***Executive Summary***

Shifts in weather patterns and increasingly frequent and more extreme storms are challenging communities around the world, including Bowie, Maryland, and inspiring many to begin the important work of understanding how climate change will affect assets and operations. As the oldest historically black university in the state of Maryland, situated at the nexus of the Washington, DC and Baltimore corridor, Bowie State University (BSU) has a responsibility to preserve the infrastructure, economic stability, ecosystems, social equity & governance, as well as health & wellness of its’ student, faculty, and staff. To continue to strive and thrive, BSU needs to understand and prepare for the specific changes in climate coming to our corner of the world.

BSU recognizes our climate adaptation efforts would be most successful with the participation of the entire campus community, and our city and county neighbors who will also need to adjust to the coming warmer and wetter weather. In 2007, BSU signed on as an ACUPPC signatory (American Colleges & University Presidents’ Climate Commitment) and subsequently established a shared governance group called the Climate Change Coordinating Committee (C4) to guide the university’s work to prepare for and adapt to climate change. Part of this committee’s charge is to help the campus community understand what we need to prepare for, and how. In doing so, the committee developed a Climate Action Plan (CAP) in 2009, which has, in part, been included in the university’s strategic planning and decision-making processes. The University signed the Second Nature Climate Commitment in 2015 which charged institutions to include *Resilience* as part of their plan. An addendum updating the CAP was finalized in December 2017.

While acknowledging that climate change will influence BSU operations, we decided to focus our resilience planning efforts on the five dimensions of resilience to assess vulnerabilities and identify relatively low-barrier and high-impact internal actions we can take. This step will help guide us as we begin to grapple with the larger question of how to assess and minimize risks to environmental health, and quality of life. We are confident that this phase of work will help reduce risks, decrease stressors on campus infrastructure and services, and guide proactive projects.

Climate adaptation and resilience planning will need to be a continuous process, and we are committed to moving the recommendations in this plan forward while also expanding our focus to include our city and county neighbors as BSU strides toward being an attractive place to live, work, learn and excel, whatever the weather may bring.

*Resilience is all about being able to overcome the unexpected*. *Sustainability is about survival. The goal of resilience is to thrive.—Jamais Cascio*

***CHAPTER 1: INTRODUCTION AND BACKGROUND***

Bowie State University (BSU) recognizes the importance of addressing climate change as well as minimizing the impact it will have on the quality of life for present and future generations. The United States Environmental Protection Agency, the Maryland Department of Environment and the Metropolitan Washington Council of Government (MWCOG) encourage all jurisdictions, including counties and municipalities, to develop a comprehensive climate change strategy outlining actions that reduce their carbon footprint. Toward that end, the 2009 Bowie State University (CAP) responds to this call to action and establishes a durable framework to guide the implementation and consequent accounting of the University’s GHG reduction initiatives. It is important to emphasize that implementation of the university’s CAP and accompanying Resilience Plan are closely associated with important environmental tenants. Throughout the development of the CAP, a number of themes consistently emerged that informed the selection of the strategies and measures included in Resilience Planning, those themes were to:

**Build on existing efforts** – As discussed in the University’s Climate Action Plan, BSU has already put in place a number of initiatives, programs, and policies that support climate protection goals. Rather than use limited resources and reinvent the wheel, this Resilience plan seeks to bring those existing University efforts together under one framework, suggest improvements or augmentations, and add new efforts where gaps may exist.

**Emphasize measures aligned with University goals and priorities** – As climate change is an area of growing significance, the University’s responsibility to deliver high quality core services in a way that informs the quality of life for the campus community remains the chief driver of the Climate Action Plan and Resilience Plan. The strategies in these plans are tailored to complement this priority.

**Engage the BSU community and Partner with the City of Bowie, and Prince George’s County**  – There are many steps, which can be taken to address climate change and to assist with forging resilience on the BSU Campus and the surrounding community. The development of far reaching solutions necessary to achieve a significant level of resilience; however, will require coordinated and broad participation of BSU, local governments and the other institutions that make-up Prince George’s County. In response, the BSU plan calls for the creation of significant outreach and communication efforts and the establishment of public/private partnerships to help create a strong foundation for community participation in climate change and resilience efforts.

**Develop in-house capacity** – In order for the CAP and/or Resilience Plan to be a success, it will be important to make certain that University staff has the tools, knowledge, and support to implement climate protection/resilient strategies over the long-term. The University has already taken important steps in this direction. A number of additional strategies have been included in the BSU CAP Administrative Guidelines (See Appendix A; chapter 1) that are aimed at further strengthening the internal structure necessary to ensure the University’s leadership role in addressing climate change and establishing a resilient environment in which BSU may continue to thrive.

**Monitor, verify and adjust** – Lastly, regular monitoring and verification of progress will be critical to determining if strategies are achieving their intended results. Revisiting the Plan on a regular basis will provide opportunities to fine tune strategies and maximize results. Revising the plan periodically will also allow the University to incorporate new strategies and approaches into their efforts as new technologies, partnership opportunities and best practices become available.

***CHAPTER 2: DEVELOPING THE STRATEGY***

Development and implementation of a BSU Resilience Strategy provides an opportunity for the university, the City of Bowie, and Prince Georges’ County to partner, research and articulate some of the most pressing resilience challenges. Toward this end, it is BSU’s intent to transform resilience from a concept into an action plan such that its’ Resilience Strategy will provide an invaluable roadmap for BSU to adapt and thrive in response to the formidable climate challenges of the 21st Century.

As climate change continues to pose significant risks, unpredictable and extreme climate-related conditions (e.g. flooding, extreme temperatures, storms) necessitates adaptation strategies. This plan will address those strategies and indicate how they can improve the university’s resilience to today’s climate extremes while ensuring it can handle the changes projected in the years and decades ahead.

*Resilience is defined by the ability of individuals, institutions, businesses and systems within the community to survive, adapt, and grow no matter the chronic stress or acute shock it experiences. A resilient institution lives well in good times and bounces back quickly and strongly from hard times* (Second Nature, 2019).

As Prince George’s County and the region begin to feel the effects of climate change, the impacts will be experienced by the County and its residents, inclusive of the BSU Community in a number of ways. The following is a description of some of the impacts that have been the focus of recent studies and research that can be applicable to our region.

***Increasing Temperatures---*** According to the National Capital Region Climate Change Report, the average temperature in the region is projected to rise by at least 2 degrees Fahrenheit by 2025. The rising temperatures will come with a significant increase in the number of heat waves that are experienced.

***Changes in Precipitation Patterns***---In addition to rising temperatures, climate change is also expected to bring changes to the normal precipitation patterns in the region.

***Impacts on Public Heath*** ---- Increased public health risks are one of the biggest concerns that come with climate change. A warmer climate could result in increased cases of vector-borne diseases (e.g. Lyme disease carried by ticks), water borne disease, and heat related health issues, and respiratory problems due to poor air quality. In In addition to health problems, resulting directly from extreme heat events (e.g. heat stroke) there is also a correlation between heat waves and poor air quality*. (figure1)*

 Toward this end, BSU conducted a campus assessment using Second Natures’ *Campus Evaluation of Resilience Dimensions as* a guideline to help assess the five dimensions of resilience to include Infrastructure, Economics, Ecosystems Services, Social Equity & Governance, and Health & Wellness.

This tool can be used to survey campus and community members regarding their understanding of strengths and vulnerabilities in the area.  The assessment will help prioritize actions to address vulnerabilities, increase resilience and build community relationships.

***Summary of Findings***

The preliminary results (Exhibit 1) of the campus resilience dimensions survey of 17 cross-discipline university participants revealed that the infrastructure and, health and wellness posed the greatest area of resiliency concern.



Regional data (see appendix 2) indicates intense storms and precipitation will likely present as hazards of greatest concern. Hazards liable to adversely affect BSU include extreme storm events such as snow, ice and wind. In addition, environmental changes associated with climate change, particularly periods of extreme temperature are cause for concern from a health and wellness perspective. These hazards may have direct and increasing impacts on the BSU community.

**Areas of Concern**

*Infrastructure*

Maintaining a viable ***infrastructure*** emerged as a major resilience concern. The preliminary results suggest that critical facilities on which much of the campus depends ( e.g. HVAC, mechanical systems water supply ), utility dependencies including refrigeration for food and medicine, aging residence halls, vulnerable trees, hazardous materials storage, and impervious ground surfaces represent major infrastructure concerns. Further, infrastructure concerns necessarily influence the ***health and wellness*** tenets of resilience. Toward that end, of particular concern are: the support of campus food systems including utility dependencies and workforce support; storm water management; establishing protocols for management of widespread infectious disease; housing and wellbeing of students; regional transportation; information systems and networks; and support of faculty and staff during extreme weather. Thus, the major concerns revealed by the initial survey may be distilled into two broad themes:

**Recommendation 1-5 years**

*Infrastructure*

* Update mechanical, electrical, and plumbing (MEP) systems for resiliency (e.g., underground power transmission), leverage low-energy and healthy options (e.g. fresh air ventilation) and better response to seasonal extremes (e.g., increased heating and/or cooling capacity).
* Study and select roof technologies that balance decreased heat absorption, storm water management, and carbon-emission reducing renewable energy opportunities while ensuring durability and resilience to weather hazards such as high wind and snow loading.
* Power system reliability and renewability including strategic reduction of single failure points by investing in battery systems, appropriately placed backup/emergency generators, addition of onsite renewable energy sources.

**Recommendation 1-5 years**

*Health & Wellness*

* Cultivate opportunities for BSU community to forge city and county liaisons for emergency housing of international/non-local students, volunteers to bridge language gaps in emergency services, and on-campus housing options for emergency workforce.
* Support alternative work and teaching arrangements to allow continued productivity during extreme weather. This will require integrated policy and ongoing training and technology investment.
* Liaise with local police, fire, and EMS to ensure a high level of response in circumstances where disaster event extends beyond 24-36 hours.
* Establish relationship between BSU community and local stakeholders (City/County) to both foster a sense of community and initiate the development of a communications plan.
* Establish dialogue with hospital administration to better understand and assess the capacity of hospitals in the event of multiple, simultaneous scenarios.

**Recommendation 1- 7 years**

*Social Equity and Governance*

* Cultivate deeper “bench strength” to properly staff the Emergency Management Operation. This will require BSU officials to support strengthening the emergency operation capacity to include increasing communications channels to the BSU community and to the surrounding local community.
* Increase cross-over training on resiliency with city and county counterparts
* Develop shuttle service in advance of storm events by proactively engaging with transportation providers.
* Seek to improve emergency preparedness by conducting more tabletop drills and include principle staff in these exercises.
* Coordinate emergency management processes and establish routine opportunities for campus and city planning meetings and updates.
* Enhance emergency communications in different languages besides English to ensure important message and directions reach all campus population.
* Look to reevaluate effective use of social media amongst student to ensure prompt responses and appropriate actions in the event of an emergency.

**Recommendation 1-7 years**

*Ecosystem Services*

* Improve the ability to maintain storm-water systems by securing routine cleaning of storm drains and drainage ways on and around campus.
* Conduct a green infrastructure assessment to determine where storm-water runoff can effectively and efficiently be captured prior to entering the system.
* Seek ways to increase use of green infrastructure and natural systems to retain surface runoff away from critical facilities