



Clean Water State Revolving Fund (CWSRF) Requirements and Guidance Climate Adaptation Plan (CAP)

The Maine CWSRF 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 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. The CAP must be submitted to the Department within one year from the loan closing date.

Applicants note: 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 and stamped by an engineer licensed in the State of Maine. This engineer must be actively involved in the writing and development of the CAP and provide necessary oversight and guidance for all other involved staff, particularly those who are new to CAPs.

The CAP should identify hazards associated with climate change, evaluate their impacts on assets, identify adaptation measures, and present recommendations that build resiliency into the assets. At a minimum, the existing assets that must be evaluated are:

- Wastewater treatment assets that are crucial to maintaining the Town’s / District’s discharge permit requirements without disruption, including the structure that houses the asset
- All pumpstations
- All manholes associated with the collection system

Additional facility specific assets may be included also at the discretion of the Owner / Consultant. The building where portable generators and other emergency equipment is stored is an example.

Table of Contents: The format for the CAP should be organized as follows. (Additional sections may be added)

1. Executive Summary (optional)
2. Introduction (include brief description of the wastewater system, glossary of terms and acronyms, and participating personnel)
3. Existing Conditions (describe features of all assets being evaluated including photos)
4. Description of Potential Climate Change Hazards
5. Identify and Evaluate Climate Change Impacts (include all assets and system wide)

6. Identify and Evaluate Adaptation Measures (include operational, asset specific, and system wide)
7. Implementation Plan (include potential funding sources)
8. Appendices (include site location maps, maps showing asset location with respect to hazard areas, and applicable FEMA flood plain maps)

Identify Participating Personnel: The authorized responsible person in charge of the facility, whether that is the Superintendent, Town Manager, or Public Works Director, is required, as well as the Local (and/or the Regional) Emergency Management Agency. Additional participants that should be considered include the Town / Regional Planner, Board of Directors, and the public.

Identify System Hazards: Identify natural hazards that could potentially pose a risk to assets and the entire system. This should include identification of any helpful historic information. Natural hazards that may be applicable include but are not limited to: riverine and local flooding caused by excessive precipitation, flooding caused by sea level rise and / or storm surge, heavy snowfall, strong winds, and icing caused by severe storms, extreme temperature changes, and other hazards such as drought.

Identify Vulnerable Assets & Determine Consequences: Evaluate the applicable assets in the treatment system to determine their vulnerability to the identified hazards, e.g. comparing flood hazard elevations to the elevations of assets, etc. Determine possible impacts to assets and entire system and the resulting consequences, e.g. equipment damage, service interruption, etc.

Identify and Evaluate Adaptation Measures: Identify possible adaptation measures to be recommended for vulnerable assets and for the system. This includes changes in operating procedures or practices that may or may not involve a capital expense, such as identifying 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. For asset adaptation measures, estimate the costs to reduce or eliminate the assets' vulnerability to the hazard. Prioritize resiliency measures based on their effectiveness, cost, and practicality to implement.

Develop the Implementation Plan: Develop a plan (in table format) to implement the recommended adaptation measures to reduce damage to equipment or interruption to service. Each asset adaptation measure must include a cost estimate and must be prioritized for implementation with an associated time frame. For example, short-term / high priority may be defined as 1-5 years and long-term / low priority 6-10 years. More priorities may be used, such as immediate and very low priority, provided that they are assigned a timeline. The plan must include recommended operational measures (ongoing, sitewide responsibilities and actions taken by the operations staff), however, it is not required that costs and priorities are provided for these recommendations.

Funding Sources: Potential funding sources that may be available for implementing the recommended adaptation measures should be provided with a brief description.

Specific Technical Requirements: The CAP must include the following items:

1. Existing conditions must include photos taken from the ground for each pump station and each applicable asset at the WWTF.
2. Tables must be used to summarize existing features (such as year built, source of backup power, type of communication system, etc.) for each pump station asset.

3. The elevations of the existing assets that are needed to evaluate the impact of flooding must be verified on site as part of the scope of work for the CAP. This includes elevations such as the ground, floor at entrance doors, top of concrete walls, entry hatches to underground structures, bottom of electrical panels, etc.
4. Maps are required, both large and small scale, to show asset site locations only and asset locations with respect to the hazard areas. An aerial photo background should be used.
5. The CAP must use only one map datum throughout the report. If the FEMA datum must be converted this should be explained in the report. Floodplain maps and elevation tables created by the consultant must indicate the datum used.
6. Tables must be used to show the asset elevations and the flood hazard elevation so that they can be easily compared.
7. Tables must be used to summarize the applicable hazards for each asset.
8. Explanations of the climate hazards must be written such that all readers can understand.
9. Flooding must be evaluated for the assets using the effective FEMA 100-year floodplain maps. The 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.
10. The Implementation Plan should include the following disclaimer (or similar version); “Information provided in this Climate Adaptation Plan report may change over time and therefore, should not be relied upon for design of future projects without first verifying its accuracy.” This could be a footnote or in a paragraph right before the table.

Submit CAP: The CAP shall be submitted to the Department for review and approval as follows:

1. 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.
2. Draft plans will be reviewed by the assigned CWSRF CAP engineer. Comments will be sent to the Owner / Consultant to be addressed in an updated version of the plan.
3. The CWSRF program reserves the right to rescind any and all principal forgiveness funds allocated to CAPs when more than 90 days pass between the time that the CWSRF comments on a draft plan are sent to the Owner/Consultant and the time that an updated version addressing those comments is received by the CWSRF CAP engineer.
4. Final review and approval will be given at 100 % completion; and at that time, the remaining amount of the principal forgiveness can be reimbursed.

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
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 for reference only and not meant to be an endorsement or requirement of a particular method for the climate adaptation plan development. 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.

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.
- [Climate Change Adaptation Roadmap](#) – US Department of Homeland Security

- [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 – A Basic Guide for Water and Wastewater Utilities](#)– 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)
<http://water.epa.gov/infrastructure/watersecurity/climate/creat.cfm> – This 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.
- [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

Other Agencies

- [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.
- [Flood Map Service](#) – Federal Emergency Management Agency
- [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 showing 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 information on the impacts of climate change to specific topics of interest.