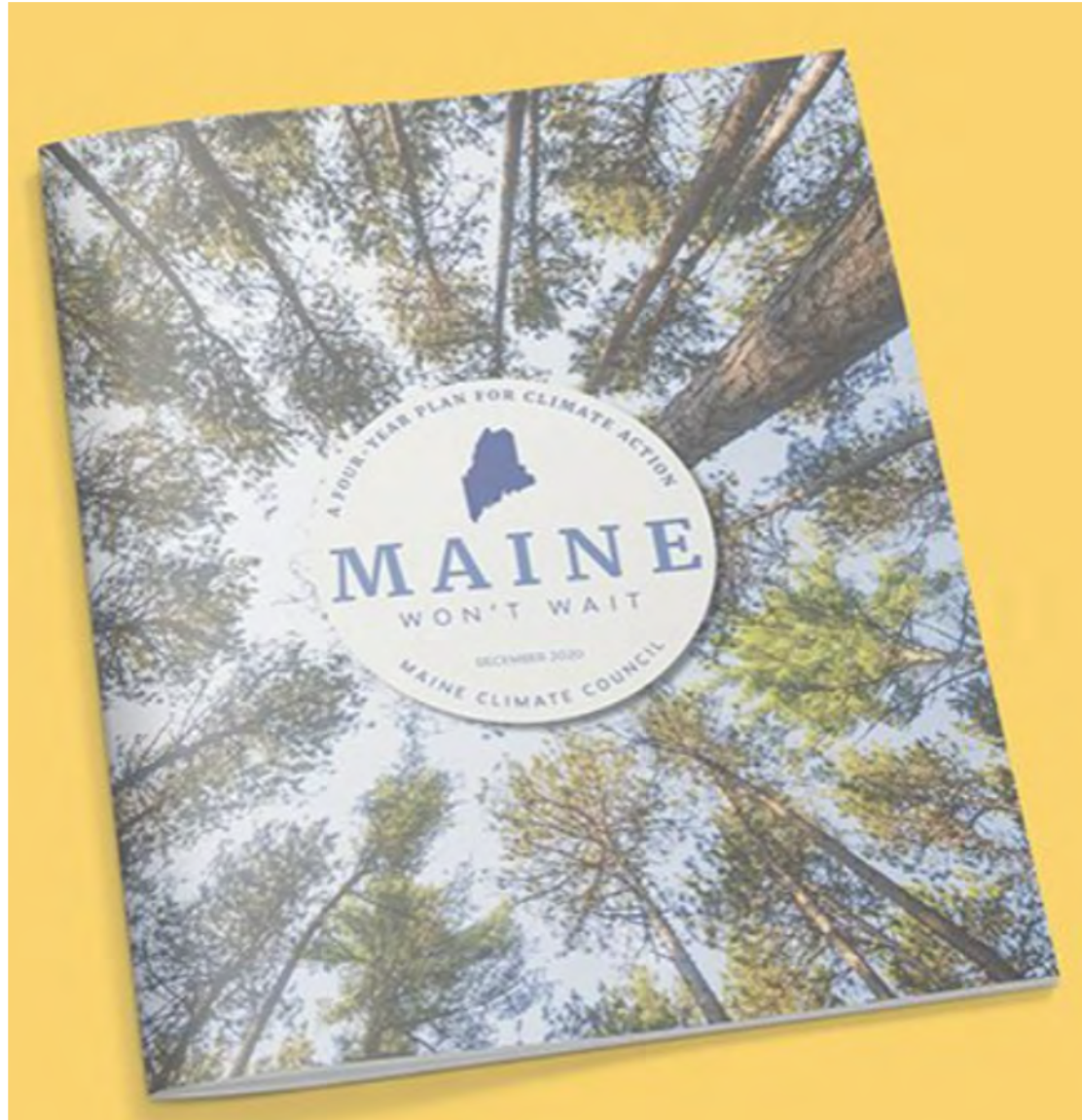


Regional Collaboration for Coastal Resilience in Harpswell, Phippsburg & West Bath

2022 Maine Sustainability & Water Conference



GOPIF Pilot Project Background



Maine Won't Wait recommended enhancing state support for communities to build climate resilience.

Pilot project goal: to develop replicable climate resilience planning and engagement models.

3 cohorts selected in a competitive process by GOPIF: coastal, inland, and northern Maine communities.

\$28K guaranteed implementation funding; support for town-specific or regional projects

Service Provider Team



- Martha Sheils
- Chloe Shields
- Liza Dubinsky



- Victoria Boundy
- Matt Craig

Resilience
Works, LLC

- Allen Kratz

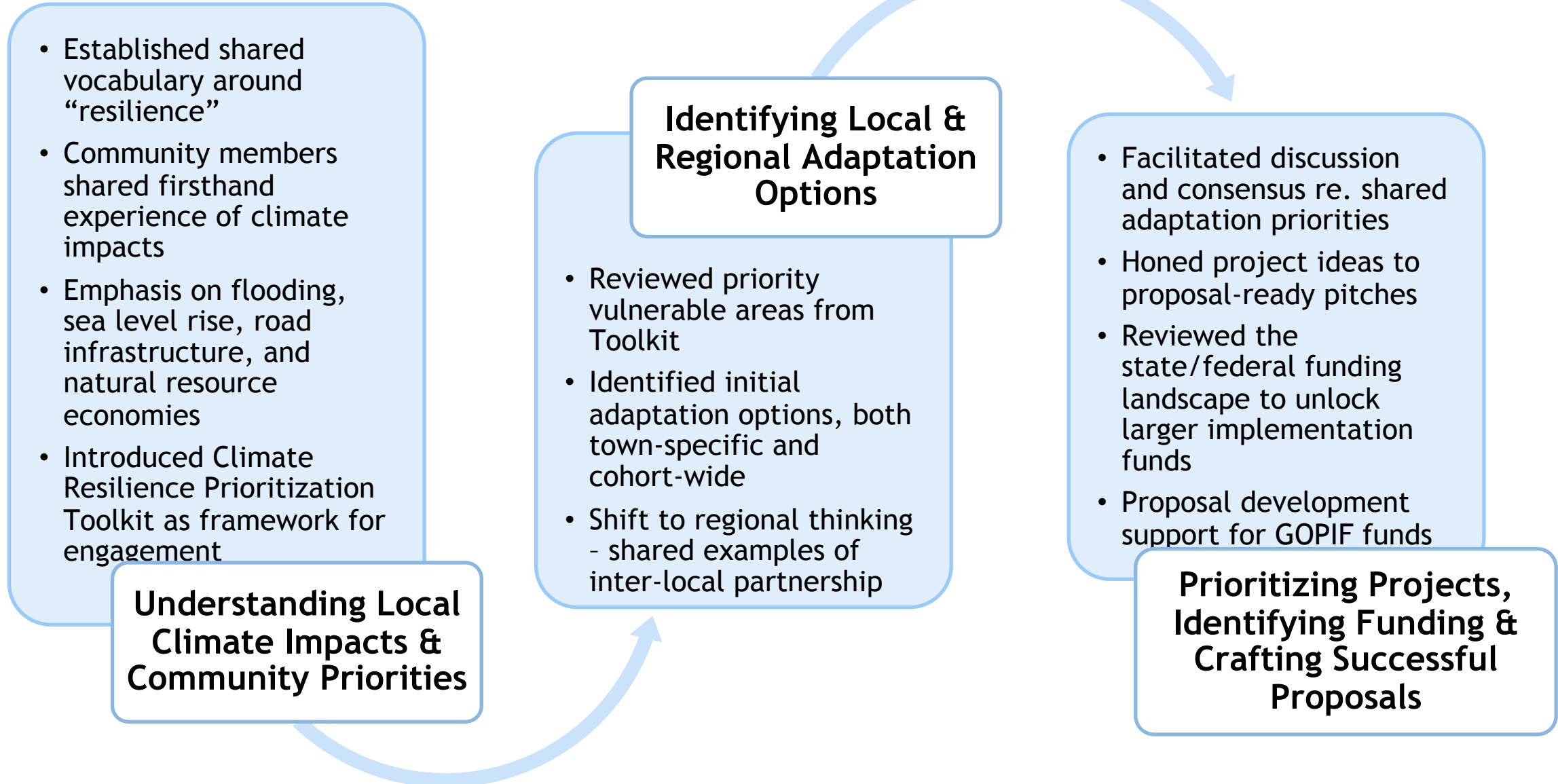
Coastal Cohort: Harpswell, Phippsburg & West Bath



- Long, narrow peninsulas
- Similar social demographics
- Varying levels of capacity and readiness
- Reliance on natural resources for local economy
- Some history of regional collaboration



Community Engagement & Planning Process



1. Identify Climate-related Hazards

- What are the climate-related hazards that threaten the community (e.g. sea level rise, storm surge, flooding, coastal erosion, etc.)?

2. List Community Assets

- What are the physical, environmental, and social assets the community values (e.g. transportation infrastructure, wetlands, elderly population)?

3. Classify Vulnerability

- How exposed and sensitive is a specific asset to a respective hazard?
- What resources are in place for that asset to cope with change (i.e. adapt)?

4. Categorize Risk

- What is the probability that each climate-related hazard will occur?
- What would the consequences be for specific community assets (e.g. loss, damage)?

5. Prioritize Community Assets

- Which community assets are a priority based on their vulnerability and risk to climate-related hazards?

6. Identify & Prioritize Actions

- What can we do to build the resilience of community assets to climate hazards?
- What factors affect how the community prioritizes actions (e.g. social impact, implementation feasibility, etc.)?

Step 1: Identify Climate-related Hazards



Hazard <i>(input hazard)</i>	Reference(s) <i>(input reference)</i>	Area(s) Affected by Hazard <i>(input location)</i>	Historic Consequences <i>(input impacts)</i>	Future Stressors and Trends <i>(input stressors and trends)</i>	Potential Impacts <i>(input impacts)</i>	Probability of Occurrence <i>(select from drop-down)</i>
1.5 ft Sea Level Rise (SLR)	Maine Won't Wait - December 2020	Town road infrastructure, septic systems, public and private wells, town	Sea level off of Maine is 8 inches higher than in 1950, thousands of properties at risk from	Ocean warming and melting ice due to climate change contributing to rising	Loss of dry beach and coast, compromised usability of town landings and septic	HIGH
Coastal Erosion	2022 Cumberland County Hazard Mitigation Base Plan	Coastal areas and marsh habitats	Noted eroding bluffs in the town, loss of land	Sea-level rise caused by climate change	Marsh migration, beach erosion, property loss	HIGH
Coastal Flooding	Harpwell Climate Resilience Vulnerability Assessment 2020	Coastal populations and infrastructure	Previous coastal flooding during nor'easters or tropical cyclones that never	Increased precipitation trends and intense weather events due to climate change	Flooded or closed roads, flooded basements, flooded businesses, inability to deliver	HIGH
Heatwave	Resilience Vulnerability Assessment 2020	Entire town, especially interior sections	Rising temperatures in Maine	degree days expected to increase 300% by mid century	issues, damage to crop yields	HIGH
Dam/Culvert Failure	Harpwell Climate Resilience Implementation Taskforce Proposal	Town culverts	Historic reportings of culvert failures in Maine causing road damage and flooding	Increasing sea-level due to climate change	Road damage due to washouts caused by higher tides	MEDIUM
Ocean Acidification	Harpwell Climate Resilience Vulnerability Assessment 2020	Intertidal areas	Noted ocean acidification in recent years in Maine, has	Uptake of carbon dioxide from atmosphere due to	Damage to shellfish habitat, loss of natural resource industry jobs,	MEDIUM
3.9 ft Sea Level Rise (SLR)	Maine Won't Wait - December 2021	Town road infrastructure, salt marshes, septic systems, culverts, landings	Sea level off of Maine is 8 inches higher than in 1950, thousands of properties at risk from	Ocean warming and melting ice due to climate change contributing to rising	Routes 24 and 123 submerged, compromised usability of town landings and septic systems, culvert failures,	MEDIUM
Hurricane	2022 Cumberland County Hazard Mitigation Base Plan	Entire town, specifics depend on track of the storm	Last hurricane in Maine occurred in 1963	climate contributes to more likely hurricanes and higher category	damage to buildings, downed trees, power outages, coastal	LOW
Landslide	2022 Cumberland County Hazard Mitigation Base Plan	Entire town, notably developed areas	Two largest landslides occurred in 1868 and 2020, other minor landslides	Consistent presence of Presumpscot Formation underneath much of urbanized area	Damage to properties, river blockage	LOW

Step 2: List Community Assets & Pair Hazards



New England
Environmental
Finance Center



Asset Name <i>(input name)</i>	Asset Type <i>(select from drop-down)</i>	Asset Category <i>(select from drop-down)</i>	Asset Ownership <i>(select from drop-down)</i>	Hazard <i>(select from drop-down)</i>
Basin Point Road	Built/Infrastructural	Transportation	Public	Coastal Flooding
Basin Point Road	Built/Infrastructural	Transportation	Public	Dam/Culvert Failure
Long Point Road	Built/Infrastructural	Transportation	Public	Coastal Flooding
Long Point Road	Built/Infrastructural	Transportation	Public	Dam/Culvert Failure
Harpswell Community School	Built/Infrastructural	Educational	Other	3.9 ft SLR
Shellfish Population	Natural/Environmental	Wildlife	Other	Ocean Acidification
Aging Population	Social	Population	Other	Heatwave

Coastal Flooding

- 1.5 ft SLR
- Coastal Erosion
- Coastal Flooding**
- Heatwave
- Nor'Easters
- Ocean Warming
- Saltwater Intrusion
- Severe Thunderstorms
- Storm Surge
- Windstorms
- 3.9 ft SLR
- Blizzards

- Critical Facilities
- Cultural
- Ecosystem/Habitat
- Educational
- Emergency Services
- Historical
- Marine Infrastructure
- Municipal
- Neighborhood
- Other
- Population**
- Recreational

Step 3: Classify Vulnerability



Asset Name <i>(fills automatically)</i>	Hazard <i>(fills automatically)</i>	Vulnerability Characteristics				Relative Vulnerability <i>(fills automatically)</i>
		Exposure + Sensitivity = Potential Impact + Adaptive Capacity = Vulnerability				
		Exposure <i>(select from drop-down)</i>	Sensitivity <i>(select from drop-down)</i>	Potential Impact <i>(fills automatically)</i>	Adaptive Capacity <i>(select from drop-down)</i>	
Basin Point Road	Coastal Flooding	HIGH	HIGH	HIGH	MEDIUM	VERY HIGH VULNERABILITY
Basin Point Road	Dam/Culvert Failure	HIGH	MEDIUM	HIGH	HIGH	HIGH VULNERABILITY
Long Point Road	Coastal Flooding	HIGH	HIGH	HIGH	MEDIUM	VERY HIGH VULNERABILITY
Long Point Road	Dam/Culvert Failure	MEDIUM	MEDIUM	MEDIUM	HIGH	MEDIUM VULNERABILITY
Harpswell Community School	3.9 ft SLR	LOW	LOW	LOW	MEDIUM	MEDIUM VULNERABILITY
Shellfish Population	Ocean Acidification	HIGH	HIGH	HIGH	MEDIUM	VERY HIGH VULNERABILITY
Aging Population	Heatwave	MEDIUM	HIGH	HIGH	LOW	VERY HIGH VULNERABILITY

Exposure: The presence of assets in places that could be adversely affected by a climate-related hazard.

Impact: Effects on natural and human systems that result from hazards.

Sensitivity: The degree to which a system, population, or asset is or may be affected by the exposure to climate-related hazards.

Adaptive Capacity: The ability of a person, asset, or system to adjust to a hazard, take advantage of new opportunities, or cope with change.

Step 4: Categorize Risk

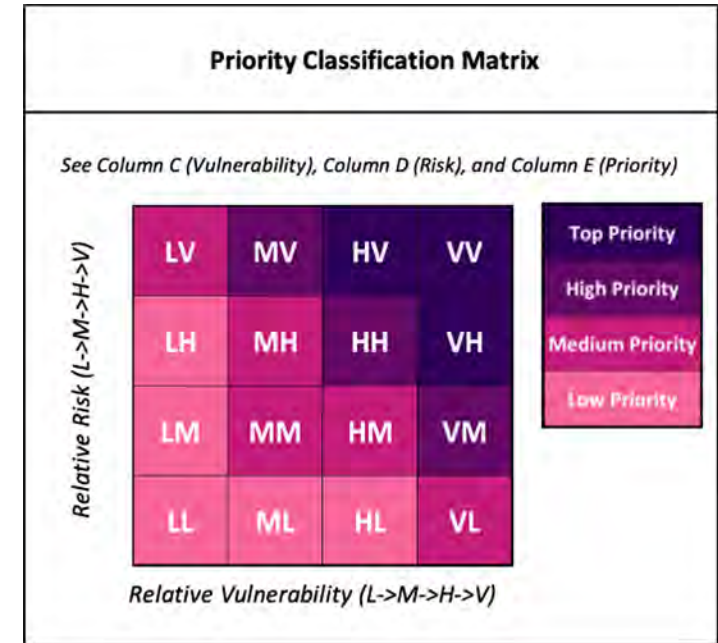
Asset Name <i>(fills automatically)</i>	Hazard <i>(fills automatically)</i>	Risk Characteristics		Relative Risk <i>(fills automatically)</i>
		Probability of Occurrence <i>(select from drop-down)</i>	Magnitude of Consequence <i>(select from drop-down)</i>	
Basin Point Road	Coastal Flooding	HIGH	HIGH	VERY HIGH RISK
Basin Point Road	Dam/Culvert Failure	HIGH	MEDIUM	VERY HIGH RISK
Long Point Road	Flooding	HIGH	HIGH	VERY HIGH RISK
Long Point Road	Dam/Culvert Failure	MEDIUM	MEDIUM	HIGH RISK
Harpswell Community School	3.9 ft SLR	LOW	MEDIUM	MEDIUM RISK
Shellfish Population	Ocean Acidification	MEDIUM	HIGH	VERY HIGH RISK
Aging Population	Heatwave	MEDIUM	HIGH	VERY HIGH RISK

Probability of Occurrence: The likelihood of a hazard event occurring.

Consequence: A subsequent result that follows (e.g. damage to or loss of an asset).

Step 5: Prioritize Community Assets

Asset Name <i>(fills automatically)</i>	Asset Ownership <i>(select from drop-down)</i>	Hazard <i>(fills automatically)</i>	Resilience Characteristics		Relative Priority <i>(fills automatically)</i>
			Vulnerability <i>(fills automatically)</i>	Risk <i>(fills automatically)</i>	
Basin Point Road	Public	Coastal Flooding	VERY HIGH	VERY HIGH	TOP PRIORITY
Basin Point Road	Public	Dam/Culvert Failure	HIGH	VERY HIGH	TOP PRIORITY
Long Point Road	Public	Coastal Flooding	VERY HIGH	VERY HIGH	TOP PRIORITY
Aging Population	Other	Heatwave	VERY HIGH	VERY HIGH	TOP PRIORITY
Shellfish Population	Other	Ocean Acidification	VERY HIGH	VERY HIGH	TOP PRIORITY
Long Point Road	Public	Dam/Culvert Failure	MEDIUM	HIGH	MEDIUM PRIORITY
Harpswell Community School	Other	3.9 ft SLR	MEDIUM	MEDIUM	MEDIUM PRIORITY



Step 6. Prioritize Adaptation Options



+1 = Criteria definitely met

0 = Unsure/do not know

-1 = Criteria not met/negative effects

Action 1: Birch Point Road, shoreline erosion

Prioritization Criteria	Score	Notes
FEASIBILITY		
Funding: With existing or expected funding sources	-1	Engineering complete, construction not yet funded
Political support: Likelihood of political support	+1	
Local champion: Supported by a strong advocate or champion	+1	
Administrative: With existing operations, staffing or procedures	+1	
Technical: With existing technology or staff know how	+1	
Legal: With existing authorities or policies	+1	
SOCIAL BENEFITS		
Access: Protects access to jobs or services	0	
Health & safety: Protects residents, prevents injury, promotes public health	+1	
Awareness: Increases public awareness of climate impacts	+1	
Inclusivity: Engages underrepresented populations, frontline communities	0	
Vulnerable residents: Protects especially vulnerable residents	+1	
Recreation & education: Maintains recreational, educational opportunities	0	
ECONOMIC BENEFITS		
Jobs: Promotes/retains jobs	+1	
Reduces disruption: Reduces service or network disruptions	+1	
Reduces damages: Reduces damage to structures, infrastructure	+1	
ENVIRONMENTAL BENEFITS		
Habitats & biodiversity: Creates/maintains habitat, biodiversity	+1	
Water quality: Maintains or improves water quality	+1	
Greenhouse gases (GHG): Reduces GHG emissions	0	
Energy use: Reduces energy use	0	
COMMUNITY OBJECTIVES		
Community objectives: Advances other community objectives	+1	
Existing plans: Supports existing plan objectives (e.g. comp plan)	+1	
Duration of benefits: Benefits continue over a long period of time	+1	
ACTION 1 TOTAL SCORE		15

Step 6. Identify Adaptation Options



Similarities Regional Actions

West Bath	Phippsburg	Harpwell
<ul style="list-style-type: none"> • Many competing top priority areas - difficulty to identify which to address first (further prioritization needed, where to start!) • A few top priority public roads; impacts related to SLR, erosion - Birch Road, Austin Road (culvert failure) & Sabino Road. Lack of engineering plans (some planning related to Birch Road). • Concerns around community landings that affect the working waterfront and future implications of SLR; concerns from harvesters, fisherman about holding up to storms/storm surge • Aquaculture industry has concerns related to health of fishery • Concerns related to State Roads (State Road Causeway and Berry's Mill Road) - Is this on DOTs radar? Lack of relationship/ongoing discussion with MDOT • Littlefield School is a historic building, important to community; located on Berry's Mill Road in low lying area near Mill Pond - stands to be 	<ul style="list-style-type: none"> • Some overall hurdles - people doing municipal planning/governance have skepticism around SLR as a real issue, and skeptical that they will ever be able to secure funding to make resilience projects a reality. Lack of knowledge/capacity, new staff - don't have those longstanding local champions yet • Damaged waterfront infractures (wharfs, landings - Popham Pier, Acrelot Wharf, Meadowbrook) - funding for engineering assessment to understand how SLR/other climate impacts have contributed to that damage, what it would take to adapt that infrastructure. Town is already putting \$ towards this - but additional \$ to move forward. • Can we advocate regionally for vulnerable State Roads (Winnegance Causeway) to MDOT? Harpwell has already met with MDOT, but what if the three towns banded together to meet with MDOT and exert more pressure? Involve MEMA 	<ul style="list-style-type: none"> • Public roads and SLR impacts/periodic coastal flooding - need for preliminary engineering to address SLR (and \$ to do • Public launches/landings - done some conceptual analysis for inundation impacts for 1, need for additional 6 landings. • Landings and Roads - Develop a template that can be used for assessing inundation (esp during King Tide events in winter). How much inundation occurs with SLR; how many hours are landings/roads inundated? For quantitative determination of level of inundation and frequency of inundation events (measure existing and project into future). <ul style="list-style-type: none"> ○ Apply for State/other fundings for regional engagement of design/engineering services (Harpwell already has contract with engineering firm at set rate; may preclude Harpswell from joining because they receive a

A Shared Priority for Social Resilience

TIMES RECORD > Posted December 5, 2021 | Updated December 14, 2021

Harpswell, West Bath, Phippsburg to investigate climate's impact on future of town landings

Baker Design Consultants will conduct a climate resiliency analysis on three town landings: Garrison Cove boat launch on Bailey Island in Harpswell, Sabino Landing in West Bath, and Acre Lot Wharf in Phippsburg.

BY KATHLEEN O'BRIEN TIMES RECORD

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2 COMMENTS



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Phippsburg's *Acre Lot Wharf*

Photo: Troy Watson

- Resilience analyses and cost estimates for three town landings/wharves
- Site visit brought up wider community issues and will inform other projects
- Many lessons learned from Town Landing site assessment



Harpswell's *Garrison Cove Boat Launch*

Photo: Bill Muldoon

Lessons Learned from West Bath

**Importance of
technical & other
support to small
communities**

**Working
collaboratively
with neighbors**

**Using the tools to
set town
priorities**



West Bath's *Sabino Landing*

Photo: Barney Baker, GEI

Pilot Informed Statewide Community Resilience Partnership



COMMUNITY RESILIENCE PARTNERSHIP

For Service Providers

Recruit
a group of 2-5 communities
and apply for a Service
Provider Grant.

Assist
communities to join the
Partnership by completing
the 3 criteria

Assist
communities to apply
for action grants

Community
Resilience Pilot
SUMMER 2021

Service provider grant
applications are accepted
two times per year:

FEBRUARY 15
AUGUST 16

3 CRITERIA:

adopting a resolution of commitment, completing
a pair of self-assessments, and holding a
community workshop to prioritize initial climate
resilience and clean energy actions.

Open enrollment, no deadline

Action grant applications
are accepted two
times per year:

MARCH 22
SEPTEMBER 20



maine.gov/future/climate/community-resilience-partnership

Thank you! Questions?

Contact: Victoria.boundy@maine.edu

