May 2025

FINAL REPORT:
A Plan for Infrastructure Resilience

Maine Infrastructure
Rebuilding and Resilience Commission

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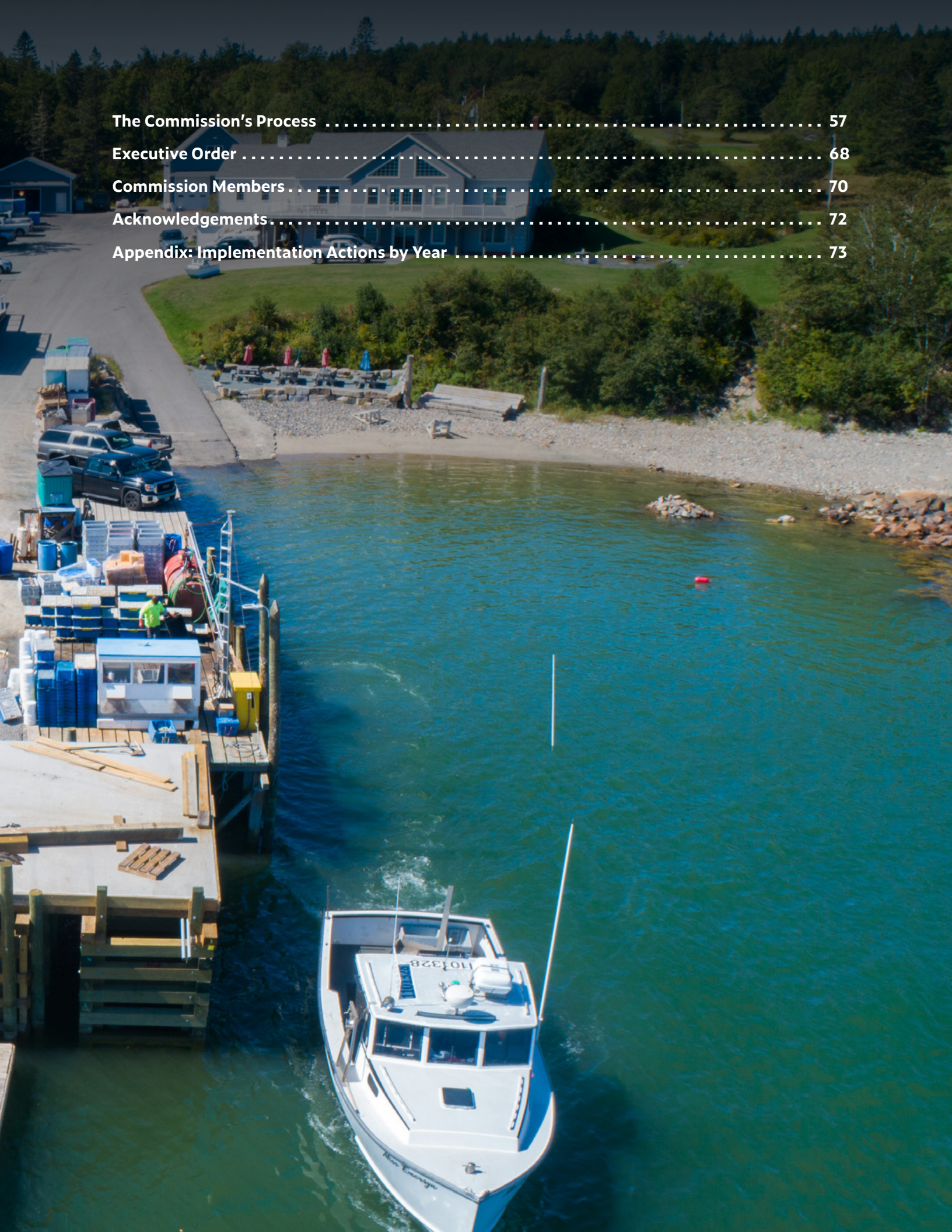
On January 12, 2024, Chipman's Wharf, a 106-foot wharf on the Narraguagus River in Milbridge was washed away by a devastating storm, including an entire bait shed. Supported by grant funding available to working waterfront businesses to rebuild, the wharf was reconstructed later in the year to continue serving the local fishing fleet. Credit: Island Institute



May 7, 2025

Dear Governor Mills,

As co-chairs of the Infrastructure Rebuilding and Resilience Commission you established by Executive Order in May 2024, we are pleased to deliver to you, the Legislature, and the people of Maine the state's first Plan for Infrastructure Resilience, the culmination of our work over the last year to inform and guide Maine's response, recovery, and rebuilding from extreme storms. This Plan builds upon the interim report we delivered halfway through our work in November 2024, transitioning from a set of preliminary recommendations to a full-fledged plan shaped by the same urgent and unifying theme: the State and its partners must act today to ensure the resiliency of our people, environment, and economy against future storms and climate-related impacts and to protect the Maine we love for future generations.

The stories we heard from dozens of Maine people at our listening sessions throughout the state over the past year paint a stark portrait of what our futures might look like without deliberate action and investment to improve community resilience. More than 16 months after the January 2024 storms, both coastal and inland towns report infrastructure still not fully repaired. Old Orchard Beach, according to Town Manager Diane Asanza, was still recovering from the battering of a 2022 storm when the 2024 storm hit. Commission member Shiloh LaFreniere, Town Manager in Jay, warned, "Towns are not prepared to deal with these storm impacts — they do not have the resources in house and do not know what resources are available out of house." Darren Woods, Aroostook County EMA Director, noted, "Communities and agencies are not just complaining when we identify issues and areas for resilience. We are already working hard at resilience efforts at the local level."

As you noted upon the delivery of our interim report, "Storms know no politics. They don't care if you are a Republican, Democrat, or Independent. They will flood our homes and businesses, wash out our roads and bridges, and threaten the health and safety of our people."

The nonpartisan nature of infrastructure resilience has remained consistent throughout our deliberations. Maine, like all states, depends on federal funding and coordination for disaster preparedness and hazard mitigation, and on significant funding for recovery and rebuilding in the wake of disasters. As we finalized this Plan for delivery, high-ranking officials in the federal administration publicly proposed the elimination of the Federal Emergency Management Agency (FEMA), from which the Maine Emergency Management Agency (MEMA) and regional emergency management agencies receive the bulk of their funding. At the same time, FEMA announced the termination of the Building Resilient Infrastructure and Communities (BRIC) grant program, a critical resource, with no replacement at the time of termination. Such sweeping and unprecedented policy reversals fundamentally complicate this work.

Despite these significant headwinds, this Plan remains urgent and critical. Maine must anticipate scenarios in which states bear greater responsibilities and costs for hazard mitigation, emergency preparedness, and disaster recovery.

The Plan we deliver to you and the people of Maine today aims to go beyond a compilation of recommendations that sit overlooked on a shelf. It identifies agencies, organizations, and partners accountable for implementation and sets forth timeframes for action, ranging from immediate steps to a decade in the future. We included metrics to track the overall progress of the Plan to inform decision makers and the public. This Plan charts a path to a stronger, more resilient Maine by strengthening infrastructure and reducing disaster risks; improving disaster preparedness, response, and recovery; and sustaining Maine's momentum through strategic investments.

To that end, the Plan recommends that the new State Resilience Office tracks activity and reports the plan's progress. It also recommends that you as Governor establish an entity whose purpose is to receive those reports and monitor implementation of the Plan's strategies and actions.

Without relentless focus and attention, Maine risks losing the meaningful momentum it's gained since the devastating storms of December 2023 and January 2024, which prompted the creation of our Commission. Your Administration and the Legislature committed an historic $60 million for storm relief for working waterfronts, infrastructure projects, and business recovery, and, more recently, an additional $39 million through the newly passed LD 1 to help Maine communities, homeowners, businesses, and emergency response personnel better prepare for and withstand severe storms.

These investments will help to protect our communities against the havoc of future storms, from days-long power outages that disrupt lives and economic activity, washed out roads that impede heating fuel deliveries and emergency responders, flooding that puts drinking water systems at risk of contamination, and much more.

These investments will save lives, will save taxpayers money, and strengthen our economy. According to a recent study released by the U.S. Chamber of Commerce, every $1 spent on climate resilience and preparedness saves communities $13 in damages, cleanup costs, and economic impact. By that measure, the more than $100 million that Maine has already committed will save over $1 billion in the coming years.

While that figure is impressive, it pales in comparison to the financial scale of Maine's infrastructure and resilience challenge. The state and communities will likely need billions in investments over the decades to come to adequately prepare for the increasingly frequent and intense storms in our future. Philanthropy also has an essential role to play in catalyzing innovation, filling funding gaps, and supporting community-led resilience efforts. This is a daunting reality, but one we face together as a state unafraid to acknowledge the challenges of today and to anticipate the challenges of tomorrow.

In closing, we along with all of the Commission's members extend our gratitude to the many individuals who contributed to the Commission's work. This includes the many participants in the listening sessions, the officials who hosted us around the state, the numerous experts who presented to the Commission, and staff from the Governor's Office of Policy Innovation and the Future and the Maine Emergency Management Agency.

We thank you, Governor Mills, for this opportunity to lead the Commission and deliver a plan for a more resilient Maine.

Linda Nelson, Economic and Community Development Director, Town of Stonington

Dan Tishman, Principal and Chairman of Tishman Realty & Construction

Co-Chairs, Infrastructure Rebuilding and Resilience Commission

EXECUTIVE SUMMARY

A new era of storms and natural disasters has marked its arrival in Maine with dramatic and devastating results. Between March 2022 and May 2024, Maine experienced an extraordinary nine natural disasters, each severe enough to merit Presidential disaster or emergency declarations. The rising severity and frequency of these storms and floods raise urgent alarms about the increasing risks of extreme weather in our state and drive home the imperative that Maine plan for and invest in infrastructure resilience at the state, regional, and local levels.

These implications had not yet emerged when, in May 2024, Governor Mills established the Commission on Infrastructure Rebuilding and Resilience by Executive Order and charged its 24 members with developing a plan to reduce the risk of damage from extreme storms and floods, and actions to improve Maine's ability to respond and recover when the next disasters hit. As the Commission heard from affected communities and met to develop this plan, six key messages informed its deliberations:

- **The situation is urgent.** Maine cannot assume that the recurring storms of the past three years are an anomaly.
- **Maine must become more active, capable, and self-resourced** in hazard mitigation, disaster recovery, and climate resilience in anticipation of more frequent disasters as well as changes in federal disaster management policies.
- **The financial scale of Maine's infrastructure resilience challenge is extensive**, with hundreds of millions needed in infrastructure investments over the next decade.
- **The cost of inaction far exceeds proactive investment**, with studies repeatedly showing that every $1 invested in resilience likely avoids $13 in damage and economic impact.
- **Maine needs to change how and where we build.** The state and communities must prepare for difficult conversations about getting out of harm's way and relocating critical infrastructure to safer areas.
- **The state will have to be strategic and efficient with resources.** Current funding and human capacity, both state and local, are insufficient. Regional collaboration and capacity along with a robust strategy for long-term funding of resilience projects can make efficient use of resources.

As the Commission reviewed the final draft of this plan in March and April, changes at the federal level — specifically the Federal Emergency Management Agency's (FEMA) decision to sunset certain hazard mitigation funding programs — highlighted the need for Maine to work proactively to advance resilience and hazard mitigation projects. Maine showed resilience and determination during the storms and must advance this work in light of changes at the federal level. Maine's state motto "Dirigo" means "I lead." By implementing this plan, Maine will be a national leader at tackling hazard mitigation challenges head-on.

The Commission's final product, an Infrastructure Resilience Plan, provides strategies and actions that strengthen infrastructure and reduce disaster risks; improve disaster preparedness, response, and recovery; and sustain Maine's momentum through strategic investments. The plan is a comprehensive approach to integrate resilience principles deeply into decision-making at all levels of government.

INFRASTRUCTURE RESILIENCE PLAN SUMMARY

The Commission's Plan is organized into three pillars, each supported by a series of strategies and actions.

I. Strengthen Infrastructure and Reduce Disaster Risk

1. Identify, prioritize, and strengthen vulnerable infrastructure.
2. Assist communities to effectively assess and reduce risk.
3. Improve and protect energy infrastructure and increase energy resilience for customers.
4. Protect and promote resilience across a diverse mix of public and privately owned working waterfront infrastructure.

II. Improve Disaster Preparedness, Response, and Rebuilding

5. Enhance communications during and immediately after emergencies.
6. Strengthen emergency coordination and rapid reaction capabilities across governments and with the philanthropic and nonprofit sector to alleviate immediate post-disaster needs.
7. Expedite permitting for post-disaster rebuilding, infrastructure strengthening, and resilience projects.
8. Develop tools and education to make buildings more resilient.

III. Sustain Maine's Momentum through Strategic Investments

9. Improve data and information sharing to help leaders make informed decisions about risk.
10. Maximize federal funding for disaster recovery and proactive resilience projects.
11. Develop long-term funding and financing strategies for infrastructure resilience.

Flooding during the severe storms of 2024 overtook roads in Bingham, Maine. Credit: DECD

The late Bill Kitchen, Machias Town Manager, describes the extent of flooding in Machias during the January 2024 storm, when wind-driven waves and storm surge caused water to flow over the Machias dike, damaging the structure and flooding adjacent downtown areas of Machias.

The plan will be implemented through cooperation among state agencies; local, county, and tribal governments; the nonprofit and philanthropic sector; the private sector; Maine's institutions of higher education and continuing education; and the public.

The plan identifies and builds upon several key areas of momentum in Maine. The plan reinforces the work of the Maine Climate Council and anticipates activities that the State of Maine and its partners are beginning, supported by a historic $69 million resilience grant from the National Oceanic and Atmospheric Administration (NOAA). The newly established Maine Office of Community Affairs will house a State Resilience Office and work with state agencies to coordinate resources and services for communities to build resilience through a "one-stop shop" model of engagement and assistance.

Recognizing the urgency of the situation, the Governor and the Legislature took initial steps in April 2024, designating $60 million for storm recovery and rebuilding damaged infrastructure with greater resilience. This funding enabled repair and recovery investments in 43 towns and cities, nearly 70 working waterfront facilities, and nearly 150 businesses and nonprofits. Additionally, the Federal Emergency Management Agency (FEMA) directed over $32 million to communities and households over the past two years for disaster recovery costs, a number that is expected to grow as FEMA continues payments to local governments for the damage to public infrastructure in December and January.

The Commission's work is already bearing fruit. LD 1 "An Act to Increase Storm Preparedness for Maine's Communities, Homes and Infrastructure" implements several of the Commission's key interim recommendations by providing funding for home resiliency improvements, emergency communication and disaster recovery, and community flood risk management. The plan leverages these new investments and identifies opportunities to build on their success.

These are important initial investments but only a start in meeting Maine's long-term needs. The growing severity of storms fueled by a warming climate, centuries of development in areas at risk, and the looming possibility of a reduced federal role in disaster management are challenges that Maine must confront immediately with commitment, investment, and innovation.

INTRODUCTION

A New Era of Risk

The dangers of extreme weather and natural hazards have become undeniable in Maine over the past three years, as a series of intense storms caused millions of dollars in damage and claimed four lives. Heroic action by hundreds of first responders across the state likely saved many more lives. These storms raise alarms about the risks facing our state and the need to plan for and invest in immediate and long-term infrastructure resilience at the state, regional, and local levels.

In a span of just four weeks during December 2023 and January 2024, three historically severe storms caused catastrophic inland and coastal flooding, resulting in unprecedented devastation to infrastructure and communities across the state. The damage to public infrastructure reached at least $90 million, with millions more in losses for private homes and businesses.

Between December 17 and 21, 2023, heavy rainfall combined with rapid snowmelt, partially frozen ground, and pre-saturated soils to produce catastrophic flooding across three of Maine's largest river systems and their tributaries, the Kennebec River, the Androscoggin River, and the Saco River. Over a dozen river gauges reached major or record flood levels following heavy rain and snowmelt, requiring two municipalities to perform emergency evacuations. Flooded rivers caused the closing of hundreds of roads, stranding entire communities and preventing emergency responders and power recovery crews from accessing hard-hit areas for days. Furthermore, widespread, prolonged, and damaging winds of 45-80 miles per hour resulted in extensive downed trees and power lines, leaving over 440,000 properties without power for several days. The storm claimed the lives of four people, including two whose vehicle was swept away by floodwaters. State officials estimate that damage exceeded $20 million across 10 of Maine's 16 counties. Some of the hardest-hit areas were rural communities with limited fiscal, staff, and community capacity for guiding recovery, as well as several counties that have been sites of prior declared disasters over the past year alone.

The next storm, on January 10, 2024, caused significant flooding and infrastructure damage along the Maine coast. Heavy wind, rain, and flooding destroyed homes, buildings, and roadways. Record-high storm tides damaged lighthouses and devastated docks, wharves, and piers serving Maine's iconic and vital working waterfronts. On January 13, just three days later, the state experienced a second coastal storm and new record-high storm tides that further damaged coastal homes, businesses, beaches, and waterfront infrastructure. Initial public infrastructure damage estimates from the

Federal Policy Changes

As the Commission reviewed the final draft of this plan in March and April 2025, the Federal Emergency Management Agency (FEMA) ended the Building Resilient Infrastructure and Communities (BRIC) grant program and other changes have been proposed to the structure of FEMA. All states, including Maine, rely on federal funding for disaster preparedness and hazard mitigation, and on a coordinated federal response during recovery and rebuilding after a disaster.

To ensure that lives and property continue to be protected, Maine must — with urgency — become more active, capable, and self-resourced in hazard mitigation, disaster recovery, and climate resilience in anticipation of more frequent disasters as well as further changes in federal disaster management policies. This will require much more robust state leadership and funding, as well as stronger partnerships and collaboration with local governments, philanthropy, and the nonprofit and private sectors.

FEMA

two storms were over $70 million, far surpassing those incurred from the December storm. With the start of fishing season just months away, waterfront businesses that serve the industry faced a daunting timeline to repair and rebuild. As in December, some of the most affected communities were smaller towns with fewer resources on hand to navigate one of the most complex recoveries in Maine's history.

In response, Governor Mills requested federal disaster declarations for all three storms through two major disaster declaration requests. With additional storms in March and May 2024, the state of Maine is now simultaneously grappling with the fallout from an unparalleled eight major disaster declarations and one emergency declaration over the past 21 months. This is a dramatic increase over recent decades when Maine had averaged just one disaster or emergency declaration per year.

These events demonstrate an urgent need to invest now in long-term resilience strategies that avoid the ballooning and preventable costs of repeated cycles of damage and rebuilding. With 3,500 miles of tidal coastline, Maine has the fourth-longest coast in the continental United States. The Maine coast is an economic engine for the state, attracting millions of visitors annually and supporting working waterfronts for the state's important fishing, lobstering, aquaculture, and shipbuilding industries and related marine businesses. Rising sea levels and a rapidly warming Gulf of Maine threaten coastal communities and the marine resources they depend on. Maine's central and western mountain areas have been hit repeatedly with intense storms that caused severe flooding along major rivers and minor streams alike, resulting in serious infrastructure and economic damage to natural-resource-based industries and important tourism sectors, such as outdoor recreation.

This culvert in Paris, Maine was constructed in 2023 to withstand extreme weather events, and was undamaged during the storms in 2024. Credit: Maine DOT

Relentless warming trends on land and at sea drive extreme storms, rising seas, flooding, and drought, all of which threaten our environment, heritage industries, infrastructure, and the future of our communities and economy. Maine's coastal and inland communities currently face numerous threats and challenges:

- **Accelerating sea-level rise:** The rate of sea level rise continues to accelerate in Maine. Since 2000, the rate of sea level rise is roughly 2.5 times faster than the long-term trend since 1912. In 2023, Maine's three long-term tide gauges (in Portland, Eastport, and Bar Harbor) measured record-high annual mean sea levels for six of the 12 months, an average of 6.1 inches above levels from the year 2000. Annual mean sea level in 2024 ranked second, behind 2023, measuring an average of 5.5 inches above 2000 levels, and new record water levels were set for five of the 12 months. Rising seas threaten Maine's coastal economies. The "Cost of Doing Nothing" analysis conducted in 2020 by the Maine Climate Council found that forecasted sea level rise by 2050 threatens more than 21,000 coastal jobs in tourism, fishing, and real estate, which is equivalent to 3 percent of Maine's workforce.

- **Inland flooding:** Inland flooding endangers people and affects transportation, water, and other community infrastructure. In the next 30 years, approximately 2,300 inland road culverts have a two-in-three chance of overtopping during flood events, according to an analysis from The Nature Conservancy in Maine. Failed culverts and roads severely impair the ability to move people and goods, deliver emergency services, and restore electricity and communications. In rural areas, lengthy detour distances due to road washouts can inflict financial and emotional burdens on individuals and communities. Impaired infrastructure that limits access to recreational sites for skiing, snowmobiling, boating, fishing, camping and other activities can harm Maine's vital tourism and outdoor recreation industries. Very often, businesses that cater to outdoor recreation are seasonal operations. These businesses have only a few months to earn a year's worth of revenue, making any downtime due to impaired infrastructure a substantial threat.

- **Emerging threats:** While flooding is one of the most damaging hazards in Maine, communities and infrastructure also face threats from high winds, heat, wildfire, drought, and saltwater intrusion. As a densely forested state, high winds and wildfires that knock down trees are particularly threatening to the electric grid, transportation networks, and buildings. Drinking water systems are increasingly at risk from drought and saltwater intrusion. While the frequency of drought has not increased in the historical record, precipitation variability from year to year has increased (2020 had the driest growing period on record, while 2023 had the wettest), straining wells and water systems across the state. Along the coast, increased demand for water during dry periods in summer months can cause saltwater to seep into aquifers, contaminating drinking water for islands and coastal communities. High heat may affect transportation and electric transmission infrastructure in the future, while near-term impacts may be health risks for the outdoor workers who build, maintain, and repair these and other systems.

Increased frequency and intensity of storm events: In recent decades, Maine has experienced an average of one disaster or emergency declaration annually.

However, since March 2022, Maine has seen eight disaster declarations and one emergency declaration:

DISASTER DECLARATION

When: October 30-31, 2022

Where: Knox, Waldo, and York Counties

What: Severe Storm Flood Event

DISASTER DECLARATION

When: December 23-24, 2022

Where: Franklin, Knox, Oxford, Somerset, Waldo, and York Counties

What: Severe Storm Flood Event

DISASTER DECLARATION

When: April 30-May 1, 2023

Where: Franklin, Kennebec, Knox, Lincoln, Oxford, Sagadahoc, Somerset, and Waldo Counties

What: Severe Storm Flood Event

DISASTER DECLARATION

When: June 26, 2023

Where: Oxford County

What: Severe Storm Flood Event

DISASTER DECLARATION

When: June 29, 2023

Where: Franklin County

What: Severe Storm Flood Event

EMERGENCY DECLARATION

When: September 15-17, 2023

Where: Across the State

What: In Advance of Hurricane Lee's Landfall

DISASTER DECLARATION

When: December 17-21, 2023

Where: Androscoggin, Franklin, Hancock, Kennebec, Oxford, Penobscot, Piscataquis, Somerset, Waldo, and Washington Counties

What: Severe Storm Flood Event

DISASTER DECLARATION

When: January 9-13, 2024

Where: Cumberland, Hancock, Knox, Lincoln, Sagadahoc, Waldo, Washington, and York Counties

What: Severe Storm Flood Event

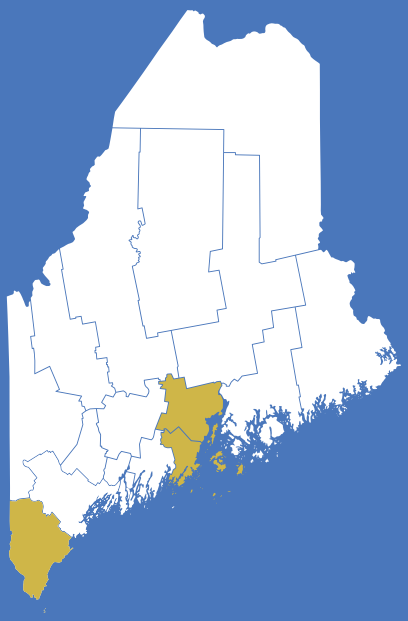
DISASTER DECLARATION

When: April 3-5, 2024

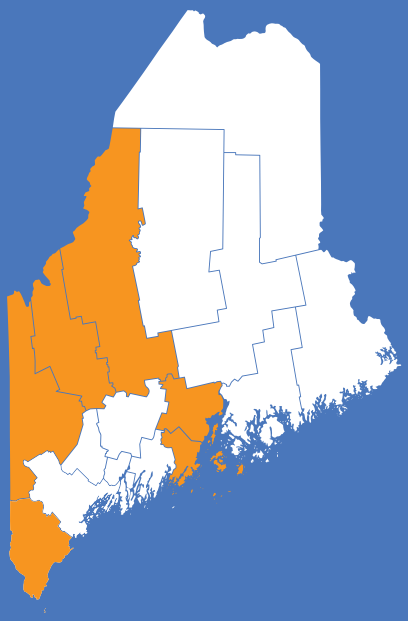
Where: Cumberland and York Counties

What: Severe Winter Storm

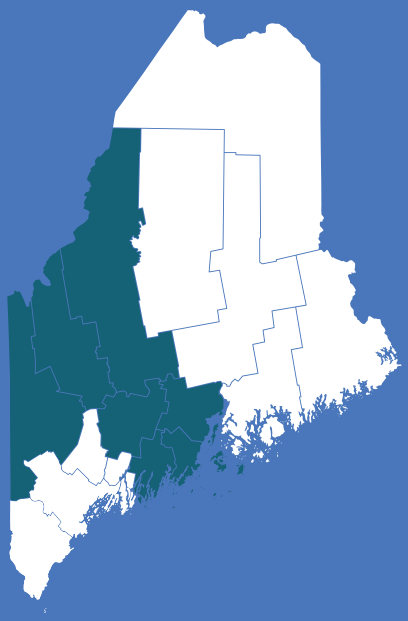
October 30-31, 2022



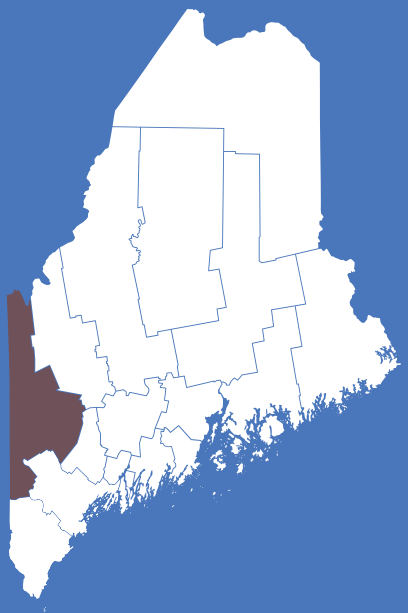
December 23-24, 2022



April 30-May 1, 2023



June 26, 2023



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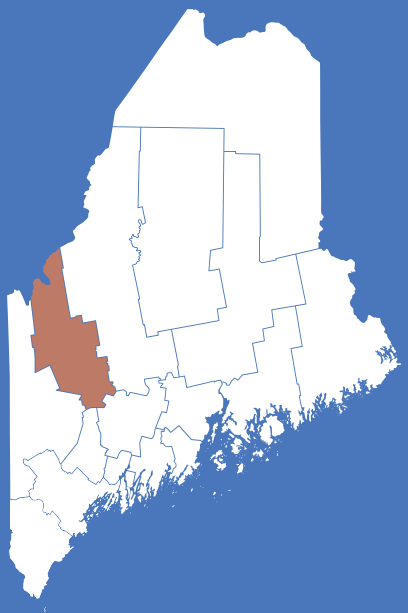
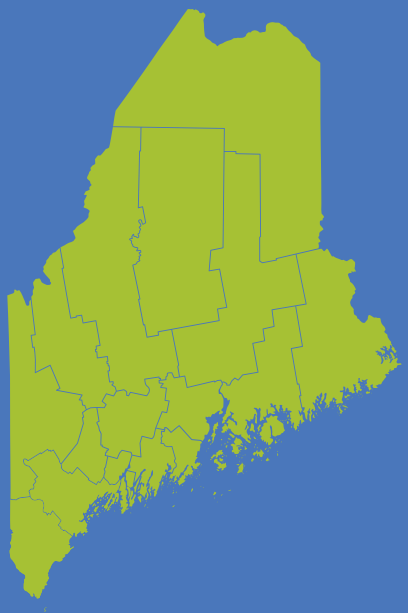
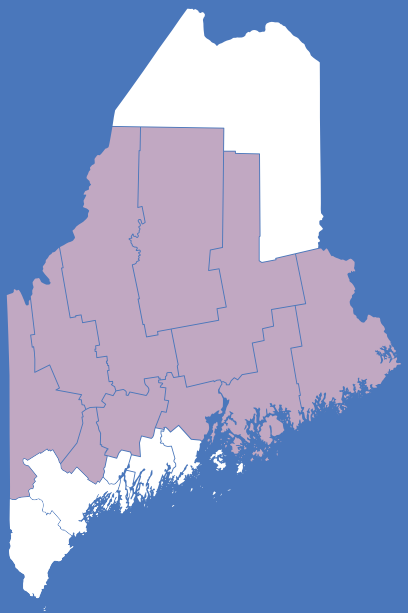


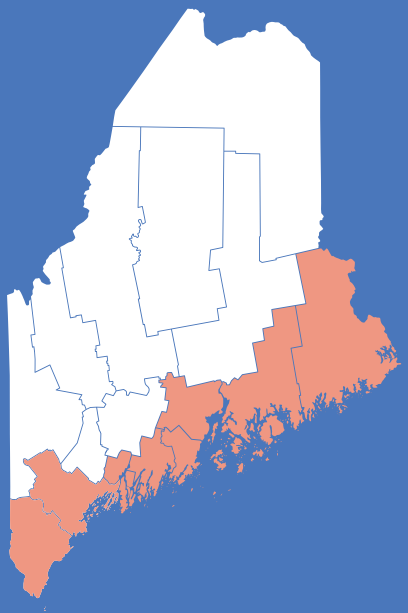
September 15-17, 2023



December 17-21, 2023



January 9-13, 2024



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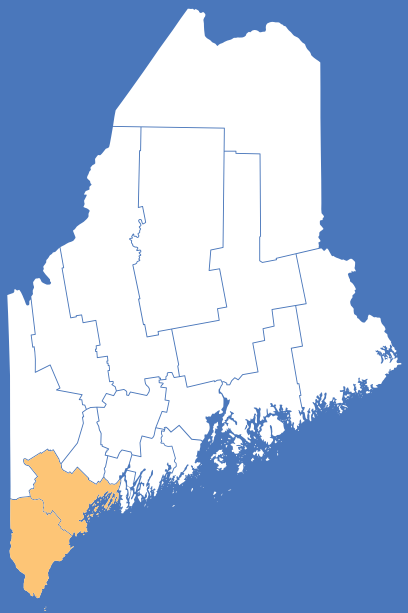


THE IMPERATIVE FOR ACTION

In the weeks and months following the December 2023 and January 2024 storms, Maine people, business owners, community leaders, and state agencies worked diligently to repair and rebuild. Questions and uncertainty swirled as owners looked upon damaged homes, storefronts, wharves, and roadways. How quickly could it be rebuilt? Should it be rebuilt here? How would it be paid for?

For many, urgency and cost were understandably the primary concerns. With the depth of winter still ahead, many needed a reliable shelter for their families. Others anxiously looked ahead to the next tourism or fishing season. In the western hills, that meant reopening as rapidly as possible for ski season and outdoor recreation. On the coast, with the start of fishing season just a few months away, mobilizing to rebuild wharves, piers, and other working waterfront infrastructure took on an urgent resolve. In beach towns, sand dunes that defend homes and infrastructure from the sea lost much of their size and may take years to regenerate naturally. Even after nearly a year and half, restoring both human-made and natural protections remains front of mind for many.

As the Commission toured the state, members heard stories from town officials, emergency managers, first responders, and business owners about the speed and scale of damage and the challenges of recovery and rebuilding. Officials from nearly every town expressed shock at the number of severe rain or storm events in recent years and the challenges of navigating the rebuilding process.

- In Stonington, as the second storm in three days barreled towards the town, community members hurried to secure damaged wharves and bait sheds with chains and, in one case, parked a forklift on a damaged pier to prevent it from being carried away on the next storm tide.

- In Old Orchard Beach, the sand dunes and beaches that are the lifeblood of the summer tourism season are also the first layer of defense against winter's coastal storms. The dunes were severely eroded by the January storms, leaving town and county officials worried about how to protect the community from battering waves in the coming winter.

- The towns of Rumford and Mexico are accustomed to annual spring floods when snowmelt swells the rivers, but leaders shared their sense that the December flood was completely unprecedented. The Androscoggin River and its tributaries rose faster than ever before, leaving officials and residents with little time to prepare or evacuate. In Mexico, the Swift River reached the highest flow rate ever recorded, claiming the lives of two residents. County emergency managers shared stories of deep fatigue from repeated disaster recoveries.

- In Jay, a severe summer rainstorm in June 2023 washed out roads and culverts in many locations. Repairs to the roads and culverts are complete. However, navigating complex FEMA reimbursement systems consumed as much as 10 hours per week of the town staff's time.

- In Rockland, waterfront infrastructure sustained damage during the January storms. The city's multi-use piers and related facilities serve commercial and recreational vessels, house various marine businesses, and enable transportation and emergency services for island communities.

- In Machias, the town offices were flooded and severely damaged, as were businesses along Route 1. The dike that carries Route 1 and the Downeast Sunrise Trail is critical to regional connectivity and popular for walking and recreational fishing. It was overtopped by floodwaters and town leaders feared the dike might have been breached, until the waters receded and revealed it to be damaged but intact.

- In Aroostook County, which did not experience severe conditions in December or January but has weathered previous severe storm events and floods, officials voiced their concern about the lack of updated flood maps, as ice jams and flooding become more frequent and less predictable. The county's remoteness means that communities must plan for extended periods without electricity, fuel, and other resources.

- In Hallowell, the Kennebec River rose and inundated the downtown during the December 2023 storm. Floodwater filled the basements of downtown businesses to the ceiling and in some cases lifted buildings off foundations. Business owners rushed to salvage the food, appliances, and merchandise aided by the massive efforts of volunteers, employees, city workers, and first responders.

Infrastructure is the backbone of our state and communities. It makes public safety and public health possible, and it underpins economies and the activities of Maine people, households, and businesses. For many people affected by the storms, the repeated episodes between 2022 and 2024 left little doubt that Maine has entered a new era of storm intensity and vulnerability.

Questions about how to rebuild infrastructure have become commonplace. How much higher should roads or wharves be to avoid the next flood? How much stronger to withstand the next onslaught? In far too many instances, decades-old flood maps and outdated building codes did not offer sufficient answers for the magnitude of the challenge. When confronted with the need to rebuild quickly, communities, engineers, contractors, and property owners frequently lacked designs and approaches that could be trusted to withstand the next big storm.

Last century's thinking will not solve this century's problems. Maine needs new approaches to inform how and where communities rebuild. State policy, plans, and funding programs must align near-term needs with long-term resilience goals. These new solutions must be available immediately in the aftermath of a disaster so that when urgency and emotion are high, the path to recovery is clear and actionable.

The following are the most important messages the Commission heard and the lessons that inform this plan:

- **The situation is urgent.** Maine cannot assume that the recurring storms of the past three years are an anomaly. Individuals, communities, and the state must prepare for storms and disasters that are becoming more intense, more damaging, and more disruptive to lives and economies in our state.

- **Maine must become more active, capable, and self-resourced** in hazard mitigation, disaster recovery, and climate resilience in anticipation of more frequent disasters as well as changes in federal disaster management policies. With the federal government sunsetting hazard mitigation programs like the Building Resilient Infrastructure and Communities (BRIC) program and publicly proposing significant changes to the Federal Emergency Management Agency (FEMA), Maine must anticipate scenarios in which states bear greater responsibilities and costs for hazard mitigation, emergency preparedness, and disaster recovery. Such a shift would have significant implications for the state's budget and fiscal health.

- **The financial scale of Maine's infrastructure resilience challenge is extensive,** with billions needed in infrastructure investments over the next 25 years. For example, Maine's transportation infrastructure will require several hundred million dollars in flood resiliency improvements over the next decade. Proactive investments in resiliency are far more cost effective than the economic impacts and rebuilding costs from disasters.

  Over the past four years, more than $110 million in state funds and $4.4 billion in federal funds has been spent on proactive infrastructure resilience and reactive disaster recovery. If federal policy is headed toward a future in which states are increasingly responsible for disaster recovery, then proactive risk reduction led by the state and communities is imperative to Maine's self-preservation.

  The state's investments over the past four years include $39 million in 2025 for LD 1's disaster recovery and proactive resiliency initiatives, $65 million in 2024 for storm recovery and community resilience, approximately $7 million in 2023 for the Community Resilience Partnership and Maine Infrastructure Adaptation Fund. Much of this was one-time funding and more than half of these state funds total went to disaster recovery needs rather than proactive resilience projects.

  Maine has received significant federal investment over the past several years for resilient infrastructure. The Maine Jobs and Recovery Plan (MJRP) distributed $78 million across 2021 and 2022 for clean water and climate adaptation projects. Programs funded through the Bipartisan Infrastructure Law (BIL) and Inflation Reduction Act (IRA) have invested over $4.4 billion in Maine since 2021, including over $2 billion for improvements and upgrades to Maine's transportation system; nearly $800 million to modernize and strengthen the energy grid; and over $600 million for resilience projects that address clean water and wastewater systems, rehabilitate aging infrastructure, and conserve Maine lands and waters.

  As federal programs come to an end, state and local governments must find ways to continue investments in infrastructure. A sustained funding plan should put more emphasis on proactive risk mitigation, reducing the need for reactive disaster recovery funding over time.

- **The cost of inaction far exceeds proactive investment.** Extreme weather events are costing the U.S. close to $150 billion each year, according to the Fifth National Climate Assessment. The total cost of storms in Maine over the past three years likely exceeds $100 million. We must pay, now or later, for improvements to our infrastructure, homes, and businesses. The choice Maine faces is whether to make proactive investments to safeguard infrastructure and communities against the fury of storms and floods we know will come, or to wait for those storms to hit and pay for the fallout — preventable loss of life, avoidable community devastation, and unnecessary economic disruption.

  The 2020 "Cost of Doing Nothing" report identified six municipal wastewater treatment plants that are vulnerable to inundation by sea level rise in as little as 25 years. The replacement cost for these facilities could be $30 million to $90 million if they are not adequately prepared for the impact of rising seas.

Every $1 Invested in Resilience Saves $13

Decades of studies by the National Institute of Building Sciences, and more recently by the U.S. Chamber of Commerce, have shown that investments in proactive measures yield savings many times greater by preventing and avoiding casualties, damage, and economic disruption.

- US Chamber of Commerce (2024 study):
  The Preparedness Payoff: The Economic Benefits of Investing in Climate Resilience

> "The study revealed that each $1 of investment in resilience and disaster preparedness reduces a community's economic costs after an event by $7...in addition to the $6 of savings for damage already assumed in our model. Combining the two ratios finds that every $1 invested in resilience and disaster preparedness saves $13 in economic impact, damage, and cleanup costs after the event."

National Institute of Building Sciences (2019 report):
Mitigation Saves: Mitigation Saves up to $13 per $1 Invested across flooding, hurricane surge, wind, and fire.

- Adopting the latest building code requirements saves $11 per $1 invested.
- Above-code design and private sector building retrofits each save $4 per $1 cost.
- Telecommunications, roads, power, water infrastructure retrofits save $4 per $1 cost.
- Federal grants save $6 per $1 cost.

	ADOPT CODE	ABOVE CODE	BUILDING RETROFIT	LIFELINE RETROFIT	FEDERAL GRANTS
Overall Benefit-Cost Ratio	11:1	4:1	4:1	4:1	6:1
Cost ($Billion)	$1/yr	$4/yr	$520	$0.6	$27
Benefit ($Billion)	$13/yr	$16/yr	$2200	$2.5	$160
Riverine Flood	6:1	5:1	6:1	8:1	7:1
Hurricane Surge	N/A	7:1	N/A	N/A	N/A
Wind	10:1	5:1	6:1	7:1	5:1
Earthquake	12:1	4:1	13:1	3:1	3:1
Wildland-Urban Interface Fire	N/A	4:1	2:1	N/A	3:1

- **Maine needs to change how and where we build.** Most of Maine's infrastructure was built for the last century. The climate and our population are different today and will be different decades from now. The damage that communities suffered over the past three years is largely the result of two factors: a warming climate that is changing the frequency and severity of storms; and the growth of Maine's towns and cities over centuries in places that today have higher risks of flooding, storm surge, and other natural hazards. Maine must simultaneously act to curb the causes of climate change, adapt to increased risk, and anticipate future risk when making decisions about where and how to build. The state and communities must prepare for difficult conversations about getting out of harm's way and relocating critical infrastructure to safer areas.

- **The state will have to be strategic and efficient with resources.** Funding and human capacity, both state and local, are insufficient to individually assist each of Maine's nearly 500 cities, towns, plantations, and tribal communities. Ensuring that every community in Maine is prepared for future storms and disasters will require:

  - Regional collaboration supported by regional capacity that makes efficient use of limited resources and encourages cooperative problem solving. Storms and floods do not care about municipal boundaries. Maine is a home rule state where decisions with long-term effects are often made at the municipal level. Maine will need to lean into and leverage its experience addressing regionally significant issues like infrastructure, transportation, and housing to become more resilient.

  - A strategy for long-term resilience funding that 1) acknowledges the need for Maine to commit significant resources over the coming decades to protect and prepare communities and infrastructure for natural disasters; 2) recognizes that the state's public resources will be insufficient and must be deployed efficiently; and 3) develops new sources of funding, finance, and insurance from within and beyond the state budget.

On May 21, 2024, Governor Janet Mills signed an Executive Order on the wharf in Stonington to establish the Infrastructure Rebuilding and Resilience Commission in the wake of historic storm damage across the state.

MAINE'S MOMENTUM IS GROWING

On May 21, 2024, Governor Mills created the Infrastructure Rebuilding and Resilience Commission by Executive Order. The Commission was charged with reviewing and evaluating Maine's response to the December 2023 and January 2024 storms, identifying crucial areas for near-term investment and policy needs, and developing the state's first long-term infrastructure plan to ensure that Maine is ready for the harsh storms ahead. The Commission complements and reinforces the work of the Maine Climate Council, which has defined "resilience" in the state's climate action plan, *Maine Won't Wait*, as the "ability of a community, business, or natural environment to prepare for, endure, react to, and move forward from the impacts of climate change."

Maine's response to and recovery from these disasters hinges on resources from individuals, businesses, philanthropy, and a host of local, state, and federal sources. In April 2024, Governor Mills and the Legislature allocated $60 million to rebuilding public infrastructure, repairing critical working waterfront piers and wharves, and assisting small businesses struggling with recovery costs. Awards were distributed across three programs targeting different impacted entities:

1. Through the Maine Infrastructure Adaptation Fund, Maine Department of Transportation (Maine DOT) awarded over $25 million to 43 municipalities to mitigate the impact of intense storms, flooding, and rising sea levels. Grants supported 22 culvert replacement projects; 13 road, bridge, and stormwater projects; and 4 water and wastewater projects.

2. Maine DOT and the Department of Marine Resources awarded nearly $23 million in grants to reconstruct and improve damaged wharves and piers, rebuild and restore key marine support buildings, and repair and upgrade fuel and electrical systems at nearly 70 working waterfront businesses.

3. The Department of Economic and Community Development awarded $10 million in grants in the first round of the Business Recovery and Resilience Fund program. Nearly 150 businesses and nonprofits received grants to help with design, permitting, and construction costs for projects that address the impacts of the previous winter's storm.

Historic Investment in Climate Resilience

In October 2024, Maine kicked off a major $69 million climate resilience grant, funded through the National Oceanic and Atmospheric Administration's (NOAA) Climate Resilience Regional Challenge. Funds are being used to protect Maine's communities, environment, and working waterfronts from extreme storms, flooding, and rising sea levels. Over the next five years, Maine will implement three integrated climate resilience-building strategies that advance the recommendations outlined in *Maine Won't Wait*, Maine's Climate Action Plan, and collectively build the capacity of underserved, rural, and tribal communities. Strategies include: build enduring community resiliency, reduce climate impacts through nature-based solutions and investments in green infrastructure, and strengthen the resilience of working waterfronts. Examples of activities under each strategy are outlined here:

- Building Enduring Community Resiliency: expanding support to communities through the Community Resilience Partnership, establishing a statewide Resilience Collaborative to provide towns and Tribes with services to plan, design, and implement resilience and risk-reduction projects, supporting investments in critical infrastructure projects through the Maine Infrastructures Adaptation Fund, engineering and design support for local and regional green infrastructure projects, and establishing a State Resilience Office.
- Reduce Climate Impacts Through Nature-based Solutions and Investments in Green Infrastructure: development of climate risk and assessment tools and decision support resources for Maine's inland and coastal communities, placement of Maine Shore Corps Stewards around the state to support green infrastructure opportunities, demonstration projects to model nature-based solution implementation and regional collaboration across state agencies, a cross-agency permitting forum to advance climate-related changes to Maine's permitting process, implementation of a new Climate Resiliency Conservation Fund for land acquisition, personnel across state agencies and project partners to provide capacity expertise, and technical assistance to Maine communities.
- Strengthen the Resilience of Working Waterfronts: development of a statewide working waterfront strategy, dedicating funds for working waterfront resilience project, and implementation of the Seafood Economic Accelerator of Maine Roadmap.

In July, Governor Mills toured Fisherman's Wharf in Portland before a press conference with NOAA to announce the recipients of $575 million in highly competitive Climate Resilience Grant Challenge awards to strengthen and protect communities and working waterfronts.

Additionally, the Governor and Legislature allocated $5 million to the Community Resilience Partnership for grants to communities for vulnerability assessments and proactive risk reduction and community preparedness projects. The program provides grants and technical assistance to municipalities, tribal governments, and unorganized territories in Maine for projects that increase resilience to extreme weather, improve energy efficiency, and transition to clean energy. More than 260 communities in Maine are actively participating in the program, which has awarded over $16 million in grants to 276 municipal and tribal community resilience projects since it was established in 2021.

Federal disaster relief and recovery resources augmented the state's rebuilding funds. In 2024, impacted families and households in Maine received $11.4 million in relief funds through FEMA's Individual Assistance program for the December and January storms. An additional $21.2 million has been reimbursed to municipal governments and the state through FEMA's Public Assistance program for the disasters that occurred since October 2021.

Last year, Maine competed successfully for a $69 million grant from the National Oceanic and Atmospheric Administration (NOAA) to improve the resilience of communities, the environment, and working waterfronts to extreme storms, flooding, and rising sea levels. This funding enables an ambitious and wide-reaching scope of work that accelerates existing programs like the Community Resilience Partnership and Maine Infrastructure Adaptation Fund, while developing new data, tools, regulatory options, and partnerships that will drive resilience outcomes for years to come.

Much of the activity funded by the NOAA grant will be coordinated by the newly created Maine Office of Community Affairs (MOCA). This standalone agency in the executive branch will foster better communication and partnerships between the state and communities. MOCA will serve as a one-stop shop within state government to provide coordinated and efficient planning, technical assistance, and financial support

to towns, cities, tribal governments and regional entities to help them better plan for common challenges, pursue solutions, and create stronger, more resilient communities. MOCA will support community and regional work on issues related to land use and development; housing and building codes; and community resilience and floodplain management. A new State Resilience Office within MOCA will coordinate the implementation of the NOAA grant's activities, new initiatives stemming from the LD 1 legislation described below, and the implementation of this plan.

The Commission's interim report published in November 2024 suggested strategies to reduce the risk of extreme storms and floods and actions to improve Maine's ability to respond and recover when the next disasters hit. Implementation has begun on several interim recommendations through legislation and agency action. Other interim recommendations are carried forward in this plan as actions for the state and its partners.

In January, the Governor and bipartisan leaders of the Legislature took an important first step to implement the Commission's interim recommendations. LD 1 "An Act to Increase Storm Preparedness for Maine's Communities, Homes and Infrastructure" creates the new State Resilience Office within MOCA and invests $39 million in resilience measures, including:

- $15 million to launch a Home Resiliency Grant Program for homeowners to strengthen roofs or

floodproof basements in their primary residence to protect against severe weather damage and reduce insurance losses.

- $10 million for the Disaster Recovery Fund at the Maine Emergency Management Agency (MEMA) to provide the state's required share of the non-federal match for federal disaster recovery funds.

- $9 million to launch the Flood Ready Maine initiative at the State Resilience Office, improving flood models, updating flood maps, and building regional capacity for floodplain management.

- $800,000 to update emergency communications technology and early warning systems at MEMA.

- $750,000 to establish the Safeguarding Tomorrow Revolving Loan Fund at MEMA, which will leverage additional federal funds to create a self-sustaining source of capital for infrastructure rebuilding and strengthening projects.

Maine has generated significant momentum through these and other state government efforts as well as across hundreds of communities, organizations, and businesses. This is just the start of the work that must be expanded and accelerated for Maine to meet the challenges ahead.

LD 1: Preparing Maine's Communities, Homes and Infrastructure for Storms

"An Act to Increase Storm Preparedness for Maine's Communities, Homes and Infrastructure" was introduced to the 132nd legislature as Legislative Document 1 (LD 1). Key components of the Act include establishing a Home Resilience Program through the Bureau of Insurance, improving emergency communications and disaster recovery funds, and establishing a State Resilience Office and Flood-Ready Maine initiative. All of LD 1 was funded by existing Other Special Revenues and federal funds, with no General Funds required.

- Home Resilience Program, $15 million: Grant program for homeowners to strengthen primary residences against severe weather damage and reduce insurance losses (e.g., roof strengthening, basement floodproofing).

- Maine Emergency Management Agency, $12 million: One-time funding for Disaster Recovery Fund as match for FEMA recovery funds, establishing a Safeguarding Tomorrow Revolving Loan Fund and a limited-period contract/grants specialist, and updating communications technology and early warning systems and a limited period communications system manager.

- State Resilience Office and Flood-Ready Maine Initiative, $9.6 million: Establish the State Resilience Office at MOCA and federally funded positions, Flood-Ready Maine initiative to improve flood models and maps and develop an online data hub and geospatial data manager, Regional Certified Floodplain Manager initiative to increase NFIP participation and program coordinator.

Parts of Route 133 in Jay, Maine sustained heavy damage from runoff during an historic summer rainfall in June 2023 that required months of repairs. Credit: Maine DOT

2025 INFRASTRUCTURE RESILIENCE PLAN

The Commission developed the strategies and actions that follow by traveling to and learning from impacted communities around the state, hearing from experts in Maine and other states, and drawing upon the knowledge and experience of its members. The plan begins to consider the breadth of resources and capabilities needed over the next decade to lead Maine toward a more resilient future.

With the frequency and intensity of storms seemingly increasing every year, Maine must accelerate action, making both immediate preparations for the next storm and investing in capabilities and systems that build transformative, long-term resilience. The Commission's plan proposes a comprehensive set of reinforcing actions, capabilities, investments, and policies that build upon Maine's current momentum.

Overview & Scope

The Infrastructure Resilience Plan is organized into three pillars:

1. **Strengthen Infrastructure and Reduce Disaster Risk** includes activities for identifying and reducing risk to infrastructure and assisting communities in Maine to understand and manage their risks.

2. **Improve Disaster Preparedness, Response, and Rebuilding** contains activities to improve the readiness of Maine's communities, infrastructure, and emergency systems for future disasters.

3. **Sustain Maine's Momentum through Strategic Investments** outlines investments to sustain and grow the capabilities and resources Maine will need to stay resilient in the decades to come.

This plan considers both public infrastructure and essential private infrastructure located in Maine. Public infrastructure in this plan refers to facilities, assets, and systems that are owned, operated, and maintained by public entities such as the state, tribal, county, and municipal governments to provide access, protection, or other services to people in the state of Maine. Examples include roads and bridges; drinking water, wastewater, and stormwater treatment facilities; and civic infrastructure such as town offices, fire and police facilities, and schools. Many other essential services are provided by private infrastructure, such as the electric grid, communications and broadband infrastructure, health care facilities, and vital economic infrastructure such as working waterfronts. The plan also includes a handful of actions that can help strengthen or protect non-infrastructure private property through incentives, higher standards, and education.

Tracking & Accountability

Each of the three pillars contains several strategies, which in turn contain a table of actions for implementation. Each action is assigned to a lead agency or organization as well as potential partners who can contribute to implementation. With over 50 actions and more than a dozen implementation leaders and partners, the plan requires 1) an entity that will track activity and report the plan's progress, and 2) an entity that receives those reports, provides accountability for the plan's outcomes, and assists in connecting to important constituencies for the purposes of communicating the plan's progress and providing feedback to the lead agencies and organizations.

The Commission makes the following two recommendations:

- First, that the State Resilience Office be assigned to regularly collect information from each of the lead implementing agencies and organizations about the implementation status of each strategy and action, including efforts to secure new resources for actions that do not have existing resources.

- Second, that the Governor establishes a body whose purpose is to monitor implementation of the plan's strategies and actions. The body should be smaller in number than the Commission and be of a similar composition of representatives from state agencies, municipal governments, regional organizations, the private sector, the nonprofit sector, and the philanthropic community. The body should meet at least twice a year to receive reports from the State Resilience Office on the status of implementation and discuss communications with and from key constituencies.

Timeframes & Sequencing

Each of the plan's strategies includes tables containing specific actions for implementation. A timeframe for each action suggests the ideal period in which the activity should be carried out.

Generally, actions identified for "0-2 years" either have existing funding and staffing resources or can be initiated within existing funding and authorities. These early actions may be foundational to actions that come later, unlocking potential interdependencies and making possible more ambitious plans and strategies in the future.

Actions identified for "3-5 years" are likely to require new resources, new budget allocations, or new legislative authority. The lead entities and partners for these actions should begin now to consider how to develop the resources and capabilities needed to execute these intermediate actions.

The longer-term actions identified for "6-10 years" are not low-priority items. In fact, many of these actions would significantly accelerate Maine's ability to increase resilience to extreme weather, floods, and other changing natural hazards. However, these are actions that may require additional conceptual development, planning, and investment or have outcomes that can be expected accrue on longer timelines. There is little reason for these actions to be delayed should favorable circumstances arise earlier than planned.

Measuring Progress

Tracking the progress of the infrastructure plan informs decision makers and the public, and helps evaluate whether evidence-based adjustments, enhancements, or replacements to policies and investments are necessary to meet resilience objectives. The following intended outcomes and key performance measures are established by the Commission to track the overall progress of the plan.

INDICATORS OF PROGRESS

Increased Financial Resources

Amount of state, federal, and philanthropic funds allocated annually to improving the resilience of state-managed infrastructure (roads, bridges, facilities, state parks, etc.).

Amount of state, federal, and philanthropic funds allocated annually to the Maine Infrastructure Adaptation Fund, Community Resilience Partnership, and other community assistance for resilient infrastructure.

Increased Participation in the CRP & Awareness of Natural Hazards

Percent of municipal and tribal governments actively enrolled or working with a service provider to enroll in the Community Resilience Partnership.

2035 TARGET 80% of municipal and tribal governments (currently 53%)

Percent of municipal and tribal governments that complete vulnerability assessments with funding and technical assistance from the Community Resilience Partnership or other sources.

2035 TARGET 50% of municipal and tribal governments (currently 20%)

Increased Flood Risk Information

Percent of organized and unorganized communities with flood hazards areas that have digitized flood maps.

2035 Target

100% of communities (currently 66%)

Legislation & Funding

As the sections that follow will describe, there is near-term work in the plan that is already under way or has resources allocated for the stated purpose. The plan indicates the status of these actions and identifies existing or anticipated resources that support them.

Many of the actions in the plan will require new resources. The state and communities will need to consider their needs comprehensively and assess the available sources of funding. Federal and state grants will be important sources but ultimately insufficient. State and local governments will need to consider other ways of generating new resources, whether through increasing revenues, borrowing, or relying on insurance — with sound approaches potentially applying a mix of all three.

Communication & Education

This plan is an opportunity to engage people, communities, and businesses in the urgency and the processes of building resilience. The state will work with stakeholders, including members of the implementation monitoring body, to identify and reach key audiences and constituencies. Key audiences that can eventually become partners for communication might include the regional councils; municipal, county, and tribal governments; service provider organizations; businesses; nonprofits, and the philanthropic community.

The state will work with stakeholders to identify existing venues for engagement where key audiences already gather, such as town council meetings, conferences, government and industry association meetings, webinars, and others. The state will develop engagement materials such as slide decks and talking points. Importantly, the state and stakeholders will also work together to gather and communicate the stories of people, communities, and businesses who are impacted by severe weather and other impacts of climate change as well as those who experience the benefits of the plan's strategies.

I. Strengthen Infrastructure and Reduce Disaster Risk

1. Identify, prioritize, and strengthen vulnerable infrastructure.

A whole-of-government approach is needed to make Maine's infrastructure more resilient. Governments at the local, regional, and state levels need to understand what infrastructure is most vulnerable, prioritize needs, allocate scarce resources, and take action to mitigate urgent risks. To help prioritize investments within categories of vulnerable infrastructure, the Commission suggests that state agencies and communities consider the following criteria: 1) protection of life safety, 2) preservation of public health, and 3) prevention of economic damages.

Components of this work are underway. State agencies are currently conducting vulnerability assessments of state-owned and leased assets that will be completed in early 2026. The assessment is detailing the exposure of buildings and facilities to changing natural hazards, determining the state's risk-tolerance for certain asset types, and developing interventions to mitigate risks to the assets, operations, and agency missions. These assessments build on and complement other ongoing risk analyses and planning efforts, including MEMA's state hazard mitigation plan and dam safety program, long-term capital project planning by Maine DOT and other agencies, and the Public Utilities Commission requirement for climate protection planning by the major electric utilities.

Nearly 100 communities have completed or are currently conducting vulnerability assessments with grants from the Community Resilience Partnership, Coastal Communities Grant Program, Shore and Harbor Planning Grant Program, and assistance from service provider organizations. Uncovering vulnerabilities deeper within systems and understanding the risk of multiple "cascading" or "compounding" failures may require more effort and sophisticated methods than most communities can muster alone, so assistance is necessary. Last year the Partnership added new technical assistance grants specifically for vulnerability assessments. To date, 31 communities have partnered with regional councils and other service provider organizations through this opportunity.

Damaged working waterfront structures in New Harbor show the force of storm surge on waterfront infrastructure. Credit: Island Institute

Critical Infrastructure: Protecting People through the Built Environment

Billions of dollars are needed for long-term infrastructure improvements for any given sector. The Commission was tasked with examining the challenge Maine faces in long-term planning, and opportunities to avoid catastrophic costs and impacts through creative solutions. "Critical infrastructure" is distinguished from all infrastructure by the impact that disruption would have on public safety, security, health, and the economy. Bridges, roads, wastewater treatment plants, drinking water, communications, and working waterfronts fit within this category to varying degrees. The degree of criticality for a given structure depends on factors like its condition, age, and the services it provides. In the context of climate resilience and extreme events, the vulnerability of critical infrastructure is dependent upon its level of exposure to hazards (such as flooding or high winds) and its ability to withstand and recover from impacts. Regular maintenance and repairs are one piece of ensuring safety, and strategic resilience investments are essential for long-term durability and adaptability.

Wastewater Treatment Plants

There are 150 publicly owned wastewater treatment facilities in Maine. Wastewater infrastructure and facilities are often located in places that are low lying to take advantage of gravity fed collection systems and nearby surface waters for discharge, making them susceptible flooding. These facilities contain piping, mechanical systems, and electronic equipment, which can be damaged when submerged by floodwaters. According to the most recent Environmental Protection Agency Clean Watersheds Needs Survey, Maine will need to spend more than $2 billion to meet wastewater improvement and resilience needs. The Maine Department of Environmental Protection (DEP) has conducted flood and hazard risk assessments for many of the facilities and support mitigation efforts through a revolving loan fund and loan forgiveness with climate resilience planning. Resilient solutions may include relocation, elevation, and hard armoring of facilities, all of which are in addition to existing maintenance needs.

Drinking Water

Drinking water infrastructure in Maine includes both public water systems and private wells. Both the quality and quantity of drinking water needs to be ensured for all Maine people. In collaboration with MEMA, the Maine Center for Disease Control & Prevention (CDC) has surveyed all public water systems to assess risk, including an analysis of flooding hazards at all source wells. The survey highlighted the vulnerability of public water sources to climate impacts, such as drought, saltwater intrusion, flooding of public wellheads, power outages, and pollutant runoff. To address these risks, the Maine CDC is prioritizing redundant sources and systems, backup power, vulnerability assessments, and emergency plans for local drinking water systems.

Communications

Reliable communication system infrastructure is critical for emergency management, ensuring timely dissemination of warnings, coordination of response efforts, and public safety during disasters. Reliable internet and phone services allow emergency responders and public officials to share updates about extended outages, road closures, and other infrastructure changes such as drinking water advisories. Effective communication was one of the biggest issues raised by communities in listening sessions across the state. The ability of Maine people to communicate with one another is vital to relaying information between family, friends, and neighbors. In communities that may already have limited access to broadband or cell service, such as rural or remote areas, or populations that may have additional communication barriers such as older Mainers or the non-English reading public, wide-reaching and accessible communication is particularly important. As climate-related threats intensify, resilient and redundant communication networks help states maintain connectivity, support first responders, and facilitate rapid recovery efforts.

Roadways, Culverts, and Bridges

Reducing vulnerabilities across transportation infrastructure is essential for safety, effectiveness, and cost. Between 2014 and 2024, Maine DOT received approximately $1.5 million annually in emergency relief dollars from the Federal Emergency Management Agency (FEMA) to repair storm damage. As one of its efforts to prepare for future storms, Maine DOT has started preliminary engineering on seven climate-related projects located in coastal environments that currently experience flooding. Construction cost estimates have been completed on 5 of the 7 projects, with estimates ranging from $3 million to $45 million dollars per project. As a large, rural state, Maine's roadways and bridges are critical to the restoration of power and are a lifeline to accessing needs such as food and medical care. Culverts are essential elements of flood prevention and the protection of roadways for both coastal and inland environments. A large number of state and local culverts are undersized and at risk of overtopping or washing out during storm events, causing a road to be closed until repairs are possible. Maine DOT has identified 8 miles of state-managed roads that are projected to experience flooding in the 1.5-foot sea level rise scenario and may identify more roadways at risk when new data is available.

Working Waterfronts

Of Maine's 3,500 miles of coastline, less than 20 miles is considered working waterfront. Maine's working waterfronts are vital to the state, both economically and culturally, and access to the ocean is crucial to Maine's identity and to the commercial fishing and aquaculture industries. Infrastructure such as docks, wharves, and piers were devasted during the severe storms of January 2024, highlighting the need to strengthen and protect public and private working waterfront access. The majority of working waterfronts are privately owned, and there are ongoing conversations among stakeholder groups about strategies and partnerships to protect working waterfront properties and shoring up aging and vulnerable infrastructure.

Electric Grid

Recent extreme weather and disasters have demonstrated the need for increased resilience and reliability of the electric grid in Maine. Reliability data and reporting, grid planning, and grid innovation and modernization are three approaches to understanding and addressing vulnerabilities of the energy grid. In 2022, the Legislature required Maine's two investor-owned utilities to file integrated grid plans and all electric utilities to file climate change protection plans that ensure utility infrastructure is prepared for future storm events and ready to transmit and distribute electricity to its customers. In 2024, Governor Mills announced $6.6 million in federal grant awards to six Maine utilities and technology providers to deploy electrical grid resilience projects in communities across the state.

Critical infrastructure: Physical systems, facilities, and assets (such as buildings, roads, and wastewater treatment) vital for the functioning of society, whose disruption would impact public safety, security, and health. Critical infrastructure is also determined by economic stability and the livelihoods impacted by the destruction of a structure, such as wharves and piers in Working Waterfronts.

A work crew wraps up installation of the new underground stormwater retention system in Damariscotta last September. Credit: Town of Damariscotta

As the state and communities identify resilience needs and projects, Maine will need a robust workforce of planners, engineers, and construction workers to carry out these projects. The private sector depends on a reliable stream of projects to justify investments in new equipment and additional personnel. With funds from the state's NOAA grant, the Community Resilience Partnership will make engineering services available at no cost to communities. These services will take 20 local green infrastructure projects from concept to design, resulting in engineering plans that communities can use to seek implementation funding and bid for construction. As technical assistance, capacity building, and planning grants increase the volume of community projects that are ready for implementation, engineering and construction firms will need a larger skilled workforce. Apprenticeship programs and higher education intuitions can help meet these demands.

Flood Risk Disclosure Law

In April 2024, the Maine Legislature passed a flood disclosure law requiring real estate sellers to provide buyers with flood risk information. Sellers must disclose if a property is in a FEMA-designated flood hazard area, any past flood events, active flood insurance costs, and prior flood-related claims or disaster aid. This law enhances transparency, ensuring buyers understand potential risks before purchasing. Many buyers overlook flood risk, so this measure helps them make more informed decisions and know when to take proactive steps to avoid future loses.

A stream crossing on Route 2 near New Sharon was improved in 2023 and survived the flooding that December. Credit: Maine DOT

"About 10 years ago we decided to change our state culvert standards from a 25-year storm to a 100-year storm sizing. It was controversial at the time. However, today we can look back and say we have not lost a single culvert that has been upgraded to the new standards."

—JOYCE TAYLOR, MAINE DOT CHIEF ENGINEER

Strategy Implementation Table I. 1

Activity	Timeframe	Lead (and partners)	Status	Resources
Assess the vulnerability of state-owned assets to climate change hazards and extreme weather. Develop vulnerability assessment protocols, resources, training, and assistance for communities to enable assessments at the community or regional levels.	0-2 years	All state agencies with GOPIF and State Resilience Office	In progress, assessment began in March 2025	Existing FEMA Hazard Mitigation Assistance grant
Develop a prioritization framework and appropriate metrics for investments within categories of vulnerable infrastructure using the following criteria: protection of life safety, preservation of public health, prevention of economic damages. Emphasize community input and leadership with support and guidance from the state.	0-2 years	GOPIF (with State Resilience Office and Governor's Infrastructure Implementation Committee)		Existing FEMA Hazard Mitigation Assistance grant
Develop a robust pipeline of local infrastructure resilience projects by providing planning, design, and engineering assistance to communities, thereby generating a steady stream of work for businesses.	0-2 years	MOCA Community Resilience Partnership		Existing NOAA CRRC grant
Expand existing workforce training programs, including apprenticeships and pre-apprenticeships, service corps, and UMS's internship initiatives, with a focus on resilience-related fields such as construction, engineering, and community planning.	3-5 years	Dept. of Labor (with University of Maine System, Maine Community College System, Career and Technical Education programs, and Construction Training Programs)		
Recruit more students into resilience-related fields such as engineering and community planning.	6-10 years	University of Maine System, Maine Community College System and Career and Technical Education programs		

2. Assist communities to effectively assess and reduce risk.

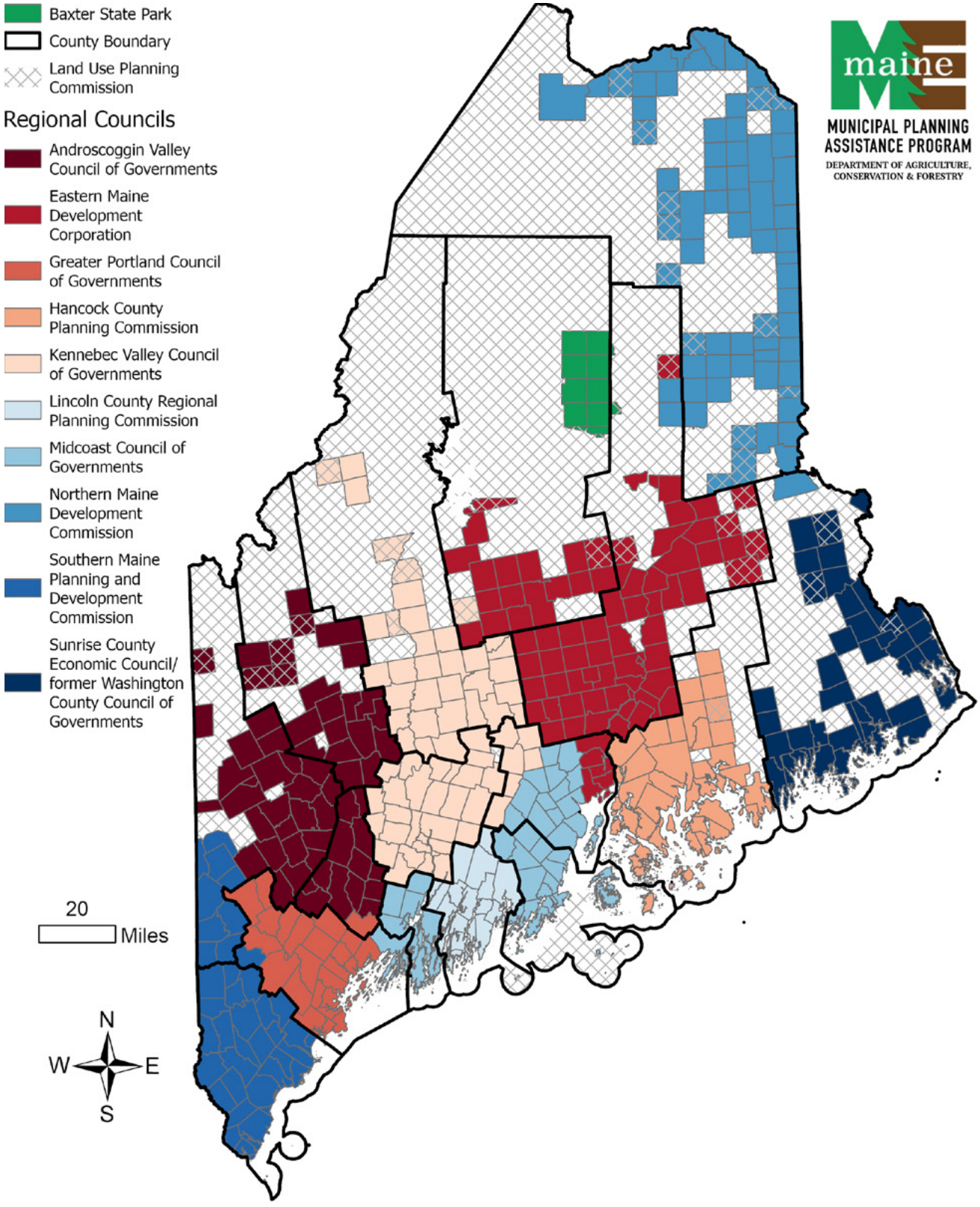
With nearly 100 communities across Maine already assessing the vulnerability of their own assets, resources, and community members, now is the time for the state to increase the quantity and sophistication of tools and services to help communities build on their momentum. Over the next several months, the State Resilience Office at the Maine Office of Community Affairs will begin to coordinate new and existing activities to assist communities. The office will develop additional tools and technical assistance to assess and communicate about risks. Maine DOT is currently developing a Maine Coastal Flood Risk Model that will provide maps for sea-level rise scenarios and coastal storm flood risks. The State Resilience Office and Maine DOT will develop a user's guide to help different audiences understand and utilize information from the model. LD 1's Flood Ready Maine initiative and activities under the NOAA resilience grant will assess needs for inland flood risk information and tools, which will entail inland flood modeling and mapping, easy-to-understand user guides, and other tools that make flood risk information accessible for different audiences.

Crucially, Maine is expanding investments in regional capacity to assist communities to set their own priorities and implement projects that meet local and regional needs. Maine has 10 regional councils that assist community planning for growth management, economic development, housing, public transportation, and community resilience, and other issues. Funding from Maine's NOAA grant has expanded upon a two-year pilot project to include all 10 of the regional councils for an additional five years. Staff at each regional council are now assisting communities to identify resilience priorities and develop project funding proposals. Building on this model, the Flood Ready Maine initiative created by LD 1 will fund a certified floodplain manager position in each of the 10 regional councils, growing the capacity and expertise available to communities to reduce risks.

Philanthropy and the nonprofit sector should be a key part of long-term resilience building in Maine. There is a need for capacity building in rural communities and regions and for education and community engagement in all parts of the state. Philanthropic entities that have established relationships with community organizations are ideally situated to develop and tailor programming to meet local and regional needs for information, dialogue, and implementation. Pilot projects are one way philanthropy can encourage innovation, test new approaches to engagement and capacity, and scale up successful models. Philanthropy also plays an important role in land conservation, a role that can be expanded to include voluntary land acquisition for storm and flood risk reduction and habitat benefits.

Capacity building: The effort and process of adding resources that enhance an organization's operations, skills, and functions. This can include new staff, volunteers, trainings, guides, templates, model ordinances, and other tools that support ongoing development (as opposed to a one-time intervention).

Maine Regional Councils



Maine Office of Community Affairs:
A New One-Stop Shop for Communities

The Maine Office of Community Affairs (MOCA) is a new standalone state office that partners with Maine communities to strengthen planning and implementation at the local level. It serves as a one-stop shop within state government to provide coordinated and efficient planning, technical assistance, and financial support to towns, cities, tribal governments and regional entities, to help them better plan for common challenges, pursue solutions, and create stronger, more resilient communities.

Starting in July 2025, MOCA will reorganize seven existing state programs involving land use, housing and flood plain planning, as well as building codes, coastal management, and climate resilience. Other state programs that provide services to communities on these and other related topics will remain in other agencies, with the Office ensuring increased coordination across agencies and program staff.

MOCA will also include a newly established State Resilience Office and staff, supported by the historic $69 million climate resilience grant awarded to Maine by the National Oceanic and Atmospheric Administration. The staff of the reorganized programs and the State Resilience Office will work together to enable each community to find the support services that are right for them.

An early project for the MOCA will be developing a single grant portal for communities to access multiple state grant programs. Programs involving land use, housing and floodplain planning, as well as building codes, coastal management, and some climate resilience funding and programs, will be reorganized into the new Office starting in July 2025. This includes:

- Community Resilience Partnership, currently in the Governor's Office of Policy Innovation and the Future
- Maine Coastal Program, currently in the Department of Marine Resources
- Maine Floodplain Program, currently in the Department of Agriculture, Conservation and Forestry
- Municipal Planning Assistance Program, currently in the Department of Agriculture, Conservation and Forestry
- Housing Opportunity Program, currently in the Department of Economic and Community Development
- Maine Uniform Building and Energy Code/Code Enforcement, currently in the Office of State Fire Marshal
- Volunteer Maine, an independent state office currently connected to the Department of Education that leads to a stronger Maine through volunteerism
- The State Resilience Office, a new office supported by the NOAA resilience grant

MOCA Director
Samantha Horn

MAINE OFFICE OF
Community
Affairs

Action Plan for Communities

Across the state of Maine, communities are working to advance disaster preparedness and infrastructure resilience at the local level. Below are a set of steps and resources communities can use to take action to address vulnerabilities and invest in resiliency projects.

Community action steps:

1. Complete a Vulnerability Assessment to identify risk and needs, utilizing a Community Resilience Partnership (CRP) grant.
2. Create or update a local capital investment plan to prioritize among resilience and other community needs.
3. Establish a resilience reserve account to start saving for future resilience projects, local cost share for grants, or unexpected storm damage.
4. Match mitigation and adaptation projects to funding and financing options with the help of a CRP Regional Coordinator.

Resources for communities:

- Community Resilience Partnership (CRP) — Participation in the Community Resilience Partnership is available to all municipalities, federally recognized tribes, and unorganized territories in Maine. The benefits of joining the Partnership include access to funding opportunities, help with project development and grant writing, trainings on important topics, and peer-to-peer learning events. The Partnership offers grants and technical assistance for vulnerability assessments.
- CRP Regional Coordinators — The Regional Coordinator Program consists of a network of assistance providers at each of Maine's 10 regional councils who provide support to communities enrolled in the Partnership. Examples of services include project development and management, technical assistance, community engagement support, process guidance, and grant writing and management services.

Resilience in Action: Van Buren

Credit: Town of Van Buren

"With FEMA's assistance, homeowners in vulnerable areas volunteered to relocate to safer ground, and the properties were deeded to the town. These former residential lots are now being transformed into a resilient community space. By creating a public park with a community garden and walking path, we are not only revitalizing the area but also enhancing our town's ability to adapt to future challenges, promoting environmental sustainability, and fostering community cohesion."

—LUKE DYER
VAN BUREN TOWN MANAGER

Strategy Implementation Table I. 2

Activity	Timeframe	Lead (and partners)	Status	Resources
Expand tools and funding for communities and regions to assess vulnerabilities in infrastructure, including culverts and stormwater assets, drinking water and wastewater systems, transportation, communications, and other public and private facilities that are essential to local economies.	0-2 years	MOCA State Resilience Office and Community Resilience Partnership, with DACF, DOT MIAF, and other agencies	Community Resilience Partnership added technical assistance for vulnerability assessments in 2024.	Existing FEMA BRIC and NOAA CRRC grants; Community Resilience Partnership grants
Increase state and regional capacity to assist communities with flood and natural hazard risk reduction, prioritizing communities that are rural and vulnerable to natural disasters.	0-2 years	MOCA with the 10 regional councils	LD 1 creates Flood Ready Maine initiative and funds regional certified floodplain managers	LD 1 authorizes funding
Encourage philanthropies and nonprofit organizations to support capacity-building, pilots, and community engagement and education for resiliency.	0-2 years	Maine Community Foundation (with philanthropies and nonprofits)		
Develop a sustained public communications strategy to raise awareness, engagement, and support community dialogue about resilience efforts and long-term challenges.	0-2 years	MOCA State Resilience Office with other agencies		Existing NOAA CRRC grant
Establish a homeowners resilience program to provide grants to residents to strengthen their homes against damage and loss from severe weather.	0-2 years	DPFR Bureau of Insurance	LD 1 creates the Home Resiliency Program	LD 1 authorizes funding
Assist towns to take actions that reduce flood risk, protect property, increase participation in the National Flood Insurance Program, and lower flood insurance premiums.	0-2 years	MOCA State Resilience Office and Floodplain Management Program	LD 1 creates Flood Ready Maine initiative	LD 1 authorizes funding
Assist towns to establish resilience reserve accounts and capital investment plans.	3-5 years	MOCA Community Resilience Partnership		Community Resilience Partnership grants
Provide data and education for communities to establish “resiliency overlay districts” using the best available science and data to reduce risk in areas where additional protective measures are needed.	3-5 years	MOCA		
Incentivize communities to take regional or watershed approaches to planning, prioritization and investment in risk reduction and resilient infrastructure.	6-10 years	MOCA		Community Resilience Partnership grants

3. Improve and protect energy infrastructure and increase energy resilience for customers.

Electricity outages are one of the most common and disruptive storm impacts to people and businesses in Maine. As a rural and heavily forested state, two significant challenges for the electric grid are long electricity distribution lines to communities and a high probability of tree damage during wind or ice storms. In 2024, over 50 percent of outage hours were the result of tree damage both in and out of utility rights-of-way. As Maine transitions toward a clean energy economy and electrifies more energy uses, making the grid more reliable and customers more energy resilient must be a priority.

The actions below build upon work that is already in progress. The Governor's Energy Office (GEO) is implementing the Maine Energy Plan and the State Energy Security Plan, while the Maine Public Utilities Commission (PUC), is overseeing 10-year Integrated Grid Plans and Climate Change Protection Plans that Maine's investor-owned utilities are developing as required by law, as well as an inquiry into improving resiliency and addressing rising storm costs.

The Governor's Energy Office, in collaboration with the Public Utilities Commission, utilities, and Maine Emergency Management Agency will improve access to information about outage impacts by developing an initial critical facility map that includes available energy resilience-related information. The Governor's Energy Office will facilitate relevant partners to explore the feasibility of utilizing higher resolution data to support a power outage summary dashboard that offers the public greater transparency into reliability metrics and outage trends over time. The map and dashboard will enable further community engagement and energy resilience planning. Colorado's Critical Infrastructure and Facility Prioritization Process is an example of this inventory, prioritization, and outreach.

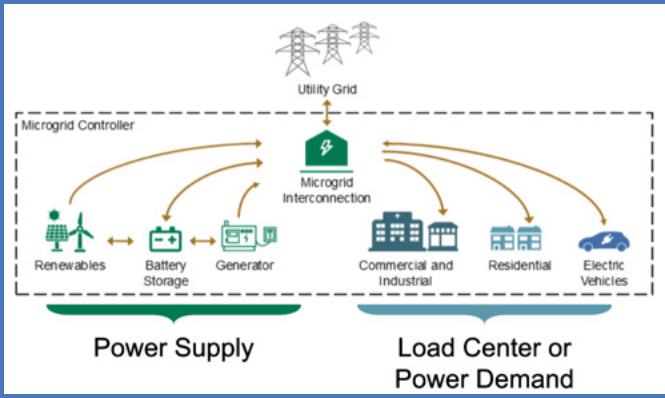
Maine will accelerate the adoption and deployment of clean energy technologies that can provide resilience to energy customers. In a state with some of the most frequent electricity outages, battery storage is a technology with significant benefits for energy resilience. Batteries that store enough energy for a few hours of use can help prevent some of the basic nuisances of power outages while potentially participating in demand management initiatives. Combining battery storage with on-site solar or wind generation can extend the resilience benefit substantially. Microgrids can help critical facilities like hospitals, shelters, warming and cooling centers, and emergency operations centers maintain a high level of functionality during extended power outages, improving safety and services for residents who might be at greater risk during power outages. The federally funded Maine Grid Resilience Grant Program provides implementation funding for eligible grid resilience activities, including microgrid deployment. In 2024, the Governor's Energy Office announced the first round of awards under the program, including a community microgrid project. Funding for electric grid infrastructure improvements will be a continued focus, considering both ratepayer-funded options as well as alternative funding sources. Education about the benefits of community microgrids can expand interest and opportunities for deployment.

The state will continue to collaborate with regional partners and regulators to ensure reliable electricity generation supply during winter months. As long as the New England grid is reliant on natural gas for generating electricity, Maine will continue to be subject to volatile global natural gas markets that can adversely affect

energy prices and availability. The availability of natural gas for electricity generation can fluctuate during the winter months when demand rises for heating homes. During prolonged cold periods, natural gas availability for generation can be limited, causing prices to increase and the region to rely more upon generation facilities that utilize other fuels such as oil. Home heating fuels (oil, propane, and kerosene) face similar global and regional volatility issues, and deliveries can be constrained during extended periods of very cold weather and winter storms. Road closures due to culvert washouts or fallen trees can prevent fuel deliveries at critical times for residents. Multiple state agencies and fuel delivery companies are focused on this issue, including the Governor's Energy Office, MEMA, Maine DOT, and Efficiency Maine Trust.

State Spotlight: Colorado

The State of Colorado's Microgrids for Resilience Program provides planning and construction grants for projects at critical facilities and community centers in vulnerable areas. Microgrid technology that employs on-site batteries and solar generation can help critical facilities like hospitals, shelters, and emergency operations centers maintain a high level of functionality during extended power outages.



Strategy Implementation Table I. 3

Activity	Timeframe	Lead (and partners)	Status	Resources
Facilitate the collection and publication of trend data on electricity outages and grid vulnerabilities.	0-2 years	GEO (with PUC, MEMA, and utilities)	Aligned with Maine Energy Plan Objective B, Strategy A	
Monitor energy reliability, volatility, and costs for electricity generation and delivery of fuels for home heating during extreme cold periods and winter storms. Continue to address through the advancement of the Maine Energy Plan and other efforts.	0-2 years	GEO (with regional industry partners)	Aligned with Maine Energy Plan, Objective B, Strategy A	
Develop an initial critical facility map using available energy resilience-related information.	3-5 years	GEO (with PUC and utilities)		
Enable the adoption of clean energy powered microgrids that enhance storm resilience, especially for critical services and facilities that serve vulnerable populations.	3-5 years	GEO (with PUC and utilities)		

4. Protect and promote resilience across a diverse mix of public and privately owned working waterfront infrastructure.

Maine's coastal communities, working waterfronts, fisheries, and aquaculture businesses are directly impacted by intense storms, sea-level rise, storm surge, and the rapidly changing Gulf of Maine ecosystem. Maine's working waterfronts are vital to the state, both economically and culturally, and access to the ocean is crucial to Maine's identity and future blue economy.

To continue Maine's long history of a diverse working waterfront along the coastline, Maine needs to implement local and regional approaches that protect and support a mix of public and privately owned working waterfront infrastructure, in part by developing tools and support for all types of working waterfront infrastructure. To maintain public working waterfront infrastructure as the long-term backbone for commercial fisheries and other blue economy sectors in Maine, Maine should invest in resilience upgrades and ongoing maintenance to withstand future sea level rise and extreme storms. To support privately owned working waterfront infrastructure, Maine should invest in providing support services, including technical assistance to complete resiliency upgrades, engineering and permitting support, and business planning support for future generations enabling strong working waterfront businesses and helping avoid the need for rapid crisis response.

To inform these efforts, Maine needs a systematic method to compile inventory data across all types of working waterfront infrastructure. A rapid inventory should take into consideration economically vital working waterfronts, working waterfronts that support socially vulnerable populations, and working waterfronts that form a base for the future of fisheries. This work can build on existing knowledge from nonprofits and academic researchers as well as local efforts like the Downeast Conservation Network and existing knowledge of working waterfront stakeholders. Local knowledge should ground truth and validate the most vulnerable working waterfronts.

Strategy Implementation Table I. 4

Activity	Timeframe	Lead (and partners)	Resources
Identify and map the most vulnerable working waterfront infrastructure through a systematic, statewide approach, considering economically vital facilities, social vulnerability, and future growth opportunities. Ground truth vulnerability data with local knowledge from harbormasters and town staff.	0-2 years	DMR/MOCA Maine Coastal Program (with working waterfront stakeholders)	
Invest in resilience upgrades and ongoing maintenance of public working waterfront infrastructure to withstand sea level rise and extreme storms.	0-2 years	DMR and DOT	Existing NOAA CRRC grant and NOAA CDS funds
Strengthen privately owned working waterfront infrastructure by providing business resiliency planning support and engineering and permit assistance to design and complete resilience upgrades.	0-2 years	MOCA/DMR Maine Coastal Program (with DMR, DECD, DEP	NOAA CDS funds
Create new policy options, funding, and technical assistance, such as an entity outside of state government with the capacity to protect critical private working waterfront properties at risk of conversion to non-marine uses.	3-5 years	MOCA/DMR Maine Coastal Program (with DMR, Land for Maine's Future, and working waterfront stakeholders and the philanthropy community)	

Challenges of Inventorying Working Waterfront Vulnerabilities along the Maine Coast

Inventorying working waterfronts along Maine's coastline is an important step in identifying vulnerabilities, and prioritizing funding for resiliency measures, but faces many challenges. Maine's diverse array of working waterfronts is composed of both public and privately owned properties. Town officials such as harbor masters, town managers, and selectmen, many of which are volunteers, have limited capacity to contribute data to inventorying public working waterfronts. To complete vulnerability inventories of private working waterfront, the sensitivity of private wharf data is a barrier. It is difficult to reach people, build trust, and receive information about precious shore access arrangements, especially where they involve private handshake agreements and concerns about local conflict or liability issues. In addition, following the devastating January 2024 storms, many working waterfront communities were overwhelmed and in recovery mode and had limited bandwidth to participate in inventorying and assessments. In addition, much of the repair, recovery and maintenance work was happening with volunteer labor, and often, with out-of-pocket funds, making tracking difficult.

Given the lack of an updated, comprehensive inventory of Maine's working waterfront, and differences between public and private working waterfront infrastructure (and the distinct importance of each), one of the main challenges the state faces is not knowing the scale of working waterfront vulnerability or how to characterize the data. There is a need for a systematic approach to data compilation.

In 2006, the Island Institute completed a coast-wide working waterfront inventory that found that working waterfront takes up only 20 miles Maine's extensive coastline. An updated, statewide comprehensive inventory is needed for Maine to effectively prioritize working waterfront protection efforts. Recently, the Sunrise County Economic Council updated the Washington County portion of the 2006 "Last 20 Miles Inventory" after the January 2024 storms, focusing primarily on public infrastructure, by requesting reports of storm damage to infrastructure from communities and reaching out by phone and email to community leaders and harbormasters. The inventory, though not comprehensive, and facing many of the inventorying challenges cited above — such as limited response from overwhelmed communities, and only select data on important privately held working waterfront — helps provide a clearer view of working waterfront vulnerabilities in Washington County. To inventory intertidal access, primarily for the clam fishery, the Downeast Conservation Network with the Maine Coast Heritage Trust and Sunrise County Economic Council led a mapping exercise that was attended by shellfish harvesters, constables and committee members, in addition to local land trusts representatives. The challenge moving forward is how to complete and then steward this inventory, and how to create a source of funding and technical assistance that allows rapid response when opportunities arise to secure long-term intertidal access for shellfish industry.

Other recent inventory efforts led by organizations in the Working Waterfront Coalition provide important datapoints — such as state inventory of public boat access held by the Maine Coastal Program, properties identified through the Department of Marine Resources' Working Waterfront Access Protection Program in collaboration with Land for Maine's Future, efforts to assess working waterfronts of social and cultural importance based on where fishing license holders are selling product out of, and resources such as the Maine Coast Fishermen's Association Working Waterfront Inventory template. However, a statewide, systematic approach would guide the state in investing in services critical to support private working waterfront, and resiliency upgrades to maintain public working waterfront services along the coast for commercial fishermen and aquaculturists.

Understanding Working Waterfront Resiliency Funding Needs

Data and survey responses from recent efforts to understand working waterfront resiliency funding needs indicate that a large proportion of working waterfront sites have either damage from recent storms or deferred maintenance problems that threaten the future of the infrastructure's resilience. Following the January 2024 storms, public and private working waterfronts that sustained damage needed financial support. The state's one-time Working Waterfront Resiliency Grant awarded nearly $23 million in grants to reconstruct and improve damaged wharves and piers that supported 10 or more commercial fishermen. To support smaller, privately owned properties rebuild — most of whom had infrastructure that was not covered by flood insurance and limited options to secure affordable loan funding — both the Maine Coast Fishermen's Association and Island Institute provided grants for rebuilding. The Maine Coast Fishermen's Association distributed $5,000 grants to 45 properties through their Working Waterfront Fund for critical repairs. These funds helped cover the cost of materials like planks and pilings, hiring labor to rebuild wharves, and cleaning up debris, with most recipients using the funds to complete the repair work themselves, as is an enduring tradition among fishermen. The Island Institute also distributed grants ranging from $2,500 to $10,000 to 50 awardees for storm related needs to commercial wharves, co-op wharves, family fishing wharves, boat yards, and aquaculture operations.

The rebuilding needs from these recent storms can help inform priorities for future funding: though each working waterfront property has unique challenges, funding to complete engineering and permitting design and pay for materials and construction costs to improve the resilience of infrastructure is needed for both public and private working waterfronts. In addition, for many properties, there is no external source of funding for repairs and resilience upgrades. Match requirements for grants are a significant barrier to obtain funding for many property owners, especially smaller family-owned properties.

II. Improve Disaster Preparedness, Response, and Rebuilding

5. Enhance communications during and immediately after emergencies.

Effective communication of timely and accurate information before, during, and following emergencies is both critical and challenging. During recent disasters, numerous communities relied on social media platforms to communicate with residents due to the absence of reliable alternatives. To address this issue, communities like Dover-Foxcroft are implementing subscriber-based mobile phone notification systems that allow users to receive text messages or emails with important information. These notifications are limited to individuals who opt in to the service, so a robust public education effort is required to onboard residents.

With investment from LD 1, MEMA will expand the availability of the Integrated Public Alert and Warning System (IPAWS). Unlike subscription-based systems, IPAWS allows for universal dissemination of Wireless Emergency Alerts, which are sent by cellular carriers to all mobile phones within a designated area without requiring prior user registration. MEMA will expand the number of public officials trained and authorized to issue alerts; add more languages to the service to reach more populations in Maine; and enhance the targeting of alerts to affected areas without alerting those outside the area with non-relevant information. These improvements will ensure the right audience receives the right information at the right time.

Technology alone will not solve all of the challenges of emergency communications. There is a need to improve the effectiveness of communicators and their messages, broaden and strengthen communication networks to reach difficult-to-contact populations, and prepare information receivers to know what actions to take when emergency notices are posted. MEMA will improve information sharing across different levels of government by building relationships with partners who can help tailor messages and delivery for certain audiences. This is especially important for difficult-to-reach populations such as people in remote places without phones and people for whom English is not a first language.

Strategy Implementation Table II. 5

Activity	Timeframe	Lead (and partners)	Status	Resources
Upgrade emergency communication systems, practices, and training for state, county, and municipal leaders to ensure dependable communication with residents during emergencies.	0-2 years	MEMA		LD 1 provides funding and staffing
Develop strategies to streamline and improve information sharing among state, county, and local emergency managers and officials.	0-2 years	MEMA		LD 1 provides funding and staffing
Develop and strengthen relationships with vulnerable communities to ensure that all Maine people can quickly access trusted sources of emergency communications and disaster response.	3-5 years	MOCA (with MEMA and the Office of New Americans)		

The Town of Dover-Foxcroft is implementing a subscriber-based cell-phone notification system that allows users to receive text messages or emails with important information. American Woolen Company Foxcroft Mill, Dover-Foxcroft, Maine. Credit: Jack Clukey

6. Strengthen emergency coordination and rapid reaction capabilities across governments and with the philanthropic and nonprofit sector to alleviate immediate post-disaster needs.

The demand for services and resources climbs dramatically in the aftermath of a disaster. MEMA, along with county and local partners, work quickly to identify the immediate needs of individuals, businesses, and local governments. As state agencies follow established procedures to request federal disaster relief resources, there is an opportunity to strengthen the role of non-governmental organizations that specialize in providing immediate relief needs, such as meals, cleanup services, and shelter.

The Island Institute, for example, quickly made small grants available for working waterfront businesses to stabilize and repair damaged wharves and waterfront buildings in the immediate aftermath of the January coastal storms. The Maine Coast Fishermen's Association, in cooperation with many organizations across the philanthropic community, also made small grants to privately owned fishing businesses for recovery activities. MEMA and the Maine Community Foundation will work with the nonprofit and philanthropy sector to plan and coordinate disaster relief activities closely with the state via the Emergency Operations Center and the Maine Long-Term Recovery Board.

Strategy Implementation Table II. 6

Activity	Timeframe	Lead (and partners)	Status	Resources
Develop and coordinate opportunities for the philanthropic and nonprofit sector to help fill needs not being met by disaster relief programs.	0-2 years	MEMA (with the Maine Long Term Recovery Board and philanthropy community)		
Increase engagement and education among county and municipal officials, the philanthropic and nonprofit sector, and donors about the mechanisms for requesting and providing disaster relief assistance.	3-5 years	MEMA (with Volunteer Maine, Maine Community Foundation, and other donors)		
Increase funding for emergency management staffing at state, county, and local levels.	3-5 years	State, county, and local governments.		
Assist communities to formalize networks and contracts for disaster recovery services (e.g., debris management, construction contractors).	3-5 years	MEMA (with county emergency management agencies)		

7. Expedite permitting for post-disaster rebuilding, infrastructure strengthening, and resilience projects.

The urgency to rebuild hundreds of damaged buildings, facilities, and infrastructure can strain regulatory agencies that have a statutory responsibility to review activities taking place in or adjacent to protected natural resources. Agencies expended enormous effort after the December and January storms to review permit applications with speed and urgency, prioritizing applications for rebuilding projects, but were limited by staff capacity. Additionally, state and federal permit requirements can increase project costs and lengthen timelines for property owners and construction firms. For example, work windows intended to protect environmentally sensitive areas can also compress construction schedules and shift activities to times of the year with less favorable weather, increasing project costs.

To prepare for the next disaster, the Department of Environmental Protection (DEP) has developed a Willing & Qualified Vendor Agreement that allows the department to utilize private-sector vendors to review license applications. As of early 2025, 13 vendors have agreed to participate. Additional vendors can be added when necessary. The DEP is currently utilizing these vendors to process a backlog of coastal permit applications following the January 2024 storm events and the overall higher volume of applications associated with increased clean energy development and economic activity in the state. In the future, vendors will be utilized on an as-needed basis when there are similar surges in license applications that the department does not have adequate staff capacity to process.

The DEP, in coordination with other agencies, will propose to the Board of Environmental Protection expansions in the types of projects that are eligible for the permit-by-rule process, such as making wharves and piers more resilient. Permit-by-rule is a streamlined approval for an activity that requires a permit under the Natural Resources Protection Act when the activity is carried out in certain locations and in accordance with specific standards to minimize environmental impact.

The DEP will suggest to the Legislature additional statutory exemptions, with environmental safeguards, for certain emergency work during and immediately following disasters. The DEP will convene a regulatory reform forum to identify potential changes to Department regulations to facilitate climate resilience, informed by outreach to affected stakeholders, including the private sector. The DEP will collaborate with other state agencies to create educational materials to raise awareness of permitting requirements and about the types of disaster response and recovery activities that are exempt from permitting or eligible for an expedited permit-by-rule. This can help get answers to the public quickly and ensure that applicants have the information they need to submit the appropriate application. Furthermore, state agencies will coordinate federal engagement concerning revisions to the Army Corps of Engineers' General Permit for Maine, seeking to reduce in-water work restrictions, duplicative permit process, and review timelines.

Maine Department of Environmental Protection storm remediation responders work to clean up an oil spill inside a basement in Bingham, Maine following the historic storms of 2024. Credit: Maine DEP

Strategy Implementation Table II. 7

Activity	Timeframe	Lead (and partners)	Status	Resources
Develop temporary contracts at state agencies to increase capacity for permit application review during periods of high demand.	0-2 years	DEP (with other permit-review agencies)	Feb 2025: DEP has 13 willing and qualified vendors to assist	
Develop a list of suggested regulatory exemptions with appropriate environmental safeguards for emergency activities during and immediately following a disaster.	0-2 years	DEP (with other agencies)	Expand on LD2030 (2024)	
Convene a regulatory reform forum to identify potential changes to Department regulations to facilitate climate resilience, informed by outreach to affected stakeholders, including the private sector.	0-2 years	DEP (with other agencies)		Existing NOAA CRRC grant
Engage federal agencies (such as the Army Corps of Engineers and NOAA Fisheries) about permitting improvements such as restrictive in-water work windows, duplicative state and federal permits, and lengthy agency review times.	0-2 years	DEP and GOPIF (with other agencies)		
Create educational materials to raise awareness of permitting requirements, explain eligibility for expedited state permitting through permit-by-rule, and provide guidance for emergency rebuilding work.	0-2 years	DEP (with MOCA)		Existing NOAA CRRC grant and new positions requested in budget
Propose expanded uses of permit-by-rule and include additional resilience-related practices (e.g., making wharves and piers more resilient).	3-5 years	DEP		

Maine Department of Environmental Protection
Supporting Resilience through Streamlined Permitting

The Maine Department of Environmental Protection (DEP) safeguards Maine's natural resources by working to preserve and enhance the environment while ensuring public access and enjoyment. The Natural Resources Protection Act (NRPA) was enacted by the Legislature to protect the State's natural resources such as coastal and freshwater wetlands, coastal sand dune systems, lakes, significant wildlife habitats, fragile mountain areas, and rivers, streams and brooks.

In 2024, the DEP introduced emergency legislation in response to the multiple storm events of December 2023 and January 2024. The Legislature passed the bill (L.D. 2030) into law, amending NRPA to allow for faster rebuilding of more resilient piers, wharves, and docks; to reduce permitting requirements for property owners seeking to elevate their building foundations; and to exempt emergency flood alleviation activities from NRPA permitting in the future when necessary for public safety.

The DEP recently enacted improvements to permitting processes and proposed additional changes to reduce review time for applications, better address individual and cumulative impacts, encourage nature-based solutions, and update rules for consistency with other measures and best practices:

- Created the Maine Enterprise Licensing System (MELS) to increase the transparency of the permitting process, improve the ease of permit-by-rule with online submissions, and allow the public to view all pending applications.
- Developed a Willing & Qualified Vendor Agreement that allows the DEP to utilize private-sector vendors to review license applications and reduce any backlog during surges in applications through outsourced support when staff capacity is limited.
- Expanding options for the use of Permit-by-Rule (PBR) including proposing to make coastal shoreline stabilization projects eligible under the Department's Chapter 305 NRPA PBR rules.
- Clarifying standards for resource protection through proposed updates to the Department's Chapter 310 Wetlands and Waterbodies Protection rules.
- Incorporated the best available science on the location of coastal sand dune systems into the Department's Chapter 355 Coastal Sand Dune Rules.

The following proposed changes to Chapter 305: Natural Resources Protection Act — Permit by Rule Standards and Chapter 310: Wetlands and Waterbodies Protection include standards related to coastal shoreline stabilization intended to increase resilience and protect essential ecosystems:

- Allow some projects using riprap or biodegradable stabilization materials to be eligible for PBR. (Ch. 305)
- Reduce restrictions on biodegradable materials for coastal sand dune restoration. (Ch. 305)
- Increase seawall heights up to base flood elevation under PBR (except in coastal sand dune systems). (Ch.305)
- Add beach scraping as a PBR-eligible activity. (Ch. 305)
- Set standards and limits on structural stabilization projects that require an individual permit, to increase predictability for applicants and to ensure impacts are reasonable. (Ch. 310)
- Limit use of riprap and hard armoring when not protecting structures or infrastructure. (Ch. 310)

Maine DEP has convened a Steering Committee and Technical Committee to work together to develop a consensus-based framework for improving the State's stormwater regulations, specifically Chapter 500, considering the State's environmental protection and climate adaptation goals. Newly proposed rules will likely require additional stormwater treatment in newly identified sensitive and threatened watersheds, tailor treatment to the stressors in the watershed, and require less treatment for low-impact development in watersheds that do not face significant development pressure.

8. Develop tools and education to make buildings more resilient.

Building codes are regulations used to establish minimum safety requirements for the construction of new buildings and retrofits to existing buildings. The Maine Uniform Building and Energy Code (MUBEC) applies to all towns in the state. MUBEC is comprised of several sets of international codes, including the International Building Code (IBC) and the International Residential Code (IRC), that are in use in all 50 states. The IBC and IRC are updated every three years. Maine has adopted the 2021 international codes and as of April 7, 2025, municipalities must comply with the codes and corresponding standards (although only communities with populations greater than 4,000 are required to enforce the codes). MUBEC staff are scheduled to join the new Maine Office of Community Affairs in 2025, leveraging opportunities to provide assistance and training to towns in coordination with other land use and resilience programs.

There are numerous examples around the country of homes or communities that were designed and built to the latest building codes that not only survived a significant natural disaster but were able to continue their intended function, helping the occupants or community quickly recover and remain resilient. A 2019 study by the National Institute of Building Sciences found that communities save $11 for every $1 invested in adopting the latest building codes. These cost savings come from lower property damage, reduced insurance premiums, and fewer emergency response incidents. Stronger building codes will also help reduce insurance premiums for residents.

The state will continue to look for opportunities to promote and incentivize "beyond-code" interventions that enhance a structure's overall resilience to wind and flood damage from storms, floods, and other severe weather events. The new Maine Home Resilience Grant program created by LD 1 incentivizes homeowners to upgrade their roof to the FORTIFIED Homes standard developed by the Insurance Institute

Avesta's Bayside Anchor Apartments in Portland were built to meet the PHIUS+ Passive House standard, which significantly reduces energy use and lowers heating costs for residents. Credit: Avesta Housing

for Business & Home Safety (IBHS). The American Society of Civil Engineers' newest building standards for structures located in floodplains, ASCE 24-24, is an opportunity to proactively update municipal floodplain ordinances beyond the minimum requirements of the National Flood Insurance Program.

A barrier to advancing resilient codes across the state is ensuring there is adequate staff, training, and communication materials to enforce building codes and code updates. Some towns in Maine do not have a code officer or licensed building inspector, while other towns share inspectors. Code enforcement is often combined with administrative tasks, inspections, plan review, and training to keep up with evolving construction technologies and updated standards. MEMA, MUBEC, and the Kennebec Valley Council of Governments partnered to propose a pilot program for regional code enforcement that would expand enforcement services across several counties. The state should continue to seek opportunities to fund this proposal and other opportunities for regional collaboration, capacity building, and continuing education.

Strategy Implementation Table II. 8

Activity	Timeframe	Lead (and partners)	Status	Resources
Review state building codes for opportunities to increase resilience and protect structures from storm and flood damage.	0-2 years	MOCA Building Codes program		
Develop model ordinances, resilient building codes, and higher standards and assist municipal adoption to help communities reduce risks from flooding and other natural hazards. For example, consider the benefits and costs of incorporating relevant sections of the ASCE 24-24 Flood Resistant Design and Standards in the state's model floodplain ordinance.	3-5 years	MOCA Building Codes and Floodplain programs (with other agencies)		
Implement regional code enforcement programs with awareness of how codes and enforcement needs vary by region.	3-5 years	MOCA Building Codes program (with MEMA)		
Assist local permitters, inspectors, and code enforcement officers to be knowledgeable resources for property owners to access information and assistance, not only enforcement. • Grow continuing education offerings at community colleges and mentoring opportunities that support new code enforcement officers. • Broaden training opportunities for code enforcement officers with emphasis on resilience-related resources for property owners and intersections with permitting.	3-5 years	MOCA Building Codes program (with community colleges)		

III. Sustain Maine's Momentum through Strategic Investments

9. Improve data and information sharing to help leaders make informed decisions about risk.

Reliable and accessible data is the foundation of risk management decisions. However, important data may be fragmented and siloed at various agencies and institutions across the state, lacking integration and analysis that could enable better decision making. Furthermore, under-resourced communities frequently lack the technical capacity to analyze existing data in ways that could advance their resilience goals.

The Flood Ready Maine initiative established by LD 1 at the State Resilience Office will make flood data more accessible through an online risk data hub. The hub will gather, curate, store, analyze, and make critical datasets available to communities and users across the state. The initiative will assess community information needs and barriers, then develop easy-to-understand maps, visualizations, decision-support tools, and communication aids. The Flood Ready Maine initiative and the state's NOAA grant include funding for the development of inland hydrologic models and the modernization of outdated community flood maps. LD 1 also includes funding for the development of an online flood risk communication platform similar to Texas's BuyersAware.org website that enables property owners and prospective buyers to look up the flood risk of their property. This platform will be a critical source of information for compliance with Maine's 2024 Real Estate Flood Risk Disclosure law (LD 2035).

In the long-term, Maine should establish a robust Center for Disaster Risk Analysis with a mission to deliver high quality disaster risk information to diverse users and decision makers. The center could be established in partnership with universities in Maine, with staff to coordinate information gathering, analysis, and communication as well as research and education. The center would collaborate with state agencies on activities such as supporting community-based programs to improve flood monitoring and prediction, informing early warning systems, documenting and retaining information about disasters for future analysis, and assisting the development of a skilled workforce for research, floodplain management, and resilience planning. Public engagement by the center should help residents and community leaders understand strategies for preparedness, mitigation, and resilience. Similar centers in other states include the Iowa Flood Center at the University of Iowa and the Institute for a Disaster Resilient Texas at Texas A&M University.

Flood Risk Disclosure Law

In April 2024, the Maine Legislature passed a flood disclosure law requiring real estate sellers to provide buyers with flood risk information. Sellers must disclose if a property is in a FEMA-designated flood hazard area, any past flood events, active flood insurance costs, and prior flood-related claims or disaster aid. This law enhances transparency, ensuring buyers understand potential risks before purchasing. Many buyers overlook flood risk, so this measure helps them make more informed decisions and know when to take proactive steps to avoid future loses.

State Spotlight: Iowa

The Iowa Flood Center is the nation's only academic research center devoted solely to flooding. The Center develops tools and reliable information to help community leaders, homeowners, and businesses make better flood-related decisions. The Center's work is accessible to everyone through the online Iowa Flood Information System, which communicates real-time information about stream levels, flood alerts and forecasts, and hydrologic conditions for the entire state.

Strategy Implementation Table III. 9

Activity	Timeframe	Lead (and partners)	Status	Resources
Launch an Online Risk Data Hub that centralizes existing information and maps on natural hazards and climate risks, enabling communities and other users to assess vulnerability.	0-2 years	MOCA State Resilience Office (with MEMA, GEO, and other agencies)		LD 1 provides funding and staffing
Develop accessible products and tools for communities based on coastal and inland flood risk models.	0-2 years	MOCA State Resilience Office (with DOT, DACF, MEMA)		Existing NOAA CRRC grant
Analyze flood insurance data to develop a more accurate assessment of flood risk.	0-2 years	MOCA State Resilience Office		LD 1 provides funding
Establish a statewide communication and public information program (similar to Texas' BuyersAware website) that informs local decision makers and residents about the risk from flooding and other hazards, providing guidance on how they can mitigate potential adverse impacts.	0-2 years	MOCA State Resilience Office		LD 1 provides funding
Increase the number of river and tide gauges to improve real-time access to water level monitoring and predictions.	6-10 years	DACF Maine Geologic Survey		
Establish a Center for Disaster Risk Analysis in partnership with universities and philanthropy that will identify critical data gaps, develop new analytical capabilities, and train a workforce skilled in risk communication and management.	6-10 years	Universities and philanthropy community		

10. Maximize federal funding for disaster recovery and proactive resilience projects.

Uncertainty about the future of federal funding programs and policies has grown since the Commission's interim report was published. The state will continue to monitor the status of federal programs and pursue available funding opportunities that align with state priorities. Maine currently has active resilience-related grants from NOAA's Climate Regional Resilience Challenge, the Department of Energy's Grid Resilience and Innovation Partnership Program, FEMA's Hazard Mitigation Assistance grant programs, and other federal programs.

As described above, the state's NOAA grant expands capacity through the Regional Resilience Collaborative to help communities develop infrastructure resilience projects. These regional coordinators are helping communities identify and develop project scopes, and find and apply for state, federal, and philanthropic funds to implement the projects. Following disasters, communities need additional capacity to manage the tasks and coordination required to access federal reimbursement for infrastructure repairs. Towns, regional councils, and the state should plan ahead for this capacity need in preparation for future disasters.

LD 1 establishes the state's non-federal cost share needed for MEMA to apply for FEMA's Safeguarding Tomorrow Revolving Loan Fund program. These state and federal funds will capitalize a state revolving fund that makes low interest loans to municipal, county, and tribal governments for hazard mitigation and infrastructure resilience projects. With additional capitalization and loan repayments, the fund becomes a self-sustaining source of financing for expensive community infrastructure improvements.

Strategy Implementation Table III. 10

Activity	Timeframe	Lead (and partners)	Status	Resources
Assist communities through the regional councils to navigate complex federal grant programs.	0-2 years	MOCA Community Resilience Partnership	Regional Resilience Collaborative	Existing NOAA CRRC grant
Develop and launch the Safeguarding Tomorrow Revolving Loan Fund to support hazard mitigation and infrastructure resilience projects.	0-2 years	MEMA		LD 1 provides non-federal match and staffing
Adopt an enhanced State Hazard Mitigation Plan to qualify for additional federal resilience funding.	3-5 years	MEMA (with other agencies)		
Develop and implement a funding plan that maintains state, regional, and local capacity built with funds from Maine's NOAA CRRC grant and transitions successful grant-funded activities to other funding sources.	3-5 years	MOCA State Resilience Office (with Governor's Office and agencies)		

11. Develop long-term funding and financing strategies for infrastructure resilience.

Maine must begin with urgency to become more self-reliant in generating the financial resources required for hazard mitigation, disaster recovery, and resilience. Increasingly costly storms and aging infrastructure create a pressing need to develop long-term funding and financing strategies that sustain momentum and allow Maine to address complex and expensive infrastructure vulnerabilities. Drinking water, wastewater, and stormwater infrastructure, along with transportation, energy, communications, and broadband are some of the most expensive systems to upgrade or relocate for resilience and will benefit from robust funding and financing strategies.

Both the state and communities must begin to think seriously about the benefits and tradeoffs of generating new revenues, reserving funds for future needs, borrowing for current needs, and insuring assets against future losses. State and local governments will need to consider two complementary aspects of financing resilience: a banking function that connects capital with resilience projects, and an insurance function that provides property owners, including state and local government entities, with a pathway to recovery when there is a loss.

The state will conduct a comprehensive assessment of funding options for planning and project implementation that leads to the development of a sustainable, long-term resilience financing strategy. The assessment will identify opportunities to 1) optimize existing state funding and programs, especially in ways that leverage larger federal funds where possible; 2) suggest items that require a state budget strategy; and 3) propose new funding sources beyond the state budget. The process will include a study to explore policy, regulatory, and legislative options for execution of the strategy, including the potential for a centralized financing entity such as a resilience bank and the feasibility of an insurance mechanism for public infrastructure.

State Spotlight: Rhode Island

The Rhode Island Infrastructure Bank is Rhode Island's central hub for financing infrastructure improvements, including climate resilience, for municipalities, businesses, and homeowners. The Infrastructure Bank leverages limited capital in a revolving fund to offer financing for an array of infrastructure-based projects including water and wastewater, roads and bridges, and energy efficiency and renewable energy.

RHODE ISLAND INFRASTRUCTURE BANK

State Spotlight: Vermont

The State of Vermont's Emergency Relief and Assistance Fund covers up to 17.5 percent of FEMA's non-federal cost share requirement for communities that adopt certain resilience policies and just 7.5 percent for communities that choose not to participate. At a special resilience meeting of the Maine Climate Coucil in January, Julie Moore, Secretary of the Vermont Agency of Natural Resources, explained, "In terms of Vermont's key tools and approaches, a big piece has been aligning state programs, funding, and incentives. This includes the Emergency Relief and Assistance Fund program that increases cost shares for municipalities who are taking the necessary steps to improve their infrastructure."

Strategy Implementation Table III. 11

Activity	Timeframe	Lead (and partners)	Status	Resources
Assess the state's funding need for infrastructure resilience projects over the next 10 years and its ability to borrow or raise revenues for those projects.	0-2 years	GOPIF and State Resilience Office		Existing NOAA CRRC grant
Convene a work group to develop a plan for sustained, long-term funding sources and the banking and lending mechanisms (e.g., bonds, revenues, a resilience bank) for improving the resilience of Maine's infrastructure.	0-2 years	GOPIF and State Resilience Office		Existing NOAA CRRC grant
Strengthen MEMA's Disaster Recovery Fund (DRF): Raise or eliminate the Fund's statutory balance limit. Provide a reliable, long-term funding allocation. Revise the Fund's chapter rule to prioritize provision of the non-federal cost share to FEMA disaster programs resulting from a Presidentially Declared Disaster or Emergency and to prioritize building back with greater resilience after disasters. Restructure the Fund's non-federal cost share formula to incentivize municipal adoption of resilience practices and higher standards.	3-5 years	MEMA (with GOPIF and MOCA)		Would require legislative action
Convene a work group to evaluate the feasibility of various insurance models for public infrastructure and private working waterfront properties.	3-5 years	GOPIF and State Resilience Office		Existing NOAA CRRC grant
Expand loan and incentive programs to help businesses that support infrastructure projects (such as construction firms and engineering firms) to invest in equipment and systems for resilience-related projects.	6-10 years	DECD		Requires budget/ legislative action

THE COMMISSION'S PROCESS

Overview of the Commission's Work

The Commission is co-chaired by Dan Tishman and Linda Nelson, and consists of 24 individuals, including state and local officials; representatives of affected communities, businesses, and industries; and experts in infrastructure, construction, engineering, electrical utilities, floodplain management, financing, philanthropy, emergency response, and climate science. Staff from the Governor's Office of Policy Innovation and the Future and Maine Emergency Management Agency provide policy and technical support, while a consulting team provides analytical services, strategy research, and expertise in disaster resilience practices.

The Commission held public listening sessions and site visits in Stonington, Old Orchard Beach, Saco, Rumford, Mexico, Jay, Rockland, Machias, and Caribou. The listening sessions allowed the Commission members to learn directly from town leaders, municipal and county emergency managers, and impacted residents and businesses. The Commission's official meetings, held both virtually and in person between May 2024 and May 2025, engaged experts from other states, including Vermont, Texas, and Colorado, and leveraged the expertise of each Commission member.

In November 2024, the Commission published an interim report that captured priority topics and draft recommendations from its first 6 months of work. The co-chairs released the interim report in Hallowell, where floodwaters from the Kennebec River inundated the downtown during the December 2023 storm. The report identified rebuilding and preparedness priorities for Maine in the immediate and near term and outlined additional considerations for long-term resilience.

Following the release of the interim report, the Commission convened for further discussion and deliberation between December 2024 and April 2025. During this time, Commission members identified areas that required further attention, leading to the creation of four small groups, each of which met at least twice for deeper exploration of certain topics. These small groups provided the rest of the Commission with suggestions, and members continued to build on and refine the draft recommendations and resolve any gaps across the plan. After deepening their analysis, the Commission developed its final report.

Community Listening Sessions

The Resilience Commission held listening sessions throughout Maine to hear about storm impacts and recovery efforts from local leaders, emergency responders, and municipal staff. Visits included Stonington in Hancock County; Old Orchard Beach and Saco in York County; Rumford and Mexico in Oxford County; Jay in Franklin County; Rockland in Knox County; Machias in Washington County; and Caribou in Aroostook County.

During visits to Maine's coastal counties, Commission members toured areas impacted heavily during the January 2024 storms. These storms impacted much of Maine's diverse coastline, ranging from severe sand dune erosion in southern Maine's low-lying coastal areas to flooding and wave damage in Midcoast and Downeast Maine's rocky harbors and shorefronts. During visits to Maine's inland counties, Commission members toured areas heavily impacted by the June 2023 and December 2023 storms. Community leaders in Franklin, Oxford, and Aroostook counties spoke of heavy rain and fast-rising water levels that stranded people, washed out roads, closed businesses, and damaged homes and neighborhoods.

Each listening session and site visit provided Commission members with local examples of the challenges communities face as they recover from storm damage and prepare for future storms.

Stonington Listening Session

Stonington, located in Hancock County, is one of the most productive working waterfronts in Maine. Stonington and neighboring Deer Isle experienced significant impacts from the January 2024 storms, including extreme flooding that closed and damaged many public roads and storm surge that severely damaged public and private working waterfront infrastructure.

The Deer Isle Causeway, the sole access to Deer Isle and Stonington, was overtopped and impassable during much of the storms' duration. The Commission's site visit to Stonington included the Governor's signing of the Executive Order to Establish the Commission on Infrastructure Rebuilding and Resilience, a tour of storm impacts and rebuilding efforts, and a listening session with local leaders.

George O'Keefe, Rumford Town Manager, addresses the Commission during their visit to tour storm related impacts there in 2024.

Old Orchard Beach and Saco Listening Session

In York County, the increasing frequency and severity of coastal storm events represent a major threat to the region's visitors, jobs, and wages. The back-to-back January 2024 storms brought hazards including snow, rain, wind, flooding, storm surge, and power outages to York County. In the aftermath of the January storms, county officials mobilized to address the impacts of these storms but faced significant bureaucratic, financial, and logistical challenges.

The Commission visited Camp Ellis in Saco, a residential beach community at the mouth of the Saco River. A mile-long jetty constructed by the Army Corps of Engineers in the 1870s was intended to keep the river mouth navigable by preventing sedimentation. Instead, the jetty deprives the adjacent beach of its source of sand and concentrates wave energy on the beach dune during storms. The beach is now almost entirely eroded, leaving little natural defense for the community and infrastructure at Camp Ellis.

Rumford, Mexico, and Jay Listening Session

The Commission visited Rumford, Mexico, and Jay to meet with local leaders and view areas impacted by multiple flooding events in 2023. The towns of Rumford and Mexico are located along the Androscoggin River in Oxford County. Like numerous towns in western Maine, Rumford and Mexico experienced severe flooding impacts during the December 2023 storm that dropped approximately 7 inches of rain on the region and caused the Androscoggin River and adjacent tributaries to overtop roads, flood houses, wash out culverts, and cause extensive damage. The town of Jay is located along the Androscoggin River in Franklin County and experienced washouts during repeated storms in May, June, and December of 2023.

Rockland Site Tour

The Commission visited Rockland for a tour of waterfront infrastructure that sustained damage during the January storms. Rockland's multi-use piers and related facilities serve commercial and recreational vessels, are home to various marine businesses, and enable transportation and emergency services for island communities. Adjacent landside parks host three major festivals each year that bring thousands of visitors to the region. The city has undertaken extensive resiliency planning in recent years to guide improvements to waterfront facilities, park spaces, and adjacent infrastructure. The plans include "flexible resilience" that prepares for sea levels 2.7 feet higher than today and allows for additional adaptive measures in the future without requiring a full rebuild of the facilities. The city has secured state and federal funding for some phases of construction and is in need of additional funding to fully implement the plans.

Machias Listening Session

The Commission visited Machias to meet with local leaders, view areas impacted by flooding, and learn about climate resiliency measures the town is pursuing. Machias is the county seat of Washington County and serves as a key service center for the region. Machias has a highly vulnerable downtown waterfront with a complex environment of natural and manmade features. Three major freshwater rivers enter Machias Bay — the Machias River, the Middle River, and the East Machias River — and the Bay's natural tidal funneling effect causes high vertical tidal range. In addition, the bowl-shaped geography of downtown Machias causes high stormwater flow into the area during precipitation events, stressing the town's aging stormwater infrastructure and further exacerbating tidal and freshwater flooding.

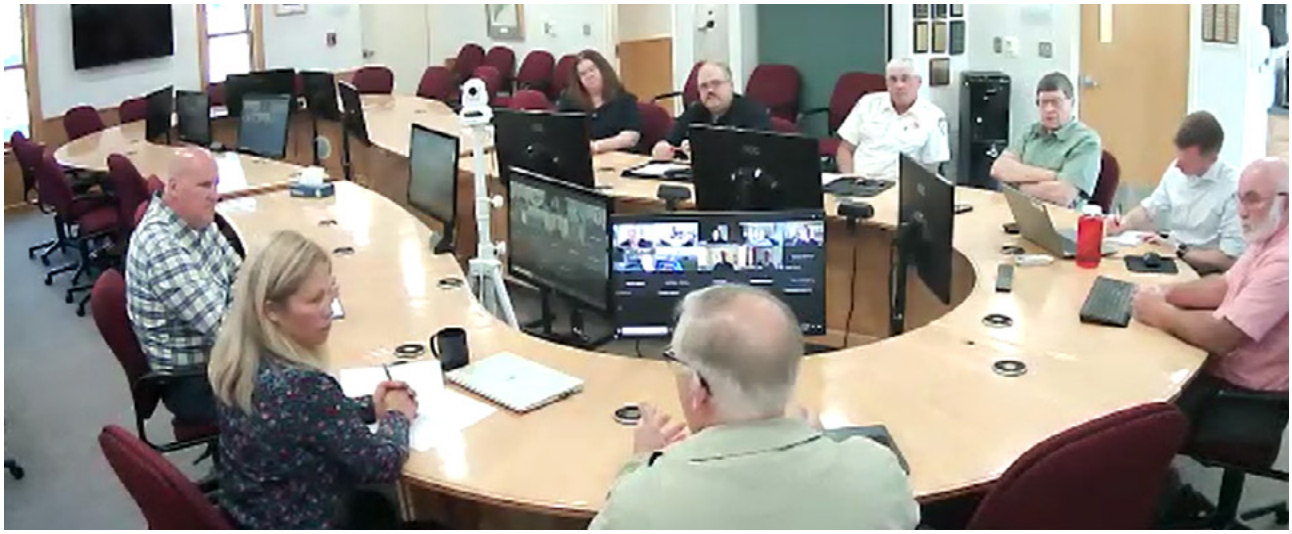
U.S. Highway Route 1, which cuts through downtown Machias and serves as a major road artery in the region, passes over the Machias Dike. The Machias Dike and causeway is an embankment structure with multiple box culverts, timber and stone masonry, earthen fill, and tidal flap gates. The dike crosses the Middle River where the river joins the tidal portion of the Machias River. The dike is severely deteriorated from a transportation infrastructure standpoint and restricts tidal flow and fish passage to the upstream tidal marsh of the Middle River. During storm events, including the January 2024 storms, prevailing winds out of the south and southeast push water and waves directly at the dike. Storm surge causes water to flow over the dike leading to further deterioration and flooding of the adjacent downtown areas. The storms also damaged the Down East Sunrise Trail, a popular multi-use corridor connecting eastern Maine that passes through Machias and serves as an economic engine for the town.

Aroostook County Listening Session

The Commission conducted a hybrid virtual and in-person listening session in Caribou in Aroostook County. Regional leaders and emergency managers and local officials from Caribou, Frenchville, Limestone, Presque Isle, and Van Buren shared experiences from storm events experienced in the last few years, updates on resilience planning, and details on regional needs. Aroostook County flood maps are out of date, making it challenging to assist communities in resilience planning for floods. Local leaders noted several challenges specific to Aroostook County's northern location. For example, fuel is typically delivered to the county from southern Maine, exposing a risk that poor weather and storm events may cause delays in fuel reaching northern towns. The electrical system in the region is antiquated, and mitigating potential long-term power outages is a resilience focus area for the county. Managing an extended outage includes addressing access to resources such as food and fuel, as well as systems such as communications, work, and banking.

Hallowell Press Event

The Commission held a press event in Hallowell to release its interim report and recommendations. At the event, the owners of a Water Street property shared their story of recovering from the December 2023 flood, which included replacing all floor joists on the first floor for the affected businesses, mold remediation, foundation strapping, re-insulation, electrical work, basement flood vent installation, sump pumps, and sloped drainage to allow for easier water recession. The owners were aided by a Business Recovery and Resilience Fund award from the Department of Economic and Community Development.



On September 6, 2024, Commission members visited Caribou to meet with regional and local leaders and emergency managers, and discuss storm events the region had experienced in the last few years as well as resilience planning needs across Aroostook County.

Local business owner Rich Friscia, above, leads local leaders on a tour of his historic Hallowell building on Water Street, which was lifted from its foundation by flood waters in the December 2024 storm. The building has now been repaired with funding through a state business resiliency grant to help it withstand future storms.

Commission Meetings

Between July 2024 and May 2025, the Commission convened regularly to hear perspectives from local leaders and state experts on Maine's current approach to response, recovery, and rebuilding from extreme storms, and considerations of how to improve the state's approach moving forward. The Commission also heard from other states — including Texas, Vermont, and Colorado — about lessons learned from flood and disaster responses and subsequent infrastructure resiliency policies and projects. During October and November 2024, the Commission reviewed and refined recommendations and determined priority areas.

Expert presentations and key discussions included the following:

- **2023-2024 Storms and Climate Connections, Sea-Level Rise**: A presentation from the Maine Geological Survey and University of Maine highlighted recent climactic trends in Maine. Maine's climate is getting warmer and wetter with more extremes and variability. The rate of sea level rise has been increasing from 0.8 inches per decade on a long-term scale, to about 2.0 inches per decade since 2002. Mean sea levels set numerous records in 2023 and 2024. The storms on January 10 and January 13, 2024, set records along Maine's coastline due to coinciding storm surge, tide level fluctuations, and sea-level rise.

- **Storm Preparation, Response, and Delivery**: The Maine Emergency Management Agency (MEMA) provided information on the agency's role in coordinating support across all phases of emergency management from mitigation and preparedness to response and recovery.

- **Lessons learned from the Rebuild Texas Commission**: Dr. Sam Brody, Director of the Institute for a Disaster Resilient Texas at Texas A&M University, provided a summary of the Texas "Eye of the Storm" report developed following Hurricane Harvey. The report provided a flood mitigation framework organized in four components: Avoid, Accommodate, Resist, and Communicate.

- **Lessons from Vermont: Policy actions taken after Tropical Storm Irene**: Vermont experienced major flooding in 2011 and again in 2023 and 2024. Julie Moore, Vermont's Secretary of Natural Resources, shared key tools and approaches Vermont has implemented to increase the state's flood resilience, including establishing a Municipal Technical Assistance Program, an Emergency Relief Assistance Fund, and a Flood Resilient Communities Fund. Based on lessons from Vermont, Commission members discussed emerging recommendations, such as exploring state codes and standards, bolstering the state's municipal technical assistance programs, leveraging regionalism and partnerships as vehicles to scale solutions, reducing barriers to funding opportunities, and statewide insurance mechanisms. The Commission discussed the need to better understand changes in risk; ways of evaluating costs and risks when making decisions; and available information, modeling, and digital tools related to flood risk (for example, climate-informed floodplain modeling).

- **Working Waterfront Overview & Perspectives on Working Waterfront Resilience**: The Department of Marine Resources provided an overview of the status of working waterfront infrastructure in Maine and existing programs in the state that support and protect working waterfronts. Much of Maine's working waterfront infrastructure experienced severe storm damage in the January 2024 storms. In addition, working waterfront infrastructure faces pressure from competing uses, redevelopment, and disrepair. A panel of working waterfront stakeholders shared perspectives on the challenges facing the waterfront construction and engineering industry, and barriers faced by municipalities to address working waterfront resiliency in their communities.

- **Managing the Unavoidable: Capacity and Planning, Permitting, and Paying for Resilient Infrastructure**: The Maine Climate Council's Community Resilience Working Group provided

a summary of their recommendations to assist communities in understanding their exposure to climate threats and taking proactive steps to become more resilient. MEMA provided an overview of capacity challenges within their agency, detailing the limited capacity among staff to take on additional resiliency planning responsibilities (exacerbated by multiple federal disaster recovery processes). The Department of Environmental Protection (DEP) provided an overview of permitting processes, proposed legislation, and the need for customer support capacity to field calls, complete site visits, and advise permit seekers. The Maine Bureau of Insurance provided an overview of flood insurance programs and the relatively low participation in Maine and offered considerations for improvement.

- **State of Maine Energy Landscape & Electric Utility Resilience**: The Maine Governor's Energy Office gave an overview of the energy challenges in Maine and several potential recommendations for consideration, including expanding baseline assessments of outages and grid vulnerabilities, adopting clean-energy technologies, exploring innovative solutions, engaging regionally to advance cost-effective reliability systems, and planning for challenges in volatile fuels that impact home heating. The Maine Public Utilities Commission gave an overview of grid planning, climate resilience planning, and addressing storm damage costs. The Commission also heard from Maine's two investor-owned electric utilities, Central Maine Power and Versant Power, about storm impacts, recovery, and long-term resiliency efforts.

- **Lessons from Colorado: Colorado Grid Resilience Strategy & Funding**: The Commission heard from the Colorado Energy Office and Colorado Resilience Office about Colorado's approaches to grid resilience, microgrid grant program, and cooperation with utilities and communities.

- **Water-Related Systems and Infrastructure**: The Commission heard from state officials about Maine's drinking water, wastewater, and stormwater infrastructure to inform their understanding of resilience upgrade needs.

Between December 2024 and April 2025, Commission meetings shifted to condensing learnings, identifying gaps, and building a structure and framework for a final report and infrastructure plan. The following months included small group discussions with the opportunity to have more in-depth and thematic conversations. Expert presentations and key discussions of new material included:

- **Flood Risk Data Status and Analyses, Part 1**: Dr. Sam Brody and Dr. Wesley Highfield presented a survey of the flood data landscape in Maine. Current data on natural features, structures, and social vulnerability is robust but there are issues with the age and resolution of information, such as the floodplain maps which need to be updated for accurate planning and risk communication.

- **Flood Risk Data, Part 2**: Dr. Wesley Highfield provided an update on an analysis of flood risk using the National Flood Insurance Program's repetitive loss and insurance penetration data, and exposure across commercial, industrial, public and residential buildings.

- **National Review Panel Feedback**: Basilia Yao and Dr. Sam Brody reported on feedback about the November interim report gathered from interviews with national experts on disasters, flood mitigation, and resilience including plan implementation advice.

Small Group Discussions

To efficiently address the complex challenges related to Maine's infrastructure resilience, between February and March 2025 the Commission met in several small group convenings to examine the needs of specific topics. These groups were tasked with exploring the details of Maine's current challenges and providing suggestions with innovative ideas and solutions to the full Commission. Small group topics included:

- **Vulnerable Infrastructure Prioritization and Working Waterfront Stakeholder Group**: Across multiple categories of infrastructure, facilities and systems need to become more resilient to climate impacts. The group discussed sequencing and prioritization approaches for investment of limited resources. To prioritize what seems like an insurmountable amount of need, the group identified three key criteria: protecting life and public safety, preserving public health, and preventing economic damage. Proactive risk mitigation was recognized as a more cost-effective path than post-disaster rebuilding, and economic analysis tools will be needed to help adequately upgrade infrastructure without paying for more than is needed. Beyond designing and installing infrastructure, planning and engagement with communities early in decision making should be part of problem-solving. A working waterfront stakeholder group held parallel conversations and discussed a systematic inventory and regional approach to protecting Maine's working waterfront infrastructure.
- **Workforce, Business Development, and Municipal Capacity**: Maine will need specialized expertise throughout the public and private sectors that can plan, design, implement, and evaluate resilience and rebuilding efforts. Investments in existing initiatives with a proven record of success must be complemented by imaginative new strategies and partnerships to ensure a healthy supply of well-trained workers (including municipal and regional workers) and businesses that can tackle these challenges. Expanding workforce pathways through training programs, funding resilience-related fields, and faculty positions in high-need disciplines, would strengthen the base of skilled workers. Supporting municipal capacity through increased funding for emergency management professionals, structured guidance for local governments, and a public communications strategy on resilience all enhance locally led resilience measures. Enhancing business engagement and stability would further ensure resilience projects are structured to provide a steady stream of work for businesses, and exploring targeted loan or

In July 2024, the Commission met with local leaders from the Towns of Rumford, Mexico, and Jay, and emergency managers from Oxford County Emergency Management Agency to discuss impacts from storms over the past two years and subsequent recovery and rebuilding efforts. Community leaders highlighted the need for administrative support for documenting damages during the FEMA insurance reimbursement process, as well as planning and engineering technical assistance for rebuilding with resilience.

incentive programs could help businesses invest in equipment and infrastructure for resilience related projects.

- **Permitting & Building Codes**: The challenge of rebuilding infrastructure after a storm and preparing infrastructure to be more resilient for future storms encompasses increasingly complex and technical projects that require engineering expertise and time-sensitive decisions. Addressing regulatory obstacles at the federal, state, and local levels will all be necessary to help streamline the permitting process. The group discussed revising federal work windows for rebuilding and resilience by addressing inconsistencies that can hinder projects, while still ensuring environmental protections. Expanding permit-by-rule for certain activities that increase the resilience of a property or structure were identified as paths for long-term storm preparation and faster rebuilding. To bolster building code enforcement, the small group emphasized the value of mentorship, networking building, training, and other resources. When code officers have access to training and resources, they can support communities not just with enforcement but also be a source of expertise for safe and resilient building practices. For example, after severe storms when municipal staff capacity is stretched thin, code officers can often end up in recovery and planning roles.

- **Funding & Financing for Resilience Projects**: The State of Maine must become more active, capable, and self-resourced in anticipation of more frequent disasters. In conversations about the scale of resources needed to proactively and reactively pay for disaster damage, the group identified activities at the state and municipal level to advance financing. Steps such as evaluating borrowing capacity and potential revenue sources, strengthening the Disaster Recovery Fund (DRF) through long-term funding, assisting municipalities to establish resilience reserve accounts, incentivizing regional approaches to infrastructure investment, and exploring models for insuring public infrastructure and working waterfronts were all proposed for consideration.

Analysis and Research

The Commission secured the services of a consulting team consisting of Dr. Samuel Brody and Dr. Wes Highfield of Texas A&M University and Basilia Yao of Matter+Form Consulting. The team's members supported commissions in Texas following Hurricane Harvey and in New York City following Superstorm Sandy. Among several specialties and services, the team analyzed data related to flood risk and disaster recovery funding in Maine.

Analyses utilized OpenFEMA datasets to evaluate funding disbursed in the aftermath of disasters, with a focus on understanding the distribution of federal assistance. The datasets include FEMA Public Assistance, Individual Assistance, hazard mitigation grants, and National Flood Insurance Program claims. These analyses involve tracking the allocation of disaster relief funds across counties and over time.

From these analyses, the Commission gained a more nuanced picture of flood risk across the state. The consultant team:

- Conducted a data gap analysis, including an assessment of existing datasets, their applications, and appropriateness for inclusion in analyses that address flood risk and mitigation. The gap analysis includes data held by the state and existing open federal sources.

- Evaluated flood risks, storm surge threats, and vulnerabilities using a range of data and methodologies. Risk status is based on factors such as floodplain map ages, storm surge risk to both structures and populations, and LiDAR data to determine the readiness of high-resolution elevation models.

- Assessed the social vulnerability of communities using standardized measures, including Maine's social vulnerability data and health-based measures from the Behavioral Risk Factor Surveillance System (BRFSS). Additionally, risks from natural-technical hazards (NATECH) will be evaluated based on federal Toxic Release Inventory (TRI) and EPA Superfund locations.

- Evaluated flood risks that may exist outside of officially delineated floodplains, particularly focusing on high-water marks and areas with National Flood Insurance Program claims and policies in X-zones.

- Cataloged agricultural losses from past floods, with cross-references to recovery grants funded by the U.S. Department of Agriculture.

- Assessed the distribution of existing flood insurance policies, the status of structures in high-risk zones, and the state of pre-FIRM claims, second home claims, and repetitive loss/severe repetitive loss properties.

- Provided links to potential funding opportunities, particularly in relation to projects and needs identified in Maine's state hazard mitigation plan.

- Proposed conceptual methodologies for generating future mapping resources, including delineating hazard overlay districts and watershed planning districts that can be used to inform future growth and development while reducing flood risks.

The consultant team developed a series of issue briefs with recommendations drawn from successful examples across the country, tailored to needs and opportunities in Maine:

- Local Capacity Building for Storm Risk Reduction
- Maine Disaster Data Service
- Disaster-Related Funding and Technical Assistance
- Risk Communication and Awareness
- Resilience Overlay Districts
- Local Participation in the FEMA Community Rating System (CRS)
- Adoption of Disaster-Resilient Building Codes
- Statewide Watershed Planning Program for Flood Risk Reduction

An aerial view of storm damage to the waterfront in New Harbor in 2024. Credit: Island Institute

COMMISSION MEMBERS

A representative with expertise in hazard mitigation:

Sam Roy, Supervisory Physical Scientist, United States Geological Survey

A leader from Maine's philanthropic sector:

Deborah Ellwood, President, Maine Community Foundation

An expert in climate science and related storm events:

Peter Slovinsky, Marine Geologist, Maine Geological Survey

A representative with expertise in infrastructure finance and planning:

Charlie Colgan, Center for the Blue Economy, Middlebury Institute of International Studies at Monterey, and Professor Emeritus, University of Southern Maine.

A representative with expertise in insurance:

Robert Carey, Superintendent, Maine Bureau of Insurance

A representative of populations facing disproportionate impacts from storm events:

Noël Bonam, State Director, AARP Maine

A representative of an electrical utility:

Joseph Purington, President & CEO, Central Maine Power

Representatives from the construction industry:

Dan Tishman (Co-Chair), Principal and Chairman, Tishman Realty & Construction

Jack Parker, Chairman & CEO, Reed & Reed

A representative of the engineering industry:

Lissa Robinson, Senior Civil Engineer and Hydrogeologist, GEI Consultants

Representatives from impacted industries:

Curt Brown, Marine Biologist, Ready Seafood; Lobsterman; Co-Chair, Coastal and Marine Working Group, Maine Climate Council

Jim Murton, Owner, North Country Rivers; Registered Maine Guide

Two representatives from municipal government:

Shiloh LaFreniere, Town Manager, Town of Jay

Linda Nelson (Co-Chair), Director of Economic and Community Development, Town of Stonington

A representative from a regional council or county government:

Emily Rabbe, Lincoln County Regional Planning Commission

Members from state agencies

Bruce Van Note, Commissioner, Maine Department of Transportation

Patrick Keliher, Commissioner, Maine Department of Marine Resources (Through March 2025)

Carl Wilson, Commissioner, Maine Department of Marine Resources

Heather Johnson, Commissioner, Maine Department of Economic and Community Development

Amanda Beal, Commissioner, Department of Agriculture, Conservation and Forestry (designee: Judy East, Director, Bureau of Resource Information and Land Use Planning)

Melanie Loyzim, Commissioner, Maine Department of Environmental Protection

Dr. Puthiery Va, Director, Maine Center for Disease Control and Prevention

Peter Rogers, Director, Maine Emergency Management Agency

Hannah Pingree, Director, Governor's Office of Policy Innovation and the Future

Dan Burgess, Director, Governor's Energy Office

EXECUTIVE ORDER 8

An Order Establishing the Maine Infrastructure Rebuilding and Resilience Commission

FY 23/24

WHEREAS, Maine communities endured severe damage from record-breaking riverine flooding, coastal storm surge, and high winds during three extreme storm events striking in rapid succession between December 18, 2023 and January 13, 2024;

WHEREAS, communities suffered more than $90 million in damage to public infrastructure as a result of these storms and millions of dollars more in damage to private property, businesses, and homes, demanding public investment to help restore a broad range of infrastructure that is critical to local communities and the state's economy;

WHEREAS, Maine has requested eight presidential disaster declarations for severe weather events in the past two years, far more than the preceding decade, challenging the state's emergency management systems and response capabilities;

WHEREAS, preexisting concerns such as increasing real estate valuations, the shortage of affordable housing, and diminishing working waterfront infrastructure combine to create policy and fiscal challenges for Maine's communities and economy;

WHEREAS, recovery and rebuilding resources will continue to be needed as extreme storms, inland and coastal flooding, and other natural hazards are projected to increase in frequency and severity as the climate warms;

WHEREAS, the Governor introduced, and the Legislature has now passed legislation to appropriate $60 million to the Maine Infrastructure Adaptation Fund, Working Waterfront Resilience Grant Program, and Business Recovery and Resilience Fund for grants to communities, businesses, and other entities to repair, rebuild, and adapt infrastructure to support public safety, protect essential community and economic assets, and ensure long-term resilience to increasingly severe weather;

WHEREAS, Maine has an opportunity to learn lessons for improving response and disaster recovery and long-term resilience from the Maine Emergency Management Agency's Disaster Recovery Team and from other states affected by catastrophic flooding and coastal storms; and

WHEREAS, philanthropy, private capital, and local, state, and federal government entities can collaboratively support and reinforce long-term rebuilding and resilience strategies that leave communities with less risk and better prepared for the next disaster.

NOW THEREFORE, I, Janet T. Mills, Governor of the state of Maine, pursuant to authority conferred by Me. Const. Art. V, Pt. 1, §§ 1 & 12, do hereby Order the following:

I. Commission Established; Purpose

A. The Maine Infrastructure Rebuilding and Resilience Commission ("Commission") is hereby established;

B. The purpose of the Commission is to advance and support the state's approach to response, recovery, and rebuilding related to the disasters of the preceding eighteen months, and provide analysis, lessons and strategies from this recovery period, and make a report and recommendations to:

1. Ensure that Maine is maximizing the use of all federal, state, municipal and private funding resources available for storm recovery and rebuilding and effectively deploying those funds alongside state resources;

2. Monitor and describe the limitations of federal, state, and private sources of funding, including insurance markets, on recovery and long-term resilience, and recommend both short-term solutions to fill immediate gaps and long-term mechanisms to sustain resilience investments into the future;

3. Explore and encourage public-private partnerships with private firms, engineering and consulting experts, as well as private investors and philanthropy, to support rebuilding efforts and long-term economic and community resilience in the face of storm recovery;

4. Document lessons from recovery activities that can be applied to future response and recovery efforts, including recommendations for improving state and local systems for community engagement and communications, response, and recovery;

5. Prepare a plan for Maine's infrastructure that increases resilience and speeds rebuilding through strategies that improve state and local planning, permitting, infrastructure design and engineering, finance mechanisms, workforce capacity, and related needs while leveraging available funding sources and capabilities; and

6. Build on recommendations from the Maine Climate Council and its working groups that are relevant to the work of this Commission, including those supporting working waterfronts, preparing for increasing coastal and riverine flooding, and informing policies intended to improve storm response and greater long-term resilience.

II. Membership and Chairs

The Commission shall consist of the following members:

1. The Commissioner of the Department of Transportation or their designee;
2. The Commissioner of the Department of Marine Resources or their designee;
3. The Commissioner of the Department of Economic and Community Development or their designee;
4. The Commissioner of the Maine Department of Environmental Protection or their designee;
5. The Commissioner of the Department of Agriculture, Conservation and Forestry or their designee;
6. The Director of the Maine Emergency Management Agency or their designee;
7. The Director of Governor's Office of Policy Innovation and the Future or their designee;
8. The Director of the Maine Center for Disease Control and Prevention or their designee;
9. The Director of the Governor's Energy Office or their designee;
10. A representative with expertise in hazard mitigation;
11. A leader from Maine's philanthropic sector;
12. An expert in climate science and related storm impacts;
13. A representative with expertise in infrastructure finance and planning;
14. A representative with expertise in insurance;
15. A representative of populations facing disproportionate impacts from storm events;
16. A representative of one of Maine's electrical utilities;
17. A representative with expertise in engineering;
18. Two representatives with expertise in construction and rebuilding;
19. Two representatives from impacted industries;
20. Two municipal leaders, one from an inland and one from a coastal community; and
21. A representative from a regional council or county government.

The Governor shall appoint two members to serve as Co-Chairs of the Commission.

III. Funding and Staffing

A. The Governor's Office of Policy Innovation and the Future shall provide such staff as may be necessary to fulfill the Commission's charge and may seek staffing and financial support from other state agencies and private entities to accomplish the goals and work of the Commission;

B. The Co-Chairs and the members of the Commission shall serve without compensation.

IV. Proceedings and Records

A. The Co-Chairs will preside at, set the agenda for, and schedule Commission meetings. The Commission shall meet as often as it deems necessary to complete its work. To the extent practical, and to the extent that its fact-finding mission is not hindered, the Commission should conduct its work in a manner that is open and accessible to the public. Records, proceedings and deliberations of the Commission are not subject to the requirements of 1 M.R.S. c. 13, in accordance with sections 402(2)(F), (3)(J) and § 403(6) of that Chapter. The Commission may conduct its work through subcommittees.

B. The Commission shall issue a public report of its findings to the Governor and Legislature. The Commission shall issue an interim report by November 15, 2024 and shall issue a final report no later than May 15, 2025.

Janet T. Mills
Governor

ACKNOWLEDGEMENTS

The Commission would like to thank the Maine Community Foundation and the North Light Foundation for their significant support of its work.

The Commission would also like to thank staff and consultants:

The staff of the Governor's Office of Policy Innovation and the Future, including

Brian Ambrette, Senior Climate Resilience Coordinator

Sarah Curran, Deputy Director, Climate Planning and Community Partnerships

Jackie Farwell, Deputy Director, Strategic Communications and Public Affairs

Maggie Kelly-Boyd, Natural Resources Climate Policy Advisor

Dan Matz, Policy and Data Analyst, Economy and Infrastructure

Jenna Isaacson Pfueller, Communications Manager

Hannah Silverfine, Climate Risk Management Project Coordinator

The staff of the Maine Emergency Management Agency, including

Anne Fuchs, Director of Mitigation & Recovery

And

Dr. Samuel Brody of Harpswell 10 Inc.

Dr. Wesley Highfield

Basilia Yao of Matter + Form

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APPENDIX: IMPLEMENTATION ACTIONS BY YEAR

Timeframe 0-2 years

Activity	Timeframe	Lead (and partners)	Status	Resources
Identify, prioritize, and strengthen vulnerable infrastructure.				
Assess the vulnerability of state-owned assets to climate change hazards and extreme weather. Develop vulnerability assessment protocols, resources, training, and assistance for communities to enable assessments at the community or regional levels.	0-2 years	All state agencies with GOPIF and State Resilience Office	In progress, assessment began in March 2025	Existing FEMA Hazard Mitigation Assistance grant
Develop a prioritization framework and metrics for investments within categories of vulnerable infrastructure using the following criteria: protection of life and public safety, preservation of public health, prevention of economic damages. Emphasize community input and leadership with support and guidance from the state.	0-2 years	GOPIF (with State Resilience Office and Governor's Infrastructure Implementation Committee)		Existing FEMA Hazard Mitigation Assistance grant
Develop a robust pipeline of local infrastructure resilience projects by providing planning, design, and engineering assistance to communities, thereby generating a steady stream of work for businesses.	0-2 years	MOCA Community Resilience Partnership		Existing NOAA CRRC grant
Assist communities to effectively assess and reduce risk.				
Expand tools and funding for communities and regions to assess vulnerabilities in infrastructure, including culverts and stormwater assets, drinking water and wastewater systems, transportation, communications, and other public and private facilities that are essential to local economies.	0-2 years	MOCA State Resilience Office and Community Resilience Partnership, with DACF, DOT MIAF, and other agencies	Community Resilience Partnership added technical assistance for vulnerability assessments in 2024.	Existing FEMA BRIC and NOAA CRRC grants; Community Resilience Partnership grants
Increase state and regional capacity to assist communities with flood and natural hazard risk reduction, prioritizing communities that are rural and vulnerable to natural disasters.	0-2 years	MOCA with the 10 regional councils	LD 1 creates Flood Ready Maine initiative and funds regional certified floodplain managers	LD 1 authorizes funding
Encourage philanthropies and nonprofit organizations to support capacity-building, pilots, and community engagement and education for resiliency.	0-2 years	Maine Community Foundation (with philanthropies and nonprofits)		

Activity	Timeframe	Lead (and partners)	Status	Resources
Develop a sustained public communications strategy to raise awareness, engagement, and support community dialogue about resilience efforts and long-term challenges.	0-2 years	MOCA State Resilience Office with other agencies		Existing NOAA CRRC grant
Establish a homeowners resilience program to provide grants to residents to strengthen their homes against damage and loss from severe weather.	0-2 years	DPFR Bureau of Insurance	LD 1 creates the Home Resiliency Program	LD 1 authorizes funding
Assist towns to take actions that reduce flood risk, protect property, increase participation in the National Flood Insurance Program, and lower flood insurance premiums.	0-2 years	MOCA State Resilience Office and Floodplain Management Program	LD 1 creates Flood Ready Maine initiative	LD 1 authorizes funding
Improve and protect energy infrastructure and increase energy resilience for customers.				
Facilitate the collection and publication of trend data on electricity outages and grid vulnerabilities.	0-2 years	GEO (with PUC, MEMA, and utilities)	Aligned with Maine Energy Plan Objective B, Strategy A	
Monitor energy reliability, volatility, and costs for electricity generation and delivery of fuels for home heating during extreme cold periods and winter storms. Continue to address through the advancement of the Maine Energy Plan and other efforts.	0-2 years	GEO (with regional industry partners)	Aligned with Maine Energy Plan, Objective B, Strategy A	
Protect and promote resilience across a diverse mix of public and privately owned working waterfront infrastructure.				
Identify and map the most vulnerable working waterfront infrastructure through a systematic, statewide approach, considering economically vital facilities, social vulnerability, and future growth opportunities. Ground truth vulnerability data with local knowledge from harbormasters and town staff.	0-2 years	DMR/MOCA Maine Coastal Program (with working waterfront stakeholders)		
Invest in resilience upgrades and ongoing maintenance of public working waterfront infrastructure to withstand sea level rise and extreme storms.	0-2 years	DMR and DOT		Existing NOAA CRRC grant and NOAA CDS funds
Strengthen privately owned working waterfront infrastructure by providing business resiliency planning support and engineering and permit assistance to design and complete resilience upgrades.	0-2 years	MOCA/DMR Maine Coastal Program (with DMR, DECD, DEP		NOAA CDS funds

Activity	Timeframe	Lead (and partners)	Status	Resources
Enhance communications during and immediately after emergencies.				
Upgrade emergency communication systems, practices, and training for state, county, and municipal leaders to ensure dependable communication with residents during emergencies.	0-2 years	MEMA		LD 1 provides funding and staffing
Develop strategies to streamline and improve information sharing among state, county, and local emergency managers and officials.	0-2 years	MEMA		LD 1 provides funding and staffing
Strengthen emergency coordination and rapid reaction capabilities across governments and with the philanthropic and nonprofit sector to alleviate immediate post-disaster needs.				
Develop and coordinate opportunities for the philanthropic and nonprofit sector to help fill needs not being met by disaster relief programs.	0-2 years	MEMA (with the Maine Long Term Recovery Board and philanthropy community)		
Expedite permitting for post-disaster rebuilding, infrastructure strengthening, and resilience projects.				
Develop temporary contracts at state agencies to increase capacity for permit application review during periods of high demand.	0-2 years	DEP (with other permit-review agencies)	Feb 2025: DEP has 13 willing and qualified vendors to assist	
Develop a list of suggested regulatory exemptions with appropriate environmental safeguards for emergency activities during and immediately following a disaster.	0-2 years	DEP (with other agencies)	Expand on LD2030 (2024)	
Convene a regulatory reform forum to identify potential changes to Department regulations to facilitate climate resilience, informed by outreach to affected stakeholders, including the private sector.	0-2 years	DEP (with other agencies)		Existing NOAA CRRC grant
Engage federal agencies (such as the Army Corps of Engineers and NOAA Fisheries) about permitting improvements such as restrictive in-water work windows, duplicative state and federal permits, and lengthy agency review times.	0-2 years	DEP and GOPIF (with other agencies)		
Create educational materials to raise awareness of permitting requirements, explain eligibility for expedited state permitting through permit-by-rule, and provide guidance for emergency rebuilding work.	0-2 years	DEP (with MOCA)		Existing NOAA CRRC grant and new positions requested in budget

Activity	Timeframe	Lead (and partners)	Status	Resources
Develop tools and education to make buildings more resilient.				
Review state building codes for opportunities to increase resilience and protect structures from storm and flood damage.	0-2 years	MOCA Building Codes program		
Improve data and information sharing to help leaders make informed decisions about risk.				
Launch an Online Risk Data Hub that centralizes existing regional and community-level hazard, risk, and vulnerability information.	0-2 years	MOCA State Resilience Office (with MEMA, GEO, and other agencies)		LD 1 provides funding and staffing
Develop accessible products and tools for communities based on coastal and inland flood risk models.	0-2 years	MOCA State Resilience Office (with DOT, DACF, MEMA)		Existing NOAA CRRC grant
Analyze flood insurance data to develop a more accurate assessment of flood risk.	0-2 years	MOCA State Resilience Office		LD 1 provides funding
Establish a statewide communication and public information program (similar to Texas' BuyersAware website) that informs local decision makers and residents about the risk from flooding and other hazards, providing guidance on how they can mitigate potential adverse impacts.	0-2 years	MOCA State Resilience Office		LD 1 provides funding
Maximize federal funding for disaster recovery and proactive resilience projects.				
Assist communities through the regional councils to navigate complex federal grant programs.	0-2 years	MOCA Community Resilience Partnership	Regional Resilience Collaborative	Existing NOAA CRRC grant
Develop and launch the Safeguarding Tomorrow Revolving Loan Fund to support hazard mitigation and infrastructure resilience projects.	0-2 years	MEMA		LD 1 provides non-federal match and staffing.
Develop long-term funding and financing strategies for infrastructure resilience.				
Assess the state's funding need for infrastructure resilience projects over the next 10 years and its ability to borrow or raise revenues for those projects.	0-2 years	GOPIF and State Resilience Office		Existing NOAA CRRC grant
Convene a work group to develop a plan for sustained, long-term funding sources and the banking and lending mechanisms (e.g., bonds, revenues, a resilience bank) for improving the resilience of Maine's infrastructure.	0-2 years	GOPIF and State Resilience Office		Existing NOAA CRRC grant

Timeframe 3-5 years

Activity	Timeframe	Lead (and partners)	Status	Resources
Identify, prioritize, and strengthen vulnerable infrastructure.				
Expand existing workforce training programs, including apprenticeships and pre-apprenticeships, service corps, and UMS's internship initiatives, with a focus on resilience-related fields such as construction, engineering, and community planning.	3-5 years	Dept. of Labor (with University of Maine System, Maine Community College System, Career and Technical Education programs, and Construction Training Programs)		
Assist communities to effectively assess and reduce risk.				
Assist towns to establish resilience reserve accounts and capital investment plans.	3-5 years	MOCA Community Resilience Partnership		Community Resilience Partnership grants
Provide data and education for communities to establish "resiliency overlay districts" using the best available science and data to reduce risk in areas where additional protective measures are needed.	3-5 years	MOCA		
Improve and protect energy infrastructure and increase energy resilience for customers.				
Develop an initial critical facility map using available energy resilience-related information.	3-5 years	GEO (with PUC and utilities)		
Enable the adoption of clean energy powered microgrids that enhance storm resilience, especially for critical services and facilities that serve vulnerable populations.	3-5 years	GEO (with PUC and utilities)		
Protect and promote resilience across a diverse mix of public and privately owned working waterfront infrastructure.				
Create new policy options, funding, and technical assistance, such as an entity outside of state government with the capacity to protect critical private working waterfront properties at risk of conversion to non-marine uses.	3-5 years	MOCA/DMR Maine Coastal Program (with DMR, LMF and working waterfront stakeholders and the philanthropy community)		
Enhance communications during and immediately after emergencies.				
Develop and strengthen relationships with vulnerable communities to ensure that all Maine people can quickly access trusted sources of emergency communications and disaster response.	3-5 years	MOCA (with MEMA and the Office of New Americans)		

Activity	Timeframe	Lead (and partners)	Status	Resources
Strengthen emergency coordination and rapid reaction capabilities across governments and with the philanthropic and nonprofit sector to alleviate immediate post-disaster needs.				
Increase engagement and education among county and municipal officials, the philanthropic and nonprofit sector, and donors about the mechanisms for requesting and providing disaster relief assistance.	3-5 years	MEMA (with Volunteer Maine, Maine Community Foundation, and other donors)		
Increase funding for emergency management staffing at state, county, and local levels.	3-5 years	State, county, and local governments.		
Assist communities to formalize networks and contracts for disaster recovery services (e.g., debris management, construction contractors).	3-5 years	MEMA (with county emergency management agencies)		
Expedite permitting for post-disaster rebuilding, infrastructure strengthening, and resilience projects.				
Propose expanded uses of permit-by-rule and include additional resilience-related practices (e.g., making wharves and piers more resilient).	3-5 years	DEP		
Develop tools and education to make buildings more resilient.				
Develop model ordinances, resilient building codes, and higher standards and assist municipal adoption to help communities reduce risks from flooding and other natural hazards. For example, consider the benefits and costs of incorporating relevant sections of the ASCE 24-24 Flood Resistant Design and Standards in the state's model floodplain ordinance.	3-5 years	MOCA Building Codes and Floodplain programs (with other agencies)		
Implement additional regional code enforcement programs with awareness of how codes and enforcement needs vary by region.	3-5 years	MOCA Building Codes program (with MEMA)	Build on recent regional code enforcement pilot project	Existing and future FEMA BRIC grants
Assist local permitters, inspectors, and code enforcement officers to be knowledgeable resources for property owners to access information and assistance, not only enforcement. • Grow continuing education offerings at community colleges and mentoring opportunities that support new code enforcement officers. • Broaden training opportunities for code enforcement officers with emphasis on resilience-related resources for property owners and intersections with permitting.	3-5 years	MOCA Building Codes program (with community colleges)		

Activity	Timeframe	Lead (and partners)	Status	Resources
Maximize federal funding for disaster recovery and proactive resilience projects.				
Adopt an enhanced State Hazard Mitigation Plan to qualify for additional federal resilience funding.	3-5 years	MEMA (with other agencies)		
Develop and implement a funding plan that maintains state, regional, and local capacity built with funds from Maine's NOAA CRRC grant and transitions successful grant-funded activities to other funding sources.	3-5 years	MOCA State Resilience Office (with Governor's Office and agencies)		
Develop long-term funding and financing strategies for infrastructure resilience.				
Strengthen MEMA's Disaster Recovery Fund (DRF): 1. Raise or eliminate the Fund's statutory balance limit. 2. Provide a reliable, long-term funding allocation. 3. Revise the Fund's chapter rule to prioritize provision of the non-federal cost share to FEMA disaster programs resulting from a Presidentially Declared Disaster or Emergency and to prioritize building back with greater resilience after disasters. 4. Restructure the Fund's non-federal cost share formula to incentivize municipal adoption of resilience practices and higher standards.	3-5 years	MEMA (with GOPIF and MOCA)		Would require legislative action
Convene a work group to evaluate the feasibility of various insurance models for public infrastructure and private working waterfront properties.	3-5 years	GOPIF and State Resilience Office		Existing NOAA CRRC grant

Timeframe 6-10 years

Activity	Timeframe	Lead (and partners)	Status	Resources
Identify, prioritize, and strengthen vulnerable infrastructure.				
Recruit more students into resilience-related fields such as engineering and community planning.	6-10 years	University of Maine System, Maine Community College System and Career and Technical Education programs		
Assist communities to effectively assess and reduce risk.				
Incentivize communities to take regional or watershed approaches to planning, prioritization and investment in risk reduction and resilient infrastructure.	6-10 years	MOCA		Community Resilience Partnership grants
Improve data and information sharing to help leaders make informed decisions about risk.				
Increase the number of river and tide gauges to improve real-time access to water level monitoring and predictions.	6-10 years	DACF Maine Geologic Survey		
Establish a Center for Disaster Risk Analysis in partnership with universities and philanthropy that will identify critical data gaps, develop new analytical capabilities, and train a workforce skilled in risk communication and management.	6-10 years	Universities and philanthropy community		
Develop long-term funding and financing strategies for infrastructure resilience.				
Expand loan and incentive programs to help businesses that support infrastructure projects (such as construction firms and engineering firms) to invest in equipment and systems for resilience-related projects.	6-10 years	DECD		Requires budget/ legislative action

The iconic Pemaquid Point Lighthouse shines bright again, after it was restored following damage from the winter 2024 storms. The century-old bell tower in Bristol was devastated when storm surge wiped out two brick walls from the historic structure. Volunteers salvaged some of the original bricks to help repair it, cleaned up debris immediately following, and Bristol Parks and Recreation worked to ensure the repairs were done as authentically as possible. Now, additional stainless steel rods will help hold the roof and walls together in the event of another storm event. **Credit: Town of Bristol**

Infrastructure
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