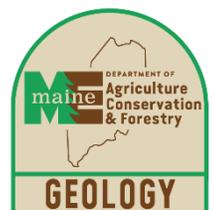


# Maine Flood Resilience Checklist



*A self-assessment tool for Maine's coastal communities to evaluate vulnerability to flood hazards and increase resilience*

Maine Coastal Program  
Maine Department of Agriculture, Conservation and Forestry  
August, 2017



*Disclaimer: The Maine Flood Resilience Checklist is for planning purposes only.*

### **Acknowledgements**

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## Coastal Flood Hazards in Maine

Coastal flooding is one of the most significant natural hazards impacting communities along Maine's 5,300-mile coastline. The occurrence of minor and moderate coastal flooding has become significantly more frequent in the last decade. Increasing intensity and frequency of coastal storms, coupled with rising sea levels, will only exacerbate impacts of coastal flooding and threats to people, property, and the natural environment.

To prepare for these intensifying threats, local decision-makers need information and tools that allow them to better understand risks and vulnerabilities posed by existing and potential future flood hazards and identify proactive steps to increase flood resilience.



### What is the Maine Flood Resilience Checklist?

The Maine Flood Resilience Checklist is a non-regulatory self-assessment tool designed to assist Maine communities evaluate how well positioned they are to prepare for, respond to, and recover from flooding events and sea level rise. It offers an integrated and practical framework for examining local flood risk, evaluating vulnerability of the natural, built, and social environments, and identifying opportunities to enhance flood resilience. Additionally, it allows communities to identify specific intervention points where local decision-makers can develop policy, strategies, and actions to address areas of vulnerability. The Checklist can help communities integrate sea level rise considerations into comprehensive plans, strengthen local floodplain ordinances, and incorporate resilience activities into capital improvement plans. Although the Checklist is focused on coastal flood hazards, it is applicable for both coastal and inland communities.

The Checklist is comprised of a series of 'yes'/'no' questions organized into five main sections:

- |  |                                       |
|--|---------------------------------------|
| I. Risk and Vulnerability                  | IV. Social and Economic Vulnerability |
| II. Critical Infrastructure and Facilities | V. Natural Environment                |
| III. Community Planning                    |                                       |

Each section consists of an overview about the connection to community resilience, suggested resources to get started, and 'yes'/'no' assessment questions. The questions are based on indicators of resilience identified in academic research and literature, existing vulnerability assessment tools, and Maine-specific conditions and aim to integrate various community sectors, including land use planning, hazard mitigation, and emergency management. To support communities with acting on their results, resources and recommendations for next steps are included in *Appendix A*.

The Checklist is intended to assist communities of all sizes and capacity levels understand vulnerabilities and plan for action, not to serve as a means for ranking or comparing communities. Its aim is to motivate communities to take action in pursuit of their target flood resilience and provide guidance and practical approaches for decreasing vulnerability. It is neither likely nor expected that any community will be able to answer 'yes' to a majority of the questions. A 'no' answer does not mean that a community is doing something wrong, it simply indicates that there is an opportunity for action. Furthermore, it is perfectly acceptable if a community does not have answers to all the questions, as that indicates an opportunity to fill a knowledge gap. Although the Checklist includes a number of factors related to resilience, it is not a comprehensive collection of information communities can or should consider for adaptation and resilience efforts.

### Linking to FEMA's Community Rating System (CRS)

The National Flood Insurance Program's (NFIP) Community Rating System (CRS) is a voluntary program that encourages and rewards community floodplain management practices that exceed the minimum NFIP standards by providing reduced flood insurance premiums for the community's policyholders.

The CRS uses a point-based class rating system in which participating communities receive points for engaging in any of 19 creditable flood risk reduction activities, organized under four categories: public

information; mapping and regulations; flood damage reduction; and warning and response. As a community accrues points, its class rating improves, and policyholders receive increased discounts on insurance premiums.

The Maine Flood Resilience Checklist incorporates CRS-related information to help communities identify practices that may provide valuable CRS credit. The Checklist uses this symbol, , to highlight elements that relate to creditable activities. *Appendix B* and *Appendix C* provide additional information about CRS activities and corresponding possible points, as outlined in the *2013 CRS Coordinator's Manual* and *2017 CRS Coordinator's Manual*, respectively, that relates to Checklist elements.

### How to Use the Checklist

The Checklist is designed to be completed through a community-based, facilitated discussion process in which key municipal staff and decision-makers participate in a dialogue about local flood vulnerability, how well existing plans, policies, and actions address flood hazards, and ways to enhance resilience. Your community must first determine what flood hazard scenarios (e.g., regulatory floodplain, hurricane and storm surge inundation, sea level rise) it wants to examine for risk, vulnerability, and potential impacts. Once the scenarios have been identified, participants should work together through each section of the Checklist and answer the questions to the best of their ability.

Interdepartmental coordination is an important aspect of community resilience and is vital for ensuring your community is prepared for flood hazards. Therefore, representatives from a variety of community departments and programs who are knowledgeable about local conditions and community plans, policies, and operations should participate in the Checklist process.

#### Highly Recommended Participants

- Planning staff
- Municipal administrator
- Code enforcement officer
- Floodplain manager
- Emergency manager
- Public works official
- Economic development staff
- Municipal engineer
- Waterfront coordinator / Harbormaster

#### Suggested Participants

- Elected official
- Public safety official
- Conservation commission representative
- Chamber of commerce representative
- Neighborhood association representative
- Local leader / resident

Once your community has gone through the Checklist questions, review your responses in each section to identify areas in which your community is doing well and areas where improvements can be made. Using your Checklist results and recommended next steps in *Appendix A* as guidance, identify specific actions and strategies your community would like to undertake to enhance local flood resilience. It is important to recognize that your results provide a snapshot in time. Your community should consider revisiting the Checklist as social and environmental conditions change and as new data become available. Your community is welcome and encouraged to share your Checklist results with the Maine Geological Survey (MGS) and/or Municipal Planning Assistance Program (MPAP) to assist coastal managers with better understanding and addressing technical and information needs for increasing flood resilience in Maine.

Regional Planning Organization (RPO) staff have been trained to help communities complete the Checklist and facilitate the discussion process. If your community is interested in increasing your flood resilience and completing the Checklist, please contact your RPO, MPAP, or MGS. If your community would like to discuss technical or financial assistance that might be available from state or federal sources for assessing flood vulnerability or increasing flood resilience, please contact MPAP.

#### **We want your feedback!**

How can the Checklist be improved? Comments and suggestions on the Checklist are welcome and encouraged. Please send feedback to the **Maine Geological Survey**.

[Peter.A.Slovinsky@maine.gov](mailto:Peter.A.Slovinsky@maine.gov)



## I. Risk and Vulnerability

Assessing your community's flood risk and vulnerability is a critical first step for understanding and addressing possible impacts to people, property, and natural resources. To make informed decisions and appropriately plan for coastal hazards, communities need to identify the potential geographic extent of flood hazards and effects in relation to their specific conditions and characteristics. Additionally, that information needs to be effectively communicated to various departments, decision-makers, and groups within the community to safeguard community assets and increase resilience.

This section addresses general risk and vulnerability from existing and potential future flood hazards, including sea level rise. It provides a baseline of your community's vulnerability to flood hazards, allowing for priorities to be established and progress to be measured. Participants should examine the impacts of the scenarios of interest on the community and determine how well existing planning, management, and regulatory programs address flood hazards. In addition to available data and mapping tools, the facilitated discussion aims to capture information about locally relevant flood conditions and impacts that might not be adequately captured by state and national data.

### Resources to Get Started

Listed below are suggested state and national data sources and mapping tools for assessing and visualizing various flood inundation scenarios and local impacts.

Your community's most recent Flood Insurance Rate Map (FIRM) approved or released by FEMA

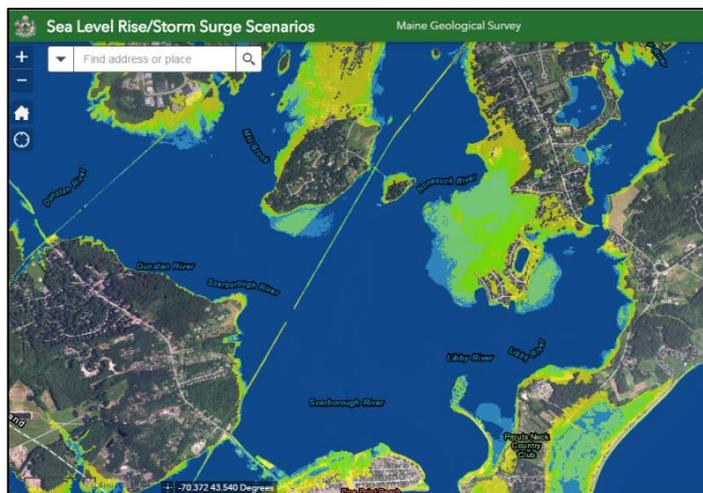
- FEMA National Flood Hazard Layer  
<https://fema.maps.arcgis.com/home/item.html?id=cbe088e7c8704464aa0fc34eb99e7f30>
- Maine Flood Hazard Map  
<http://maine.maps.arcgis.com/apps/webappviewer/index.html?id=3c09351397764bd2aa9ba385d2e9efe7>

### Highest Annual Tide

- MGS Maine Geological Survey (MGS) Highest Annual Tide Line 2015  
<http://www.maine.gov/dacf/mgs/hazards/hat/index.shtml>

### Sea Level Rise, Storm Surge, and Hurricane Inundation

- MGS Sea Level Rise/Storm Surge map viewer  
[http://www.maine.gov/dacf/mgs/hazards/slr\\_ss/index.shtml](http://www.maine.gov/dacf/mgs/hazards/slr_ss/index.shtml)
- MGS Sea Lake and Overland Surges from Hurricanes (SLOSH) map viewer  
<http://www.maine.gov/dacf/mgs/hazards/slosh/index.shtml>
- NOAA Coastal Flood Exposure Mapper <https://coast.noaa.gov/digitalcoast/tools/flood-exposure.html>



### Coastal Sand Dunes and Bluffs

- MGS Coastal Sand Dune Geology Maps <http://www.maine.gov/dacf/mgs/pubs/online/dunes/dunes.htm>
- MGS Coastal Bluff Maps <http://www.maine.gov/dacf/mgs/pubs/online/bluffs/bluffs.htm>

Risk and Vulnerability		Yes		No		N/A	Notes
1	<b>(a)</b> Has your community identified and documented the historical geographic extent and impacts and <b>(b)</b> considered the potential future extent and impacts of the following coastal hazards?	<b>a</b>	<b>b</b>	<b>a</b>	<b>b</b>		
	• Coastal and nuisance flooding						
	• Storm surge						
	• Sea level rise						
	• Coastal erosion and/or shoreline change						
2	Are potential sea level rise, hurricane, and storm surge inundation scenarios determined for your community <sup>1</sup> ?						
3	Does your community have GIS mapping and analysis capabilities or access to GIS services?						
4	Has the potential future extent of coastal hazards been identified, mapped, and considered in your community's planning?						
5	Has your community adopted a surveyed or GIS-based boundary delineating the highest annual tide (HAT) line for Shoreland Zoning?						
6	Does your community document and archive the following information related to flooding, storms, and erosion?						
	• Geographic extent of impacts						
	• Photographs of impacts						
	• Water levels						
	• Relative location of damage						
	• Date of damage						
	• Damage type						
	• Cause of damage						
	• Damage costs						
	• Repetitive loss properties, as defined by the National Flood Insurance Program						
7	Has your community conducted vulnerability assessments of the following categories based on <b>(a)</b> existing and <b>(b)</b> potential future conditions?	<b>a</b>	<b>b</b>	<b>a</b>	<b>b</b>		
	• Critical facilities						

<sup>1</sup> The Maine Geological Survey has modeled and mapped the following inundation scenarios for the entire coastline: inundation from 1, 2, 3.3, and 6 feet of sea level rise or storm surge and inundation from a Category 1, 2, 3, or 4 hurricane. <http://www.maine.gov/dacf/mgs/hazards/coastal/index.shtml>

Risk and Vulnerability		Yes		No		N/A	Notes
	<ul style="list-style-type: none"> <li>Critical infrastructure</li> </ul>						
	<ul style="list-style-type: none"> <li>Coastal properties (public and private)</li> </ul>						
	<ul style="list-style-type: none"> <li>Society and the economy (local population, historical and cultural resources, downtown areas, business districts, tourism areas, etc.)</li> </ul>						
	<ul style="list-style-type: none"> <li>Natural Environment</li> </ul>						
8	Does your community ( <b>a</b> ) conduct assessments and evaluations of local flood hazards and associated risks and, if so, ( <b>b</b> ) is that information shared with the following relevant individuals, groups, and programs?	<b>a</b>	<b>b</b>	<b>a</b>	<b>b</b>		
	<ul style="list-style-type: none"> <li>Planning staff</li> </ul>						
	<ul style="list-style-type: none"> <li>Code enforcement</li> </ul>						
	<ul style="list-style-type: none"> <li>Public works</li> </ul>						
	<ul style="list-style-type: none"> <li>Emergency managers and first responders</li> </ul>						
	<ul style="list-style-type: none"> <li>Elected officials</li> </ul>						
	<ul style="list-style-type: none"> <li>Municipal budget personnel</li> </ul>						
	<ul style="list-style-type: none"> <li>Chamber of Commerce / business community</li> </ul>						
	<ul style="list-style-type: none"> <li>Municipal commissions</li> </ul>						
	<ul style="list-style-type: none"> <li>Community members</li> </ul>						
	<ul style="list-style-type: none"> <li>Regional Planning Organization</li> </ul>						
	<ul style="list-style-type: none"> <li>State programs and agencies (MPAP, MFMP, MGS, MEMA)</li> </ul>						
9	( <b>a</b> ) Are coastal storm and flood hazard frequencies and durations established for your community <sup>2</sup> and ( <b>b</b> ) has your community determined what an acceptable level of risk is with respect to those hazards?	<b>a</b>	<b>b</b>	<b>a</b>	<b>b</b>		
10	Does your community have working relationships with technical resources such as government programs, universities, or professionals that provide assistance with flood hazards, risk, vulnerability, and resiliency?						

<sup>2</sup> NOAA NWS Hydrometeorological Design Studies Center Precipitation Frequency Data Server (PFDS) is an interactive web tool delivering NOAA Atlas 14 precipitation frequency estimates and associated information. <http://hdsc.nws.noaa.gov/hdsc/pfds/>

## II. Critical Infrastructure and Facilities

Critical infrastructure and facilities are those that, because of their function, size, service area, or uniqueness, have the potential to cause serious bodily harm, extensive property damage, or disruption of vital socioeconomic activities if damaged, destroyed, or functionally impaired. Ensuring these critical assets are operational and accessible during flood conditions is vital for emergency response and for protecting the health, safety, and wellbeing of community members.

Although your community is likely not responsible for ownership, maintenance, or repair of some critical infrastructure and facilities, it is important that local officials are familiar with how flood hazards could impact the ability of those assets to properly function and serve your community. Information sharing between community officials and owners and operators regarding vulnerability and how flood hazards are incorporated into operation and planning procedures is important for safeguarding assets against flood hazards and fostering resilience.

This section assesses whether your community has considered the effects of coastal flood hazards and sea level rise on critical infrastructure and facilities and associated operation and planning.

### Resources to Get Started

- List of critical infrastructure and facilities
- Maps of critical facilities, transportation network, water and wastewater systems, power grid, and energy networks
- Operation and maintenance plans and policies for critical infrastructure and facilities (where available)
- USGS StreamStats <http://water.usgs.gov/osw/streamstats/>



Coastal road in the Camp Ellis neighborhood of Saco covered with sand from adjacent beach due to wind and storm overwash.



The road in front of the Machias Town Hall closed as a result of nuisance flooding caused by a combination of heavy rainfall and a King Tide event.



Nuisance flooding, like that seen here on Somerset Street in Portland during a high tide event, is predicted to become more frequent as precipitation increases and sea level rises.

Critical Infrastructure and Facilities		Yes		No		N/A	Notes
		a	b	a	b		
1	Does your community have a detailed inventory, including elevations, of the following critical facilities and infrastructure that includes information about the location of assets in relation to <b>(a)</b> existing and <b>(b)</b> potential future flood hazard areas <sup>3</sup> ?						
	<ul style="list-style-type: none"> <li>Wastewater treatment and transport system (plant, pipes, and pump stations)</li> </ul>						
	<ul style="list-style-type: none"> <li>Stormwater system</li> </ul>						
	<ul style="list-style-type: none"> <li>Water treatment and transport system (plant, pipes, and pump stations) and drinking water wells</li> </ul>						
	<ul style="list-style-type: none"> <li>Power grid (substations)</li> </ul>						
	<ul style="list-style-type: none"> <li>Energy network (oil, natural gas, etc.)</li> </ul>						
	<ul style="list-style-type: none"> <li>Public roads</li> </ul>						
	<ul style="list-style-type: none"> <li>Evacuation routes</li> </ul>						
	<ul style="list-style-type: none"> <li>Culverts</li> </ul>						
	<ul style="list-style-type: none"> <li>Bridges</li> </ul>						
	<ul style="list-style-type: none"> <li>Dams</li> </ul>						
	<ul style="list-style-type: none"> <li>Piers or wharves</li> </ul>						
	<ul style="list-style-type: none"> <li>Railway infrastructure</li> </ul>						
	<ul style="list-style-type: none"> <li>Town/City Hall</li> </ul>						
	<ul style="list-style-type: none"> <li>Critical record storage building(s)</li> </ul>						
	<ul style="list-style-type: none"> <li>Police station(s)</li> </ul>						
	<ul style="list-style-type: none"> <li>Fire station(s)</li> </ul>						
	<ul style="list-style-type: none"> <li>Public works facilities</li> </ul>						
	<ul style="list-style-type: none"> <li>Emergency operation center(s)</li> </ul>						
	<ul style="list-style-type: none"> <li>Communications office(s)</li> </ul>						
	<ul style="list-style-type: none"> <li>School(s)</li> </ul>						
	<ul style="list-style-type: none"> <li>Hospitals, urgent care facilities, and health centers (e.g., nursing homes)</li> </ul>						
	<ul style="list-style-type: none"> <li>Emergency shelters</li> </ul>						
	<ul style="list-style-type: none"> <li>Transportation centers (e.g., bus station, airport, etc.)</li> </ul>						
	<ul style="list-style-type: none"> <li>Facility of regional or local significance (e.g., harbor,</li> </ul>						

<sup>3</sup> Flood hazard areas include those designated as the 100-year floodplain depicted on your community’s Flood Insurance Rate Map (FIRM) and those mapped as subject to inundation from storm surge and sea level rise.

Critical Infrastructure and Facilities		Yes		No		N/A	Notes
	marina, commercial dock, etc.)						
	<ul style="list-style-type: none"> <li>Gas and diesel tanks at marinas/working waterfronts</li> </ul>						
2	Do the following critical infrastructure and facilities experience problems associated with flooding?						
	<ul style="list-style-type: none"> <li>Wastewater treatment and transport system (plant, pipes, and pump stations)</li> </ul>						
	<ul style="list-style-type: none"> <li>Stormwater system</li> </ul>						
	<ul style="list-style-type: none"> <li>Water treatment and transport system (plant, pipes, and pump stations) and drinking water wells</li> </ul>						
	<ul style="list-style-type: none"> <li>Power grid (substations)</li> </ul>						
	<ul style="list-style-type: none"> <li>Energy network (oil, natural gas, etc.)</li> </ul>						
	<ul style="list-style-type: none"> <li>Public roads</li> </ul>						
	<ul style="list-style-type: none"> <li>Evacuation routes</li> </ul>						
	<ul style="list-style-type: none"> <li>Culverts</li> </ul>						
	<ul style="list-style-type: none"> <li>Bridges</li> </ul>						
	<ul style="list-style-type: none"> <li>Dams</li> </ul>						
	<ul style="list-style-type: none"> <li>Piers or wharves</li> </ul>						
	<ul style="list-style-type: none"> <li>Railway infrastructure</li> </ul>						
	<ul style="list-style-type: none"> <li>Facility of regional or local significance (e.g., harbor, marina, commercial dock, etc.)</li> </ul>						
	<ul style="list-style-type: none"> <li>Gas and diesel tanks at marinas/working waterfronts</li> </ul>						
3	(a) Are maps or GIS used to show the location and accessibility of critical infrastructure and facilities in relation to flood hazard areas <sup>4</sup> and (b) is that information publicly available?	<u>a</u>	<u>b</u>	<u>a</u>	<u>b</u>		
4	Are there plans and backup systems in place for critical infrastructure and facilities to ensure continuation of function and services during and after flood hazard events?						
5	Has your community assessed or considered the amount of time that would be needed to return damaged infrastructure and facilities to a functional condition post-hazard event?						
6	(a) Do critical infrastructure and facilities' maintenance plans and budgets account for adaptation/mitigation actions and (b) post-	<u>a</u>	<u>b</u>	<u>a</u>	<u>b</u>		

<sup>4</sup> Flood hazard areas include those designated as the 100-year floodplain depicted on your community's Flood Insurance Rate Map (FIRM) and those mapped as subject to inundation from storm surge and sea level rise.

Critical Infrastructure and Facilities		Yes		No		N/A	Notes
	hazard repairs and cleanup?						
7	(a) Are maintenance, repair, and upgrade activities and associated costs for infrastructure and facilities documented and tracked? (b) Are costs associated with flooding identified, documented, and tracked?	<u>a</u>	<u>b</u>	<u>a</u>	<u>b</u>		
8	Do capital improvement plans for critical infrastructure and facilities consider (a) existing and (b) potential future flood hazards?	<u>a</u>	<u>b</u>	<u>a</u>	<u>b</u>		
9	Has your community discussed at what point it will stop repairing and upgrading existing critical infrastructure and facilities to withstand flooding?						
10	 (a) Do community plans include recommendations for abandonment, relocation, or adaptation/protection of critical infrastructure and facilities located in flood hazard areas <sup>3</sup> ? (b) Have funding opportunities or mechanisms to implement those actions been identified?	<u>a</u>	<u>b</u>	<u>a</u>	<u>b</u>		
11	 Are critical infrastructure and facilities that are located in flood hazard areas <sup>5</sup> elevated or floodproofed to at least the 0.2% chance (i.e., 500-year) flood or 3 feet above the 1% chance (i.e., 100-year) base flood elevation?						
12	When planning new critical infrastructure and facilities, does your community consider existing and potential future impacts of the following coastal hazards?						
	• Coastal and nuisance flooding						
	• Storm surge						
	• Sea level rise						
	• Coastal erosion and/or shoreline change						

<sup>5</sup> Flood hazard areas include those designated as the 100-year floodplain depicted on your community’s Flood Insurance Rate Map (FIRM) and those mapped as subject to inundation from storm surge and sea level rise.

### III. Community Planning

Planning decisions and policies made at the local level can greatly influence how resilient a community is to coastal hazards, especially in Maine where there is a home rule governance structure. For example, local land use decisions about where and how development occurs directly impacts who and what is exposed to natural hazards. By integrating hazard mitigation and emergency preparedness with existing community planning, communities can better prepare for coastal hazards and reduce vulnerability. Furthermore, explicit consideration of resilience in planning decisions, policies, and actions can help communities to ensure the long-term viability and health of people, the economy, and natural and built environments.

This section incorporates information about community planning, emergency preparedness, and natural resource management. It aims to highlight the interconnectedness of land use planning, hazard mitigation, and emergency management and emphasize the importance of integrating those sectors within your community to enhance your overall resilience.

#### Resources to Get Started

- Comprehensive Plan
- Hazard Mitigation Plan
- Emergency Response plans and policies
- Land use and zoning regulations and ordinances



Elevating structures on pile foundations, seen here in the Camp Ellis neighborhood of Saco, protects structures against flooding, erosion, and scour.

Community Planning		Yes	No	N/A	Notes
1	Does your community have a shared vision of ‘community resilience’?				
2	Does your community have plans that address the following?				
	<ul style="list-style-type: none"> <li>• Coastal hazards                             <ul style="list-style-type: none"> <li>○ Coastal and nuisance flooding</li> <li>○ Storm surge</li> <li>○ Sea level rise</li> <li>○ Coastal erosion and/or shoreline change</li> </ul> </li> <li>• Adaptation and mitigation strategies and actions addressing coastal hazards</li> <li>• Community resilience and specific strategies and actions to increase resilience</li> <li>• Open space preservation and management</li> <li>• Beach management</li> <li>• Floodplain management</li> </ul>				
3	Does your community have the following personnel on staff or on retainer?				
	<ul style="list-style-type: none"> <li>• Professional planner</li> <li>• Code enforcement officer</li> <li>• Certified Floodplain Manager (CFM®)</li> <li>• Building inspector</li> <li>• Engineer</li> <li>• Public works director</li> <li>• Plumbing inspector</li> <li>• Emergency manager</li> </ul>				
4	Does your community's floodplain ordinance exceed minimum State standards?				
5	Does your community’s floodplain ordinance apply to flood hazard areas that extend ( <b>a</b> ) vertically and ( <b>b</b> ) horizontally beyond those identified as the Special Flood Hazard Area (SFHA) or 100-year floodplain depicted on your community’s Flood Insurance Rate Map (FIRM)? <sup>6</sup>	<u>a</u>	<u>b</u>	<u>a</u>	<u>b</u>

<sup>6</sup> Freeboard is an example of a vertical extension of the SFHA and the 500-year floodplain and areas of potential sea level rise inundation are examples of horizontal extensions of the SFHA.

Community Planning		Yes		No		N/A	Notes
6 	Do your community's land use regulations limit development in areas subject to <b>(a)</b> existing and <b>(b)</b> potential future flood hazards?	<u><b>a</b></u>	<u><b>b</b></u>	<u><b>a</b></u>	<u><b>b</b></u>		
7	Does your community have policies that limit public investment in areas vulnerable to <b>(a)</b> existing and <b>(b)</b> potential future flood hazards?	<u><b>a</b></u>	<u><b>b</b></u>	<u><b>a</b></u>	<u><b>b</b></u>		
8 	Are frequently flooded areas in your community zoned or planned for open space or prioritized for acquisition or easements?						
9 	Has your community conducted a build-out analysis based on land use regulations?						
	Have the results been compared to the spatial extent of <b>(a)</b> existing and <b>(b)</b> potential future flood hazard areas?	<u><b>a</b></u>	<u><b>b</b></u>	<u><b>a</b></u>	<u><b>b</b></u>		
10 	Do your community's land use regulations encourage the use of green infrastructure approaches for stormwater management?						
11	<b>(a)</b> Does your community offer economic incentives (e.g., development fee waivers) for property owners that willingly implement flood risk reduction practices on their property (e.g., freeboard outside of regulatory floodplain, elevating structure above minimum freeboard requirement, etc.)? <b>(b)</b> If so, are the incentives advertised?	<u><b>a</b></u>	<u><b>b</b></u>	<u><b>a</b></u>	<u><b>b</b></u>		
12	Does your community have a comprehensive plan?						
13 	Does your community have a MEMA- and FEMA-approved hazard mitigation plan that addresses preparedness for <b>(a)</b> existing and <b>(b)</b> potential future flood hazards?	<u><b>a</b></u>	<u><b>b</b></u>	<u><b>a</b></u>	<u><b>b</b></u>		
	Does the plan appear in the county hazard mitigation plan?						
14 	Does your community have a hazard/disaster education and outreach plan?						
	• Community plan						
	• School plan						
15 	Are clearly marked signs placed throughout your community indicating the following and does your community provide						

<sup>7</sup> Public investment in functionally water-dependent uses, as defined in Title 38, M.R.S.A, is exempt.

Community Planning		Yes		No		N/A	Notes
	related information to residents and businesses prior to a possible flood event?						
	<ul style="list-style-type: none"> <li>Evacuation routes</li> </ul>						
	<ul style="list-style-type: none"> <li>Evacuation pick-up locations</li> </ul>						
	<ul style="list-style-type: none"> <li>Shelter locations for people and for pets/farm animals</li> </ul>						
16	Are high water mark, storm surge, and/or potential future flood elevation signs posted in your community in publicly visible areas?						
17	(a) Does your community participate in flood hazard reduction programs (e.g., National Flood Insurance Program (NFIP), FEMA's Community Rating System, etc.)? (b) If so, is your community in good standing with those programs?	<u>a</u>	<u>b</u>	<u>a</u>	<u>b</u>		
18	Is your community designated as StormReady by the National Weather Service?						
19	Has your community adopted the most recent Maine Uniform Building and Energy Code (MUBEC)?						
20	Does your community have a local hazard disclosure policy requiring hazard disclosure by real estate agents, private sellers, and/or by municipal officials for properties located in (a) the FEMA-designated regulatory floodplain and/or (b) other flood hazard areas (e.g., storm surge, sea level rise, etc.)?	<u>a</u>	<u>b</u>	<u>a</u>	<u>b</u>		
21	Does your community have a disaster response and recovery plan that includes short- and long-term actions and policies and identifies personnel responsible for those actions?						
22	Does your community participate in practice drills of emergency response plans?						
23	(a) Does your community have a flood warning plan and (b) a flood warning system?	<u>a</u>	<u>b</u>	<u>a</u>	<u>b</u>		
24	Does your community have an emergency communication system to use prior to, during, and after a storm event or natural disaster (e.g., reverse 911 call system for landlines, IPAWS for cell phones)?						
25	Does your community have an emergency evacuation plan that identifies populations needing evacuation assistance and mechanisms for providing that assistance?						

Community Planning		Yes	No	N/A	Notes
	Does the plan account for seasonal population variability?				
26	Does your community have mutual aid agreements with neighboring communities for hazards and disaster preparation, response, and recovery?				
27	Does your community have a plan for acquiring and disseminating response and recovery equipment and materials (generators, food, water, etc.)?				
28	Does your community have a post-disaster waste management and debris removal plan that has been reviewed by MEDEP, MEMA, and FEMA?				
29	Does your community budget for local disaster response and recovery funds (not from State or federal agencies)?				
30	Are mechanisms in place for your community to solicit and receive external funds for disaster response and recovery?				
31	Does your community have an established line of credit to ensure capital flow post-disaster?				
32	Does your community track storm/hazard recovery and cleanup expenses?				
	Does the tracking method comply with FEMA and MEMA requirements for disaster recovery funding programs (e.g., 2D Statement of Damages Road Tracker form)?				
33	Does your community have a plan to address and expedite permitting and inspection processes associated with post-disaster repairs while ensuring that reconstruction and redevelopment are resilient and directed away from flood hazard areas?				

## IV. Social and Economic Vulnerability

Social vulnerability refers to social, economic, and demographic factors that affect community resilience. Negative impacts of coastal flood hazards are not spread equitably among all populations or businesses within a community. Traditionally vulnerable populations, including the elderly and poor, are more likely to be adversely impacted by hazard events. Understanding who is most vulnerable and why is crucial for developing strategies and actions to protect those populations from flood hazards and for building resilience.

This section focuses on populations and economic resources within your community that may be especially vulnerable to coastal flooding and sea level rise and practical ways for decreasing that vulnerability.

### Resources to Get Started

- Community tax maps
- Economic development plans
- American Community Survey and U.S. Census data <https://www.census.gov/data.html>
- List and maps of culturally and historically significant resources



Working waterfronts, like the one pictured here located on the island of Vinalhaven, are vital to Maine's culture and economy. They support numerous maritime industries, including fishing, marinas, trade, transportation, and boat building and repair. Their proximity to open coastal waters makes them, and the people whose livelihoods depend on them, particularly vulnerable to coastal storms, flooding, and sea level rise.

Social and Economic Vulnerability		Yes		No		N/A	Notes
1	Has your community identified and assessed the following traditionally vulnerable populations located in areas vulnerable to <b>(a)</b> existing and <b>(b)</b> potential future flood hazards and considered them in flood hazard risk, preparedness, and response activities?	<b><u>a</u></b>	<b><u>b</u></b>	<b><u>a</u></b>	<b><u>b</u></b>		
	• Elderly population						
	• Households below the poverty level						
	• Residents without vehicle access						
	• Disabled individuals						
	• Non-native English speakers						
	• Service industry/tourism-based workers						
	• Homeless population						
	• Working waterfront workers						
	• Other local vulnerable population						
2	Has your community determined total property value within areas subject to <b>(a)</b> existing and <b>(b)</b> potential future flood hazards?	<b><u>a</u></b>	<b><u>b</u></b>	<b><u>a</u></b>	<b><u>b</u></b>		
3	Has your community assessed the financial impacts and subsequent impacts to the tax base of <b>(a)</b> existing and <b>(b)</b> potential future flood hazards to the following?	<b><u>a</u></b>	<b><u>b</u></b>	<b><u>a</u></b>	<b><u>b</u></b>		
	• Infrastructure						
	• Facilities						
	• Public property						
	• Commercial private property						
	• Residential private property						
4	Has your community assessed the level of flood insurance coverage in flood hazard areas?						
5	<b>(a)</b> Has your community assessed trends in the relative size and age of the permanent resident population and seasonal visiting population and <b>(b)</b> predicted future trends and impacts?	<b><u>a</u></b>	<b><u>b</u></b>	<b><u>a</u></b>	<b><u>b</u></b>		
6	Does your community conduct education and outreach to ensure community members and businesses are aware of hazard risks, warning procedures, and evacuations plans?						
	Are education and outreach materials prepared in the major languages spoken by residents and visitors?						
7	Is there strong participation among residents in social networks and citizen organizations (e.g., volunteer organizations, faith-based						

Social and Economic Vulnerability		Yes		No		N/A	Notes
	organizations, and civic groups) in your community?						
8	Is your community served by an active Community Emergency Response Team (CERT)?						
9	Has your community analyzed commuting patterns to identify the extent to which the local economy is dependent on the workforce traveling into and out of your community and how (a) existing and (b) potential future flood hazards could impact that transport?	<u>a</u>	<u>b</u>	<u>a</u>	<u>b</u>		
10	Has your community identified strategies for protecting or relocating culturally or historically significant artifacts/structures located in (a) existing and/or (b) potential future flood hazard areas?	<u>a</u>	<u>b</u>	<u>a</u>	<u>b</u>		
11	Is the economic base of your community diversified beyond tourism, maritime industries, and fisheries?						
12	Does your community encourage businesses located in flood hazard areas <sup>8</sup> to prepare continuity of operations plans?						
13	Does your community encourage businesses located in flood hazard areas <sup>8</sup> to purchase flood insurance?						
14	Does your community have business-supported groups (e.g., Chamber of Commerce) that assist local businesses with assessing vulnerability, flood hazard preparation, and hazard mitigation and adaptation?						
15	Does your community encourage local businesses to register as approved vendors for federal post-disaster procurement processes?						
16	Does your community have an economic development plan or strategy that addresses (a) existing and/or (b) potential future flood hazards?	<u>a</u>	<u>b</u>	<u>a</u>	<u>b</u>		

<sup>8</sup> Flood hazard areas include those designated as the 100-year floodplain depicted on your community’s Flood Insurance Rate Map (FIRM) and those mapped as subject to inundation from storm surge and sea level rise.

## V. Natural Environment

Maine's natural coastal systems, such as beaches, dunes, and wetlands, provide significant economic benefits, including tourism and recreation, as well as essential services and functions, such as erosion control and flood water attenuation. These natural systems protect and buffer communities from the impacts of coastal storms and flooding, reduce vulnerability, and can prevent economic losses from existing and future coastal hazards.

Coastal development has altered many of the natural systems along the coast of Maine, significantly impairing their ability to mitigate the impacts of coastal hazards. Furthermore, as sea levels increase, many of these systems will have to migrate landward to survive. If these systems continue to degrade or cannot keep pace with sea level rise due to physical barriers (*e.g.*, seawalls and roads) a significant percentage could be permanently lost. Protecting and preserving these resources and providing the opportunity for them to adapt to changing environmental conditions will help to ensure their sustained functions, services, and benefits.

This section relates to potential flood impacts to your community's natural systems and the plans, policies, and strategies in place to protect them now and into the future.

### Resources to Get Started

- Conservation and natural resource plans
- Maps of conserved lands  
<http://www.maine.gov/dacf/mnap/assistance/conslands.htm>
- Maps of natural areas of significance
- Maine Geological Survey (MGS) Coastal Sand Dune Geology maps and data  
<http://www.maine.gov/dacf/mgs/pubs/online/dunes/dunes.htm>
- MGS Coastal Bluff maps and data <http://www.maine.gov/dacf/mgs/pubs/online/bluffs/bluffs.htm>
- Maine Natural Areas Program Potential Tidal Marsh Migration and Coastal Undeveloped Blocks After 1 m of Sea Level Rise maps and data  
[http://www.maine.gov/dacf/mnap/assistance/coastal\\_resiliency.html](http://www.maine.gov/dacf/mnap/assistance/coastal_resiliency.html)



The Libby River Marsh, part of Maine's largest salt marsh, Scarborough Marsh, protects surrounding areas from flooding and buffers against rising seas.

Natural Environment		Yes		No		N/A	Notes
1	<b>(a)</b> Are the following natural resource areas within your community identified and mapped and <b>(b)</b> has your community conserved or developed a plan to conserve or restore them?	<b>a</b>	<b>b</b>	<b>a</b>	<b>b</b>		
	• Dunes and beaches						
	• Wetlands						
	• Coastal and wetland buffers and adjacent uplands						
	• Natural areas of significance						
	• Coastal Barrier Resources System (CBRS)						
2	Are potential conservation efforts, easements, and land acquisitions assessed for <b>(a)</b> existing and <b>(b)</b> potential future flood impacts and long-term ability to provide beneficial functions?	<b>a</b>	<b>b</b>	<b>a</b>	<b>b</b>		
3	Does your community prioritize repetitive loss properties for acquisition and conversion to open space?						
4	Does your community have local ordinances to protect the following from development or disturbance that are more protective than State regulations?						
	• Dunes and beaches						
	• Wetlands						
	• Coastal and wetland buffers						
	• Bluffs						
	• Flood hazard areas <sup>9</sup>						
	• Erosion hazard areas						
	• Natural areas of significance						
	• Coastal Barrier Resources System (CBRS)						
5	Has potential future marsh migration been analyzed, considered, and addressed in your community's planning and land use decisions?						
6	Has your community assessed impacts ( <i>e.g.</i> , saltwater intrusion) of <b>(a)</b> existing and <b>(b)</b> potential future flood hazards and sea level rise to public and private drinking water supplies?	<b>a</b>	<b>b</b>	<b>a</b>	<b>b</b>		
	Is there a plan in place to protect supplies?						

<sup>9</sup> Flood hazard areas include those designated as the 100-year floodplain depicted on your community's Flood Insurance Rate Map (FIRM) and those mapped as subject to inundation from storm surge and sea level rise.

Natural Environment		Yes	No	N/A	Notes
7	Does your community have a plan and process in place to ensure septic systems located in environmentally sensitive and flood hazard areas are routinely inspected and functioning properly?				
8	Does your community prohibit, or allow with more stringent environmental restrictions, septic systems in flood hazard <sup>10</sup> and coastal areas or encourage adaptation practices to protect from storm and flood impacts?				
9	(a) Are the following sites located within flood hazard areas <sup>10</sup> in your community? (b) If so, are there plans and policies in place to mitigate flood hazard impacts and protect human and environmental health?	a	b	a	b
	• Brownfields				
	• Superfund sites				
	• Landfills				
	• Tailings ponds and mining waste sites				
10	Are environmental protection measures, strategies, and priorities integrated in your community’s comprehensive and hazard mitigation plans?				
11	Do your community’s post-storm recovery plans ensure protection of environmentally sensitive or significant areas (e.g., dune systems)?				

<sup>10</sup> Flood hazard areas include those designated as the 100-year floodplain depicted on your community’s Flood Insurance Rate Map (FIRM) and those mapped as subject to inundation from storm surge and sea level rise.

**Definitions of Key Terms**

**100-year Flood** - The flood event having a 1-percent chance of being equaled or exceeded in any given year. The 1-percent annual chance flood is also referred to as the base flood.

**500-year Flood** - The flood event having a 0.2-percent chance of being equaled or exceeded in any given year.

**Adaptation** - Adjustment in natural or human systems to a new or changing environment that exploits beneficial opportunities or moderates negative effects.

**Adaptive Capacity** - The combination of the strengths, attributes, and resources available to an individual, community, society, or organization that can be used to prepare for and undertake actions to reduce adverse impacts, moderate harm, or exploit beneficial opportunities.

**Coastal Flooding** – The temporary inundation of normally dry, low-lying coastal land, caused by severe weather events along the coasts, estuaries, and adjoining rivers, abnormally high tide events, and abrupt and long-term increases in sea level.

**Coastal Hazards** - Physical phenomena that expose a coastal area to risk of property damage, loss of life and environmental degradation. In Maine, coastal hazards include flooding, severe storms, hurricanes, erosion, and sea level rise.

**Exposure** - People, property, systems, or other elements present in hazard zones that are thereby subject to potential losses.

**Freeboard** – a factor of safety usually expressed in feet above a flood level (*e.g.*, base flood elevation) for purposes of floodplain management.

**Green Infrastructure** – A cost-effective, resilient approach to managing wet weather impacts that protects, restores, or mimics the natural water cycle and reduces and treats stormwater at its source while delivering environmental, social, and economic benefits.

**Mitigation** - The lessening of the potential adverse impacts of physical hazards (including those that are human-induced) through actions that reduce hazard, exposure, and vulnerability.

**Nuisance Flooding** - Flooding which causes public inconvenience such as road closures. Nuisance flooding is increasing due to climate-related sea level rise and land subsidence combined with loss of natural coastal barriers.

**Resilience(ey)** – The ability of a community to adapt to changing conditions, withstand disruption, and rapidly recover from emergencies

**Risk** - Risks are threats to life, health and safety, the environment, economic well-being, and other things of value. Risks are often evaluated in terms of how likely they are to occur (probability) and the damages that would result if they did happen (consequences).

**Sea Level Rise** – The increase in sea level, both globally and locally, primarily due to thermal expansion caused by warming of the ocean (since water expands as it warms) and increased melting of land-based ice, such as glaciers and ice sheets.

**Sensitivity** - Sensitivity is the degree to which a system is affected, either adversely or beneficially, by climate variability or change.

**Special Flood Hazard Area (SFHA)** – The area, as marked on the Flood Insurance Rate Map (FIRM), that will be inundated by the flood event having a 1-percent chance of being equaled or exceeded in any given year. (*see 100-year flood*)

**Storm Surge** - The abnormal rise in water level generated by a storm, measured as the height of the water above the normal predicted astronomical tide. The surge is caused primarily by a storm's winds pushing water onshore.

**Vulnerability** - The degree to which physical, biological, and socio-economic systems are susceptible to and unable to cope with adverse impacts of a hazard. Vulnerability is a function of exposure, sensitivity, and adaptive capacity.

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## Appendix A: Additional Resources and Recommendations

### State Resources

- Maine Coastal Program
  - Grant opportunities <http://www.maine.gov/dacf/mcp/grants/index.html>
- Maine Floodplain Management Program
  - Maine Flood Hazard Map  
<http://maine.maps.arcgis.com/apps/webappviewer/index.html?id=3c09351397764bd2aa9ba385d2e9efe7>
- Maine Geological Survey
  - Highest Annual Tide Line 2015 <http://www.maine.gov/dacf/mgs/hazards/hat/index.shtml>
  - Sea Level Rise/Storm Surge map viewer and data  
[http://www.maine.gov/dacf/mgs/hazards/slr\\_ss/index.shtml](http://www.maine.gov/dacf/mgs/hazards/slr_ss/index.shtml)
  - Sea Lake and Overland Surges from Hurricanes (SLOSH) map viewer and data  
<http://www.maine.gov/dacf/mgs/hazards/slosh/index.shtml>
  - Coastal Sand Dune Geology Maps <http://www.maine.gov/dacf/mgs/pubs/online/dunes/dunes.htm>
  - Coastal Bluff Maps <http://www.maine.gov/dacf/mgs/pubs/online/bluffs/bluffs.htm>
- Maine Municipal Assistance Program
  - Information and resources for planning for climate variability  
<http://www.maine.gov/dacf/municipalplanning/technical/climate.shtml>
- Maine Natural Areas Program
  - Potential Tidal Marsh Migration map viewer and data  
[http://www.maine.gov/dacf/mnap/assistance/marsh\\_migration.htm](http://www.maine.gov/dacf/mnap/assistance/marsh_migration.htm)
  - Coastal Undeveloped Blocks After 1 m of Sea Level Rise map viewer and data  
[http://www.maine.gov/dacf/mnap/assistance/coastal\\_blocks\\_1m\\_slr.htm](http://www.maine.gov/dacf/mnap/assistance/coastal_blocks_1m_slr.htm)
  - Conserved Lands <http://www.maine.gov/dacf/mnap/assistance/conslands.htm>
- Maine Department of Environmental Protection
  - Climate Adaptation Toolkit <http://www.maine.gov/dep/sustainability/climate/adaptation-toolkit/index.html>
- Maine Emergency Management Agency
  - Hazard mitigation <http://www.maine.gov/mema/mitigation/index.shtml>

## I. Risk and Vulnerability

In addition to data sources and mapping tools listed in the “Resources to Get Started” section above, there are a number of resources, data, and tools available that can help your community understand local flood risk, assess impacts, and take action to decrease vulnerability.

### Resources

#### Assessing Risk and Vulnerability

- NOAA’s *Coastal Flood Exposure Mapper* is an online visualization tool for assessing coastal hazard risks and vulnerabilities that enables users to explore and create a collection of user-defined, savable and downloadable maps showing people, infrastructure, and natural resources exposed to coastal flood hazards. <https://coast.noaa.gov/digitalcoast/tools/flood-exposure.html>
- HAZUS-MH is a nationally applicable standardized methodology that contains models for estimating potential losses from earthquakes, floods, and hurricanes. It uses Geographic Information Systems (GIS) technology to estimate physical, economic, and social impacts of disaster. <https://www.fema.gov/hazus>
- The NOAA Coastal Services Center developed an on-line training module *The Roadmap for Adapting to Coastal Risk*, a participatory approach for assessing vulnerability to hazards and for incorporating relevant data and information about hazards and climate into ongoing local

planning and decision-making. <https://coast.noaa.gov/digitalcoast/training/community-resilience-part-i-assessing-vulnerabilities-using-the-roadmap-for-adapting-to.html>

- NOAA's *Adapting to Climate Change: A Planning Guide for State Coastal Managers* is a guide to assist coastal managers develop and implement adaptation plans to reduce the risks associated with climate change impacts. <https://coast.noaa.gov/czm/media/adaptationguide.pdf>
- *Understanding Your Risks: Identifying Hazards and Estimating Losses* provides step-by-step guidance on how to conduct a risk assessment. <https://www.fema.gov/media-library/assets/documents/4241>

#### Precipitation Data

- Cornell's *Extreme Precipitation Analysis in New England* is an interactive web tool for extreme precipitation analysis and includes estimates of extreme rainfall for various durations and recurrence intervals. <http://precip.eas.cornell.edu/>
- NOAA NWS Hydrometeorological Design Studies Center *Precipitation Frequency Data Server* (PFDS) is an interactive web tool delivering NOAA Atlas 14 precipitation frequency estimates and associated information. <http://hdsc.nws.noaa.gov/hdsc/pfds/>
- Department of Homeland Security Regional Resiliency Assessment Program, *Casco Bay Region Resiliency Assessment*. <http://www.northeastern.edu/kostas/wp-content/uploads/2017/03/Maine-RRAP-RA-FINAL-no-links.5-13.pdf>
- Department of Homeland Security Regional Resiliency Assessment Program - *Casco Bay Region Assessment* summary report, downscaled climate models, radar-based rainfall data, and Intensity, Duration, and Frequency (IDF) curves for precipitation. <http://www.northeastern.edu/kostas/rrap/>

#### Data Collection Tools

- *Wetlands Watch Sea Level Rise* mobile application is a crowdsourcing platform for gathering real-time, georeferenced data on local flooding and impacts. <http://wetlandswatch.org/sea-level-rise-phone-app/>
- U.S. Army Corps of Engineers' *Mobile Information Collection Application* (MICA) is user-friendly, cost-effective web-based and mobile application for digital collection and transfer of flood data. <http://www.erc.usace.army.mil/Media/Fact-Sheets/Fact-Sheet-Article-View/Article/476670/mobile-computing-mica-and-blue-roof/>

#### Recommendations

- Integrate information about current and potential future flood risk and hazards into your community's existing planning, policies, and activities to protect people, homes, and infrastructure, now and into the future.
- Partner with local universities and colleges to identify and operationalize opportunities for faculty and student research to help answer questions your community has and inform local decision-making.

## II. Critical Infrastructure and Facilities

### Resources

#### Assessing Vulnerability

- NOAA's *Coastal Flood Exposure Mapper* is an online visualization tool for assessing coastal hazard risks and vulnerabilities, including vulnerability of critical infrastructure. <https://coast.noaa.gov/digitalcoast/tools/flood-exposure.html>

#### Engineering and Design

- *StreamStats Version 4* is a GIS-based web application developed by the U.S. Geological Survey for calculating drainage basin characteristics and streamflow statistics for user-selected sites on

ivers and streams in Maine. It provides an assortment of analytical tools for water-resources planning and management and engineering and design purposes for rivers, streams, and watersheds. <http://water.usgs.gov/osw/streamstats/>

- *New England Interstate Water Pollution Control Commission* (NEIWPC) is an interstate agency that coordinates regional activities to meet the water-related needs of New England states by providing leadership in water management and protection, helping to establish design standards for wastewater treatment facilities, and participating in training and certification of treatment plant operators. <http://www.neiwpc.org/>

#### Funding

- The Maine Department of Environmental Protection oversees the Revolving Loan Funds program, which offers low-interest loans to improve municipal and quasi-municipal wastewater treatment infrastructure. Communities that make investments to have high-quality, safe and sustainable wastewater facilities will see the return from businesses that want to locate or expand to their towns and cities. These projects will improve resiliency and can save taxpayers money by reducing future repairs and upgrades while maintaining service functionality. <http://www.maine.gov/dep/water/grants/srfparag.html>
- U.S. EPA's Water Infrastructure and Resiliency Finance Center provides resources on financing disaster recovery and mitigation for water and wastewater utilities. <https://www.epa.gov/waterfinancecenter/financing-disaster-recovery-and-resilience-mitigation-water-and-wastewater>

#### Adaptation and Mitigation

- U.S. EPA developed *Flood Resilience: A Basic Guide for Water and Wastewater Utilities* to assist small and medium-sized water and wastewater utilities with protecting critical assets from flood hazards. [https://www.epa.gov/sites/production/files/2015-08/documents/flood\\_resilience\\_guide.pdf](https://www.epa.gov/sites/production/files/2015-08/documents/flood_resilience_guide.pdf)
- U.S. EPA's offers guidance on assessing risk, emergency response, recovery, and training for drinking water and wastewater resilience. <https://www.epa.gov/waterresilience>

#### Recommendations

- Incorporate existing and potential future coastal hazards into design standards, capital improvements planning, and regulations for critical infrastructure.
  - The Berwick Water Department and U.S. EPA engineers conducted a pilot project to evaluate the flooding risk and resilience of drinking and wastewater infrastructure in the town and determine actions to improve the utility's resilience to flooding. <https://toolkit.climate.gov/case-studies/small-water-utility-builds-flood-resilience>
- Conduct a detailed vulnerability assessment of potential flood impacts to your critical infrastructure and facilities.
  - The Saco Bay Sea Level Adaptation Working Group (SLAWG) undertook an assessment of the potential impacts of sea level rise and storm surge scenarios on public and private roads within the Saco Bay region. The summary report, *Road Infrastructure Assessment Report*, outlines the methodology and findings. <http://www.smrpc.org/images/SLAWG/FINAL%20SLAWG%20DOC%203.pdf>
- Develop an inventory of prioritized infrastructure and facilities vulnerable to existing flood hazards and future sea level rise to inform upgrade, repair, and replacement projects.
- Adapt and adopt existing federal floodplain management and development policies for guiding public and/or private development in your community. Examples of such federal policies include:
  - Executive Order (EO) 11988 requires federal agencies to avoid to the extent possible the long- and short-term adverse impacts associated with the occupancy and modification of flood plains and to avoid direct and indirect support of floodplain development wherever there is a practicable alternative. Under the order, federal agencies funding and/or permitting critical facilities are required to avoid the 0.2% (500-year) floodplain

- or protect facilities to the 0.2% chance flood level. <https://www.fema.gov/executive-order-11988-floodplain-management>
- [EO 13690](#) amended EO11988 and established a Federal Flood Risk Management Standard (FFRMS) requiring federal actions to use one of the following approaches for establishing flood elevation and hazard area they use in siting, design, and construction: best-available, actionable climate science; two feet above the 100-year (1% annual chance) flood elevation for standard projects and three feet above for critical buildings like hospitals and evacuation centers; or build to the 500-year (0.2% annual chance) flood elevation. <https://www.fema.gov/federal-flood-risk-management-standard-ffrms>

### III. Community Planning

#### Resources

##### Land Use Planning and Development

- NOAA's Smart Growth for Coastal and Waterfront Communities is a guide developed by NOAA, U.S. EPA, the International City/County Management Association, and Rhode Island Sea Grant that builds on smart growth principles to create coastal and waterfront-specific strategies for development. It is aimed at planners, local government officials, developers, residents, and other stakeholders. <http://coastalsmartgrowth.noaa.gov/>
- U.S. EPA offers resources and guidance on smart growth approaches that can help communities prepare for and recover from natural disasters. <https://www.epa.gov/smartgrowth>

##### Disaster Preparedness, Response, and Recovery

- *Natural Disaster Debris Management Site Planning: Considerations for York County Coastal Communities* is a report drafted by the Southern Maine Planning and Development Commission, in partnership with the York County Emergency Management Agency, that provides an overview on identifying potential debris management sites and understanding the logistics that surround choosing these sites. Specific suggestions and observations are also included in the report as well as a more extensive list of helpful materials. <http://www.smrpc.org/images/SLAWG/Report%20on%20Debris%20Site%20Identification%20May%202016.pdf>
- FEMA Integrated Public Alert and Warning System (IPAWS) allows community officials to provide the public with emergency information. <https://www.fema.gov/integrated-public-alert-warning-system>
- Maine Emergency Management Agency provides guidance materials and planning resources for emergency preparedness for schools and students. <http://www.maine.gov/mema/prepare/schools/index.shtml>

##### Adaptation and Mitigation

- Maine Sea Grant's *Property Owner's Guide to Managing Flooding, Erosion & Other Coastal Hazards* was created to help coastal property owners and municipal officials identify features and different types of hazards on the Maine coast, and evaluate responses and actions. <http://www.seagrants.umaine.edu/coastal-hazards-guide>
- U.S. EPA's *Smart Growth Fixes for Climate Adaptation and Resilience* is a guide designed to assist local government officials, staff, and boards find strategies to prepare for climate change impacts through land use and building policies. The guide includes case studies and adaptation strategies organized by hazard and categorized by ease of implementation. <https://www.epa.gov/smartgrowth/smart-growth-fixes-climate-adaptation-and-resilience>
- National Weather Service *StormReady Program* helps communities respond to hazardous weather by providing emergency managers with clear-cut guidelines on how to improve their hazardous weather operations. <http://www.stormready.noaa.gov/>

## Funding

- Maine Coastal Program oversees grant programs for coastal community planning, coastal access, and working waterfronts. <http://www.maine.gov/dacf/mcp/grants/index.html>
- FEMA administers Hazard Mitigation Assistance (HMA) grant programs to assist states, federally-recognized tribes, and local communities with eligible mitigation planning and projects that reduce disaster losses. The Pre-Disaster Mitigation (PDM) program provides funds for hazard mitigation planning and projects on an annual basis and Flood Mitigation Assistance (FMA) program provides funds for planning and projects to reduce or eliminate risk of flood damage to buildings that are insured under the National Flood Insurance Program. <https://www.fema.gov/hazard-mitigation-assistance>
- U.S. Army Corps of Engineers' Maine Silver Jackets team, an interagency group of federal and state partners, provides annual funding for flood risk reduction projects. <https://silverjackets.nfrmp.us/State-Teams/Maine>

## Recommendations

- Develop a resilience plan and/or integrate resiliency into existing community plans and policies.
- Establish a municipal fund to support local resiliency efforts.
  - Communities in the San Francisco Bay area have implemented a \$12 annual tax
- Integrate hazard mitigation into your community's comprehensive plan.
- Consider offering incentives to encourage private property owners to voluntarily implement flood risk reduction practices.
  - The town of Hull, MA offers a \$500 credit toward development permitting cost if property owners elect to incorporate at least two feet of freeboard into their construction. <http://www.mass.gov/eopss/docs/mema/resources/mitigation/freeboard-incentive-program-hull.pdf>
- Establish a low-interest loan program to provide financing to private property owners to retrofit homes and businesses to be more resilient to impacts from flooding and extreme storms.
  - Connecticut developed its "Shore Up Connecticut" program to provide financial assistance for flood-resilience retrofits for property owners that were not eligible for federal disaster aid after Sandy. Both home and business owners are eligible for loans under the program and can borrow up to \$300,000 to pay for flood resilience improvements. <http://shoreupct.org/>
- Post signs or markers indicating historical flood depths and/or potential future sea levels in publicly visible areas around your community to increase awareness of local flood risk and encourage action to mitigate that risk. FEMA's High Water Mark Initiative is a community-based program that offers guidance, resources, and standardized signage for communicating local flood risk. <https://www.fema.gov/high-water-mark-initiative>
- Encourage or require property buyers to review flooding and sea level rise risks to property with municipal staff and sign a form acknowledging the risk.
- Adopt zoning and/or floodplain ordinances that apply to flood hazard areas that extend beyond, horizontally and/or vertically, those identified as the 100-year floodplain depicted on your community's Flood Insurance Rate Map (FIRM) to account for existing and potential future flood hazard areas.
  - The City of Northampton, Massachusetts changed its regulatory floodplain boundaries from FEMA's 100-year floodplain to the 500-year floodplain as a surrogate for climate change. <http://www.northamptonma.gov/1415/Hazard-Mitigation>
  - The Georgetown Climate Center developed a model zoning ordinance, which was tested in communities in Connecticut and Maryland, that extends the boundaries of the areas subject to floodplain regulations to protect development that will become increasingly vulnerable to flood hazards as sea levels rise. <http://www.georgetownclimate.org/reports/zoning-for-sea-level-rise.html>

- Collaborate with property owners located in areas vulnerable to flood hazards to form a district in which property owners opt in to participate, wherein the district would use capital raised by issuing bonds to make resiliency improvements, which is paid back through a property tax assessment.

## IV. Social and Economic Vulnerability

### Resources

- *Integrating Historic Property and Cultural Resource Consideration into Hazard Mitigation Planning* is a guidance document developed by FEMA that provides a step-by-step method for developing and implementing a pre-disaster planning strategy for historic properties and cultural resources. [fema.gov/environmental-planning-and-historic-preservation-program/](http://fema.gov/environmental-planning-and-historic-preservation-program/)
- NOAA's *Quick Report Tool for Socioeconomic Data* provides easy access to downloadable economic and demographic data for coastal areas. <https://coast.noaa.gov/digitalcoast/tools/qrt.html>
- *Surging Seas* is a web-based sea level rise analysis mapping tool developed by Climate Central that allows users to see areas potentially affected by sea level rise and storm surge, down to the neighborhood scale, and with risk timelines. It also provides population statistics, summaries of homes and land affected by sea level rise and storm surge, fact sheets, data downloads, and action plans. <http://sealevel.climatecentral.org/>
- The U.S. Census Bureau provides interactive web-based tools for examining and visualizing federal social and economic data from the Census and American Community Survey. <https://www.census.gov/data.html>
- In many Maine communities and counties, emergency management is supported by volunteer teams that have received special training to support first responders and perform important response functions. Most of these teams receive basic training as Community Emergency Response Teams (CERT), and then may specialize in a particular type of response such as amateur radio or animal and pet care. [http://www.maine.gov/mema/prepare/community/prep\\_community\\_cert.shtml](http://www.maine.gov/mema/prepare/community/prep_community_cert.shtml)

### Recommendations

- Identify local organizations and groups that can help build support and engagement within the community for understanding flood vulnerability and increasing resilience.
- Encourage and provide assistance to local businesses to register as approved vendors for federal post-disaster procurement processes. [https://www.sba.gov/sites/default/files/disaster\\_contracting.pdf](https://www.sba.gov/sites/default/files/disaster_contracting.pdf)
- Encourage your Chamber of Commerce and local businesses to assess their vulnerability to coastal flood hazards and assess how well prepared they are for flooding events.
  - Mississippi-Alabama Sea Grant developed the *Tourism Resilience Index: A Business Self-Assessment: Understanding How Prepared Your Business is for a Disaster*. [http://masgc.org/assets/uploads/publications/1142/tourism\\_resilience\\_index.pdf](http://masgc.org/assets/uploads/publications/1142/tourism_resilience_index.pdf)

## V. Natural Resources

### Resources

- The Maine Coastal Program *Stream Habitat Viewer* is an online map viewer that displays stream habitats for species important to Maine’s economy, ecology, and way of life and provides information about dams and road crossings that can act as barriers to fish passage and stream health. <http://www.maine.gov/dacf/mcp/environment/streamviewer/>
- Maine Natural Areas Program developed GIS data related to tidal marshes, marsh migration, and undeveloped coastal areas with the potential to support future tidal marsh under a one foot sea level rise scenario. [http://www.maine.gov/dacf/mnap/assistance/coastal\\_resiliency.html](http://www.maine.gov/dacf/mnap/assistance/coastal_resiliency.html)
- The Nature Conservancy’s *Coastal Resilience* platform is a web mapping tool that allows users to examine nature’s role in reducing coastal risks and opportunities for habitat conservation in Maine. <http://maps.coastalresilience.org/maine/>
- NOAA’s *Green Infrastructure Mapping Guide* shows spatial analysts how to incorporate nature-based solutions, or green in infrastructure, into their GIS work. <http://coast.noaa.gov/digitalcoast/training/gi-mapping.html>
- NOAA’s *How to Consider Climate Change in Coastal Conservation* is an online resource that walks the user through the step-by-step approach identified in the *Guide for Considering Climate Change in Coastal Conservation* that can be used to create a new conservation plan or update an existing one that incorporates climate change information. The approach draws from existing strategic conservation planning frameworks but focuses on climate considerations and key resources specifically relevant to the coastal environment. <http://coast.noaa.gov/digitalcoast/training/coastal-conservation.html>

### Recommendations

- Adopt land use regulations that require expanded setbacks to protect buffer areas around natural resource areas.
- Adopt land use regulations and/or zoning ordinances to protect, accommodate, and facilitate future marsh migration.
- Identify and prioritize conservation areas that offer multiple benefits such as flood protection, wildlife habitat, recreation, and CRS credit.
- Utilize buy-out options of properties repeatedly damaged by coastal hazards and preserve those areas as open space.
- Develop easement language for coastal properties that accounts for sea level rise and subsequent changes to property boundaries.
- Identify opportunities to restore, conserve, or enhance natural protective features.
  - Municipal officials in Provincetown, MA undertook a managed retreat of a beachfront parking lot that was at risk from erosion. The town demolished the existing parking lot and constructed a new lot 125ft inland, allowing for restored shoreline in the original footprint of the lot. [http://www.nytimes.com/2016/07/07/us/at-a-cape-cod-landmark-a-strategic-retreat-from-the-ocean.html?\\_r=0](http://www.nytimes.com/2016/07/07/us/at-a-cape-cod-landmark-a-strategic-retreat-from-the-ocean.html?_r=0)

**Appendix B: Community Rating System (CRS) Credit  - 2013 CRS Coordinator's Manual**

The activity and element numbers correspond with those in the *2013 CRS Coordinator's Manual*. The element descriptions provided in the table are brief summaries of what is credited in the CRS program. Additionally, the CRS program credits more activities and elements than what are listed here. For a full explanation of activities, elements, and criteria for receiving credit, see the Coordinator's Manual. **Note:** The point values listed in the tables below are the maximum possible points that a community can receive for the associated activity and/or element. In many instances, it is likely that communities will be eligible for partial credit rather than the maximum points available.

Checklist Section and Question	CRS Credit							
	Activity	Element	Description	Max. Points				
Risk and Vulnerability	1	320	Map Information Service	322.c	Credit is given for providing information about flood problems other than those shown on the FIRM (e.g., sea level rise).	20		
				322.e	Credit is given for providing information about special flood-related hazards in your community, including coastal erosion.	20		
				322.f	Credit is given for providing information about past floods that have occurred in the community.	20		
		440	Flood Data Maintenance	440EDM	(Coastal Erosion Hazard Supplement) Credit is provided if a state or local agency maintains reference marks spaced no more than ½ mile apart and records shoreline erosion in relation to those reference marks at least every 5 years OR if a state or local agency takes new aerial photographs at least every five years to update its shoreline erosion rates.	20		
	4	320	Map Information Service	322.c	Credit is given for providing information about flood problems other than those shown on the FIRM (e.g., sea level rise).	20		
				400	Mapping and Regulations	410MCE	(Coastal Erosion Hazards Supplement) Credit is provided for mapping coastal erosion hazard areas or erosion rate analyses for management purposes. (In support of Maine's Coastal Sand Dune Rules, the Maine Geological Survey developed maps of erosion-prone areas which could provide CRS credit under this activity).	50
						412.f	Credit is provided for mapping and regulating certain special flood-related hazards, including coastal erosion and inland hazards.	50
						442.a	Credit is provided for digital or other systems that improve access, quality, and/or ease of flood data, including data about coastal high hazard areas.	160
	6	320	Map Information Service	322.a	This element credits providing basic information found on your community's FIRM that is needed to write a flood insurance policy.	30		
				322.f	Credit is given for providing information about past floods that have occurred in the community.	20		
		510	Floodplain Management	512.b	This element provides credit for a repetitive loss area analysis and mitigation plan that was developed following a standard planning process.	140		

Checklist Section and Question		CRS Credit			
		Activity	Element	Description	Max. Points
Risk and Vulnerability	7	Planning	512.a	Credit is provided for a community-wide floodplain management plan that was prepared by following a standard planning process. One required step of the process is assessing flood hazards.	382 (35 for hazard assessment)

Checklist Section and Question		CRS Credit				
		Activity	Element	Description	Max. Points	
Critical Infrastructure and Facilities	1	310	Elevation Certificates	312.a	Credit is provided for maintaining FEMA Elevation Certificates on all buildings in the SFHA after the date of application to the CRS.	38
				312.b	This element provides credit for maintaining Elevation Certificates on buildings built or substantially improved between the date of the community's initial FIRM and the date of application to the CRS.	48
				312.c	Credit is provided if completed Elevation Certificates (ECs) are maintained for buildings that were constructed in the regulatory floodplain before the date of the community's initial FIRM. Even if the EC was not completed at the time of construction, a community can receive credit if elevation data is transferred to ECs.	30
		430	Higher Regulatory Standards	432.f	Credit is provided for regulation that either prohibit critical facilities from the regulatory floodplain or set higher standards for protection them from flood damage.	80
				432.m	This element provides credit for higher regulatory standards not addressed in other elements of Activity 430, including requiring streets in the floodplain to be at or above the BFE to provide access for emergency vehicles during a flood.	100
	3	440	Flood Data Maintenance	442.a	Credit is provided for digital or other systems that improve access, quality, and/or ease of flood data, including building footprints and/or building elevation data.	160
	4	610	Flood Warning and Response	612.d	Credit is provided for the community coordinating its flood warning and response program with its critical facilities, such as wastewater treatment plants.	75
	10	520	Acquisition and Relocation	522.d	Credit is provided for acquiring, relocating, or otherwise clearing critical facilities, such as a water treatment plant, from the regulatory floodplain and ensuring the property, or portion within the floodplain, remains vacant.	190 (6 per facility)
	11	430	Higher Regulatory Standards	432.f	Credit is provided for regulation that either prohibit critical facilities from the regulatory floodplain or set higher standards for protection them from flood damage.	80

Checklist Section and Question	CRS Credit					
	Activity	Element	Description	Max. Points		
Community Planning	2	420	Open Space Preservation	420	This activity provides credit for areas in the regulated floodplain that are permanently preserved as open space. Additional credit is given for measures that encourage less development in the floodplain and for parcels that are protected by deed restrictions or provide natural floodplain functions.	2,020
		400	Mapping and Regulations	410MCE	<i>(Coastal Erosion Hazards Supplement)</i> Credit is provided for mapping coastal erosion hazard areas or erosion rate analyses for management purposes. <i>(In support of Maine’s Coastal Sand Dune Rules, the Maine Geological Survey developed maps of erosion-prone areas which could provide CRS credit under this activity).</i>	50
		510	Floodplain Management Planning	510	This activity credits the production of an overall strategy of programs, projects, and measures that will reduce the adverse impact of flooding on the community. Credit is provided for a community-wide floodplain management plan that follows a defined planning process, a detailed mitigation plan for repetitive loss areas, and a natural floodplain functions plan.	622
	3	430	Higher Regulatory Standards	432.o	This element provides credit for your community’s procedures for administering floodplain management regulations. Credit is given for having a Certified Floodplain Manager (CFM®) on staff, staff members that are graduates of approved Emergency Management Institute (EMI) courses, and accreditation of the building department by the International Accreditation Service (ISA).	67
				430	This activity credits regulations that exceed the minimum criteria of the National Flood Insurance Program (NFIP). Creditable regulations include those related to freeboard; prohibition of fill; development limitations; and coastal A Zone development.	2,042
	5	410	Floodplain Mapping	412.d	Credit is provided for using study standards higher than those required by FEMA to develop regulatory maps and flood data for regulating areas based on flood data not provided with the community’s FIRM, such as future sea level rise conditions.	160
		430	Higher Regulatory Standards	432.m	This element provides credit for regulatory approaches and standards that are not addressed in other elements of Activity 430, such as floodplain regulations that incorporate future sea level rise conditions.	100
	6	430	Higher Regulatory Standards	430	This activity credits regulations that exceed the minimum criteria of the National Flood Insurance Program (NFIP). Creditable regulations include those related to freeboard; prohibition of fill; development limitations; first floor enclosure limits; and coastal A Zone development.	2,042
				430CER	<i>(Coastal Erosion Hazards Supplement)</i> Credit is provided for coastal erosion regulations and dune and beach regulations that prohibit new building within mapped erosion, dune, and beach areas. <i>Due to State regulations, coastal ME communities are likely eligible for at least 200 points for element 430CER).</i>	370

Checklist Section and Question	CRS Credit					
	Activity	Element	Description	Max. Points		
Community Planning	8	420	Open Space Preservation	420	Credit is provided for areas in a regulated floodplain that are permanently preserved as open space. Parcels that are protected by deed restrictions or provide natural floodplain functions are eligible for the most credit.	2,020
		520	Acquisition and Relocation	520	This activity credits the acquisition of a property and either the demolition of the building or the relocation of the building outside of the regulatory floodplain.	2,250
	9	510	Floodplain Management Planning	512.a	This element credits a community-wide floodplain management plan that was prepared by following a standard planning process. Points can be earned if the plan identifies areas likely to be flooded and flood problems that are likely to get worse in the future as a result of future development.	382
	10	450	Stormwater Management	452.a	This element credits regulating development on a case-by-case basis to ensure that peak stormwater runoff flow will not exceed pre-development runoff flow. Partial credit can be given for stormwater management regulations that require implementation of low-impact development/green infrastructure when new development occurs.	380
				452.d	This element provides credit for implementing best management practices (BMPs) to protect water quality. To receive credit, a community’s stormwater management regulations must either specify one or more measures or refer to BMPs as published in an official government reference.	20
	13	510	Floodplain Management Planning	510	This activity credits the production of an overall strategy of programs, projects, and measures that will reduce the adverse impact of flooding on the community. Hazard mitigation plans prepared in accordance with FEMA requirements will receive some credit under this activity.	622
	14	330	Outreach Projects	330	This activity credits providing the public with information needed to increase flood hazard awareness.	350
	15			332.b	This element credits developing a pre-flood plan for public information projects that will be implemented during and after a flood.	50
	16			332.a	Credit is provided for disseminating information about local flood risk and past floods.	200
	18	610	Flood Warning and Response	612.e	Credit is provided to communities that have received a StormReady designation from the National Weather Service.	25
	19	430	Higher Regulatory Standards	432.h	Credit is provided for adopting and enforcing the International Code Series (I-Codes), which are included in the Maine Uniform Building and Energy Code (MUBEC), and for the community’s Building Code Effectiveness Grading Schedule (BCEGS) classification.	100
	20	320	Map Information Service	320	This activity credits providing inquirers with information from the community’s FIRM and other sources of information about the local flood hazard and natural floodplain functions.	90
		340	Hazard Disclosure	340	Credit is provided if a community’s real estate agents advise prospective floodplain occupants about the flood hazard and the flood insurance purchase requirement. More credit is provided if the disclosure includes other hazards, such as coastal erosion.	80

Checklist Section and Question		CRS Credit							
		Activity	Element	Description	Max. Points				
Community Planning	21	610	Flood Warning and Response	610	This activity provides credit for a community that, at a minimum, has adopted a flood warning and response program that includes a flood threat recognition system; methods to warn the public of an impending flood; a plan for response operations; and coordination with critical facility operators.	395			
	23								
	24						612.b	Credit is provided for emergency warning alerts and messages that are disseminated to the public when a flood is imminent.	75
	25						612.c	This element credits a flood warning and response plan that identifies specific tasks to reduce or prevent threats to health, safety, and property from flooding.	115

Checklist Section and Question		CRS Credit				
		Activity	Element	Description	Max. Points	
Social and Economic Vulnerability	3	370	Flood Insurance Promotion	372.a	Credit is provided for assessing your community’s current level of flood insurance coverage and identifying shortcomings.	15
	6	330	Outreach Projects	330	This activity credits providing the public with information needed to increase flood hazard awareness.	350
		350	Flood Protection Information	350	This activity credits providing the public with detailed information about local flood risk and protection measures.	125
	13	370	Flood Insurance Promotion	370	This activity provides credit for a three-step process of assessing local flood insurance coverage, developing a coverage improvement plan, and implementing the plan.	110

Checklist Section and Question		CRS Credit				
		Activity	Element	Description	Max. Points	
Natural Environment	1	320	Map Information Service	320	This activity credits providing inquirers with information from the community’s FIRM and other sources of information about the local flood hazard and natural floodplain functions.	90
		420	Open Space Preservation	420	Credit is provided for areas in a regulated floodplain that are permanently preserved as open space. Parcels that are protected by deed restrictions or provide natural floodplain functions are eligible for the most credit.	2,020
				420CEOS	(Coastal Erosion Hazard Supplement) Credit is provided for the preservation of coastal erosion open space within a community’s mapped coastal erosion hazard area. Designated open space may include areas protected by coastal construction setbacks. Dune and beach areas preserved in their natural undeveloped state may also qualify for additional credit under elements 420.c and 420.g.	750

Checklist Section and Question	CRS Credit					
	Activity	Element	Description	Max. Points		
Natural Environment	1	440	442.a	Credit is provided for digital or other systems that improve access, quality, and/or ease of flood data, including data about areas with natural floodplain functions (e.g., wetlands and designated riparian habitat).	160	
			440EDM	(Coastal Erosion Hazard Supplement) Credit is provided if a state or local agency maintains reference marks spaced no more than ½ mile apart and records shoreline erosion in relation to those reference marks at least every 5 years OR if a state or local agency takes new aerial photographs at least every five years to update its shoreline erosion rates.	20	
		510	Floodplain Management Planning	512.c	This element credits the creation and adoption of plans that protect one or more natural functions within the community's floodplain.	100
		540	Drainage System Maintenance	540EPM	(Coastal Erosion Hazard Supplement) This element credits professionally designed maintenance programs, such as dune restoration, bluff stabilization, and beach nourishment programs, that protect buildings from coastal flooding or erosion. Credit for this element is dependent on having coastal erosion setback regulations.	100
	3	510	Floodplain Management Planning	512.b	This element provides credit for a repetitive loss area analysis and mitigation plan that was developed following a standard planning process.	140
	4	420	Open Space Preservation	422.g	Credit is provided for regulations that govern development and construction and policies followed on public lands that protect channels and shorelines in their natural state.	120
				420CEOS	(Coastal Erosion Hazard Supplement) Credit is provided for the preservation of coastal erosion open space within a community's mapped coastal erosion hazard area. Designated open space may include areas protected by coastal construction setbacks. Dune and beach areas preserved in their natural undeveloped state may also qualify for additional credit under elements 420.c and 420.g.	750
		430	Higher Regulatory Standards	430CER	(Coastal Erosion Hazards Supplement) Credit is provided for coastal erosion regulations and dune and beach regulations that prohibit new building within mapped erosion, dune, and beach areas. (Due to State regulations, coastal ME communities are likely eligible for at least 200 points for element 430CER).	370
	5	320	Map Information Service	322.c	Credit is given for providing information to inquirers about flood problems other than those shown on the FIRM (e.g., sea level rise).	20
				322.g	This element credits providing information about areas that should be protected because of their natural floodplain functions.	20

Checklist Section and Question	CRS Credit					
	Activity	Element	Description	Max. Points		
Natural Environment	5	420	Open Space Preservation	420	Credit is provided for areas in a regulated floodplain that are permanently preserved as open space. Parcels that are protected by deed restrictions or provide natural floodplain functions are eligible for the most credit.	2,020
	8	430	Higher Regulatory Standards	432.m	This element provides credit for regulatory approaches and standards that are not addressed in other elements of Activity 430, including prohibiting installation of new septic systems in the floodplain.	100
	11	420	Open Space Preservation	420	Credit is provided for areas in a regulated floodplain that are permanently preserved as open space. Parcels that are protected by deed restrictions or provide natural floodplain functions are eligible for the most credit.	2,020

## Appendix C: Community Rating System (CRS) Credit - 2017 CRS Coordinator's Manual

The activity and element numbers correspond with those in the [2017 CRS Coordinator's Manual](#). The element descriptions provided in the table are brief summaries of what is credited in the CRS program. Additionally, the CRS program credits more activities and elements than what are listed here. For a full explanation of activities, elements, and criteria for receiving credit, see the Coordinator's Manual. **Note:** The point values listed in the tables below are the maximum possible points that a community can receive for the associated activity and/or element. In many instances, it is likely that communities will be eligible for partial credit rather than the maximum points available.

Checklist Section and Question	CRS Credit							
	Activity	Element	Description	Max. Points				
Risk and Vulnerability	1	320	Map Information Service	322.c	Credit is given for providing information about flood problems other than those shown on the FIRM (e.g., sea level rise).	20		
				322.e	Credit is given for providing information about special flood-related hazards in your community, including coastal erosion.	20		
				322.f	Credit is given for providing information about past floods that have occurred in the community.	20		
		440	Flood Data Maintenance	442.d	Credit is provided if a state or local agency maintains reference marks spaced no more than ½ mile apart and records shoreline erosion in relation to those reference marks at least every 5 years OR if a state or local agency takes new aerial photographs at least every five years to update its shoreline erosion rates.	20		
	4	320	Map Information Service	322.c	Credit is given for providing information about flood problems other than those shown on the FIRM (e.g., sea level rise).	20		
				410	Floodplain Mapping	412.f	Credit is provided for mapping coastal erosion hazard areas or conducting erosion rate analyses for management purposes. <i>(In support of Maine's Coastal Sand Dune Rules, the Maine Geological Survey developed maps of erosion-prone areas which could provide CRS credit under this activity).</i>	50
						442.a	Credit is provided for digital (e.g., GIS) or other flood data maintenance systems that improve access, quality, and/or ease of updating flood data, including data about coastal high hazard areas.	160
	6	320	Map Information Service	322.a	This element credits providing basic information found on your community's FIRM that is needed to write a flood insurance policy.	30		
				322.f	Credit is given for providing information about past floods that have occurred in the community.	20		
		510	Floodplain Management Planning	512.b	This element provides credit for a repetitive loss area analysis and mitigation plan that was developed following a standard planning process.	140		
	512.a			Credit is provided for a community-wide floodplain management plan that was prepared by following a standard planning process. One required step of the process is assessing flood hazards.	382 (35 for hazard assessment)			

Checklist Section and Question	CRS Credit					
	Activity	Element	Description	Max. Points		
Critical Infrastructure and Facilities	1	310	Elevation Certificates	312.a	Credit is provided for maintaining FEMA Elevation Certificates on all buildings in the SFHA after the date of application to the CRS.	38
				312.b	This element provides credit for maintaining Elevation Certificates on buildings built or substantially improved between the date of the community’s initial FIRM and the date of application to the CRS.	48
				312.c	Credit is provided if completed Elevation Certificates (ECs) are maintained for buildings that were constructed in the regulatory floodplain before the date of the community’s initial FIRM. Even if the EC was not completed at the time of construction, a community can receive credit if elevation data is transferred to ECs.	30
		430	Higher Regulatory Standards	432.f	Credit is provided for regulation that either prohibit critical facilities from the regulatory floodplain or set higher standards for protection them from flood damage.	80
				432.o	This element provides credit for higher regulatory standards not addressed in other elements of Activity 430, including requiring streets in the floodplain to be at or above the BFE to provide access for emergency vehicles during a flood.	100
		3	440	Flood Data Maintenance	442.a	Credit is provided for digital (e.g., GIS) or other systems that improve access, quality, and/or ease of flood data, including building footprints and/or building elevation data.
	4	610	Flood Warning and Response	612.d	Credit is provided for the community coordinating its flood warning and response program with its critical facilities, such as wastewater treatment plants.	75
	10	520	Acquisition and Relocation	522.d	Credit is provided for acquiring, relocating, or otherwise clearing critical facilities, such as a water treatment plant, from the regulatory floodplain and ensuring the property, or portion within the floodplain, remains vacant.	190 (6 per facility)
	11	430	Higher Regulatory Standards	432.f	Credit is provided for regulation that either prohibit critical facilities from the regulatory floodplain or set higher standards for protection them from flood damage.	80

Checklist Section and Question		CRS Credit				
		Activity	Element	Description	Max. Points	
Community Planning	2	420	Open Space Preservation	420	This activity provides credit for areas in the regulated floodplain that are permanently preserved as open space. Additional credit is given for measures that encourage less development in the floodplain and for parcels that are subject to coastal erosion, have low-density zoning, are protected by deed restrictions, or provide natural floodplain functions.	2,870
		410	Floodplain Mapping	412.f	Credit is provided for mapping coastal erosion hazard areas or conducting erosion rate analyses for management purposes. <i>(In support of Maine’s Coastal Sand Dune Rules, the Maine Geological Survey developed maps of erosion-prone areas which could provide CRS credit under this activity).</i>	50
		510	Floodplain Management Planning	510	This activity credits the production of an overall strategy of programs, projects, and measures that will reduce the adverse impact of flooding on the community. Credit is provided for a community-wide floodplain management plan that follows a defined planning process, a detailed mitigation plan for repetitive loss areas, and a natural floodplain functions plan.	622
	3	430	Higher Regulatory Standards	432.q	This element provides credit for your community’s procedures for administering floodplain management regulations. Credit is given for having a Certified Floodplain Manager (CFM®) on staff, staff members that are graduates of approved Emergency Management Institute (EMI) courses, and accreditation of the building department by the International Accreditation Service (ISA).	67
				430	This activity credits regulations that exceed the minimum criteria of the National Flood Insurance Program (NFIP). Creditable regulations include those related to freeboard; prohibition of fill; development limitations; and applying V Zone regulations to coastal A Zone development.	2,462
				432.k	This element provides credit for enforcing V Zone regulations in the coastal A Zone	500
	5	410	Floodplain Mapping	412.d	Credit is provided for using study standards higher than those required by FEMA to develop regulatory maps and flood data for regulating areas based on flood data not provided with the community’s FIRM, such as future sea level rise conditions, and for mapping the base flood elevation with freeboard.	200
		430	Higher Regulatory Standards	430	This activity credits regulations that exceed the minimum criteria of the National Flood Insurance Program (NFIP). Creditable regulations include those related to freeboard; prohibition of fill; development limitations; first floor enclosure limits; and applying V Zone regulations to coastal A Zone development.	2,462
	6					
	8	420	Open Space Preservation	420	Credit is provided for areas in a regulated floodplain that are permanently preserved as open space. Parcels that are protected by deed restrictions or provide natural floodplain functions are eligible for the most credit.	2,870

Checklist Section and Question	CRS Credit					
	Activity	Element	Description	Max. Points		
Community Planning	8	520	Acquisition and Relocation	520	This activity credits the acquisition of a property and either the demolition of the building or the relocation of the building outside of the regulatory floodplain.	2,250
	9	510	Floodplain Management Planning	512.a	This element credits a community-wide floodplain management plan that was prepared by following a standard planning process. Points can be earned if the plan identifies areas likely to be flooded and flood problems that are likely to get worse in the future as a result of future development.	382
	10	450	Stormwater Management	452.a	This element credits regulating development on a case-by-case basis to ensure that peak stormwater runoff flow will not exceed pre-development runoff flow. Partial credit can be given for stormwater management regulations that require implementation of low-impact development/green infrastructure when new development occurs.	380
				452.d	This element provides credit for implementing best management practices (BMPs) to protect water quality. To receive credit, a community's stormwater management regulations must either specify one or more measures or refer to BMPs as published in an official government reference.	20
	13	510	Floodplain Management Planning	510	This activity credits the production of an overall strategy of programs, projects, and measures that will reduce the adverse impact of flooding on the community. Hazard mitigation plans prepared in accordance with FEMA requirements will receive some credit under this activity.	622
	14	330	Outreach Projects	330	This activity credits providing the public with information needed to increase flood hazard awareness.	350
	15			332.b	This element credits developing a pre-flood plan for public information projects that will be implemented during and after a flood.	50
	16			332.a	Credit is provided for disseminating information about local flood risk and past floods.	200
	18	610	Flood Warning and Response	612.e	Credit is provided to communities that have received a StormReady designation from the National Weather Service.	25
	19	430	Higher Regulatory Standards	432.h	Credit is provided for adopting and enforcing the International Code Series (I-Codes), which are included in the Maine Uniform Building and Energy Code (MUBEC), and for the community's Building Code Effectiveness Grading Schedule (BCEGS) classification.	100
	20	320	Map Information Service	320	This activity credits providing inquirers with information from the community's FIRM and other sources of information about the local flood hazard and natural floodplain functions.	90
		340	Hazard Disclosure	340	Credit is provided if a community's real estate agents advise prospective floodplain occupants about the flood hazard and the flood insurance purchase requirement. More credit is provided if the disclosure includes other hazards, such as coastal erosion and sea level rise.	80

Checklist Section and Question		CRS Credit							
		Activity	Element	Description	Max. Points				
Community Planning	21	610	Flood Warning and Response	610	This activity provides credit for a community that, at a minimum, has adopted a flood warning and response program that includes a flood threat recognition system; methods to warn the public of an impending flood; a plan for response operations; and coordination with critical facility operators.	395			
	23								
	24						612.b	Credit is provided for emergency warning alerts and messages that are disseminated to the public when a flood is imminent.	75
	25						612.c	This element credits a flood warning and response plan that identifies specific tasks to reduce or prevent threats to health, safety, and property from flooding.	115

Checklist Section and Question		CRS Credit				
		Activity	Element	Description	Max. Points	
Social and Economic Vulnerability	3	370	Flood Insurance Promotion	372.a	Credit is provided for assessing your community’s current level of flood insurance coverage and identifying shortcomings.	15
	6	330	Outreach Projects	330	This activity credits providing the public with information needed to increase flood hazard awareness.	350
		350	Flood Protection Information	350	This activity credits providing the public with detailed information about local flood risk and protection measures.	125
	13	370	Flood Insurance Promotion	370	This activity provides credit for a three-step process of assessing local flood insurance coverage, developing a coverage improvement plan, and implementing the plan.	110

Checklist Section and Question		CRS Credit				
		Activity	Element	Description	Max. Points	
Natural Environment	1	320	Map Information Service	320	This activity credits providing inquirers with information from the community’s FIRM and other sources of information about the local flood hazard and natural floodplain functions.	90
		410	Floodplain Mapping	412.f	Credit is provided for mapping coastal erosion hazard areas or conducting erosion rate analyses for management purposes. <i>(In support of Maine’s Coastal Sand Dune Rules, the Maine Geological Survey developed maps of erosion-prone areas which could provide CRS credit under this activity).</i>	50
		420	Open Space Preservation	420	Credit is provided for areas in a regulated floodplain that are permanently preserved as open space. Additional credit is given for measures that encourage less development in the floodplain and for parcels that are subject to coastal erosion, have low-density zoning, are protected by deed restrictions, or provide natural floodplain functions.	2,870

Checklist Section and Question	CRS Credit					
	Activity	Element	Description	Max. Points		
Natural Environment	1	420	Open Space Preservation 422.e	Credit is provided for the preservation of coastal erosion open space within a community's mapped coastal erosion hazard area. Designated open space may include areas protected by coastal construction setbacks, but creditable setbacks must prohibit all buildings or other encroachments. Dune and beach areas preserved in their natural undeveloped state may also qualify for additional credit under elements 422.c and 422.h.	750	
		440	Flood Data Maintenance	442.a	Credit is provided for digital (e.g., GIS) or other flood data maintenance systems that improve access, quality, and/or ease of flood data, including data about coastal high hazard areas and areas with natural floodplain functions (e.g., wetlands and designated riparian habitat).	160
				442.d	Credit is provided if a state or local agency maintains reference marks spaced no more than ½ mile apart and records shoreline erosion in relation to those reference marks at least every 5 years OR if a state or local agency takes new aerial photographs at least every five years to update its shoreline erosion rates.	20
		510	Floodplain Management Planning 512.c	This element credits the creation and adoption of plans that protect one or more natural functions within the community's floodplain.	100	
	3	510	Floodplain Management Planning 512.b	This element provides credit for a repetitive loss area analysis and mitigation plan that was developed following a standard planning process.	140	
	4	420	Open Space Preservation	422.h	Credit is provided for regulations that govern public and private development and construction and policies followed on public lands that protect channels and shorelines in their natural state.	120
				422.e	Credit is provided for the preservation of coastal erosion open space within a community's mapped coastal erosion hazard area. Designated open space may include areas protected by coastal construction setbacks, but creditable setbacks must prohibit all buildings or other encroachments. Dune and beach areas preserved in their natural undeveloped state may also qualify for additional credit under elements 422.c and 422.h.	750
		430	Higher Regulatory Standards 432.n	Credit is provided for coastal erosion regulations and dune and beach regulations that prohibit new building within mapped erosion, dune, and beach areas. <i>(Due to State regulations, coastal ME communities are likely eligible for at least 200 points for element 432.n).</i>	370	

Checklist Section and Question	CRS Credit				
	Activity	Element	Description	Max. Points	
Natural Environment	5	320	Map Information Service	322.c Credit is given for providing information to inquirers about flood problems other than those shown on the FIRM (e.g., sea level rise).	20
				322.g This element credits providing information about areas that should be protected because of their natural floodplain functions.	20
	5	420	Open Space Preservation	420 Credit is provided for areas in a regulated floodplain that are permanently preserved as open space. Additional credit is given for preserving parcels in areas subject to coastal erosion, programs that protect natural channels and shorelines, and parcels that are protected by deed restrictions or provide natural floodplain functions.	2,870
	8	430	Higher Regulatory Standards	432.o This element provides credit for regulatory approaches and standards that are not addressed in other elements of Activity 430, including prohibiting installation of new septic systems in the floodplain.	100
11	420	Open Space Preservation	420 Credit is provided for areas in a regulated floodplain that are permanently preserved as open space. Additional credit is given for preserving parcels in areas subject to coastal erosion, programs that protect natural channels and shorelines, and parcels that are protected by deed restrictions or provide natural floodplain functions.	2,870	