

Resilience Baseline at the University of New Hampshire JNH Sustainability Institute Kathryn Bennett, Clayton Bentley, Quinn Curtis, Haley Puntin, Marisa Yacco NH Sustainability Dual Major Capstone Project Spring 2019 Faculty Advisors: Dr. Cameron Wake and Jennifer Andrews

Motivation

- Second Nature's framework encourages schools from across the country to identify strengths and vulnerabilities to enhance resilience and to identify area for improvement.
- The framework assess UNH's social, environmental and economic systems, which allows us to solve for the initial indicators of resilience that will set the campus benchmarks as well as identify areas where our campus hopes to improve capacity in the future.



Research Objectives

To evaluate the indicators that will serve as baseline measurements of resiliency through Second Nature's Framework, focusing on UNH's **physical** (i.e. infrastructure: roads, buildings, vehicles) and **social** (i.e. institutions) capitals.

Methods

Collected raw data and existing statistics from:

- Transportation Department
- NH DOT
- Transit Services
- UNH Survey/Research Center
- Northern New England Passenger Rail Authority
- Bureau of Transportation Statistics
- Campus Planning
- Sustainability Institute
- Energy and Utilities

Indicator results were determined through mathematical calculations, ratios, dollar amounts and other metric specific approximations.

Physical Capital Results

6 Indicators: Building Energy Efficiency, Air Conditioning, Multi-Modal Transportation System, Access to Campus, Reduced Greenhouse Gas Emissions, **Telecom Access & Reliability 32 Metrics:** information from stakeholders, department experts, third-party databases, and interviews.

Greenhouse Gas Emissions

Total GHG Emissions: 45,761 Metric Tons Carbon Dioxide Equivalent



Social Capital Results

2 Indicators: Structural Connections for Coordination and Planning and Ability to Experiment, Monitor and Adapt

11 Metrics: 9 Sustainability Committees and 8 Reports were analyzed.



7/9 committee's information were available online. 6/9 committees have members and roles available online. 3/9 committees publish their agenda and/or meeting minutes online.

8/8 reports have been updated within the last 10 years. 7/8 reports are available publicly online. 4/8 reports are updated from 2017 data.



Transportation System⁴ Wildcat System Ridership 270,855 157,949 160,111 97,010

Building Energy Efficiency Deferred Maintenance: \$225 Million **Building Maintenance Budget:** \$8 Million = **4%** of total

UNH Sustainability Task Force Meeting³

Measuring indicators and metrics is crucial for driving change and making informed decisions to measure UNH's resilience and to improve over time. Change cannot be managed if objectives are not measured. Understanding the financial, environmental, and physical impacts of climate change and supplying quantitative measurements to each metric can help to: • Make informed decisions

- to improve overall resilience
- Generate a cohesive call for action
- Set benchmark goals to make improvements and track progress
- Increase the University's overall accessibility & transparency, key aspects of sustainability
- Promote renewable resources
- Improve energy efficiency

- Expand public dialogue across campus

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References:

- [2] Second Nature. Climate Resilience. Retrieved from secondnature.org/climate-resilience/. [3] https://sustainableunh.unh.edu/opportunities
- <u>cognized-as-one-of-greenest-u-s-schools/</u>

Discussion



UNH Wildcat transit buses help reduce personal vehicle use

Next Steps

• Assign long-term, desired values for each metric

• Calculate metrics yearly to track changes and progress

• Make metrics and information more accessible

• Compare UNH's metrics and goals against other Universities

• Complete remaining indicator and metric analysis for the Social Capitals and extend to other three capitals

[1] Forum for the Future (2018 June 12). The Five Capitals – a Framework for Sustainability. Retrieved from www.forumforthefuture.org/the-five-capitals

[4] UNH Campus Planning (2019) Retrieved from https://www.unh.edu/transportation/sites/www.unh.edu.transportation/files/media/PDFs/TPC/tpc15_final_apx_a-g.pd [5] Press, M. C. (2017, October 22). UNH recognized as one of greenest U.S. schools. Retrieved April 22, 2019, from https://www.pressherald.com/2017/10/22/unh-