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MPHA
Maine Public Health Association

June 5, 2020

Maine Climate Council
Office of Policy Innovation and the Future
181 State House Station
Augusta, ME 04333

Dear Maine Climate Council Members:

On behalf of the Public Health Subgroup of the Maine Climate Council's (MCC) Community Resilience Planning, Public Health, and Emergency Management Working Group, I am proud to present four strategies for improving public health through climate change adaptation and mitigation. Our strategies support Maine's efforts to become more informed, prepared, and resilient in the face of a changing climate.

In 1998, the Institute of Medicine (IOM, now the National Academy of Medicine) published a landmark report, *The Future of Public Health*. In it, the IOM defined "public health" as "what we as a society do collectively to assure the conditions in which people can be healthy." We also know that climate change impacts health. According to the U.S. Centers for Disease Control and Prevention, "public health can be affected by disruptions of physical, biological, and ecological systems, including disturbances originating here and elsewhere. The health effects of these disruptions include increased respiratory and cardiovascular disease, injuries and premature deaths related to extreme weather events, changes in the prevalence and geographical distribution of food- and water-borne illnesses and other infectious diseases, and threats to mental health."

Climate change and strategies to adapt and mitigate its health effects may impact already vulnerable populations disproportionately, including rural communities, people experiencing low-income, youth, older adults, people of color, those who work outdoors, migrant workers, and individuals with pre-existing health conditions. As such, we encourage the MCC to advance strategies that advance health equity, and assure – proactively – that vulnerable communities are not unfairly burdened with the health, economic and social consequences associated not just with climate change, but also with the state's response efforts. Further, we support the inclusion of these populations in decision making, specifically as they pertain to their local communities. Engaging and empowering Maine's public health district coordinating councils through additional staff, funding, technical assistance, and other resources, could be one strategy for advancing local efforts and elevating the voices of vulnerable populations within our existing public health system.

With these considerations, we believe each MCC Working Group will present strategies that promote and protect public health. As such, we spent the last seven months identifying and prioritizing public health impacts from a changing climate that would be uniquely addressed by this sub-group, and developing and recommending priority adaptation, preparedness, and mitigation strategies for the protection of human, animal, and environmental health.

In the spirit of these considerations, we propose four strategies that advance public health and health equity, facilitate the mitigation and/or adaptation to climate change in Maine, and are not redundant with the other Working Groups:

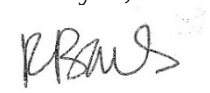
- Strategy #1: Improve Public Health Behavior Related to Climate Impacts Through Investments in Public Health Monitoring and Education
- Strategy #2: Conduct Public Education About Climate Change Health Effects and Resources
- Strategy #3: Reduce Impacts from High Intensity Weather Events
- Strategy #4: Improve Health Systems' Capacity to Mitigate & Adapt to Climate Change

Given the thread of public health throughout the other Working Groups, the public health sub-committee endorses the adoption of recommendations from other Working Groups that improve public health, including efforts to reduce emissions from the transportation (including fuel efficiency standards), shipping, rail, and energy sectors. We support increased investments in renewable energy, broadband access, and land use policies that encourage "smart growth" and bike/ped infrastructure.

We also support investments in public health education and workforce training, especially in "green" jobs, which advance the state's response to climate change, provide livable wages to Maine people, invest in Mainers' education, and improve public health and health equity. These investments will be especially important for members of Maine's workforce that are currently employed in industries that are being adversely impacted by climate change. We further support the adoption of efforts that invest in and strengthen Maine's public health and health care systems.

We are proud to present these strategies for your consideration. We also recognize there is still much work to do to sort through and prioritize recommendations from across all the Working Groups; as such, please let us know if you have any questions, or would like our feedback on other strategies you are reviewing and considering.

Thank you,



Rebecca Boulos, MPH, PhD
Co-Chair Public Health Sub-Group

cc:
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Acknowledgments

Thank you to all the members of the Community Resilience Planning, Public Health, and Emergency Management Working Group for volunteering your time, experience, and expertise over the past several months to advance this important work. We are sincerely appreciative of your efforts. We also extend our gratitude to the many stakeholders who attended our working group and subgroup meetings, and who provided feedback on our strategies as they were developed. Thank you.

A special acknowledgment for the Public Health Subgroup Members who prepared the strategies outlined below:

Lance Boucher, American Lung Association
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Definitions

- Health Equity: “Everyone has a fair and just opportunity to be as healthy as possible. This requires removing obstacles to health such as poverty, discrimination, and their consequences, including powerlessness and lack of access to good jobs with fair pay, quality education and housing, safe environments, and health care.” (Robert Wood Johnson Foundation)
- Mitigation: “Strategies to reduce gross annual greenhouse gas emissions and net annual greenhouse gas emissions” (Maine Climate Council legislation)
- Public Health: “What we as a society do collectively to assure the conditions in which people can be healthy” (Institute of Medicine, now the National Academy of Medicine)
- Public (or Population) Health Monitoring: “The regular collection of data on relevant components of health and its determinants in the population or in samples thereof, aimed at informing the public health policy process.” (European Public Health Association)

Strategy #1: Improve Public Health Behavior Related to Climate Impacts Through Investments in Public Health Monitoring and Education

1. **Describe the Recommended Strategy and how it addresses Maine's climate resiliency and mitigation goals.** Without correct and current data, predictive ability to monitor for the increased prevalence of disease conditions will falter; diseases, themselves, may be misunderstood; health programs do not accomplish their goals; and resources are incorrectly or inefficiently allocated. Public health monitoring is the foundation of a successful and equitable public health system. Thus, the broad strategy is to increase public health monitoring and educational capacity across the state to provide the data necessary to appropriately identify and address emerging climate-related issues, and to increase awareness and understanding of these data. Strong public health monitoring systems allow public health officials to describe and assess the state of health problems more accurately. Reliable data can improve health promotion programs and help policymakers and administrators allocate resources effectively. Communicating the data in effective ways for diverse audiences ensures its usage to influence public health behavior.

   This strategy addresses adaptation and resilience to the impacts of climate change through increased investment in monitoring, which helps inform predictive modeling, planning, and public education.

Definition:

The European Public Health Association defines "Public (or Population) Health Monitoring as "the regular collection of data on relevant components of health and its determinants in the population or in samples thereof, aimed at informing the public health policy process."

2. **What is your measurable outcome for this strategy, assuming all recommended actions to implement the strategy are achieved?** The purpose of public health monitoring is to continuously collect health-related data, requiring a long-term, systematic planning effort. The aggregation of quality health data is essential to the success of all public health initiatives. The outcome of successful public health monitoring comes in the form of disease prevention through successful public health programming and interventions, and the correct allocation of resources. In many cases, the benefit is immediate. For arboviral monitoring, for instance, weekly collection and testing of mosquitoes have been used as early predictors of risk from mosquitoes prior to the appearance of human or veterinary cases. Likewise, HAB monitoring can help predict shellfish closures and indicate when reopening is possible.

3. **What specific actions would be required to implement the strategy, including but not limited to legislation or regulation? Considering the recommended actions listed, who, if they can be named, are the specific actors needed for implementation?** Additional monitoring is needed pertaining to the following climate change impacts:
   - Direct the Department of Environmental Protection (DEP) to implement air allergen, particulate matter, and ozone monitoring in all Maine counties:
     - DEP had pollen monitoring in the past in several parts of the state; however, currently, there isn't any being conducted.
     - Update DEP Rules to include air allergen monitoring

    - Include local air allergen monitoring in DEP Air Quality alerts
    - Update rules guiding DEP's air quality control regions to reflect current monitoring approaches (Southern, Central, Eastern, Northern)
    - Direct DEP to assess (and update if need be) particulate matter and ozone standards, as needed.
    - Provide DEP with authority to adopt stricter air quality standards than the U.S. Environmental Protection Agency.
    - Establish and fund ambient and community-scale air toxics programs.
- Direct DEP to invest in freshwater harmful algal bloom (HAB) monitoring, including modeling in big lakes/public water supplies
- Direct the Maine Center for Disease Control and Prevention (Maine CDC) to invest in additional monitoring systems, including:
    - Vector-borne disease monitoring (especially ticks and mosquitoes)
        - Create vector-borne control districts, either tick or mosquito, based at either the municipal, county, or created district level.
        - Formulate plans and disseminate information about control strategies for vector tick and mosquito, as well as insect and arthropod vector issues.
        - This strategy would be based on similar programs in other northeastern states (e.g., Massachusetts).
    - Browntail moths
- Direct the Department of Marine Resources (DMR) to invest in additional monitoring activities, including:
    - HAB monitoring
    - Vibrio monitoring

Other public health monitoring investments and considerations:

- Develop and validate advanced monitoring and data analysis technologies.
- Support for water testing in private wells after inundation
- Collect, analyze, and report data disaggregated by age, race, ethnicity, gender, disability, geography, and other demographic factors -- allowing for the identification of socially vulnerable populations in the State, and accordingly, the strategic deployment of interventions.

Implementation partners:

- Maine CDC has led many public health monitoring programs and partners with both universities and nonprofits to strengthen such programs and fill data needs from more remote regions of Maine. DMR would implement marine HAB and Vibrio monitoring and DEP would implement freshwater HAB and air quality monitoring. Partnerships would include municipal governments, and state agencies, such as the Department of Agriculture, Conservation and Forestry (DACF).
- Maine CDC's Drinking Water Program, the Maine Geological Survey, and the Maine DEP jointly develop programs to educate and assist private well owners to assess vulnerability of private drinking water wells to flood inundation and provide resources to help mitigate vulnerabilities.

4. What is the timeframe for this strategy?

	Short-term (2022)	Mid-term (2030)	Long-term (2050)	2070 -2100
To implement	x	x		
To realize outcomes	x	x	x	

5. Please analyze the Recommended Strategy against the following criteria.

Workforce - Will the strategy create new jobs, prevent job loss, or cost the state jobs?	This strategy both prevents jobs loss and generates jobs through need of new staff to: • Create new monitoring and testing sites across the state, based on health needs (for example, in the area of vector-borne diseases and HAB monitoring, many organizations conduct routine monitoring during the summer months, and use college students as technicians. While these are a small part of the workforce, it does frequently provide some with their first real work experience in public/global health and can provide a springboard to future employment in the health field). • Manage testing sites, and the collection, analysis, and dissemination of data • Manage laboratory testing and reporting • Provide pest management services • Oversee disease monitoring and interpretation (roles for biologists, veterinarians, and medical entomologists) • Conduct vector and other disease monitoring (student researchers, research mentors, data managers and communications specialists/educators)
Benefits (non-workforce) – What are the expected co-benefits of this strategy (e.g., improved health, increased economic activity, wildlife habitat connectivity, reduce natural hazard risk, increased recreation, avoided damage)?	Maine could become a national leader for improved and comprehensive public health monitoring, specifically related to climate change. Currently, Maine excels in some areas of monitoring, including marine HAB and vector-borne diseases. Data show that air quality impacts human health. Air pollution, including ozone and particulate matter, as well as increases in pollen can increase risk for asthma and other respiratory illnesses - and can aggravate symptoms for those who already have respiratory health challenges. Improving monitoring systems - as well as public awareness of (and how to use) them, will improve public health. With the increasing prevalence of vector-borne disease in Maine, citizens and tourists alike are increasingly nervous about spending time in Maine's natural lands. Investing in improved

	vector-borne disease monitoring will help inform our vector-tracking efforts, interventions, and public education campaigns.
Costs – What are the estimated fiscal costs and other costs to carry out this program. To the state? To municipalities? What resources do you anticipate needing to inform Mainers about the strategy and the opportunity/costs of the strategy? Where would financing likely come from?	The primary costs for an increase in public health monitoring would be for staffing and testing equipment. In addition, depending on the type of monitoring, extensive travel allocations may be needed. This is especially true for Maine. Mosquito control districts in Massachusetts have an annual budget of more than $2 million. These costs do not include potential spray programs that must be instituted during a mosquito-borne disease outbreak, such as the outbreak of eastern equine encephalitis virus in 2019. Spray response to control mosquitoes during the outbreak may be greater than $2 million.
Equity – Is this strategy expected to benefit or burden low-income, rural, and vulnerable residents and/or communities? What outreach has been/will be undertaken to understand the impact of the strategy on front-line communities?	Currently, air quality monitoring data are unavailable in Franklin, Lincoln, Piscataquis, Sagadahoc, Somerset and Waldo counties. However, we see some of the most significant burdens of lung-related illness in these areas, in addition to disparities in health care access. While monitoring about climate change impacts alone will not address issues of equity, making the best use of a wide variety of data at the individual, neighborhood, community, and county levels, for example, can provide a more complete description of the underlying factors that may influence health outcomes (e.g., evidence suggests social determinants may amplify climate-related health effects). Using data to inform programming will help to address issues of equity across the state.
Proven strategy & feasibility – Has this strategy been implemented successfully elsewhere? Is it feasible with today's technology? What barriers to implementation exist (e.g., financial, structural, workforce capacity, public/market acceptability)?	The Maine Tracking Network, launched in 2009, provides data on a variety of topics, including those related to climate: • Air quality • Asthma • COPD • Heat illness • Public water supply • Tick-borne disease In addition, since the appearance of West Nile virus in North America in 1999, Maine has had a multi-disciplinary monitoring program for arboviruses, involving public health entities, wildlife professionals, pest control operators and universities. This monitoring program collects and tests mosquitoes in 13 of 16 counties in Maine weekly, running July-September yearly. Maine currently runs a HAB monitoring program for both marine waters and, in a limited capacity, in fresh waters. This

	includes phytoplankton monitoring and testing of shellfish. These programs can be expanded upon to meet current needs. Barriers to Implementation: To an extent, the large size of Maine as well as lack of infrastructure, such as high-speed internet, can present significant challenges. Adequate, long-term funding is also critical. Also, while several states in the northeast, including Massachusetts and New York State, have implemented successful vector control districts, public concern about spray programs, especially in coastal areas, could be a barrier to implementation.
Legal authority – Does the strategy require new statutory (legal/legislative) authority?	No, but increased funding is required; some rules will need to be updated.
Are additional research and data needed? Are there major data gaps related to this strategy?	For vector-borne monitoring, the size of the state means that significant personnel time and travel are involved in sampling, so additional funds may be needed if federal assistance declines. There are also major data gaps in understanding HAB bloom dynamics and emerging HABs that are novel to Maine and caused by climate change. Another data gap is in understanding the occurrence and virulence of Vibrio in Maine and where controls would prevent illness. Specific costs for the state that should be identified include any potential impacts of spray programs to commercially important industries, such as commercial fisheries and lobster. (See also comments about inconsistent funding for vector and disease monitoring, below.) Air quality data are currently unavailable in Franklin, Lincoln, Piscataquis, Sagadahoc, Somerset and Waldo counties.

6. Rationale/Background Information.

Currently, Maine has very few vector-control programs (just two town-based programs in York County). Vector and disease monitoring efforts are sporadic due to inconsistent funding. Therefore, funding support for sustained routine vector and vector-borne disease monitoring, which historically relies on sporadic grant funding, is critical to this strategy. Regular monitoring for these agents of disease and the diseases themselves is necessary to document present status and change of range or location, much of which can be tied to climate and habitat alteration. Of parallel importance is the concurrent development of public education and outreach materials to

empower the lay public to take action to limit vector-friendly habitat and thereby reduce exposure risk to vector-borne diseases.

In addition, under Maine's current air quality monitoring system, 8 of Maine's 16 counties (34% of the state's population) lack Particulate Matter monitoring and 6 of 16 counties (15% of the population) lack ozone monitoring. In addition to representing a high number of Mainers, those counties without monitoring also have some of the highest percentage of the population with lung or cardiovascular disease, and are thus, at risk for adverse impacts of unhealthy air. While the current monitoring network might meet the standards required by law, it does not provide the citizens of Maine with sufficient real-time, location-specific information to inform their decisions and protect their health. To adequately protect and improve public health we believe our goal should be for each county in Maine to have monitoring for Particular Matter, ozone and allergens.

Strategy #2: Conduct Public Education About Climate Change Health Effects and Resources

1. **Describe the Recommended Strategy and how it addresses Maine's climate resiliency and mitigation goals.** The broad strategy is to increase capacity across the state to provide public health education about climate change effects and resources. This may entail strengthening the public health system in Maine to account for the need to reach all Mainers. Providing clear, consistent messaging about climate change health effects and resources will be vital in ensuring the public is prepared to adapt and understands the reasoning for adaptation.

   All strategies emerging from the public health sub-workgroup involve a specific education component.

2. **What is your measurable outcome for this strategy, assuming all recommended actions to implement the strategy are achieved?** Providing up-to-date information for various Maine constituencies will be ongoing. As climate change science evolves, public health professionals will have to be ready and agile in responding appropriately. We will need staff who can interpret research and policy recommendations and communicate the information in a way that is accessible for all populations. Thus, while the work will never be "done," with additional resources, public education can be systematic and planful. This will require strengthening the public health system, including increasing the public health workforce (e.g., health educators) at the state and local levels, and partnering with existing community organizations and coalitions.

3. **What specific actions would be required to implement the strategy, including but not limited to legislation or regulation? Considering the recommended actions listed, who, if they can be named, are the specific actors needed for implementation?** Given gaps in awareness about climate change health effects and resources, and their respective potential to impact public health, we recommend investing in Maine CDC's and Maine DEP's public education efforts for these topics:
   - Air quality alerts
   - High heat and cold warnings (e.g., a central place where public can look to for strategies to protect their health)
   - Harmful Algal Blooms (HABs) and how to adapt
   - Vector-borne diseases and how to combat
   - Water testing education (especially during floods)
   - Health advisories
   - Reframing "Heat Pumps" as "Heat/Cold Pumps"

We also suggest education about the health effects of wood smoke. According to the U.S. Environmental Protection Agency (EPA), "The biggest health threat from smoke is from fine particles, also called fine particulate matter or PM2.5. These microscopic particles can get into your eyes and respiratory system, where they may cause burning eyes, runny nose, and illnesses, such as bronchitis. Fine particles can make asthma symptoms worse and trigger asthma attacks. Fine particles can also trigger heart attacks, stroke, irregular heart rhythms, and heart failure,

especially in people who are already at risk for these conditions." Thus, in addition to education, an additional strategy could be a wood stove exchange program. This type of program would reduce carbon and other greenhouse gas emissions because of the higher efficiency of newer woodstoves.

Implementation Partners:
Large-scale public education requires support from entities at all levels of government, as well as non-governmental partners (e.g., non-profits, businesses, schools, local hospitals, and clinics), and creative advertising. Essential partners will be Maine CDC, District Coordinating Councils, local health departments and Boards of Health, hospitals/health clinics, non-profit organizations, and academic institutions, as well as the Department of Environmental Protection, Department of Marine Resources, and other state departments, as appropriate. Identifying champions for each message and/or each population will help with persuasiveness and accessibility.

4. What is the timeframe for this strategy?

	Short-term (2022)	Mid-term (2030)	Long-term (2050)	2070 -2100
To implement	x	x		
To realize outcomes	x	x	x	

5. Please analyze the Recommended Strategy against the following criteria.

Workforce - Will the strategy create new jobs, prevent job loss, or cost the state jobs?	This strategy both prevents job loss, and has potential to create jobs, especially in health education/health promotion. Additionally, if 2-1-1 is identified as a centralized repository for information, there could be a need for additional 2-1-1 staffing.
Benefits (non-workforce) – What are the expected co-benefits of this strategy (e.g., improved health, increased economic activity, wildlife habitat connectivity, reduce natural hazard risk, increased recreation, avoided damage)?	Unhealthy air from high ozone days and particulate matter spikes can be dangerous for otherwise healthy people who work or exercise outdoors. Thus, while this strategy focuses on education, increasing public awareness of available monitoring systems, resources, and programs that alert the public to poor air quality days, or address sources of pollution that are modifiable at the individual level (e.g., wood stoves), is important for protecting public health. Increasing awareness and education about vector-borne disease, and availability of cooling centers and other resources can also prevent disease. Culturally appropriate, and locally delivered messaging can also increase trust in public health and science and have potential to improve the health status and health outcomes of Maine residents.
Costs – What are the estimated fiscal costs and	The primary costs for an increase in public education would be for staffing and resource development. At a minimum, staffing would be necessary for developing education materials and coordinating with

other costs to carry out this program. To the state? To municipalities? What resources do you anticipate needing to inform Mainers about the strategy and the opportunity/costs of the strategy? Where would financing likely come from?	businesses, non-profits, schools, hospitals, and government agencies. Additional staff may be needed to reach specific populations, including rural areas that are not serviced by another non-profit or governmental agency. This could be done using all in-state services and professionals. For the wood stove exchange program, the American Lung Association is currently administering a wood stove changeout program using EPA fine funding in Cumberland County. Replicating this program with ME DEP violation funding could be a possibility.
Equity – Is this strategy expected to benefit or burden low-income, rural, and vulnerable residents and/or communities? What outreach has been/will be undertaken to understand the impact of the strategy on front-line communities?	Efforts to tailor education to vulnerable populations should be made, such as translating materials, using infographics rather than text, and other principles of health literacy, and promoting adaptation strategies that are free and available to the public. A woodstove exchange program would also save people money, many of whom live in rural, underserved areas, and/or are lower income.
Proven strategy & feasibility – Has this strategy been implemented successfully elsewhere? Is it feasible with today's technology? What barriers to implementation exist (e.g., financial, structural, workforce capacity,	There are multiple health departments that have developed an "Extreme heat" toolkit, focused specifically on adaptation strategies during extreme weather events. Cumberland District Public Health Council also has an extreme heat plan. Maine CDC works with schools on vector-borne education curricula. Plans like these could be tailored across all strategies and vulnerable populations. Implementation Barriers: Our abilities to provide timely and comprehensible information to those who need it most are the biggest implementation barriers. Much of Maine is still without broadband access, so simply sending an email alert is insufficient. Trust is potentially another barrier that is hard to quantify - specifically, trust in public health and science. It is important that climate change adaptation messaging is clear, concise, and consistent. In addition to the American Lung Association's work in Cumberland County (see above), Vermont also has a model woodstove exchange

public/market acceptability)?	program: https://publicservice.vermont.gov/sites/dps/files/documents/Renewable_Energy/CEDF/Funding_Opportunities/vFY2019%20WSCO%20Brochure.pdf. Tip sheets from Vermont's Department of Health are available here: https://dec.vermont.gov/document-categories/air-quality-and-climate-division-wood-burning.
Legal authority – Does the strategy require new statutory (legal/legislative) authority?	Legislation may be needed for specific topics. For example, with extreme heat events, it will be important to enact legislation to ensure electric companies do not shut off residents' electricity due to non-payment, thus preventing them from accessing home air conditioning as a prevention for heat-related illness. Additionally, it may be worth exploring whether there is benefit in creating additional public health jurisdictions through legislation. Currently, the government public health landscape in Maine consists of the Maine CDC, 8 geographic public health districts (and one tribal public health district), and 2 local health departments. One-third of public health districts focus on one county; the other two-thirds focus on multiple counties and/or multiple tribes. Thus, it is worth exploring strategies for strengthening Maine's sub-district, local public health.
Is there other important information relevant to this strategy?	There will need to be specific campaigns for each category listed below. Additionally, each campaign will need to be specifically tailored and translated for certain populations. • Air quality alerts • High heat and cold warnings - central place where public can look to for strategies to protect their health • HABs and how to adapt • Vector-borne disease and how to combat • Water testing education (especially during floods) • Health advisories • Heat pumps/rebates for energy efficiency/strategies for reducing climate impacts
Other?	

6. Rationale/Background Information.

Everyone benefits from improved air quality. Unhealthy air from high ozone days and particulate matter spikes can be dangerous for otherwise healthy people who work or exercise outdoors. Identifying strategies for bettering Maine's air quality, such as in Public Health Strategies 1 and 4, will alleviate health inequities between high- and low-risk populations. Educating the public about health risks associated with poor air quality, as well as the availability of resources, such as DEP's air quality alerts, will help the public make informed decisions about its risk behavior.

Strategy #3: Reduce Impacts from High Intensity Weather Events

1. **Describe the Recommended Strategy and how it addresses Maine's climate resiliency and mitigation goals.** The broad strategy is to increase private homeowners', businesses', and municipalities' capacity to prepare for high intensity weather events, to reduce long-term damage to communities.

2. **What is your measurable outcome for this strategy, assuming all recommended actions to implement the strategy are achieved?** Implementation can begin immediately to protect sources of drinking water through established US EPA programs. Monitoring for HABs, however, will take funding to implement in exceedance of existing but limited Maine DEP monitoring efforts. Outcomes will be realized once land use restrictions are imposed, and municipal code enforcement is armed with ordinances.

3. **What specific actions would be required to implement the strategy, including but not limited to legislation or regulation? Considering the recommended actions listed, who, if they can be named, are the specific actors needed for implementation?**
    - Implement land use controls to regulate activities that could release nutrients or chemical contaminants into vulnerable watersheds that supply drinking water. This can be accomplished with source water protection ordinances, prohibitions of some high-risk land uses, adoption of best management practices with respect to agriculture, chemical use, and construction practices in vulnerable watersheds. Also consider low impact development (LID) strategies in municipal development plans.
    - In municipalities with Combined Sewer Overflow (CSO) discharge points, evaluate and prioritize replacement/upgrade of existing infrastructure to prevent future sewage discharges into bays, estuaries, and rivers where contact with humans or shellfish is likely. In addition to the direct bacterial pollution impacts of CSOs, nutrient loading can increase the occurrence and magnitude of HABs, especially in freshwater.
    - In municipalities with public water systems located near floodplains, evaluate flood zone predictions to identify drinking water wells (serving public water systems) in danger of flood inundation due to climate change.
    - Maine CDC's Drinking Water Program, the Maine Geological Survey, and the Maine DEP jointly develop programs to educate and assist private well owners to assess vulnerability of private drinking water wells to flood inundation and provide resources to help mitigate vulnerabilities.

Implementation Partners:

- Municipalities, Maine CDC's Drinking Water Program, and Maine Rural Water Association will collaborate on land use protection via source water/wellhead protection ordinances.
- Maine DEP currently implements the CSO reduction program.

4. What is the timeframe for this strategy?

	Short-term (2022)	Mid-term (2030)	Long-term (2050)	2070 -2100
To implement	x	x		
To realize outcomes	x	x	x	

5. Please analyze the Recommended Strategy against the following criteria.

Workforce - Will the strategy create new jobs, prevent job loss, or cost the state jobs?	No
Benefits (non-workforce) – What are the expected co-benefits of this strategy (e.g., improved health, increased economic activity, wildlife habitat connectivity, reduce natural hazard risk, increased recreation, avoided damage)?	• Attract growth in areas with sound land use measures, promote green space and recreational opportunities, and increase land values. • Protect water sources from contamination and avoid costs associated with remediation, treatment, infrastructure improvements, and long-term monitoring. • Ensure sustainability of drinking water supplies for long-term benefits and future generations. • Prevent future exposure health risks to humans and shellfish with CSO infrastructure improvements. • Infrastructure improvements ensure sustainable shellfish and recreation industries.
Costs – What are the estimated fiscal costs and other costs to carry out this program. To the state? To municipalities? What resources do you anticipate needing to inform Mainers about the strategy and the opportunity/costs of the strategy? Where would financing likely come from?	• Costs associated with each identified adaptation strategy can vary depending on the extent of local climate change impact. For example, replacement of failing CSO may be greater in Portland where there are greater numbers of CSOs as compared to Bangor or Mechanic Falls. • Cleanup costs associated with watershed chemical pollution can range from $10Ks to $1Ms and greater depending on the extent of the chemical or nutrient discharged into a watershed and the complexity of cleanup. • HAB treatment costs annually in the range of $10K to $10M and greater for public water systems to relocate intakes, treat for HABs, and conduct long-term water quality monitoring of source water.
Equity – Is this strategy expected to benefit or burden low-income, rural, and vulnerable residents and/or communities? What outreach has been/will be undertaken to understand	Strategies presented are neutral with respect to equity.

the impact of the strategy on front-line communities?	
Proven strategy & feasibility – Has this strategy been implemented successfully elsewhere? Is it feasible with today's technology? What barriers to implementation exist (e.g., financial, structural, workforce capacity, public/market acceptability)?	Land use restrictions are an approach to protect watersheds in use throughout the country. US EPA and state regulatory agencies promote this technique to protect drinking water supplies as part of a multilayered strategy combined with chemical and contaminant physical barriers and best management practices. Possible Implementation Barriers: • Cultural barriers and misperception that land use restrictions are an impediment to business growth • Competing municipal budget items that delay funding of CSO infrastructure replacement • Funding for long-term monitoring
Legal authority – Does the strategy require new statutory (legal/legislative) authority?	No
Are additional research and data needed? Are there major data gaps related to this strategy?	Data are needed to: • Evaluate flood zone impacts on groundwater wells (expand FEMA flood zone impact mapping). • Monitor lakes and reservoirs for HAB (Phosphorus and other basic water quality monitoring - pH, anions/cations, cyanotoxins).
Other?	

6. Rationale/Background Information.

- Clean Water Act
- Safe Drinking Water Act
- Maine Drinking Water Rules
- Title 30-A MRSA Section 3002

Strategy #4: Improve Health Systems' Capacity to Mitigate & Adapt to Climate Change

1. **Describe the Recommended Strategy and how it addresses Maine's climate resiliency and mitigation goals.** The broad strategy is to support health systems in developing mitigation and adaptation strategies in response to climate change.

2. **What is your measurable outcome for this strategy, assuming all recommended actions to implement the strategy are achieved?** The achievement of carbon neutrality within 6 years by Maine's four major health systems, and their development and implementation of preparedness plans to adapt to extreme weather events.

3. **What specific actions would be required to implement the strategy, including but not limited to legislation or regulation? Considering the recommended actions listed, who, if they can be named, are the specific actors needed for implementation?** For **Mitigation**, we propose to:
   - Incentivize the achievement of carbon neutrality within 6 years by Maine's four major health systems (MaineHealth, Central Maine Medical Center, Northern Light Health and MaineGeneral). These systems account for ~27 hospitals across Maine (In addition, there are ~11 independent, and much smaller, hospitals, which would be incentivized to adopt a similar goal over a longer period). Incentives could include:
     - Priority for plan approval and permitting purposes;
     - Density bonuses;
     - Rebates of building permit fees;
     - Grants to help fund green development costs;
     - Green building tax credits;
     - Property tax or income tax credits; and
     - Free technical assistance in greening efforts, loans, and loan guarantees (See Database of State Incentives for Renewables and Efficiency - DSIRE).
     - In addition, many utilities offer rebates and similar incentives for installation of more energy-efficient equipment and other energy conservation measures (Healthcare Design Magazine, 2008).
   - Strategies to achieve carbon neutrality could include (Gunderson):
     - Retrofitting light fixtures
     - Replacing exhaust fans
     - Wiring cooling systems to respond to outside temperature and humidity
     - Upgrading water chillers
     - Scheduling HVAC system hours
     - Instituting automatic computer shut-off protocols
     - Diversifying energy sources
     - Increasing recycling and reusing efforts
     - Procuring local food
     - Encouraging public transportation
     - Anesthetic gas capture
   - Encourage hospitals' Community Health Needs Assessment (CHNA) community benefits investments to align with broader state health priorities, including climate

goals and associated endeavors. This would entail partnerships between health systems, Maine CDC and non-governmental stakeholders.

For **Adaptation**, we propose to:

- Incentivize preparedness planning and implementation for Maine's four major health systems (MaineHealth, Central Maine Medical Center, Northern Light Health and MaineGeneral; the 11 independent, and much smaller, hospitals would have more time to adopt similar planning and implementation directives).
    - In year 1, hospitals would be directed to conduct an energy audit to determine how much energy their system uses. Based on the assessment, the four major health systems would be required to develop action steps to reduce that amount by 30% by year 3.
    - In year 2, hospitals would conduct a preparedness audit. Based on the assessment, hospitals would be required to develop action steps to address gaps in preparedness.
    - Potential incentives and resources mirror the list above.
    - Preparedness planning strategies could include (Haines & Ebi, 2019):
        - Climate change and health training for practitioners; redundancies created for climate shocks
        - Assessment of vulnerability, capacity, and adaptation regularly conducted and used in planning; robust early-warning networks; additional planning for vulnerable populations
        - Health infrastructure designed to withstand storms and floods (e.g., ground floors designed to take on floodwater and air systems that filter heavy smoke), with redundant systems added to ensure continuity of care [Seltenrich 2018]
        - Policies to manage environmental health hazards regularly reviewed; practitioners review care practices and adjust as appropriate; reliable communication tools developed

Implementation Partners: Health Systems, Maine DHHS/Maine CDC, Statewide Coordinating Council, District Coordinating Councils, community stakeholders

4. What is the timeframe for this strategy?

	Short-term (2022)	Mid-term (2030)	Long-term (2050)	2070 -2100
To implement	x	x		
To realize outcomes		x	x	x

5. Please analyze the Recommended Strategy against the following criteria.

Workforce - Will the strategy create new jobs, prevent job loss, or cost the state jobs?	This proposal will create jobs and prevent job loss through investments in "green" jobs.

Benefits (non-workforce) – What are the expected co-benefits of this strategy (e.g., improved health, increased economic activity, wildlife habitat connectivity, reduce natural hazard risk, increased recreation, avoided damage)?	● Could result in more than $20 million in cost savings (Gundersen estimate) ● New energy efficiency strategies hold the promise of reduced costs for the hospital sector: U.S. hospitals spend more than $5 billion annually on energy, often equaling 1-3% of a typical hospital's operating budget, or an estimated 15% of profits. ● Support local farms through changes in food procurement; increase physical activity; cultural shift in medical care facilities, increase awareness of energy usage, energy cost saving. ● Education of health system staff about energy usage and strategies for adopting climate-friendly behaviors ● Medical community can then educate patients about health risks using monitoring systems and programming, such as DEP air quality alerts
Costs – What are the estimated fiscal costs and other costs to carry out this program. To the state? To municipalities? What resources do you anticipate needing to inform Mainers about the strategy and the opportunity/costs of the strategy? Where would financing likely come from?	There are costs associated with investing in green building designs and potential upfront costs of alternative energy sources and new systems; however, there are also funds available to assist with these investments (DSIRE database, noted above). Other sustainability practices, such as reducing, reusing, recycling, and composting, can save money. In the long-term, these investments will save money.
Equity – Is this strategy expected to benefit or burden low-income, rural, and vulnerable residents and/or communities? What outreach has been/will be undertaken to understand the impact of the strategy on front-line communities?	All Maine residents and visitors will benefit from cleaner air; in particular, the most vulnerable among us – including children, older adults, people with heart or lung disease and people living in poverty – who are most at risk from the impacts of climate change. Other specific beneficiaries include staff, patients, and hospitals/health care systems.
Proven strategy & feasibility – Has this strategy been implemented successfully elsewhere? Is it feasible with today's technology? What barriers to implementation exist (e.g., financial, structural,	Many hospitals nationally have adopted carbon-neutral strategies (e.g. Kaiser Permanente in CA, Gunderson in WI, Partners & Boston Medical Center in Boston). Potential Barriers: Hospital size may make it difficult for some to adopt carbon-neutral strategies, which is why we are focusing on the 4 largest systems, with the potential for modified strategies for the smaller, independent hospitals. There may have

workforce capacity, public/market acceptability)?	to be an educational component to this strategy to increase awareness about the amount of pollution from hospitals, and the consequences for human health as hospitals may resist this partially unfunded mandate.
Legal authority – Does the strategy require new statutory (legal/legislative) authority?	No
Are additional research and data needed? Are there major data gaps related to this strategy?	Assessment of hospital efforts to date; other sources of potential funding to finance an incentive program (besides those found in DSIRE)
Other?	

6. **Rationale/Background Information.** The health care sector accounts for nearly one-tenth of U.S. greenhouse gas emissions and, reportedly, would rank seventh in the quantity of such emissions internationally if it were its own country (Seervai & Blumenthal 2018). According to a Department of Energy report, hospitals use 836 trillion BTUs of energy annually and have more than 2.5 times the energy intensity and carbon dioxide emissions of commercial office buildings, producing more than 30 pounds of CO2 emissions per square foot. Reducing the energy intensity of this sector will decrease its carbon footprint and alleviate stress on America's electric power infrastructure. Furthermore, burning fossil fuels has been associated with birth defects, impaired nervous system function, and can increase risk for preterm birth, cardiovascular disease, chronic lung disease, cancer, and overall mortality. Given the energy usage of hospitals and medical systems, identifying a strategy for reducing their emissions will be beneficial for climate and human health.

   According to the World Health Organization, the 7 elements of a Climate Friendly Hospital are:

   1. Energy Efficiency: Reduce hospital energy consumption and costs through efficiency and conservation measures.
   2. Green Building Design: Build hospitals that are responsive to local climate conditions and optimized for reduced energy and resource demands.
   3. Alternative Energy Generation: Produce and/or consume clean, renewable energy onsite to ensure reliable and resilient operation; renewable energy produced off-site can also be used
   4. Transportation: Use alternative fuels for hospital vehicle fleets; encourage walking and cycling to the facility; promote staff, patient, and community use of public transport; site health-care buildings to minimize the need for staff and patient transportation.
   5. Food: Provide sustainably grown local food for staff and patients.
   6. Waste: Reduce, reuse, recycle, compost. Employ alternatives to waste incineration.
   7. Water: Conserve water; avoid bottled water when safe alternatives exist.

Appendix A: Working Group Outline: December 2019

The Maine Climate Council is established to advise the Governor and Legislature on ways to mitigate the causes of, prepare for and adapt to the consequences of climate change. Working Groups have been established to discuss potential strategies to put forth for consideration by the Maine Climate Council for final decision.

Maine Climate Council Goals:

1. Reduce Maine's greenhouse gas emissions: 45% reduction by 2030, 80% by 2050; net zero by 2045.
2. Maine Climate Action Plan update, including mitigation and adaptation strategies, due by December 1, 2020.

Working Group Mission:

To develop, evaluate and recommend to the Maine Climate Council strategies to mitigate and adapt to climate change as they pertain to community resilience planning, public health, and emergency management.

Working Group Scope:

All working groups are to:

1. Consider costs and benefits across low income, elderly, and/or vulnerable populations;
2. Advise on economic and workforce benefits and challenges; and
3. Recommend funding and financing mechanisms for proposed strategies.

Public Health Subgroup Mission:

- To identify and prioritize public health impacts from a changing climate in Maine; and
- To develop and recommend priority adaptation, preparedness, and mitigation strategies to the Maine Climate Council for the protection of human, animal, and environmental health.

Public Health Subgroup Goals:

1. Educate the public
2. Conduct public outreach
3. Communications/public buy-in
4. Health equity in all policies

Public Health Subgroup Scope:

The below scope of the Public Health subgroup contains overlap with other working groups; therefore, representatives from the Public Health subgroup will serve as liaisons with 1) Transportation, 2) Buildings, Infrastructure & Housing, 3) Natural and Working Lands, and 4) Energy.

Top Tier:

1. Health system preparedness & CO2 reduction
2. Temperature extremes
3. Vector-borne disease
4. Food/water-borne illness outbreaks (human & animal)
5. Air quality

Middle Tier:

1. Well management
2. Non-public water
3. Forcing system to think one category up

Bottom Tier:

1. Public health monitoring *(requires more time to develop)*
2. Food security/sustainable food production and supply; nutrient quality

Revision Spring 2020: Based on discussions within, and external to, the public health sub-group, including input from the Scientific & Technical Subcommittee, we decided to rearrange our scope and focus on the following 7 strategies, all of which have equal weight in terms of importance. We will prioritize them as they are developed and we learn more about efforts on the broader Working Group and the other WGs. The 7 strategies are:

Strategy #1: Improve Public Health Monitoring Capabilities
Strategy #2: Conduct Public Education About Climate Change Health Effects
Strategy #3: High Intensity Weather Impacts
Strategy #4: Vector-Borne Diseases
Strategy #5: Impacts of Food/Water-Borne Illness Outbreaks (Human & Animal)
Strategy #6: Improve Air Quality
Strategy #7: Healthcare Systems: Mitigation & Adaptation

Meeting Schedule:

All meetings will be located in the Deering Building (Conference Room 101) on the AMHI Campus in Augusta. All below agenda items are subject to change.

November 18, 2019 (9:00am-12:00pm)
Introduce working group members, review working group mission, scope, and working group schedule

December 19, 2019 (1:00pm-4:00pm)
Basic presentations & potential strategies discussion kick-off

January 9, 2020 (9:00am-12:00pm)
Introduction and discussion of potential strategies

February 11, 2020 (9:00am-12:00pm)
Outline viable strategies and corroborate with Science & Technical Committee

March 12, 2020 (9:00am-12:00pm)
Perform cost-benefit analysis of potential strategies

April 9, 2020 (9:00am-12:00pm)
Perform cost-benefit analysis of potential strategies

May 14, 2020 (9:00am-4:00pm)
Discuss and prioritize potential recommendations to put forward to Maine Climate Council

Appendix B: Impacts of Food/Water-Borne Illness Outbreaks (Human & Animal)

Foodborne Illness Outbreaks:

Harmful algal Blooms (HABs) in the marine environment: Warming waters in the Gulf of Maine have already caused several changes in the composition, abundance and timing of Harmful algal Blooms (HABs). HABs are caused by toxic phytoplankton that can be ingested by marine organisms, especially bivalve shellfish such as clams, mussels and oysters. Humans, marine mammals and birds can then be exposed to the toxins through consumption of contaminated shellfish. It is hypothesized that climate change has led to the incursion of Gulf Stream waters deep into the Gulf of Maine, possibly transporting and supporting the growth of new HAB species (D. Townsend,cAN 2018). Maine first documented Amnesic Shellfish Poisoning (ASP) in 2016 and has monitored blooms throughout the coast every year since (cite DMR). In addition to ASP in the Gulf of Maine, the annual Paralytic Shellfish Poisoning (PSP) bloom over the past decade has begun earlier in the season and persisted longer (Maine Department of Marine Resources). There are also HABs that have been observed in the Gulf of Maine in recent years that impact fish and shellfish but are not toxic to humans. These HABs can cause mass die offs of marine organisms through oxygen depletion or direct physiological impacts such as interfering with gill function.

> *Adaptation strategies*: increase HAB monitoring capacity including phytoplankton and shellfish sampling, improve predictive modeling of HABs to guide industry and management decisions, invest in research to develop best management practices when HABs impact the fishing industry, invest in technology to depurate biotoxins from shellfish. Establish regional working groups to communicate and strategize response to morbidity/mortality events of aquatic species (e.g. Maine's Aquatic Animal Health Technical Committee, since 2001; NOAA's New England Marine Mammal Working Group, since 2017).

Harmful algal Blooms (HABs) in the freshwater environment: Warming freshwater sources in Maine also pose a potential risk to human health through the increased occurrence and persistence of Harmful Algal Blooms (HABs). In freshwater, HABs are caused by certain species of cyanobacteria (blue green algae) that produce cyanotoxins. Climate change can increase fresh water HABs through the following mechanisms: increased rainfall delivers nutrients through runoff enhancing HAB events, longer growing seasons and warmer water temperatures promote growth of cyanobacteria, higher carbon dioxide levels in the water can lead to expansive blooms, and, rising sea levels and increased salinity can allow marine HABs to invade fresh water sources. Drinking or swimming in fresh water impacted by HABs can cause human health effects including rashes, liver damage and neurological effects. Other mammals and freshwater organisms can also be adversely impacted by HABs as illustrated by regional illness and deaths reported in domestic dogs.

> *Adaptation strategies:* Increase freshwater HAB monitoring, improve predictive modeling of HABs to guide management decisions, invest in research to develop best management practices when HABs impact drinking water sources. Establish regional working groups to communicate and strategize response to morbidity/mortality events especially for domestic animals. Evaluate freshwater protection strategies for

effectiveness at mitigating watershed nutrient runoff from intense storms (culvert sizing, buffer widths, land uses).

Vibrios in the marine environment: Vibrio species and specifically Vibrio parahaemolyticus (Vp) have increased in prevalence and virulence in the northeast over the past decade. Vibrios are naturally occurring marine bacteria that can be ingested by bivalve shellfish such as clams, mussels and oysters or be present on the shells of crustaceans such as lobster. Humans can then become ill through exposure to Vp by consumption of contaminated shellfish or improper handling of raw seafood. Vibrios are associated with warm, estuarine waters and increase when shellfish are exposed to high ambient temperatures during harvest and processing. Increasing temperatures of nearshore waters and ambient air during the summer months is resulting in increasing numbers of Vibrio related illnesses in Maine and throughout the United States.

Adaptation strategies: Increase Vibrio monitoring capacity, continue to develop preventive management for high risk areas, invest in research to develop best management practices when Vibrios impact the fishing industry, invest in technology to depurate Vibrios from shellfish.

High-intensity Weather Events: The climate trend for the northeastern US is projected to have more frequent and higher intensity precipitation events by the late part of this century according to the Fourth National Climate Assessment (US Global Change Research Program, 2018). These weather events produce flood waters that can carry soil erosion particles, agricultural runoff, chemical contaminants, and bacteria into surface waters. This leads to gastrointestinal illness and chemical exposures from recreational contact or consumption of untreated drinking water. High-intensity rainfall events also increase combined sewer overflows and sanitary sewer overflows which in turn impact water quality. Where these CSOs and SSOs discharge to coastal waters they impact shellfish fisheries and aquaculture by closing harvest areas for extended time periods. They also expose people to pathogens from recreational contact.

Adaptation strategies: Communities and stakeholders implement land use controls to regulate activities that could release nutrients or chemical contaminants into vulnerable watersheds and source water areas. Adopt nutrient and chemical best management practices in agricultural applications. Community and private water systems reliant on groundwater and vulnerable to flood water inundation implement infrastructure improvements to protect well heads and water delivery systems. Municipalities with CSO discharge points prioritize and replace sewer infrastructure most vulnerable to high-intensity weather-related CSO discharges.

References

- Dr. David Townsend, 2018 quoted in Portland Press article titled “Deep current of record-breaking warm water causes concerns for the Gulf of Maine”.
- Moore, S.K., Trainer, V.L., Mantua, N.J. et al. Impacts of climate variability and future climate change on harmful algal blooms and human health. Environ Health 7, S4 (2008). https://doi.org/10.1186/1476-069X-7-S2-S4.

Appendix C: Stakeholder Input
January - May 2020

We received feedback from multiple stakeholders in response to our draft strategies. All input received either was directly added to an existing strategy or is noted here.

Additional Ideas Supported by Sub-Group

Food Systems

- Increased investments in sustainable food systems/food production
- Encouraging the adoption of a plant-based diet. Plant-based eating reduces greenhouse gas emissions from cattle. Land that is otherwise fallow can be repurposed for growing oats for oat milk, which is an increasingly popular product, and an opportunity for new economic activity. For household budgets, plant-based food products generally have a longer shelf life than meat, dairy and fish, meaning less waste.
- Food insecurity threats are important. Food systems are mentioned, but the link with vulnerable populations could be clearer.

High Intensity Weather Events & Health Equity

- Given the adverse impact that downed power lines can have on our health (e.g., through food/medicine safety through loss of refrigeration; safe housing through loss of heating/cooling mechanisms; and communication), the exploration of buried power lines throughout the state, particularly in rural areas, could be helpful for minimizing consequences of high intensity weather events.

Public Health Workforce/Job Training

- Subsidized education/job training for new “green” jobs
- Development of a MaineCorps (similar to AmeriCorps or Civilian Conservation Corps), which would focus on climate-related projects

Psychological Preparedness

- There was input to include psychological preparedness for community members, municipal officials, businesses, health care systems, schools, and other entities about the effects of climate change. This type of training would improve constituents’ psychological resilience in the face of adverse climate effects.

Public Education

- In regards to reducing climate change impacts and themes in public education campaigns-suggest prioritizing green infrastructure solutions first (for example strategies to reduce impacts of high heat mitigation will entail protecting and expanding green space/tree canopy, locations of publicly available cooling amenities/centers, etc.). This could be a value/priority through which to implement or assess specific actions.

Additional Considerations for Maine Climate Council

Working Group Membership

- Question about whether the makeup of the working groups is representative of the state as a whole, especially in regard to Black, Indigenous and People of Color (BIPOC), and Lesbian, Gay, Bisexual, Transgender, Queer/Questioning (LGBTQ+) communities.

Expand Scope of "Community Resilience"

- There was feedback to define "community resilience" in the context of social resilience, including universal health care/decentralizing health care, climate insurance, ensuring livable wages, and that communities own the tools to mitigate the worst of climate change.

Green Bank

- There was a request for us to consider support for a Green Bank, which would use public employee's retirement funds, divesting them from oil. *Please see Buildings, Infrastructure and Housing Working Group's materials for more information.*

Wildfires

- Wildfire-generated smoke, harmful to human health, is likely to increase in the future, not just from fires in Maine but in the surrounding region as well. *Please see Natural & Working Lands Working Group's materials for more information.*

Marijuana Industry

- Research suggests the energy required to grow marijuana is substantial. "Indoor cannabis cultivation is one of the most energy-intensive industries in the U.S., requiring electricity to power lamps, to maintain consistent temperature and humidity levels, and to power fans for ventilation, among other things. This energy consumption, unless otherwise mitigated, results in significant greenhouse gas emissions." (Warren 2019)
- The suggestion is to consider incentives for Maine's new and developing marijuana industry to adopt climate friendly energy practices (e.g., use of renewable energy) and other strategies for reducing adverse climate impacts and promoting health equity (livable wages, safe working conditions for employees).

State Hazard Mitigation Plan

- The State Hazard Mitigation Plan would be an excellent tool to work with public health education at all levels. You could include infectious diseases, pandemics, etc. as one of Maine's natural hazards. Then create the risk assessment for this hazard, the vulnerability assessment. Then you could address the capabilities to implement mitigation in the Mitigation Strategy that you come up with (goals, actions, implementation, updating/maintenance), etc. This would then be updated every 5 years. It would also help the local and tribal plans in Maine to develop their hazard mitigation plans.