

# Climate Resilience Initiative: Progress from Spring 2023 through Fall 2025

Neil Leary  
November 21, 2025

This document reports progress through 2025 on [Building Climate Resilience at Dickinson and in Central PA](#), a joint initiative of Dickinson College, Carlisle Borough, and Cumberland County. Publications produced by the initiative are listed and hyperlinked in Section 7, page 6, and recommendations for action by the College are included as an annex beginning on page 7.

## 1. Introduction

The Dickinson faculty approved a [resolution](#) in fall 2022 calling on the College to uphold its commitment to reduce greenhouse gas emissions, expand its commitment to climate action to include climate resilience, and to update the College’s Climate Change Action Plan with the goal of finding more ways to implement bold, innovative, and effective strategies to achieve climate justice goals and to support individuals, departments, and our community in operating sustainably. Responding to the faculty resolution, President John E. Jones signed the [Resilience Commitment of Second Nature](#) in December 2022, joining Dickinson with over 100 colleges and universities working to make their campuses and communities resilient to climate change. Dickinson’s obligations under the Resilience Commitment, their timeline, and status are summarized in Table 1.

*Table 1. Resilience Commitment Obligations, Timeline, and Status*

Timeline	Tasks	Status
Spring 2023	Create a joint campus-community working group to guide and coordinate collaborative College and community efforts.	Completed
Fall 2023 – Spring 2024	Assess climate risks and resilience of Carlisle, Cumberland County, and Dickinson College.	Completed
Spring 2024 – Fall 2025	Identify and evaluate strategies for building climate resilience.	Completed
Fall 2025	Develop and adopt an action plan to increase resilience.	Not started
Spring 2026	Begin implementation.	Not started
Beyond 2026	Monitor progress toward resilience and review and update the action plan every five years.	Not started

## 2. Building on Past Work

The work of the Resilience Initiative builds on prior collaborations of Dickinson's Center for Sustainability Education (CSE) with community partners, including:

- In 2016, students in the course Sustainable and Resilient Communities engaged in community-based research with community stakeholders to assess community resilience of Carlisle using the Rockefeller Foundation's City Resilience Index,
- Students in the 2018 Sustainable and Resilient Communities course worked with staff of the Planning Department of Cumberland County to evaluate implications of climate change for mitigating natural hazards in the County.
- Also in 2018, CSE convened Carlisle and Cumberland County community leaders to participate in two weeks of Resilience Dialogues sponsored and facilitated by the U.S. Global Change Research Program.
- In 2019, CSE and Carlisle participated in the first cohort of college and community partnerships in Pennsylvania's Local Climate Action Program (PA LCAP). Dickinson Climate Action Fellows, Carlisle Borough Council Members, and Center for Sustainability Education staff worked together to estimate Carlisle's greenhouse gas emissions, develop scenarios of future emissions, and research options for reducing emissions in the Borough.
- In 2020, CSE participated in the 2<sup>nd</sup> cohort of PA LCAP college and community partners, this time working with Cumberland County staff and Shippensburg University to estimate county-level current and future emissions and research options for action.
- In 2021, at the request of the Planning Department of Cumberland County, students in the Baird Sustainability Fellows program assessed climate change vulnerabilities in Cumberland County.

These past collaborations made significant contributions to the following outcomes:

- Carlisle Borough incorporated goals for community resilience in the 2019 update to its Comprehensive Plan.
- Cumberland County included discussion of climate change in the 2020 update to Cumberland County's Hazard Mitigation Plan.
- Both Carlisle and Cumberland County adopted Climate Action Plans in 2022.

## 3. Climate Resilience Working Group and Launch of the Resilience Initiative

President Jones directed Ken Shultes, then associate vice president for sustainability, and Neil Leary, associate provost and director of the Center for Sustainability Education, to convene and lead a working group to advise and support efforts to fulfill Dickinson's obligations under the Resilience Commitment. The Climate Resilience Working Group was established as a subcommittee of the President's Commission on Environmental Sustainability (PCES) in spring 2023. Following dissolution of PCES in 2024, the Working Group continued its work and reported to the new Sustainability Subcommittee of the Planning & Budget Committee.

The Working Group includes Dickinson students, faculty, and staff, a representative of the Carlisle Borough Manager's Office, and a representative of the Planning Department of Cumberland County. Members of the Working Group include Neil Leary (co-chair), Ken Shultes (co-chair until June 2024), Marisa Arreola '24 (student), Allyssa Decker (Environmental Studies faculty), Elizabeth Grant (Cumberland County Planning Department), John Henson (Biology faculty), Caroline Krauth '26 (student), Lauren Lasater (Compliance & Risk Management), Lindsey Lyons (CSE staff), Jillian Mann '26 (student), Lindsay Mintz (Student Life staff), Sara Markowitz (Clarke Forum staff), Olivia Ngai '26 (student), Sumaiya Quayum (CSE staff), Hanna Roman (French & Francophone Studies faculty), Kristin Strock (Environmental Studies faculty), Jill Swartz (Public Safety), and Jared Woolston (Carlisle Borough Manager's Office).

The Working Group launched the initiative *Building Climate Resilience at Dickinson and in Central Pennsylvania* in spring 2023 with creation of a website for the initiative, [Climate Resilience, Stepping Forward as a Leader](#), and an open meeting attended by campus and off-campus community members. To guide the initiative, the Working Group produced in summer 2023 a scope of work, an approach for assessing resilience, a background paper on observed and projected changes in climate hazards in Cumberland County, and a background paper on mapping populations of socially vulnerable people in the County. All these outputs are linked below in the *Publications* section of this report. They were shared with campus and off-campus communities through an electronic newsletter with 370 subscribers and publication on the initiative's website.

## 4. Assessment of Climate Risks and Resilience Strategies

Assessments of climate risks and resilience strategies have been completed for Carlisle, Cumberland County, and Dickinson College. Much of the work was performed by Baird Sustainability Fellows and Climate Action Fellows under the direction of the Center for Sustainability Education.

### 4.1. Risks and Resilience in Carlisle and Cumberland County

Students in the 2023 Baird Sustainability Fellows program assessed climate risks and resilience for health and wellbeing, ecosystems and ecosystem services, infrastructure and utility services, economy and finances, and vulnerable populations in Carlisle and Cumberland County. The students collected information about climate risks in the region, regional sources of strength for building resilience, weaknesses that can undermine resilience, and strategies for adapting and building resilience to limit potential harms. Information sources used by the students include the reports of the 2021 Baird Sustainability Fellows, the 2021 Pennsylvania Climate Impacts Assessment, the 2021 Pennsylvania Climate Action Plan, the 5<sup>th</sup> National Climate Assessment, the 6<sup>th</sup> Assessment Report of the Intergovernmental Panel on Climate Change, and many other publications. In addition, the students interviewed over 40 Carlisle and Cumberland County community stakeholders.

The students produced draft reports and presented preliminary findings at a community workshop attended by 50 community stakeholders from across the county. The 3-hour workshop began with short presentations from the students about climate risks and resilience in the County, moved into a series of small group discussions facilitated by the students to explore selected climate resilience topics, and closed with a conversation among all workshop participants to share important ideas

from the small groups. The students used information and insights gained from the workshop to revise their reports, final versions of which were published online and distributed to the community through the resilience newsletter. Also published online is a report on the community workshop.

A synthesis of the students' work plus information from other published sources was prepared by the Center for Sustainability Education, published online in March 2025, and shared with County and Borough stakeholders. The synthesis includes tables that identify resilience strategies for each category of risk (health and wellbeing, infrastructure and utility services, ecosystems and ecosystem services, and economy and livelihoods), indicators for tracking progress, and primary actors for implementation of each strategy.

Outcomes that have resulted from the work include:

- Inclusion of climate resilience goals and affirmation of the county's commitment to climate action in the 2024 update to Cumberland County's Comprehensive Plan.
- Inclusion of an expanded discussion of climate change, identification of extreme heat as a hazard for the first time, and a section on social vulnerability, resilience, and equity in the 2025 update to Cumberland County's Hazard Mitigation Plan.

## 4.2. Risks and Resilience at Dickinson College

Climate risks and resilience at Dickinson College were assessed by students in the 2024 Baird Sustainability Fellows and Climate Action Fellows programs. Using the work performed by the 2023 Baird Sustainability Fellows as a starting point, the 2024 Baird Sustainability Fellows and Climate Action Fellows evaluated how changing climate hazards in the county could impact Dickinson College, strengths and weaknesses at the College for managing the hazards, and strategies for building resilience at the College. Their research included four focus group discussions that were facilitated by the students. Nearly 60 Dickinson administrators, staff and faculty members participated in the focus groups. At the end of the semester, the students led a workshop to engage Dickinson administrators, staff, and faculty in discussion of their preliminary findings and recommendations. Following the workshop, the students wrote final reports that presented their findings and recommendations of resilience strategies for protecting student and employee health and wellbeing, infrastructure, utilities, and grounds, continuity of operations, and college finances.

In spring 2025, the 2024 Baird Sustainability Fellows and Neil Leary produced a summary of the climate risks judged to be most salient for Dickinson and recommendations for action by the College. The recommendations are:

1. Convene a working group to develop a comprehensive climate resilience plan.
2. Continue to engage students, staff, faculty, and community partners in climate resilience work.
3. Design and implement a climate health resilience plan.
4. Climate-proof and decarbonize physical infrastructure.
5. Maintain, adapt, and expand the campus tree canopy.

6. Develop an academic continuity plan.
7. Reinststate continuity planning for other essential functions.
8. Improve electric power reliability and resilience.
9. Set targets and initiate steps to increase reserve funds.
10. Assess and manage endowment exposure to climate risk.

The recommendations, which are elaborated in the annex of this report beginning on page 7, are focused on climate-related risks but many would simultaneously increase resilience with respect to other risks faced by the college. The recommendations were submitted to the Sustainability Subcommittee of the Planning & Budget Committee for their consideration and action.

## 5. Resilience Learning and Research

Second Nature's Resilience Commitment calls for signatories to integrate climate resilience into the curriculum and cocurricular programs and to engage in research on climate resilience. Prior to Dickinson signing the Commitment, resilience had already been incorporated into the course SUST 200 Introduction to Sustainable and Resilient Communities through readings, writing assignments, and semester-long community-based research projects. In fall 2023 and fall 2024, following Dickinson joining the Resilience Commitment, climate resilience was made the focus of the SUST 490 Advanced Practicum in Sustainability course that is taken by Baird Sustainability Fellows. Additionally, student Climate Action Fellows were hired and supervised by CSE to research climate risks and resilience strategies for the College. Several Environmental Studies courses and one First Year Seminar have also engaged students in learning about climate resilience.

There are many other places in the curriculum into which climate change and climate resilience could add value to student learning. A group of faculty members and Academic Affairs staff have met to discuss ideas for supporting teaching and research related to climate change. Options include encouraging applications for Sustainability Education Fund grants for course development, faculty development, and student-faculty research related to climate resilience and climate change; faculty "share fairs" focused on climate change teaching and scholarship; faculty study groups on climate change topics; and creating a recurring faculty study group and workshop similar to Valley & Ridge that would have a climate change focus.

## 6. Next Steps

The next steps for Dickinson are to develop, adopt, and implement an action plan for building climate resilience at the College. To be consistent with and fulfill Dickinson's obligations under the Resilience Commitment of Second Nature, the action plan should include:

- Goals and target dates for increasing climate resilience,
- Mechanisms and indicators for tracking progress,
- Actions to make climate resilience part of Dickinson's curriculum and other learning experiences for all students,
- Actions to expand research in resilience, and
- A process for reviewing and updating the action plan not less frequently than every five years.

Moving this work forward will require affirmation by senior leaders and the Dickinson community of the importance of building climate resilience at the College and assigning responsibilities and resources to develop and implement a plan. This will be challenging because the work cuts across multiple divisions of the College, requires collaboration of people with many kinds of expertise, is likely to entail significant effort, and will be constrained by limited financial and human resources. Resilience work will also be challenged by an out-of-date plan and stalled progress for reducing Dickinson's greenhouse gas emissions.

Inaction, however, would place Dickinson's students, staff, faculty, and assets at growing risk from climate hazards. Inaction would also risk Dickinson's standing as a leader in sustainability learning and action. Making progress on climate resilience and emissions reduction will require identifying and prioritizing the most significant climate risks and emission reduction opportunities, focusing initially on the highest priorities with cost-saving and cost-effective strategies, and making use of opportunities to integrate climate resilience, energy efficiency and reliability, and carbon reductions in capital projects, energy, mechanical and information systems, deferred maintenance, management of campus grounds, risk management, continuity planning, student experience programs, wellness programs, the curriculum, student and faculty scholarship, and other facets of our work at Dickinson.

## 7. Resilience Initiative Publications

Publications of the Resilience Initiative can be accessed online at [https://www.dickinson.edu/info/20052/sustainability/4371/climate\\_resilience/2](https://www.dickinson.edu/info/20052/sustainability/4371/climate_resilience/2). Direct links to individual publications are provided below.

### *Scope of Work, Approach, and Background Papers*

- [Scope of Work, Building Climate Resilience at Dickinson and in Central PA](#), Resilience Working Group, Jul 2023.
- [Approach for Resilience Assessment, Building Climate Resilience at Dickinson and in Central PA](#), Resilience Working Group, Jun 2023.
- [Changing Climate Hazard in Cumberland County, a Review of the Evidence](#), N. Leary, Aug 2023.
- [Social Vulnerability, Resilience, and Equity](#), N. Leary and G. Messimer, Sep 2023.

### *Climate Risks and Resilience in Carlisle and Cumberland County*

- [Climate Risks and Resilience in Cumberland County, a Synthesis](#), N. Leary, Mar 2025.
- [Social Equity and Governance](#), Kathryn Hickey '24, Jan 2024.
- [Health and Wellbeing](#), Heidi Beardsley '25, Jan 2024.
- [Ecosystems](#), Kristen Beach '24, Jan 2024.
- [Infrastructure, Utilities, and Services](#), Christian Polk '24, Jan 2024.
- [Economy and Finances](#), Isabella Moes '24, Jan 2024.

## *Climate Risks and Resilience at Dickinson College*

- [Recommendations for Building Climate Resilience at Dickinson College](#), N. Donia '26, K. Gauchan '24, N. Salsich '25, K. Sipe '25, and N. Leary, Aug 2025.
- [Strategies for Student and Employee Health and Wellbeing](#), N. Salsich '25, Feb 2025.
- [Strategies for Infrastructure, Utilities, and Grounds](#), K. Sipe '25, Feb 2025.
- [Strategies for Continuity of Operations](#), N. Donia '26, Feb 2025.
- [Strategies for College Finances](#), K. Gauchan '25, Feb 2025.
- [Ecosystem Services, Green Infrastructure, and Stormwater Management](#), A. Ray '25, Jun 2024.
- [Health and Wellbeing of Dickinson students and employees](#), R. Semma '25, Jun 2024.
- [Infrastructure and Continuity Planning](#), S.V. Bautista, '26, Jun 2024.

## Annex

### Recommendations for Building Climate Resilience at Dickinson College

Natalia Donia '26, Karuna Gauchan '24, Noah Salsich '25, Kailey Sipe '25, and Neil Leary  
Center for Sustainability Education, Dickinson College  
August 6, 2025

The severe thunderstorm that struck Carlisle without warning the afternoon of June 30, 2025, demonstrated some of the risks posed by extreme weather to Dickinson College, its students and employees, and to communities in the region. High winds, heavy rainfall, flash flooding, and hail caused extensive damage to trees and buildings on campus and in Carlisle, downed power lines, flooded and closed streets, and created life-threatening conditions. In the aftermath of the storm, students, employees, and youth participants in the CPYB and CTY programs walked through debris and under damaged trees on campus. Emergency vehicles responding to calls in Carlisle struggled to find safe routes to their destinations, as did commuters, other motorists, and cyclists.

The Lower Quad filled with over a foot of storm water, muddy water flowed from Britton Plaza to flood the lower level of the library, and building materials stored outdoors for summer projects were damaged. The college closed for two days while facilities and groundskeeping staff worked to make the campus safe by removing fallen trees, tree limbs, and debris and roping off dangerous areas. Over 5000 Carlisle households lost power, as did parts of Dickinson's campus. Several hundred households continued to be without power for one and two days after the storm.

The damaging storm is emblematic of the complex, multifaceted and continually evolving climate risks faced by Dickinson – risks that are being amplified by human-caused climate change. Recognizing the seriousness of the risks, President John Jones signed the Resilience Commitment of Second Nature in December 2022, pledging Dickinson to develop and adopt a climate resilience plan to mitigate climate risks to our campus and community.

To help inform development of a plan, we assessed climate risks to the college, evaluated resilience building strategies, and developed recommendations for action. Our work was performed as part of the 2024 Baird Sustainability Fellows program and included focus group discussions, a workshop, and interviews with Dickinson employees, review and synthesis of relevant publications, and multicriteria analyses of potential

response strategies.<sup>1</sup> We built on prior work of the 2023 Baird Sustainability Fellows Kristen Beach '24, Heidi Beardsley '25, Kathryn Hickey '24, Isabella Moes '24, and Christian Polk '24, the 2022 Baird Sustainability Fellows Claudia Bonaccorsi '22, Jackie Greger '22, Julie Korgen '22, Sam Lavine '22, Grace Messimer '23, Emily Pikturna '22, Ashley Russo '22, and Franklin Saeteros '22, and Climate Action Fellows Christine Gurek '25, An Hoang '25, Grace Ngo '27, Aidan Ray '25, Rahma Semma '25, and Sebastian Valdez Bautista '26. Our and their research reports are published on Dickinson's [Climate Resilience](#) website.

In this document we briefly summarize the climate risks that we judge to be most salient for Dickinson College and present our recommendations for action. Our recommendations are organized around four categories of risk: human health and wellbeing, infrastructure and grounds, continuity of operations, and college finances. Additionally, we offer two cross-cutting recommendations.

We recommend the following actions:

11. Convene a working group to develop a comprehensive climate resilience framework.
12. Continue to engage students, staff, faculty, and community partners in climate resilience work.
13. Design and implement a climate health resilience plan.
14. Climate-proof and decarbonize physical infrastructure.
15. Maintain, adapt, and expand the campus tree canopy.
16. Develop an academic continuity plan.
17. Reinstate continuity planning for other essential functions.
18. Improve electric power reliability and resilience.
19. Set targets and initiate steps to increase reserve funds.
20. Assess and manage endowment exposure to climate risk.

The recommendations, which are elaborated below, are focused on climate-related risks but many would simultaneously increase resilience with respect to other risks faced by the college. We direct our recommendations to the Sustainability Subcommittee of the Planning & Budget Committee while also sharing them with others at Dickinson to catalyze conversations, encourage creative responses, and invite feedback.

### **Crosscutting Recommendations**

Climate hazards and climate change pose multiple, intersecting risks to Dickinson College, the Dickinson community, and communities in the region. Effective action to limit the risks and build resilience requires a coordinated, holistic framework and process that cuts across the different divisions and functions of the college.

#### *1. Convene a Working Group to Develop a Comprehensive Climate Resilience Framework*

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<sup>1</sup> We thank the many Dickinson employees who contributed valuable information to our research through focus group discussions, interviews, and an end-of-semester workshop. They include Seth Allen, Angie Barone, Daniel Berndt, Steve Bobb, Deb Bolen, Samantha Brandauer, Em Breneman, Todd Bryant, Sarah Burkett, Tim Cahill, Tori Campbell, Celine Cunningham, Renée Cramer, James D'Annibale, Dee Danser, Allyssa Decker, Katie DeGuzman, Jeanette Diamond, Heather Dunn, Dan Guerrisi, Maureen O'Brien Dermott, Jeanette Diamond, Shannon Egan, Karen Faryniak, Jill Forrester, Darren Glass, Debrah Hargrove, Angie Harris, Jay Himes, David Kelly, Mike Kiner, Kristen Kostecky, Cheryl Kremer, Sarah Leahy, Jennifer Love, Stacey Mackes, Jesse McDonald, Lindsay Mintz, Mackenzie Moyer, Amalia Pesantes Villa, Bernadette Pham, Ben Sweger, Tim Richwine, Carlo Robustelli, Katie Schweighofer, Carol Shaffer, Tracy Snyder, Michelle Spencer, Braxton Stroup, Melissa Sturm-Smith, Elise Yeh, David Walker, Kevin Walters, Amy Ward, Stephen Winn, Sean Witte, and Sonya Wright. We also thank David Gleim of Warren Wilson College who spoke with us about his college's response to and recovery from Hurricane Helene.

We recommend that Dickinson’s Sustainability Subcommittee convene a working group and charge it with developing a framework for building climate resilience and presenting the framework to the Planning & Budget Committee for its consideration and action. The process for developing the framework should be transparent and participatory, seeking input from members of the Dickinson community, off-campus partners, and external experts.

The framework should be understood to be a broad umbrella under which more specific strategies and actions are to be developed and implemented in an iterative process of learning and action for building climate resilience at Dickinson. It should identify priority risks and opportunities for action for the next 5 years, describe strategies for addressing the prioritized risks and opportunities, and assign responsibilities for mobilizing resources and implementation. The framework should also establish measurable objectives and provide for monitoring and assessing progress, learning from experience, and updating the framework periodically as knowledge and experience are gained. Our other recommendations, presented below, offer targeted actions for implementation under the framework.

## *2. Continue to Engage Students, Staff, Faculty, and Community Partners in Climate Resilience Work*

We recommend that students, staff, faculty, and community partners continue to be engaged in climate resilience work at Dickinson. Each of these constituencies have participated in and contributed important knowledge and perspectives to the initiative [\*Building Climate Resilience at Dickinson and in Central Pennsylvania\*](#). Their continued participation should be encouraged and supported. On-campus and off-campus audiences should be kept engaged and informed through periodic open meetings, workshops, public presentations, online publication of progress and other reports, and distribution of newsletters. While Dickinson’s resilience planning work should focus on the college campus and its’ members, Dickinson should continue to work with community partners in mutually beneficial ways that help reduce climate risks in Carlisle and other communities across Cumberland County and Central Pennsylvania.

Climate resilience work offers rich opportunities for students to gain important skills and experience by using the campus as a living lab for learning about climate risks, resilience strategies, and problem solving. The Center for Sustainability Education, faculty members, Facilities Management, Student Life, the risk management office, and other entities should collaborate in creating learning opportunities for students. Student participation in resilience work can include course projects, independent student research, student-faculty research, and service on relevant committees and task forces.

### **Human Health and Wellbeing**

Climate change and extreme weather events pose significant risks to the health and wellbeing of Dickinson students, employees, and employees’ families. Health risks that are most salient for Dickinson College are described briefly below, followed by recommended actions.

*Extreme heat events* are very likely to increase in frequency, severity, and duration in our region, exposing students, employees, employees’ families, children at the Dickinson College Children’s Center, summer residents of the CBYB and CTY programs, contracted workers, and campus visitors to growing risks of heat-related illnesses. Extreme heat is a significant health risk, killing more people on average per year in the United States than any other weather hazard, aggravating chronic illnesses of hundreds of thousands of people each year, and resulting in more than 100,000 emergency room visits and hospitalizations annually. At particular risk from extreme heat are children, the elderly, people with pre-existing health conditions, and those who work outdoors, work in hot and poorly ventilated indoor environments, or engage in athletics and other strenuous outdoor activities.

*Outdoor air quality* will likely be degraded in Central Pennsylvania by climate change unless emissions of air pollutants are reduced significantly. Degraded air quality would increase risks to students, employees, and employees' families from heart disease, asthma, other respiratory diseases, and other adverse health effects that are associated with air pollution. Nationally, air pollution causes an estimated 60,000 to 260,000 premature deaths each year. Central Pennsylvania, including the Harrisburg-Carlisle area where Dickinson is located, is one of ten areas recently reported to have the worst air pollution in the United States from fine particulate matter. Dickinsonians at high risk from degraded air quality are many of the same groups who are at risk from extreme heat exposure.

*Mental health* of students and employees can be negatively impacted by extreme weather events, which are likely to become more frequent and severe with climate change. Studies have demonstrated that people whose homes, families, and communities are harmed by extreme weather can suffer anxiety, depression, post-traumatic stress disorder, suicidal ideation, and suicide. These mental health effects can impact students' and employees' mental wellbeing, students' academic performance, and employees' work performance.

*Additional health effects* of climate change that could impact the Dickinson community include degraded indoor air quality from mold, bacteria, and other biological contaminants that thrive in warm, moist environments, increased incidences of infectious diseases such as Lyme disease, injuries from severe weather, disruptions to the ability of healthcare facilities in the Carlisle area to provide services during emergencies, and impacts of extreme weather on transportation systems that impede people's access to healthcare services. The wellbeing of the Dickinson community can also be impacted by the effects of climate change on food costs and food security, housing costs and housing security, and people's finances and livelihoods.

### Recommendations for Protecting Health and Wellbeing

#### 3. *Design and Implement a Climate Health Resilience Plan*

Dickinson should design and implement a plan for protecting students and employees from heat-related illness, physical and mental health risks from storm events, degraded outdoor and indoor air quality, and infectious diseases. The plan should also include contingencies for accessing healthcare during periods when local and regional healthcare facilities and services may be impacted by extreme weather, electric power and telecommunications outages, or disruptions to transportation systems.

The climate-health plan should adopt a near-term focus on extreme heat and heat-related illnesses by including the elements noted below. Extension of the plan to address additional climate-related health risks should be considered in future years.

- *Heat Risk Education and Training:* Dickinson should develop a program to educate students, employees, and communities in Cumberland County about health risks associated with extreme heat events, how to recognize symptoms, and measures to prevent and treat heat-related illnesses. Additionally, selected employees should receive periodic training for preventing and responding to heat-related illness, either in a stand-alone unit or integrated into a more comprehensive first aid training program. Public Safety officers, athletics coaches, Wellness Center staff, Resident Assistants, and other Student Life staff are among those who should participate in the training. The [University of Pennsylvania's Heat Illness Prevention Program](#) and the [University of Washington's Heat Education & Awareness Tools](#) are models of effective programs that should be consulted when developing a plan for Dickinson.
- *Heat Protocols for Dickinson Athletics:* Dickinson Athletics has robust protocols and practices for addressing heat-related risks for varsity athletes. However, because average temperatures and extreme

heat events are projected to increase, the protocols and practices should be reviewed to assess their continued adequacy and evaluate if and how they could be updated to be more protective of athletes' health. Consideration also should be given to strategies for protecting the health of students who engage in non-varsity recreational activities from heat-related illness. The Centers for Disease Control's webpage for [Heat and Athletes](#) provides links to numerous relevant resources. Also useful are the [University of Texas at Austin's 2025-2026 recommended heat protocols](#),

- *Employee Heat Illness Prevention Program*: Dickinson should implement a program to prevent heat-related illness for its employees. The program should go beyond education to include guidelines and implementation of workplace practices and rules that protect employees from heat exposure and heat-related illness. Dickinson should look to guidance from the Occupational Safety and Health Administration (OSHA) for creating a [heat illness prevention program](#) and [heat exposure standards](#).

## **Infrastructure and Grounds**

Climate change and extreme weather events pose significant risks to Dickinson's infrastructure and grounds. Assets at risk include campus buildings, mechanical equipment, the central energy plant, electric power and telecommunication lines and equipment, water, stormwater and sewage lines and structures, hardscapes such as sidewalks, paths, drives, and parking lots, green infrastructure including campus trees, shrubs, lawns, rain gardens, and athletic fields, and the college farm.

*Risks of physical damage* to infrastructure from severe weather are likely to grow as the climate continues to get increasingly warm, wet, and extreme. More frequent and severe heavy rains, flash floods, stormwater floods, and windstorms can damage building exteriors and interiors, exacerbate mold and other indoor air quality problems, shift foundations, erode soils, and damage hardscape and landscape features. Damage to infrastructure can result in costly repairs and the loss of use of the affected assets, causing disruptions to academic programs, student housing, dining, communications, and other college functions. In extreme cases, severe weather can cause infrastructure failures that endanger lives.

*Aging and deteriorating materials* can be accelerated by a hotter, wetter, and more variable and extreme climate. Accelerated deterioration can increase operation and maintenance costs, reduce useful lifetimes of infrastructure, and increase the frequency of needed replacements. These effects can add to the backlog of deferred maintenance needs, an issue that the National Association of College and University Business Officers and Moody's Ratings have identified as a growing concern in higher education that can impact college finances, student enrollment, credit ratings, and costs for borrowing funds.

*Performance of infrastructure* can be reduced by changes in climate that diverge from the design parameters of the infrastructure. Maintaining desired indoor temperatures, humidity, air quality, and comfort can become more challenging, require greater energy use for space conditioning, and increase utility costs. Diminished indoor air quality and comfort can impact the health of students and employees.

*Trees and other green infrastructure* that provide substantial benefits to the Dickinson community are very likely to be stressed by the changing climate. Many of Dickinson's trees, shrubs, and perennials are likely to become increasingly ill-suited to Carlisle's climate, experience increased pressures from pests and disease, and suffer impaired health and higher mortality. Consequently, they may provide diminished stormwater control, cooling, aesthetic, and mental health benefits. Costs for monitoring, maintaining and replacing trees and other plants and for maintaining athletic fields are likely to increase. The Dickinson Farm faces distinct risks that were not addressed in our research.

## Recommendations for Protecting Infrastructure and Grounds

#### 4. *Climate-Proof and Decarbonize Physical Infrastructure*

Dickinson should engage engineering and other experts to assess vulnerabilities of buildings and other physical infrastructure to climate hazards while simultaneously assessing opportunities to reduce their greenhouse gas emissions, identify and prioritize critical risks and emission reduction opportunities, and advise on a multi-year plan to proactively, strategically, and cost-effectively mitigate risks and reduce emissions. The plan should give deliberate attention to the effects of weather and climate on the condition and performance of physical infrastructure, building enclosures, and building foundations as part of Dickinson's annual monitoring and inspection practices. It should also include assessment and remediation of buildings with chronic indoor air quality problems such as mold. Actions to address prioritized risks and emission reduction opportunities should be incorporated into Dickinson's budgeting process for deferred maintenance.

#### 5. *Maintain, Adapt, and Expand the Campus Tree Canopy*

Dickinson should assess the health of campus trees with respect to changes in climate, damage from storms, and other pressures on tree health, continue to invest in the care and maintenance of campus trees, identify and select species for new plantings that can thrive in the changing climate, and strategically expand the campus tree canopy. These actions can reduce the urban heat island effect and thereby help limit health risks from extreme heat. The actions would also maintain and increase the substantial benefits produced by campus trees for managing stormwater, protecting air quality, providing quality greenspaces that contribute positively to mental health and wellbeing, and providing a visually appealing campus that helps Dickinson to recruit and retain students and employees.

### **Continuity of Operations**

Continuity of Dickinson College's operations is highly sensitive to weather and other events that can cause outages of electric power and telecommunication services, damage campus buildings, and disrupt transportation systems, health care services, emergency services, supply chains, and pipelines for water and natural gas. The disruptions can impact the ability of the college to communicate with the campus community and beyond, offer academic instruction, advising, and student support services, provide access to library and other information sources, enable students and employees to travel safely to and from campus, and provide our students with safe and healthy food, housing, water, wellness services, and recreational opportunities.

Over the past year Dickinson has experienced weather-related events that have impacted many of these functions, some lasting a few hours and others a day and more. Yet there is always the potential for larger events to disrupt operations for many days, weeks, and even months, the likelihood of which are anticipated to grow as the climate warms.

*Electric power outages* are caused most often in the United States by extreme weather events. Powerlines, transmission towers, transformers, and substations are at risk from high winds, falling trees and tree limbs, floods, and land subsidence. Across Pennsylvania, including the PPL service area, the reliability and resilience of electric power distribution has declined in recent years. The Pennsylvania Public Utility Commission reports power outages have increased in frequency and duration since 2015 and identifies contributing factors to include more frequent storms, weakening of trees by the Emerald Ash Borer and other stresses, and insufficient investment by utilities in managing vegetation that overhangs or is adjacent to powerlines and other infrastructure.

Dickinson has very limited capacity to generate and store electricity for powering the campus during electric power outages. The systems we have are only sufficient for supplying power for emergency communications,

emergency lighting, keycard lock systems, and a few other small electricity uses. Electric power outages that the college has experienced have been disruptive to campus operations, but we have been fortunate that the outages have been relatively short in duration. We are, however, highly vulnerable to events that would cause long-duration power outages. Our vulnerability may increase in the near future as extreme weather events become more frequent and severe in the warming climate.

*Telecommunications*, which encompass telephone and cellular networks, data centers, data and video transmission, the internet, and other services, are reliant on electric power and are disrupted when climate hazards cause power outages. Telecommunications infrastructure itself can also be directly impacted by severe weather, as Dickinson College learned when downed trees damaged internet fiber optic lines on two occasions last year. These events prompted the college to contract with an additional internet service provider.

*Academic instruction* and ancillary services that support student success can be impacted and require adaptation, relocation, or suspension due to power and telecommunications outages, damages to and closure of buildings, or closure of the campus or parts of the campus due unsafe conditions. The disruptions to academic functions can have significant negative impacts on student and employee mental and physical wellbeing, student success, persistence, and retention, and faculty scholarship and professional activities.

*Student housing and dining services* can also be impacted by climate-related hazards and require relocating students to temporary housing and limiting or closing food services. Dickinson residence halls and the Holland Union Building (HUB) are equipped with back-up power generation and storage systems. But the capacities of the systems support very limited uses. In the residence halls, the back-up systems do not provide enough power to operate heating, ventilation and cooling equipment, non-emergency lighting, or plug loads. In some buildings, automatic flush toilets cannot be operated during a power outage. Back-up power systems in the HUB do not have sufficient capacity to operate refrigerators, freezers, electric cooking equipment, non-emergency lighting, or card swipe machines.

## Recommendations for Continuity of Operations

### 6. *Develop an Academic Continuity Plan*

The Academic Affairs division should develop and adopt a continuity plan that establishes policies and procedures for guiding Dickinson College decision-makers, faculty members, and Academic Affairs staff in supporting continued teaching and learning during and after disruptive events. The plan should be attentive to equity considerations, seek input from students, identify key individuals and teams who will make decisions, allocate resources, and communicate with different audiences, and empower faculty to implement flexible, creative solutions that serve students' needs. The campus community should be made aware of the plan and have easy access to it. Key people should be trained in executing the plan and provision should be made for periodically reviewing and updating the plan.

The plan should draw from and build on strategies that proved effective in responding to the COVID-19 pandemic, using Academic Technology's webpage for [Academic Continuity](#) as a starting point. The plan should encompass other types of risks in addition to pandemics that can disrupt instruction for extended periods such as extreme weather, power outages, extensive building damage, key infrastructure failure, civil unrest, and mass violence.

[Planning for Academic Continuity, a Guide for Academic Leaders](#) from Every Learner Everywhere can serve as a key resource for developing a plan for Dickinson. The guide highlights lessons drawn from a review of over 100 academic continuity plans and identifies the University of Massachusetts – Amherst, Minnesota State Tech, and [Elon University](#) as having exemplary academic continuity plans. Some of the issues that Dickinson's plan

could usefully address include identifying spaces that can be reallocated if needed for classroom and other academic uses, providing guidance and assistance for shifting from in-person to online and hybrid modes of instruction, encouraging widespread use of the Learning Management System to better facilitate mid-semester shifts in teaching modes, identifying backup instructors for courses as feasible, and establishing policies for modifying academic workloads, assignments, exams, grading, and incompletes when a semester is disrupted. Provision also should be made for continuing student support services from Academic and Disability Services, Academic Advising, the Writing Center, and the Quantitative Reasoning Center.

#### *7. Reinstate Continuity Planning for Other Essential Functions*

Dickinson senior officers should evaluate the state of continuity planning at Dickinson for essential functions beyond academic programs, assess needs and priorities for continuity planning, and develop a strategy and process for reinstating effective continuity planning at the college. To help guide this process, advice should be sought from external professionals with expertise in continuity planning.

In March 2020, after the college closed due to the COVID-19 pandemic, Dickinson asked directors of administrative units to prepare business continuity plans. The purpose of the plans was to enable units to continue to perform essential functions if a significant number of staff were out of the office due to illness. Since 2020, there have been significant changes in personnel and organizational units at Dickinson. Yet directors have not been asked to review and update their continuity plans. It is important for Dickinson to reinstate continuity planning to be better prepared for climate hazards and other disruptive events.

#### *8. Improve Electric Power Reliability and Resilience*

We recommend that Dickinson engage relevant experts to assess and prioritize needs for back-up electric power for periods of power outages, evaluate options for back-up power generation and storage, and identify cost-effective options for meeting the highest priority needs with zero carbon or low carbon energy. Drawing on the results of the analysis, the Planning & Budget Committee and the Division of Finance & Administration should develop and adopt a strategy for funding and implementing the highest priority options over a multi-year timeline.

### **College Finances**

Climate hazards impact Dickinson's finances through multiple pathways. As already noted, the impacts of climate hazards can increase costs for operation, maintenance, repair, and replacement of campus infrastructure and grounds. The effects of extreme heat, degraded air quality, and severe weather on employees' health can diminish worker productivity, increase days of sick leave, and increase costs from employees' health insurance and workers' compensation claims. Outages of electric power and telecommunications cause costly disruptions of essential functions and loss of work time and employee productivity.

Large events can have regional scale impacts on electric power and natural gas transmission, oil refining and shipments, and supply chains for food and other materials purchased by the college that would impose significant costs on Dickinson. College revenues are also at risk from events that disrupt academic instruction, close buildings, or close the campus for extended periods and require student fees for tuition, room, and board and rents from summer programs to be refunded. New student recruitment and retention of current students could be impacted by damages to the campus that entail long periods of reconstruction and recovery.

Some costs of climate hazards are covered by property insurance. But insurance premiums paid by Dickinson could increase in the future and insurance availability could decrease if insurance companies judge that

growing climate hazards are increasing their financial exposure. Growing climate hazards can also increase borrowing costs. In fact, there is already evidence of increased insurance costs, increased borrowing costs, and lowered property values in areas of the US with high and growing risks from flooding, tropical storms, and wildfires. Some markets in the Gulf Coast region and California have seen insurance premiums increase 50 to 90 percent since 2018 and some insurers have withdrawn coverage in high-risk locations.

Another potentially significant but difficult to assess financial risk to Dickinson is exposure of the endowment portfolio to hazards from climate change and policy changes. Businesses and assets in regions with substantial climate hazards, or in economic sectors that are particularly vulnerable to climate hazards, may be at increasing risk as the climate changes. Investment portfolios with high exposures to these at-risk assets may be riskier than portfolios with lower exposures. Also of concern are exposures to fossil energy assets that are subject to high levels of uncertainty from volatile changes in environmental and energy policies and regulations. Concerns about these types of risks is motivating research on ways to stress test investment portfolios under scenarios of high climate change impacts and major changes in regulatory and policy environments to inform the design investment strategies that can help hedge against the risks. The extent to which Dickinson's endowment is exposed to climate risks has not been assessed.

### Recommendations for College Finances

#### *9. Set Targets and Initiate Steps to Increase Reserve Funds*

Dickinson's Division of Finance & Administration and the Planning & Budget Committee should review needs for financial reserve funds for operations, health insurance, and study abroad with respect to current and changing climate and other risks, set appropriate targets for reserve funds, and initiate steps to meet reserve targets that are feasible and consistent with Dickinson's overall financial needs and priorities. The review and any revisions to reserve targets should be informed by learning from the practices of peer institutions and guidance available from groups such as the National Association of College and University Business Officers (NACUBO).

#### *10. Assess and Manage Endowment Exposure to Climate Risk*

The Board of Trustees' Committee on Investments and Dickinson's Vice President for Finance and Administration should engage Investure's managers and members in discussions about assessing and managing exposure of members' endowments to climate risk, including risk from impacts of extreme weather and climate change on assets and risk from changes and uncertainty in environmental and energy regulations and policies. Currently, Dickinson analyzes endowment risk from six perspectives: geographic risk, currency risk, liquidity, leverage, capital structure, and net asset value of private equity investments and unfunded liabilities. Consideration should be given to adding climate risk as a seventh perspective or to integrating climate risk into one or more of the other perspectives. The Committee on Investments should be asked to report to the Dickinson community on its discussions with Investure and its members, its assessment of endowment exposures to climate risks, and viable approaches for managing the risks.