Framework for Protecting Public and Private Investment in Clean Water Act Enforcement Remedies

I. Executive Summary

To promote long-term compliance with the Clean Water Act (CWA) and protect public and private investment in CWA enforcement remedies, EPA will consider relevant climate risks in appropriate CWA enforcement matters[1] and include provisions that ensure the continuing efficacy of injunctive relief. Extreme weather events, such as storms, floods, and droughts, pose significant risks to water infrastructure and water pollution control measures, and these risks are likely to affect the ability of regulated entities to comply with CWA requirements over time. These issues are of necessity already requiring attention in many communities across the country. This framework builds on the efforts of states, local communities, and industry that are addressing this issue, and adopts common sense measures for protecting people, the environment, and economic investments from the impacts of a changing climate, with the goal of assuring long-term compliance.

While EPA recognizes there is uncertainty inherent in projections of the range of climate impacts, this framework provides useful consistency and predictability for communities and businesses about EPA's enforcement approach, while recognizing the importance of adapting our approach to reflect the unique circumstances of each situation. Municipalities and businesses are interested in protecting their investments, and both understand that vulnerabilities such as the increasing frequency of extreme weather events need to be prepared for in order to adapt to such risks. As part of their CWA enforcement remedies, it is important for municipalities and businesses to be proactive in addressing these vulnerabilities and uncertainties, as inaction could prove costly in the future.

This framework applies to CWA enforcement actions and sets out specific expectations for newly initiated, ongoing (currently in active settlement discussions), and reopened CWA enforcement matters where application of the framework is feasible and appropriate. EPA anticipates that application of the framework will focus on cases that have broad potential impacts, long-term remedies, and large infrastructure investments, or involve facilities that are more vulnerable to climate impacts, such as facilities located in coastal areas or those that are discharging to receiving waters likely to experience notably altered flows.

II. Objectives of the Framework

1. Protect public and private investment in CWA enforcement remedies.
2. Ensure water enforcement remedies lead to long-term compliance with the CWA in the face of current and future climate impacts.
3. Promote more climate-resilient and adaptive infrastructure and communities consistent with Executive Order (EO) 13653, which calls for the modernization of federal programs to support climate-resilient investments and climate-resilient watersheds, ecosystems, natural resources, communities, and economies.

[1] The framework applies to all sections of the Clean Water Act.

III. Background

Increased frequency and severity of weather events are affecting the ability of communities and regulated entities to adequately protect water resources and maintain compliance with the CWA. We are already seeing the challenges posed by sea level rise, storm surge, more frequent and more intense storms, heat waves, and increased flooding and drought. These changes threaten the existing and future investment of billions of private and taxpayer dollars in infrastructure, in addition to other health, economic, and environmental impacts.

While the exact timing and severity of future changes in climate are difficult to project with certainty and such events are expected to vary across regions, major impacts are already apparent, and these impacts are expected to continue and become more pronounced. For example, global sea level in 2014 was 2.6 inches above the 1993 average and continues to rise at a rate of about one-eighth of an inch per year.[2] Since 1992, the rate of global sea level rise has been roughly twice the rate observed over the last century[3] and the 2014 National Climate Assessment projects one to four feet of additional sea level rise by 2100.[4] Since 1958, the number of strong storms that bring heavy precipitation has increased by 71% in the Northeast and by over 25% in the Midwest and Southeast, [5] but it is predicted that areas like the Southwest will experience less precipitation, indicating that wet areas will get wetter and dry areas will get drier.[6] Additionally, heat waves are occurring more frequently across the United States, while cold waves are less frequent, and these trends are expected to continue.[7] Furthermore, 15 of the 16 warmest years on record have occurred since 2001, with 2015 surface temperatures being the warmest on record since modern record keeping began in 1880.[8] Temperatures are projected to rise another 2°F to 4°F in most areas of the United States over the next few decades.[9]

Many of the already occurring and projected climate impacts have significant implications both for protecting investments in water pollution control infrastructure and maintaining compliance with the CWA. A changing climate may significantly affect community water infrastructure and industrial facilities, with impacts on public health and the environment, and on the viability of large investments that communities and private entities have made in protecting clean water. These changes are already affecting the ability of regulated entities to maintain compliance with CWA NPDES permit requirements. For example, heavy downpours can overwhelm treatment

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[2] Rebecca Lindsey, *Climate Change: Global Sea Level,* NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION (Updated June 10, 2016), https://www.climate.gov/news-features/understanding-climate/climate-change-global-sea-level.

[3] U.S. National Climate Assessment, *Overview: Climate Change Impacts in the United States,* U.S. GLOBAL CHANGE RESEARCH PROGRAM, 6 (2014), *available at* http://www.globalchange.gov/browse/reports/overview-climate-change-impacts-united-states-third-national-climate-assessment.

[4] *Id.* at 9.

[5] *Id.* at 6.

[6] U.S. National Climate Assessment, *Precipitation Changes,* U.S. GLOBAL CHANGE RESEARCH PROGRAM, 6 (2014), http://nca2014.globalchange.gov/report/our-changing-climate/precipitation-change.

[7] U.S. National Climate Assessment, *supra* note 2 at 14.

[8] *NASA, NOAA Analyses Reveal Record-Shattering Global Warm Temperatures in 2015*, NASA (Jan. 20, 2016), https://www.nasa.gov/press-release/nasa-noaa-analyses-reveal-record-shattering-global-warm-temperatures-in-2015.

[9] U.S. National Climate Assessment, *supra* note 2 at 7.

systems, leading to overflows of sewerage systems and waste storage structures, which can cause CWA violations.

The obligation to maintain long-term compliance with the CWA, as well as common sense and sound engineering practices, necessitate that climate impacts be considered in CWA enforcement actions. Municipalities are interested in protecting public investments in clean water, and companies want to ensure that their business investments are sound. Both understand the need to assess vulnerabilities from the increasing frequency and severity of weather events and take steps to prepare for and adapt to these risks. Communities investing billions of taxpayer dollars in wastewater infrastructure systems, and businesses looking to make reliable business decisions, understand that it is economically beneficial to ensure these investments will be resilient to climate impacts and also ensure that infrastructure is effectively protecting clean water into the future.

Fourteen states have already finalized climate change adaptation plans, and another eight are developing their plans.[10] In addition to state level research that focuses on climate change impacts to each state, finalized state adaptation plans include measures that have been, or will be implemented, such as: conducting vulnerability assessments to assess potential impacts and susceptibility to hazardous conditions in floodplains, coastlines, agricultural areas, and wildfire risk areas; measures to integrate considerations of climate change and sea level rise into plans involving state assets, investments, land management, and resources; participating in State Revolving Funds to finance water project infrastructure and upgrades; improving mapping and sea-level rise characterization to identify vulnerable areas; considering climate change in developing water resource plans to ensure sustainable supplies of clean and abundant water; and encouraging development that allows rainwater to soak into the ground, rather than running off into sewer systems.[11] We can build on the experience and leadership of these states and incorporate the lessons they have learned as we develop a consistent national approach.

Many sewer authorities are also already considering the impacts of climate change on their long-term investments. Cities like Miami and Boston are already working on identifying the key issues, determining their vulnerability, and incorporating climate change considerations into management and infrastructure investment decisions.[12] In 2008, EPA released a screening assessment of the impact of climate change on combined sewer overflows in the Great Lakes and New England "to determine whether the potential implications of climate change on CSOs [combined sewer overflows] in these regions warrant further consideration and study, and to evaluate the need for decision support tools and information enabling CSS [combined sewer system] managers to better incorporate consideration of climate change into their decision

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[10] *State and Local Adaptation Plans*, GEORGETOWN CLIMATE CENTER, http://www.georgetownclimate.org/adaptation/state-and-local-plans (last visited Oct. 18, 2016).

[11] *Id.*

[12] Miami-Dade County, *Climate Action Plan*, http://www.miamidade.gov/greenprint/pdf/climate_action_plan.pdf; The City of Boston, *Climate Ready Boston* (October 2013), http://www.cityofboston.gov/news/uploads/30044_50_29_58.pdf.

making processes."[13] EPA's study found that if sewer authorities make policy decisions to account for climate impacts and design and build in a margin of safety, the risks posed by climate change to combined sewer systems should be manageable.[14]

Organizations like the National Association of Clean Water Agencies (NACWA), the Water Environment Federation (WEF), and the American Society of Civil Engineers (ASCE) acknowledge the seriousness of climate impacts on water resources and infrastructure, and the importance of considering and adapting to a changing climate.[15] The on-the-ground experience of the members of these organizations can provide very useful lessons learned to inform EPA's approach.

Private businesses are also considering climate impacts in their decision making processes. The insurance and reinsurance industries have begun to include risks related to climate change when making risk management decisions,[16] and private companies are taking climate change into account in making investments.[17] For example, energy companies have elevated control equipment in flood prone areas and have begun to strengthen transmission and distribution lines to withstand more intense winds. Other companies have changed stormwater management compliance strategies to rely more on resilient strategies like restoring surrounding ecosystems, such as wetlands, rather than building additional storm management infrastructure. Additional adaptation measures include raising critical infrastructure components above previous flood levels, reinforcing berms around impoundments to increase strength and prevent flood related scour, and requiring future engineered caps to be designed and constructed to withstand the effects of a 1-in-500 year flood event.

Climate change has direct and indirect climate impacts on factors that affect long-term compliance and water quality. For example, one risk posed by climate change is increased drought frequency and magnitude, which can result in increased water temperature, reduced mixing volume, and shallower discharge depths. There have also been alterations to the thermal

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[13] *A Screening Assessment of the Potential Impacts of Climate Change on Combined Sewer Overflow (CSO) Mitigation in the Great Lakes and New England Regions*, EPA, http://cfpub.epa.gov/ncea/cfm/recordisplay.cfm?deid=188306.

[14] *Id.*

[15] *Climate Change*, THE NATIONAL ASSOCIATION OF CLEAN WATER AGENCIES, https://www.nacwa.org/index.php?option=com_content&view=article&id=32:climate-change&catid=13:21stcc&Itemid=104; *Protecting Water Resources and Infrastructure from the Impacts of Climate Change*, WATER ENVIRONMENT FEDERATION, http://www.wef.org/GovernmentAffairs/PolicyPositionStatement/ProtectingWRClimateChange/; *Committee on Adaptation to a Changing Climate,* AMERICAN SOCIETY OF CIVIL ENGINEERS, http://www.asce.org/climate-change/climate-change.

[16] *Reinsurers' Strong Enterprise Risk Management Key to Success – and Survival: S&P*, INSURANCE JOURNAL (August 22, 2016), http://www.insurancejournal.com/news/international/2016/08/22/424019.htm.

[17] For a summary of some recent examples of private sector strategies to protect investments from the impacts of climate change, see *United Nations Framework Convention on Climate Change: Private Sector Initiative*, UNITED NATIONS FRAMEWORK CONVENTION ON CLIMATE CHANGE, http://unfccc.int/adaptation/workstreams/nairobi_work_programme/items/6547.php (a database of case studies featuring climate change adaptation activities undertaken by private companies in a variety of sectors around the world developed under the Private Sector Initiative of the Nairobi work programme of the United Nations Framework Convention on Climate Change).

profile of some receiving waters, including the loss of spatial and temporal thermal refuges for indigenous species. Over the last few years there have been documented increases in thermal exceedances and water quality violations from industrial cooling water discharges, in particular power plants for which the greatest energy demands, and thus the largest temperature loadings, occur during the months of highest in-stream temperatures and lowest flows.

EPA encourages all entities regulated under the CWA to take steps to become more resilient and adapt to the impacts of climate change. These efforts help to keep pollution out of the nation's waters, protect human health and water quality, and improve compliance with the CWA. EPA's enforcement program has a strong history of promoting sound, long-term, and sustainable wastewater infrastructure investments. EPA is committed to continuing this approach by addressing the risks associated with climate change, promoting resilience, and supporting communities and industry in building adaptive capacity that allows protection of water quality and human health and long-term compliance with the CWA.

IV. Legal Authority

EPA has broad authority under the CWA to assess and address climate risks to the Nation's water quality and the resilience of water quality infrastructure. The CWA's objective to "restore and maintain the chemical, physical, and biological integrity of the Nation's waters"[18] can best be achieved by utilizing both historic data and future projections.

Pursuant to Section 309 of the CWA, EPA has authority to issue compliance orders and to ask a court for "appropriate relief" to remedy violations of the Act.[19] In fashioning a remedy in an administrative or judicial enforcement action or seeking relief from a court under Section 309(b), it is both reasonable and appropriate for the Agency and the courts to take into account and address the impact of climate change on water quality and compliance. Appropriate relief in such cases may include requirements to ensure that a permittee constructs, operates, and maintains its facility in compliance with the CWA and its permit, in light of conditions as they exist now and that are likely to exist in the future as a result of climate change.

In addition, under CWA Section 308, EPA also has broad authority to request information to carry out the objectives of the Act, including to determine if any person is in violation of the Act.[20] Thus, EPA has the authority to obtain information to allow the Agency to understand the resilience of an entity's infrastructure and to assess how compliance measures and control structures will perform now and into the future.

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[18] Clean Water Act § 101, 33 U.S.C. § 1251(a).
[19] Clean Water Act § 309, 33 U.S.C. § 1319.
[20] Clean Water Act § 308, 33 U.S.C. § 1318.

V. Framework[21]

To ensure long-term compliance with the CWA and protect public and private investment in CWA enforcement remedies, EPA will consider relevant climate risks in appropriate enforcement matters and include, where suitable, injunctive relief that accounts for such risks. EPA will determine the appropriate remedy to address the risks posed by climate change on a case-by-case basis, taking into account the nature of each regulated entity and the underlying violation(s) addressed in the enforcement action, and considering what makes sense under the circumstances. In CWA enforcement actions, EPA will include, where appropriate, a requirement to complete a vulnerability assessment and to incorporate remedial measures necessary to address vulnerabilities to climate change and to assure long-term compliance with the laws that protect clean water. See Section VI. for further discussion of vulnerability assessments.

Major climate-related events (such as storms, floods, and droughts) are likely to affect the ability of regulated entities to comply with the requirements of the CWA. Traditionally, the design of CWA compliance remedies has been based on historic climate and hydrologic patterns (e.g., precipitation, including the frequency and magnitude of large storms). But due to changes in climate, historic weather patterns and data are often not adequate to accurately characterize current or future conditions.

Due to inherent differences in municipal and industrial CWA enforcement cases, each matter will be handled on a case by case basis. Given the size of investment in wastewater infrastructure that is generally involved in municipal CWA enforcement actions and the close relationship between the resilience of that infrastructure and compliance, for municipal enforcement actions that require large-scale capital investments and long-term compliance schedules, the enforcement remedy should include a requirement that the regulated entity prepare a publicly-available vulnerability assessment (defined below), unless there is a case specific reason that such a requirement is not appropriate. That assessment will identify any climate change vulnerabilities that may impair the entity's ability to comply with its CWA permit.

For CWA enforcement actions involving industrial entities, enforcement remedies will include a vulnerability assessment where facility-specific circumstances make that appropriate. Such circumstances include: proximity to water bodies and areas that may be impacted by flooding, storm surge, and sea level rise; capacity of the collection or treatment system to handle more frequent or more intense precipitation; and possible downstream impacts.

In appropriate CWA enforcement actions, EPA will require as part of the remedy that regulated entities implement resilience and adaptation measures based on the results of these vulnerability assessments and the expected useful life of the infrastructure in question, as needed to ensure long-term compliance with the CWA. Vulnerability assessments provided for in enforcement

[21] This framework does not supersede earlier guidance and it is to be read in conjunction with other relevant policies. *See e.g.,* Combined Sewer Overflow (CSO) Policy, 59 Fed. Reg. 18688 (Apr. 19, 1994), *available at* https://www3.epa.gov/npdes/pubs/owm0111.pdf; *Combined Sewer Overflows – Guidance for Financial Capability Assessment and Schedule Development,* EPA (Feb. 1997), *available at https://www3.epa.gov/npdes/pubs/csofc.pdf.*

remedies should be scaled to the size and complexity of the facility and the likelihood and possible size of climate-related impacts. Resilience and adaptation measures might include a variety of site-specific requirements, such as backup power and treatment, green infrastructure to manage increased precipitation and storm events, reduce scour that exposes buried infrastructure and reduce temperature impacts to surface waters, and/or hardening treatment facility components to ensure continued operation during flooding.[22]

Enforcement remedies requiring vulnerability assessments and implementation of resilience and adaptation measures will incorporate adaptive management approaches that are flexible enough to deal with the uncertainty inherent in future climate projections and enable the incorporation of new information and tools as they become available. EPA will work with regulated entities on a case-by-case basis to consider the risks associated with climate change and the costs of resilience and adaptation measures.[23] The goal will be to determine the most appropriate, effective, and cost-effective remedies to achieve and maintain CWA compliance.

VI. Vulnerability Assessment

A climate change vulnerability assessment helps to identify and understand the particular vulnerabilities of facilities and systems to the risks associated with climate change. The assessment needs to account for both the most recent historic data available, with a time series long enough to capture the rate and extent of impacts that have been occurring,[24] and future projections for:

1. Sea level rise (if geographically relevant);
2. Storm surge (if geographically relevant);
3. Precipitation timing, amounts, and intensity;
4. Frequency and magnitude of storm events;
5. Location of floodplains;
6. Potential fluctuations of freshwater stages, such as changes in river channels and flood elevations (if geographically relevant);
7. Frequency and magnitude of droughts, and resulting changes in stream flow and wildfire regimes; and
8. Changes in water temperature.

There are a variety of possible approaches to conducting a vulnerability assessment, and the type of assessment an entity uses may vary on a case-by-case basis. Regulated entities may develop internal analyses using a variety of information and tools available from federal, state, and local entities, and non-governmental organizations, or utilize external consultants. For example, municipal entities might consider using one of the practical tools under EPA's Climate Ready

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[22] For more examples of resiliency and adaptation considerations, *see* New England Interstate Water Pollution Control Commission (NEIWPCC), *What's New in the Revised Edition TR-16: Guides for the Design of Wastewater Treatment Works: 2011 Edition as Revised in 2016*, http://www.neiwpcc.org/neiwpcc_docs/What'sNew_TR-16_rev2011.pdf.

[23] Entities may already be implementing such measures. If that is the case, then that factor will be considered when determining the appropriate remedy.

[24] See trends, for example, at http://www.cpc.ncep.noaa.gov/anltrend.gif.

Water Utilities initiative, such as the Adaptation Strategies Guide, the Extreme Events Workshop Planner or the Climate Resilience Evaluation and Awareness Tool (CREAT). CREAT is a freely available software tool EPA designed to assist water and wastewater utility owners and operators in assessing climate change-related risks at their utility (https://www.epa.gov/crwu). Industrial entities may consider using the U.S. Climate Resilience Toolkit to assess their vulnerabilities (https://toolkit.climate.gov/). EPA's Adaptation Resource Center (ARC-X) also provides useful information to help decision makers develop and implement adaptation strategies (https://www.epa.gov/arc-x). While the target audience for ARC-X is local government officials, the website provides many tools that are useful for anyone interested in learning about climate risks and solutions for adaptation.

VII. Other Considerations

Executive Orders (EO)

Executive Order 13653, *Preparing the United States for the Impacts of Climate Change*, calls for broad federal government action to improve climate preparedness and resilience in the U.S.[25] It specifically directs all agencies to modernize federal programs to support climate-resilient investments by eliminating or reforming any existing policies that discourage resilient investments and by finding opportunities to proactively support and encourage climate-resilient investments. EO 13653 also directs EPA, along with other key agencies and departments, to inventory and assess necessary changes to existing land- and water-related policies, programs, and regulations in order to ensure more resilient watersheds, natural resources, ecosystems, communities, and economies.

Executive Order 13690, *Establishing a Federal Flood Risk Management Standard and a Process for Further Soliciting and Considering Stakeholder Input*, seeks to increase community resilience to the impacts of current and future flooding, which are exacerbated by climate change.[26] It amends the existing 1977 EO 11988, *Floodplain Management*, by establishing a Federal Flood Risk Management Standard to expand the base flood elevation and boundaries in order to help ensure taxpayer-funded projects are built or rebuilt to be resilient to flood risks and therefore last as long as possible. EO 13690 changes how the floodplain is established to account for climate change considerations and encourages the use of natural systems and nature-based approaches, such as green infrastructure.

Executive Order 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*, instructs federal agencies to identify and address disproportionately high and adverse human health and environmental effects on minority populations and low-income populations. These populations may be disproportionately affected by climate change. Heavy rains and flooding made more intense by climate change can damage

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[25] Executive Order, *Preparing the United States for the Impacts of Climate Change,* THE WHITE HOUSE (Nov. 1, 2013), http://www.whitehouse.gov/the-press-office/2013/11/01/executive-order-preparing-united-states-impacts-climate-change.

[26] Executive Order, *Establishing a Federal Flood Risk Management Standard and a Process for Further Soliciting and Considering Stakeholder Input,* THE WHITE HOUSE (Jan. 30, 2015), https://www.whitehouse.gov/the-press-office/2015/01/30/executive-order-establishing-federal-flood-risk-management-standard-and-.

drinking water, wastewater, and stormwater infrastructure, which may increase the risk of water contamination and illness. Minority and low-income populations may be less able than others to adapt or recover from these human health and environmental impacts.

Professional and Industry Standards and Practices

A number of professional and industry civil engineering standards and practices apply to municipal wastewater management infrastructure and treatment systems and industrial facilities. The general purpose of these standards is to ensure the integrity of wastewater systems and private industry projects through appropriate design, construction, operation, and maintenance, given current and future use and conditions. It is important to consider the potential risks associated with climate change where regulated entities are required by settlement terms to implement remedies consistent with "sound engineering practices." Civil engineers, in particular, are responsible for design and maintenance of water quality infrastructure that may be significantly affected by extreme weather events.[27] Thus, it is essential for civil engineers to anticipate, assess, plan, and prepare for climate risks – including planning for climate change impacts – in order for infrastructure to continue to protect human health, welfare, and the environment and maintain compliance with the law.

VIII. Implementation Considerations

EPA recognizes there is uncertainty inherent in projections of the range of impacts from a changing climate and in the remedial measures that may be necessary to address such impacts. However, regulated entities are accustomed to making decisions and investments in the face of uncertainty, such as population changes, market forecasts, aging infrastructure and budget challenges. The increased frequency and severity of weather events is just one additional facet of uncertainty that companies and municipalities face. As with other challenges, inaction now could prove extremely costly in the future; taking preventive action today can help reduce future costs that might otherwise be necessary to deal with the impacts of climate change.

When making decisions within a range of uncertainty, the best solutions are typically the ones flexible enough to adapt to changes over time. An adaptive management framework allows incorporation of new data and tools as they become available, while still making sound investments today. Adaptation planning can be integrated into existing infrastructure management programs, such as capacity development, asset management, and emergency response planning. Climate adaptation strategies may provide additional benefits to regulated entities, including cost savings, increased system reliability, and more efficient and sustainable operations.

Every regulated entity has a unique set of circumstances, resources, and priorities. Therefore, each entity will have different climate resiliency and adaptation strategies. For this reason, it is important for each regulated entity to assess its own vulnerability and consider a range of options that address its particular obligations and goals as well as resource challenges. EPA will work

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[27] *Policy Statement 360 – Impact of Climate Change*, AMERICAN SOCIETY OF CIVIL ENGINEERS, http://www.asce.org/issues-and-advocacy/public-policy/policy-statement-360---impact-of-climate-change/.

with regulated entities to determine the most appropriate approach to a vulnerability assessment and resilience measures on a case-by-case basis.

Moving forward, EPA case teams should raise the issue of climate risks to the regulated entity early in negotiations. Consent decrees will include language that requires development of vulnerability assessments, where appropriate, and provide mechanisms for addressing identified vulnerabilities.

This framework is not a rule or final agency action; nor does this framework establish any binding legal obligations on EPA or the regulated community. It may be adjusted and expanded to additional water enforcement matters in the future, as appropriate.