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GOVERNOR

STATE OF MAINE
DEPARTMENT OF AGRICULTURE, CONSERVATION & FORESTRY
LAND USE PLANNING COMMISSION
22 STATE HOUSE STATION
AUGUSTA, MAINE 04333-022

AMANDA E. BEAL
COMMISSIONER

JUDY C. EAST
EXECUTIVE DIRECTOR

June 8, 2020

Maine Climate Council
Office of Policy Innovation and the Future
181 State House Station
August ME 04333-0181

RE: Community Resilience Planning, Emergency Management and Public Health Working Group
Community Resilience Planning Sub-Group Recommendations

Dear Maine Climate Council Members:

It is with great pleasure and respect that I recommend to you the three Strategies prepared by the sub-group on Community Resilience Planning within the larger Working Group on Community Resilience Planning, Emergency Management and Public Health.

Each of the sub-groups had the benefit of tremendous assistance as our work shifted from monthly in-person Working Group meetings to a variety of virtual platforms during the stay-safe-at-home exigencies of the COVID-19 pandemic. The staff at the Governor's Office of Policy Innovation and the Future (GOPIF) helped the Working Group immensely throughout and also to navigate an open public process. Many individuals stepped forward to cover for those who had to focus on public health and emergency response. I would like to recognize Rebecca Boulos, Executive Director of the Maine Public Health Association, who filled in as co-chair for Dr. Nirav Shah and Rebecca Lincoln as they had to respond to the public health crisis. Likewise, Maine's State Hazard Mitigation Officer, Anne Fuchs, navigated her own amplified professional demands along with very difficult personal circumstances with grace and thoroughness. We also had tremendous cooperation from individuals within state agencies, regional planning agencies, academia, and non-profit organizations who we tapped for their expertise and insights in the development of significant detail for our first strategy. As the workload increased many stepped forward to help carry the load for which I am deeply grateful.

Stakeholder Input and Public Outreach

Stakeholder contributions were assembled during late April and in several meetings during the month of May. These contributions were insightful, constructive, and helpful. In addition to the deep cross section of public, private, non-profit, academic, and legislative representatives on the Working Group itself, we had extensive participation from the Maine Association of Planners, Build Maine, all the Regional Planning Organizations and several Economic Development Districts, the Maine Municipal Association, the Climate Change Adaptation Providers Network, Rebuild NYC, New England Environmental Finance Center, Maine Coast Heritage Trust, The Nature Conservancy, and several municipalities.

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As the Maine Climate Council proceeds with additional public involvement during the summer I recommend that we reach out directly and more extensively to municipal officials who may not have had the opportunity to contribute to date. I also strongly recommend that we schedule meetings during the evenings to enhance their ability to participate.

There were several times during our meetings that Working Group members and stakeholders noted the need for definitions of terms and clear descriptions of the challenges we face with climate change. The terms *resilience*, *adaptation*, and *mitigation* must have agreed upon definitions that can be easily referenced. Our working group reviewed 13 possible definitions of resilience and chose the following definition, that was included in one draft iteration of Strategy #2:

Resilience is defined as “the capacity of a community, business or the natural environment to prepare for, withstand, respond to and recover from a hazardous event”.

This needn't be *the* definition the Climate Council uses but an agreed upon definition is essential. The term adaptation is often used interchangeably with the term resilience. We will forward the multiple definitions of both terms that Working Group members have assembled from around the world to the Maine Climate Council for your final choice. Likewise, in the [legislation creating the Maine Climate Council](#), and on the [Maine Climate Council web page](#), the term mitigation refers to efforts that reduce carbon emissions. However, the Federal Emergency Management Agency (FEMA) refers to hazard *mitigation* in their references to reducing the vulnerability of communities and infrastructure to natural hazards – yet that is what the Working Group means by the word resilience. It all gets very confusing to those not close to this work and we recommend addressing this issue with clear, quickly referenced definitions.

Related to this need for clear definitions is a need for basic literacy around climate change, its causes, and its impacts. A publication from the [National Oceanographic and Aeronautic Administration, Climate Literacy, The Essential Principles of Climate Science](#), provides a resource for educators. The Resilience Working Group recommends it to the Maine Climate Council.

Associated with this desire for guidance on basic principles of climate science, many said we need to ground our recommendations in Maine examples and demonstrate how benefits outweigh costs to municipalities. Such examples are abundant in case studies that describe the relevance and cost effectiveness of resilience efforts to communities of all sizes and climate vulnerabilities. To that end the Resilience Working Group recommends use of the [Coastal Community Grant case studies](#), lessons learned from communities implementingⁱ the [Maine DEP Stream Crossing Upgrade Grant Program](#), lessons learned and described by the [Coastal Community Resilience focus area of Maine Sea Grant](#), among many others.

Finally, several stakeholders (Maine Association of Planners, Maine Municipal Association, Climate Change Adaptation Providers Network, New England Environmental Finance Center) indicated their willingness to assist with outreach efforts during the summer of 2020. The Resilience Working Group recommends that the Climate Council take them up on their generous offers to canvas their members and professional colleagues, get the word out, and encourage participation and additional input.

Note that this coordination and collaboration is already taking place among the Maine Municipal Association, the 40 MS4ⁱⁱ municipalities subject to the higher rule thresholds of the stormwater rules, and draft changes to improve the Chapter 500 stormwater rules in Strategy 1b.

Finally, a note on the policy lessons of conducting this work in the midst of the COVID-19 pandemic. Municipal stakeholders have observed they are now more adept in using virtual meeting platforms and they have appreciated increased access to public meetings. Virtual meeting options have helped those who can find it difficult to participate such as the elderly, parents with young children, and those with limited transportation options. Virtual meeting platforms offer the means of reducing greenhouse gas emissions and increasing overall access, during inclement weather, and in the evenings when attendance by the elderly can be restricted due to [night blindness](#). While this improved public access and successful telework stories are an unexpected benefit, the pandemic also highlights the unequal distribution of broadband access in rural Maine.

Community Resilience Planning Strategies

The Community Resilience Planning sub-group of the Community Resilience Planning, Emergency Management and Public Health Working Group recommends to the Maine Climate Council the following climate strategies with their associated actions and measurable outcomes:

1. Comprehensive Review of Maine Lawsⁱⁱⁱ to Achieve Resilience and Economic Security in the Face of Climate Change^{iv}
2. Improve Delivery System of Technical Assistance on Resilience to Municipalities
3. Funding Mechanisms to Achieve Resilience

The three Community Resilience Planning strategies are proposed as an interrelated whole. Each can stand on its own merits but, to realize the goal of community resilience and economic security in the face of climate change, all three are mutually inter-dependent. Each strategy is founded on the scientific and technical committee recommendations particularly with respect to projections for sea level rise and riverine flooding. Likewise, implementation of all three strategies is bounded by the financial constraints imposed by the economic impact of the COVID-19 pandemic. These relationships are depicted in the diagram below.

Implementation of all 3 strategies:

- facilitates – and is facilitated by the other two strategies
- recognizes financial constraints that are
- reshaped by the coronavirus pandemic



Strategy #1 calls for and, with nine sub-strategy drafts, initiates a comprehensive review and revision of several Maine statutes and their associated regulations to support adaptation and resilience. This set of revisions is guided by best available science and adoption of the ranges of projected sea level rise and riverine flooding established by the Science and Technical

Committee^v. It is also guided by a deliberate effort to remove inconsistent regulatory definitions and standards and the need to reduce the burden on those who will be impacted by the changes (applicants, their consultants, and those who will interpret and enforce them at all levels).

Strategy #2 recognizes that the magnitude of the impacts of climate change is significant, yet specific effects vary across the state. Some localities do not understand their vulnerabilities, nor do they have the capacity to develop a resilience response. Others know of their vulnerabilities yet lack the capacity to secure funding or manage their response. This strategy establishes the institutional infrastructure at the state and regional levels to support resilience in all municipalities. It stresses the importance of using existing governance structures, providing access to the most recent data and tools, and tailoring assistance to municipal need and capacity.

Strategy #3 affirms the reality that funding resilience to the impacts of climate change will be expensive. Such investments in resilience, however, will cost less than responding to repetitive and increasing climate impacts that compound virtually all contemporary social problems. The profound economic disruption posed by the COVID-19 pandemic will demand even greater efficiency than was already obvious at the launch of the Maine Climate Council's work. Thus, the actions recommended in this strategy call for investment of dollars but especially for coordination, efficiency, collaboration, and incentivizing behavior.

The strategy recommends Executive Orders to establish cabinet level coordination across state agencies so that funding priorities are consistent and can reach communities and regional organizations who are ready to implement adaptation solutions. The strategy also recommends assembly and maintenance of a clearing house of funding options from public and private sources and the development of, and participation in, multiple creative financing ideas. In addition to the job creation potential of climate resilience (in design, construction, project management, operation and maintenance) there are benefits associated with reduced vulnerability, avoided economic disruption, social continuity and reduced response time after disaster, achieving greater resilience over time, and reliance on functional regional networks and existing local governance structures.

Areas of Emphasis

The three Strategies from the Community Resilience Planning sub-group are attached. Also attached, in Appendix A, are working drafts of the review recommended in Strategy #1 that calls for a *Comprehensive Review of Maine Laws to Achieve Resilience and Economic Security in the Face of Climate Change* (sub-strategies (1a-1i)). This detail was initiated by our "sub sub-groups" with the assistance of Working Group members and professionals in several state agencies^{vi} with decades of combined experience in policy, planning, and permitting.

As the Working Group neared completion of its Strategies and incorporated stakeholder input, we asked for areas of emphasis across and within each Strategy. The issues, concerns, and items of greatest promise for economic recovery as well as climate resilience are provided here.

- *Link change with strong technical assistance.* All three Strategies work together. Each one facilitates – and is facilitated by the other two and recognizes the financial constraints that are reshaped by the coronavirus pandemic. This sentiment was repeated in multiple forums.

- *One size does not fit all.* Tailor recommendations to the variable sizes and circumstances of communities in Maine. This issue was raised in discussions on assessing climate vulnerabilities, identifying resilient responses, creating model ordinances, incentivizing actions that result in funding priorities, and in ensuring that regulatory change can be seamlessly absorbed into municipal governance. Incentives for small rural communities for instance need to be less onerous than for larger centers, in recognition of their substantially unequal starting point in terms of capacity and the absence of large infrastructure investment.
- *Don't reinvent the wheel.* Working Group participants and stakeholders often observed that other states have models on which Maine can draw. Many specific actions in our three strategies rely upon and reference lessons learned about successful technical assistance and training programs, effective incentive programs, and innovative financing mechanisms in states across the country. They are referenced in footnotes, as linked web pages throughout the documents, and in the Technical Assistance Resources provided at the end of Strategy 2.
- *Link climate resilience to economic recovery.* This issue arose with resounding support for the creation of a Maine Climate Corps to train the next generation of climate professionals in the trades, sciences, law, real estate, design, and engineering. It also resulted in the modification of a stakeholder-recommended idea for a climate mitigation impact fee (where a new development that increased greenhouse gas emissions would be assessed a fee) to a climate mitigation reward/incentive program (where a new development that was carbon neutral or that captured stormwater would be rewarded with things like greater floor area, reduced fees, and other economic development incentives).
- *Be bold.* Our Working Group was encouraged by public attendees at the January 2020 Maine Climate Council meeting to take the threats associated with our climate vulnerability with utmost seriousness and to be bold in our response. We have done so. The scope of the statutory and rule changes recommended in Strategy #1 is extensive. It will take time and political courage to be realized. Embedded within that change is a deep understanding and respect for the impact of such change. The recommendations stress reducing regulatory burdens to facilitate economic recovery and climate resilience. They also stress the need for support at all levels – state, regional, local – to guide, interpret and implement the changes. We deliberately chose in several instances to make clear declarative statements to the Climate Council; not to study further, but to act. Boldness also seeks innovation. The third Strategy on Funding Mechanisms identifies innovative financing ideas that link resilience with economic recovery and minimizes, as much as possible, the tax burden we face in addressing the costly infrastructure implications of our current climate vulnerabilities.
- *Leverage - leverage - leverage.* Much as the axiom asserts how fundamental location is to real estate, the Working Group recognizes the essential principle of leverage in climate resilience. Leverage is essential to secure funding from public and non-profit sources, to efficiently reach over 400 municipalities with technical assistance, and to incentivize behavior in the public and private sectors. It is of paramount importance in the economic reality we collectively face as a result of the COVID-19 pandemic. The single Strategy from the Emergency Management sub-group, to create a State Infrastructure Climate Adaptation Fund that would provide local matching funds to enable municipalities and state agencies to access significant federal dollars, is a vital system of leverage.

Cross Cutting Strategies

There are issues that arose among several Working Groups, three of which concern the Community Resilience Planning sub-group. These issues were assembled by the GOPIF staff

and co-chairs of the affected Working Groups to determine whether and how our strategies addressed them. The three cross cutting issues include:

1. coastal community resilience
2. the location of development
3. “getting out of harm’s way”

These issues arose among the Community Resilience Planning sub-group (1, 2 & 3), the Transportation Working Group (1 & 3), the Coastal and Marine Working Group (1, 2 & 3) and the Natural and Working Lands Working Group (1). Several Working Group co-chairs addressed these issues through a gap analysis of existing strategies and generating questions for further analysis.

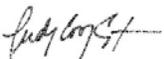
To address “coastal community resilience” a gap analysis of the strategies from the Community Resilience Planning and the Coastal and Marine Working Groups concluded that # 1 was adequately covered between the suite of strategies from those two working groups.

To address the “location of development” issue a gap analysis of the strategies was completed by the Community Resilience Planning, Coastal and Marine, Transportation, and the Natural and Working Lands Working Groups. A stakeholder presentation made to representatives of the Maine Association of Planners and Build Maine concluded that many of the issues associated with location of development are covered by the existing suite of strategies. However, there are many complex and contentious issues that remain unresolved concerning where to place, promote, and restrict development, a conversation that will continue during the summer months and well into the future.

The “getting out of harm’s way” issue is also fraught with controversy and has significant financial, taxation, hazard, and equity implications. It is the debate over the choice to rebuild or to retreat/relocate away from the natural hazards associated with repeated flood losses in areas subject to sea level rise or riverine flooding. Given the magnitude of the issues already before the Climate Council, the co-chairs of the Community Resilience Planning, Coastal and Marine, and Transportation Working Groups did not create specific strategies for this issue. Instead they generated a list of the essential questions^{vii} that we as a state and as a society must grapple with as climate change increases our risk and exposure to destructive conditions that have enormous financial consequences.

Thank you for the opportunity to contribute to this work. It is a privilege to work alongside so many dedicated individuals in the public, private, academic, and non-profit sector on this critical issue of such great import to our state and our children’s future.

Sincerely,



Judith C. East
Co-Chair, Community Resilience Planning, Emergency Management and Public Health Working Group

Enclosure(s): Community Resilience Planning Strategies 1, 2, and 3;
Appendix including Community Resilience Planning Sub-Strategies 1a-1i

cc:

Anne Fuchs, State Hazard Mitigation Officer, Maine Emergency Management Agency
Rebecca Boulos, Executive Director, Maine Public Health Association
Dr. Nirav Shah, Director Maine Centers for Disease Control
Rebecca Lincoln, Toxicologist, Maine Department of Health and Human Services
Sarah Curran, Senior Analyst, Governor’s Office of Policy Innovation and the Future (GOPIF)
Brian Ambrette, Senior Climate Resilience Coordinator, GOPIF
Cassandra Rose, Climate Council Coordinator, GOPIF

ⁱ The Town of Damariscotta funded a culvert replacement with Maine DEP Stream Crossing Upgrade funds at proper design specifications after multiple re-builds of the same culvert using FEMA funding that only allowed repair at former, and inadequate, design standards.

ⁱⁱ Municipal Separate Storm Sewer System operators subject to the National Pollutant Discharge Elimination System (NPDES) permit program.

ⁱⁱⁱ Laws” refers to all statutes, executive orders, state regulations and affected municipal regulations and ordinances

^{iv} In support of the first strategy, the Community Resilience Planning sub-group has prepared nine additional strategies (1a through 1i) with statute- and rule-specific recommendations. These additional strategies are intended for inclusion in an Appendix to the Maine Climate Council report and to initiate implementation of our first strategy.

^v STS Phase 1 Report, p. 82, Table 7

^{vi} Maine Department of Environmental Protection, Land Use Planning Commission, Maine Geological Survey, Floodplain Management Program, Municipal Planning Assistance Program, Maine Coastal Program

^{vii} Key questions on “getting out of harm’s way” discussion
What are community impacts associated with relocation including:

- availability of alternate housing,
- loss of tax base,
- reduction in user base for municipal utilities,
- loss of population to neighboring communities,
- impact on community culture, historic properties, neighborhoods, and others

What are the infrastructure impacts associated with more frequent and intense destruction associated with storm surge and SLR? And:

- How many times and at what cost threshold do we repair before we rebuild?
- How many times and at what cost threshold do we repair before we relocate?
- Do we repair when near end of asset life? How near?

By what criteria?

- How many people are affected, trapped, or forced to detour?
- What services are rendered less or inaccessible?
- How does the system (bridge, bridge approaches, peninsula cut-offs) act together to provide protection?
- What is the impact of catastrophic failure relative to the cost of repair and hardening? Egs.
 - WWTP failure extends shellfish closure beyond mandated permanent closure areas to those that are normally open
 - Cost of installing a temporary bridge and new bridge
- Who is affected at the regional and statewide level and who pays when risk is allowed to continue?

What process do we use to discuss these issues?

What is the public process for projects that cross jurisdictional boundaries?

Community Resilience Planning, Public Health, & Emergency Management
Working Group

**Strategy # 1 - Comprehensive Review of Maine Laws¹ to Achieve Resilience and
Economic Security in the Face of Climate Change**

Recommended Climate Strategies, Actions and Measurable Outcomes

1. Describe the Recommended Strategy and how it addresses Maine’s climate resiliency and mitigation goals.

Summary: This strategy calls for and, with nine sub-strategy drafts, initiates a comprehensive review and revision of several Maine statutes and their associated regulations that are integral to supporting municipal, regional, and state level adaptation and resilience. This set of revisions is guided by best available science and adoption of the ranges of projected sea level rise (Science and Technical Committee Phase 1 Report, p. 82, Table 7) and riverine flooding established by the Science and Technical Committee. It is also guided by a deliberate effort to remove inconsistent regulatory definitions and standards and the need to reduce the burden on those who will be impacted by the changes (applicants, their consultants, and those who will interpret and enforce them at the state and municipal levels).

The statutes and rules proposed for revision are listed below under “legal authority” and the nine sub-strategy drafts (in Appendix A) provide a significant start toward implementation of this strategy.

- a. For adaptation strategies, what climate impacts does it address? How will this strategy reduce the vulnerability of Mainers to the impacts of climate change?

As an overall statutory and rules revision strategy, almost all climate impacts are addressed. Our working group focused mostly on adaptation and little on how these statutes and regulations could be changed to help focus on mitigation; however, some feel that integrating mitigation goals into these laws (e.g. Comprehensive Planning, Site Law, etc.) should be a key part of the changes. As all six Working Group strategies are integrated by the Maine Climate Council, we anticipate that recommendations for how statutes can address mitigation goals will emerge. The more mitigation that happens, and the sooner, the less adaptation (and spending of billions of dollars and avoiding a lot of disruption) will need to happen along the way in the next 100 years and beyond.

- b. List any site-specific geographies where the strategy would be applied.

As above, the strategy applies statewide.

2. What is your measurable outcome for this strategy, assuming all recommended actions to implement the strategy are achieved?

- a. For mitigation strategies:

- i. What is the estimated CO₂e savings (metric tons) by 2025, 2030, 2050?

¹ “Laws” refers to all statutes, executive orders, state regulations and affected municipal regulations and ordinances

N/A

- ii. What is the cost effectiveness of those reductions (cost per ton of CO₂e reduced) and the total cost?

N/A

- b. Are outcomes measurable with current monitoring systems?

N/A

The recommended rule changes are primarily adaptation strategies. Measurable outcomes are listed in bullet points below:

Consistent, scientifically defensible definitions across statutes and regulations will result in:

- reduced frustration and confusion among applicants and regulators,
- public policy and associated regulation grounded in best available science.

Reduction of regulatory burdens for projects that achieve resilience and efficient development will result in:

- faster implementation of resilience projects,
- faster approval and financing of development in city and community centers,
- faster realization of associated economic recovery.

Linking rule changes with improved technical assistance and training will result in:

- informed implementation,
- feedback from those affected to quickly address unintended consequences.

3. What specific actions would be required to implement the strategy, including but not limited to legislation or regulation. Examples include: establish a program or a fund, conduct additional research, provide education or training, coordinate with other parties/agencies/states, etc. Considering the recommended actions listed, who, if they can be named, are the specific actors needed for implementation?

- A. Review sub-strategy recommendations (Sub-Strategies 1a – 1h¹) of the resilience working group and propose revisions to Maine laws to improve resilience of Maine communities in the immediate (3-6 month) term.
- B. Direct the review and revision of all sub-strategies to ensure consistency and scientifically defensible definitions across all statutes and rules. For example, but not limited to:
 - Align definitions and rules of wetlands and floodplains in Natural Resource Protection Act (NRPA) and Shoreland Zoning statutes where they overlap or are inconsistent, and
 - Reference the highest astronomical tide, rather than the highest annual tide.
 - Achieve consistency across statutes and rules over what is protected and/or subject to the jurisdiction of each in terms of actions that are exempt or subject to permit by rule with particular focus on culvert replacement.
- C. Be deliberate in minimizing the burden created by such statutory and rule changes on applicants and their consultants, permitting and compliance staff across all state agencies, and the review and permitting demands on local Planning Boards and Code Enforcement Officers.
- D. Seek to modernize the regulatory review process for activities related to climate resilience.

- E. In concert with Resilience Strategy #2 (Improve Delivery System of Technical Assistance on Resilience to Municipalities) coordinate roll out of any statutory or rule changes with robust technical assistance and training efforts within state agencies, at the regional level, and for municipalities.
- F. Codify guidance that results from any statutory or rules changes and develop certification programs for engineers and climate change professionalsⁱⁱ.
- G. Improve rules and regulations to enable more dense development and interconnected street networks (currently made challenging by wetlands / setback / sewer rules) in areas that are specifically identified by communities for walkable development.

4. What is the timeframe for this strategy?

Review of detailed working group recommendations could start immediately.

- When is the outcome realized?

Revisions to rules or policies (not requiring legislative action or statutory change) could be completed within 6 months.

Revisions to statutes, if proposed during the 130th Legislature could take effect in the summer of 2021; associated rule changes could take a few months longer depending on the issue and process required by statute.

	Short-term (2022)	Mid-term (2030)	Long-term (2050)	2070 -2100
To implement	A, B, C, D, E			
To realize outcomes	A, B, C, D, E	A, B, C, D, E	A, B, C, D, E	A, B, C, D, E

5. Please analyze the Recommended Strategy against the following criteria. (Each Working Group can add its own sector-specific criteria as appropriate.)

<p>Workforce - Will the strategy create new jobs, prevent job loss, or cost the state jobs?</p>	<p>Short term the strategy requires the skills of professionals with knowledge of the legislative process. These can be professionals within existing state agencies as well as contracted advisors from the planning, legal, academic, and engineering communities.</p> <p>Longer term, the strategy requires the skills of those who can train and provide technical assistance to communities who will implement the revised rules. Additional staff capacity will be needed within the Municipal Planning Assistance Program and within regional planning organizations.</p> <p>Jobs will be created among those who prepare analyses of the cost-benefit of different designs, and among those who build and maintain structures and facilities in areas less prone to extreme impacts. These may be absorbed within the existing consulting and contractor community or expand with growth. There are also opportunities for student projects and internships to design, test, and evaluate.</p>
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<p>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)?</p>	<p>Changes to Maine law and regulations will cause local ordinances and rules to change accordingly. A comprehensive review will ensure consistency across regulations governing natural resources.</p> <p>A consistent approach among statutes and regulations will help communities learn and implement the new rules. A risk-based planning approach using risk tolerance will also assist communities in learning and implementing revised rules.</p> <p>Streamlining regulatory processes that address climate resilience will ensure adaptation projects are completed quickly before hazard events (that are more likely yet not predictable) and during recovery from adverse events.</p> <p>Regulations will be based on vetted scientific information around the range of future risks faced by communities. Regulatory language will be flexible to allow for swift change if risk projections change.</p> <p>The standardization and adoption of sea level rise projections across municipalities and agencies could improve recreational opportunities, avoid damage, benefit public health, and lessen impact on businesses for decades--especially if revisited at regular intervals.</p>
<p>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?</p>	<p>Contracted services to develop/revise statutes and rules (\$10,000-30,000 by the state) if beyond capacity of existing agency staff.</p> <p>Training costs (at the state level) will be associated with:</p> <ul style="list-style-type: none"> • an expanded code enforcement and planning board training program (\$50,000?) • Training of review staff in state agencies (\$50,000?) • partnerships or contracts with Maine Municipal Association and regional planning agencies (\$100,000-\$200,000?) • certification for contractors in resilient design practices (~\$50,000?) <p>There will be costs at the local level to update ordinances and maps. Additionally, there could be a cost on the towns tax base by making some properties unbuildable.</p>
<p>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?</p>	<p>All populations, communities, and sectors currently at risk of loss (of life, business activity, property) could benefit from proposed rule changes that reduce their risk exposure.</p> <p>Likewise, the same populations, communities, and sectors may face loss of property or commercial value if regulations reduce their ability to operate or live in their current locations.</p> <p>Property owners may benefit with longer lasting structures adjacent to resources. Other property owners may be disadvantaged if their property becomes unbuildable or they have fewer options for new</p>

	<p>structures or remodels. Towns may lose tax money from property values being reduced if they are unbuildable. Depending on the strategy, these issues could be mitigated to an extent. For example, if a rolling easement is instituted (say as part of shoreland zoning or floodplain ordinance), a property owner has use of it (and the municipality gets taxes) until a set threshold is met, then the property is bought out and focus is given to "water dependent activity" until the property has no use left due to certain conditions.</p> <p>Without deliberate efforts to support them, smaller towns with limited resources could be disproportionately impacted by the cost of updating ordinances and maps.</p> <p>Any relocation or disruption of activity caused by regulatory change could be tied to investment and incentives that places a priority on low income households and businesses.</p>
<p>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)?</p>	<p>Several states (CA, CT, DE, MD, MA, NY, RI, VA) have tied resilience measures to scientifically agreed upon ranges of sea level rise and riverine flooding projections.</p> <p>There are regional associations for specific industries that have incorporated resiliency measures for example NEIWPCC’sⁱⁱⁱ TR-16 standard for flood risk management.</p> <p>Barriers to implementation include:</p> <ul style="list-style-type: none"> • limited existing capacity with state agencies, particularly at Maine DEP and the Municipal Planning Assistance Program at DACF, and at the regional level • general resistance to change and persistent localized skepticism in the reality of climate change and its impacts
<p>Legal authority - Does the strategy require new statutory (legal/legislative) authority?</p>	<p>Yes, recommendations are proposed to the following identified statutes and rules (priority order assigned, does not reflect numbering system of sub-strategies):</p> <ul style="list-style-type: none"> • Shoreland Zoning Act (Title 38, Chapter 3, §§ 435-449) • Natural Resources Protection Act (Title 38 Chapter 3, §§ 480A – 480JJ) and rules, Chapter 305 (Permit By Rule), Chapter 310 (Wetlands and Waterbodies Protection), Chapter 355 (Coastal Sand Dune Rules) • Statewide Standards for Timber Harvesting and Related Activities in Shoreland Areas, (01-669 CMR Ch. 21, Section 11,B,4,c) • Stormwater Management Act (Title 38, Chapter 3, § 420D) and rules, Chapter 500 • Maine Floodplain Management model ordinance

	<ul style="list-style-type: none"> • Site Location of Development Act (Title 38, Chapter 3, §§ 481-490) and rules, Chapters 371-382 • Comprehensive Planning and Land Use Regulation Act (Title 30-A, Chapter 3, §§ 4301- 4483) • Land Use Regulation (Title 12, Chapter 206-A) • Subsurface Wastewater Disposal Rules (Title 22, Chapter 241)
<p>Additional research and data gaps.</p>	<p>While the working group has provided initial recommendations, legal and professional advice is needed to develop specific statutory proposals for the 130th Legislature.</p> <p>This will include disclosure of scientific information trends and impacts. Any changes will need to establish whether applicants will be required applicants to review, or to review and to meet a new standard. In addition, new standards could look at different climate regions of the state, along with the types of geology and watershed characteristics, and tailor design storms to consider accordingly. E.g. differences in recurrence of specific storms in different parts of the state. This may be accomplished by using multipliers on top of a specific storm size to get at larger storms to consider.</p> <p>Also, improved projections for changes in the 2-, 10-, 25-, 50-, 100-, and 500-year precipitation and flow events will allow revisions to rules for inland and riverine settings. Some states have considered or are acting on incorporating emissions to development projects.</p> <p>CCAP convened a symposium on legal liabilities for governments regarding climate change/adaptation. Several reports, fact sheets, and other guidance available.</p>

6. Rationale/Background Information

**Please footnote substantive disagreements among the Working Group members
There were none

ⁱ From Public Health Sub-Group: Add review of Subsurface Wastewater for effectiveness in terms of protecting public health by reducing pollution sources that directly impact public safety through contamination of shellfish resources and drinking and bathing waters. The indirect impact of failing subsurface waste management systems should also be considered due to nutrient loading which can lead to Harmful Algal Blooms and eutrophication. Education, effective enforcement and continuity of municipal application of existing laws and regulations should also be promoted.

ⁱⁱ Models for such training are available from the Association of Climate change Officers, [the checklist for communities from the MA Municipal Vulnerability Preparedness Program \(https://www.mass.gov/municipal-vulnerability-preparedness-mvp-program\)](https://www.mass.gov/municipal-vulnerability-preparedness-mvp-program) and the Low Impact Development checklist from RI (<http://www.dem.ri.gov/programs/bpoladm/suswshed/pdfs/lidplan.pdf>).

ⁱⁱⁱ NEIWPCC is a regional commission that helps the states of the Northeast preserve and advance water quality. <https://neiwpc.org/> I defy anyone who can find what the acronym actually stands for on their entire web site!!!

Community Resilience Planning, Public Health, & Emergency Management
Working Group
**Strategy # 2 - Improve Delivery System of Technical Assistance on Resilience to
Municipalities**
Recommended Climate Strategies,
Actions and Measurable Outcomes

1. Describe the Recommended Strategy and how it addresses Maine’s climate resiliency and mitigation goals.

Summary:

The magnitude of the impacts of climate change is significant yet specific effects vary across the state. Some localities do not understand their current and future vulnerabilities, nor do they have the capacity to develop a resilience response. Others have a better understanding of their vulnerabilities. Indeed about 75% of coastal communities have completed vulnerability assessments yet they often lack the capacity to secure funding or manage their response. This strategy establishes the institutional infrastructure at the state and regional levels to support resilience in all municipalities. It stresses the importance of using existing governance structures, providing access to the most recent data and tools, and tailoring assistance to municipal need and capacity.

- a. For adaptation strategies, what climate impacts does it address? How will this strategy reduce the vulnerability of Mainers to the impacts of climate change?

As an overall technical assistance strategy, all climate impacts are addressed. Municipalities will learn of their specific climate vulnerabilities and obtain support in addressing them.

As noted in Strategy #1, our Working Group focused mostly on adaptation and little on how improvements in technical assistance could help municipalities focus on mitigation. As all six Working Group strategies are integrated by the Maine Climate Council, we anticipate that recommendations for how improvements in the delivery of technical assistance can address mitigation goals will emerge.

- b. List any site-specific geographies where the strategy would be applied.

As above, the strategy applies statewide, however, technical assistance will be scaled to each municipality depending on need and provided regionally in rural low population areas.

2. What is your measurable outcome for this strategy, assuming all recommended actions to implement the strategy are achieved?

- a. For mitigation strategies:

- i. What is the estimated CO₂e savings (metric tons) by 2025, 2030, 2050?

Difficult to establish as recommendations in this Strategy are intended to equip municipalities with the training and tools to initiate mitigation actions to reduce greenhouse gas emissions. What actions will be adopted, by when, and by how many municipalities is not known well enough to extrapolate into a measure of CO₂ emission reductions.

- ii. What is the cost effectiveness of those reductions (cost per ton of CO₂e reduced) and the total cost?

N/A

- b. Are outcomes measurable with current monitoring systems?

The recommended Technical Assistance improvements are primarily adaptation strategies.

Measurable outcomes are listed in bullet points below:

- Completed climate vulnerability assessments and climate resilience planning documents.
- Designated climate resilience individuals and/or local group.
- Efficiencies derived from collaborations among municipalities, shared responsibilities, shared responses – resulting in funded projects that are professionally managed and implemented.
- Adequate staff at state and regional levels to provide technical assistance.
- Fully trained Code Enforcement Officers available to municipalities in all parts of the state.
- Efficient delivery of technical assistance and tools to assess vulnerability, design adaptation responses, and support resilience efforts through funding that leverages public dollars.

1. What specific actions would be required to implement the strategy, including but not limited to legislation or regulation. Examples include: establish a program or a fund, conduct additional research, provide education or training, coordinate with other parties/agencies/states, etc. Considering the recommended actions listed, who, if they can be named, are the specific actors needed for implementation?

- A. Expand state level support of technical assistance on the impacts of a changing climate and develop resilience into all activities.

- a) Designate resilience officers within state agencies; define their responsibilities and qualifications.
- b) Provide specialized training and support to regional organizations to carry out their technical assistance delivery to communities. Include and engage engineers, landscape architects, and consultants as audience for certain climate resiliency concepts (e.g. stormwater infrastructure, coastal infrastructure, etc.). Draw on their expertise as well for training programs.
- c) Where regional planning commission capacity is not available, establish a “circuit rider”ⁱ program to provide technical assistance to small communities
- d) Increase capacity for training and certification of Code Enforcement Officers
- e) Anticipate potential for support and management of technical assistance program by nonprofit/private partners to allow for continued program viability in the event of loss of state funding
- f) Link technical assistance to funding programs and incentivize municipal participation (see Resilience Strategy #3 Funding Mechanisms)

- B. Support regional delivery of technical assistance on climate impacts and resilience across the state.

- a) Support regional planning organizations/councils of government with demonstrated capacity, expertise, and municipal relationships in providing technical assistance; expand training programs to those lacking current capacity. Require designation of

resilience staffing capacity within the regional organization for access to state contractual support.

- b) Create regional groups to exchange ideas, share information and facilitate the transfer, sharing, and/or demonstration of strategies provided in one community to others within regional service areas.
- C. Seek efficiencies in the creation and delivery of technical assistance
- a) Create consistent and coordinated messaging for climate resilience while accommodating variable delivery (organizations, people, agencies).
 - b) Require transfer, sharing, and/or demonstration of strategies provided in one community to others in regional service area.
 - c) Provide resilience training and guidance to Select Boards/Councils, Planning Boards, designated resilience staff and/or committees, Code Enforcement Officers and other key municipal staff, particularly for municipalities that lack such capacity.
 - d) Recognize and call upon the expertise and skill set currently available from:
 - i. non-profit organizationsⁱⁱ to provide Technical Assistance, tools, facilitation, coordination of partners, and training at all levels
 - ii. the deep skill set already available in the consulting, engineering, and design community as resources for Technical Assistance
 - iii. academic partners both as sources of resources (funds, internships) and as important members of the local community (university of Maine campuses, local private colleges)
- D. Use existing governing structures and processes rather than creating new ones
- a) Define responsibilities and qualifications of local resilience officer and local resilience committees and to the greatest extent feasible, engage with existing community staff and capacity.
 - b) Designate a local official, municipal staff member, or committee to be responsible for resilience planning and implementation as a prerequisite for qualifying for state financial assistance for resilience-related capital expenditures.
 - c) Create models and guidance documents for integrating resilience into existing planning, regulatory, and governance processes for municipalities of varying sizes and risk categories.
 - d) Embed resilience training into existing and expanded Code Enforcement Officer training programs.
- E. Support municipalities to understand the impacts of a changing climate and develop resilience and mitigation into all activities.
- a) Facilitate and participate in community conversations regarding available climate resilience strategies, including visioning a resilient and economically viable future, mitigation, adaptation, natural solutions (eg. living shorelines), fortification, and relocationⁱⁱⁱ. Include resilience and mitigation strategies in Comprehensive Economic Development Strategies (CEDS) documents.
 - b) Include technical assistance on municipal mitigation opportunities:
 - i. Measures to reduce GHG emissions
 - ii. Assistance with Public Utilities Commission Request For Proposals on solar siting projects

- iii. Establishing micro-grids
 - iv. Municipal financing assistance
 - c) Scale technical assistance to:
 - i. different community types (urban, rural, large, small, inland, coastal), level of awareness and understanding of their risks and vulnerabilities, and
 - ii. level of vulnerability (some communities will simply need more help than others).
 - d) Provide support to municipalities to update a comprehensive plan, create a climate chapter or develop a resilience plan, and to assist them in defining, adopting and implementing tangible actions that are specific to their circumstances and hazards.
 - e) Improve upon the education, effective enforcement, and continuity of municipal application of subsurface wastewater disposal laws.
 - f) Provide information and documentation on the legal and social obligations of municipal governments for resilience planning (with reference to legal liability work by Conservation Law Foundation and Sea Grant Law Center, announcements by bond rating agencies), and why it/how it benefits them and the community at large.
 - g) Provide educational and technical assistance to businesses and individuals to become more sustainable and resilient.
 - h) Develop practical messaging on climate change impacts that resonates with communities and stakeholders. For example, instead of simply discussing how sea levels will rise X feet in 50 years, discuss it in the context of how nuisance flooding in a community has increased and will increase in the future or how droughts and temperature extremes have impacted food production.
- F. Provide a clearing house to coordinate public and non-profit sector data and decision-support tools to ensure use of consistent, current data on vulnerability and risk, assets, economics, demographics, nature-based solutions^{iv}, and mitigation opportunities^v.
 - a) Coordinate across state agencies to ensure consistent messaging and a central location/information source for end users to navigate. Consider a Maine 'climate dashboard' with interactive maps, data, and guidance to consolidate and communicate climate-related information.
 - b) Ensure any "Climate Dashboard" is accessible at the municipal level.
 - c) Share case studies^{vi} of successful resilience projects that demonstrate how and where to obtain and leverage funds, how to progress from planning and design to project implementation, who to contact for more information and practical experience, and what kinds of projects are possible and transferable to other communities.
 - d) Share lessons learned from post-disaster recovery analyses that demonstrate community resilience, for example post Tropical Storm Irene in Vermont and ReBuild NY after Hurricane Sandy.
 - e) Prepare presentations for municipal officials describing funding programs, example projects, application procedures, technical information on how communities can interpret/integrate scientific information and engage vulnerable communities in local decision-making.
 - f) Create guidance documents on funding sources for Green House Gas mitigation and resilience work
 - i. Categorize for scientific research and monitoring, assessment, planning,

- implementation, and evaluation with best practices for each sector.
- ii. Include models to consider social vulnerability and equity in resilience planning.
- iii. Include ways to access programs, keys to a successful proposal, and use this exchange to inform improvements to funding programs themselves
- iv. Include how to manage and administrate grants, contracts, and Request For Proposal procedures.
- g) Focus on hazards including coastal and riverine flooding, high heat, and extreme storms and impacts to critical infrastructure, historic downtowns, and vulnerable populations.
- h) Require consistent design guidance that is adaptive to current resilience needs for critical transportation infrastructure (culverts, roads, bridges, (utilize MaineDOT design guidance) and all critical infrastructure (WWTPs, hospitals, drinking water systems, etc.)
- i) Track the accomplishments and need to understand the efficacy of implementation efforts.
- j) Address social vulnerability and integration of social service agencies in technical assistance training on climate impacts and resilience options:
 - i. promote communication and coordination between emergency response agencies and municipalities
 - ii. for social service organizations, food pantries, etc. to enable planning for impacts of climate change on social service programs
 - iii. in recognition of the positive role of social capital in providing resilience to Vermont communities in the aftermath of Hurricane Irene in VT ^{vii}
 - iv. examine social vulnerability as a dimension of a vulnerability assessment as demonstrated by the Flood Resilience Checklist and the [The Nature Conservancy Coastal Risk Explorer](#).

3. What is the timeframe for this strategy?

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

4. Please analyze the Recommended Strategy against the following criteria. (Each Working Group can add its own sector-specific criteria as appropriate.)

<p>Workforce - Will the strategy create new jobs, prevent job loss, or cost the state jobs?</p>	<p>Yes, additional staff at the state and regional levels are needed in order to effectively implement this strategy Including:</p> <ul style="list-style-type: none"> • MPAP program (2 + staff at minimum) • Maine Geological Survey (marine geologist, currently federally funded) • Maine DEP • state coastal engineer, • resiliency specialists in regional organizations (support for ~ 8 staff and/or circuit rider).
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	<p>New jobs are likely in some of the larger municipalities. New roles will be defined within local government that may not require additional hiring or expense. New jobs are also likely in non-profit and educational institutions. Workforce impacts can be measured in avoided damage to vulnerable infrastructure, downtowns, and businesses.</p>
<p>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)?</p>	<p>The primary benefit of enhanced technical assistance is avoided damage to infrastructure, buildings, businesses, and the natural environment. Secondary impacts to the local and state economy may be minimized. Negative impacts on water quality and shellfish resources will also be avoided if wastewater treatment plants are protected from flood damage and catastrophic effluent release. Efficiency considerations are paramount such that:</p> <ul style="list-style-type: none"> • The creation and distribution of data and tools will avoid duplication and achieve consistency. • Delivery mechanisms are useable and scalable to communities of varying size and capacity. • Actions may be new but can be integrated into existing governance processes.
<p>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?</p>	<p>Funds are needed to support additional staff at the state level (Municipal Planning Assistance Program, Floodplain Management Program, Maine DEP, Maine Geological Survey) and at the regional level (contracts to regional councils), and large municipalities.</p> <p>Anticipated funds (from General Fund) are: New state personnel: ~ \$600,000 Additional contractual support for regional staffing: ~\$500,000 Development of training programs: ~\$100,000</p>
<p>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?</p>	<p>There is a deliberate effort to achieve efficiency in the delivery of the necessary technical assistance in this strategy. This is done by establishing statewide clearing house of data, tools, and training coupled with regional delivery of assistance to municipalities. In particular, the strategy stresses coordination and regional support to low-income, rural, and vulnerable residents and communities.</p>
<p>Proven strategy & feasibility – Has this</p>	<p>The recommended framework for providing technical assistance at state and regional levels is very similar to one that exists now. The</p>

<p>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)?</p>	<p>primary difference is that current staffing levels are a fraction of what they were in the past at the state level (in municipal planning assistance, floodplain management, marine geology, permitting and compliance, code enforcement training, and others) and support for the regional planning councils has been level or in decline for 30 years.</p> <p>Training and certification programs for elected officials provided by Association of Climate Change Officers and New England Environmental Finance Center.</p> <p>A list of example technical assistance tools and approaches are provided in Appendix ##; these come from within Maine and around the country.</p> <p>There are no technical/feasibility issues associated with the strategy.</p>
<p>Legal authority - Does the strategy require new statutory (legal/legislative) authority?</p>	<p>No, there is expertise available within state government and regional organizations (regional planning commissions, councils of government, non-profits, extension service) to provide technical assistance.</p>
<p>Additional research and data gaps.</p>	
<p>Other?</p>	

**Please footnote substantive disagreements among the Working Group members
There were none

Technical Assistance Examples/Ideas (For reference, and Case Study examples)

Municipal Preparedness Programs

Massachusetts - [Municipal Vulnerability Preparedness Program](#) created through Executive Order 569: Establishing an integrated Climate Change Strategy for the Commonwealth 9.16.2016. provides planning and "action" grants that support vulnerable communities; [Case Study slide deck](#) describes 82% of municipalities have rec'd \$33M+ in planning & action grants during 1st three of program.

Encourage the development and use of resiliency standards through planning, design and development process. Such standards would apply to materials, construction techniques, siting of critical facilities and infrastructure, for both new development and redevelopment” Source: [APA Draft Hazard Mitigation Policy Guide](#)

Case Studies in Resilience

Decreasing vulnerability of beach-based business, from [Wells Reserve at Laudholm Tides Taxes and New Tactics](#) Southern Maine Planning and Development Commission.

[Damariscotta FY16 Coastal Community Grant](#),

[Boothbay Harbor FY17 Coastal Community Grant](#) case studies.

Vulnerability Assessment Mapping in [South Portland, see FY20 Coastal Community Grant](#) project description. Story map approach.

[Coastal Community Grants Case Studies webpage](#).

Island institute [I LEAD Leadership workshops](#) etc.

[Small Town Resilience: Lessons from Maine webinar recording](#).

[Resilience Dialogues](#) webinar recording featuring Chris Feurt, Wells NERRS

Climate Resilience and Economic Recovery

Michigan's [\(Re\)Development Ready Communities](#) Model.

[Development Ready Community Framework – Build Maine Draft Materials dated 3.4.20](#).

Living Shorelines design guidelines, regulations & certifications

[New Jersey - Living Shorelines Engineering Guidelines](#)

Virginia - [2015 living shorelines contractor training workshop](#)

Michigan - [Certified Natural Shoreline Professional Course](#)

Maryland - [Living shorelines regulations](#)

Maine Geological Survey - [Living Shorelines in Maine](#)

The Nature Conservancy – [Living Shorelines in New England: State of the Practice](#)

Climate change professional certifications

[Association of Climate Change Officers](#) provides training for elected officials and the New England EFC has a relationship with them to provide trainings and webinars in RI & MA. Trainings are pretty general but on-point for the states, and appropriate for elected officials.

[Coastal Climate Risk and Resilience Certification](#) at Rutgers University

Canadian: [Infrastructure Resilience Professional](#) (IRP) designation [Program description 2 pages](#), and [first six graduates](#)

Maryland - [Certified Climate Change Professional](#) credential training program

Antioch University New England - [Climate Resilience Certificate for Professionals](#)

ⁱ Circuit Riders: Personnel hired by, or under contract to, state or regional organization to provide Technical Assistance across dispersed geographic regions where there is limited capacity at the local or regional level. Examples from New York: <https://www.adirondack.org/energy-circuit-riders>, [Tug Hill region of upstate New York](#), Delaware: <https://c2e2.unepdtu.org/wp-content/uploads/sites/3/2016/03/regional-ee-planning.pdf>, Massachusetts, Boston Region Metropolitan Planning Organization [TA program](#) provides support to municipalities through a circuit rider program which could include regional planning, Economic Development District, and state staff.

ⁱⁱ Wells National Estuary Reserve, New England Environmental Finance Center, The Nature Conservancy, Maine Coast Heritage Trust, Build Maine, Maine Sea Grant, others

ⁱⁱⁱ Relocation discussions need to recognize the wide range of potential community impacts such as availability of alternate housing, loss of tax base, reduction in user base for municipal utilities, loss of population to neighboring communities, impact on community culture, historic properties, neighborhoods, and others.

^{iv} Projects that restore, protect and/or manage natural systems to address hazards like flooding, erosion, drought, and heat islands in ways that are cost-effective, low maintenance, and multi-beneficial for public health, safety, and well-being. Examples include living shorelines, land conservation, restoration and green stormwater management among others.

^v Examples include helping towns navigate the RFP issued by the PUC for municipal solar projects, establishing micro-grids, additional municipal financing option (perhaps through the Bond bank) to help town bring more municipal solar or other renewable projects online.

^{vi} Many good examples exist based on projects completed using Coastal Community Grants and Shore and Harbor grants. Additional case studies are available from New England environmental Finance Center.

^{vii} [Vermont Recovering Stronger](#) Kulkarni, T. S., Stone, R. S., Oates, L., & Smith, S. (2019). State hazard mitigation planning: Moving from risk to resilience in Vermont. *Natural Hazards Review*, 20(4), 6019001. doi:10.1061/(ASCE)NH.1527-6996.0000338

Community Resilience Planning, Public Health, & Emergency Management
Working Group

Strategy # 3 - Funding Mechanisms to Achieve Resilience

Recommended Climate Strategies,
Actions and Measurable Outcomes

1. Describe the Recommended Strategy and how it addresses Maine’s climate resiliency and mitigation goals.

Summary: Funding resilience to the impacts of climate change will be expensive. Such investments in resilience, however, will cost less than responding to repetitive and increasing climate impacts that compound virtually all contemporary social problems. The profound economic disruption posed by the COVID-19 pandemic will demand even greater efficiency than was already obvious at the launch of the Maine Climate Council’s work. Thus, the actions recommended in this strategy call for investment of dollars but especially for coordination, efficiency, collaboration, and incentivizing behavior.

The strategy recommends Executive Orders to establish cabinet level coordination across state agencies so that funding priorities are consistent and can reach communities and regional organizations who are ready to implement adaptation solutions. The strategy also recommends assembly and maintenance of a clearing house of funding options from public and private sources and the development of, and participation in, creative financing ideas within and beyond Maine’s border. In addition to the job creation potential of climate resilience (in design, construction, project management, operation and maintenance) there are benefits associated with reduced vulnerability, avoided economic disruption, social continuity and reduced response time after disaster, achieving greater resilience over time, and reliance on functional regional networks and existing local governance structures.

- a. For adaptation strategies, what climate impacts does it address? How will this strategy reduce the vulnerability of Mainers to the impacts of climate change?

As an overall funding mechanisms strategy, all climate impacts area addressed.

- b. List any site-specific geographies where the strategy would be applied.

As above, the strategy applies statewide.

2. What is your measurable outcome for this strategy, assuming all recommended actions to implement the strategy are achieved?

- a. For mitigation strategies:

- i. What is the estimated CO2e savings (metric tons) by 2025, 2030, 2050?

N/A

- ii. What is the cost effectiveness of those reductions (cost per ton of CO2e reduced) and the total cost?

N/a

- b. Are outcomes measurable with current monitoring systems?

N/A

The recommended Financing Mechanisms are primarily adaptation strategies. Measurable outcomes are listed in bullet points below:

- Successful application of existing and proposed funding mechanisms to achieve resilience in municipalities for vulnerability assessments, resilience planning and project implementation.
- Successful attraction of federal grants to secure vulnerable infrastructure.
- Projects that simultaneously increase community resilience and demonstrate economic opportunity in community defined development areas.
- Support for staff in state and regional agencies to implement technical assistance programs of direct benefit to municipalities.
- Non-profit sector financial leverage leading to successful grant funding awards for resilience planning and implementation.
- Inter-agency agreements that coordinate actions among state agencies in support of climate resilience measures
- Municipalities achieving a “climate ready” or “climate resilient” status that is transferable and shared with other municipalities

3. What specific actions would be required to implement the strategy, including but not limited to legislation or regulation. Examples include: establish a program or a fund, conduct additional research, provide education or training, coordinate with other parties/agencies/states, etc. Considering the recommended actions listed, who, if they can be named, are the specific actors needed for implementation?

- A. Issue Executive Order that all state agencies support communities in the preparation of climate resilience assessments and plans as needed,
- I. Establish cabinet-level leadership (like the former Land and Water Resources Council) to coordinate across agencies and cultivate non-profit and private sector partnerships to support local, regional and state community resilience efforts
 - II. Designate GOPIF as the lead agency/office for this inter-agency effort
 - III. Develop inter-agency Memorandum of Agreement for a resilience implementation coordinating groupⁱ (Build on work of interagency climate resource groups from previous administration – Environmental and Energy Resources Work Group and [Maine Interagency Climate Adaptation work group](#))
 - IV. Consider adapting Pennsylvania municipal flood protection programⁱⁱ that provides high level of State assistance to municipalities (initial evaluation of flood risk, design, funding, construction for projects exceeding a 1:1 cost benefit ratio) for stream and riverine flood risks.
 - V. Establish a resilience officer and criteria (duties and qualifications) for a State resilience officer in lead and partner agencies
 - VI. Increase financial support to regional planning agencies to achieve efficiencies in support for municipalities (see Resilience Strategy #2 “Improve Delivery System of Technical Assistance on Resilience to Municipalities)
 - VII. Prioritize financial support for:
 - i. the augmentation and distribution of data packages to municipalities for Comprehensive and/or Climate Resilience Planning to include climate resilience data.

- ii. basic funding for preparation of Comprehensive Plans and Climate Vulnerability/Resilience Plans.
 - iii. Stream Smartⁱⁱⁱ and Coast Wise^{iv} technical assistance programs.
- B. Reward communities who cooperate regionally and leverage public funds with non-profit and private sources (For example Island Institute, The Nature Conservancy, Soil & Water Conservation Districts, Maine Municipal Bond Bank)
 - I. Build on and integrate regional hazard mitigation plans, adaptation, and transportation/infrastructure/ capital investment plans to achieve economies of scale and save costs.
 - II. Review and update the budgeting and financing sections of existing plans and planning mechanisms to integrate adaptation and climate resilience into local and regional investment strategies.
 - III. Regionalize and cooperate to compete nationally for funding (example, Maine Municipal Bond Bank, Finance Authority of Maine, and ME Insurance)
 - IV. Develop long-term capital plans to demonstrate need and access bond market.
- C. Issue Executive Order that state funding programs *that have climate mitigation and adaptation implications* include provisions that award preference to those communities, or multi-municipal districts, with locally adopted planning initiatives that develop resilience^v (modeled on provisions in Title 30-A, Chapter 187 [Section 4349A-1 State Capital Investments](#)),
 - I. Create list of criteria for awarding resilience points in grant, loan, or bond fund programs that address mitigation and resilience efforts.
 - II. Coordinate among agencies to ensure
 - i. Consistent climate resilience criteria across rulemaking initiatives (see next Action re incentives).
 - ii. Inclusion of resilience considerations into guidance documents for completion of plans for downtown revitalization, housing, Tax Increment Financing (TIF) district approvals, Brownfields redevelopment, and infrastructure in support of economic development.
 - iii. Award of bonus points in community facilities, infrastructure, and economic development grant and loan proposals (eg. Community Development Block Grants, Drinking Water State Revolving Fund) that include features that afford resilience to impacts of climate change.
 - iv. Reduction of local matching fund requirements for towns or multi-town regions that seek to implement climate resilience projects, whether pursuant to Comprehensive Plans, Hazard Mitigation Plans or Climate Vulnerability/Resilience Plans.
 - III. Ensure State level plans are consistent with federal requirements to improve access and reduce matching requirements in federal funding programs (eg USDHS, FEMA)
- D. Incentivize and reward municipalities and regions who incorporate mitigation and resilience into planning documents, local regulations, capital investment planning, and resilience staffing support.
 - I. Create checklists to establish “Climate-Ready” or “Resilient Community” designations.
 - II. Develop “readiness” thresholds that address equity across municipalities of varying sizes and circumstances.
 - III. Recognize and incentivize regional collaboration among small municipalities in achieving “readiness”

- IV. Recognize implementation of Flood Resilience Checklist as part of any bonus points program.
 - V. Reward participation in National Flood Insurance Program (NFIP) and its voluntary Community Rating System^{vi} to bolster community resilience and lower state financial impacts.
 - VI. Reward coordination of resilience objectives among communities who prioritize infrastructure improvements on a regional basis.
- E. Create a clearing house for grant, loan, foundation, bond, and local finance programs and mechanisms available for resilience planning and resilience adaptation.
- I. Assemble/complete database of funding sources including grants, loans, impact or use fees, tax revenues/subsidies, revenue/obligation/investment bonds, sponsorship^{vii}/stewardship for voluntary contribution^{viii}, market-based credit or trading, tax increment financing districts, capital improvements, insurance/reinsurance
 - II. Coordinate public sector financing with private foundations to leverage funding.
 - III. Align funding to priority areas and coordinate multiple sources to projects in the same area or time.
 - IV. Map funded projects so they can be seen spatially/temporally to connect program managers, and technical assistance providers to highlight gaps in service and available support.
 - V. Improve access to sources through targeted federal advocacy.
- F. Develop model Memorandum of Understandings among public, private and non-profit partners that establishes mutually reinforcing duties and obligations
- I. Tie membership dues (ex. trade associations), to receipt of assistance from subject matter experts.
- G. Modify existing financing mechanisms to support local adaptation projects, such as Tax Increment Financing (TIF) districts.
- H. Develop new financing mechanisms (resilience, catastrophe bonds, special purpose districts, public private partnerships) to finance natural infrastructure for risk reduction^{ix}
- I. Work with a consortium of New England states to access larger financial markets.
 - II. Change/advocate for financing of risk-reducing resilience measures during post-disaster recovery vs. recovery to pre-disaster conditions.
 - III. Deploy a “green” infrastructure bank model retaining individual program independence while maximizing re-investment potential
 - IV. Build incentives into existing land purchase and taxation programs (LMF, open space taxation) to support managed retreat. See New Jersey model acquisition programs: [Green Acres](#) for open space and [Blue Acres](#) for floodplain acquisitions.
- I. Create a Maine Infrastructure Bank (alternatively, house within Maine Municipal Bond Bank) to provide municipal financing for resilience and green infrastructure. Merge existing loan funds (Clean Water, Drinking Water, Wastewater, Land Acquisition, Energy Efficiency) so that:
- I. Access is customer-centric rather than program-centric
 - II. Infrastructure financing is tied to economic development (brownfields, transportation, housing) and Green House Gas mitigation (clean energy and energy efficiency)
 - III. Create self-sustaining revolving loan funds; establish low interest incentives for resilience projects.
- J. Seek legislative and voter approval for a climate resilience bond issue like the [Mass. Municipality Vulnerability Preparedness Program](#) or the [Rhode Island Clean Water and Green Economy Bond](#), or the [Atlanta Environmental Impact Bond, and others](#).

- K. Seek legislative authorization to establish Climate Resilience Authorities^x to undertake or support resilience infrastructure projects by financing or refinancing the capital costs associated with resilience infrastructure.
- L. Stay informed about the [Transportation and Climate Initiative](#) (TCI) (similar to [Regional Greenhouse Gas Initiative](#)) and learn of funding sources used by the other 12 Northeastern and Mid-Atlantic states and DC collaborating to improve transportation, develop a clean energy economy and reduce carbon emissions in the transportation sector.
- M. As recommended by the Emergency Management sub-group, establish a “State Infrastructure Climate Adaptation Fund” that would allow municipalities and state agencies to access the funds needed to supplement the often-excessive local cost shares associated with large adaptation projects.
- N. Establish a Maine Climate Corps for climate-related workforce development. Engage private and public sector support in mentoring, internship, and work/study programs in fields related to resilience planning, design and implementation (legal, financial, real estate, GIS mapping, geotechnical, fluvial hydrogeology, architecture, engineering, all construction trades, etc.). Include robust involvement with higher education, K-12 programs across the state and requirements to stay in Maine for a period of time to apply workforce training to resilience projects within Maine communities. Examine economic benefits of restoration ([Massachusetts example](#)) and resilient workforce training ([Oregon analysis](#)).
- O. Establish climate incentive/reward system(s) for development that is carbon neutral or of resilient design. Carbon neutrality would be demonstrated by practices used in construction and operation. Resilient design would be demonstrated by on-site stormwater capture, reducing heat effect, planting and tree canopy retention, among others. Direction is available from the [American Society of Landscape Architects’ Sustainable Sites Initiative](#) (SITES) that is comparable to the [Leadership in Energy and Environmental Design \(LEED\)](#) green building rating system.
- P. Develop legislation to create the legal authority for [Land Banks and a State inter-agency Real Estate Investment Trust \(REIT\)](#) as an additional tool for communities to evaluate and strategically fund projects that support state and local climate, economic, and quality of life goals. A late breaking recommendation, this item needs further definition as to how it fits into a climate strategy and helps real estate, conservation, and economic development entities reach resilient solutions for land use and development.

4. What is the timeframe for this strategy?

	Short-term (2022)	Mid-term (2030)	Long-term (2050)	2070 -2100
To implement	A, B, C, D, E, F, G, H, I, J			
To realize outcomes	A, B, C, D, E, G,	A, C, F, H, I, J	A, C, F, H, I, J	A, C, F, H, I, J

5. Please analyze the Recommended Strategy against the following criteria. (Each Working Group can add its own sector-specific criteria as appropriate.)

Workforce - Will the strategy create new jobs,	Climate resilience projects create jobs from project initiation, design, construction, project management, as well as operation and maintenance. They are therefore an on-going source of employment.
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<p>prevent job loss, or cost the state jobs?</p>	<p>The loss of some jobs will be replaced by a workforce designed and adapted to a future that is different from the past (shift from fossil to renewable energy analogy).</p>
<p>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)?</p>	<p>The collaborative, unified, and regional responses recommended here will ensure more likely positive outcomes, avoidance of immediate and ongoing costs of economic and systemic disruption, and thus continuity and reduced response time to achieve normalcy after disruption.</p> <p>Each plan, program, and piece of infrastructure that gets funded is more resilient and will increase resilience over time, project by project.</p> <p>Regional Planning Commissions have cultivated relationships that are trusted and can deliver on behalf of multiple communities.</p>
<p>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?</p>	<p>There are administrative costs associated with issuing executive orders, involving the public, and engaging state agencies around revised program criteria. The cost to State government of setting up the programs recommended likely involve additional staff in several agencies and/or additional coordinating roles for existing staff. Outreach and engagement will have costs associated with web site and printed materials, public meetings (venues, travel etc.) and facilitation.</p> <p>Costs to municipalities will be limited to coordination with neighbors and regional networks of other municipalities.</p> <p>National research demonstrates the cost effectiveness of paying for resilience^{xi}</p> <p>The costs associated with measures to make critical infrastructure, historic downtowns, housing, and the transportation system more resilient will be significantly higher than setting up the programs recommended here. However, alignment of funding criteria coupled with efficient delivery of funding sources generates a far higher benefit cost ratio when compared to the economic and systemic disruption of a “do nothing” strategy.</p> <p>The financing will come from the wide variety of funding mechanisms that are the entire point of this strategy: multiple approaches from public, private and nongovernmental sources.</p>
<p>Equity - Is this strategy expected to benefit or burden low-income, rural, and vulnerable residents and/or communities?</p>	<p>Those disadvantaged may include coastal residents who lose property value and their livelihoods.</p>

<p>What outreach has been/will be undertaken to understand the impact of the strategy on front-line communities?</p>	<p>The strategy addresses the limited capacity of smaller, often low income, and rural communities by encouraging and rewarding regional cooperation.</p> <p>Stakeholder input has included representation from Community Action Agencies, Maine Municipal Association, and representatives from rural municipalities.</p>
<p>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)?</p>	<p>This strategy is not a function of technical feasibility or financial capacity. As a Funding Mechanisms strategy, it recognizes the significant financial need in attaining resilience, the existing funding limitations and COVID-19 pandemic constraints, and the need to find every available efficiency within Maine, and creative financing mechanisms within and beyond Maine’s borders.</p> <p>Barriers to implementation are rooted in the extensive areas of vulnerability (developed areas along riverine corridors on the coast), assertions of property rights, expectations of compensation, and insurance programs that can induce risky choices in the face of climate impacts.</p> <p>There are example strategies in Maine and several other states:</p> <ul style="list-style-type: none"> • Mass. Municipality Vulnerability Preparedness Program • Rhode Island Municipal Resilience Program of the RI Infrastructure Bank • Climate Resilience Authority model from Maryland Senate Bill 457 (passed May 2020) allowing issuance and sale of state and local tax-exempt bonds for infrastructure projects. • Water Resource Restoration sponsored projects in IA • Fort Kent ME – decision making process around levee construction and protection; and on-going costs associated with that decision • NC – stormwater fee to address repetitive losses from flooding • NH – TDR approaches in repetitive flooding situations (needs state enabling statute) • Case studies of innovative financing prepared by Climate Finance Advisors for the United Nations Environment Programme Finance Initiative (UNEP FI) and the Global Commission on Adaptation (GCA)
<p>Legal authority - Does the strategy require new statutory (legal/legislative) authority?</p>	<p>Legislative approval is required for Maine to join the Transportation and Climate Initiative and is also required for issuance of a climate resilience bond (similar to the Mass. Municipality Vulnerability Preparedness Program).</p>
<p>Other?</p>	
<p>Other?</p>	

6. Rationale/Background Information

****Please footnote substantive disagreements among the Working Group members
There were none.**

ⁱ Climate-specific interagency funding group (ex. funding program managers – CWSRF/DWSRF/Brownfield/Septic/Tanks/ 319/SHIP/CCG/HMGP/energy-efficiency/etc. and other agency programs, Environmental Protection Fund, Municipal Investment Trust Fund),

ⁱⁱ [Municipal flood protection program of the Pennsylvania DEP](#). Rather than provide TA only, the state instead provides a very high level of assistance to municipalities starting at initial evaluation of flood risk right through to funding and constructing recommended improvements that exceed a 1:1 C/B ratio. The program is not intended to address Sea Level Rise (SLR) but rather is focused on protection from “normal” river and stream flooding but it could be adapted to enhanced flooding due to climate change/SLR. Projects proposed for implementation must be funded individually by the state legislature rather than the Department using a pool of funds set aside for such projects. See also [Pennsylvania Flood Protection Manual](#)

ⁱⁱⁱ https://www.maine.gov/dacf/mfs/policy_management/water_resources/stream_smart_crossings.html

^{iv} <https://www.wellsreserve.org/project/coastwise>

^v Resilience plans within Comprehensive Plans, Hazard Mitigation Plans, or Climate Vulnerability/Resilience Plans

^{vi} Community Rating System (CRS) is a voluntary incentive program that recognizes and encourages community floodplain management activities that exceed the minimum program requirements. As a result, flood insurance premium rates are discounted to reflect the reduced flood risk resulting from the community actions meeting the three goals of the community rating system:

1. Reduce flood damage to insurable property;
2. Strengthen and support the insurance aspects of the National Flood Insurance Program, and
3. Encourage a comprehensive approach to floodplain management

In addition to the discounts on national Flood Insurance Program premiums, the CRS a great checklist that will unearth adaptation options for the municipality that lead to more resilience against flooding potential.

^{vii} To finance nontraditional water-infrastructure projects, some states have created a new type of program within their CWSRFs known as “sponsorship” programs. Through sponsorship, a municipal government, water utility, or other applicant applies for a loan for a traditional water-infrastructure project and increases the loan enough to sponsor a nontraditional project.

For example, in Ohio, a borrower applying to the Water Resource Restoration Sponsorship Program (WRRSP) for wastewater-treatment loans can either propose its own watershed-restoration project or “sponsor” a third party - such as a land trust, park district, or other entity – in doing a watershed-protection or -restoration project.

<https://www.conservationfinancenetwork.org/2018/05/21/using-state-revolving-funds-for-land-conservation>

^{viii} Stewardship Mapping or STEW-MAP answers the question: who takes care of our environment? STEW-MAP surveys civic groups who work to conserve, manage, monitor, transform, educate on and/or advocate for the environment across a defined city, region, or landscape. It is both a study of a region's civic environmental stewardship resource and a publicly available online database and visualization tool to support a range of practical applications. Leveraging stewardship capacity can be a powerful way for governments, non-profits, and other organizations to achieve outcomes that would otherwise be impossible with finite resources, and to create communities that are stronger, healthier, greener, and more resilient. Mobilizing this potential requires understanding what stewardship capacity and connections exist across a landscape, and being able to connect these to form a model of shared stewardship. See <https://www.nrs.fs.fed.us/STEW-MAP/>

^{ix} Colgan, C. S., M. W. Beck, S. Narayan, 2017. Financing Natural Infrastructure for Coastal Flood Damage Reduction. Lloyd's Tercentenary Research Foundation, London.

^x Climate Resilience Authorities allow counties, or municipalities (or multiple counties or municipalities) to finance or refinance the capital costs associated with resilience infrastructure such as flood barriers, culverts, green spaces, building elevation, and other stormwater infrastructure. The authority determines the revenue sources of the resilience authority including the use of general fund revenue and general obligation bonds and establishes the budgetary and financial procedures. The resilience authority can receive money from its incorporating local government, the state, other governmental units, or private organizations; it can charge and collect fees for its services; (with approval from the local governing body) can charge and collect fees to back its bond issuances; have employees and consultants as necessary; use the services of other governmental units.

^{xi} Multi-Hazard Mitigation Council (2019.). *Natural Hazard Mitigation Saves: 2019 Report*. Principal Investigator Porter, K.; Co-Principal Investigators Dash, N., Huyck, C., Santos, J., Scawthorn, C.; Investigators: Eguchi, M., Eguchi, R., Ghosh., S., Isteita, M., Mickey, K., Rashed, T., Reeder, A.; Schneider, P.; and Yuan, J., Directors, MMC. Investigator Intern: Cohen-Porter, A. National Institute of Building Sciences. Washington, DC. www.nibs.org and

National Institute of Building Sciences, Multihazard Mitigation Council, *Natural Hazard Mitigation Saves: An Independent Study to Assess Future Savings From Mitigation Activities* (2005), http://c.ymcdn.com/sites/www.nibs.org/resource/resmgr/MMC/hms_vol2_ch1-7.pdf?hhSearchTerms=Natural+and+hazard+and+mitigation.

Definitions of resilience

1. *Rockefeller Foundation*
The capacity of individuals, communities, institutions, business, and systems within a city to survive, adapt and grow no matter what kinds of chronic stresses and acute shocks they experience.
2. *Center for Climate and Energy Solutions:*
Climate resilience is the ability to anticipate, prepare for, and respond to hazardous events, trends, or disturbances related to climate. Improving climate resilience involves assessing how climate change will create new, or alter current, climate-related risks, and taking steps to better cope with these risks.
3. *Wikipedia from "Resilience: The emergence of a perspective for social-ecological systems analyses" and "Global Environmental Change". Annual Review of Environment and Resources*
Climate resilience can be generally defined as the capacity for a [socio-ecological system](#) to: (1) absorb stresses and maintain function in the face of external stresses imposed upon it by [climate change](#) and (2) adapt, reorganize, and evolve into more desirable configurations that improve the [sustainability](#) of the system, leaving it better prepared for future climate change impacts.
4. *US Climate Resilience Toolkit*
The capacity of a community, business, or natural environment to prevent, withstand, respond to, and recover from a disruption.
5. *Intergovernmental Panel on Climate Change*
The capacity of social, economic, and environmental systems to cope with a hazardous event, trend, or disturbance, responding or reorganizing in ways that maintain systems' essential function, identity, and structure while also maintaining the capacity for adaptation, learning, and transformation
6. *National Ocean Service, NOAA*
Coastal resilience means building the ability of a community to "bounce back" after hazardous events such as hurricanes, coastal storms, and flooding – rather than simply reacting to impacts
7. *COP 23 UN Climate Change Conference*
Resilience means the key economic and social systems are climate-proofed for the future.
8. *USEPA*
A capability to anticipate, prepare for, respond to, and recover from significant multi-hazard threats with minimum damage to social well-being, the economy, and the environment.
9. *Second Nature*
The ability of a system or community to survive disruption and to anticipate, adapt, and flourish in the face of change.
10. *D. H. Meadows Thinking in Systems*

The ability of a system to recover from perturbation; the ability to restore or repair or bounce back after a change due to an outside force

11. *National Research Council*

The ability to prepare and plan for, absorb, recover from, and more successfully adapt to adverse events

12. *Stockholm Resilience Centre What Is Resilience?*

Resilience is the long-term capacity of a system to deal with change and continue to develop.

13. *IPCC 2007*

Resilience to climate change of a community can be defined as a combination of resistance to frequent and severe disturbances, capacity for recovery and self-organization, and the ability to adapt to new conditions.

Bob Faunce (who assembled the 13 definitions) observes:

None of these definitions perfectly satisfy my personal requirements of clarity, simplicity and understandability but I like aspects of some of them. #4 lists the systems at risk (any other distinct categories?) and #11 adds the “prepare and plan for” component. Several others identify the threat as a “hazardous event”, which I think covers the full range of threats such as extreme heat and cold, SLR, flooding, extreme precipitation, climate-related disease and vectors, etc. Putting them all together, I suggest the following.

“The capacity of a community, business or the natural environment to prepare for, withstand, respond to and recover from a hazardous event”

The Resilience Working Group chose Bob’s final definition and used it in our cover letter to the Maine Climate Council

Definitions for Adaptation

(IPCC) defines **adaptation** as: 'the process of adjustment to actual or expected **climate** and its effects. In human systems, **adaptation** seeks to moderate or avoid harm or exploit beneficial opportunities.

Adaptation to climate change means planning and preparing for and managing the unavoidable consequences of the **climate changes** already underway.

Susanne Moser

<http://www.susannemoser.com/research.adaptation.php#:~:text=Adaptation%20to%20climate%20change%20means,the%20climate%20changes%20already%20underway.>

Adaptation has been defined in different ways.

- The [UNFCCC](#) defines it as actions taken to help communities and ecosystems cope with changing climate condition.
- The [IPCC](#) describes it as adjustment in natural or human systems in response to actual or expected climatic stimuli or their effects, which moderates harm or exploits beneficial opportunities.
- The [UN Development Program](#) calls it a process by which strategies to moderate, cope with and take advantage of the consequences of climatic events are enhanced, developed, and implemented.
- The [UK Climate Impacts Program](#) defines it as the process or outcome of a process that leads to a reduction in harm or risk of harm, or realization of benefits associated with climate variability and climate change.
- [NCCARF](#) regards it as consisting of actions undertaken to reduce the adverse consequences of climate change, as well as to harness any beneficial opportunities.
- [The Victorian Government](#) says adapting to climate change is about taking deliberate and considered actions to avoid, manage or reduce the consequences of a hotter, drier and more extreme climate and to take advantage of the opportunities that such changes may generate.

Appendix A

Community Resilience Planning Sub-group

Sub-Strategies to initiate and support work recommended in Strategy 1 - Comprehensive Review of Maine Laws to Achieve Resilience and Economic Security in the Face of Climate Change

Strategy 1 calls for a Comprehensive Review of multiple Maine statutes and rules. The following DRAFT Strategies initiate the work recommended in Strategy 1. The intent of the Resilience Sub-group was to capture the thinking, wisdom, and experience that was “in the room during the course of the working Groups deliberations.” We acknowledge and appreciate the assistance of several state agencies and regional planning organizations in compiling the drafts to this point in the process.

All are assembled here in PDF but the individual editable WORD documents are available if this strategy is moved forward by the Maine Climate Council.

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1a - Improve Site Location of Development Act ('Site Law') Regulations and Rules

Community Resilience Planning, Public Health, & Emergency Management Work Group

Strategy for Resilience Working Group

Which MCC goal does the strategy help to achieve?

- Addresses adaptation and resilience to the impacts of climate change

Review and revise Maine Site Location of Development Law (MRSA Title 38, Chapter 3, §§ 481 – 490) and associated Rules (primarily Chapter 375) to support adaptation and resilience as guided by best available science and initial recommendations of Community Resilience working group.

Describe the strategy:

Adopt the ranges of projected sea level rise (STS Phase 1 Report, p. 82, Table 7), riverine flooding, and precipitation projections established by the Science and Technical Committee as guidance to statutory and rule changes in several Maine statutes.

Chapter 375, Section 4 No Unreasonable Effect on Runoff/Infiltration Relationships: revise flooding standards to utilize best available scientific projections of flooding (precipitation-based and sea level/surge-based); require determination of flood risk of proposed development to be based on best available flood projections and flood-prone areas beyond just the FEMA Flood Insurance Rate Maps which frequently are not representative of the true flood risk of an area and are not reflective of future risk associated with climate change; update rainfall tables for all storm return intervals (e.g., 25-year storm event); reevaluate whether the storm return intervals (2-, 10-, and 25-year storm events) for which pre-development/post-development stormwater runoff conditions are currently assessed and evaluated are sufficient for accounting for climate change impacts and revise as necessary, perhaps to more intense but less frequent events (e.g., 30-, 50-year storms); incorporate considerations of future climate conditions in standard dealing with large gas terminals; incorporate considerations of how large development projects impact existing runoff/infiltration-related infrastructure.

Chapter 375, Section 7 No Unreasonable Adverse Effect on Ground Water Quality and Section 8 No Adverse Effect on Ground Water Quantity: incorporate future climate conditions and considerations into groundwater standards.

Chapter 375, Section 9 Buffer Strips and Section 15 Protection of Wildlife and Fisheries: review and revise rules as appropriate to ensure climate change impacts and mitigation of potential damaging impacts to wildlife/cold water fisheries are incorporated into standards; evaluate adequacy of currently required buffer sizes (i.e. 100 and 75 feet) and quality for protection of wildlife and fisheries

and mitigation of thermal impacts under future climate conditions and revise as appropriate; revise rules to allow and/or require site-specific considerations to be accounted for when evaluating vegetative buffers.

Other: Revise statutes and rules so they can adapt easily as scientific projections may change over time; ensure consistency with Chapter 500, as 'no adverse impact' relates to Chapter 500.

What are the benefits?

Large-scale development and land disturbance projects account for future climate conditions and minimize detrimental impacts to the natural environment and Maine communities. A comprehensive review will ensure consistency across regulations governing natural resources.

A consistent approach across regulations will help communities learn and implement the new rules.

Regulations will be rooted in scientific consensus around the range of future risks faced by communities.

Regulation language will be flexible to allow for swift change if risk projections change.

- Is there an opportunity to create jobs in Maine?

Short term the strategy requires the skills (contracted?) of professionals with knowledge of the legislative process.

Long term, the strategy requires the skills of those who can train and provide technical assistance to those within communities who will implement the revised rules.

What are the costs?

Revise statutes, if necessary, and rules

Trainings and technical assistance on rule changes for municipalities (Code Enforcement Officers and planners), Regional Planning Organizations, and contractors/engineers

What is the timeframe for implementation of this strategy? Short term, mid-term or long term?

When does implementation begin and what is the expected duration?

Rule revisions can begin in the short-term, perhaps in conjunction with revisions to other rules and policies including NRPA and Shoreland Zoning

When is the outcome realized?

Revisions to rules (not requiring legislative action or statutory change) could be completed within 6 months.

Revisions to statutes, if proposed during the 130th legislative session could take effect in the summer of 2021; associated rule changes could take a few months longer depending on the issue and process required by statute.

What populations, communities, or sectors will benefit from the strategy? AND Who might be disadvantaged by the strategy?

All populations, communities, and sectors currently at risk of development pressure and associated impacts to stormwater quantity, groundwater, and surface water quality could benefit from proposed rule changes.

Developers could incur additional costs as a result of additional regulatory requirements for projects triggering Site Location of Development

How might the strategy address issues of equity?

Is there a model for this, either in or outside of Maine?

Yes, specific examples forthcoming

Are additional research and data needed? Are there major data gaps related to this strategy?

Yes, while the working group has provided initial recommendations, legal and professional advice is needed to develop specific statutory proposals for the 130th legislature.

- Improved projections for precipitation amounts associated with 2-, 10-, 25-, 50-, 100-, and 500-year precipitation and flow events
- Appropriate design storm for assessment and determination of pre- vs. post-development conditions
- Climate change impacts on groundwater quality
- Vegetative buffer widths for protection of wildlife and cold water fisheries under future climate conditions such as increased precipitation

Are there rules or legislation that could enact this strategy?

Yes, recommendations are proposed to the following statutes and rules:

Statutes:

- Site Location of Development Act (MRSA Title 38, Chapter 3, §§ 481-490) and Rules Chapter 375
- Stormwater Management Act (MRSA Title 38, Chapter 3, § 420-D)

1b - Improve Stormwater Management & Erosion and Sedimentation Control Regulations and Rules

Community Resilience Planning, Public Health, & Emergency Management Work Group

Strategy for Resilience Working Group

Which MCC goal does the strategy help to achieve?

- Addresses adaptation and resilience to the impacts of climate change

Review and revise Maine Stormwater Management Law (MRSA Title 38, Chapter 3, §420-D) and Erosion and Sedimentation Control (MRSA Title 38, Chapter 3, §420-C) and associated Rules (Chapter 500, 501, and 502) to support adaptation and resilience as guided by best available science and initial recommendations of Community Resilience working group.

Describe the strategy:

Adopt the ranges of projected sea level rise (STS Phase 1 Report, p. 82, Table 7), riverine flooding, and precipitation projections established by the Science and Technical Committee as guidance to statutory and rule changes in several Maine statutes.

Chapter 500:

Section 4 Stormwater Standards / Part C (4) Low Impact Development Credit: Require and/or further incentivize use of low impact development (LID) approaches; consider increasing percentage of stormwater volume required to be managed with LID from 50%; revise rules to incorporate maintenance requirements for LID measures and all stormwater measures; revise rules to allow developers to get 'credit' for the LID measures they implement without needing to do all of the measures noted in this current rule section; clarify language and required standards to reduce confusion with and ambiguity of requirements and permit process; revise language to promote and reflect the benefit of covered parking areas; consider incentivizing the use of porous pavement to address impervious coverage in areas where appropriate (site-specific) and ensure inclusion of appropriate maintenance requirements; consider quantifying LID credits based on specific quantitative standards (e.g., square feet).

Section 4 Stormwater Standards / Part F Flooding standard: consider revising standard to: incorporate water volume considerations into standards; require and/or incentivize projects between 1 and 3 acres to mitigate flooding/stormwater impacts; require developers to address project flooding impacts that extend beyond property lines and municipal boundaries; increase water volume treatment requirement or increase the volume of water that needs to be retained on-site; improve

clarity of language regarding how DEP will review and consider hydrographs for peak flow during the permit and project review process.

Section 4 Stormwater Standards / Part 3 Waiver of the flooding standard: reconsider if existing waivers are appropriate and will adequately manage stormwater under future projections of precipitation associated with climate change; Increase waiver requirements/standards so that they are more difficult to receive and achieve better stormwater management practices; consider eliminating the channel protection waiver, or, if retained, improve clarity of language to minimize potential discrepancies related to how channel protection requirements are handled internally by DEP staff; consider eliminating the water quality standard waiver and prohibiting use of the treatment wavier to meet the water quality standard.

Current practice allows, but does not require, applicants to evaluate whether incorporation of peak matching detention will actually reduce the potential flooding in the stream to which the project discharges. In some cases (*e.g.*, when the stormwater discharge is at the downstream end of the watershed) detention of the peak may actually increase the potential for flooding. This has been a weakness in the flooding standard for long time, but as the intensity of storms increase, it has the potential to become a more significant issue than in the past. Perhaps applicants should be required to do an analysis of the likely effect of detention on instream flows at downstream points of vulnerability for flooding or infrastructure impacts.

Water quality standards: evaluate whether existing standards are protective enough for addressing projected future storm intensities and precipitation amounts.

Treatment requirements and retention: incorporate projections of future precipitation and storm frequencies in standards; consider requiring developers to design stormwater management measures to more intense storm events, beyond 2-, 10-, and 25-year events; consider requiring developments to retain all stormwater volume associated with set storm frequencies on site; revise size requirements for stormwater management strategies, such as buffers and retention ponds, to account for projections of future precipitation amounts and capture more stormwater volume; evaluate and ensure rule changes account for potential impacts of greater on-site stormwater retention on groundwater quality and consider more stringent requirements for holding stormwater on-site; investigate channel protection storage as a strategy for addressing increased stormwater volume.

Appendix H: update rainfall tables with best available precipitation data and projections of future precipitation and storm frequency; currently, regulations reference specific and static rainfall numbers and data that are external to DEP, which is limiting if the external data gets updated – the reference should be updated to cite and link to the data source rather than list static data; revise regulations to allow, and possibly encourage, the use of rainfall data that exceeds the minimum required storm event and/or rainfall volume; amend regulations to ensure that ‘pre-development’

conditions used for evaluating pre- vs. post-development stormwater impacts accurately reflect the true pre-development conditions of an area.

Other: consider revising Chapter 500 to modify exemptions from rules for agriculture and forestry land uses and consider developing standards for those specific land uses; consider increasing the required design storm size for emergency spillways; consider and improve incentives for redevelopment projects; incorporate redevelopment standards in the current regulations (see City of Portland regulations for example); consider revising statute to require flooding standards and water quality standards for projects smaller than the 3- and 1-acre threshold triggers; consider requiring 'Permit By Rule' (PBR) projects to treat more than 50% of the development site area; consider lowering the statutory threshold for when a full permit, not just a PBR, is necessary; amend requirements for DOT and Turnpike Authority projects to be consistent with requirements for other permit applicants; investigate the inclusion of underground injection and groundwater requirements into existing regulations; investigate the impacts and unintended consequences of infiltration on groundwater quality.

Erosion and sedimentation controls: revise and update best management practices (BMP) (sizing of control structures, dewatering practices, etc.) to ensure they account for projections of future precipitation and storm frequency; update the BMP design manual

What are the benefits?

Improved stormwater management practices, reduced risk of increases and changes in flow(flooding), reduced release and transport of pollutants to waterbodies, wetlands, and groundwater

Regulation language will be flexible to allow for swift change if risk projections change.

- Is there an opportunity to create jobs in Maine?

Short term the strategy requires the skills (contracted?) of professionals with knowledge of the legislative process.

Long term, the strategy requires the skills of those who can train and provide technical assistance to those within communities who will implement the revised rules.

What are the costs?

Revise statutes, if necessary, and rules

Trainings and technical assistance on rule changes for municipalities (Code Enforcement Officers and planners), Regional Planning Organizations, and contractors/engineers

What is the timeframe for implementation of this strategy? Short term, mid-term or long term?

When does implementation begin and what is the expected duration?

Rule revisions can begin in the short-term, perhaps in conjunction with revisions to other rules and policies including NRPA and Shoreland Zoning

When is the outcome realized?

Revisions to rules (not requiring legislative action or statutory change) could be completed within 6 months.

Revisions to statutes, if proposed during the 130th legislative session could take effect in the summer of 2021; associated rule changes could take a few months longer depending on the issue and process required by statute.

What populations, communities, or sectors will benefit from the strategy? AND Who might be disadvantaged by the strategy?

All populations, communities, and sectors that experience or are involved with development or redevelopment could benefit from proposed rule changes through prevention and control of the release of pollutants to waterbodies, wetlands, and groundwater and reduction of impacts associated with increases and changes in stormwater flow.

Developers could incur additional costs as a result of additional regulatory requirements for projects triggering regulations

How might the strategy address issues of equity?

Is there a model for this, either in or outside of Maine?

Yes, specific examples forthcoming

Are additional research and data needed? Are there major data gaps related to this strategy?

Yes, while the working group has provided initial recommendations, legal and professional advice is needed to develop specific statutory proposals for the 130th legislature.

- Improved projections for precipitation amounts associated with 2-, 10-, 25-, 50-, 100-, and 500-year precipitation and flow events
- Appropriate design storm(s) for stormwater control measures
- Low impact development (LID) and green infrastructure approaches and techniques and under which conditions strategies are most appropriate and successful
- Cost of LID strategies vs traditional stormwater infrastructure measures

Are there rules or legislation that could enact this strategy?

Yes, recommendations are proposed to the following statutes and rules:

Statutes:

- Stormwater Management Act (MRSA Title 38, Chapter 3, § 420-D)
- Erosion and Sedimentation Control (MRSA Title 38, Chapter 3, § 420-C)
- Rules: Chapter 500, 501, and 502

1c - Comprehensive Planning Statute/Rule Changes

Community Resilience Planning, Public Health, & Emergency Management Work Group

Which MCC goal does the strategy help to achieve? Describe the strategy.

- **Addresses adaptation and resilience to the impacts of climate change**

Provide Maine municipalities and multi-municipal regions of every size and capacity with guidance on adaptation and resilience strategies for policy, implementation, and investment decision support.

Describe the strategy:

Ensure resilience planning is undertaken in municipal Comprehensive Plans and/or in stand alone vulnerability and resilience planning efforts.

- A. When not incorporated into Comprehensive Plans (either because no plan exists or if one was completed in the previous 5 years), *require* standalone Climate Vulnerability/Resilience Plans that identify vulnerable structures, infrastructure and populations. Update these Climate Vulnerability/Resilience Plans every 3-5 years. Integrate these Climate Vulnerability/Resilience Plans into local Comprehensive Plans by reference.
- B. Incorporate mitigation and resilience recommendations from the other Climate Council working groups into any guidance document recommended here.
- C. Develop a Guidance document to accompany the Comprehensive Plan Review Criteria Rule ([Chapter 208](#)) to ensure that each [element of the plan](#) considers resilience planning when appropriate. This Guidance is also applicable to any standalone Climate Vulnerability/Resilience Plan (CV/RP).
 - i. Add guidance questions and policy/strategy language for each element of the plan or CV/RP for local planning committees to use.
 - ii. Ensure guidance is scaled to varying scales of population, density, infrastructure, and local capacity. In any region, but particularly in rural, low density areas, regional cooperation is highly recommended among towns in the preparation of CV/RPs.
 - iii. Complete inventory of vulnerable public infrastructure with consideration for life cycle accounting, cost projections for replacement or relocation, and investigation of living shoreline or other natural resources-based means of augmenting/developing resilience.
 - iv. Identify vulnerable populations and facilities to impacts of extreme weather, flooding, extreme heat, and tick-borne disease.
 - v. Use **best** available tools in preparation of Comprehensive Plans and CV/RPs; ensure state data sets include these tools in information provided to municipalities; encourage feedback on the utility of the tools from communities (crowd source feedback of local knowledge).
 - vi. Include social vulnerability methodologies in state-provided data sets
 - vii. Emphasize long-term, risk-based planning to increase resilience while fortifying the vitality of municipal tax base and future land uses

- viii. Integrate local and county hazard mitigation plans into Comprehensive Plans and CV/RPs by reference.
- ix. Complete *the [Maine Flood Resilience Checklist](#)* as part of Comprehensive Plans and CV/RPs.
- x. Include strategies in local Comprehensive Plans to decrease Green House Gas (GHG) emissions consistent with State GHG emission reduction targets

What are the benefits?

As “comprehensive” as Comprehensive Plans are, they have not always included considerations of resilience, emergency management and hazard mitigation (Cucuzza et al). This strategy addresses these issues through reference or inclusion of requirements for integrating resilience into local planning and across disciplines.

These revisions will increase coordination among related sectors (emergency response, hazard mitigation, wastewater treatment and other public works, public health, housing) and decrease duplication of effort, improve public health and safety, lessen the impact of climate-related events. Likewise, when towns work together, share expertise, and achieve economies of scale, they increase their funding opportunities for implementation.

In-migration potential that can build Maine’s economy as municipalities realize cost savings and provide opportunities to develop stronger circular economies. Resiliency strategies that prevent or reduce the impact of climate-related disasters allow municipalities the economic bandwidth to serve constituents and businesses leading to a more stable economy at less risk for losses. These factors create a level of certainty that can prevent job loss and affords entrepreneurs and business owners the opportunity to grow. Prospective residents and businesses may be attracted to communities that have taken conscious steps in planning for climate-related events. The potential for expanding the tax base would increase revenue and contribute to a more stable and diverse economy.

Is there an opportunity to create jobs in Maine?

Yes, through engagement of professionals in the preparation of resilience plans; later multiplier effect jobs through implementation of resilience measures.

What are the costs?

Maintenance and update of state provided data sets. The Municipal Planning Assistance Program (MPAP) will require additional staff and support from other programs to meet assistance and review obligations.

Staff time will be required for any statutory and rulemaking process.

Creating local and regional plans is costly and at present there are few state funding sources available. Maine DOT authorizes a portion of the regional planning organization contractual allocation to prepare the transportation section of local Comprehensive Plans.

Additional grant funding will be needed for local and regional implementation (see Strategy on Funding Mechanisms).

What is the timeframe for implementation of this strategy? Short term, mid-term or long term?

When does implementation begin and what is the expected duration?

Guidance documents can be prepared within several months. Encouraging preparation of standalone CV/RPs could take place even sooner.

Any mandated change that requires incorporation of resilience measures into Comp Plans or preparation of CV/RPs would require changes to Title 30-A by the legislature as well as major substantive rule changes. Therefore, implementation could start no sooner than after the 2021 legislative session with allowance for departmental rule changes, therefore in late 2021 or early 2022.

When is the outcome realized?

These revisions can provide flood and erosion mitigation benefits for decades, especially if revisions are made at regular intervals as new sea level rise projections are available.

A stand-alone CV/RP can be prepared much sooner than an entire Comp Plan update.

What populations, communities, or sectors will benefit from the strategy? AND Who might be disadvantaged by the strategy?

Potential benefits will be realized in all participating municipalities.

How might the strategy address issues of equity?

Deliberate inclusion of vulnerable populations in the assessment of climate impacts will support policies and strategies that assist low income, elderly, poor, and other disadvantaged populations.

Is there a model for this, either in or outside of Maine?

Recommendations are presented in https://www.maine.gov/dacf/municipalplanning/docs/CAGS_06_Comprehensive_Planning.pdf. This document is three years old. It should be reviewed and updated with these recommendations.

See also New York from Rutgers report: <https://rucore.libraries.rutgers.edu/rutgers-lib/59527/>

Page 83 -85 – examples of statutes in:

Statewide direction:

- RI (2018 Adoption of a Shoreline Change Special Area Management Plan),
- NY (2014 Community Risk and Resiliency Act),
- MA (2014 REVISIONS TO Massachusetts Environmental Policy Act),

Local direction:

- CA (Amendments to the General Authority for and Scope of General Plan; 2015. Chapter 3, Article 5, Section 65302.2015),
- CT (An Act Concerning Climate Change Planning and Resiliency; 2018. Public Act 18-82),
- MD (The Sea-Level Rise Inundation and Coastal Flooding Act. Chapter 628 of 2018.),
- RI (Public Law Chapter 403 amends Rhode Island General Laws §45-22-7Chapter 45-22.2 2017. ; Section 45-22.2-6),
- MA (An Act Promoting Climate Change Adaptation, Environmental and Natural Resource Protection and Investment in Recreational Assets and Opportunity (H. 4835). 2018, and
- VA (SB 1443, Comprehensive Plan: Strategies to Combat Projected Sea-Level Rise, 2016.)

Are additional research and data needed? Are there major data gaps related to this strategy?

Best available tools

clearing house of tools – with assistance (see TA Strategy)

encourage cross pollination of ideas among many actors in this field

interactive tools – state resource/data package: stay current and up to date, fluid

Are there rules or legislation that could enact this strategy?

Guidance documents can be created without rule changes but requirements to include climate vulnerability and community resilience in Comp Plans and CV/RPs will require revisions to Title 30-A with subsequent revision to Chapter 208.

Consider Executive Order to initiate preparation of CV/RPs?

1d - Shoreland Zoning Statute/Rule Changes

Community Resilience Planning, Public Health, & Emergency Management Work Group

Which MCC goal does the strategy help to achieve? Describe the strategy.

Addresses adaptation and resilience to the impacts of climate change

This strategy addresses adaptation to climate change and resilience by aligning the mandatory shoreland zoning rules with the latest scientific analysis of sea level rise risk and our understanding of precipitation trends affecting riverine flooding. It also streamlines interpretation and enforcement by using consistent definitions among related statutes and the latest advances in digital data technology.

- A) Revise the Shoreland Zoning minimum Guidelines (chapter 1000), and statute (Title 38) as necessary, to reflect the sea level rise projections of the Science and Technical Subcommittee by 2100
- a. Add a coastal zone designation that prohibits new development and expansion of existing structures; OR require higher standards for new development and expansions.
 - b. Develop a demarcation line for the shoreland zone that anticipates SLR and update or remap it at regular intervals (e.g. 10 years).
 - c. Change Shoreland Zone jurisdiction and setbacks distances to reference the highest astronomical tide line (as currently done in LUPC rules)
 - d. Include guidance for the Board of Appeals to approve a variance of the maximum building height provisions of the Shoreland Zoning Ordinance to permit ~~non-~~conforming structures in existence prior to the effective date of the ordinance to comply with the structure elevation requirements of the Floodplain Management Ordinance provided that the increase in height is no more than the distance that the lowest floor elevation (including basement) is raised above its original elevation to comply with but not exceed the minimum structure elevation requirements of the Floodplain Management. Any space below the structure's first floor must be used for flood accommodation and not living space.
 - e. Do not allow new development in the floodplain. One way to do this is to classify the floodplain as a resource protection area. (Example: South Berwick?)
 - f. Increase the freeboard requirement in Chapter 1000 to be consistent with the model Floodplain Management Ordinance.
 - g. Increase the 25-foot setback requirement, where currently allowed, for new or expanded structures.
 - h. Restrict further expansion of non-conforming structures. Currently only structures within 25 feet of a resource cannot be expanded.
 - i. Expand the 250-foot jurisdiction of the Shoreland Zone to include areas available for future marsh migration or areas subject to future flooding based on sea level rise projections
 - j. Expand the 250-foot jurisdiction of the Shoreland Zone to cover areas subject to SLR

- B) Revise Coastal Bluff rules within shoreland zoning statute and regulations
 - a. Complete and update Coastal Bluff maps including detail about bluff's condition and erosion rate.
 - b. Increase the setback requirements from top of bluff for stable, unstable and highly unstable bluffs, make the setbacks the same and standardize the methodology for determining top of bluff.
 - c. Include definitions for stable and unstable bluffs
- C) Research and modify coastal bluff rules or incentivize change where appropriate in following areas:
 - a. Consider sea level rise impacts on adjacent bluffs and the cumulative impacts of bluff hardening at embayment or estuary scale.
 - b. Close the seawall armoring loophole.
 - c. Revisit and loosen the fill rules for bluff re-sloping. Require or incentivize use of re-sloping spoils to fill along the toe-edge of a bluff to provide material for natural maintenance and building of mudflats in the intertidal zone (i.e. no net loss of material)
 - d. Allow introduction of sediment to avoid unintended consequence of loss of sediment associated with a permitted activity
 - e. Incentivize living shorelines as protection in certain areas.
- D) Revise the Shoreland Zoning minimum Guidelines (chapter 1000), and statute (Title 38) as necessary, to reflect documented riverine flooding associated with increased frequency of high intensity precipitation events (20-year events).
- E) Modify statutory and guidance documents to reference data that can be readily used in GIS mapping systems.

What are the benefits?

- In concert with recommendations for Rules applying to Coastal Sand Dune Rules, Floodplains, and other natural habitats, Maine regulators (state agency personnel, Planning Boards, Code Enforcement Officers) would achieve greater consistency among related sets of rules.
- Current statutory and rules definitions will reference data that are useable in a GIS mapping system, making the process of creating shoreland zoning maps far less burdensome particularly on rural municipalities lacking staff and resources.
- Demarcation of Shoreland Zone from the highest astronomical tide, rather than highest annual tide..
- Adding flexibility to structure height limitations would allow a property owner to raise a structure to address flood vulnerability.

Is there an opportunity to create jobs in Maine?

Yes, there might be, if there is a need to update bluff maps – could probably be done with existing personnel

What are the costs?

Staff time will be required for the statutory and rulemaking process and update products such as bluff maps

What is the timeframe for implementation of this strategy? Short term, mid-term or long term?

When does implementation begin and what is the expected duration?

Implementation would require changes to Title 38 by the legislature as well as major substantive rule changes. Therefore, implementation could start no sooner than after the 2021 legislative session with allowance for departmental rule changes, therefore in late 2021 or early 2022.

When is the outcome realized?

These revisions can provide flood and erosion mitigation benefits for decades, especially if revisions are made at regular intervals as new sea level rise projections are available.

What populations, communities, or sectors will benefit from the strategy? AND Who might be disadvantaged by the strategy?

Shoreline landowners, developers, code enforcement officers,

Code Enforcement Officers will have difficulty enforcing any change to the 250-foot jurisdiction and it may upset many people

How might the strategy address issues of equity?

Poor people often live in floodplains and may be disadvantaged by doing nothing and succumbing to flood events with no insurance. Likewise, implementation of new rules may limit their ability to expand.

Is there a model for this, either in or outside of Maine?

Are additional research and data needed? Are there major data gaps related to this strategy?

Allow and provide guidance for “thin layer deposition” as means to elevate saltmarshes. (What regulations would apply?) Example in connection with bridge replacement project in Damariscotta.

Consider creation/model of rules for “municipal bluff management district”

Shoreland Zoning rules in coastal areas show a lack of correlation between the shoreland zoning jurisdiction and projected impacts from sea level rise (see Lincoln County Sea Level Rise Ordinance Project – Interim Report). Research and authorize creation of sea level rise overlay districts in municipalities that do not have a local zoning ordinance.

Would need to research and develop data for bluffs in response to SLR if we go down that route.

Are there rules or legislation that could enact this strategy?

Communities that do not have zoning ordinances cannot enact a SLR overlay zone unless state statute is changed (Title 30-A §4352 §§2).

Revise Title 30-A to allow an overlay zoning district landward of the maximum 250 foot jurisdiction in future floodplains or sea level rise areas. Develop flood and resilience standards similar to those identified in Shoreland Zoning and Floodplain Management Ordinances.

1e - Authorize a Sea Level Resilience Overlay Zone

Strategy for Resilience Working Group

Which MCC goal does the strategy help to achieve? Describe the strategy.

- **Addresses adaptation and resilience to the impacts of climate change**

The State can authorize municipalities to adopt a Sea Level Resilience overlay zone that provides for enhanced standards within a geographic area defined by a selected sea level rise scenario. Such an overlay zone can be created by a community with zoning but a statutory change will be required for communities that do not now have zoning. (Currently, towns that do not have zoning ordinances can only enact state-mandated Shoreland Zoning and optional adult business zoning). Other municipal development ordinances should be amended to ensure consistency with the overlay zone.

[Question: Should this overlay zone be specific to coastal/SLR resilience or can it be applied by riverine communities that want to adopt a flood risk management higher standard?]

- A) Encourage communities with zoning and authorize communities without zoning to create climate-related overlay zones to account for future increase in sea level and riverine flooding.
 - a. Amend Title 30-A to authorize communities without zoning to enact climate-related overlay zoning and rolling easements pursuant to a consistent comprehensive plan or a community vulnerability/resilience plan
 - b. Create a rule establishing either voluntary guidelines or mandatory standards for climate-related overlay zoning

Describe the problem/barrier that this solution will address:

- 1) Current FEMA flood zones do not consider sea level rise or changes in riverine flooding due to climate change. Municipalities need a better regulatory tool that enables communities to anticipate forward-looking flood risk.
- 2) Municipalities without a Comprehensive Plan are prohibited from enacting zoning, with two exceptions: mandatory Shoreland Zoning and optional adult business zoning. The state would need to authorize municipalities without a Comprehensive Plan to adopt the Sea Level Resilience Overlay Zone. *[Question: should adoption should be voluntary and incentivized?]*

What are the benefits?

This strategy would give communities an effective tool, and more importantly the legal protection, for considering forward-looking flood risk in land use planning.

Is there an opportunity to create jobs in Maine?

Potential for a small number of jobs with:

- Geospatial and planning expertise
- Riverine flood modeling expertise

What are the costs?

Mapping services will be needed for communities to draw the new overlay zone.

Any state-provided assistance, data, and/or incentives would carry costs.

What is the timeframe for implementation of this strategy? Short term, mid-term or long term?

When does implementation begin and what is the expected duration?

[Same as Shoreland Zoning?]

Implementation would require changes to Title 38 by the legislature as well as major substantive rule changes. Therefore, implementation could start no sooner than after the 2021 legislative session with allowance for departmental rule changes, therefore in late 2021 or early 2022.

When is the outcome realized?

These revisions can provide flood mitigation benefits for decades, especially if revisions are made at regular intervals as new sea level rise projections are available.

What populations, communities, or sectors will benefit from the strategy? AND Who might be disadvantaged by the strategy?

How might the strategy address issues of equity?
Is there a model for this, either in or outside of Maine? Coastal: Hull, MA – Sea Level Rise Overlay Riverine: Woodstock, NY – Flood Fringe Overlay District (Source: Adapt Virginia “Adaptation Stories: Zoning and Building Codes” https://www.arcgis.com/apps/MapJournal/index.html?appid=1afbf2d80c6c4b1e8084ea37c7a80548) Lamprey River Watershed Project – created future floodplain maps using climate and land cover scenarios. http://100yearfloods.org/resources/
Are additional research and data needed? Are there major data gaps related to this strategy?
Are there rules or legislation that could enact this strategy? Yes

1f - Improve Floodplain Management Model Ordinance, Incentives, and Assistance

Strategy for Resilience Working Group

Which MCC goal does the strategy help to achieve? Describe the strategy.

- **Addresses adaptation and resilience to the impacts of climate change**
- A. Phase 1 would revise the model floodplain ordinance to require 3-feet of freeboard (additional elevation above base-flood elevation) in coastal areas [or a value informed by the STS's Phase 1 report] with allowances for height variances. Phase 2 would codify the model ordinance using the Chapter 1000 Shore; and Zoning Guidelines as a model.
- B. Revise Chapter 1000 to make minimum freeboard requirements consistent with the model floodplain ordinance
- C. Incentivize adoption of higher standards by municipalities, including but not limited to:
 - a. Expand the regulatory floodplain to account for SLR or increased riverine flooding. Options include: using the 0.2% chance (500-year – if/when available from FEMA) floodplain, using a 2050 1% chance flood map, or adopting a community-wide floodplain (this needs to be defined).
 - b. Limit rebuilding of substantially damaged structures to one time only or to a certain cumulative improvement value (will require a local or state mechanism to track damage and improvements).
 - c. Increase flood resilient design standards, including: apply V-zone requirements in the A-zone, restrict siting of critical infrastructure in flood hazard areas, require elevation of mechanical and electrical equipment.
 - d. Consider non-regulatory options like buyout programs in high risk areas or post-disaster redevelopment plans.
- B) Provide more accurate flood mapping statewide with capabilities that allow communities to define their own floodplains (i.e. increasing freeboard both horizontally as well as vertically).
- C) Provide assistance for communities to challenge FEMA maps OR do local floodplain maps statewide.
- D) Require disclosure and recording (in Registry of Deeds) of current and future flood risk during real estate transactions.

Describe the problem/barrier that this solution will address:

- A) The state's model floodplain ordinance contains provisions for a 1-foot freeboard. However, that freeboard reference is inadequate given the STS's latest sea level rise projections.
- B) FEMA flood maps do not consider sea level rise at all, so towns that use the maps for regulatory purposes are not accurately assessing risk of potential future conditions.
- C) FEMA flood maps are often quite inaccurate, especially in rural and inland areas due to limited modeling and quality topographic data.
- D) Many communities, especially small or rural, cannot afford the expense of developing more accurate flood models and data. The inaccurate maps may be significant barriers to economic

development.

- E) Maine real estate disclosures required sellers to inform buyers of certain risks inherent in the property, but existing and future flood risk is not required to be disclosed.

What are the benefits?

- A) Increasing floodplain standards will increase the resiliency of coastal infrastructure to existing and potential future floods while also decreasing flood insurance premium costs
- B) Developing statewide datasets on potential future floodplain conditions will provide communities with forward looking data that is consistent in its modeling approach and support local resiliency planning
- C) Requiring real estate disclosures to, at a minimum, include existing floodplain hazards will help lead to a more informed population and minimize continued development/redevelopment in flood hazard areas
- D) The state's model floodplain ordinance contains provisions for a 1-foot freeboard. However, that freeboard reference is not found in any state regulation and is inadequate given the STS's latest sea level rise projections.
- E) FEMA flood maps do not consider sea level rise at all, so towns that use the maps for regulatory purposes are not accurately assessing risk.
- F) In addition to not considering sea level rise, FEMA flood maps are often quite inaccurate in rural and inland areas.
- G) Many communities, especially small or rural, cannot afford the expense of challenging inaccurate FEMA maps. The inaccurate maps may be significant barriers to economic development.
- H) Sellers are required to inform buyers of certain risks inherent in the property, but future flood risk is not required to be disclosed.

Is there an opportunity to create jobs in Maine?

Not directly

What are the costs?

What is the timeframe for implementation of this strategy? Short term, mid-term or long term?

When does implementation begin and what is the expected duration?

Rule revisions can begin in the short-term, perhaps in conjunction with revisions to other rules and policies including Shoreland Zoning and Coastal Sand Dune Rules.

When is the outcome realized?

These revisions can provide flood mitigation benefits for decades, especially if revisions are made at regular intervals as new sea level rise projections are available.

What populations, communities, or sectors will benefit from the strategy? AND Who might be disadvantaged by the strategy?

Buyers will benefit from an improved understanding of a property's exposure to risk. There is evidence that some east coast markets are already pricing flood risk and sellers are seeing lower valuations for high-risk property.

How might the strategy address issues of equity?

Is there a model for this, either in or outside of Maine?

- A)
- B) Many examples depending on the strategy.
- C) City of Saco Floodplain Ordinance - <https://ecode360.com/9676746>
- D) Lamprey River Watershed Future Floodplains - <http://100yearfloods.org/resources/>
- E)
- F) Yes: <https://www.nrdc.org/flood-disclosure-map>

Are additional research and data needed? Are there major data gaps related to this strategy?

Are there rules or legislation that could enact this strategy?

Yes

1g - Update the Coastal Sand Dune Rules to Improve Resilience

Strategy for Resilience Working Group

Which MCC goal does the strategy help to achieve? Describe the strategy.

- **Addresses adaptation and resilience to the impacts of climate change**
- A) Update the rules' **sea level standard** to reflect the Science and Technical Subcommittee's projection of 3-5 feet of sea level rise by 2100.
- B) Strengthen the rules' preference for and provide guidance for **natural or nature-based** shoreline erosion controls (e.g. living shorelines) when seeking to replace an existing seawall. Provide additional flexibility to construct the replacement feature with projected sea level consideration.
- C) Clarify **exemptions** by stating that the impervious footprint must be currently in existence or must have been in existence as of a certain date, such as the date of the exemption.
- D) Revise process and requirements for public infrastructure permitting including proposals to improve evacuation routes
- E) Review the list of activities subject to permit-by-rule to determine whether it should be expanded to include additional activities or whether standards need to be updated
- F) Add a definition for living shoreline and revise the wetland rules to permit and encourage living shorelines
- G) Evaluate the existing exemption from permitting of minor alterations of permeable area in frontal dunes which can lead to the conversion of driveways, which are allowed as a minor alteration of permeable area, to building expansions

Describe the problem/barrier that this solution will address:

- A) **Sea level standard** – The current standard came from a rules revision in 2004 that requires the project site to “remain stable after allowing for a 2-foot rise in sea level over 100 years”. MCC-STS now projects between 3 and 5 feet of sea level rise by 2100, and the possibility of even higher rise.
- B) **Natural and nature-based seawall replacements** – New seawalls are prohibited under current rules. However, where the replacement of an existing seawall would be allowed, greater preference, guidance, and potential incentives should be given to natural or nature-based solutions (for example, living shorelines) as well as flexibility to account for sea level rise. In addition, flexibility should be provided for changes or improvements to municipal infrastructure, especially nature based solutions in suitable areas, that are intended to address impacts associated with sea level rise.
- C) **Exemptions** (38 MRSA 480-Q:31) – Current rules may allow a one-time exemption for expansion that takes place on existing impervious area, with no stipulation on how long ago that impervious area may have existed. There is also no tracking mechanism for the number of expansions take place on a property. Finally, the definition of “minor expansion” is unclear and generally left to the municipality to interpret.

- D) Currently, existing engineering footprints (e.g., road ROWs,, etc.) can be used to place new coastal engineering structures in the sand dune system. This should be investigated further as it is allowing new hardened structures to be placed in to areas when the rules prohibit new walls. Any such relaxation of requirements should be limited to municipal infrastructure.
- E) I'm wondering if anything in here should relate to recommendations from the [2017 Beaches WG on beach nourishment?](#) (creating new funding sources, develop coordinated programs for technical assistance to towns for beach management, creating a comprehensive beach management program, etc.)

What are the benefits?

- A) Greater margin of safety against flood and erosion hazards.
 - B) Natural and nature-based shoreline protections have lower end-effect erosion risk, and can improve habitat and natural sediment fluxes.
 - C) Clarifying and tracking exemptions will ensure that rules are consistently and verifiably applied.
- Is there an opportunity to create jobs in Maine?
- o Potentially by pushing more nature-based infrastructure work which requires consulting engineers, etc.

What are the costs?

New professional staff with coastal engineering appropriate technical expertise will be required for the rule review process and implementing recommendations of the Beaches Advisory Group.

What is the timeframe for implementation of this strategy? Short term, mid-term or long term?

When does implementation begin and what is the expected duration?

Rule revisions can begin in the short-term, perhaps in conjunction with revisions to other rules and policies including Shoreland Zoning and floodplain management.

When is the outcome realized?

These revisions can provide flood and erosion mitigation benefits for decades, especially if revisions are made at regular intervals as new sea level rise projections are available.

What populations, communities, or sectors will benefit from the strategy? AND Who might be disadvantaged by the strategy?

Shoreline landowners, developers, code enforcement officers may be affected

How might the strategy address issues of equity?

Is there a model for this, either in or outside of Maine?

- A) The 2004 rules were considered a model for integrating sea level rise risk into practice. Other states including NY and RI now include recent sea level rise projections into permitting, facility-siting, and funding programs.
- B) Maryland has a strong policy preference for living shorelines over hardened erosion controls such as seawalls, bulkheads, and riprap.

Are additional research and data needed? Are there major data gaps related to this strategy?

Are there rules or legislation that could enact this strategy?

Yes

1h - Land Use Planning Commission - Regulatory Changes to Help Achieve Community Resilience

Final version May-29-2020

Community Resilience Planning, Public Health, & Emergency Management Work Group

Which MCC goal does the strategy help to achieve?

- Addresses adaptation and resilience to the impacts of climate change

Describe the strategy:

Review State statutes and associated Land Use Planning Commission regulations, the Comprehensive Land Use Plan (CLUP), and guidance documents (collectively referred to as “regulations”) pertinent to determining adaptation and resiliency to climate change for future development in the unorganized territories. Focus on those areas identified by the Community Resilience Planning Work Group: site law regulations; stormwater, erosion, and sedimentation control measures; comprehensive planning; shoreland zoning; current zoning with regard to overlay zones; floodplain ordinances; and coastal dunes.

Describe aspects of State laws and LUPC regulations that could be changed to improve adaptation and resiliency.

A) Issues Addressed in Site Law Regulations

Review and revise the Maine Land Use Planning Commission’s rule Chapter 10 (01-672 C.M.R. Ch. 10) as the rule applies to larger development projects that do not trigger Site Law review. The goal of any revisions is to support adaptation and resilience as guided by best available science.

Chapter 10 (01-672 CMR Ch. 10)

Section 10.25,N. Ground Water Quality: Research implications of aligning the Commission’s standards for ground water quality with the no unreasonable undue adverse effect standards set forth in DEP’s Chapter 375, sec. 7 and incorporate future climate conditions and considerations into groundwater standards.

Protection of Wildlife and Fisheries: Develop new Commission standards for wildlife and fisheries to ensure climate change impacts and mitigation of potential damaging impacts to wildlife and cold water fisheries are incorporated into the Commission’s rules.

Section 10.25,J. Water Supply: Modify subsection 10.25,J,4 to consider cumulative demands (or “foreseeable consequences of a development”) on and impacts to water supplies from larger developments and increased development pressure in general, as measured by the LUPC Geographically Oriented Action Tracker (GOAT) database.

B) Stormwater, Erosion, and Sedimentation Control

Review and revise Maine’s Stormwater Management Law (Title 38, Chapter 3, §420-D), review and revise the Maine Land Use Planning Commission’s Rules (01-672 CMR Ch. 10), and adopt stormwater management rules applicable to the Land Use Planning Commission’s service area to support adaptation and resilience as guided by best available science.

Maine Stormwater Management Law (Title 38, Chapter 3, §420-D)

Revise the Maine Stormwater Management Law so that it applies state-wide, including all the area served by the Maine Land Use Planning Commission.

Chapter 500 (06-096 CMR Ch. 500):

Joint Rule. Concurrent with revising Chapter 500 to address the strategies of the Community Resilience Working Group, adopt Chapter 500 as a joint Department of Environmental Protection (Department) and Maine Land Use Planning Commission (Commission) rule.

Memorandum of Agreement. Execute a memorandum of agreement between the Department and the Commission regarding use of Department stormwater engineers for technical review of applications submitted to the Commission under the joint Chapter 500 rule.

Staff Resources. Request additional stormwater engineers for the Department to ensure sufficient resources for the technical review of stormwater permit applications state-wide.

Chapter 10 (01-672 CMR Ch. 10, Sections 10.25,E; 10.25,M; and 10.27,D)

Section 10.25,E. Natural Character and Cultural Resources: Develop specific stormwater management standards for hillside resources to account for increases in recent, current, and projected precipitation intensity and frequency of severe storm events.

Section 10.25,M. Erosion and Sedimentation Control: The Maine Land Use Planning Commission’s rules incorporate best management practices by referencing the “Maine Erosion and Sediment Control Practices Field Guide for Contractors.” Maine Department of Environmental Protection (2014). Revise and update the Field Guide, including the sizing of control structures, dewatering practices, etc., to ensure they account for projections of future precipitation and storm frequency. Update the Chapter 10 references to the Field Guide with its most recent revision date.

Section 10.27,D. Roads and Water Crossings: Review and update road standards for ditches, ditch relief culverts, water bars, and turnouts to account for documented and projected increases in precipitation intensity and frequency of severe storm events.

C) Comprehensive Planning

Ensure resilience planning is undertaken in revising the LUPC Comprehensive Land Use Plan (CLUP) and/or in a standalone vulnerability and resilience planning process.

Change Title 12 to *require* a standalone Climate Vulnerability/Resilience Plan (CV/RP), or set of plans (e.g., one for each county or subregion), which identifies vulnerable structures, infrastructure and populations in the Commission’s service area. Update the Climate Vulnerability/Resilience Plan(s) for the Commission’s service area regularly.

The Commission’s service area (sometimes referred to as the UT) is diverse and includes many different geographies and interests (e.g., commercial woodlands, coastal areas and islands, dense patterns of mixed use and residential development, large-scale agricultural operations, multiple counties, plantations and certain towns, energy generation and transmission infrastructure). Because of this diversity, the Commission should retain the flexibility it has now to design a resiliency planning process, or processes that best suits the topics and stakeholders involved.

Incorporate mitigation and resilience recommendations from the other Climate Council working groups into any guidance document recommended here.

Adapt any guidance document accompanying the Comprehensive Plan Review Criteria Rule ([Chapter 208](#)) to also address amendment or update of the Commission’s CLUP. The process to amend or update the CLUP is not subject to the Growth Management Act and is described in 12 M.R.S. §685-C(1). When adapting the guidance document, incorporate the following recommendations:

- Tailor guidance to the Commission’s service area. For example, CV/RPs for the UT may focus on topics such as: recreation, wildlife habitat, renewable energy, coastal resources and implications for island communities, regional development patterns that cluster development, or other topics.
- Ensure that guidance is scaled so that it can be applied to areas served by the LUPC. The UT includes many places that are near municipalities that act as activity centers and provide services to homes and businesses in neighboring townships or plantations. Collaborative planning between the two jurisdictions should be incentivized (e.g., tying funding for CV/RPs to a demonstration of local or regional partnerships when applicable).
- Encourage collaboration between the LUPC and other state agencies, counties, municipalities, and private land owners to identify infrastructure that may be at risk, and to identify alternative means of building resiliency to the effects of climate change.
- Use best available data and tools in updating the CLUP or CV/RPs.
- Complete *the [Maine Flood Resilience Checklist](#)* as part of creating CV/RPs.
- Review and update procedures and revise rules as needed for the LUPC to participate in the National Flood Insurance Program’s Community Rating System¹ to bolster community resilience and lower state financial impacts.

¹The Community Rating System (CRS) is a voluntary incentive program that recognizes and encourages community floodplain management activities exceeding the minimum program requirements. As a result, flood insurance premium rates are discounted to reflect the reduced flood risk resulting from community actions meeting the three goals of the rating system:

1. Reduce flood damage to insurable property,
2. Strengthen and support the insurance aspects of the National Flood Insurance Program, and
3. Encourage a comprehensive approach to floodplain management

D) Shoreland Zoning

Chapter 10 (01-672, CMR Ch. 10)

Review standards relevant to shoreland districts to make sure they are both sufficiently protective of water quality and shoreland environments in light of climate change and potential population pressure. Standards must allow flexibility for the development review process to account for changes due to climate change, such as increased precipitation, runoff, infiltration, water temperature, and flooding as well as increased pressure on resources due to development expansion and population growth. Compare LUPC rules with the Maine Department of Environmental Protection's, Chapter 1000, Guidelines for Municipal Shoreland Zoning Ordinances, looking for areas where changes to LUPC rules could be more protective of resources and improve community resiliency.

Given that rezoning of shoreland districts to other zones may occur in the LUPC service area, review rezoning and permitting criteria to make sure that protections of shoreland areas can be maintained in the face of climate and population changes and that regulations support resiliency.

Apply the best available science to understand the predicted degree and scope of environmental changes.

The Commission's Chapter 10 rules do not currently have standards specific to the protection of coastal bluffs. Conduct a comprehensive assessment of the Commission's service area to determine the location of any coastal bluffs and potential risks of bluff erosion to development activities. Depending on the results of the risk assessment, review whether standards specific to coastal bluffs are sufficiently protective in light of climate change and potential population pressure.

Sections 10.21 - 10.23, Land Use Subdistricts. Those subdistricts found in shorelands:

10.21,G. Maritime Development Subdistrict (D-MT);

10.21,A. Accessible Lake Protection Subdistrict (P-AL);

10.23,E. Great Pond Protection Subdistrict (P-GP);

10.23,L. Shoreland Protection Subdistrict (P-SL);

10.23,N. Wetland Protection Subdistrict (P-WL):

Review descriptions of shoreland zones to ensure integration with the Flood Prone Area Protection subdistrict as that subdistrict accounts for the effects of climate change (such as sea level rise and wetland migration) along with mapping zones.

In addition to the discounts on National Flood Insurance Program premiums, the CRS has a checklist including many adaptation options for municipalities that will increase resilience to flooding.

Research the implications of distinguishing coastal shoreland zones and riverine shoreland zones to support resiliency by tailoring regulations that anticipate the different changes predicted for these areas. Review use listings, level of development review, and standards for those activities most likely to negatively affect water quality and shoreland areas and for those activities most likely to suffer damage as a result of climate change.

Section 10.26,F. Maximum Structure Height: Investigate revising rules to include special exceptions to height limits, especially for pre-existing structures, in the case of design and alterations for flood-proofing. Ensure rule revisions and guidance related to elevating structures for flood-proofing also minimize the visual impacts of those structures.

E) Overlay Zones

Provide guidance to the LUPC that describes the purpose and desired outcome of climate-related overlay zones. Because the Commission's zoning system operates differently from municipalities, there may be many ways to plan for future flood risk in the UT, particularly in coastal areas or near rivers, and the Commission should have the flexibility to pursue all productive avenues as needed.

There may be some portions of the LUPC service area that are more susceptible to the effects of climate change than others. Complete a risk analysis, targeted data collection, and GIS modeling in areas most likely to be susceptible to flooding.

Once a basis for new regulatory tools has been established through GIS modeling based on the outcome of a risk analysis, the Commission could create or alter existing standards, create new or alter existing zones, or develop other regulatory tools such as an overlay zone, through routine technical rulemaking in Chapter 10.

F) Floodplain Management

Chapter 10 (01-672 CMR Ch. 10, Sections 10.10; 10.11; 10.23,C; 10.25,T; 10.26,F; and 10.27)

Section 10.10. Variances: Review whether the neighborhood standard and the prior owner standard might conflict with variance requests that would otherwise improve structural resiliency. Review Section 10.10,D (Variances in Special Flood Hazard Areas) for opportunity to strengthen language regarding recognition of increased risks due to climate change for development varying from dimensional requirements in areas of special flood hazard.

Section 10.11. Nonconforming Uses and Structures: Investigate the policy implications of allowing expansion up to the existing, nonconforming set back line in areas where there is flood risk. Research the implications of changing language to make expansion related to floodproofing easier (Section 10.11,C,1,a and b).

Section 10.23,C. Flood Prone Area Protection Subdistrict (P-FP): Research the implications of changing the description/boundaries of the P-FP to account for sea level rise and increased riverine flooding by adopting the recommendations of the Scientific and Technical Committee. Investigate the questions of if, when, and how existing development could be moved out of harm's way, especially after repeated losses from flooding. Review whether additional allowed activities should require a permit in the P-FP. Given differences between riverine and coastal flood plain areas, research the

implications of splitting the P-FP into riverine and coastal subzones, similar to how the P-SL is split into P-SL1 and 2, with corresponding requirements for land use activities.

Section 10.25,T. Activities in Flood-Prone Areas: Review current flood resilient design and construction standards for structures (such as the freeboard standard) in light of the most recent recommendations for design and construction in flood plains and in light of predicted increases in the strength, extent, and duration of flooding. Review whether wind and water-loading values and height requirements associated with the current base flood predictions are sufficient design standards in light of predicted increases to flood elevations and storm strength. Clarify the language around engineer review of designs for flood prone areas to certify that designs meet standards of practice for ensuring prevention of, or resistance to, flood damage. Research the implications of changing the location limits on development in coastal floodplains to be landward of the highest astronomical tide.

Section 10.26,F. Maximum Structure Height: Investigate revising rules to include special exceptions to height limits, especially for pre-existing structures, in the case of design and alterations for flood-proofing. Ensure rule revisions and guidance related to elevating structures for flood-proofing also minimize the visual impacts of those structures.

Section 10.27. Activity Specific Standards: Research the implications of increasing setback and buffering distances from the normal high water mark for activities or using a flood extent standard (for example, 25-yr flood) to further minimize flood effects on activities allowed in the P-FP. Review standards generally to make sure they are sufficiently protective, promote resiliency, and allow flexibility as environmental pressures change.

G) Coastal Sand Dune Rules

Chapter 10 (01-672, CMR Ch. 10)

The Commission's Chapter 10 rules currently have limited standards specific to the protection of sand dune areas. Conduct a comprehensive assessment of the Commission's service area to determine the location of any sand dunes and potential risks from development activities. Depending on the results of the risk assessment, consider whether sand dune specific standards should be pursued that are sufficiently protective in light of climate change and potential population pressure. Based on NRPA, the focus should be on standards that are protective of the natural supply or movement of sand within or to the sand dune system; significant wildlife habitat; threatened or endangered plant habitat; travel corridors; freshwater, estuarine or marine life; and existing scenic, aesthetic, recreational, or navigational uses. Standards must allow flexibility for the development review process to account for changes due to climate change, such as increased precipitation, runoff, infiltration, water temperature, and flooding as well as increased pressure on resources due to development expansion and population growth. Apply the best available science to understand the predicted degree and scope of environmental changes, such as increased sea level rise and storm surges.

10.25,P. Protected Natural Resources: Review Section 10.25,P,1 (Review Standards for Determinations of No Unreasonable Impacts) in light of NRPA requirements for sand dunes. Consider whether specific standards are needed in 10.25,P,5 (currently reserved for coastal sand dunes).

10.25,T. Activities in Flood Prone Areas: Review regarding development activities in sand dune systems. Research the implications of requiring geological/engineering review of projects in dune systems to ensure projects will have no undue adverse impact.

What are the benefits?

A) Issues Addressed in Site Law Regulations

Benefits result from regulations that incorporate the best available scientific information on climate change and from the application of consistent standards between DEP and LUPC regulations. Specific benefits will be realized when assessing the potential impacts to surface and ground water quality, surface and ground water quantity, and wildlife habitat from larger scale development projects for which LUPC is the permitting authority.

B) Stormwater, Erosion, and Sedimentation Control

Improved stormwater management practices, reduced risk from increases and changes in flow (flooding), reduced release and transport of pollutants to waterbodies, wetlands, and groundwater. Regulation language will be flexible to allow for swift change if risk projections change.

C) Comprehensive Planning

The 2010 CLUP includes a high-level discussion of climate change and notes that the Commission will monitor the effects of climate change and develop more specific policies when needed, but it does not offer unique concrete strategies or policies to make the UT more resilient to the effects of climate change. The strategy proposed here would require that the Commission take the next step to integrate resilience planning into the next update of the CLUP, and in the meantime potentially create a standalone CV/RP(s).

This strategy will increase coordination among jurisdictions operating in rural Maine (small towns, counties, and the LUPC) and decrease duplication of effort, improve public health and safety, and lessen the impact of climate-related events.

D) Shoreland Zoning

New protections for coastal bluffs in the LUPC's service area could result. Adding flexibility to structure height limitations would allow property owners to raise structures to address flood vulnerability. The LUPC will realize greater flexibility in development review and in responding to changing risk projections over time with updated maps and by distinguishing between coastal and inland shoreland areas.

E) Overlay Zones

This strategy would allow LUPC to consider forward-looking flood risk in zoning and permitting decisions in the UT.

F) Floodplain Ordinances

Revising floodplain standards to account for increases in flood extent, strength, duration, and frequency will increase the resiliency of riverine and coastal floodplain infrastructure while potentially decreasing the cost of flood insurance premiums. Flexible regulatory language can allow for swift updates to rules if risk projections change.

G) Coastal Sand Dune Rules

Rules protective of dune systems will prevent increased erosion and flooding in these systems while not interfering with the natural flow of any surface or subsurface waters. Flexible regulatory language can allow for swift updates to rules if risk projections change.

- Is there an opportunity to create jobs in Maine?

A) Issues Addressed in Site Law Regulations

Larger projects typically require professionals with specialized knowledge of engineering and environmental assessment. Revising Maine's regulations to incorporate measures for community resilience will support job creation in Maine.

B) Stormwater, Erosion, and Sedimentation Control

Short term, the strategy requires professionals with knowledge of the legislative process.

Mid-term, the strategy also requires additional professional engineering positions within the Department of Environmental Protection.

Long term, the strategy requires the skills of those who can train and provide technical assistance to those within regulated communities who will implement the revised rules.

C) Comprehensive Planning

Yes, through engagement of professionals in the preparation of a resilience plan and implementation of resilience measures.

D) Shoreland Zoning

These changes could create greater demand for individuals with skills in geographic data collection, modeling, and mapping; development design in shoreland areas; and in training staff and providing technical assistance to communities.

E) Overlay Zones

Geospatial and planning expertise, and coastal and riverine flood modeling expertise will be required to implement this strategy, particularly in the UT where existing data sources are minimal and dated.

F) Floodplain Ordinances

There is an opportunity to create jobs through greater demand for individuals with skills in geographic data collection, modeling, and mapping (preparing improved flood risk maps); development design in floodplains; and in training staff and providing technical assistance to communities. Removing barriers to raising structures could provide local construction jobs.

G) Coastal Sand Dune Rules

Professional staff with coastal engineering expertise may be required for reviewing and implementing recommendations.

What are the costs?

A) Issues Addressed in Site Law Regulations

The review and revisions of related LUPC regulations is anticipated to be managed with existing staff resources without significant costs.

B) Stormwater, Erosion, and Sedimentation Control

At least two new professional stormwater engineering positions within the Department of Environmental Protection.

Training and technical assistance on rule changes for County UT Administrators, Regional Planning Organizations, and contractors/engineers.

C) Comprehensive Planning

Staff time will be required to update the CLUP or create standalone CV/RPs. If LUPC does not have the capacity to undertake the required regional or statewide planning efforts, then more capacity will have to be added to the planning staff or qualified consultants may be required to complete certain tasks.

Creating local and regional plans is costly and at present there are few public funding sources available. This is particularly true for regional planning in areas that include the UT. Both public and private sector stakeholders in these areas have many different needs competing for the same limited sources of time and money. Without a dedicated source of funding, regional planning efforts will be infrequent and limited in what they can address.

D) Shoreland Zoning

Staff time will be required for the statutory and rulemaking process and to periodically review rule effectiveness and the latest risk assessments. There will be costs associated with creating new maps based on climate projections. If the LUPC does not have the capacity to complete the work, then more capacity will have to be added to the planning staff or qualified consultants may be required for these tasks. There may be costs associated with training staff. Landowners may experience higher costs for compliance with rules.

E) Overlay Zones

Implementing this strategy will require a risk assessment focused on the UT, to determine what data/spatial modeling is needed. Gathering the data and completing the required analysis, based on recommendations from a risk assessment, will also have costs. Following this initial work, creation of regulatory tools to address future-looking flood risk will require staff time and potentially use of qualified consultants.

F) Floodplain Ordinances

Staff time will be required for the statutory and rulemaking process and to periodically review rule effectiveness and the latest risk assessments. There will be costs associated with creating new maps based on climate projections. If the LUPC does not have the capacity to complete the work, then more capacity will have to be added to the planning staff or qualified consultants may be required for these tasks. There may be costs associated with training staff. Landowners may experience higher costs for compliance with the rules.

G) Coastal Sand Dune Rules

Staff time will be required to complete the assessment and draft rule revisions. If the LUPC does not have the capacity to complete the work, then more capacity will have to be added to the planning staff or qualified consultants may be required for these tasks. There may be costs associated with training staff. Landowners may experience higher costs for compliance with the rules.

What is the timeframe for implementation of this strategy? Short term, mid-term or long term?

- When does implementation begin and what is the expected duration?

Research and rule revisions can begin in the short-term, perhaps in conjunction with revisions to other rules and policies. Guidance documents can be prepared in the short term, as well as encouraging the preparation of standalone Climate Vulnerability/Resilience Plans.

Any mandated change that requires incorporation of resilience measures into the CLUP, or preparation of Climate Vulnerability/Resilience Plans would require changes to Title 12 by the legislature. Implementation could start no sooner than after the 2021 legislative session with allowance for any resulting departmental rule changes, therefore in late 2021 or early 2022.

For overlay zones, implementation depends on acquiring resources needed for work associated with data collection and modeling.

In the long term, these revisions can provide climate resiliency benefits for decades, especially if revisions are made at regular intervals as new data become available.

- When is the outcome realized?

Revisions to statutes, if proposed during the 130th legislative session, could take effect in the summer of 2021; associated rule changes could take a few months longer depending on the issue and process required by statute.

Revisions to rules (not requiring legislative action or statutory change) could be completed within 6 months.

A standalone Climate Vulnerability/Resilience Plan can be prepared much sooner than an update to the Commission's CLUP, which is subject to the process described in Title 12 and includes submittal to the legislature for review and approval during two concurrent sessions. [See 12 M.R.S. §685-C(1)(A-B) for full description of process.]

What populations, communities, or sectors will benefit from the strategy? AND Who might be disadvantaged by the strategy?

A) Issues Addressed in Site Law Regulations

A consistent approach across regulations will help communities learn and implement the new rules. Regulations will be rooted in scientific consensus around the range of future risks faced by communities. Developers of larger projects could incur additional costs as a result of additional regulatory requirements that incorporate standards or requirements for community resilience, public health, and emergency management.

B) Stormwater, Erosion, and Sedimentation Control

All populations, communities, and sectors in the unorganized territories that experience or are involved with development or redevelopment could benefit from proposed rule changes through prevention and control of the release of pollutants to waterbodies, wetlands, and groundwater and reduction of impacts associated with increases and changes in stormwater flow.

Developers could incur additional costs as a result of additional regulatory requirements for projects triggering regulations.

C) Comprehensive Planning

People who live, work, or recreate in areas served by the Commission and which are the subject of an update to the CLUP or creation of standalone CV/RPs, would benefit from this strategy. Regulatory changes that occur as a result of creation of plans or policies could potentially affect the ability of property owners to pursue development or related activities. In some cases, development potential may be limited.

D) Shoreland Zoning

Populations, communities, and sectors involved with shoreland zones will benefit in the long term through increased resiliency enabled by the proposed rule changes. In the shorter term, there may be additional constraints on development in these areas.

E) Overlay Zones

People who live, work, or recreate in the UT are affected by changes in zoning or permitting standards, particularly regarding the potential to develop land. In some locations, development potential could be limited or curtailed.

F) Floodplain Ordinances

Areas with floodplains will benefit in the long term through increased resiliency enabled by the proposed rule changes. Property owners within floodplains will benefit by having more opportunity for flood-proofing existing structures.

G) Coastal Sand Dune Rules

Coastal areas with sand dunes will benefit in the long term through increased resiliency enabled by the proposed rule changes. In the shorter term, there may be additional constraints on development in these areas.

How might the strategy address issues of equity?

A) Issues Addressed in Site Law Regulations

Establishing similar community resilience, public health, and emergency management standards for larger scale development projects, whether the project is located within the LUPC service area under the LUPC regulations or in municipalities under the DEP's jurisdiction would ensure consistent statewide regulation.

B) Stormwater, Erosion, and Sedimentation Control

Requiring that the Maine Stormwater Management Law apply state-wide could reduce one incentive for developers to consider using land outside of towns, in the unorganized territories where it is harder to provide services, to avoid the requirements of that statute.

C) Comprehensive Planning

Deliberate inclusion of vulnerable populations in the assessment of climate impacts will support policies and strategies that assist low income, elderly, poor, and other disadvantaged populations.

D) Shoreland Zoning

Establishing similar standards for shoreland zones, whether projects are located in the LUPC's service area or the DEP's jurisdiction would ensure consistent statewide regulation.

E) Overlay Zones

Because the strategy would lead to limitations on development in areas at risk of future flooding, some landowners may be more affected than others. The strategy should acknowledge this likelihood.

F) Floodplain Ordinances

Landowners who could not afford to move from floodplains would have more opportunity for floodproofing, potentially lowering flood insurance costs.

G) Coastal Sand Dune Rules

Establishing similar standards for protection of sand dunes, whether the project is located within the LUPC service area under the LUPC regulations or in municipalities under the DEP's jurisdiction would ensure consistent statewide regulation.

Is there a model for this, either in or outside of Maine?

A) Issues Addressed in Site Law Regulations

The existing standards set forth in the Site Law and related Chapter 375 rule can be used to map desired changes to the LUPC's Chapter 10 rule.

B) Stormwater, Erosion, and Sedimentation Control

Yes, the Maine Waterway Development and Conservation Act is a statute that applies state-wide, and the Department and Commission have joint rules to implement that statute.

C) Comprehensive Planning

Recommendations are presented in

https://www.maine.gov/dacf/municipalplanning/docs/CAGS_06_Comprehensive_Planning.pdf. This document is three years old. It should be reviewed and updated with these recommendations.

The Commission has a program called [Community Guided Planning and Zoning](#) which offers a regional planning model for the UT and could be adapted for the purpose of developing CV/RPs.

D) Shoreland Zoning

The Maine Department of Environmental Protection's, Chapter 1000, Guidelines for Municipal Shoreland Zoning Ordinances can serve as a model.

E) Overlay Zones

The LUPC has regulatory tools that involve an overlay system ([see application of the adjacency principle](#)), but they are primarily used for locating certain types of development subject to the Commission's rezoning process. A similar approach could potentially be used to limit development in areas prone to future flood risk. However, any overlay system or similar regulatory tool will only be as effective as the underlying data or modeling it is based on.

F) Floodplain Ordinances

Lamprey River Watershed Future Floodplains, <http://100yearfloods.org/resources/>, provides a floodplain projections and mapping model from New Hampshire.

G) Coastal Sand Dune Rules

Maine DEP's sand dune rules will provide a model for developing LUPC rules protective of sand dune areas.

Are additional research and data needed? Are there major data gaps related to this strategy?

A) Issues Addressed in Site Law Regulations

Yes, while the working group has provided initial recommendations, legal and professional advice is needed to develop specific statutory proposals for the 130th Legislature. Additional research is needed to discern how to incorporate new standards for community resilience, public health, and emergency management for larger projects in the LUPC's service area that do not require a Site Law permit.

B) Stormwater, Erosion, and Sedimentation Control

Yes, while the working group has provided initial recommendations, legal and professional advice is needed to develop specific statutory proposals for the 130th Legislature.

- Improved projections for precipitation amounts associated with 2-, 10-, 25-, 50-, 100-, and 500-year precipitation and flow events accounting for increases in precipitation and peak flows documented in the state (see Scientific and Technical Subcommittee report *Scientific Assessment of Climate Change and Its Effects in Maine*).
- Appropriate design storm(s) for stormwater control measures
- Low impact development (LID) and green infrastructure approaches and techniques and under which conditions strategies are most appropriate and successful
- Cost of Low Impact Development (LID) strategies vs traditional stormwater infrastructure measures
- Potential workload increases for the Department's stormwater engineers.

C) Comprehensive Planning

Use best available tools and datasets. Information available for the UT varies from region to region. A vulnerability assessment of the entire area served by LUPC regarding likely effects from climate change would facilitate any efforts to create a Climate Vulnerability/Resilience Plan or to implement any associated regulatory changes.

D) Shoreland Zoning

Improved projections for changes in the 2-, 10-, 25-, 50-, 100-, and 500-year precipitation and flow events accounting for increases in precipitation and peak flows documented in the state (see Scientific and Technical Subcommittee report *Scientific Assessment of Climate Change and Its Effects in Maine*) will inform revisions to rules for inland and riverine settings.

E) Overlay Zones

Yes. The best available data for the Commission's service area comes from FEMA in the few Minor Civil Divisions that have been mapped. SLR modeling scenarios may be available for coastal areas and islands in the Commission's service area (e.g., Cobscook Bay, Monhegan and Matinicus Plantations, etc.), but modeling of flood risk in riverine environments has not been done.

F) Floodplain Ordinances

Improved projections for changes in the 2-, 10-, 25-, 50-, 100-, and 500-year precipitation and flow events accounting for increases in precipitation and peak flows documented in the state (see Scientific and Technical Subcommittee report *Scientific Assessment of Climate Change and Its Effects in Maine*) will inform revisions to rules for inland and riverine settings.

G) Coastal Sand Dune Rules

A comprehensive assessment of the Commission's service area is needed to determine the location of any sand dunes and the potential risks from development activities to these areas.

Are there rules or legislation that could enact this strategy?

A) Issues Addressed in Site Law Regulations

Statutes:

- *Use Regulation* (M.R.S. Title 12, Chapter 206-A)

Rules:

- The Commission's Chapter 10 Rules (01-672 CMR Ch. 10)

B) Stormwater, Erosion, and Sedimentation Control

Statutes:

- *Stormwater Management Act* (M.R.S. Title 38, Chapter 3, § 420-D)

Rules:

- Joint DEP/Commission Chapter 500 Rules
- The Commission's Chapter 10 Rules (01-672 CMR Ch. 10)

C) Comprehensive Planning

Guidance documents can be created without rule changes but requirements to include climate vulnerability and community resilience in an update to the CLUP and CV/RPs will require revisions to statute.

Statutes:

- *Use Regulation* (M.R.S. Title 12, Chapter 206-A)

Consider an Executive Order which addresses both municipal and the LUPC contexts to initiate preparation of CV/RPs.

D) Shoreland Zoning

Rules:

- The Commission's Chapter 10 Rules (01-672 CMR Ch. 10)

E) Overlay Zones

Rules:

- The Commission's Chapter 10 Rules (01-672 CMR Ch. 10)

F) Floodplain Ordinances

Rules:

- The Commission's Chapter 10 Rules (01-672 CMR Ch. 10)

G) Coastal Sand Dune Rules

Rules:

- The Commission's Chapter 10 Rules (01-672 CMR Ch. 10)

1i Natural Resources Protection Act Statute/Rule Changes

Community Resilience Planning, Public Health, & Emergency Management Work Group

Placeholder: notes to date provided here; strategy under review by Maine DEP

DEP's Permit-by-rule standards for stream crossings (Chapter 305, Section 10) do not address any of the stream-smart principles. With increasing frequency of extreme storm events, making sure all new crossings can pass sufficient flow seems like an important strategy. We updated [LUPC] rules to address stream-smart principles for new crossings last year. Also, statutory exemptions for replacement of existing crossings do not adequately address the need to pass sufficient flow, are inconsistent across statutes and rules, and at least in our case, provide disincentives for culvert upgrades. The work of the Resilience Working Group may provide a great opportunity to address culvert replacement comprehensively.

NRPA (38 M.R.S. 480-Q):

2-D. Existing crossings. A permit is not required for the repair and maintenance of an existing crossing or for the replacement of an existing crossing, including ancillary crossing installation activities such as excavation and filling, in any protected natural resource area, as long as:

A. Erosion control measures are taken to prevent sedimentation of the water; [PL 2011, c. 205, §3 (NEW).]

B. The crossing does not block passage for fish in the protected natural resource area; and [PL 2011, c. 205, §3 (NEW).]

C. For replacement crossings of a river, stream or brook:

(1) The replacement crossing is designed, installed and maintained to match the natural stream grade to avoid drops or perching; and

(2) As site conditions allow, crossing structures that are not open bottomed are embedded in the stream bottom a minimum of one foot or at least 25% of the culvert or other structure's diameter, whichever is greater, except that a crossing structure does not have to be embedded more than 2 feet. [PL 2011, c. 205, §3 (NEW).]

For purposes of this subsection, "repair and maintenance" includes but is not limited to the riprapping of side slopes or culvert ends; removing debris and blockages within the crossing structure and at its inlet and outlet; and installing or replacing culvert ends if less than 50% of the crossing structure is being replaced;

Statewide Standards for Timber Harvesting and Related Activities in Shoreland Areas, (01-669 CMR Ch. 21, Section 11,B,4,c).

This MFS rule includes language similar to the NRPA exemption for culvert replacements, with one exception:

11,B,4,c.iii. (slightly different):

b. As site conditions allow, crossing structures that are not open bottomed are embedded in the stream bottom at least 25% of the culvert or other structure's diameter, except that a crossing structure does not have to be embedded more than 2 feet.

The NRPA requirement for embedding a minimum of 1 foot is not included, which for very small culverts, seems to make sense.

Use Regulation (12 M.R.S. Sec. 685-B):

1-A. Exceptions. Except as provided in this section or by commission rule:

- A. A permit is not required for the repair and maintenance of an existing road culvert or for the replacement of an existing road culvert, as long as the replacement culvert is:
 - (1) No more than one standard culvert size wider in diameter than the culvert being replaced;
 - (2) No more than 25% longer than the culvert being replaced; and
 - (3) No longer than 75 feet.

Ancillary culverting activities, including excavation and filling, are included in this exemption. A person repairing, replacing or maintaining an existing culvert under this paragraph shall ensure that erosion control measures are taken to prevent sedimentation of the water and that the crossing does not block fish passage in the water course

<p>Which MCC goal does the strategy help to achieve? Describe the strategy.</p> <p>Addresses adaptation and resilience to the impacts of climate change</p> <p>This strategy addresses adaptation to climate change and resilience by aligning the mandatory shoreland zoning rules with the latest scientific analysis of sea level rise risk and our understanding of precipitation trends affecting riverine flooding. It also streamlines interpretation and enforcement by using consistent definitions among related statutes and the latest advances in digital data technology.</p> <p>F)</p>
<p>What are the benefits?</p> <p>Is there an opportunity to create jobs in Maine?</p>
<p>What are the costs?</p>

What is the timeframe for implementation of this strategy? Short term, mid-term or long term?

When does implementation begin and what is the expected duration?

When is the outcome realized?

What populations, communities, or sectors will benefit from the strategy? AND Who might be disadvantaged by the strategy?

How might the strategy address issues of equity?

Is there a model for this, either in or outside of Maine?

Are additional research and data needed? Are there major data gaps related to this strategy?

Are there rules or legislation that could enact this strategy?