

Building Climate Resilience at Dickinson and in Central PA Approach for Resilience Assessment

June 15, 2023

This document outlines the approach we will use to assess exposures to climate stressors, climate vulnerabilities, and climate resilience. An initial assessment will be carried out from fall 2023 through spring 2024, and results will be synthesized in summer 2024. The second phase of the resilience initiative, investigation of climate change adaptation and resilience strategies, will follow completion of the resilience assessment. In future, more focused and detailed assessments may be performed for climate vulnerabilities and areas of resilience identified as high priorities.

The initial assessment will follow the general approach recommended by Second Nature for a [Campus-Community Resilience Assessment](#). The approach includes identifying and understanding campus and community exposures to climate and other stressors, vulnerabilities from climate stressors, strengths and weaknesses that provide capacities or pose obstacles for responding effectively to climate stressors, strategies for building climate resilience, developing indicators and metrics for evaluating current resilience and progress in building resilience; collecting and using data to establish values for selected metrics; and synthesizing information to characterize climate resilience. These steps will be carried out for three domains or jurisdictions (Dickinson College, Carlisle Borough, and Cumberland County) and five dimensions of resilience (society, equity, and governance; health and wellbeing; ecosystem services; infrastructure, utilities, and services; and economy and finances), taking into account interdependencies across domains and dimensions.

A resilience assessment matrix tool, adapted from matrices developed by Arizona State University and Portland State University, will be used to guide collection of information for the assessment and to organize the collected information (see [Dickinson-Carlisle-Cumberland Resilience Assessment Matrix](#) and examples from [Arizona State University](#) and [Portland State University](#)). Data will be collected and input to the resilience assessment matrix by Dickinson students and a companion report produced. Data will be collected and input for Carlisle and Cumberland County in fall 2023 by students in the Baird Sustainability Fellows Practicum course and data for Dickinson College will be collected and input in spring 2024 by Dickinson students in the Introduction for Sustainable and Resilient Communities course. Other courses in future semesters may undertake focused assessments on issues identified as priorities in the initial assessment.

Data sources for input to the matrix and for the companion report will include planning documents of Dickinson College, Carlisle Borough, Cumberland County, and Pennsylvania; county- and census tract-level indices of natural hazards' risks, social vulnerability, and community resilience from the Federal Emergency Management Agency (FEMA), the Centers for Disease Control and Prevention, and the University of South Carolina's Hazards Vulnerability and Resilience Institute; relevant reports and studies; and consultations, interviews, focus group meetings, and workshops with community members, subject matter experts, and staff of government agencies, community organizations, businesses, and Dickinson College.

The draft matrix is populated with suggested resilience dimensions and planning areas as listed on following page, which draw from guidance from Second Nature and the examples from Arizona State University and Portland State University. The dimensions and planning areas will be used to help organize the collection, analysis, and reporting of information, while taking into account overlaps and interdependencies across dimensions and planning areas. Input is invited from Climate Resilience Working Group members and others to refine the lists of dimensions and planning areas so that they are well matched to our communities.

Table 1. Resilience Dimensions and Planning Areas

Society, Equity, Governance Community engagement Social cohesion & trust Economic opportunity Vulnerable populations Comprehensive planning Hazard mitigation planning Climate action planning Emergency management Cross-jurisdiction coordination	Ecosystem Services Air quality Streams, wetlands, lakes Forests Wildlife, pollinators, & biodiversity Recreation Flood control Flood plain & watershed management	Economy & Finances Regional/local economic development Employment & incomes Agriculture Tourism & recreation Municipal budgets & tax base Hazard insurance Credit ratings Emergency funds Reserve funds Funding for climate resilience & greenhouse gas reduction
Health & Wellbeing Healthcare services & facilities Healthcare insurance & access Urban heat islands Food security Homelessness Affordable housing Education Recreation Safety	Infrastructure, Utilities, Services Energy Water Stormwater Waste Transportation Buildings Parks, landscaping, grounds Communication Emergency shelters, cooling shelters	

Following are descriptions, examples, and data sources of the information to be input to the data fields in the draft matrix.

Climate Stressors: List changing climate hazards that are most relevant for each planning area. Examples include rising average temperatures and more frequent and/or severe extreme temperature events, extreme precipitation events, droughts, and storms. Data sources include Climate Change in Cumberland County 2021 draft report; Cumberland County Hazard Mitigation Plan Update 2020; Pennsylvania Climate Impacts Assessment 2021; and the FEMA National Risk Index.

Other Stressors: List non-climate stressors that could significantly impact abilities to respond effectively to climate stressors in each planning area. Examples include economic recession, loss of a major employer, poverty, food insecurity, affordable housing shortage, and pandemic. Data sources include the Cumberland County Planning Department, Cumberland Area Economic Development Corporation, Carlisle Borough Manager's Office, and consultations with subject matter experts.

Vulnerabilities: List and briefly describe potential impacts in each planning area from exposures to climate stressors. Examples include health impacts from extreme heat events or degraded air quality, property damages, injuries and power outages from storms and flooding, loss of farm output, decreased food security, and harm to trout fisheries. Data sources include the Climate Change in Cumberland County 2021 draft report; Cumberland County Hazard Mitigation Plan Update 2020; Pennsylvania Climate Impacts Assessment 2021; the FEMA National Risk Index; and social vulnerability indexes from the Centers for Disease Control and Prevention and the University of South Carolina's Hazards Vulnerability and Resilience Institute.

Strengths: List and briefly describe assets, organizations and activities that provide capacities for responding effectively to limit harms from climate and other stressors. Examples include existing planning processes that are effective, strong cross-jurisdiction relationships for collaboration, community organizations that provide important services to vulnerable populations, educational institutions with relevant expertise, farms and farm operators with experience managing climate-related risks, and local economy and job markets that are strong and diverse. Data sources include members of the Climate Resilience Working Group; consultations, interviews, focus group meetings, and workshops with community members, subject matter experts, and staff of the Cumberland County Planning Department, Cumberland Area Economic Development Corporation, Carlisle Borough Manager's Office, and Dickinson College; and the Baseline Resilience Index for Communities of the University of South Carolina's Hazards Vulnerability and Resilience Institute.

Weaknesses: List and briefly describe factors that can obstruct effective responses for limiting harms from climate and other stressors in each planning area. Examples include low awareness and understanding of climate risks and resilience strategies, limited technical expertise, and financial limitations. Data sources include members of the Climate Resilience Working Group and consultations, interviews, focus group meetings, and workshops with community members, subject matter experts, and staff of the Cumberland County Planning Department, Cumberland Area Economic Development Corporation, Carlisle Borough Manager's Office, and Dickinson College.

Resilience Strategies: List and briefly describe strategies for building climate resilience in each planning area. Examples include maintaining and increasing tree canopies and green spaces, improving stormwater management, trainings to prevent and respond to heat-related illnesses, building connections among people and organizations for collective action, and providing equitable access for the most vulnerable residents to living wage jobs, healthcare, quality housing and other needs. Data sources include Climate Change in Cumberland County 2021 draft report, the Carlisle Borough Comprehensive Plan 2019, Pennsylvania Climate Action Plan 2021, and consultations, interviews, focus group meetings, and workshops with community members, subject matter experts, and staff of the Cumberland County Planning Department, Cumberland Area Economic Development Corporation, Carlisle Borough Manager's Office, and Dickinson College.

Resilience Indicators: List and briefly describe indicators that represent features of each planning area for which progress in building resilience are to be assessed. Examples of indicators can be found in Second Nature's [Indicators of Resilience](#), example resilience assessment matrices of [Arizona State University](#) and [Portland State University](#), and in resilience progress reports submitted to Second Nature ([Completed Resilience Assessments](#)). Input for selection of indicators will be invited from Resilience Working Group members and community stakeholders.

Resilience Metrics: List, briefly describe, and provide a value for metrics for each indicator that can serve as a measure of capacities to prevent, limit, absorb, recover from, and adapt to potential harms from climate hazards. Examples of indicators can be found in Second Nature's [Sample Resilience Metrics](#), example resilience assessment matrices of [Arizona State University](#) and [Portland State University](#), and in resilience progress reports submitted to Second Nature ([Completed Resilience Assessments](#)). Input for selection of indicators will be invited from Resilience Working Group members and community stakeholders.

Priority: Priority from 1 (Very High Importance) to 4 (Low Importance) will be assigned to each metric with input from Resilience Working Group members and community stakeholders.

References

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https://www.carlislepa.org/government/comprehensive_plan/index.php

CDC. (2015). Planning for an Emergency: Strategies for Identifying and Engaging At-Risk Groups. A guidance document for Emergency Managers. Centers for Disease Control and Prevention, Atlanta, GA.

<https://www.cdc.gov/nceh/hsb/disaster/atriskguidance.pdf>.

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University of South Carolina, Hazards Vulnerability & Resilience Institute. BRIC: Baseline Resilience Indicators for Communities. Online:

https://www.sc.edu/study/colleges_schools/artsandsciences/centers_and_institutes/hvri/data_and_resources/bric/index.php

University of South Carolina, Hazards Vulnerability & Resilience Institute. SoVI® Social Vulnerability Index for the United States, 2010 – 2014. Online:

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