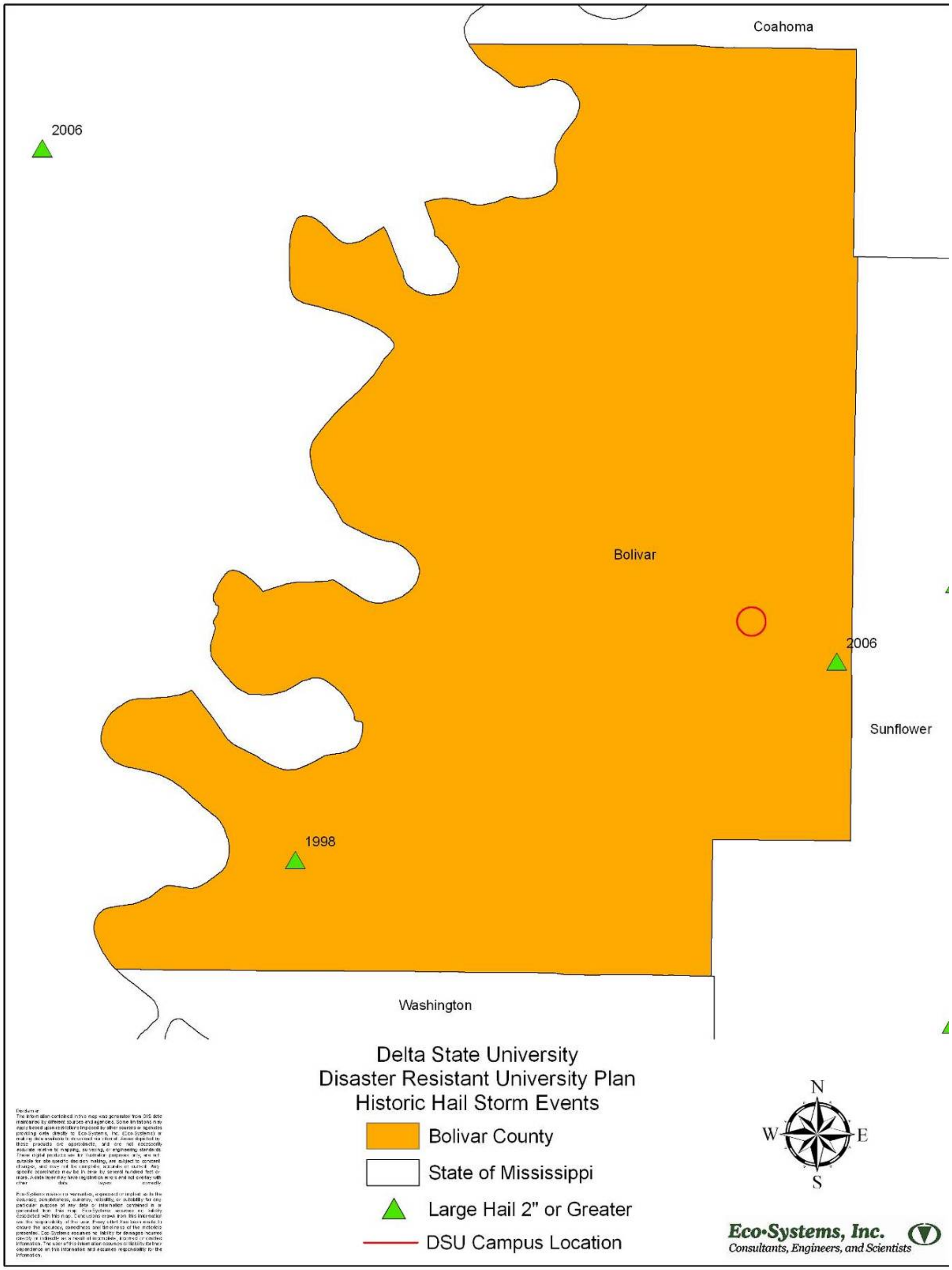


Figure 6.4 - Historic Large Hailstorm Events



6.1.3c Potential Hailstorm Impacts to the University

The National Severe Storms Laboratory indicates that hailstones of ¾" or greater have the capability of causing severe damage including damage to property. Larger hailstones also have the potential to cause injury to people caught in the open during a severe hailstorm. Common property damage to property from severe hailstorms includes broken windows in buildings and vehicles and roof damage. The probability of significant structural damage from a hailstorm event is slight. However, since most hailstorms are associated with severe thunderstorms, the potential for roof damage combined with large volumes of rain has the potential to create significant content damage to university buildings.

6.1.4 Hurricanes and Coastal Storms – General Information

Atlantic hurricanes are tropical cyclones that form over the warm waters of Atlantic Ocean, Caribbean Sea or Gulf of Mexico generally from mid-summer to late fall. Some hurricanes can produce Category 1 wind speeds (74 miles per hour) over one hundred miles from the eye of the hurricane. Consequently, these storms can cause widespread damage long before the center of the storm moves over land; after which the storms begin to rapidly lose strength[17]. The DSU campus is located approximately 250 miles from the Gulf of Mexico coastline and would generally be considered outside the destructive reach of a major hurricane. Therefore hurricanes and coastal storms are not considered to pose a substantial hazard to the university.

6.1.4a Historic Occurrence Data – Hurricanes and Coastal Storms

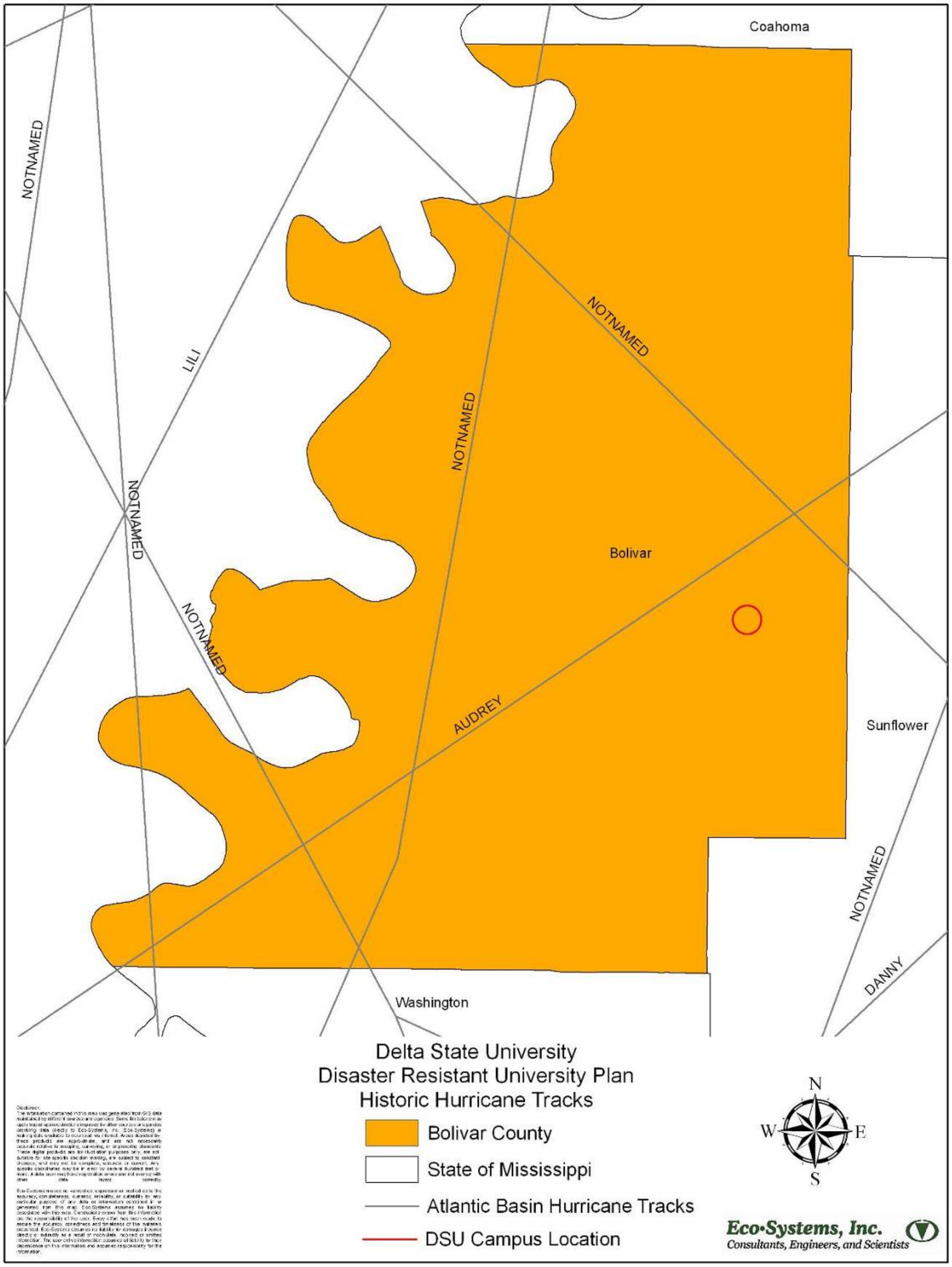
The destructive capability of hurricanes was clearly demonstrated on August 29, 2005 when Hurricane Katrina made landfall at the mouth of the Pearl River. A total of 1,844 people died as a result of Hurricane Katrina with 238 of those fatalities occurring in Mississippi. The majority of damage in Bolivar County was caused by downed trees. There was some damage to the electrical distribution grid resulting in the loss of refrigeration for residential and commercial users and the loss of wastewater collection and drinking water distribution capability. The loss of these services can lead to unsanitary conditions, particularly in an urban area, and can result in human health concerns. Statewide damage estimates from two recent hurricanes are depicted in Table 6.7 below.

Table 6.7 Historic Tropical/Hurricane Data

Location	Date	Type	Property Damage	Crop Damage
Katrina	8/29/2005	Hurricane/typhoon	$5.9 Billion	$1.5 Billion
Rita	9/24/2005	Hurricane/typhoon	$485,000	$2.3 Million

[17] FEMA

Figure 6.5 - Historic Hurricane Tracks



6.1.4b DSU's Vulnerability to Hurricanes and Coastal Storms

The DSU campus is located approximately 250 miles from the Gulf of Mexico coastline and is generally outside the most destructive reach of a major hurricane. However, these storms can produce significant amounts of rainfall even after the most severe wind speeds have subsided. The campus of DSU may be susceptible to flooding due to this rainfall threat. Additionally, it is possible for a hurricane to continue producing damaging winds even at inland locations such as the campus of DSU. Therefore hurricanes and coastal storms are considered potential hazards to the university.

6.1.4c Potential Hurricane and Coastal Storm Impacts to the University

To better quantify the University's vulnerability to hurricanes, FEMA's HAZUS-MH model was used to assess vulnerability to hurricanes and tropical activity. The primary output from the HAZUS-MH model was a probability scale indicating the probability of slight, moderate or severe damage to critical facilities on campus. The scenario chosen for the campus of DSU was to simulate the effects of the highest hurricane force winds ever recorded on campus. According to the model, the highest hurricane force winds produced on campus were from Hurricane Audrey that made landfall on June 27, 1957. That hurricane had maximum sustained winds on campus of approximately 71 miles per hour. The damage probabilities were then associated with predicted ranges of potential damages to buildings and contents on the University categorized as critical, high priority, or medium priority for mitigation planning purposes. The HAZUS model indicated less than a 5% chance of minor to moderate damages for selected buildings on campus. However, due to the potential for secondary impacts from downed trees, power lines, and other concerns, this hazard is considered a hazard of concern but given a low priority for mitigation.

6.1.5 Severe Winter Storms – General Information

Severe winter storms can include heavy snowfall, freezing rain and high wind speeds. While these types of storms are not typical for the Southeastern United States, they can and do occur in Mississippi. The DSU campus is located in northwest Mississippi only 17 miles south of the 34th parallel and has an average low temperature in January of 34°F (the lowest). The record low for the area is -6°F occurring twice, once on January 12, 1962 and again on February 2, 1951.

6.1.5a Historic Occurrence Data – Severe Winter Storms

NOAA has twelve winter storm events on record since 1996. These storms generally produced snow and some icing conditions affecting the Bolivar County area. Of these storms, the 1994 ice storm was by far the most damaging and disruptive storm on record. This type of storm has the potential to disable transportation, communications and electrical service to the university and is therefore retained as a hazard of concern.

Table 6.8 Bolivar County Winter Storm Events

Location	Date	Size (inches)	Property Damage
Bolivar	2/1/1996	Winter Storm	Data Not Available
Bolivar	12/22/1998	Ice Storm	$16,600,000
Bolivar	1/27/2000	Heavy Snow	$1,100,000
Bolivar	12/13/2000	Ice Storm	$13,000
Bolivar	12/31/2000	Heavy Snow	Data Not Available
Bolivar	2/25/2003	Ice Storm	$130,000
Bolivar	2/26/2003	Ice Storm	$15,000
Bolivar	12/22/2004	Ice Storm	$400,000
Bolivar	2/18/2006	Ice Storm	$60,000
Bolivar	1/25/2008	Ice Storm	$300,000
Bolivar	3/7/2008	Heavy Snow	$200,000
Bolivar	3/1/2009	Winter Weather	Data Not Available
Totals:			**$18,788,000.00**

Table 6.9 Area Average Temperatures (°F) [18]

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Avg. High	51°	57°	66°	74°	82°	89°	93°	92°	86°	77°	63°	54°
Avg. Low	34°	38°	45°	53°	62°	70°	74°	71°	65°	54°	44°	37°
Mean	43°	48°	56°	64°	72°	80°	84°	82°	76°	66°	54°	46°

Table 6.10 Area Record Temperatures (°F)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Record High	80°	82°	89°	95°	99°	103°	106°	106°	103°	96°	87°	82°
Record Low	-6°	-6°	17°	27°	39°	48°	54°	51°	38°	25°	13°	3°

6.1.5b DSU's Vulnerability to Severe Winter Storms

Although rare, storms of the magnitude of the 1994 ice storm can disable the University and surrounding community for days or weeks. Temperatures do not typically stay below freezing for more than a few days but the damage to infrastructure can require weeks of repair and debris removal. Long periods of temperatures below freezing can cause significant potable water distribution difficulties and wastewater collection and treatment difficulties. Should the University lose electrical power supply and potable water supply, providing heat to University structures will be a challenge unless there are emergency backup systems in place.

[18] NOAA National Weather Service

6.1.5c Potential Severe Winter Storm Impacts to the University

Potential impacts to the University from severe winter weather are generally limited to short-term power outages, cancelled classes, and impacts to transportation access. Power outages and transportation difficulties are generally the precipitating factors in cancelling of classes on campus. As previously mentioned, these impacts are typically short lived with normal operations generally resuming within a day or two of the actual event.

6.1.6 Thunderstorms, Lightning, Wind – General Information

Severe thunderstorms develop when a cold dry air mass moves into an area dominated by warm moist air. This basic scenario develops frequently during the spring and late fall in the Southeast. The National Severe Storms Laboratory (NSSL) has compiled data on severe storms and has developed occurrence probability zones based upon some of that data. This data was derived from empirical data collected from 1980-1999. Based upon the compiled data, DSU is located very close to the border that depicts between 4 and 5 severe thunderstorm days per year. Due to the high likelihood that the campus of DSU will experience a severe thunderstorm and the associated high winds, this hazard has been retained for further consideration.

6.1.6a Historic Occurrence Data – Thunderstorms, Lightening, and Wind

NOAA has recorded 186 reports of severe thunderstorms and high wind events in Bolivar County between 1963 and 2008.[19]. This represents approximately 4 reported thunderstorm and wind events in Bolivar County each year. However, the data suggests that these events have either increased dramatically over the past 2 decades or the number of reported incidents has increased dramatically over the past 2 decades. For instance, the year 2006 saw a reported 14 events in Bolivar County while there were no reported events for the years 1950-1963, 1964-1965 and 1979-1981, to list a few. Severe thunderstorms and the high wind events associated with severe thunderstorms caused an estimated $314,000 in property damage in Bolivar County during 2008 alone.[20] Due to the high likelihood of DSU experiencing severe thunderstorms each year and the potential for these storms to cause damage to buildings, structures, infrastructure and transportation, it should be considered as a priority hazard.

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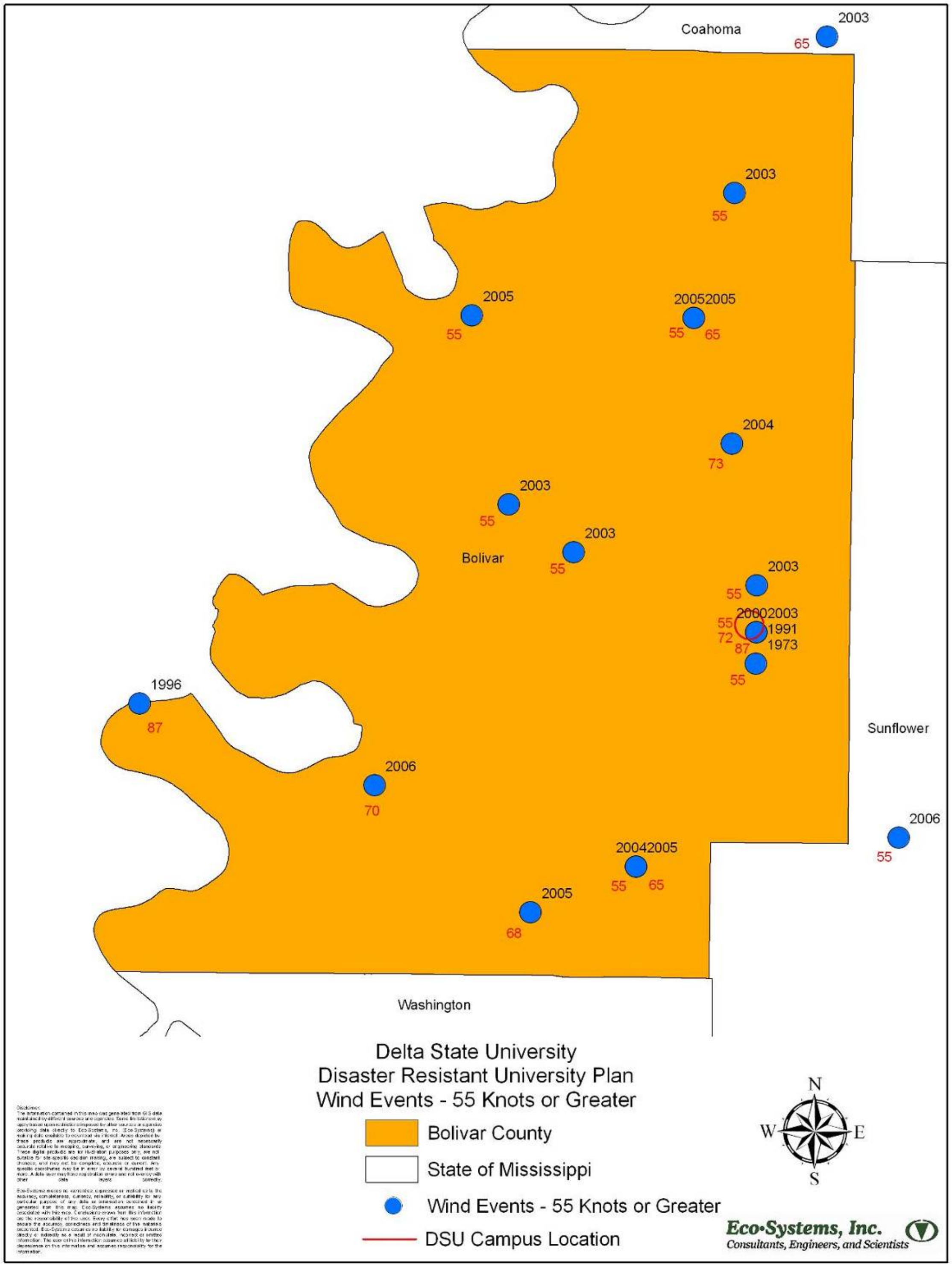
[19] NOAA
[20] NOAA

Figure 6.6 - Historic Wind Events



6.1.6b DSU's Vulnerability to Thunderstorms, Lightning, and Wind

Due to seasonal weather patterns in Mississippi having the tendency to generate severe thunderstorms on a routine basis, the University's vulnerability to thunderstorms, lightning, and high wind is high. These seasonal weather patterns have the potential to produce strong thunderstorms that have potential to generate significant lighting, high winds, and tornados. Based on this information and known historical impacts, the University will consider thunderstorms and associated weather as a high priority for mitigation actions.

6.1.6c Potential Thunderstorm, Lightning, and Wind Impacts to the University

Events related to thunderstorms in Mississippi are generally accompanied by other activities that have a higher probability of causing significant damage than the thunderstorm itself. High winds, lightening, spin-off tornados, and widespread or localized flooding are common events associated with severe thunderstorms. Because of the high probability of occurrence and the unpredictable nature of severe thunderstorms, any given storm has the potential to cause at least minor or moderate damage to the University. In general terms, the University is susceptible to damages from high wind gusts, lightning, localized flooding and associated damages to buildings, trees, and other university property. Thunderstorms in Mississippi may last anywhere from a few minutes to a couple of hours depending on the intensity, tracking speed, and other factors. Based on the potential for damage, frequency of occurrence, and unpredictability, severe storms and associated activities are considered to be a high mitigation priority for the University.

6.1.7 Tornados – General Information

Tornados or funnel clouds can develop from severe thunderstorms or from hurricanes. Generally, the most active time of year for tornados is during the spring and fall months, however, tornados can develop any time of year in the Southeast. A tornado's path can be as narrow as a few yards and do little more than damage some tree limbs or it can be over ½ mile wide and destroy everything it contacts. A tornado's wind speed and corresponding damage potential is measured utilizing the Enhanced Fujita Scale.[21] Table 6.10 illustrates the Enhanced Fujita Scale and Table 6.11 provides a description of the expected resulting damage from a tornado in each category of the scale.

[21] FEMA

Table 6.11 Fujita Scale and Enhanced Fujita (EF) Scale

FUJITA SCALE			DERIVED EF SCALE		OPERATIONAL EF SCALE	
F Number	Fastest 1/4-mile (mph)	3 Second Gust (mph)	EF Number	3 Second Gust (mph)	EF Number	3 Second Gust (mph)
0	40-72	45-78	0	65-85	0	65-85
1	73-112	79-117	1	86-109	1	86-110
2	113-157	118-161	2	110-137	2	111-135
3	158-207	162-209	3	138-167	3	136-165
4	208-260	210-261	4	168-199	4	166-200
5	261-318	262-317	5	200-234	5	Over 200

To further enhance the level of information concerning tornado intensities, the Enhanced F-Scale rates damages to specific types of buildings based on identified Damage Indicators (DI) and a Degree of Damage (DOD) scale. For the purposes of this plan DODs for DI-20: Institutional Buildings including university buildings, hospitals, or government buildings are detailed in the following table:

Table 6.12 Degrees of Damage from Tornados Based on Wind Speed

DOD	Damage Description	Wind Speed (In MHP)		
		Expected	Lower Bound	Upper Bound
1	Threshold of visible damage	72	59	88
2	Loss of roof covering (<20%)	86	72	109
3	Damage to penthouse roof and walls; loss of rooftop HVAC equipment	92	75	111
4	Broken glass in windows or doors	95	75	115
5	Uplift of lightweight roof deck and insulation; significant loss of roofing material (>20%	114	95	136
6	Façade components torn from structure	118	97	140
7	Damage to curtain walls or other wall cladding	131	110	152
8	Uplift of pre-cast concrete roof slabs	142	119	163
9	Uplift of metal deck with concrete fill slab	146	118	170
10	Collapse of some top story exterior walls	148	127	172
11	Complete destruction of all or a large portion of building	210	178	268

6.1.7a Historic Occurrence Data - Tornados

NOAA has recorded 28 reports of confirmed tornados in Bolivar County between 1957 and 2008 with 17 occurrences within the last 16 years. The overall total represents approximately 0.5

confirmed tornados in Bolivar County each year. However, the most recent data from NOAA indicates that approximately 1.0 tornado per year is confirmed in Bolivar County each year. For instance, from 1992-2008 there were 17 reported tornados with 3 of them occurring in 2008 alone. Due to the high likelihood of DSU experiencing a nearby confirmed tornado each year and the potential for tornados to cause massive devastation to buildings, structures, infrastructure and transportation, it should be considered as a priority hazard.

Table 6.13 Historic Tornado Data[22]

Location	Date	Magnitude	Property Damage	Crop Damage
Bolivar County	5/2/1957	F1		
Bolivar County	2/20/1961	F1	$25,000.00	
Bolivar County	12/12/1965	F1		
Bolivar County	7/20/1966	F1	$250,000.00	
Bolivar County	5/24/1973	F1	$3,000.00	
Bolivar County	5/7/1975	F1	$3,000.00	
Bolivar County	5/7/1975	F2	$250,000.00	
Bolivar County	3/28/1977	F2	$250,000.00	
Bolivar County	3/28/1977	F2	$25,000.00	
Bolivar County	5/7/1982	F3	$250,000.00	
Bolivar County	12/11/1983	F1	$250,000.00	
Bolivar County	5/24/1992	F0	$25,000.00	
To	3/9/1994	F1	$50,000.00	
Hattiesburg	3/7/1995	F0	$5,000.00	
Lumberton	3/7/1995	F0	$2,000.00	
Carnes	2/19/1996	F1	$100,000.00	
Carnes	4/17/1998	F0	$5,000.00	
Hattiesburg	6/5/1998	F1	$20,000.00	
Hattiesburg	4/14/1999	F0		
Hattiesburg	3/12/2001	F1	$6,000,000.00	
Hattiesburg	1/7/2005	F1	$125,000.00	
Hattiesburg	8/29/2005	F1	$2,000.00	$15,000.00
Rawls Springs	11/15/2006	F1	$2,000.00	
Petal	4/14/2007	F1	$200,000.00	
Mammoth Springs	10/17/2007	F1	$100,000.00	
McLaurin	3/3/2008	F1	$1,500,000.00	
Rock Hill	5/15/2008	F1	$700,000.00	$500,000.00
McLaurin	5/15/2008	F1	$80,000.00	
TOTALS:			**$10,222,000.00**	**$515,000.00**

[22] NOAA National Climatic Data Center

Figure 6.7 - Historic Tornado Touchdowns by Date

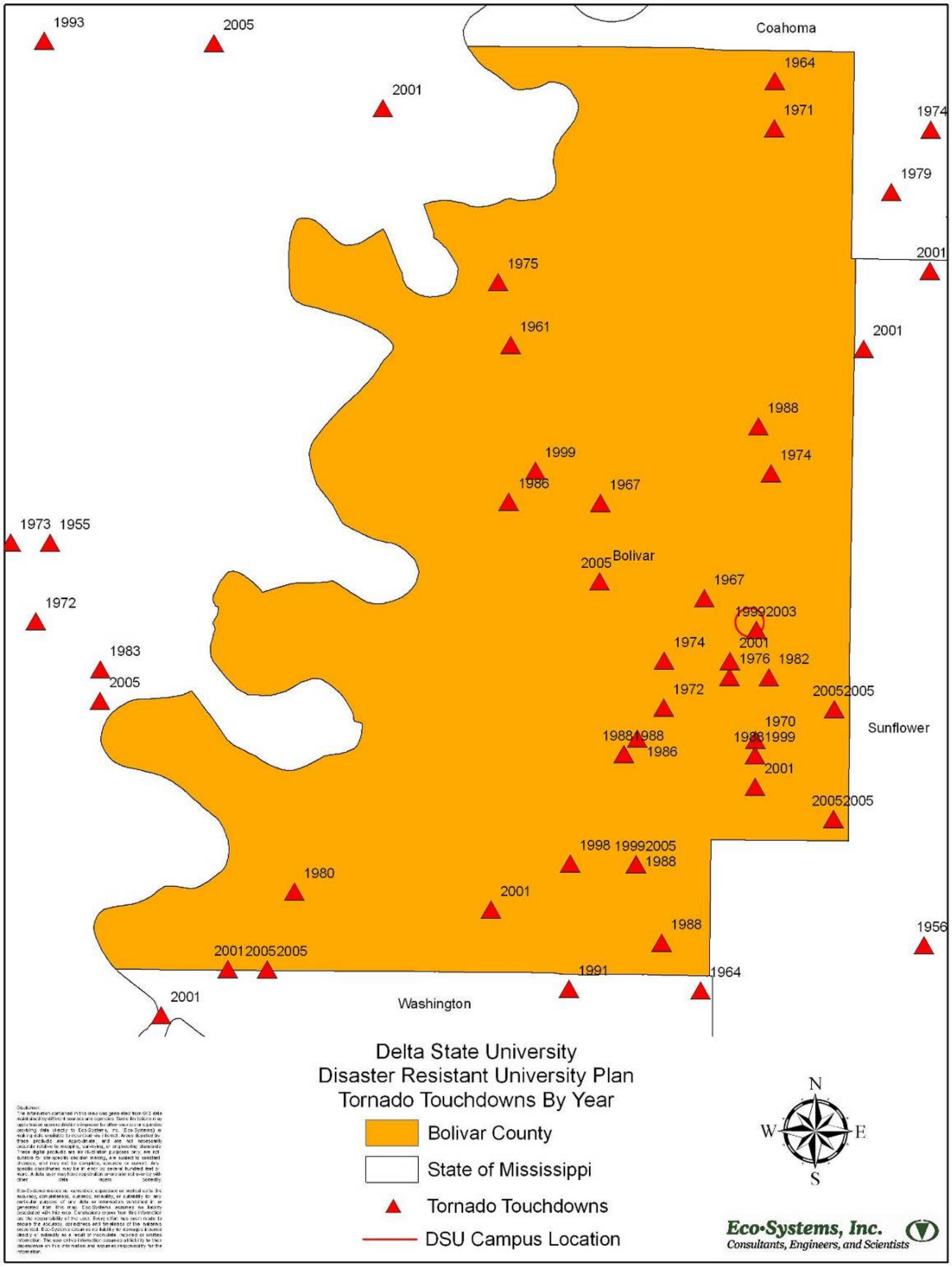


Figure 6.8 - Historic Tornado Touchdowns by Scale

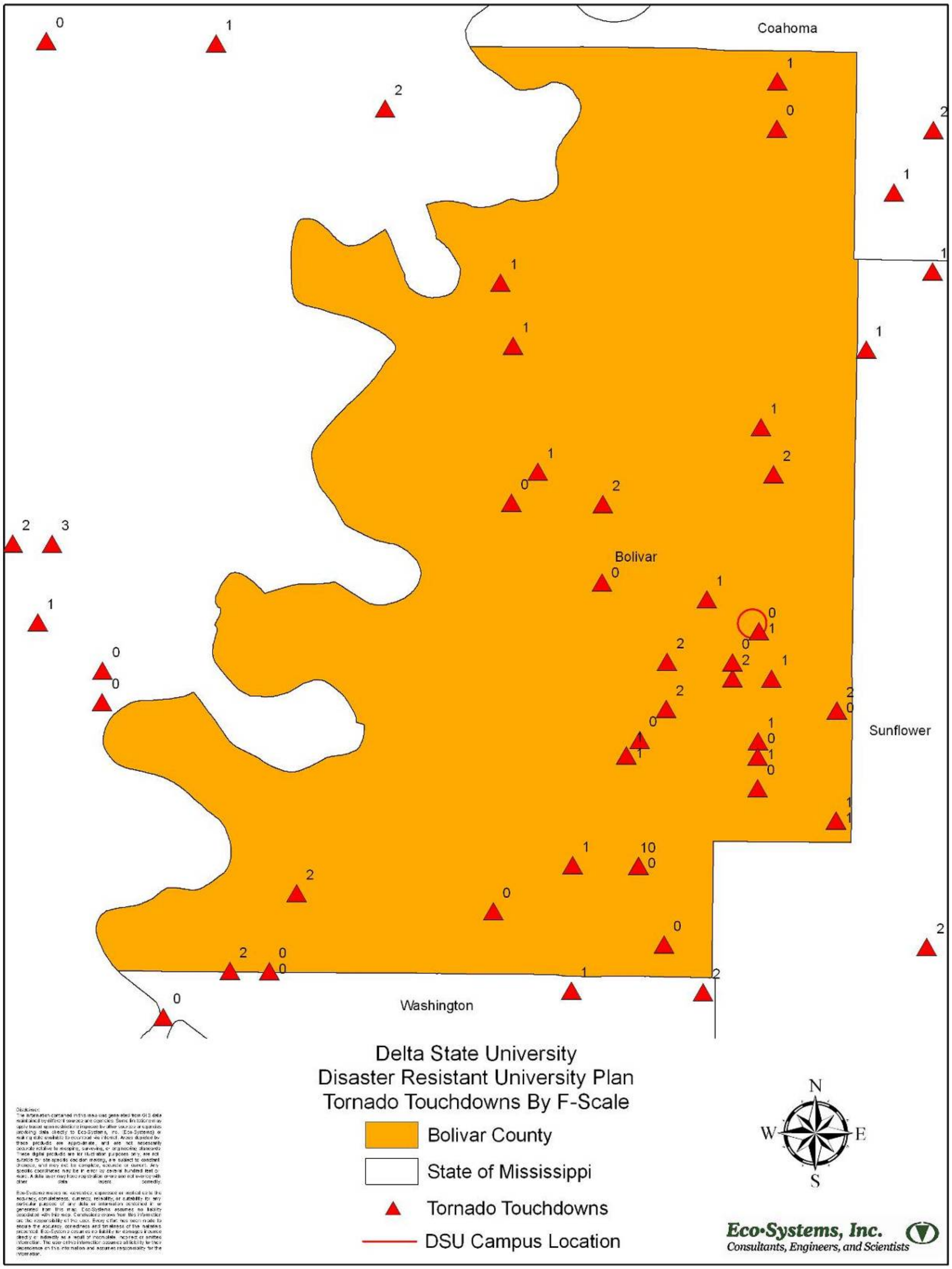
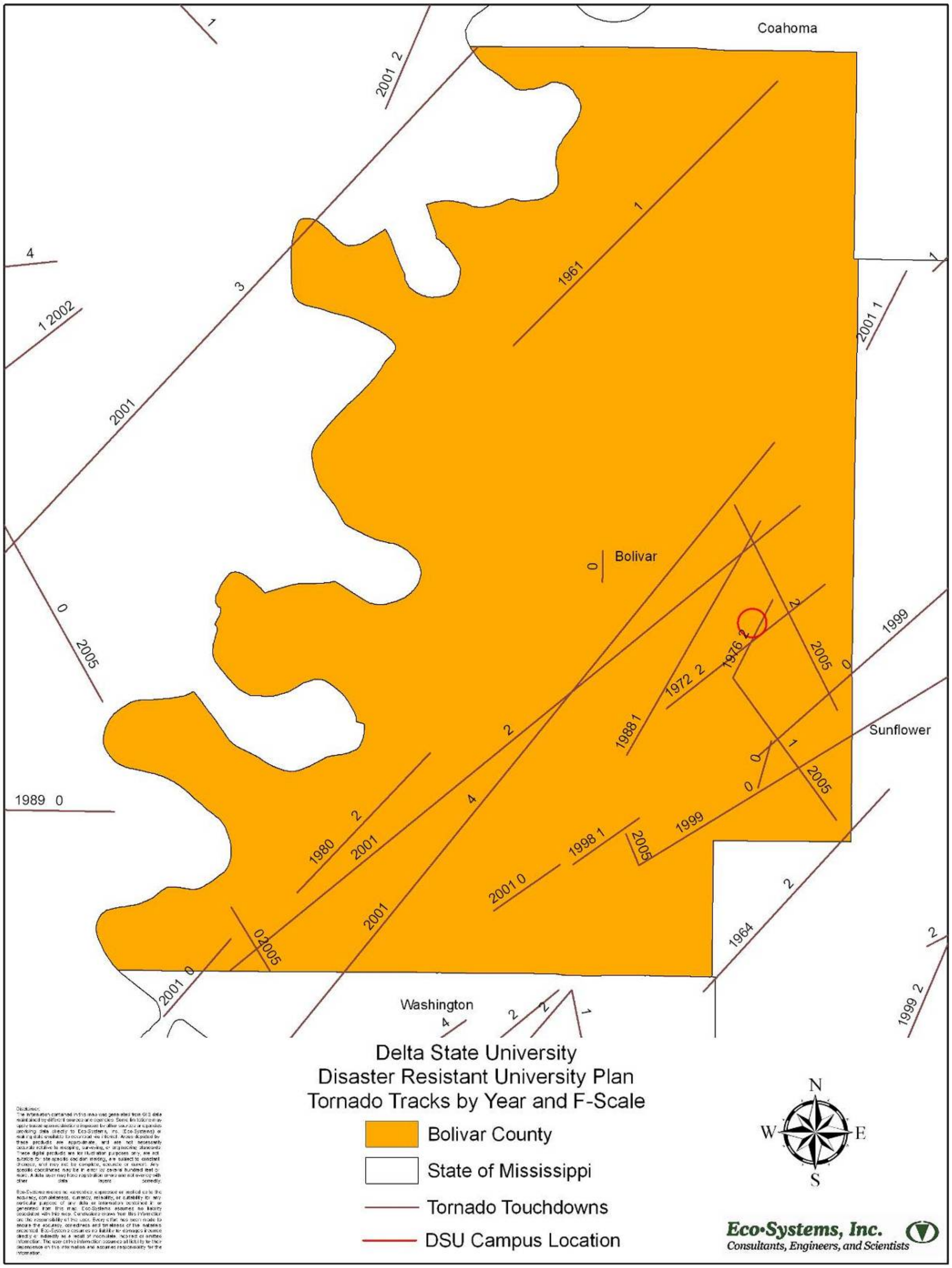


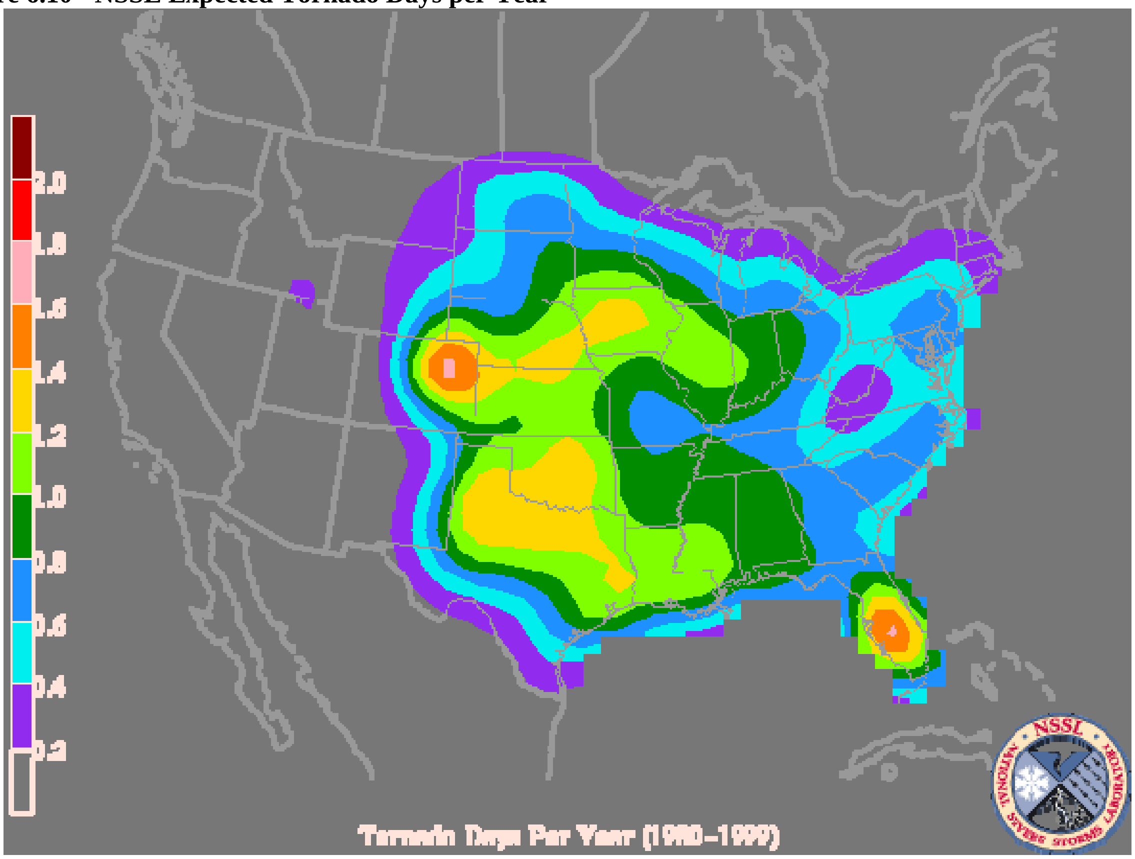
Figure 6.9 - Historic Tornado Tracks



6.1.7b DSU's Vulnerability to Tornados

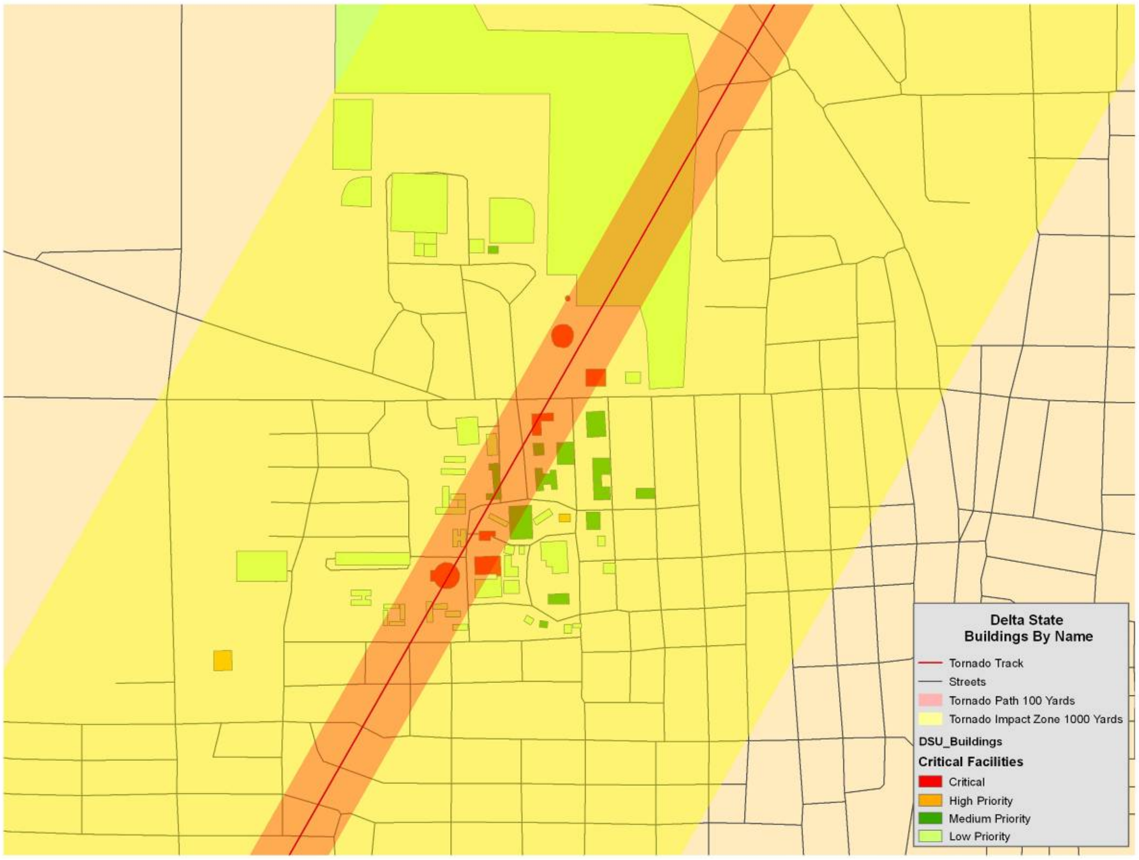
The National Severe Storms Laboratory (NSSL) has compiled data on severe storms derived from empirical data collected from 1980-1999. Based upon that data, DSU is located in the region that depicts between 0.8 and 1.0 expected tornado days per year, therefore tornadoes are retained for further mitigation consideration.

Figure 6.10 - NSSL Expected Tornado Days per Year[23]



[23] NOAA National Weather Service

Figure 6.11 - Potential Tornado Path Scenario



6.1.7c Potential Tornado Impacts to the University

Given the anticipated degrees of damage to institutional buildings combined with historic data shown in the following tables and maps of historical events, the University can expect with some degree of certainty that tornados potentially affecting the University will fall within the F0-F3 range with the most common occurrences being tornados of F1 and F2 magnitude with expected DOD ranges from 1 through 5 as indicated in **Table 6.12** above. These indicators combined with the relatively dense nature of development and building placement on campus, expected damages from an F1-F2 tornado are expected to be high in terms of monetary loss and indicates a high priority for mitigation actions.

6.1.8 Wildland and Urban Fires – General Information

A wildfire is any uncontrolled burning of undeveloped grassland, brush or forest. Wildland fires are more prevalent in the western United States where the climate is more arid. However, wildland fire can be a danger in south Mississippi, particularly during drought conditions. Bolivar County has experienced some cases of wildfire, however no incidents of significance have been recorded by NOAA for Bolivar County. Since the university is located within the City of Cleveland, it is highly unlikely that an uncontrolled wildland fire would endanger campus property. Therefore, the threat of wildland fire has been excluded from further consideration as a hazard for the campus of DSU. Bolivar County has a land area of approximately 560,900 acres, of which, 84,800 acres (15%) are forested.[24] However, due to the density of development and the close proximity of many University buildings to each other, the potential for an urban fire significantly affecting the University is high. Consideration should be given to potential mitigation actions relative to urban fires.

6.1.8a Historic Occurrence Data – Wildfires

The densely developed nature of the University and the close proximity of some buildings to others makes urban fire a hazard of concern. Fire protection and response services for the University are provided by the City of Cleveland's Fire Department. Documented evidence of a significant urban fire on the DSU campus does not exist.

6.1.8b DSU's Vulnerability to Wildfire

Although this is a hazard of concern, most structures on campus are constructed from materials that tend to resist the spread of an urban fire from one building to another. Modern building codes and construction methods also reduce the risk of adverse impacts from urban fires. Mitigation strategies for this risk should be policy related in nature and should include continuous monitoring of construction codes to ensure that new buildings on campus are constructed in a manner that ensures optimum protection of life and property from potential impacts related to urban fires.

[24] Forest Statistics for Mississippi Counties-1994, USDA Forest Service

6.1.8c Potential Wildfire Impacts to the University

Based on previously stated information related to predominant construction materials, placement of buildings on campus, and the level of available response services, it is anticipated that impacts to the University from urban fires are slight and would potentially only impact one or two buildings as opposed to a widespread or campus-wide urban fire. Mitigation considerations should include education of the university community related to building evacuation practices, routine fire drills, and monitoring of construction codes to ensure that new buildings are constructed in a manner that ensures protection of life and property from fire threats.

6.2 MANMADE HAZARDS

At the request of IHL, this plan incorporates a discussion and consideration of man-made hazards that have potential to impact the University. Due to the proximity of two heavily traveled state highways and campus proximity to the City of Cleveland, considerations for man-made hazards are of particular concern to DSU. Within the context of man-made hazards, it is significant to note that other planning efforts concurrent to this plan are considering the impacts of manmade hazards and are developing plans for mitigation and response to such activities. As a point of reference, these plans include: the Emergency and Critical Incident Response Process. The listing of manmade hazards considered for this planning effort is included in **Table 6.13** below.

Table 6.14 List of Manmade Hazards to be Evaluated

Hazard	Accept as Hazard	Likely Occurrence	Mitigation Priority
Chemical	Yes	Medium	Medium
Civil Disturbance	Yes	Low	Low
Hazardous Materials Accident	Yes	Medium	Medium
Power Failure	Yes	Medium	High
Terrorism	Yes	Low	Low
Transportation Incident	Yes	High	High
Health Incident / Infectious Disease	Yes	Medium	Low

6.2.1 Chemical

The University stores and maintains stockpiles of various types of chemicals related to the academic, research, and maintenance activities occurring on campus on a routine basis. These chemicals range from cleaning supplies such as solvents to chemicals used in research processes that may be considered hazardous or sensitive. Due to the presence of these types of materials, it is imperative that the University have policies and procedures in place to address issues related to potential spills, leaks, and other incidents.

To address these concerns, the DRU Committee identified facilities such as chemical storage buildings as Critical or High Priority Facilities.

6.2.2 Civil Disturbance/Terrorism

In recent years, concerns related to civil disturbance on University campuses have increased due to recent events on campuses around the country. Active shooter incidents at Virginia Tech and the University of Alabama-Huntsville have increased awareness of the potential for these types of incidents to occur on any campus. These concerns combined with heightened awareness of terrorism have led many universities to adopt plans, policies, and procedures to address active shooter incidents and other types of civil disturbance activities including those that may occur at spectator sports events.

The University Police Department has initiated a number of programs and policies on campus designed to reduce crime and incidents of civil disturbance. Included in these policies is the University's Emergency and Critical Incident Response Process. This process is designed to specifically outline how the University will respond to emergency incidents. The process also provides the University to notify and involve additional service providers if necessary.[25]

Additional programs implemented by the University include a Campus Watch program modeled after the National Neighborhood Watch Program that encourages individual vigilance and informed awareness regarding crimes and suspicious activity. The University has also used news alerts, and the University's website as means of communicating emergency messages to the campus community.[26]

6.2.3 Hazardous Materials Transportation Incidents/Accidents

Northern portions of campus are located directly adjacent to State Highway 8 with the Eastern portions of the DSU campus located within 1 mile of State Highway 61. Such close proximity could result in the partial or complete evacuation of campus for severe incidents located nearby.

For the purpose of this plan, transportation incidents involve passenger air, highway, rail or water travel that result in the release of hazardous materials and may also result in the death or injury of persons involved. According the U.S. Department of Transportation, nearly 17,000 reported incidents occur each year in the United States that meet the described definition above resulting in approximately 14 fatalities, 280 injuries and $63 million in property damages. In Mississippi, there were 130 highway transportation incidents and 15 rail transportation incidents involving hazardous materials releases in

[25] Delta State University Emergency and Critical Incident Response Process:
[26] Delta State University; Maintaining a Safe and Secure Campus Environment

2008. Due to the proximity of the DSU campus to two state highways, there is a potential threat to the DSU campus from this type of hazard.

6.2.4 Power Failure

Power failure events occur at the University occasionally. These events are typically associated with other types of events such as weather extremes. Recent power failures have been related to severe thunderstorms and periods during the summer when peak power demands exceed the system's capacity. However, the presence of an electrical substation near campus, the fact that most electrical infrastructure is underground, and an informal agreement with the power company to make the University a priority serve to lessen the length of time the University is without power. Since incidents of power failure are sporadic and typically occur for a short period of time, the need to address power failure through mitigation strategies is considered a low priority.

6.2.5 Health Incident/Infectious Disease

In recent years, outbreaks of a variety of infectious diseases have become more common. Diseases such as influenza, H1N1 (swine flu), and avian flu have the potential to spread rapidly in areas of concentrated populations. As recently as May 2009, the University took precautions in advance of commencement exercises due to a widespread H1N1 outbreak that was affecting 38 states. Although at the time, no cases had been confirmed in Mississippi, the national scale of the outbreak was significant enough to cause the University to issue information and press releases related to precautionary measures.

6.3 VULNERABILITY ASSESSMENT SUMMARY

Figure 6.1 at the beginning of this section summarizes both the Vulnerability Assessment and the Profiles of Hazards of Concern by integrating both issues into a single graphic that depicts each hazard of concern based on the University's potential exposure and mitigation priority for each hazard type. In establishing mitigation priorities for DSU, consideration should be given to the mitigation priorities as communicated in Figure 6.1 to ensure that hazards with the highest probability for occurrence and the highest potential loss to the University are given first priority for mitigation strategies and funding.

7.0 MITIGATION STRATEGIES

7.1 INTRODUCTION TO MITIGATION STRATEGIES

The mitigation strategies included in this section have been selected through a process of careful analysis of the risk and vulnerability assessments that illustrated areas in which the University could implement strategies that would effectively minimize the risks and vulnerabilities. In addition, the DRU Committee conducted significant discussions and deliberations on the relative merits of strategies and options to be considered for inclusion into the plan and for implementation. Considerations for prioritization and inclusion of strategies included elements related to the feasibility of implementation, cost, and other considerations included in the STAPLEE criteria as suggested by FEMA. The STAPLEE criteria are derived directly from FEMA's Multi-Hazard Mitigation Planning Guidance and includes considerations of the **S**ocial, **T**echnical, **A**dministrative, **P**olitical, **L**egal, **E**conomic, and **E**nvironmental merits and impacts of a given mitigation strategy.[27]

The strategies presented in the plan have been organized according to specific goals identified by the DRU Committee. In some cases mitigation strategies may include multiple options for achieving the same desired outcome. These options will be further explored, prioritized and ranked later in this section. In other cases, more than one option may be included and will be considered as implementation mechanisms become available. The following narrative describing goals and associated mitigation options also includes elements derived from DRU Committee discussions relative to pros and cons for various mitigation strategies as well as hazards to be addressed and specific buildings affected, where applicable.

7.2 GOAL 1

Protect the health, safety, and welfare of students, faculty, and staff at Delta State University.

7.2.1 Background

Protection of the health, safety, and welfare of the university community is the highest mitigation priority associated with establishment of DSU as a Disaster Resistant University. While DSU has done an outstanding job of ensuring that the campus is secure and that response plans are adequate to address potential eventualities, efforts should be undertaken to ensure that the entire university community is aware of appropriate responses to a variety of events that have the potential to affect the community.

[27] FEMA 2003

7.2.2 Potential Hazards

All Identified Potential Hazards

7.2.3 Mitigation Options

Mitigation Option 1: Develop a comprehensive public outreach/education campaign to inform the university community of appropriate response actions to watches, warnings, and other types of natural hazard alerts. The campaign should target the university community as a whole but different communications media should be considered for different audiences (i.e. students, faculty, and staff).

Mitigation Option 1.1: Publish and distribute a crisis management/natural hazard mitigation guide for department chairs and other interested persons. The idea is to condense both the crisis management plan and the mitigation plan into a single, concise document. Availability of this document will enhance crisis management and mitigation by allowing faculty and staff to be more familiar with the fundamentals of both.

Mitigation Option 1.2: Place crisis management/hazard mitigation information on digital outlets in a format and forum that students are most likely to access (i.e. university website, social media, etc.)

Mitigation Option 1.3: Establish policies and procedures for developing individual emergency evacuation and response plans for students and other members of the university community with disabilities.

Pros: Informing and educating the university community on appropriate actions related to appropriate responses and actions to hazard events will increase the likelihood of a greater percentage of the community being safe and secure prior to, during, and after an event.

Cons: The diversity of audiences on campus will necessitate the need for communication in a variety of formats including those for persons with disabilities, foreign language speaking students, and students who may not necessarily respond to traditional communication methods.

Mitigation Option 1.4: Install signs to identify designated storm sheltering areas and outside signs indicating directions to designated sheltering areas. Shelters have little benefit if those to be protected are not aware of their locations. Signage should take two different forms: 1) interior signs to provide directions to safe-room/shelter locations within buildings (i.e. interior hallways, building locations away from exterior windows, etc.); and 2) exterior signs to provide directions to buildings that are designated as shelter facilities. These facilities should also be identified on publicly available campus maps.

Mitigation Option 1.5: Provide a facility or the expansion of a facility to allow for stocking of basic health and first aid supplies (i.e. the Student Health Center).

Pros: Potentially shortens the amount of time that members of the university community need to seek appropriate shelter.

Cons: Universal symbols should be utilized to ensure that a single sign has the capability to effectively communicate to a potentially diverse audience.

Mitigation Option 1.6: Acquire a siren alert system to include voice capabilities to ensure that alerts are audible on all exterior areas of campus. Voice capabilities added to the system would allow for warnings and instructions to reach those outside buildings.

Mitigation Option 1.7: Install an early detection system for lightning to ensure that persons in unprotected areas are aware of the potential danger and can take appropriate action to ensure their safety.

Pros: Enhancement of the alert systems would allow direct communication to persons outside buildings and the flexibility to deliver a message customized to the particular circumstances or hazard event.

Cons: This measure must be combined with adequate public education to ensure message recipients are aware of the proper response to warning announcements.

Mitigation Option 1.8: Construct small stand-alone shelters for outlying areas of campus such as the golf course or athletic fields, where transportation to the designated campus shelters is not possible.

Pros: This will provide a sheltering option in more remote locations of campus where currently none exists.

Cons: These stand-alone structures would only provide shelter for a small number of persons ranging from just a few to as many as a couple dozen.

7.3 GOAL 2

Ensure the continuity of service for buildings, facilities and operations identified as critical and high priority.

7.3.1 Background

Certain functions of the University must remain operable prior to, during and after an event to serve as centers for basic life services. Certain structures will need electricity for medical equipment, drinking water distribution and wastewater collection systems to be operable. Additionally, emergency responders will require electricity for communications equipment and incident command functions.

7.3.2 Potential Hazards

Severe Storm, High Wind Events, Tornado, Winter Storm

7.3.3 Potentially Affected Facilities

Kethley Hall, Broom-Keener Hall, Fielding L. Wright Art Center, Bailey Hall, Young-Mauldin Cafeteria, Cassity Hall, Sillers Coliseum, O. W. Reily, Roberts Library, E. R. Jobe Hall, R. L. Caylor Hall, H. L. Nowell Union, E. Walters Hall, Hugh C. Smith, Ewing Hall, F. E. Wyatt Physical, School of Nursing, DSU Water Tower, Charles W. Capps Archives and Museum, Kent Wyatt Hall, Robert L. Crawford, Hamilton-White Child Development Center, Gibson-Gunn Commercial, Central Mechanical, Facilities Management

7.3.4 Mitigation Options

Mitigation Option 2: Purchase and install backup generators for all critical and high priority facilities (including on-campus sewer lift stations) that are currently without a source of backup power.

Mitigation Option 2.1: Install automatic relay switches for existing and future generators to ensure continuity of service at critical and high priority facilities.

Mitigation Option 2.2: Install protective film on buildings with large expanses of glass (i.e. H. L. Nowell Union, Foundation Hall and the Aquatics Center) to allow for continued occupancy and mitigation of damage to the buildings and contents resulting from the loss of those windows.

Mitigation Option 2.3: Expand the scope of the existing records digitization program to include other paper only records and building blueprints and plans located at facilities management.

Pros: Basic life supporting services could continue to be offered for the population of campus and the emergency responders.

Cons: Costs associated with equipment purchases for existing buildings may present budgeting challenges. Prioritization of those buildings may present conflicts.

7.4 GOAL 3

Ensure that campus police, firefighters and other emergency responders have the training, tools and technology necessary to adequately protect the university faculty, staff and students.

7.4.1 Background

Campus police, firefighters and other emergency responders are charged with providing the same level of service as emergency responders in urban areas. These first-on-scene personnel should have access to similar levels of training and equipment. Since Delta State University is located within the city limits of Cleveland, communication and cooperation between campus and City officials is common. The continuity of effective communication should not be limited due to insufficient or ineffective equipment.

7.4.2 Potential Hazards

All Hazards

7.4.3 Potentially Affected Facilities

All Facilities

7.4.4 Mitigation Options

Mitigation Option 3: Identify equipment, policies and training opportunities that would better equip the University's public safety systems and personnel to protect the University community.

Mitigation Option 3.1: Acquire and updated communications system for the campus first responders that is capable of communicating with community emergency service providers such as the State Police, Cleveland Police Department and the Cleveland Fire Department.

Mitigation Option 3.2: Acquire a mobile command unit capable of establishing an incident command headquarters from any location.

Pros: Consistent and up-to-date training techniques and equipment provides the foundation for the most effective delivery of emergency services. Furthermore, it provides for enhanced cooperation in multi-jurisdictional incidents.

Cons: University budgets for emergency services and protection are more limited than that of municipalities and local governments. Therefore, funding the necessary training and equipment expenses can become difficult or impossible.

7.5 GOAL 4

Establish mechanisms that will ensure continuity of the University's Hazard Mitigation Plan through continuous review, revision, and updates.

7.5.1 Background

To ensure that this Hazard Mitigation Plan stays relevant for the University's needs over time, specific policies and strategies must be implemented. Effective implementation of the following strategies will ensure that the Plan is reviewed, revised, and updated on a regular basis to ensure continuity. In addition, implementation of the following will ensure that new facilities developed on campus will be done so in a manner that is consistent with the plan.

7.5.2 Potential Hazards

The following strategies are relevant to all identified hazard types.

7.5.3 Potentially Affected Buildings

All identified buildings and systems are potentially affected through these strategies.

7.5.4 Mitigation Options

Mitigation Option 4: Link the Hazard Mitigation Plan to the University's capital building plan and Master Plan to ensure that planned buildings consider hazard mitigation strategies in design, building site, and safety features.

Pros: Linking the Hazard Mitigation Plan to other University Plans related to building siting and development will ensure that considerations relative to design, placement, and safety features will be included in planning stages and will eliminate the need for costly upgrades or retrofits post-construction.

Cons: Considerations for hazard mitigation will be a necessary component of all new buildings constructed on campus. To accomplish this, a member of the DRU Committee or other University staff person with knowledge of the plan will need to be included in facility pre-planning.

Mitigation Option 4.1: Continue to maintain the DRU Committee as a standing committee within the University to allow for periodic review and evaluation of the appropriateness and effectiveness of the Hazard Mitigation Plan.

Pros: Continuation of the DRU Committee will ensure that this plan is maintained as a "living document" that is updated at intervals to ensure relevance with current conditions at the University.

Cons: This strategy will require periodic (at least annual) meetings of the DRU Committee. It is understood that personnel changes through attrition, retirement, and other means may require new people to be added to the Committee. Doing so will further ensure continuity of plan maintenance and implementation over time.

7.5 BENEFIT-COST REVIEW

Every potential mitigation strategy has a cost associated with implementation. These costs may be direct costs associated with infrastructure upgrades, building retrofits, or purchase of equipment, supplies, or materials. Indirect costs may be associated with staff time dedicated to implementation or costs associated with implementation of policy-related strategies. Similarly, every potential mitigation strategy has an associated benefit or set of benefits. Direct and indirect costs associated with implementation of mitigation strategies are often easy to quantify in monetary terms. However, relative benefits of mitigation strategies are often more difficult to quantify. In general terms, those strategies offering the greatest benefit at the lowest cost are considered the highest priority and are described as having the highest benefit-cost ratio.

According to FEMA, benefits realized from mitigation projects are directly associated with the avoided damages and losses as a direct result of the mitigation activity. Specific benefits are calculated based on the estimation of future losses resulting from two scenarios: 1) the resulting damages and losses from a particular event without undertaking the mitigation project; and 2) the resulting damages and losses from the same event with the mitigation project completed.[28] Direct benefits are the derivation of the difference between anticipated results potentially incurring if the losses with the mitigation project in place are less than losses incurred without the mitigation project in place. With this approach it is assumed that the greatest potential benefits are associated with hazard events with higher severity and higher potential for damages and losses. Thus those event types prone to higher damages and losses typically have mitigation projects with the highest benefits. It can also be reasoned that mitigation strategies necessary to mitigate damages and losses from the most severe events have the potential to have the highest costs of implementation.

According to FEMA, there are four categories of avoided damages associated with any hazard type. These include:

1. **Avoidance of casualties:** Because of the high population density at the University's Cleveland Campus, potential casualties factor into all considered hazard types and most of the mitigation strategies being considered for implementation.
2. **Avoidance of loss-of-function:** Loss of function is a significant consideration in establishment of mitigation strategies and many were designed around the need to ensure continuity of service and function, specifically for those systems on campus critical to preparedness, response, and recovery from a hazard event.
3. **Avoidance of physical damage:** The potential for physical damage and the potential for loss of function may be directly related. Physical damage is also a significant consideration given the density of buildings on campus and the presence of valuable equipment, infrastructure, and irreplaceable research data and archived collections.
4. **Avoidance of emergency management costs:** These costs are associated with the level of effort and costs associated with hazard preparedness, response, and recovery. Examples of emergency management costs associated with recent hazard events include debris removal and management, cleanup costs, and costs associated with enhanced security.

All of the mitigation strategies outlined in this section were examined in light of the four categories of potential damage and were given a relative value within one or more of the four categories as illustrated in **Table 7.1**. Those strategies with the highest potential influence on a particular category were given a value of three while those with the lowest potential influence on a particular category were given a value of zero. Casualties and loss of function tend to contribute the greatest monetary damage to universities and other

[28] FEMA 2003

institutions. To ensure that the benefit of a given mitigation strategy acknowledges these potentially higher costs; a multiplier factor of two was incorporated into the analysis and included in the final ranking values of each mitigation strategy. The multiplier is only applied to the casualty and loss of function categories.

Table 7.1 Benefit / Cost and Ranking Summary Table

Mitigation Strategies		Avoided Damages				
Number	Brief Description	Casualty	Loss of Function	Physical Damage	Emergency Manag.	Total
	Multiplier Factor	**2**	**2**	**1**	**1**	
1	Development of a comprehensive outreach / education campaign	2	2	1	3	12
1.1	Publish and distribute a crisis management/natural hazard mitigation guide for University Leadership.	2	2	0	2	10
1.2	Inclusion of hazard mitigation and emergency management information on digital outlets	2	1	0	2	8
1.3	Establish Policies and Procedures for development of emergency evacuation plans for students with disabilities	3	0	1	2	9
1.4	Install signs designating storm sheltering locations and safe rooms or areas within buildings.	3	1	0	3	11
1.5	Develop a facility for stocking of basic health and first aid supplies.	2	2	0	2	10
1.6	Consider acquisition of a voice-capable siren alert system.	3	2	0	2	12
1.7	Install an early detection system for lightning	3	0	0	2	8
1.8	Construct small stand-alone shelters for outlying areas of campus	3	0	0	0	6
2	Purchase and install backup generators for all critical and high priority facilities currently without backup power.	1	3	2	3	13
2.1	Install automatic relay switches for existing and future generators.	1	3	2	2	12
2.2	Install protective film on buildings with large expanses of glass (H.L. Nowell Union)	3	1	2	1	11
2.3	Expand the scope of the existing records digitization program	0	3	2	0	8
3	Provide equipment upgrades and professional training for the police department and other first responders.	2	2	0	3	11
3.1	Acquire and updated communications system for the campus first responders	2	2	0	3	11
3.2	Acquire a mobile command unit	2	2	0	3	11

4	Link the Hazard Mitigation Plan to the Capital Building Plan and the Campus Master Plan	1	3	3	2	13
4.1	Continue to maintain the DRU Committee as a standing committee within the University	2	2	2	2	12

7.6 MITIGATION STRATEGY PRIORITIZATION

Table 7.1 provides a rough indication of prioritization of mitigation strategies but does not account for relative or perceived cost as compared to relative or perceived benefit. It also does not account for other factors that are generally considered as part of the STAPLEE criteria that provide insight into the feasibility, ease of implementation, and general acceptance of certain mitigation actions. In addition, **Table 7.1** includes alternatives to some actions that would achieve the same goals through differing means. **Table 7.2** is designed to further evaluate the proposed mitigation strategies and to refine the prioritization based on the STAPLEE criteria. In **Table 7.2**, criteria are marked with a plus (+) for favorable, and a negative (-) for less favorable. The number of pluses is then added to the relative ranking score from **Table 7.1** to provide a more refined ranking score for the proposed mitigation strategies.

The STAPLEE Criteria is included as part of the mitigation prioritization process as required by FEMA (FEMA, 2003) as a guide for evaluating the appropriateness and potential effectiveness of potential mitigation actions. While the STAPLEE Criteria are designed to evaluate mitigation actions on a local government level, it was felt that the criteria are equally applicable to a university setting. In this case, the STAPLEE Criteria were used to evaluate each proposed mitigation strategy and to enhance and compliment the initial priority ranking provided in **Table 7.1**. Within this context it is fully understood that buy-in of the plan on the part of the University administration, Faculty Senate, Staff Council and other is necessary for the ultimate success of the plan. The University exists in many ways as a self-contained community with a number of constituency groups within that community. Each has a unique perspective on a given issue and each groups' input is necessary to achieve success.

Additional considerations for prioritization of potential mitigation strategies included consideration of the included hazard profiles, vulnerabilities, costs, and projected or potential benefits. Some strategies offer benefit to only one hazard type or one structure while others provide potential benefit relative to multiple hazards and in some cases, the entire campus or university community.

Table 7.2 Staplee Criteria Ranking

STAPLEE Criteria		S (Social)		T (Technical)			A (Admin.			P (Political)			L (Legal)			E (Economic)				E (Environmental)				
Considerations For Alternate Actions		Community Acceptance	Effect on Segment of Population	Technical Feasibility	Long0term Solution	Secondary Impacts	Staffing	Funding Allocated	Maintenance/ Operations	Political Support	Local Champion	Public Support	State Authority	Existing Local Authority	Potential Legal Challenge	Benefit of Action	Cost of Action	Contributes to Economic Goals	Outside Funding Required	Effect on Land/ Water	Effects on Endangered Species	Effect on HAZMAT/ Waste Sites	Consistent with Community Environmental Goals	Consistent with Federal Laws
1	Development of a comprehensive outreach / education campaign	1	1	1	0	1	1	0	1	1	0	1	1	1	1	1	1	0	0	1	1	1	1	1
1.1	Publish and distribute a crisis management/natural hazard mitigation guide for University Leadership.	1	1	1	0	1	1	0	1	1	0	1	1	1	1	0	1	0	0	1	1	1	1	1
1.2	Inclusion of hazard mitigation and emergency management information on digital outlets	1	1	1	0	1	1	0	0	1	0	1	1	1	1	0	1	0	0	1	1	1	1	1
1.3	Establish Policies and Procedures for development of emergency evacuation plans for students with disabilities	1	1	1	1	1	1	0	0	1	1	1	1	1	1	1	1	0	0	1	1	1	1	1
1.4	Install signs designating storm sheltering locations and safe rooms or areas within buildings.	1	1	1	0	0	1	0	0	1	0	1	1	1	1	1	0	0	0	1	1	1	1	1
1.5	Develop a facility for stocking of basic health and first aid supplies.	1	1	1	1	1	1	0	0	1	1	1	1	1	1	1	0	0	0	1	1	1	1	1

STAPLEE Criteria		S (Social)		T (Technical)			A (Admin.			P (Political)			L (Legal)			E (Economic)				E (Environmental)				
Considerations For Alternate Actions		Community Acceptance	Effect on Segment of Population	Technical Feasibility	Long0term Solution	Secondary Impacts	Staffing	Funding Allocated	Maintenance/ Operations	Political Support	Local Champion	Public Support	State Authority	Existing Local Authority	Potential Legal Challenge	Benefit of Action	Cost of Action	Contributes to Economic Goals	Outside Funding Required	Effect on Land/ Water	Effects on Endangered Species	Effect on HAZMAT/ Waste Sites	Consistent with Community Environmental Goals	Consistent with Federal Laws
1.6	Consider acquisition of a voice-capable siren alert system.	**1**	**1**	**1**	**1**	**1**	**1**	**0**	**0**	**1**	**0**	**1**	**1**	**1**	**1**	**1**	**0**	**0**	**0**	**1**	**1**	**1**	**1**	**1**
1.7	Install an early detection system for lightning	**1**	**1**	**1**	**1**	**1**	**1**	**0**	**0**	**1**	**0**	**1**	**1**	**1**	**1**	**1**	**1**	**0**	**0**	**1**	**1**	**1**	**1**	**1**
1.8	Construct small stand-alone shelters for outlying areas of campus	**1**	**0**	**1**	**1**	**1**	**0**	**0**	**1**	**1**	**0**	**1**	**1**	**1**	**1**	**0**	**0**	**0**	**0**	**1**	**1**	**1**	**1**	**1**
2	Purchase and install backup generators for all critical and high priority facilities currently without backup power.	**1**	**1**	**1**	**0**	**1**	**1**	**0**	**0**	**1**	**0**	**1**	**1**	**1**	**1**	**1**	**1**	**0**	**0**	**1**	**1**	**1**	**1**	**1**
2.1	Install automatic relay switches for existing and future generators.	**1**	**0**	**1**	**0**	**1**	**1**	**0**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**0**	**1**	**1**	**1**	**1**	**1**	**1**
2.2	Install protective film on buildings with large expanses of glass (H.L. Nowell Union)	**1**	**1**	**1**	**1**	**1**	**1**	**0**	**0**	**1**	**0**	**1**	**1**	**1**	**1**	**1**	**0**	**0**	**0**	**1**	**1**	**1**	**1**	**1**
2.3	Expand the scope of the existing records digitization program	**1**	**0**	**0**	**1**	**1**	**0**	**0**	**1**	**1**	**0**	**1**	**1**	**1**	**1**	**1**	**0**	**0**	**0**	**1**	**1**	**1**	**1**	**1**

STAPLEE Criteria		**S (Social)**		**T (Technical)**			**A (Admin.**			**P (Political)**			**L (Legal)**			**E (Economic)**				**E (Environmental)**				
Considerations For Alternate Actions		Community Acceptance	Effect on Segment of Population	Technical Feasibility	Long0term Solution	Secondary Impacts	Staffing	Funding Allocated	Maintenance/ Operations	Political Support	Local Champion	Public Support	State Authority	Existing Local Authority	Potential Legal Challenge	Benefit of Action	Cost of Action	Contributes to Economic Goals	Outside Funding Required	Effect on Land/ Water	Effects on Endangered Species	Effect on HAZMAT/ Waste Sites	Consistent with Community Environmental Goals	Consistent with Federal Laws
3	Provide equipment upgrades and professional training for the police department and other first responders.	**1**	**1**	**1**	**1**	**1**	**1**	**0**	**0**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**0**	**0**	**0**	**1**	**1**	**1**	**1**	**1**
3.1	Acquire and updated communications system for the campus first responders	**1**	**1**	**1**	**1**	**1**	**1**	**0**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**0**	**0**	**0**	**1**	**1**	**1**	**1**	**1**
3.2	Acquire a mobile command unit	**0**	**1**	**1**	**1**	**1**	**1**	**0**	**0**	**0**	**1**	**0**	**1**	**1**	**1**	**1**	**0**	**0**	**0**	**1**	**1**	**1**	**1**	**1**
4	Link the Hazard Mitigation Plan to the Capital Building Plan and the Campus Master Plan	**1**	**0**	**1**	**0**	**1**	**1**	**0**	**0**	**1**	**0**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**0**	**1**	**1**	**1**	**1**	**1**
4.1	Continue to maintain the DRU Committee as a standing committee within the University	**1**	**0**	**1**	**1**	**1**	**1**	**0**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**0**	**1**	**1**	**1**	**1**	**1**

The final priority ranking of selected mitigation strategies is provided in **Table 7.3** and includes the implementing office or University department as well as a general timeframe for implementation. Specific mitigation activities will be implemented as time and resources are available to facilitate implementation. Some strategies with a lower ranking may be implemented prior to higher ranking strategies primarily due to the ease of implementation, low cost of implementation, or other factors.

Final priority ranking of proposed mitigation strategies resulted from the quantitative analysis offered in Tables 7.1 and 7.2. However, those prioritization processes were not without input from the DRU Committee and opportunities to override the quantitative rankings were provided to the committee based on their own priorities, the priorities of the University and input obtained from public meetings and other input processes.

Table 7.3 Mitigation Strategy Priority Ranking

Ref #	Description	Implementing Office	Estimated Project Durations (Years/Months)	Potential Source of Funding	Priority Ranking
4.1	Continue to maintain the DRU Committee as a standing committee within the University	University Police	Ongoing	Hazard Mitigation Grant Program	1
2.1	Install automatic relay switches for existing and future generators.	Facilities Management	1 (12)	Generator Grant Program	2
1	Development of a comprehensive outreach / education campaign	Communications and Marketing	1.5 (18)	Pre-disaster Mitigation Grant Program	3
2	Purchase and install backup generators for all critical and high priority facilities currently without backup power.	Facilities Management	2 (24)	Hazard Mitigation Grant Program/ Generator Grant Program	4
4	Link the Hazard Mitigation Plan to the Capital Building Plan and the Campus Master Plan	Facilities Management	.5 (6)	Internal	5
1.7	Consider acquisition of a voice-capable siren alert system.	University Police	1 (12)	Hazard Mitigation Grant Program	6
3	Provide equipment upgrades and professional training for the police department and other first responders.	University Police	2 (24)	Dpt. Of Homeland Security	7
1.3	Establish Policies and Procedures for development of emergency evacuation plans for students with disabilities	University Police Housing and Res Life	.5 (6)	Internal	8
1.6	Develop a facility for stocking of basic health and first aid supplies.	Health Services	1.5 (18)	Hazard Mitigation Grant Program	10
2.2	Install protective film on buildings with large expanses of glass (H.L. Nowell Union)	Facilities Management	1 (12)	Hazard Mitigation Grant Program	11
1.5	Install signs designating storm sheltering locations and safe rooms or areas within buildings.	Facilities Management	1.5 (18)	Hazard Mitigation Grant Program	13
1.2	Inclusion of hazard mitigation and emergency management information on digital outlets	Communications and Marketing	1 (12)	Internal	14

8.0 PLAN IMPLEMENTATION, MAINTENANCE, AND EVALUATION

8.1 PLAN IMPLEMENTATION

The Office of the Vice-President for Student Affairs will be the lead implementing unit within the University. The Office of Student Affairs will work in concert with the administration to work through implementation of the prioritized measures and will engage other units within the University as necessary and appropriate to assist with implementation activities. In addition to general oversight of implementation, the Office of Student Affairs will identify specific work to be completed, timelines for completion, estimated project costs, and identification of potential funding sources. It is understood that some measures may be implemented without the assistance of external funding. In those cases, the Office of Student Affairs, working through the University's budgeting process, will assign those projects for implementation as internal budget resources allow.

8.2 PLAN MAINTENANCE, EVALUATION, AND REVISION

The DRU Committee, as the lead planning group for development of the Hazard Mitigation Plan, will continue to serve in an advisory role with respect to plan maintenance, evaluation, and subsequent revisions to the plan. The DRU Committee will meet twice per year to ensure that implementation schedules are being followed and to ensure the plan continues to be relevant with respect to actual campus conditions. A recommended meeting schedule will include one meeting per semester with one conducted in the fall semester and one in the spring semester. Plan updates will continue to be an on-going task and will be reported to the DRU Committee for their comment, input, and approval. A plan implementation worksheet is included as **Appendix B** and is designed as a tool for the DRU Committee to monitor implementation progress.

During its fall meeting, the DRU Committee will include on its agenda an evaluation of the plan's overall functionality and relevance to current conditions. The purpose for this evaluation is to analyze current conditions on campus and changes since the previous fall meeting that necessitate changes to the plan. In determining the need for plan updates, the committee will consider the following criteria:

1. New construction or planned construction of buildings that warrant consideration in the mitigation planning process,
2. Identification of additional risks or vulnerabilities that may be attributed to material changes on campus (significant population increases, new construction, etc.),
3. Identification of new mitigation strategies to be added to the plan or existing strategies that have been determined infeasible and need to be removed from the plan. It is important to note that new strategies should be subjected to the same level of review and analysis as the initial strategies to ensure potential effectiveness,

4. New legislation, campus policies, or other rules, laws, or regulations that have the potential to impact the effectiveness of implementation,
5. Other conditions or changes that warrant significant review, changes, or updates to the plan.

The spring semester meeting of the DRU Committee will include discussions and activities as necessary to update major components of the plan based on changing conditions on campus and also based on discussions and materials presented in the fall meeting. These discussions will consider ongoing implementation activities and the impacts, if any, of hazard events occurring since the previous meeting. Specific attention will be paid to the effectiveness of implemented strategies as they relate to hazard events that may have occurred since the last meeting. This meeting will also provide an opportunity for discussion of additional mitigation strategies that may need to be incorporated into the plan. The community stakeholders and area elected officials will be invited to participate in the spring meeting to allow for continued public involvement. The DRU Committee may choose to update the plan on an annual basis as needed or may chose to wait until the five-year required update. In either case, the DRU Committee shall follow the appropriate process for updating the plan including elements related to public outreach, approval by the DRU Committee as a whole and submission to MEMA and FEMA for their concurrence.

The plan must be considered for a major update every five years. If significant changes are made to the plan at the five-year interval, MEMA and FEMA will be notified of major upgrades to the plan and the updated plan will be submitted to them for concurrence. In addition, all major plan upgrades must be provided to the University Administration and neighboring jurisdictions including the City of Cleveland and Bolivar County.

Delta State University's DRU Plan will be considered as part of the University's overall planning process and will interface directly with the Capital Improvement Plan and the Campus Master Plan. This is to ensure that all new construction planning on campus will consider mitigation strategies in siting and design of new facilities on campus. In addition, all new structures on campus will be classified as Critical, High Priority, Medium Priority, or Low Priority and incorporated into **Tables 5.0 – 5.3** as appropriate.

Appendix A: Agendas and Sign-in Sheets for DRU Committee Meetings

Delta State University
Disaster Resistant University Plan
Project Kick-Off Meeting

May 28, 2009
10:00 A.M.

Location: Delta State University, Main Campus
Meeting Site TBD

Attendees: Bruce A. Laird (Eco-Systems)
DRU Advisory Committee Members

Purpose: Project overview, discussion of goals and objectives, commencement of the DRU planning process.

1. Welcoming and introductions

2. Overview of the project and planning process (Eco-Systems presentation)
    a. Presentation of project schedule
    b. Presentation of mitigation options/opportunities
    c. Overview of the plan "crosswalk"

3. Discussion of goals, objectives, outputs and outcomes of the planning process

4. Discussion/definition of critical facilities
    a. Charge to committee to assist in defining critical facilities

5. Discussion/definition/scope of hazard events and hazard profiles

6. Discussion/identification of existing and relevant plans

7. Next steps and committee tasks
    a. Next meeting date
    b. Communication
    c. Information needs from the University community

10:00 am – 11:30 am

Delta State University
Disaster Resistant University Committee Meeting
1st Meeting – May 28, 2009; 10:00 a.m.

Name	Title	Phone Number	E-mail Address
Lynn Buford	Chief of Police DSU	846-4155	lbuford@deltastate.edu
Michael Gann	Director of Com. & Marketing	846-4676	mgann@deltastate.edu
SANJAY DATAR	PROJECT ENGR	601-936-4440	sanjay.datar@eco-systemsinc.com
Wayne Blansett	VP – Student Affairs	662-846-4150	wblansett@deltastate.edu
Julie Jackson	Dir. of H&RL	662-846-4151	jjackson@deltastate.edu
DeAndre House	H&RL	662-846-4151	dhouse@deltastate.edu
Greg [illegible]	Assistant Chief Fire dept	662-[illegible]-1111	lancesanto@cableone.net
Bob Boyles	Grants	846-4804	rboyles@deltastate.net
Beverly Lindsey	Payroll/Staff Council	846 4648	blindsey@deltastate.edu
BENNIE WALKER	Asst. Chief Police	662 846-4157	bwalker@deltastate.edu
Matt Logan	Technical Director	662-846-4760	mlogan@deltastate.edu
Chris Giger	Director Admin Services	662-846-4760	cgiger@deltastate.edu
Beverly Fratesi	CIO	662-846-4760	bfratesi@deltastate.edu
Richard Houston	Director of Counseling	662 846-4690	rhouston@deltastate.edu

Delta State University
Disaster Resistant University Committee Meeting
1st Meeting – May 28, 2009; 10:00 a.m. – 11:30 am

Name	Title	Phone Number	E-mail Address
Bob Neal	Emergency Coordinator	601-432-6143	bneal@mississippi.edu
Gene Bishop	Fire Inspector	662 843 3159	cufd@bellsouth.net
Chris Giger	OIT	662 846 4760	cgiger@deltastate.edu
Beverly Fradesi	CIO - OIT	662-846-4700	[illegible]@deltastate.edu
Sam Washington	Dir. of Procurement/Auxiliary	662-846-4046	swshngtn@deltastate.edu

Delta State University
Hazard Mitigation Plan
2nd Committee Meeting
July 28, 2009, 10:00 a.m.

Meeting Agenda

1. Presentation of the plan as drafted to-date and receipt of initial committee feedback

2. Discussion of categorization of critical facilities with final input on facilities listed as “critical”, “high priority”, “medium priority”, “low priority”

3. Facilitation of a discussion of valuation of buildings and contents (for critical facilities) to be used in completing the HAZUS-MH modeling for vulnerability assessments

4. Initial discussions/brainstorming on potential mitigation actions

5. Discussion of potential timeline for the first public meeting/hearing

6. Other discussions/input as directed by the committee

Delta State University
Hazard Mitigation Plan
2nd Committee Mtg

7-28-09 10:00 A.M.

Name	Department/Agency	E-Mail Address
Sam Washington	Procurement	swshngtn@deltastate.edu
Robin Boyles	Grants	rboyles@deltastate.edu
Wayne Blansett	UPSA	wblanset@deltastate.edu
Julie Jackson	H&RL	jjackson@deltastate.edu
Benny E Walker	Police	bwalker@deltastate.edu
Lynn Buford	Police	lbuford@deltastate.edu
Matt Logan	OIT	mlogan@deltastate.edu
TOMMY VERDELL	OFM	TVERDELL@DELTASTATE.EDU
[illegible]	CUFD	lancesauto@cableone.net
[illegible]	CUFD (City of Clev.)	cufd@bellsouth.net
Richard Houston	Counseling/Health Services	rhouston@deltastate.edu
Teresa Houston	Student Bus-Liason w/Follett & Aramark	thouston@deltastate.edu

Delta State University
Hazard Mitigation Plan
Committee Meeting

March 4, 2010, 10:00 a.m.
Baoni Center, Broom Hall

Meeting Agenda

1. Brief overview of the draft plan document and review of risk and vulnerability assessments including HAZUS data.

2. Discussion of mitigation strategies.

    a. Discussion of existing mitigation strategies.

    b. Discussion of mitigation priorities.

    c. Discussion of potential mitigation alternatives.

3. Administrative matters: MEMA Plan/Grant Extension

4. Other discussions/input as directed by the committee

Delta State University
Disaster Resistant University Committee Meeting
March 4, 2010

662-846- ....

NAME	TITLE	PHONE NUMBER	EMAIL ADDRESS
Richard Houston	Director Cassidy Short [illegible]	4690	rhouston@deltastate.edu
Matt Losan	Technical Director	4760	mlosan@deltastate.edu
TOMMY VERDELL	DIRECTOR - FM	4744	TVERDELL@DELTASTATE.EDU
Christy Montesi	Chair, Staff Council	4646	cmontesi@deltastate.edu
CHRIS GIGER	DIR. ADMIN SYSTEMS	4760	cgiger@deltastate.edu
Lynn Buford	Chief of Police	4155	lbuford@deltastate.edu
Wayne Blansett	VP St. Affairs	4150	wblansett@deltastate.edu
Sam Washington	Dir. Procurement	4046	swshngtn@deltastate.edu
Bob Neal	Emergency Coordinator	601-432-6143	bneal@mississippi.edu
Michael Gann	Dir. Comm. & Marketing	4676	mgann@deltastate.edu
Robin Boyles	Grants Cor.		

Delta State University **May 20, 2010, 2:00 p.m.**
Hazard Mitigation Plan
Committee Meeting

Meeting Agenda

1. Final discussion of mitigation goals and strategies.

    a. Goal 1: Protect the health, safety, and welfare of students, faculty, and staff at Delta State University

    b. Goal 2: Ensure continuity of service for buildings, facilities, and operations identified as critical and high priority.

    c. Goal 3: Ensure that campus police, firefighters, and other emergency response personnel have the training, tools, and technology necessary to adequately protect the university, faculty, staff, and student.

2. Discussion of other mitigation strategies not included in the handout and/or presentation.

Delta State University
Disaster Resistant University Committee Meeting
May 20, 2010

Name	Title	Phone Number	E-mail Address
Julie Jackson	Dir. Housing & Res Life	846-415	jjackson@deltastate.edu
Christy Montesi	(Chair, Staff Council) Dir. Career Services	846-4646	cmontesi@deltastate.edu
CHRIS GIGER	DIR. ADMINISTRATIVE SERVICES	846.4760	cgiger@deltastate.edu
Sam Washington	Dir. of Procurement/Auxiliary Svcs	846-4046	swashngtn@deltastate.edu
Lynn Buford	Chief of Police	846-4155	lbuford@deltastate.edu
Wayne BLANSETT	VP - Stu. AFFairs	846-4150	wblansett@deltastate.edu (over)
Michael Gann	Director, Comm. & Marketing	846-4676	mgann@deltastate.edu

Delta State University DRU Committee
9-23-10 10:30

Name	Phone #	Email
Julie Jackson	846-4151	jjackson@deltastate.edu
Matt Logan	846-4760	mlogan@deltastate.edu
Chris Giger	846-4760	cgiger@deltastate.edu
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Bruce Laird	601-936-4440	bruce.laird@eco-systemsinc.com
Bob Neal	601-432-6143	bneal@mississippi.edu
Linda Smith	846-4740	lindasmith@deltastate.edu
Lynn Buford	846-4155	lbuford@deltastate.edu
Richard Houston	846-4690	rhouston@deltastate.edu
Wayne Blansett	846-4150	wblanset@deltastate.edu
Michael Gann	846-4676	mgann@deltastate.edu
Robin Boyles	846-4804	rboyles@deltastate.edu
Beverly Fratesi	846-4760	bfratesi@deltastate.edu

Appendix B: Public Meeting and Public Outreach Information

Since August of 2008, Delta State University has been working on our Disaster Resistant University / Mitigation Plan. This is a very detailed and comprehensive plan which includes the four phases of emergency management: Preparedness, Response, Recovery and Mitigation. Hazard mitigation planning is a systematic, four-phased process which includes: 1. Organizing resources, 2. Hazard Identification and Risk Assessment, 3. Developing the Mitigation Plan, and 4. Adoption and Implementation of the Plan. We are now in the final phase of our Plan.

Since you and your office are such important stakeholders not only to our community but to Delta State University as well, I would like to invite you to attend a meeting with the other stakeholders involved in this project. **We will be meeting here on campus March 4, 2010, at 1:30 pm in the Baoni Center, Broom Hall room 132**.

Please make a special effort to attend this important meeting. We value not only your attendance, but your input and approval as well. Should you have questions regarding this matter, please do not hesitate to contact me at 662-846-4156 or 662-719-8160 or by email; lbuford@deltastate.edu.

Sincerely,

Mr. Lynn Buford
Chief of Police
Delta State University

Public Meeting Invite List for March 4, 2010, 1:30pm.

Ray Bell, City of Cleveland Public Works, 'raybell@cableone.net'

Charles Gilmer, Bolivar County Sheriff's' Dept. 'chiefdeputy@co.bolivar.ms.us'

Buster Bingham, Chief of Police for City of Cleveland 'inv6@bellsouth.net'

Billy Nowell, Mayor, City of Cleveland, 'billynowell@cableone.net'

Will Hooker, Bolivar County Administrator, 'whooker@co.bolivar.ms.us'

Gene Bishop, Cleveland volunteer Fire Department. 'cvfd@bellsouth.net'

William Quinton, Director, Bolivar County EMA 'Bill Quinton'

Bob Neal, Emergency Coordinator, MS Institutions of Higher Learning

day, September 28, 2010, THE BOLIV

JOHN ROBERT

Today you would be 2.
Happy birthday to you.

Balloons, cake, and smiles!
ll your presents stacked in piles.
With love from Mom and Dad,
anything to make you glad!
Blow out your 2 candles,
go put on your new sandals.
Let's go out to play!
Son, for today is your day!
In Heaven you will celebrate
hat has made this a special date!
We love you and miss you!

py birthday, love Mom and Dad!
9/28/2008 -11/28/2008.
Love Mommy & Daddy

Bolivar Commercial

PROOF OF PUBLICATION

STATE OF MISSISSIPPI, COUNTY OF BOLIVAR.

Personally appeared before me, the undersigned authority in and for the County of Bolivar, State of Mississippi, MARK S. WILLIAMS, Publisher of THE BOLIVAR COMMERCIAL, daily newspaper and published in the City of Cleveland, in said Country and State who, on oath, deposes and says that The Bolivar Commercial is a newspaper as defined and prescribed in Senate Bill No. 203 enacted at the regular session of the Mississippi Legislature of 1948, amending Section 1958 of the Miss. Code of 1942, and that the publication of which the instrument annexed is a true copy, was published in said paper, to wit:

In Volume 94 No. 170 Dated Sept 28 2010
In Volume ____ No. ____ Dated ____________ 20 ____
In Volume ____ No. ____ Dated ____________ 20 ____
In Volume ____ No. ____ Dated ____________ 20 ____
In Volume ____ No. ____ Dated ____________ 20 ____
In Volume ____ No. ____ Dated ____________ 20 ____

and that said newspaper "has been established for at least twelve months ~~next~~ prior to the first publication" of this notice.

[signature] Publisher

Sworn to and subscribed before me, this the 19th

day of January, 2011

[signature] Notary Public

STATE OF MISSISSIPPI · DIANE M. KAMSON · ID No 25635 · Comm Expires August 17, 2012 · NOTARY PUBLIC · BOLIVAR COUNTY

My Commission expires 8/17, 2012

Publishers's Fee $ ________.

STYLES

www.bolivarcom.com

DSU seeks public input in disaster planning effort

A public hearing will be held at 5:30 p.m. on Oct. 5 in the Baioni Conference Center of Broom Hall to invite comments and suggestions as Delta State, local, and state officials work toward the university's designation as a Disaster-Resistant University (DRU).

The DRU designation promotes a proactive approach to reducing and managing a university's vulnerability to hazards. It ensures that universities have conducted a detailed analysis of potential hazards and ways to minimize them, as well as involving the necessary local officials and agencies in planning appropriate responses.

With this designation, Delta State will be eligible to apply for federal funding to better address potential hazards and disaster response.

The meeting will be led by Jay C. Estes, regional operations manager and senior planner for Eco Systems, Inc.; Bruce Laird, project engineer for Eco Systems, Inc.; and Bob Neal, emergency and fire safety coordinator for the Mississippi Institutions of Higher Learning.

The three prepared the risk analysis for Delta State. Representatives from various campus units will be on hand to answer questions as well.

For more information, contact Delta State Police Chief Lynn Buford at 662-846-4155.

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Appendix C: Summary Listing of Suggested Action Measures

1. Continue to maintain the DRU Committee as a standing committee within the University
2. Install automatic relay switches for existing and future generators.
3. Development of a comprehensive outreach / education campaign
4. Purchase and install backup generators for all critical and high priority facilities currently without backup power.
5. Link the Hazard Mitigation Plan to the Capital Building Plan and the Campus Master Plan
6. Consider acquisition of a voice-capable siren alert system.
7. Provide equipment upgrades and professional training for the police department and other first responders.
8. Establish Policies and Procedures for development of emergency evacuation plans for students with disabilities
9. Identify emergency traffic routes through signage.
10. Develop a facility for stocking of basic health and first aid supplies.
11. Install protective film on buildings with large expanses of glass (H.L. Nowell Union)
12. Publish and distribute a crisis management/natural hazard mitigation guide for University Leadership.
13. Install signs designating storm sheltering locations and safe rooms or areas within buildings.
14. Inclusion of hazard mitigation and emergency management information on digital outlets

Appendix D: Plan Implementation Worksheet

DSU DRU Plan Implementation Worksheet						
Action Measure Number	**Current DRU Committee Priority**	**Proposed, Active, Complete, or On-going**	**% Complete**	**Funding Status**	**Completion Date**	**Comments**