Northern Light Health℠

Keeping Our Promise in the Face of Change

A Climate Resiliency Plan for Northern Light Health

Version 1.0 | December 2023

Climate Health Team

This document was prepared as an interdepartmental collaboration by Northern Light Health, in accordance with our signature on the United States Department of Health and Human Services' Health Sector Climate Pledge. This document is non-binding and for planning purposes only and is intended for internal use only by Northern Light Health, its' members, and affiliates. Any external use, including, but not limited to, reproduction and distribution, must be reviewed by, and is at the discretion of Northern Light Health's Vice President of Facilities, Sustainability and Supply Chain.

Table of Contents

Who We Are 6

How We're Doing 9

Health Workforce 10

Water, Sanitation, Hygiene, and Health Care Waste Management 11

Solid and Medical Waste Management 12

Sustainable Energy Services 13

Infrastructure, technologies, and products 13

What Are Our Risks? 14

Risks Related to Where We Are 15

Aging Infrastructure 15

Rising Temperatures 15

Changing Precipitation Patterns 15

Sea Level Rise 16

Facility Vulnerabilities Specific to our Hospitals 17

Northern Light Acadia Hospital (Acadia) 17

Northern Light A.R. Gould Hospital (A.R. Gould) 17

Northern Light Blue Hill Hospital (Blue Hill Hospital) 18

Northern Light C. A. Dean Hospital (C. A. Dean) 19

Northern Light Eastern Maine Medical Center (EMMC) 19

Northern Light Inland Hospital (Inland) 20

Northern Light Maine Coast Hospital (Maine Coast) 20

Northern Light Mayo Hospital (Mayo) 21

Northern Light Mercy Hospital (Mercy) 21

Northern Light Sebasticook Valley Hospital (SVH) 22

Risks Related to Who We Are 24

Extreme Weather Events and Housing Stock 25

Rising Temperatures and Poor Air Quality 25

Drinking Water Access and Quality 26

Vector-borne Diseases 26

Sea Level Rise 26

Loss of Traditional Resource-based Employment 27
Population Vulnerabilities Specific to our Geographies 28
Aroostook County; A.R. Gould 28
Hancock County; Blue Hill and Maine Coast 28
Piscataquis County; C. A. Dean, Mayo, and EMMC 29
Penobscot County; EMMC and Mayo 30
Kennebec County; Inland 30
Waldo County; SVH, Inland 31
Somerset County; SVH, Inland, and C. A. Dean 32
Cumberland County; Mercy 32
City of Portland; Mercy 33
City of Bangor; EMMC 33
State of Maine; Acadia 34
How Can We Help? 36
Findhelp Tool 36
Screenings During Medical Visits 36
Telehealth 36
Healthy Life Resources/EAP 36
Community Impact Teams 37
Community Vaccination Clinics 37
Community Outreach Events 37
Collaborating with our Partners 38
Regional Emergency Preparedness Planning 38
Clinical Collaborations with Other Hospitals 38
Community Needs Assessments 38
Emergency Medical Services 39
Maine Public Health Association (MPHA) 39
Maine Hospital Association (MHA) 39
Practice GreenHealth and the Institute for Healthcare Improvement 39
Maine Healthcare Climate Collaborative 40
What to Do 41
Transportation and Utility Access 41

Flooding 42
Water Supply 42
Shelter Capacity 43
Extreme Weather Events and Housing Stock 43
Rising Temperatures and Poor Air Quality 44
Vector-borne Diseases 45
Access to Healthcare 46
Mental Health Service Capacity 46
The Path Forward 48
References 49

Who We Are

Northern Light Health is an integrated healthcare delivery system, located in the State of Maine. Northern Light and its subsidiaries provide a broad range of healthcare and related services throughout Maine. We are a non-profit organization comprised of ten member hospitals, primary care locations, cancer care, continuing care facilities, home health/hospice services, a multi-branch retail pharmacy, occupational health clinics, emergency and medical transport, as well as the "home office" system entities. Our more than 10,000 employees provide care and services to hundreds of thousands of patients in Maine.

As a major provider of healthcare services to the people of Maine and a leader in the health and wellness field, we are taking steps to minimize our environmental impact while providing excellent care in a sustainable manner. While uncoordinated efforts to decrease environmental impacts and increase climate resiliency have been in progress for years, Northern Light Health formalized its commitment to these efforts in 2022, with the formation of an employee-driven Climate Health team, and again in 2023 when we signed the U.S. Department of Health and Human Services Health Sector Climate Pledge to reduce emissions 50% by 2030 and achieve net zero emissions by 2050. We are making a long-term commitment to organizational sustainability and reducing our contribution to climate change.

For the purposes of this plan, we will focus on the efforts of the following hospital member organizations, as well those of the System.

Northern Light Acadia Hospital (Acadia) operates an acute care, short stay psychiatric hospital located in Bangor, Maine (100 licensed beds, approximately 76 available), and provides a full continuum of mental and behavioral health services for children, teens, and adults. A subsidiary, Northern Light Acadia Healthcare, provides an alcohol and drug treatment program, adult and children's case management services, school-based services, employee assistance programs, mental health services integrated within primary care practices, and other mental health community services. Acadia is one of few Maine hospitals designated solely to psychiatric health, and as such, serves the majority of the State of Maine. In 2022, construction of a 50-bed single occupancy room facility and renovation of 50 existing rooms commenced; project completion is expected in early 2024.

Northern Light A.R. Gould Hospital (A.R. Gould) operates a community hospital in Presque Isle, Maine, with 89 licensed beds (approximately 76 available). A.R. Gould has family and specialty practices in Caribou, Fort Fairfield and Presque Isle, Maine, as well as Northern Light Continuing Care Mars Hill, a 72-bed facility providing long-term care, skilled nursing, and rehabilitation services in Mars Hill, Maine. A. R. Gould's primary service area is comprised of communities in rural and geographically isolated Aroostook County in Northern Maine.

Northern Light Blue Hill Hospital (Blue Hill) operates a critical access hospital located in Blue Hill, Maine (25 licensed beds, approximately 10 available), and has family and specialty practices in Blue Hill, Castine, Deer Isle-Stonington, and Bucksport. Blue Hill's service area is the peninsular region of Hancock County, which includes remote coastal towns and island communities, as well as tourists and seasonal residents. In August of 2023, Blue Hill completed a modernization project on the current campus in Blue Hill, replacing the old hospital with a smaller, more efficient facility.

Northern Light CA Dean Hospital (CA Dean) operates a critical access hospital (25 licensed beds, approximately 14 available) and long-term care facility in Greenville, Maine, and has family and specialty practices in Greenville, Monson, and Sangerville. C.A. Dean serves the residents of remote, rural areas in northern Somerset and Piscataquis counties, as well as tourists and seasonal residents in the Moosehead Lake/North Woods region. In 2022, construction commenced on a project that includes replacement of the existing hospital; project completion is expected in the spring of 2024.

Northern Light Eastern Maine Medical Center (EMMC) operates an acute care tertiary medical center located in Bangor, Maine (411 licensed beds, approximately 343 available), which provides a variety of inpatient and ambulatory healthcare services. Our system's flagship facility, EMMC and its staff of more than 450 physicians provides primary, specialty, and intensive care services in the Bangor area, and is a level II trauma center that serves communities throughout central, eastern, and northern Maine. Primary and specialty services are offered in Bangor, Orono, Brewer, and Hampden.

Northern Light Inland Hospital (Inland) is a community hospital located in Waterville, Maine (48 licensed beds, approximately 35 available), with primary and specialty care physician offices in Waterville, Oakland, Unity, and Madison, and a continuing care center (Lakewood) on the Inland campus. Inland serves predominantly eastern Kennebec, Somerset, and Waldo Counties, including densely settled and rural areas.

Northern Light Maine Coast Hospital (Maine Coast) operates an acute care hospital located in Ellsworth, Maine (64 licensed beds, approximately 45 available) with primary and specialty practices in Ellsworth, Gouldsboro, Southwest Harbor, Somesville, and Bar Harbor. Maine Coast provides emergency, primary and specialty care, acute inpatient, diagnostic, and surgical services. Maine Coast Hospital is a full-service hospital primarily serving both Hancock and western Washington Counties; coastal areas that are home to both rural communities and prime vacation destinations.

Northern Light Mayo Hospital (Mayo) is a critical access hospital located in Dover-Foxcroft, Maine (25 licensed beds, 25 available), and has family and specialty practices in Corinth, Dexter, Dover-Foxcroft, and Milo. Mayo Hospital provides advanced medical services to more than 26,000 residents in rural Piscataquis, Penobscot, and Somerset counties, which are also popular locations for vacation homes and tourists.

Northern Light Mercy Hospital (Mercy) is an acute care hospital in Portland, Maine (200 licensed beds, approximately 77 available), and is a sponsored ministry of the Sisters of Mercy of the Americas. Mercy provides inpatient and outpatient medical, surgical, and obstetrical/gynecological care, and has family and specialty practices in Portland, South Portland, Yarmouth, Falmouth, Windham, and Gorham. Located in Maine's largest city, Mercy provides care in Maine's most densely populated and culturally diverse region, with its primary service area being Cumberland and eastern York Counties. In 2021, construction was completed on a new, modern facility that consolidated all hospital operations onto one campus.

Northern Light Sebasticook Valley Hospital (SVH) operates a critical access hospital located in Pittsfield, Maine (25 licensed beds, 25 available), and has family practices in Pittsfield, Newport, and Clinton, as well as specialty practices in Pittsfield. SVH serves a largely rural area in central Maine, including areas of parts of Somerset and Penobscot Counties primarily, and Kennebec and Waldo Counties secondarily.

Northern Light Health's focus on reducing our carbon footprint and enhancing our climate resiliency is relatively new. As such, this plan relies heavily on related work that has been completed in the past, along with current initiatives. Understandably, most of the relevant planning done to date has focused on the hospitals. Going forward, we will include other members and affiliated organizations in our overall sustainability and resilience planning efforts. Member organizations that will continue to be incorporated, but for whom sustainability efforts thus far have been limited, are described here.

Northern Light Home Care & Hospice (Home Care & Hospice) provides home health, inpatient and community-based hospice, telehealth, palliative care, and community health services statewide, with home care locations in South Portland, Waterville, Ellsworth, Bangor, and Presque Isle. Home Care & Hospice clinicians make more than 160,000 in-home visits each year caring for an average of 1,400 people on any given day. Home Care & Hospice also plans and staffs immunization clinics, adult health clinics, and education and awareness events for all ages, across the State of Maine.

Northern Light Medical Transport (Medical Transport) provides emergency ambulance services to several communities and unorganized townships in Maine. Medical Transport also provides non-emergency ambulance and wheelchair transportation to destinations throughout New England. Medical Transport operates several ambulances, including a dedicated neonatal transport vehicle and a dedicated critical care transport ambulance.

Northern Light Work Health (Work Health) provides occupational and workplace healthcare services. Work Health currently has seven clinics located in Bangor, Dover-Foxcroft, Ellsworth, Pittsfield, Portland, Presque Isle, and Waterville.

Northern Light Health Foundation (Foundation) holds and manages funds without donor restrictions and funds with donor restrictions for the benefit of various Northern Light Health companies and other exempt organizations in Maine. The Foundation has dedicated employees located across the system and plans and manages a number of events each year.

Northern Light Pharmacy operates retail pharmacies in Bangor, Brewer, Ellsworth, Waterville, and Portland. Northern Light Pharmacy also operates a division that provides mail order and specialty medications and operates several delivery vehicles.

How We're Doing

Northern Light Health's organizational focus on reducing our carbon footprint and enhancing our climate resiliency is still relatively new. In early 2022, system leadership championed the formation of, and established, a Climate Health Team. The Climate Health Team is comprised of Northern Light employees who contribute a portion of their work time to further climate change initiatives and emissions reduction opportunities for the system. The Team developed a charter and logo, and members self-selected various working groups on topics such as education and communication, transportation, supply chain, advocacy, food service, and waste stream. The working groups meets regularly, and the full Team convenes monthly to discuss ideas and share progress. Over time these meetings have evolved to include guest speakers in a "lunch and learn" format. The Team publishes a quarterly newsletter, "Climate Chronicles", with a target audience of employees across the system. Climate Chronicles shares news stories related to climate change and information on sustainability efforts across the system and the region, with an emphasis on empowering employees to identify small changes in their everyday work roles that can contribute to our overall efforts in reducing our environmental footprint. The Team also crystallized support around developing a greenhouse gas inventory for Northern Light Health, according to the internationally recognized standards of the Greenhouse Gas Protocol and began collecting and analyzing Scope 1 and 2 emissions data for the selected baseline year (2021), and beyond.

In April 2023, Northern Light Health signed the U.S. Department of Health and Human Services Health Sector Climate Pledge to reduce carbon emissions by 50% by 2030 and achieve net zero emissions by 2050. This formal, public pledge underscores our commitment to reducing our impact on the environment. We recognize that climate change, and our contributions to it, have an impact on the health and well-being of our patients, employees, and facilities, and the safety and vitality of the broader communities in which we live and serve. This pledge is aligned with Northern Light Health's mission to improve the health of the people and communities we serve, and our system values of integrity, respect, compassion, and accountability.

In 2023, in conjunction with our System's commitment to lowering greenhouse gas emissions, the first staff resources dedicated to sustainability efforts were established. The system's Vice President of Facilities and Supply Chain position was re-designed, becoming the Vice President of Facilities, Sustainability, and Supply Chain. Additionally, the new position of Manager of Sustainability was created as a centralized system point-person for all climate change and sustainability initiatives and projects across our member organizations and community.

Northern Light's next priority in our journey towards sustainability is identifying, collecting, and analyzing data related to Scope 3 emissions; a much broader category than Scopes 1 and 2, and with more diverse and elusive data sources and formats (including emissions tied to our supply chain).

The World Health Organization, in their Guidance for Climate-resilient and Environmentally Sustainable Health Care Facilities, identifies four fundamental requirements for providing safe and quality care;

- Health workforce
  - Adequate numbers of skilled human resources with decent working conditions, empowered and informed to respond to these environmental challenges
- Water, sanitation, hygiene, and health care waste management

        - Sustainable and safe management of water, sanitation, and healthcare waste services
    - Sustainable energy services
    - Infrastructure, technologies, and products
        - Appropriate infrastructure, technologies, products, and processes, including all the operations that allow for the efficient functioning of the health care facility

To frame the discussion and scope of Northern Light Health's climate resilience planning efforts, we will examine each of these requirements, as they relate to our organization and broader community.

Health Workforce

Northern Light Health employs more than 10,000 people across the system. Our talent acquisition team aggressively recruits clinical and non-clinical talent; from our member organizations' local labor markets to those talent pools across the state, region, nation, and even internationally. Northern Light puts an organizational emphasis on employee development, satisfaction, and engagement, as well as departmental succession planning and internal promotions, recognizing that retaining and cultivating our valuable employees is critical to providing high-quality patient care and organizational excellence.

Like many healthcare organizations, we have struggled in recent years with staffing issues, especially with certain in-demand clinical positions. Labor shortages of providers, nurses, CNAs, and others, largely attributed to employee burnout in the wake of the COVID-19 pandemic, continue to be a challenge. Some of the barriers faced in recruiting and rebuilding our workforce include wage competition and volatility in a constrained labor market, Maine's relatively higher housing costs and limited housing availability, and relative geographic isolation and cold climate.

An additional challenge is the aging workforce. The State of Maine has the dubious distinction of being "the oldest state in the nation" based on average age of residents; in addition to the obvious healthcare implications of the patient population we serve, this also represents a significant workforce consideration. The American Community Survey, published by the U.S. Census Bureau, reports the 2020 median age of Maine's population as 44.8 years old (compared to 38.2 of the entire United States), and that of Maine's total population, 20.6% is aged 65 years or older. The same data show that in 2020, 15.8% of Maine residents were aged 55 to 64 years old, while only about 13% were 10-19 years old. Given that, it's reasonable to assume that the number of Maine residents aging out of the work force within a decade is higher than the number aging into it. Maine also has a significant "brain drain" problem; many young Mainers move out of the State for education and/or job opportunities.

One of the significant efforts undertaken by Northern Light Health to combat the shortage of skilled healthcare workers is the development and implementation of several sponsored education and training programs. We have partnered with local schools and secondary institutions to subsidize education for in-demand clinical positions such as CNAs, registered nurses, and respiratory technicians. Graduates of these programs are guaranteed a position in the System in exchange for a commitment to maintain employment for a period of time. Northern Light also sponsors several paid internships for college students interested in exploring and gaining experience in non-clinical, administrative healthcare roles.

Increasingly, there are signs that Maine may serve as a climate refuge in the future. As Americans and immigrants find the heat and unpredictable weather events in areas closer to the Equator increasingly intolerable or lose access to homes in low-lying coastal areas due to sea level rise, Maine may be poised to welcome an influx of new citizens in coming decades. Although they will still face the pressures that currently exist for current Maine residents (including, but not limited to, housing shortages and cost of living, insufficient childcare openings, etc.), and they will represent an increase in our patient population, they could also prove to be a valuable pool of skilled or trainable healthcare talent.

Water, Sanitation, Hygiene, and Health Care Waste Management

Maine has long been known for its abundant clean water resources; our beautiful coast, lakes, ponds, and rivers draw millions to "Vacationland", and bottles of water from our Poland Spring and environs are enjoyed across the country. However, climate change poses a threat to both the abundance and cleanliness of the water that Northern Light Health's facilities, patients, employees, and their families depend upon. In recent decades, prolonged droughts have caused residential wells to dry up and lake and reservoir levels to drop. As sea levels rise, the increased threat of sea water incursion into freshwater aquifers puts drinking water wells that draw from those aquifers at risk. Increasingly warm weather is conducive to algal blooms, which can cause nutrient and chemical imbalances in water bodies, negatively affecting water quality. In recent years, contamination of groundwater resources with per- and polyfluoroalkyl substances (PFAS) has become an alarming issue in Maine, and while indirectly related to climate change (the production of PFAS chemicals involves extensive greenhouse gas emissions), PFAS contamination exacerbates the issue of diminishing abundance and access to clean water made worse by climate change. Additionally, as the planet, and our state, gradually heats, Maine's public water providers can expect to see a rising demand for the water they provide.

Nine of Northern Light Health's ten hospitals are tied into public water systems, which provide a monitored, clean, and constant supply of water, but as these systems depend on surface and groundwater resources, the threats from climate change could put quality and supply in jeopardy. Our hospitals depend upon access to plenty of water for patient hydration and food preparation, patient and clinician hygiene, heating and cooling facilities, infection control and sterilization, laundry, dishwashing, and countless other daily functions.

All ten of Northern Light Health's hospitals depend upon a public wastewater system to manage the safe removal and treatment of the water that cycles through our facilities. A changing climate poses risks to wastewater facilities and sewer systems. Extreme weather events and flooding can threaten capacity and functionality, as well as demand shifts in response to unexpected volume changes. Too much or too little rainfall can wreak havoc on systems that have been engineered for or are operating based upon historic water levels. Rising sea levels can lead to rising groundwater levels, posing a threat of corrosion, infiltration, or dislocation to existing buried wastewater infrastructure, especially where pipes are aging and/or are in poor repair. Extreme heat can impact wastewater treatment plants that depend upon a careful balance of microorganism growth for oxidation and sludge management.

A compromised wastewater management system could be catastrophic to our facilities in terms of patient and employee health and safety, building functionality, infection control, costs and time needed for remediation, etc. Additionally, a failure in the public wastewater treatment infrastructure could create significant public

health problems, especially during flooding events in urban settings where combined sewage overflows (handling both sewage and stormwater) exist. Most rural Maine residents depend upon residential on-site septic systems, many of which are old and not fully functioning. These home systems are also at a greater risk of failure from soil saturation due to heavy rainfall and/or flooding. These public health emergencies, while not direct impacts at our own system facilities, could cause increased patient volumes at a time when our hospitals are least able to manage them.

Solid and Medical Waste Management

Maine, like many places, does not have an abundance of options for solid waste disposal. There are limited trash-to-energy incineration options, and that capacity has dwindled in recent years. Most of Northern Light Health's non-hazardous solid waste ends up in landfills. While professionally managed and monitored, the landfills have challenges; ongoing issues related to safety, pollution, and diminishing capacity; as well as the financial and environmental impact of transporting waste from facilities across the state by the individual truckload. Maine is also at a disadvantage in the global recycling market. While our facilities do have access to cardboard recycling, limited access to recycling programs and facilities for glass, plastic, or metal waste currently exists, especially beyond Southern Maine. Part of this is due to geographic isolation (some recycling facilities that can handle these materials exist in other parts of the country), but much is also due to the lack of a profitable market for recycled products; the current economy does not support a robust recycling network. Pilot projects at select facilities are exploring composting options for food waste and recycling empty plastic containers that formerly contained disinfecting wipes. Northern Light does contract with outside vendors to collect contaminated medical waste and sharps for safe processing and disposal and reprocessing where possible. As a modern healthcare system with a large patient population, workforce, and data load, disposal of broken or outdated electronics (or E-waste) is also a significant consideration, along with other specialized categories of non-medical hazardous waste. Northern Light contracts with outside vendors for the safe and appropriate collection and disposal of hazardous pharmaceutical wastes as well as universal wastes (i.e., lamps, batteries, and ballasts).

Recognizing that food waste across the System presents an opportunity for significant improvement, The Food Group of the Climate Health Team has selected that issue as one of their initial 'top three' initiatives to pursue in 2023-2024. In collaboration with University of Maine's Mitchell Center for Sustainability, Northern Light Blue Hill Hospital completed a food waste analysis and mitigation survey that the Food Group endeavors to extend to select member organizations in the next six-to-nine months, and to the entire System by the end of 2025. Inherent in the analysis of food waste in System kitchens is the collection of organic materials which are weighed and categorized, and subsequently composted. Blue Hill retained a private company to remove compostable organics from their campus to the company-owned site. As the selected third party has restricted ability to provide similar services across the System, the Food Group is considering alternate vendors as well as self-contained composting sites. The expectation is that Northern Light Health will be completely self-contained in its composting efforts by 2026.

Increasingly volatile weather events fueled by climate change could disrupt solid waste management at our facilities, due to the reliance on regular, reliable collection by vendors dependent upon an unrestricted access to transportation corridors. Storms that bring intense flooding, snow/ice events, high winds that topple trees and utility poles, and other hazards that can make roads impassable, could keep our solid waste vendors from

accessing our facilities for waste collection, and transporting it safely for disposal. Temperature extremes could also have an impact, as very hot and very cold temperatures can affect the physical qualities of the waste and its ease of handling, as well as the vehicles and equipment that store, haul, and process it.

Sustainable Energy Services

Ensuring access to energy and fuels is a key consideration in planning for a climate-resilient future, as Northern Light Health's operations require a large amount of energy to meet the needs of our patients and employees. Buildings across the system depend on a variety of fuels (propane, natural gas, and #2 heating oil) to keep our facilities warm and running in Maine's cold climate. Healthcare facilities require huge amounts of electricity to operate, and most of our fleet vehicles run on gasoline or diesel.

The majority of Northern Light Health's facilities rely on the local electricity distribution network for power. Most of our facilities are tied to the New England ISO (ISO-NE) regional power market, which derives power from a number of sources; natural gas (43%), nuclear (24%), net imports (14%), hydro (10%), renewables (9%), and less than 1% from other sources. A few of our Aroostook County properties are tied into the Canadian power grid, rather than ISO-NE, and the majority of generation resources in that region are renewable (hydro, wind, biomass, and solar).

A key strategy in making our facilities more climate resilient is reducing our overall energy use to the greatest feasible extent. Additionally, increasing the on-site generation of power wherever possible would ensure access to a steady supply of electricity, even during supply disruptions, which are likely to increase with more extreme weather events. The gradual transition towards more renewable power sources is also prioritized. If we reduce our dependance on fossil fuels, which are a finite resource which generate greenhouse gases as part of the combustion process, we will not only lower our system's carbon footprint, but will reduce the likelihood of spills/contamination of stored fuels due to infrastructure breaches during weather emergencies.

Infrastructure, technologies, and products

Healthcare organizations rely on advanced technologies and equipment to provide the best quality medical care for our patients, and investing in improved and efficient systems and products to enhance our facilities' resiliency to the effects of climate change is an extension of that. The global healthcare sector is rapidly evolving to adapt to the "new normal", and Northern Light Health is engaged and active in exploring the evolving market of products and methodologies that can help our organization consistently provide the best care to our communities.

As a large healthcare organization with numerous facilities spanning the State of Maine, Northern Light Health undertakes a variety of capital improvements regularly. Our facilities are housed in old (even historic) buildings, as well as new, modern campuses. Whenever construction or renovation projects are needed, it's important that careful consideration be paid to design details as they relate to accessibility and capacity, especially during emergencies. Critical utility infrastructure should be sited and engineered to withstand adverse climactic conditions and prioritize energy efficiency. Planning and building facilities we need now in consideration of the needs of our communities and local environment in the coming decades will keep us at the forefront of anticipated demands and will save us unnecessary expense in retrofitting spaces or retroactively rehabilitating them later.

The potential for disruption of the food supply chain and its impact on our patients is a significant consideration. Northern Light Health endeavors to standardize, and as necessary improve, the policies and procedures specific to climate health and resilience. At present, the member organizations' approach to ensuring adequate food and nutritional provisions in the event of an emergency, whether anticipated or otherwise, varies from reliance on local/regional supermarkets and educational facilities, to letters of commitment from primary distributors. Current and planned revisions include the assurance from contracted vendors that a minimum of three days' worth of provisions would be available to every member organization as requested. Further, plans will be drafted to detail how, if necessary, additional provisions will be stored, and when unavoidable, how provisions may be rationed or otherwise utilized to extend availability past the prescribed three-day mark. As mentioned, Northern Light's work surrounding the evaluation and mitigation of food waste, including the implementation of composting (and other) initiatives as appropriate, has already begun and an improved policy and process will be applied to member organizations as their respective departments complete evaluation. A third initiative, albeit somewhat different in nature than the two mentioned here, will involve purchasing guidelines insofar as provisions including sustainable disposables and compostable packaging materials are concerned. As the Climate Health Food Group matures, the pipeline of initiatives will extend to areas of food insecurity, local sourcing, etc.

Ongoing evaluation of new products as they become available may also help Northern Light in our efforts to adapt to our changing climate. Opportunities to replace current supply chain items that we depend on for patient care and service with more sustainable options may help us minimize waste generation. More efficient products or devices can lower our demand for water, energy, gases, etc. associated with operating our current ones. With markets rapidly evolving to address healthcare's impact on the climate, gradually adapting our buildings and supply chain to incorporate the best new options will make our facilities more sustainable, and our communities healthier.

What Are Our Risks?

Generally, Northern Light Health plans for the risks associated with climate change as they have been experienced or identified as potential or likely based on our geography, topography, population, and infrastructure dependence. Risk assessment and analysis has been completed by many entities, at the global and regional scale, as well as by our individual member organizations at the local facility level. Filtering through these analyses gives an idea of the generalized threats, as well as the individual risks we face across our system.

Risks Related to Where We Are

Maine, in the northeastern United States, can be generally characterized as a mix of boreal forest and coastal ecosystems, although many smaller ecosystem distinctions exist here. Our climate is cold, and our population and developed areas are clustered around water access. We are topologically diverse, with high mountains, sea-level estuaries, and every elevation in between. Much of our state is covered in trees, and our broad watersheds are drained by an extensive network of rivers and streams, many of them dammed. Most of our modern communities were established by European settlers, and have existed for more than a hundred years, but our indigenous communities have been in the area we now call Maine for thousands of years.

Following is a generalized discussion of climate-related threats to the built environment in Maine.

Aging Infrastructure

Many of our communities are old, and served by infrastructure systems that were developed early. Road networks (including river and stream crossings), storm sewers, and dams from the early 20th century and older are still in abundant use across the state. These systems are often upgraded or retrofitted to allow for increases in capacity or enhanced functionality. Re-engineered, reconstructed replacements are often not feasible given the tight budgets of local governments. Older, degraded infrastructure is especially at risk to the weather extremes associated with climate change, which can result in unexpected water volumes that surpass historical capacity.

Rising Temperatures

Historically a cold-climate state, the rising temperatures bought on by our changing climate put unprecedented stress on our facilities. The northeastern United States is expected to experience more frequent, intense, and longer heat waves than have historically been endured in this region. Many buildings that have never required air conditioning in the past are now needing to retrofit and adapt for the comfort of our patients and employees. Aging facility infrastructure may struggle to maintain efficient operations in higher ambient temperatures. This is increasingly true for operating rooms, who rely on significant number of air changes and tightly controlled temperature and humidity parameters to ensure sterile environments. The enhanced need for building cooling requires us to acquire more energy to power these previously unneeded systems.

Changing Precipitation Patterns

It is predicted that the northeastern United States will face extreme variations in precipitation patterns in the coming decades due to climate change. More frequent, intense rainstorms will tax our communities' capacity to contain and divert high volumes of water in short periods of time. What may have historically been considered a "hundred-year flood" can be expected far more often than once a century. We also need to prepare for too little rain. Drought conditions have been experienced in recent decades in Maine and are expected to become more frequent in the future. Drought can increase the risk for wildfires, which represents significant threat for our buildings and for air quality. Further, drought threatens our drinking water sources by impacting water levels in aquifers and surface waters, but also impacts the physical qualities of our plants and soil, which can make them more vulnerable to erosion when the heavier rains come. Erosion brings challenges of its' own, including loss of shoreland and physical damage to the built environment, as well as sedimentation

of natural and man-made waterways, disrupting flow. Precipitation in the form of rain is not our only concern; in Maine's climate, more frequent, more intense storms that bring ice and snow are a significant consideration. Ice and snow can make Maine's roads treacherous or impossible to navigate, and especially when paired with high winds, can wreak havoc on trees and utility poles, causing significant transportation and power disruptions. Finally, increased storm wind intensity poses a risk to roofs and other building infrastructure, especially in coastal regions.

Sea Level Rise

As global temperatures rise, glaciers and polar ice caps melt and warm water expands, adding more liquid water to the world's oceans, which causes the levels of the seas to rise. The impacts of sea level rise are felt most in communities along or adjacent to the coast, where more solid land is gradually lost to the advancing water, and the impact of tidal reach on the built environment becomes more obvious. The more powerful storm events associated with climate change can have an exacerbating effect, pushing coastal storm surge even further inland, causing flooding and infrastructure damage and disruptions.

Facility Vulnerabilities Specific to our Hospitals

Northern Light Acadia Hospital (Acadia)

Transportation and Utility Access

Acadia relies on the road and utility network in and around Bangor for access to supplies, water and sewer service, waste disposal, and electricity. Extreme weather events that impact the City of Bangor's water and sewer facilities and infrastructure, the electrical grid and distribution lines, and the free flow of traffic along roadways could cause a significant reduction in the hospital's ability to operate. Heating and cooling of Acadia Hospital is dependent upon electricity, as well as access to natural gas, the hospital's primary heating fuel. Any extreme weather event that disrupts access to these supplies would affect the hospital's operations. Patient and employee access is also dependent upon unobstructed access to and through the area transportation network, whether arriving by ambulance, personal vehicle, bus, or on foot.

Flooding

Acadia's facilities lie in an area that is adjacent to a large freshwater wetland, at relatively the same elevation. During high water events, when the ground is saturated and the surface water levels exceed the storage capacity of the wetland, Acadia could experience mild flooding/inundation of basement areas.

Water Supply

Acadia relies on the Bangor Water District to supply water for drinking and operational purposes. The Bangor Water District sources its' water from Floods Pond in Otis; like other surface water bodies it faces inherent risks due to climate change, including water level and quality volatility and nutrient loading.

Northern Light A.R. Gould Hospital (A.R. Gould)

Transportation and Utility Access

A.R. Gould relies on the road and utility network in and around Presque Isle for access to supplies, water and sewer service, waste disposal, and electricity. Extreme weather events that impact Presque Isle's water and sewer facilities and infrastructure, the electrical grid and distribution lines, and the free flow of traffic along roadways could cause a significant reduction in the hospital's ability to operate. Heating and cooling of A. R. Gould is dependent upon electricity, as well as access to #2 heating oil, and propane, which are used to heat the hospital and associated facilities. Any extreme weather event that disrupts access to these supplies would affect the hospital's operations. Patient access is also dependent upon unobstructed access to and through the area transportation network, whether arriving by ambulance, personal vehicle, or on foot.

Flooding

Although there is limited potential for flooding at the hospital, Presque Isle Stream and the Aroostook River flow through the City of Presque Isle, and a significant portion of the downtown and surrounding area has been identified as at risk for flooding. A flood event in this region could disrupt patient access and the supply of goods and services to A. R. Gould (see above).

Water Supply

A. R. Gould relies on the Presque Isle Utilities District to supply water for drinking and operational purposes. The District sources its' water from two gravel aquifer wells in Presque Isle; like other systems that rely on groundwater sources, it faces an inherent risk of water level volatility due to climate change.

Northern Light Blue Hill Hospital (Blue Hill Hospital)

Transportation and Utility Access

Blue Hill Hospital relies on the road and utility network in and around the Town of Blue Hill for access to supplies, sewer service, waste disposal, and electricity. Extreme weather events that impact Blue Hill's sewer facilities and infrastructure, the electrical grid and distribution lines, and the free flow of traffic along roadways could cause a significant reduction in the hospital's ability to operate. Heating and cooling of Blue Hill Hospital is dependent upon electricity, as well as access to propane, the hospital's primary heating fuel. Any extreme weather event that disrupts access to these supplies would affect the hospital's operations. Patient access is also dependent upon unobstructed access to and through the area transportation network, whether arriving by ambulance, personal vehicle, or on foot.

Flooding and Sea Level Rise

Blue Hill Hospital lies on Water Street in Blue Hill, about 20 feet above sea level, and a couple hundred feet from the harbor and Blue Hill Bay. Although the harbor is relatively sheltered from intense wave action, its low elevation and the proximity of tidal water does put Blue Hill Hospital at risk of flooding from storm surge during extreme weather events (a surge of six to seven feet would reach parts of the campus at high tide). Smaller surges would also be impactful, as they could flood Water Street, restricting access to and from the hospital. Long-term sea level rise is also a risk to consider at Blue Hill Hospital; modeled scenarios of high and extreme sea level rise by 2100 show partial inundation of the hospital campus at highest astronomical tide at the 50% confidence interval.

Water Supply

Blue Hill Hospital sources it's water for drinking and operational purposes from wells in Blue Hill; like other facilities that rely on groundwater sources, it faces an inherent risk of water level volatility due to climate change.

Wind

Blue Hill Hospital is located at the head of Blue Hill Bay on the Atlantic Ocean, and as a result is within an area prone to strong winds, up to hurricane force. It therefore faces a heightened risk of wind damage to roofs and other infrastructure.

Northern Light C. A. Dean Hospital (C. A. Dean)

Transportation and Utility Access

C.A. Dean relies on the road and utility network in and around the Town of Greenville for access to supplies, water and sewer service, waste disposal, and electricity. Extreme weather events that impact Greenville's water and sewer facilities and infrastructure, the electrical grid and distribution lines, and the free flow of traffic along roadways could cause a significant reduction in the hospital's ability to operate. Heating and cooling of C. A. Dean is dependent upon electricity, as well as access to propane and #2 heating oil, the hospital's primary heating fuels. Any extreme weather event that disrupts access to these supplies would affect the hospital's operations. Patient access is also dependent upon unobstructed access to and through the area transportation network, whether arriving by ambulance, personal vehicle, or on foot.

Flooding

C. A. Dean's facilities lie in an area that is adjacent to a large freshwater wetland, at relatively the same elevation, and also within 1500 ft of Moosehead Lake. During high water events, when the ground is saturated and the surface water levels exceed the storage capacity of the wetland, C. A. Dean could experience mild flooding/inundation of basement areas. Pritham Avenue, the main road that runs along the Moosehead Lake waterfront in Greenville and that serves C. A. Dean, could also experience flooding during high water.

Water Supply

C. A. Dean relies on the Greenville Division of MaineWater Company to supply water for drinking and operational purposes. MaineWater's Greenville Division sources its' water from two wells in a sand and gravel aquifer in Moosehead Junction Township. Like other facilities that rely on groundwater sources, it faces an inherent risk of water level volatility due to climate change.

Northern Light Eastern Maine Medical Center (EMMC)

Transportation and Utility Access

EMMC relies on the road and utility network in and around Bangor for access to supplies, water and sewer service, waste disposal, and electricity. Extreme weather events that impact the City of Bangor's water and sewer facilities and infrastructure, the electrical grid and distribution lines, and the free flow of traffic along roadways could cause a significant reduction in the hospital's ability to operate. EMMC has a cogeneration facility on its State Street campus that uses natural gas to produce more than 90% of the hospital's electricity needs, which has also reduced their dependence on heating oil and water, but EMMC still relies on the electrical grid to make up the difference, and a steady supply of natural gas to power the facility. Any extreme weather event that disrupts access to these supplies would affect the hospital's operations. Patient and employee access is also dependent upon unobstructed access to and through the area transportation network, whether arriving by ambulance, personal vehicle, bus, or on foot.

Water Supply

EMMC relies on the Bangor Water District to supply water for drinking and operational purposes. The Bangor Water District sources its' water from Floods Pond in Otis; like other surface water bodies it faces inherent risks due to climate change, including water level and quality volatility and nutrient loading.

Shelter Capacity

As a large, centrally located and well-known facility in Bangor, EMMC needs to be prepared to act as a shelter space during emergencies, even if the hospital is not publicly-designated as one. Local residents that are without heat, cooling, water, electricity, food, or safe shelter may congregate in a place that they can reach on foot, and where they know those resources they are lacking may be available. The need for shelter may also coincide with an increased patient volume, depending upon the nature of the emergency.

Although EMMC lies adjacent to the Penobscot river, it is at such a high elevation that it is not considered at risk of flooding, and even conservative modeling of sea level rise and storm surge does not indicate that the hospital campus is face threat of inundation by the Penobscot River.

Northern Light Inland Hospital (Inland)

Transportation and Utility Access

Inland relies on the road and utility network in and around Waterville for access to supplies, water and sewer service, waste disposal, and electricity. Extreme weather events that impact Waterville's water and sewer facilities and infrastructure, the electrical grid and distribution lines, and the free flow of traffic along roadways could cause a significant reduction in the hospital's ability to operate. Heating and cooling of Inland Hospital is dependent upon electricity, as well as access to natural gas, #2 heating oil, and propane, all of which are used to heat the hospital and associated facilities. Any extreme weather event that disrupts access to these supplies would affect the hospital's operations. Patient access is also dependent upon unobstructed access to and through the area transportation network, whether arriving by ambulance, personal vehicle, or on foot.

Water Supply

Inland relies on the Kennebec Water District to supply water for drinking and operational purposes. The District sources its' water from China Lake; like other surface water bodies it faces inherent risks due to climate change, including water level and quality volatility and nutrient loading. China Lake has a history of problematic algal growth, and the Maine DEP designates China Lake as "very high risk" for annual algal blooms. Significant source water protection work has been done in recent decades to reduce the risk and maintain the quality of this lake, which serves as a water source for multiple communities in the area.

Northern Light Maine Coast Hospital (Maine Coast)

Transportation and Utility Access

Maine Coast relies on the road and utility network in and around Ellsworth for access to supplies, water and sewer service, waste disposal, and electricity. Extreme weather events that impact Ellsworth's water and sewer facilities and infrastructure, the electrical grid and distribution lines, and the free flow of traffic along roadways could cause a significant reduction in the hospital's ability to operate. Heating and cooling of Maine

Coast Hospital is dependent upon electricity, as well as access to #2 heating oil, the primary fuel used to heat the hospital and associated facilities. Any extreme weather event that disrupts access to these supplies would affect the hospital's operations. Patient access is also dependent upon unobstructed access to and through the area transportation network, whether arriving by ambulance, personal vehicle, or on foot.

Water Supply

Maine Coast relies on the Ellsworth Water Department to supply water for drinking and operational purposes. The Department sources its' water from Branch Lake; like other surface water bodies it faces inherent risks due to climate change, including water level and quality volatility and nutrient loading.

Northern Light Mayo Hospital (Mayo)

Transportation and Utility Access

Mayo relies on the road and utility network in and around the Town of Dover-Foxcroft for access to supplies, water and sewer service, waste disposal, and electricity. Extreme weather events that impact Dover-Foxcroft's water and sewer facilities and infrastructure, the electrical grid and distribution lines, and the free flow of traffic along roadways could cause a significant reduction in the hospital's ability to operate. Heating and cooling of Mayo Hospital is dependent upon electricity, as well as access to #2 heating oil, the hospital's primary heating fuel. Any extreme weather event that disrupts access to these supplies would affect the hospital's operations. Patient access is also dependent upon unobstructed access to and through the area transportation network, whether arriving by ambulance, personal vehicle, or on foot.

Flooding

Mayo lies on West Main Street in Dover-Foxcroft, about 40 feet above and 1000 feet away from the Piscataquis River. Although it is unlikely that the river's water levels would rise enough to pose a flood risk to the hospital property, the Piscataquis River and numerous tributaries run through the downtown area, and a flood event in this region could disrupt patient access and the supply of goods and services to Mayo (see above).

Water Supply

Mayo relies on the Dover-Foxcroft Water District to supply water for drinking and operational purposes. The District sources its' water from Salmon Stream Pond; like other surface water bodies it faces inherent risks due to climate change, including water level and quality volatility and nutrient loading.

Northern Light Mercy Hospital (Mercy)

Transportation and Utility Access

Mercy relies on the road and utility network in and around Portland for access to supplies, water and sewer service, waste disposal, and electricity. Extreme weather events that impact the City of Portland's water and sewer facilities and infrastructure, the electrical grid and distribution lines, and the free flow of traffic along roadways, could cause a significant reduction in the hospital's ability to operate. Heating and cooling of Mercy

Hospital is dependent upon electricity, as well as access to natural gas, the hospital's primary heating fuel. Any extreme weather event that disrupts access to these supplies would affect the hospital's operations. Patient access is also dependent upon unobstructed access to and through the area transportation network, whether arriving by ambulance, personal vehicle, bus, or on foot.

Water Supply

Mercy relies on the Portland Water District to supply water for drinking and operational purposes. The District sources its' water from Sebago Lake; like other surface water bodies it faces inherent risks due to climate change, including water level and quality volatility and nutrient loading.

Shelter Capacity

As a large, well-known facility in Portland, Mercy needs to be prepared to act as a shelter space during emergencies, even if the hospital is not publicly designated as one. Local residents that are without heat, cooling, water, electricity, food, or safe shelter may congregate in a place that they can reach on foot, and where they know those resources they are lacking may be available. The need for shelter may also coincide with an increased patient volume, depending upon the nature of the emergency.

Flooding and Sea Level Rise

Mercy Hospital lies on Fore River Parkway in Portland, within 20 feet of sea level, and a couple hundred feet from the tidal Fore River. Although the river and harbor are relatively sheltered from intense wave action, its low elevation and proximity to tidal water does put Mercy Hospital at risk of flooding from storm surge during extreme weather events (a surge of six to eight feet would reach parts of the campus at high tide). A surge of that magnitude would also flood Fore River Parkway, restricting access to and from the hospital. Long-term sea level rise is also a risk to consider at Mercy; modeled scenarios of intermediate sea level rise by 2100 show partial inundation of the hospital campus at highest astronomical tide at the 50% confidence interval.

Wind

Mercy Hospital is located on the Fore River near its confluence with Casco Bay on the Atlantic Ocean, and as a result is within an area prone to strong winds, up to hurricane force. It therefore faces a heightened risk of wind damage to roofs and other infrastructure.

Northern Light Sebasticook Valley Hospital (SVH)

Transportation and Utility Access

SVH relies on the road and utility network in and around the Town of Pittsfield for access to supplies, water and sewer service, waste disposal, and electricity. Extreme weather events that impact Pittsfield's water and sewer facilities and infrastructure, the electrical grid and distribution lines, and the free flow of traffic along roadways could cause a significant reduction in the hospital's ability to operate. Heating and cooling of SVH is dependent upon electricity, as well as access #2 heating oil and propane, the hospital's primary heating fuels.

Any extreme weather event that disrupts access to these supplies would affect the hospital's operations. Patient access is also dependent upon unobstructed access to and through the area transportation network, whether arriving by ambulance, personal vehicle, or on foot.

Water Supply

SVH relies on the Pittsfield Water Department to supply water for drinking and operational purposes. The Department sources its' water from two groundwater wells in nearby Burnham. Like other facilities that rely on groundwater sources, it faces an inherent risk of water level volatility due to climate change.

Risks Related to Who We Are

The term “social and environmental determinants of health” alludes to the fact that where and how a person lives can affect their physical well-being. Climate change disproportionately affects certain segments of the population that, for a variety of reasons, make them more likely to experience its negative impacts, and less likely to mitigate risk. Unfortunately, a large population of Maine’s residents can be considered disadvantaged in this sense. Maine is one of the oldest and poorest states in the country and has relatively high rates of some serious chronic health issues.

Data collected by the U.S. Census Bureau demonstrates that our population is relatively old (median age of 45.1 years in 2022, versus 39.0 years for the United States as a whole) and poor (estimated median household income of $69,543 in 2022, compared to $74,755 in the whole United States). We also have some of the oldest housing stock in the nation (in 2020, 21.5% of occupied housing units were at least 80 years old, compared with 11.3% nationwide), and a shortage in housing supply. In recent years, Maine has seen an increase in our unhoused population, as well as our immigrant community. Maine is home to indigenous communities that maintain strong ties to the land, both for its cultural and spiritual significance, as well as for food, fuel, and other resources. Much of our state is rural, and few public transportation options exist, especially ones that serve Mainers who live outside of the urban centers. Mainers have comparatively high rates of health conditions such as cancer, diabetes, and chronic lower respiratory disease.

In addition to these risks to current Maine residents, consideration should also be given to Northern Light Health’s ability to serve a growing population of residents. Although we are considering Maine’s risks associated with climate change, the impacts to our area remain relatively less catastrophic than those being experienced in many other parts of the country and world. As people are increasingly displaced from their homes in other areas, they will seek to relocate to places that seem less volatile and relatively safe. There is some indication that Maine is already seen as a “climate refuge”. As the detrimental effects of climate change continue to be felt more acutely in other areas, we can expect Maine’s population to grow, adding additional stress to our housing availability and community welfare and infrastructure programs, and increasing the patient demands on our facilities.

While some data related to our population-based risks exists in our own patient and organizational records, other sources of information should be considered to get a better picture of which climate-related risks threaten the people we serve. Community Health Needs Assessments (CHNAs) are a valuable tool used throughout Maine to determine the health-related needs of Mainers and assess health equity and access, across socioeconomic groups, geographies, and over time. Currently, there are no questions in the standardized data collection and reporting structure specifically related to the threats of climate change, but data is collected on related information, including hospitalization instances for respiratory diseases and Lyme disease cases, instances of mental health emergencies, persons with a disability, housing and food insecurity, individuals living in poverty, and households without a vehicle. These assessments are reported at the county level, and for Maine’s largest cities and specific population segments. The U. S. Census Bureau also collects data related to income and housing stock and reports down to the census tract level. The U.S. Council on Environmental Quality also maintains the Climate and Economic Justice Screening tool, which draws on several databases to provide searchable maps that identify disadvantaged communities and their risk factors.

Consideration of this data gives us a better understanding of where community health and outreach are most needed, and of what type, in the communities we serve.

Following is a generalized discussion of climate-related threats to the people of Maine.

Extreme Weather Events and Housing Stock

More intense, frequent storms can cause damage to homes of any age and condition. In Maine, where housing may be decades or centuries old, and may be in disrepair or underinsured, these extreme weather event can pose a disastrous risk to residents. High winds and intense rain, snow, and ice are especially damaging to homes in need of roof repair, a costly expense that homeowners often try to "get by with" as long as possible. Past storm damage can leave homeowners with repairs for which they may not be insured and are unable to afford on their own. Intense rain events can also lead to leaks or flooding, which can foster mold growth or contamination of the home by hazardous materials. These repairs and remediations can also be prohibitively costly and create unsafe air quality and infection concerns for residents.

Extreme weather events also impact the ability of our residents to access goods and services they need, and to seek safe shelter and medical attention when necessary. Maine has experienced several notable examples of this in recent years; in 2021 and 2022, roads in Jackman, Roque Bluffs, and Cyr Plantation collapsed and became impassable when culverts running below them were undermined and failed due to unusually high stormwater volumes. Our rural populations depend on a safe, accessible road network and personal vehicles to get from one place to another, but if roads are blocked or flooded, or vehicles damaged, safe routes may not be available. Ambulances and other emergency vehicles will also be hindered in their efforts to help those in need when roads are impassable. Extreme weather events can also damage utility supply lines, disrupting access.

Rising Temperatures and Poor Air Quality

The average temperature in the Northeast has risen by nearly 2 degrees (F) in the last 130 years and is predicted to rise at a quicker rate in the future. Maine can expect to see more frequent, more intense heat waves as a result. Warmer air temperatures are associated with poorer air quality due to ozone, airborne dust and other particulates in dry conditions, and mold growth in humid conditions. Maine has also experienced poor air quality caused by particulates drifting in the atmosphere from wildfire smoke in other areas of North America. Climate change increases the risk factors for intense wildfire events, and atmospheric currents can distribute the smoke from those fires hundreds of miles. Poor air quality combined with heat stress create hazardous health conditions for those in vulnerable, high-risk populations like the elderly, young children, and especially those that suffer from breathing disorders and other chronic health conditions. Air pollution and higher temperatures are also correlated with an increased risk of neurological and psychiatric conditions, including strokes and dementia.

Most homes in Maine were not designed or built with air conditioning, and although window units are an available and easy retrofit, many Mainers lack the means to purchase and operate them. Beyond the cost of the units themselves, the increased energy demand can be a burden to lower-income households, as the cost of electricity in Maine has risen significantly in recent years. The risks associated with high heat are amplified when infrastructure systems fail. High temperatures combined with a storm that disrupts electricity to power

air conditioners and fans, or residents' access to drinking water or cooling centers, can make it impossible for people suffering from heat stress to cool their bodies down.

Drinking Water Access and Quality

Rising temperatures, flooding, and drought conditions are all climate-driven risks that can impact Maine's drinking water supply. About 40% of Mainer's depend upon a private groundwater well for their water. Groundwater levels that depend upon recharge from precipitation can be depleted during droughts, causing residential wells to run dry. Surface water sources, like lakes and reservoirs, also drop to lower levels during droughts. They are also impacted by extreme rainfall and flooding, which can sweep sediment and pollutants into the water body via stormwater. An additional risk is enhanced algae growth, which is exacerbated by warm temperatures and the influx of nutrients brought by stormwater. These risks impact not only the actual quality of the water, requiring more extensive treatment to maintain drinking quality, but also the intake and filtering infrastructure to collect it. Mainers in disadvantaged communities are particularly at risk, as they may lack access to expensive alternatives, like buying bottled water for drinking. Residents in these situations may also be forced to ration what little water they do have access to, which can cause dehydration and compound the health risks of pre-existing conditions.

Vector-borne Diseases

Many plant and animal species have responded to a warming climate by extending their habitat range north. Unfortunately, these species include a variety of pest insects, and the diseases they carry and transmit. Diagnoses of tick-borne disease have surged in Maine in the past couple decades; a total of 908 probable and confirmed cases of Lyme disease were reported to the Maine CDC in 2008; by 2021 the number of cases was 1510. The ticks present in Maine can infect humans with a number of other diseases, including anaplasmosis and Powassan Encephalitis. Several mosquito-borne illnesses have also moved into Maine, including Eastern Equine Encephalitis and West Nile virus. Other vector-borne health concerns that have emerged as recent issues in Maine, such as the rashes caused by browntail moths and rabies, are suspected to be linked to climate change. While some of these diseases are deadly on their own (the first fatal U. S. case of Powassan virus in 2023 was confirmed in Maine), they can also worsen the health of residents with pre-existing conditions, and complicate treatment.

Sea Level Rise

As solid land is gradually lost to the rising coastline, more buildings are at risk of property damage from the effects of sea level rise. Many homes in coastal areas and along rivers, even older ones that have historically withstood coastal storms or never experienced flooding, are facing such issues, compounded by extreme storm events. Storm surge can inundate homes with contaminated, brackish water, creating costly repairs and health hazards for residents. Low-income and infirm people are particularly at risk, as they may be unable to financially or physically evacuate, mitigate against potential impacts (sandbags, boarded windows, etc.), or pay for repairs. Flood insurance is an additional expense that many families can't manage, and that may seem unnecessary since "this has never happened before". Mainers displaced from their homes will have an uphill battle finding alternative housing, due to the shortage and expense of available units.

Specific goals and actions related to sea level rise are beyond the scope of this plan, but we are identifying it as a known and contributing issue related to climate resiliency in our communities. The long-term impacts of sea

level rise should influence our organization's planning and development, and may be specifically targeted by future plans.

Loss of Traditional Resource-based Employment

Parts of Maine are well-known as productive farming regions, and our state is world-renowned for our fisheries, but climate change is expected to impact agriculture and commercial fishing in the future. Areas in every county that Northern Light Health serves have been identified as having a high rate of expected agriculture loss. Gradually warming temperatures may make it harder for Maine farmers to successfully grow the traditionally cold-hardy crops it's famous for, such as potatoes and broccoli. Warmer oceans also push cold-weather fish species further north and make our coastal areas a habitat for warm-weather species, which can make traditional fishing less predictable in terms of equipment needs and yields. Volatile weather patterns can also affect farmers and fisheries negatively. Poor air quality, especially haze related to wildfire smoke in other areas of North America, can limit the amount of sunlight plants need to flourish. Unpredictable rain patterns may make irrigation more necessary, or less feasible. Heavy rains can also erode fields that have been tilled and exposed, and the resulting stormwater carrying nutrient-rich agricultural soils can result in excess nutrient loading in the downstream surface waters that receive them. Extreme weather and low air quality poses dangerous threats to Mainers that make their living fishing, and the equipment they rely upon.

If families that depend upon farming and fishing for their livelihoods find it increasingly difficult to do so in the face of a changing climate, they may be forced to divest of their farms or equipment, seek employment elsewhere in a rural area with already limited options, or relocate their families altogether, adding additional strain to the struggling population dynamics rural communities, and the housing and labor market constraints of the places where they relocate. Additionally, the changing climate and loss of local farms and fisheries can contribute to food insecurity. Many rural families still rely on backyard gardens and patronize local farmstands and farmers' markets, many of whom accept supplemental food assistance (such as SNAP or WIC) as payment. Access to fresh local produce and seafood can be crucial in the parts of Maine where the nearest supermarket is a long drive away. The stress associated with these agricultural challenges can also have an exacerbating effect on the mental and physical health of the people facing them.

Specific goals and actions related to the loss of resource-based livelihoods are beyond the scope of this plan, but we are identifying it as a known and contributing issue related to climate resiliency in our communities. The long-term impacts of the issue should influence our organization's planning and development, and may be specifically targeted by future plans.

Population Vulnerabilities Specific to our Geographies

Aroostook County; A.R. Gould

Extreme Weather Events and Housing Stock

Aroostook County has a higher level of individuals living in poverty, a lower median household income, and higher rates of food insecurity than Maine and the United States as a whole. Additionally, 19% of occupied housing units in Aroostook County are more than 80 years old. As previously discussed, people living in poverty are less able to evacuate in the case of a climate-related emergency. They are also less able to invest in preparing their homes for extreme weather or make costly repairs after storms or flooding. Older homes, especially, may be in poorer overall condition, more prone to damage, and more expensive to retrofit and repair.

Rising Temperatures and Poor Air Quality

Aroostook County residents have higher rates of asthma, chronic obstructive pulmonary disease (COPD), adult obesity, diabetes, and cardiovascular disease than the state and the country as a whole. Chronic respiratory diseases like asthma and COPD are exacerbated by poor air quality. People with chronic medical conditions like heart disease, diabetes, and obesity are more vulnerable to heat extremes. If residents with these conditions are also part of the low-income population, they may be less able to afford equipment like air filters or air conditioners that will mitigate the effects of poor air quality and heat extremes.

Hancock County; Blue Hill and Maine Coast

Extreme Weather Events and Housing Stock

Although Hancock County does not have higher rates of poverty or food insecurity, median household incomes are lower than both the state and national rates. These figures represent rural, inland areas as well as coastal, affluent communities, so poverty extremes are likely offset by wealth extremes. For example, the US Census Bureau estimates that 12.6% of the residents in the census tract including the rural communities of Eastbrook and Franklin were below the poverty level in 2021, while for the census tract including Blue Hill, a popular coastal destination, the 2021 estimate is 9% of residents living below the poverty level. In Hancock County, 19.5% of occupied housing units are more than 80 years old. As previously discussed, people living in poverty are less able to evacuate in the case of a climate-related emergency. They are also less able to invest in preparing their homes for extreme weather or make costly repairs after storms or flooding. Older homes, especially, may be in poorer overall condition, more prone to damage, and more expensive to retrofit and repair.

Rising Temperatures and Poor Air Quality

Hancock County exceeds the national rate for asthma and high cholesterol, and both the state and national rates for high blood pressure and heart attack deaths per 100,000 residents. Chronic respiratory diseases like asthma are exacerbated by poor air quality. People with chronic medical conditions like heart disease are more

vulnerable to heat extremes. If residents with these conditions are also part of the low-income population, they may be less able to afford equipment like air filters or air conditioners that will mitigate the effects of poor air quality and heat extremes.

Vector-borne diseases

The rate of new Lyme disease cases per 100,000 residents in Hancock County is dramatically higher (211 in 2020) than for the State of Maine (84 in 2020) and the United States (11 in 2019). The warming climate has fostered the range expansion of ticks and other disease-carrying insects, especially in coastal areas of Maine, and instances of Lyme disease and other vector-borne illnesses are expected to increase.

Access to Healthcare

In Hancock County, 37.6% of residents report having to travel more than 30 miles for a primary care visit, and more than 10% of the population does not have health insurance. In a geographically remote area with high poverty rates like parts of Hancock County, travel to and from medical visits, and the fees associated with them, can make routine medical care cost-prohibitive for many residents. Consequently, important medical conditions, including those linked to climate change, can go undiagnosed and untreated.

Piscataquis County; C. A. Dean, Mayo, and EMMC

Extreme Weather Events and Housing Stock

Piscataquis County has a higher level of individuals living in poverty, a lower median household income, and higher rates of food insecurity than Maine and the United States as a whole. Additionally, 29.5% of occupied housing units in Piscataquis County are more than 80 years old. As previously discussed, people living in poverty are less able to evacuate in the case of a climate-related emergency. They are also less able to invest in preparing their homes for extreme weather or make costly repairs after storms or flooding. Older homes, especially, may be in poorer overall condition, more prone to damage, and more expensive to retrofit and repair.

Rising Temperatures and Poor Air Quality

Piscataquis County residents have higher rates of asthma than the rest of the nation, and higher rates of COPD, adult obesity, and cardiovascular disease than the state and national rates. Chronic respiratory diseases like asthma and COPD are exacerbated by poor air quality. People with chronic medical conditions like heart disease, diabetes, and obesity are more vulnerable to heat extremes. If residents with these conditions are also part of the low-income population, they may be less able to afford equipment like air filters or air conditioners that will mitigate the effects of poor air quality and heat extremes.

Access to Healthcare

In Piscataquis County, 33.1% of residents report having to travel more than 30 miles for a primary care visit, and more than 10% of the population does not have health insurance. In a geographically remote area with

high poverty rates like Piscataquis County, travel to and from medical visits, and the fees associated with them, can make routine medical care cost-prohibitive for many residents. Consequently, important medical conditions, including those linked to climate change, can go undiagnosed and untreated.

Penobscot County; EMMC and Mayo

Extreme Weather Events and Housing Stock

Penobscot County has a higher level of individuals living in poverty, a lower median household income, and higher rates of food insecurity than Maine and the United States as a whole. Additionally, 20.6% of occupied housing units in Penobscot County are more than 80 years old. As previously discussed, people living in poverty are less able to evacuate in the case of a climate-related emergency. They are also less able to invest in preparing their homes for extreme weather or make costly repairs after storms or flooding. Older homes, especially, may be in poorer overall condition, more prone to damage, and more expensive to retrofit and repair.

Rising Temperatures and Poor Air Quality

Penobscot County's population exceeds the state rates for adult obesity and COPD; the national rates for high cholesterol and high blood pressure; and both the state and national rates for asthma, diabetes, and heart attack deaths per 100,000 residents. Chronic respiratory diseases like asthma and COPD are exacerbated by poor air quality. People with chronic medical conditions like heart disease, diabetes, and obesity are more vulnerable to heat extremes. If residents with these conditions are also part of the low-income population, they may be less able to afford equipment like air filters or air conditioners that will mitigate the effects of poor air quality and heat extremes.

Kennebec County; Inland

Extreme Weather Events and Housing Stock

Kennebec County has a higher level of individuals experiencing food insecurity than the state level. Kennebec County also has a higher number of individuals living in poverty and a lower median household income than Maine and the United States as a whole. Additionally, 22.8% of occupied housing units in Kennebec County are more than 80 years old. As previously discussed, people living in poverty are less able to evacuate in the case of a climate-related emergency. They are also less able to invest in preparing their homes for extreme weather or make costly repairs after storms or flooding. Older homes, especially, may be in poorer overall condition, more prone to damage, and more expensive to retrofit and repair.

Rising Temperatures and Poor Air Quality

Kennebec County's population exceeds the state rates for adult obesity, and both the state and national rates for high blood pressure and heart attack deaths per 100,000 residents. People with chronic medical conditions like heart disease, diabetes, and obesity are more vulnerable to heat extremes. If residents with these

conditions are also part of the low-income population, they may be less able to afford equipment like air conditioners that will mitigate the effects extreme heat.

Vector-borne diseases

The rate of new Lyme disease cases per 100,000 residents in Kennebec County is higher (102 in 2020) than for all of Maine (84 in 2020) and the United States (11 in 2019). The warming climate has fostered the range expansion of ticks and other disease-carrying insects, especially in coastal areas of Maine, and instances of Lyme disease and other vector-borne illnesses are expected to increase.

Waldo County; SVH, Inland

Extreme Weather Events and Housing Stock

Waldo County has a higher level of individuals experiencing food insecurity than the state's level. Waldo County also has a higher number of individuals living in poverty and a lower median household income than Maine and the United States as a whole. Additionally, 20.2% of occupied housing units in Waldo County are more than 80 years old. As previously discussed, people living in poverty are less able to evacuate in the case of a climate-related emergency. They are also less able to invest in preparing their homes for extreme weather or make costly repairs after storms or flooding. Older homes, especially, may be in poorer overall condition, more prone to damage, and more expensive to retrofit and repair.

Rising Temperatures and Poor Air Quality

Waldo County's population exceeds the state rate for adult obesity; the national rate for high blood pressure; and both the state and national rates for asthma, COPD, diabetes, high cholesterol, and heart attack deaths per 100,000 residents. Chronic respiratory diseases like asthma and COPD are exacerbated by poor air quality. People with chronic medical conditions like heart disease, diabetes, and obesity are more vulnerable to heat extremes. If residents with these conditions are also part of the low-income population, they may be less able to afford equipment like air filters or air conditioners that will mitigate the effects of poor air quality and heat extremes.

Vector-borne diseases

The rate of new Lyme disease cases per 100,000 residents in Waldo County is dramatically higher (230 in 2020) than for all of Maine (84 in 2020) and the United States (11 in 2019). The warming climate has fostered the range expansion of ticks and other disease-carrying insects, especially in coastal areas of Maine, and instances of Lyme disease and other vector-borne illnesses are expected to increase.

Access to Healthcare

In Waldo County, 29.5% of residents report having to travel more than 30 miles for a primary care visit, and more than 11% of the population does not have health insurance. In rural areas with high poverty rates like Waldo County, travel to and from medical visits, and the fees associated with them, can make routine medical

care cost-prohibitive for many residents. Consequently, important medical conditions, including those linked to climate change, can go undiagnosed and untreated.

Somerset County; SVH, Inland, and C. A. Dean

Extreme Weather Events and Housing Stock

Somerset County has a higher number of individuals living in poverty, a lower median household income, and a higher level of individuals experiencing food insecurity than Maine and the United States as a whole. Additionally, 23.2% of occupied housing units in Somerset County are more than 80 years old. As previously discussed, people living in poverty are less able to evacuate in the case of a climate-related emergency. They are also less able to invest in preparing their homes for extreme weather or make costly repairs after storms or flooding. Older homes, especially, may be in poorer overall condition, more prone to damage, and more expensive to retrofit and repair.

Rising Temperatures and Poor Air Quality

Somerset County's residents have higher rates of asthma, COPD, adult obesity, diabetes, and cardiovascular disease than the state and the country. Chronic respiratory diseases like asthma and COPD are exacerbated by poor air quality. People with chronic medical conditions like heart disease, diabetes, and obesity are more vulnerable to heat extremes. If residents with these conditions are also part of the low-income population, they may be less able to afford equipment like air filters or air conditioners that will mitigate the effects of poor air quality and heat extremes.

Access to Healthcare

In Somerset County, 36% of residents report having to travel more than 30 miles for a primary care visit, and 9.4% of the population does not have health insurance. In rural areas with high poverty rates like Somerset County, travel to and from medical visits, and the fees associated with them, can make routine medical care cost-prohibitive for many residents. Consequently, important medical conditions, including those linked to climate change, can go undiagnosed and untreated.

Cumberland County; Mercy

Extreme Weather Events and Housing Stock

In Cumberland County, 20.9% of occupied housing units are more than 80 years old. Although Cumberland County does not have rates of poverty as low as more rural parts of the state, there are certainly lower-income residents that are less able to invest in preparing their homes for extreme weather or make costly repairs after storms or flooding. Older homes, especially, may be in poorer overall condition, more prone to damage, and more expensive to retrofit and repair.

Rising Temperatures and Poor Air Quality

Cumberland County's population exceeds the national rates for high cholesterol and asthma. Chronic respiratory diseases like asthma and COPD are exacerbated by poor air quality. Chronic respiratory diseases like asthma are exacerbated by poor air quality. People with chronic medical conditions like cardiovascular disease are more vulnerable to heat extremes. If residents with these conditions are also part of the low-income population, they may be less able to afford equipment like air filters or air conditioners that will mitigate the effects of poor air quality and heat extremes.

City of Portland; Mercy

Extreme Weather Events and Housing Stock

Portland has a higher number of residents living in poverty (14.6% in 2019) than the State of Maine as a whole (11.8% in 2019). An estimated 39% of occupied housing units in the City of Portland are more than 80 years old, and 58% of occupied housing units were renter-occupied in 2022. People living in poverty are less able to evacuate in the case of a climate-related emergency. They are also less able to invest in preparing their homes for extreme weather or make costly repairs after storms or flooding. Older homes, especially, may be in poorer overall condition, more prone to damage, and more expensive to retrofit and repair. Renters are at a particular disadvantage, since they are limited in the changes they can make to a home they don't own, even if they are able to afford it.

Rising Temperatures and Poor Air Quality

Portland's population exceeds the rates for both Cumberland County and Maine for diabetes deaths, diabetes hospitalizations, and diabetes-related emergency room visits. Portland's population also has higher rates of cardiovascular disease deaths and heart attack deaths per 100,000 residents than Cumberland County as a whole. People with chronic medical conditions like heart disease and diabetes are more vulnerable to heat extremes. If residents with these conditions are also part of the low-income population, they may be less able to afford equipment like air conditioners that will mitigate the effects of heat extremes. Renters may be further limited by landlord restrictions.

Flooding, Storm Surge, and Sea Level Rise

As Maine's largest city, Portland has a higher population density than much of the state. Since Portland is a coastal city, residents living in low-lying areas, especially along waterways, are at some risk of flooding and storm surge during extreme weather events. Even if their homes are not impacted, the road networks residents in these areas rely on may flood. Portland is also home to a significant population of unhoused persons, and many of the areas they inhabit are at the same risk of flooding and storm surge. In some areas of Portland, a long-term risk of housing loss due to sea level rise is also a concern.

City of Bangor; EMMC

Extreme Weather Events and Housing Stock

Bangor has a higher number of residents living in poverty (18.9% in 2019) than the State of Maine as a whole (11.8% in 2019). An estimated 36% of occupied housing units in the City of Bangor are more than 80 years old, and 53% of occupied housing units were renter-occupied in 2021. People living in poverty are less able to evacuate in the case of a climate-related emergency. They are also less able to invest in preparing their homes for extreme weather or make costly repairs after storms or flooding. Older homes, especially, may be in poorer overall condition, more prone to damage, and more expensive to retrofit and repair. Renters are at a particular disadvantage, since they are limited in the changes they can make to a home they don't own, even if they are able to afford it.

Rising Temperatures and Poor Air Quality

Bangor's population exceeds the rates for both Penobscot County and Maine for diabetes deaths, diabetes hospitalizations, and diabetes-related emergency room visits. Bangor's population also has higher rates of COPD than Penobscot County and the state. Chronic respiratory diseases like COPD are exacerbated by poor air quality. People with chronic medical conditions like diabetes are more vulnerable to heat extremes. If residents with these conditions are also part of the low-income population, they may be less able to afford equipment like air filters or air conditioners that will mitigate the effects of poor air quality and heat extremes. Renters may be further limited by landlord restrictions.

Flooding, Storm Surge, and Sea Level Rise

As one of Maine's largest cities, Bangor has a higher population density than much of the state. Since Bangor lies along the tidal Penobscot River, residents living in low-lying areas, especially along waterways, are at some risk of flooding and storm surge during extreme weather events. Even if their homes are not impacted, the road networks residents in these areas rely on may flood. Bangor is also home to a significant population of unhoused persons, and many of the areas they inhabit are at the same risk of flooding and storm surge. In some areas of Bangor, a long-term risk of housing loss due to sea level rise is also a concern.

State of Maine; Acadia

Service Capacity

Acadia is a psychiatric and behavioral health hospital that serves the State of Maine, and as such, needs to prepare for the impact of climate change on mental health. Mainers facing housing damage/loss, food insecurity, loss of access to traditional resource-based employment, or other climate-related problems may have higher overall anxiety and depression related to the increased risk and unpredictability of such issues. Families forced to relocate due to climate change may struggle with a sense of grief and loss, associated with leaving homes and communities where they have always felt supported. Older members of the population may feel a sense of loss for a way of life that is no longer possible in the current climate era. Younger people may struggle with feelings of hopelessness about the future and overwhelm associated with tackling the global issue of climate change. While these issues may not be enough on their own to trigger a mental health crisis in an otherwise healthy person, for those already dealing with some level of emotional or psychological condition, climate change-related concerns can contribute to the patient's burden. Additionally, enhanced

vulnerability to vector-borne illness can also expose more residents to neuropsychiatric consequences of encephalitis. Since climate change can have a significant impact on the mental health of the patient population we serve, Acadia needs to be prepared for an overall increase in volume, which may or may not be tied to specific episodic events.

How Can We Help?

Northern Light Health has a long-established network of community partnerships, community health improvement and outreach programs, which could be leveraged to expand education about the risks associated with climate change and connect vulnerable residents to services and support.

Findhelp Tool

Northern Light Health sponsors and maintains https://northernlighthealth.Findhelp.com, an online tool that connects Mainers with services and support specific to their area, and covers a variety of topics (food, transportation, health, finances, employment, legal, et al). Many of these services are already applicable resources for Mainers facing the impacts of climate change, but more work could be done to make those populations aware of the tool. Additionally, the Findhelp tool could be expanded to include more assistance specific to these issues through stronger partnerships with community agencies.

Screenings During Medical Visits

Northern Light Health practices now routinely ask screening questions at visits to establish the patient's levels of food insecurity and home safety and security. While these questions may assess some level of climate-change-related risk a patient feels, more specific, targeted questions related to home type and quality and/or physical comfort as it relates to health (such as adequate heat or cooling, or air quality) could be integrated into this routine screening to assess and track our patients' current and on-going risk levels. Responses that flag an individual as being at risk to the effects of climate change could also trigger our health care providers to provide information and resources to help our patients better prepare for adverse events or mitigate their impacts.

Telehealth

Northern Light Health has expanded our telehealth offerings significantly in the past few years. We are now able to connect remotely with patients across Maine to provide urgent care evaluations, mental health services, and routine pre-procedure check-ins and follow-ups. Telemonitoring, which uses equipment in the patient's home to collect clinical data and report it to their healthcare providers, is also used by various Northern Light facilities. Continued development of telehealth offerings, as well as the expansion of broadband internet service to underserved Maine communities, will be essential in breaking down barriers in patient access to healthcare for our rural residents, especially those for whom the commute to an in-person visit would be a financial hardship.

Healthy Life Resources/EAP

Northern Light Health Acadia Hospital's Healthy Life Resources program provides comprehensive and holistic mental wellness consultation, education, and coaching to educational institutions and businesses of all sizes, including the Employee Assistance Program (EAP) for Northern Light Health employees. Their model of providing assistance to employees struggling with personal crises, including financial, psychological, emotional, or legal issues, make Healthy Life Resources well-placed to identify individuals and families at risk of or impacted by the effects of climate change, and provide them with additional support, education and resources.

Community Impact Teams

Our hospitals have Community Impact Teams made up of employees who volunteer their time in the communities they serve. While the size, scope, and frequency of events varies across the system, the Teams and their efforts could be leveraged to actively work with populations most vulnerable to the effects of climate change.

Community Vaccination Clinics

Many of our hospitals, as well as Northern Light Home Care & Hospice and Northern Light Pharmacy, provide on-site vaccination clinics in communities across the state. We have planned and staffed numerous flu shot clinics, and the need to safely provide COVID-19 vaccinations found us exploring innovative methods, including drive-through clinics. These local, on-site clinics could be both an existing opportunity to provide education and outreach, but also can serve as a model for new efforts specifically targeting populations facing at risk due to the effects of climate change.

Community Outreach Events

Across Northern Light Health, many community-based programs provide events and seminars to engage targeted populations or educate about specific health issues. Examples include A. R. Gould's monthly seminars for seniors that provide information on topics such as diabetes and hearing aids; Acadia's MAINAH initiative that provides education, research, and support related to memory loss; C. A. Dean's free course on psychological first aid, Inland's Trunk or Treat event that handed out vaccine information along with candy; Mayo's partnership with Dexter Regional High School's Positive Action Team to provide a student Mental Health Day; and Mercy Hospital's partnership with the Dempsey Center to provide education on survivorship concerns to young women diagnosed with breast cancer. Clearly, our organizations have great models in place that demonstrate our commitment and ability to provide effective community outreach; these could be leveraged and/or replicated to target Mainers most at risk from the effects of climate change.

Collaborating with our Partners

As a healthcare leader in the State of Maine, Northern Light Health plays an important role in promoting and ensuring the health and safety of Mainers through our partnerships and collaborations with our regional partners. We understand that no one healthcare provider can effectively serve every person in our vast and diverse state, and we are committed to being a supporting link in Maine's healthcare network. This begins with routine referrals to practices and services outside our system (and receiving them), but it doesn't end there. Northern Light maintains clinical collaborations with regional and national leaders, including The Dana Farber Cancer Care Collaborative and Brigham and Women's Hospital. We know how to effectively partner with other institutions to maximize our potential, and these partnerships provide a basis and model for ongoing collaboration tackling our sector's climate resiliency and impact on the environment.

Following is a discussion of some of our organizational partnerships and collaborations.

Regional Emergency Preparedness Planning

Northern Light Health members have collaborated with regional facilities as part of local and statewide emergency preparedness planning. Emergency preparedness plans for each hospital are documented and maintained by NLH Emergency Preparedness, and are regularly reviewed and revised. Emergency Preparedness also convenes the Integrated System Emergency Management Team, which allows collaborators at facilities across our system to share best practices, address emergent issues, and access training opportunities together.

Clinical Collaborations with Other Hospitals

As a large healthcare System in our state, Northern Light has partnered with other Maine hospitals and healthcare providers to stabilize and enhance provision of care across Maine. Examples of this include a partnership between EMMC and Penobscot Valley Hospital in Lincoln to provide interim pharmacist services; a collaboration between Blue Hill Hospital, Maine Cost Hospital, MDI Hospital in Bar Harbor, the Aroostook Mental Health Center, and Healthy Acadia to open an outpatient treatment center for patients with Opiate Use Disorder; and Mercy's partnership with Maine Neonatology Associates to provide in-hospital advanced newborn care. This established model of interorganizational collaboration could be replicated to promote and expand climate resiliency and sustainable healthcare planning in Maine.

Community Needs Assessments

Shared Community Health Needs Assessments are conducted every three years throughout the state to determine the priority health-related needs of people in Mane and assess health equity and access, across socioeconomic groups and geographies. The Maine Shared CHNA assessments are a collaboration of health systems, hospitals, and the Maine Center for Disease Control and Prevention. The CHNA data, along with community engagement input, informs hospital Community Health Improvement Plans, updated every three years and required by the federal government. Northern Light hospitals actively participate in the assessments of the communities we serve, and through this work we have developed collaborative relationships with our regional healthcare, community, and public health partners. These relationships could be a basis for identifying

climate-related risks to the populations we collectively serve and working together to address them. As the results of these assessments drive policy and investment in public health in Maine, the inclusion of climate-change-related indicators in the assessment would be valuable in establishing a baseline for awareness and harm and provide a method for monitoring increases and/or decreases in risk, going forward.

Emergency Medical Services

EMMC serves as a base for LifeFlight of Maine, our state's only emergency air ambulance helicopter service, along with Central Maine Medical Center in Lewiston. Hospitals all over Maine, including, but not limited to, Northern Light member organizations, depend upon LifeFlight to get critically ill and injured patients to the facilities that can treat them. Additionally, Northern Light Medical Transport and Emergency Care (NLMT) serves regions across Maine, providing emergency ambulance and non-emergency transport. NLMT services are not limited to Northern Light facilities; they provide emergency transport to the closest, most appropriate hospital for the patient, and facilitate transfers between hospitals across the state. Northern Light's model of statewide collaboration in emergency medical services provides a basis for planning interorganizational patient transportation needs during and after climate-driven emergencies. All Northern Light hospitals have a functional helipad on campus.

Maine Public Health Association (MPHA)

Northern Light Health is a Sustaining Member of the Maine Public Health Association, a statewide nonprofit that advocates, acts, and advises on critical public health challenges. Our MPHA membership provides us with opportunities to learn from and collaborate with colleagues across the state to improve policies and reduce health inequities in Maine. The MPHA has already hosted forums related to climate change and the environment; and identified climate and environmental priorities for the Maine Legislature. Northern Light's continued involvement with MPHA will provide a forum for future collaborations on climate resiliency and sustainability among its members and be a catalyst for positive change through advocacy.

Maine Hospital Association (MHA)

All Northern Light Health hospitals are members of the Maine Hospital Association, an organization established to support and represent the interests of Maine hospitals and provide leadership through advocacy, information, and education. Our MHA membership provides us with opportunities to learn from and collaborate with colleagues across the state to improve the health of the patients and communities we serve. The MPA could provide a forum for future collaborations on climate resiliency and sustainability among its members.

Practice GreenHealth and the Institute for Healthcare Improvement

Northern Light Health is a member of Practice GreenHealth, a national organization focused on networking and supporting organizations in the healthcare community that are committed to sustainable, environmentally preferable practices, and the Decarbonizing Care Learning Community coordinated by the Institute for Healthcare Improvement (IHI). Through our membership and association with these organizations, Northern Light can connect with hospitals and systems regionally and nationwide to discuss challenges, share successes, and learn collaboratively. The network of colleagues developed through our work with Practice Greenhealth and IHI will ensure that our organizational progress towards sustainability and resiliency is efficient and benefits from the advice and support of regional partners. This work also expands the market demand for

sustainable healthcare goods and services in the Northern New England market, which should continue to benefit us, our partners, and our region, going forward.

Maine Healthcare Climate Collaborative

There is currently no statewide forum for healthcare entities in Maine to collaborate on climate initiatives that is focused entirely on the unique challenges of healthcare. In January, Northern Light Health, together with partners we are soliciting from other statewide healthcare organizations, will be launching the Maine Healthcare Climate Collaborative – a new forum to meet, share resources, find solutions to problems, and to move the healthcare sector in Maine forward to reduce total greenhouse gas emissions. This forum will be not just for acute care hospitals and systems, but for nursing homes, home health companies, ambulatory facilities, and the like. We are excited to be starting this new initiative.

What to Do

In the previous sections we have identified the various vulnerabilities that our system and our hospitals can anticipate as we face a future with a changing climate, as well as some the opportunities for tackling them. Here we will outline a plan for addressing these concerns, including measures that are currently underway, and those that still need to be explored, as well as the interested parties. No targeted timelines are assigned to these initiatives, as many are various states of engagement at different member organizations, and the extent to which new initiatives can be launched depends upon the time and availability of staff resources. It is intended that these recommendations will be present in the minds of Northern Light Health leaders and staff moving forward, and will be considered, incorporated, and/or implemented whenever possible. The recommendations will be reviewed and evaluated annually, and future iterations of this document may assign definitive timeframes if deemed appropriate.

Transportation and Utility Access

Affected Member Organizations: All

Recommendations

- Plan for emergency usage
    - Develop a plan for reduced- and low- usage of fuel, electricity, and supplies during emergencies.
        - Champions and Facilitators: Northern Light Health Member Organization Facilities, NLH Emergency Preparedness
            - Some of this is in place as part of emergency planning for individual member organizations; refer to NLH Emergency Planning for documentation.
- Identify alternate sources and routes
    - Plan with vendors for alternative routes to facilities if customary roadways are blocked or impassable.
        - Champions and Facilitators: NLH MO Facilities, NLH Supply Chain, NLH Emergency Preparedness, Vendors
    - Plan for detour patient navigation signage for alternate routes.
        - Champions and Facilitators: NLH MO Facilities, NLH Supply Chain, NLH Emergency Preparedness
    - Identify alternative sources for fuel and supplies, via alternative routes/directions.
        - Champions and Facilitators: NLH Supply Chain, NLH Emergency Preparedness
    - Implement alternative on-site electricity generation.
        - Champions and Facilitators: NLH MO Facilities, NLH Facilities Planning, NLH Emergency Preparedness
- Collaborate with local partners
    - Identify local hospitals or other relevant business partners to implement MOUs for shared services and resources during emergencies.
        - Champions and Facilitators: NLH leadership, NLH Emergency Preparedness, External Organization Leadership

- Some of this is in place as part of emergency planning for individual member organizations; refer to NLH Emergency Planning for documentation.

- Advocate for infrastructure improvements
    - Advocate for transportation infrastructure improvements on the local and state level.
        - Champions and Facilitators: NLH leadership, NLH Government Affairs

Flooding

Affected Member Organizations: Acadia, A. R. Gould, Blue Hill, C. A. Dean, Mayo, Mercy

Recommendations

- Mitigate flood risk and flood damage
    - Develop short-term emergency mitigation to deploy during flood events.
        - Champions and Facilitators: NLH MO Facilities, NLH Facilities Planning
            - This is underway at some facilities
                - Water gate at EMMC
- Long-term facility planning
    - Relocate vulnerable equipment and services to higher-elevation areas within the facility.
        - Champions and Facilitators: NLH MO Facilities, NLH Facilities Planning

Water Supply

Affected Member Organizations: All

Recommendations

- Plan for emergency water usage
    - Develop a plan for reduced- and low-water usage during emergencies.
        - Champions and Facilitators: NLH MO Facilities, NLH Emergency Preparedness
            - This has been developed at Acadia; refer to NLH Emergency Planning for documentation.
- Identify alternate sources and routes
    - Plan with vendors for back-up water deliveries to facilities if water supply is compromised.
        - Champions and Facilitators: NLH MO Facilities, , NLH Emergency Preparedness, Vendors
            - This has been developed at Acadia; refer to NLH Emergency Planning for documentation.
- Advocate for infrastructure improvements
    - Advocate for and support water supply infrastructure improvements on the local level
        - Champions and Facilitators: NLH leadership, NLH Government Affairs

Shelter Capacity

Affected Member Organizations: EMMC, Mercy

Recommendations

- Collaborate with local partners
    - Develop city-wide plans for a network of emergency shelters, considering walking distances, capacity, services, and funding
        - Champions and Facilitators: NLH MO Facilities, NLH Leadership, NLH Emergency Preparedness, Municipal Leadership, MEMA, Community Welfare Organizations
            - Some of this may be partially in place with the current network of warming/cooling centers.
- Facility Planning
    - In accordance with regional planning, develop facility shelter capacity, including designated areas and stored supplies.
        - Champions and Facilitators: NLH MO Facilities, NLH Facilities Planning, NLH Emergency Preparedness

Extreme Weather Events and Housing Stock

Affected Member Organizations: All

Recommendations

- Data Collection
    - Identify and document instances where patients' housing is vulnerable to the impacts of climate change. Possible mechanisms include noting relevant comments during in-person visit screenings and EAP encounters.
        - Champions and Facilitators: Community Care Teams and Community Health Workers, Home Care & Hospice Home Visitors, NLH Health Equity & Access, NLH Work Force EAP, NLH Practice Staff
    - Use collected data as leverage for funding opportunities for targeted program development
        - Champions and Facilitators: NLH Health Equity & Access, NLH Community Health and Grants, NLH Sustainability
- Internal Clinical Education
    - Ensure that NLH providers are well-educated on the health risks of climate change, including exacerbation of existing conditions and mental health impacts; possible Healthstream module.
        - Champions and Facilitators: NLH Sustainability, NLH Clinical Leadership, NLH Medical Groups
- Community Outreach/Education
    - Develop targeted public education to inform vulnerable populations of the health effects of climate change, utilizing existing resources whenever possible. This may include brochures

available at NLH practices, facilities, and clinics, and other community hubs; on-site education through existing NLH community outreach and population health avenues; education via televisions in hospital patient rooms; local media appearances and press releases; and internal NLH employee fora (i.e. Campfire).
        - Champions and Facilitators: Community Care Teams and Community Health Workers, Home Care & Hospice Home Visitors, NLH Health Equity & Access, NLH Community Health, NLH Population Health, NLH MarComm, NLH Sustainability, Regional and Community Partners
- Collaborate with local partners
    - Identify available financial aid and assistance programs for making homes more resilient to include in targeted education and provide these resources to front-line staff.
        - Champions and Facilitators: Member organizations, NLH Health Equity & Access, NLH Community Health, State and Local Governments, Regional and Community Aid Organizations, NLH Work Force EAP, NLH Practice Staff
- Advocate for public assistance
    - Advocate for government-supported programs that provide financial assistance for making homes more resilient to the impacts of climate change. Engage and collaborate with local municipalities on their housing initiatives.
        - Champions and Facilitators: NLH leadership, NLH Government Affairs

Rising Temperatures and Poor Air Quality

Affected Member Organizations: All

Recommendations

- Data Collection
    - Identify and document instances where patients' pre-existing medical conditions and lack of air condition/filtration make them at risk to the impacts of heat and poor air quality. Possible mechanisms include noting relevant comments during in-person visit screenings, EAP encounters, and inclusion of a related question on Community Health Needs Assessments.
        - Champions and Facilitators: Community Care Teams and Community Health Workers, Home Care & Hospice Home Visitors, NLH Health Equity & Access, NLH Work Force EAP, NLH Practice Staff, Maine CDC
    - Use collected data as leverage for funding opportunities for targeted program development
        - Champions and Facilitators: NLH Health Equity & Access, NLH Community Health and Grants, NLH Sustainability
- Internal Clinical Education
    - Ensure that NLH providers are well-educated on the exacerbating effects of heat and air quality on pre-existing conditions; possible Healthstream module.
        - Champions and Facilitators: NLH Sustainability, NLH Clinical Leadership, NLH Medical Groups

- Community Outreach/Education
    - Develop targeted public education to inform vulnerable populations of the exacerbating effects of heat and poor air quality on pre-existing conditions, utilizing existing resources whenever possible. This may include brochures available at NLH practices, facilities, and clinics, and other community hubs; on-site education through existing NLH community health and population health avenues; education via televisions in hospital patient rooms; local media appearances and press releases; and internal NLH employee fora (i.e. Campfire).
        - Champions and Facilitators: Member organizations, NLH Health Equity & Access, NLH Community Health, NLH Population Health, NLH MarComm, NLH Sustainability, Regional and Community Partners
- Collaborate with local partners
    - Identify available financial aid and assistance programs for air conditioning and air purification units and provide these resources to front-line staff.
        - Champions and Facilitators: Member organizations, NLH Health Equity & Access, NLH Community Health, State and Local Governments, Regional and Community Aid Organizations, NLH Work Force EAP, NLH Practice Staff
- Advocate for public assistance
    - Advocate for government-supported programs that provide financial assistance for home air conditioning and air purification units.
        - Champions and Facilitators: NLH leadership, NLH Government Affairs
    - Advocate for and collaborate with local governments and partners to develop a network of cooling and warming centers throughout the communities we serve.
        - NLH MO Facilities, NLH Leadership, NLH Emergency Preparedness, Municipal Leadership, MEMA, Community Welfare Organizations

Vector-borne Diseases

Affected Member Organizations: Blue Hill, Maine Coast, Inland, SVH

Recommendations:

- Internal Clinical Education
    - Ensure that NLH providers are well-educated on the expansion of vector-borne diseases into our regions, and the signs and symptoms of related illness; possible HealthStream module.
        - Champions and Facilitators: NLH Sustainability, NLH Clinical Education, NLH Medical Groups
- Community Outreach/Education
    - Develop a public education campaign to inform Maine residents of the expansion of vector-borne diseases into our regions, including ways to mitigate risk and symptoms of disease, utilizing existing resources whenever possible. This may include brochures available at NLH practices, facilities, and clinics, and other community hubs; on-site education through existing NLH community outreach and population health avenues; education via televisions in hospital

patient rooms; local media appearances and press releases; and internal NLH employee fora (i.e. Campfire).
        - Champions and Facilitators: Member organizations, NLH Health Equity & Access, NLH Community Health, NLH Population Health, NLH MarComm, NLH Sustainability, Regional and Community Partners
- Collaborate with local partners
    - Share education and outreach materials with other healthcare and non-healthcare organizations in at-risk communities.
        - NLH MarComm, NLH Sustainability, Regional and Community Partners

Access to Healthcare

Affected Member Organizations: Blue Hill, C. A. Dean, EMMC, Inland, Mayo, Maine Coast, SVH

Recommendations:

- Expansion of Telemedicine
    - Continue the development and expansion of telehealth options.
        - NLH Telehealth Services, NLH Medical Groups
    - Advocate for and liaise with insurance providers to expand patient access to covered telehealth services.
        - Champions and Facilitators: NLH leadership, NLH Managed Care
- Collaborate with local partners
    - Identify available transportation and community assistance programs that can make it easier for rural patients to attend in-person appointments. Distribute information about these options through patient education, Northern Light Health Findhelp, community welfare organizations and bulletin boards, etc.
        - Champions and Facilitators: NLH Health Equity & Access, NLH Community Health & Outreach, State and Local Governments, Regional and Community Aid Organizations, NLH Practice Staff
- Advocate for infrastructure improvements
    - Advocate for the expansion of high-speed internet access to underserved areas of Maine.
        - Champions and Facilitators: NLH leadership, NLH Government Affairs

Mental Health Service Capacity

Affected Member Organizations: Acadia

Recommendations:

- Internal Clinical Education

    - Ensure that NLH providers are well-educated on the exacerbating effects of climate-driven impacts on pre-existing mental health conditions, and that long-term climate change can be a driver of worsening mental and emotional health; possible HealthStream module.
        - Champions and Facilitators: NLH Sustainability, Acadia Clinical Leadership
- Expansion of Telemedicine
    - Continue the development and expansion of mental and behavioral telehealth options.
        - NLH Telehealth Services, NLH Medical Groups
    - Advocate for and liaise with insurance providers to expand patient access to covered telehealth services.
        - Champions and Facilitators: NLH leadership, NLH Managed Care

The Path Forward

At Northern Light Health, we are committed to make healthcare work for the people of Maine, which includes meeting their needs today, and being adequately prepared to provide the best service to the healthiest people in the future. We understand the importance of our role as a major healthcare provider in our communities; a regional leader in environmentally sustainable healthcare; and a beacon of strength, constancy, and comfort during the most trying times in our patients' lives; and it's a role we take very seriously. The work we are doing now to keep our facilities efficient and environmentally sustainable, our employees engaged and informed, and our patients healthy and resilient in the face of a changing climate, is an essential element of keeping our promise.

References

American Psychiatric Association (October 2023). Climate Change and Mental Health Connections. American Psychiatric Association. https://www.psychiatry.org/patients-families/climate-change-and-mental-health-connections

Assistant Secretary for Preparedness and Response (2022). Climate Change Resilience and Healthcare System Considerations. United States Department of Health and Human Services, Assistant Secretary for Preparedness and Response. https://files.asprtracie.hhs.gov/documents/aspr-tracie-climate-change-resilience-and-healthcare-system-considerations-508.pdf

Carpenter, Murray (2022, May 17). For all its perils, climate change could make Maine's frigid interior more hospitable. MainePublic. For all its perils, climate change could make Maine's frigid interior more hospitable | Maine Public

Bever, Fred (2022, August 3). Multimillion-dollar upgrades solve Presque Isle's toxic sludge problem. Bangor Daily News. https://www.bangordailynews.com/2023/08/03/news/aroostook/presque-isle-toxic-sludge-solutions-joam40zk0w/

Brito, Christopher (2023, May). A Maine resident just died of Powassan virus disease. Here's what to know about the tick-borne illness. CBD News. https://www.cbsnews.com/news/powassan-virus-death-maine-first-case-tick-2023/

Bureau of Remediation and Solid Waste Management. (2023, September). *Solid Waste Management*. Maine Department of Environmental Protection, Bureau of Remediation and Solid Waste Management. https://www.maine.gov/dep/waste/solidwaste/index.html

Bureau of Water Quality (2019). Maine Lakes at Risk of Having an Algal Bloom. Maine Department of Environmental Protection, Bureau of Water Quality. https://www.maine.gov/dep/water/lakes/bloomrisk.html

Burns, Christopher (2022, August 9). Traffic will be detoured 143 miles after heavy rain washes out Jackman road. Bangor Daily News. https://www.bangordailynews.com/2022/08/09/news/central-maine/jackman-rainfall-detour/

Carpenter, Murray (2022, June 3). Maine's browntail moth outbreak could be fueled by climate change, UMaine scientist says. MainePublic. https://www.mainepublic.org/2022-06-03/maines-browntail-moth-outbreak-could-be-fueled-by-climate-change-umaine-scientist-says

Corvalan, C., Villalobos Prats, E., Sena, A., Campbell-Lendrum, D., Karliner, J., Risso, A., Wilburn, S., Slotterback, S., Rathi, M., Stringer, R., Berry, P., Edwards, S., Enright, P., Hayter, A., Howards, G., Lapitan, J., Montgomery, M., Pruss-Ustun, A., Varangu, L., & Vinci, S. 2020. Towards Climate Resilient and Environmentally Sustainable Health Care Facilities. *International Journal of Environmental Research and Public Health. 17* (8849). 1-18. https://doi.org/10.3390/ijerph17238849

Division of Disease Surveillance (2023, September). *Lyme Disease*. Maine Department of Health and Human Services, Maine Center for Disease Control & Prevention. https://www.maine.gov/dhhs/mecdc/infectious-disease/epi/vector-borne/lyme/index.shtml

Division of Disease Surveillance (2023, September). *Rabies*. Maine Department of Health and Human Services, Maine Center for Disease Control & Prevention. https://www.maine.gov/dhhs/mecdc/infectious-disease/epi/zoonotic/rabies/index.shtml#data

Division of Environmental and Community Health (2023, September). Municipal Water Systems (Public Water Utilities). Maine Department of Health and Human Services, Maine Center for Disease Control & Prevention. https://www.maine.gov/dhhs/mecdc/environmental-health/dwp/consumers/waterSystemsOnline.shtml

Governor's Energy Office (2023, February). Northern Maine & Rural Energy Monitoring Report. Governor's Energy Office, State of Maine. https://www.maine.gov/energy/sites/maine.gov.energy/files/inline-files/23-0201%20LD%20682%20Northern%20Maine%20Report_FinalPDF.pdf 9/21

Health Care Without Harm (2023, May). *Anchored by Health Care: Strategies for Health Systems*. https://noharm-uscanada.org/sites/default/files/documents-files/7383/Anchored-by-health-care-Strategies-for-health-systems-HCWH.pdf

Health Care Without Harm (2023, September). *Climate and Health*. https://noharm-uscanada.org/HealthyClimate

Hueffer, Karsten, PhD, FHEA (2017, March). *Rabies ecology in a changing Arctic, an Alaskan example*. On Biology. https://blogs.biomedcentral.com/on-biology/2017/03/24/rabies-ecology-in-a-changing-arctic-an-alaskan-example/#:~:text=Climate%20change%20and%20rabies%20distribution&text=The%20management%20of%20rabies%20and,more%20pronounced%20at%20high%20latitudes.

Hughes, J., Cowper-Heasy, K., Olesson, E. Bell, R., & Stroombergen, A. (2020). Impacts and implications of climate change on wastewater systems: A New Zealand perspective. *Climate Risk Management*. *31*(2021). 1-19. https://doi.org/10.1016/j.crm.2020.100262

Maine Floodplain Management Program (2023, September) Maine Floodplain Hazard Map. Maine Department of Agriculture, Conservation & Forestry, Maine Floodplain Management Program. https://maine.maps.arcgis.com/apps/webappviewer/index.html?id=3c09351397764bd2aa9ba385d2e9efe7

Maine Geological Survey (2020, August). Sea Level Rise/Storm Surge. Maine Department of Agriculture, Conservation & Forestry, Maine Geological Survey. https://www.maine.gov/dacf/mgs/hazards/slr_ss/index.shtml

Maine Shared Community Health Needs Assessment (2023, October). *Health Profiles*. Maine Department of Health and Human Services, Maine Center for Disease Control & Prevention. https://www.maine.gov/dhhs/mecdc/phdata/MaineCHNA/health-profiles.shtml

National Center for Emerging and Zoonotic Infectious Diseases. (2022, August). Maine. Centers for Disease Control and Prevention, National Center for Emerging and Zoonotic Infectious Diseases. https://www.cdc.gov/ncezid/what-we-do/climate-change-and-infectious-diseases/index.html

National Center for Health Statistics. (2023, September). *Maine*. Centers for Disease Control and Prevention, National Center for Health Statistics. https://www.cdc.gov/nchs/pressroom/states/maine/me.htm

Practice Greenhealth (2023, September). *Climate and Health*. https://practicegreenhealth.org/topics/climate-and-health/climate-and-health

Ropeik, Annie (2022, October 7). Making the connection between PFAS and fossil fuels. Climate Monitor. https://myemail.constantcontact.com/Climate-Monitor--The-PFAS-and-climate-change-connection.html?soid=1103000147284&aid=_MdD6P0VE8Y

Stockley, Leela (2022, May 28). Flash flooding closes section of Route 1 in Aroostook County. Bangor Daily News. https://www.bangordailynews.com/2022/05/28/news/aroostook/flash-flooding-closes-section-of-route-1-in-aroostook-county/

Trotter, Bill (2021, June 11). Down East towns recovering from rainstorm that washed out miles of road. Bangor Daily News. https://www.bangordailynews.com/2021/06/10/news/down-east/down-east-towns-recovering-from-rainstorm-that-washed-out-miles-of-road/

United States Council on Environmental Quality (2023, September). Climate and Economic Justice Screening Tool. https://screeningtool.geoplatform.gov/en/#3/33.47/-97.5

United States Census Bureau (2023, September). United States Census Bureau. https://data.census.gov/

United States Department of Health and Human Services (2023, September). Health Sector Resources Hub. U. S. Department of Health and Human Services. https://www.hhs.gov/climate-change-health-equity-environmental-justice/climate-change-health-equity/health-sector-resource-hub/index.html

United States Department of Health and Human Services (2023, September). Climate Resilience Plan Elements for Healthcare Organizations. U. S. Department of Health and Human Services. https://www.hhs.gov/sites/default/files/climate-resilience-plan-elements-healthcare-organizations.pdf

United States Global Change Research Program (2021, August). U. S. Climate Resilience Toolkit. National Oceanic and Atmospheric Association. https://toolkit.climate.gov/

Water Science School (2018, June). *Drought and Groundwater Levels*. United States Geological Survey, Water Science School. https://www.usgs.gov/special-topics/water-science-school/science/drought-and-groundwater-levels#:~:text=The%20water%20levels%20in%20aquifers,water%20levels%20below%20ground%2C%20too.

World Health Organization. (2020, October). WHO Guidance for Climate Resilient and Environmentally Sustainable Health Care Facilities. World Health Organization, Climate Change and Health. https://www.who.int/publications/i/item/9789240012226

World Resources Institute (2023, October). Greenhouse Gas Protocol. World Resources Institute. https://ghgprotocol.org/