



Attachment 3

Climate Adaptation Plan (CAP) Requirements and Guidance



Maine CWSRF Climate Adaptation Plan

The Department is providing an incentive to encourage municipalities and districts to develop a Climate Adaptation Plan (CAP) for their wastewater treatment system. Under this context, the “wastewater treatment system”, a.k.a. system, will consist of the municipality’s or district’s infrastructure assets to collect, convey, treat, and discharge municipal sewage. The incentive will be provided in the form of a principal forgiveness loan to borrowers who want to develop a CAP. The amount of incentive will be established annually during development of the Intended Use Plan (IUP) and may vary, as determined by CWSRF, depending on the specifics of the borrower’s wastewater treatment system. The intent of the CAP is for loan recipients to assess their existing wastewater treatment system’s vulnerabilities to climate change and develop a plan for system resiliency. Wastewater treatment systems that have undergone major and substantial upgrades in the last five years or, that are currently undergoing the process (planning, design, or construction) of major and substantial upgrades do not meet the intent of the CAP. Wastewater treatment systems that have no assets adjacent to, or within, the 100-year FEMA floodplain and are not susceptible to sea level rise and storm surge also do not meet the intent of a CAP.

The CAP must be prepared by a licensed engineer and submitted to the Department **within one year of the loan closing date.**

The CAP should identify hazards associated with climate change, evaluate their impacts on critical assets, identify adaptation measures and present recommendations that build resiliency into the critical assets. Some impacts to critical assets will develop slowly over time (sea level rise, air and water temperature changes, precipitation changes, etc.) and other impacts may happen suddenly (storms, tidal surge, ice jams, etc.). Therefore, it is important to consider what adaptation measures may be implemented over time, and what may be implemented in the near term. For example, emergency operations’ planning is often intended to define actions taken during a specific weather event. Adaptation planning identifies adaptation measures, or practices, to implement prior to an anticipated weather event so that the level of emergency response needed during a weather event is reduced.

The format for the final report is at the discretion of the author and contributors; however, each of the following steps should be addressed. The Maine DEP CWSRF will meet with the applicant prior to starting the CAP to answer any questions about these expectations and requirements.

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- 1. Identify Participating Personnel:** The authorized responsible person in charge of the facility, whether that is the Superintendent/Town Manager/Public Works Director, is required.

Primary Participants (expected/required):

- Superintendent
- Town/City/District Manager
- CWSRF Project Engineer
- Consultant Engineer
- Local Emergency Management Agency

Other key individuals that may prove to be helpful include:

Additional Participants (discretionary):

- Town Planner / Regional Planner
- Board of Directors
- General Public
- Regional Emergency Management Agency
- Select Board
- Drinking Water Program
- Insurance Company

- 2. Identify System Hazards:** Identify natural hazards that could potentially pose a risk to critical assets and the entire system. This should include identification of any helpful historic information. The following is a list of examples of natural hazards that may be applicable. The list is not meant to be all inclusive.

- Heavy Precipitation & Floods (riverine, flash, inland, urban, coastal)
- Severe Storms (i.e. Nor' Easters, Hurricanes, Heavy Snowfall, Ice Storms)
- Stronger winds
- Sea Level Rise (i.e. inundation, marsh migration)
- Storm Surge (from Category 1 and 2 hurricanes)
- Ocean Acidification
- Drought
- Temperature changes

- 3. Identify Vulnerable Assets & Determine Consequences:** Evaluate critical assets of the treatment system to determine their vulnerability to the identified hazards, e.g. determining elevations of assets, locations of asset, etc. Determine possible impacts to critical assets and entire system and the resulting consequences, e.g. equipment damage, service interruption, etc.

- 4. Identify and Evaluate Adaptation Measures:** Identify possible short and long-term adaptation measures to be recommended for vulnerable critical assets and for the system. This includes changes in operating procedures or practices that may or may not involve a capital expense. Estimate the costs to reduce or eliminate the critical assets' vulnerability to the hazard. Prioritize resiliency options based on their effectiveness, cost, and practicality to implement. Where possible identify potential funding sources for implementing recommendations.

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- 5. Develop the Implementation Plan:** Develop a plan (preferably in table format) to implement the recommended adaptation measures to reduce damage to equipment or interruption to service. Each adaptation measure must include a cost estimate and must be prioritized and identified for short-term (within 1-5 years) or long-term (within 6+ years) implementation.

- 6. Submit CAP:** The CAP shall be submitted to the Department for review and approval at the following times:
 - At any point in the drafting process, Maine DEP CWSRF is available to meet or assist the applicant to answer any questions about the plan;
 - A draft plan must be submitted at the 80% completion for review at which time the applicant may request reimbursement for up to 70% of the principal forgiveness.
 - Final review and approval will be given at 100 % completion; and at that time, the remaining amount of the principal forgiveness can be reimbursed.

Specific Technical Requirements

In addition to the above-described requirements, the CAP must include the following items:

- A glossary of terms and acronyms must be included at the front of the report.
- Existing conditions must include photos taken from the ground for each pump station and the major components at the WWTF and any other critical assets.
- Tables must be used to summarize existing features (such as year built, source of backup power, type of communication system, etc..) for each asset.
- Explanations of the hazards must be included such that all readers can understand.
- Hazards must include predicted sea level rise and storm surge where applicable.
- Riverine and coastal flooding must be evaluated for the critical assets using the FEMA 100-year floodplain maps. The most current effective maps and any associated revisions must be used unless there are more conservative preliminary maps available.
- The 100-year Base Flood Elevation must be conservatively assigned to the asset. Interpolating between BFEs should be done only when appropriate and rounded up to the nearest half foot.
- A table must be used to summarize the applicable hazards for each critical asset.
- Tables must be used to show the elevation of the asset's existing critical components and the elevation associated with the hazard so that elevations can be easily compared.
- All critical assets must be evaluated for accessibility during hazard events.
- All critical assets must be evaluated for a widespread and sustained power outage event.
- Maps are required, both large and small scale, to show asset locations only and asset locations within the hazard areas.
- The actual FEMA panels (and any associated revisions) used to evaluate the hazards must be included in the CAP for reference.

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Key Terms and Definitions:

These working definitions were created in coordination with Maine state agencies. Sources of definitions for Risk Assessment and for Vulnerability can be found from the Global Change Research Program at GlobalChange.gov <http://www.globalchange.gov/climate-change/glossary>.

TERM	DEFINITION
Weather	Weather is the atmospheric condition at any given time or place, measured from variables such as wind, temperature, humidity, air pressure, cloudiness, and precipitation. Weather can vary from hour-to-hour, day-to-day, and week-to-week.
Climate	Climate is the average weather condition at a given place over a period, for example, meteorologists often make comparisons against a 30-year period, called a climate normal. Long-term climate is usually defined as a century or more.
Climate Change	Climate Change is a difference in the climate over multiple decades or longer. Long-term variations in climate can result from both natural and human factors.
Adaptation	Adaptation is an adjustment in natural or human systems that adequately and appropriately capitalizes on beneficial opportunities or reduces negative effects due to a changing climate.
Resilience	Resilience is the capacity to prepare for, respond to, and rapidly recover from significant hazard events with minimal damage to social well-being, the economy, and the environment.
Risk Assessment	Studies that estimate the likelihood of specific sets of events occurring and their potential positive or negative consequences.
Vulnerability	The degree to which physical, biological, and socio-economic systems are susceptible to and unable to cope with adverse impacts of climate change.

References & Further Resources:

The following resources are listed for reference only and are not meant to be an endorsement or requirement of a particular method for climate adaptation plan development.

A. Technical Assistance:

All state and federal assistance is available at no cost.

Maine Department of Environmental Protection

- [Maine Climate Change Clearinghouse](#) – the Department of Environmental Protection has developed a centralized source of information to assist communities mitigate and adapt to environmental changes while recognizing beneficial opportunities and moderating negative effects.

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US Department of Homeland Security

- [Critical Infrastructure Vulnerability Assessments](#) – the Department’s Protective Security Coordination Division conducts specialized field assessments to identify vulnerabilities, interdependencies, capabilities, and cascading effects of impacts on the nation’s critical infrastructure.
- [Infrastructure Survey Tool](#) – the Infrastructure Survey Tool (IST) is a voluntary, web-based security survey conducted by Protective Security Advisors (PSAs) in coordination with facility owners and operators after an Assist Visit to identify and document the overall security and resilience of the facility.

US Environmental Protection Agency

- [Flood Resilience Guide](#) – this basic guide for water and wastewater utilities has a user-friendly layout, embedded videos, and flood maps to guide you through flooding threats and identify practical mitigation options that protect your critical assets. The U.S. EPA developed this guide to help drinking water and wastewater utilities become more resilient to flooding. This approach was successfully tested during a pilot project at a small drinking water system, the Berwick Water Department (BWD), in Berwick, Maine. This guide is particularly useful for small and medium utilities. It provides easy-to-use worksheets with corresponding videos (based on the Berwick pilot). Although this guide focuses on flood resilience, the same approach can be applied to enhancing resilience to other hazards
- [Climate Resilience Evaluation & Awareness Tool](#) (CREAT) – is a risk assessment application, which helps utilities in adapting to extreme weather events through a better understanding of current and long-term weather conditions. Find out which extreme weather events pose significant challenges to your utility and build scenarios to identify potential impacts. Identify your critical assets and the actions you can take to protect them from the consequences of extreme weather events on utility operations. Generate reports describing the costs and benefits of your risk reduction strategies for decision-makers and stakeholders.

B. Analysis Tools: evaluate environmental changes related to the changing climate.

Non-regulatory

- [Maine’s Climate Future](#) – 2015 Update, University of Maine
- [Coastal Hazard Resources](#) – the Department of Agriculture, Conservation and Forestry Contains information and mapping tools for Maine’s Highest Annual Tide, Sea Level Rise / Storm Surge, Marsh Migration, Potential Hurricane Inundation, and Maine FEMA Floodplain Maps.

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- Regional Sea Level Rise Modelling:
 - [Midcoast](#)
 - [Washington County](#)
 - [Lincoln County](#)
 - [Casco Bay \(wetlands\)](#)
 - [Saco Bay](#)

Regulatory

- [Flood Map Service](#) – Federal Emergency Management Agency

C. Process Support Tools: help guide integration of data into decision-making processes.

- [Infrastructure Survey Tool](#) – US Department of Homeland Security
- [Flood Resilience Guide – A Basic Guide for Water and Wastewater Utilities](#), – US Environmental Protection Agency
Contains Berwick, ME Water Department Treatment Plant Flood Resilience Project
 - Berwick, ME Case Study - [Flood Resilience Guide - VIDEO](#)
- Climate Resilience Evaluation & Awareness Tool (CREAT) – <http://water.epa.gov/infrastructure/watersecurity/climate/creat.cfm>

D. Planning Roadmaps:

- [Climate Change Adaptation Roadmap](#) – US Department of Homeland Security
- [Adaptation Strategies Guide for Water Utilities](#) – US Environmental Protection Agency
- [Being Prepared for Climate Change – A workbook for Developing Risk-Based Adaptation Plans](#) – US Environmental Protection Agency
- [New England Regional Climate Adaptation Plan](#) – US Environmental Protection Agency

E. Clearinghouses on Best Practices:

- [U.S. Climate Resilience Toolkit](#) – US Global Change Research Program contains a 5-step framework to discover and document climate hazards, then develop workable solutions to lower climate-related risks, case studies to see how people are building resilience for their businesses and in their communities; a catalog of more than 200 digital tools can help you take steps to build resilience, from engaging a community to developing a climate action plan; and, the CRT includes additional resources to reach experts, reports, trainings, and information on the impacts of climate change to specific topics of interest.