

Using State Revolving Funds to Build Climate-Resilient Communities

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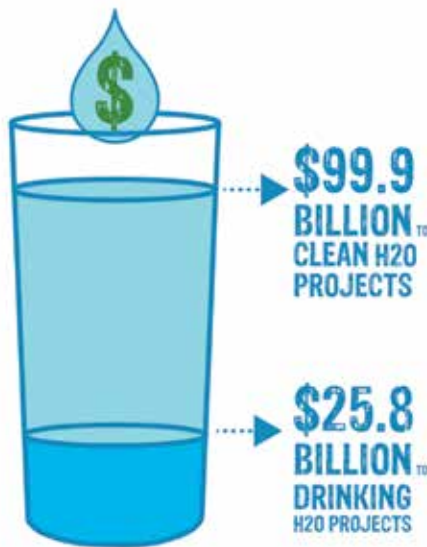
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INTRODUCTION

Record numbers of extreme weather events including floods, heat waves, droughts, fires, and snowstorms have affected communities across the United States in recent years.¹ These events as well as warmer temperatures, changing precipitation patterns, and rising sea levels are expected to intensify as climate change continues. These impacts threaten public health, water availability and quality, and homes and infrastructure. Communities must proactively plan for climate change-related risks and implement flexible and sustainable solutions to protect public health, the economy, and the environment.

Figure 1. Total project assistance provided by SRFs through FY 2013



There are several existing funding programs that can be used to make communities more resilient to a changing climate. State Revolving Funds (SRFs) are clear examples. They provide critical support for a variety of water and wastewater projects, including drinking water and wastewater treatment facilities and stormwater pollution management. SRFs involve federal, state, and local partnerships, thereby helping to support local economies. Every dollar invested in water infrastructure generates roughly \$2.62 in the private economy, and every new job added in the water sector adds 3.68 jobs to the national economy due to the benefits of clean water.²

Table 1. Main differences between the Clean Water and Drinking Water State Revolving Funds		
	Clean Water State Revolving Fund	Drinking Water State Revolving Fund
Established	1987	1996
Projects Eligible	Water quality protection projects (e.g., nonpoint source pollution, watershed protection, municipal wastewater treatment)	Drinking water projects (e.g., source water, treatment, transmission and delivery)
Total Support	\$99.9 billion	\$25.8 billion

The Clean Water State Revolving Fund (CWSRF) was created in 1987 and its success spurred the subsequent creation of the Drinking Water State Revolving Fund (DWSRF) in 1996. The CWSRF supports a wide variety of water quality protection projects, including those that address nonpoint source pollution, watershed protection, and municipal wastewater treatment. The DWSRF supports drinking water systems to finance infrastructure that improves drinking water quality and better protects public health. Together, these programs have enabled states to provide more than \$125 billion in low-interest loans and grants to protect public health and improve the quality of our nation’s water resources.³ Both were identified by President Obama in his 2013 Climate Action Plan as a key tool for climate change preparedness.⁴

These programs provide much-needed funds to meet communities’ existing water infrastructure needs and, increasingly, to address challenges from natural disasters. For example, during Hurricane Sandy in 2012, power outages and flooding interrupted water and sewer service to tens of millions of people and caused the release of billions of gallons of untreated sewage across the Northeast.⁵ To help New York and New Jersey rebuild after Hurricane Sandy, the U.S. Environmental Protection Agency (EPA) provided additional SRF capitalization grants to help repair and fortify water and wastewater infrastructure.

Both the CWSRF and the DWSRF are administered by the states, but they are subject to oversight and programmatic regulations and guidance issued by the EPA. Each state is provided with a proportionate share of the annual Congressional appropriation (which is augmented by a required state match amount) to capitalize these revolving loan funds. States provide loans to communities from these funds, and the loan repayments are returned to the funds. Federal statutes give states complete authority to place additional conditions on eligibility for CWSRF and DWSRF support, so long as they are not inconsistent with the minimum requirements imposed by federal law or EPA grant agreements.^{6,7}

Although SRFs provide billions of dollars in funding, our nation’s water infrastructure needs far exceed the amount of available funding. Over the next 20 years, water infrastructure needs across the United States total more than \$630 billion simply to maintain current levels of service.⁸ Drinking water and wastewater utilities will need an additional \$448 to \$944 billion to prepare for climate change-related impacts through 2050.⁹ Both SRFs can support responses to a range of issues such as flooding, water scarcity, and infrastructure resiliency. However, they have historically been underutilized for these purposes. Further, SRFs are more than just a direct funding source for water infrastructure projects—they also can be used to purchase, refinance, or guarantee debt obligations.¹⁰ Ongoing federal support is needed both to maintain and strengthen our nation’s water infrastructure. State and local partners also need to consider how using infrastructure funding in smarter and more sustainable ways can help prepare for climate change.

In order to promote climate-resilient communities, NRDC recommends the development of SRF policies that incorporate (1) water efficiency, (2) green infrastructure, and (3) flood risk reduction. Water conservation and efficiency measures can cost-effectively lower water demand, improve the reliability of existing supplies, delay capital expenditures for new water infrastructure, and reduce energy demands associated with the treatment and delivery of water and wastewater. Green infrastructure practices—such as green roofs, permeable pavements, and rain barrels—reduce polluted runoff, localized flooding, and sewer overflows. Further, considering existing and future flood risks when deciding where to locate and how to design critical water infrastructure projects reduces the likelihood that future storms and other disasters will endanger the public health and infrastructure of our communities.

INTEGRATING WATER EFFICIENCY INTO SRFs

Record-breaking drought conditions in recent years have caused water shortages, widespread devastation to local and regional economies, and even shut down commerce on the Mississippi River, the nation's busiest waterway.¹¹ As temperatures continue to rise and precipitation patterns change, many areas of the country will increasingly face challenges maintaining adequate water supplies—all while water demands increase.¹²

Water conservation and efficiency techniques can increase resilience to climate impacts such as increased drought, decreased precipitation, and declining snowpack. These measures also reduce water demand, improve the reliability of existing water supplies, delay capital expenditures for new water infrastructure, and reduce energy demands associated with the treatment and transport of water and wastewater. Water-efficient landscapes, water-conserving plumbing fixtures, water rate mechanisms, and the detection and repair of leaks in water distribution systems are a few examples of ways to reduce urban water demand. As discussed in our *Waste Less, Pollute Less* issue brief, these measures also can help municipal systems improve their Clean Water Act compliance.¹³

In section A, we recommend four complementary approaches for integrating water efficiency into DWSRF and CWSRF programs. Section B illustrates that the EPA and the states have ample legal authority to implement these policies. Section C highlights a number of states already using these approaches or similar ones. Section D provides examples of water and wastewater utilities that have successfully used (or are currently using) water conservation strategies to reduce water demand and the costs of water and wastewater infrastructure.

A. FOUR COMPLEMENTARY RECOMMENDATIONS FOR STATES TO INTEGRATE WATER EFFICIENCY INTO DWSRF AND CWSRF PROGRAMS

1. Promote the availability of DWSRF and CWSRF support for water conservation plans, projects, and programs.

Such activities have long been eligible for funding under SRFs, but have been under-utilized. Similar to how the Green Project Reserve (GPR) successfully promoted the uptake of green infrastructure practices,¹⁴ states could engage in proactive outreach to encourage applications for water conservation projects. States can also help incentivize projects that incorporate water conservation and efficiency elements by offering reduced interest rates, extended repayment terms, or loan forgiveness.¹⁵

2. Require water and wastewater utilities to adopt comprehensive water conservation plans or specific policies or programs as a condition for funding.

The EPA and others have already developed guidance for utilities on the development of water conservation plans. Note that although some water conservation strategies can only be implemented by drinking water utilities (e.g., water loss audits and leak repair), most can also be implemented by wastewater utilities (e.g., incentives for water efficient fixtures and appliances; metering and volumetric billing; and changes in local ordinances and codes).¹⁶ States should also provide financial and technical resources (from SRFs or other sources) to help smaller utilities develop water conservation plans and programs.

3. Require that projects seeking funding (1) evaluate water conservation alternatives, (2) include any measures that reduce the net capital/operating costs of the project, and (3) incorporate the resulting flow reductions into the design of the overall project.

The Title II Construction Grants Program, which predated the CWSRF, required applicants to evaluate and implement cost-effective “flow reduction” methods, to reduce water demand and ensure efficient use of wastewater infrastructure funding.¹⁷ A similar approach would be sound policy today. As discussed below, the new Water Resources Reform and Development Act of 2014 provides an important opportunity to implement that approach.

4. Ensure that designs of new, replacement, or expanded infrastructure are based on the most current data and projections of per capita water demand, which are already on a downward trend nationally.

While targeted local water conservation programs can rapidly reduce water use, there is already a downward trend in per capita/household water use, due in large part to national plumbing fixture efficiency standards.¹⁸ New national standards that are being phased in over the next several years (e.g., for washing machines) will accelerate this downward trend. The EPA should facilitate this by ensuring that SRF programs are aware of these trends and that they do not rely on outdated assumptions of domestic water use when reviewing and approving applications.

B. LEGAL AUTHORITY FOR THE EPA AND STATES TO PROMOTE WATER EFFICIENCY THROUGH SRFs

Existing EPA policy makes it clear that water conservation plans, projects, and programs—including related technical assistance—are eligible for funding under both the DWSRF¹⁸ and CWSRF.²⁰ As mentioned earlier, states also have complete authority to place additional conditions on DWSRF and CWSRF assistance as long as they do not conflict with minimum federal requirements.²¹ Moreover, the EPA and states can use the following authorities to require water efficiency measures as a condition of SRF assistance for all projects, whether or not the primary purpose of the project is water conservation.

DWSRF

EPA authority

- The EPA has an explicit statutory obligation to ensure that DWSRF project assistance is used “efficiently.”²² The EPA is authorized to achieve this goal both through its own regulations²³ and those governing the conditions that must be included in its capitalization grant agreements with states.²⁴ Because the costs of building, operating, and maintaining drinking water infrastructure are directly related to the volume of water that must be supplied, measures that promote efficient water use are essential to ensuring the efficient use of DWSRF resources.²⁵
- In 1988, the EPA was expressly required to publish guidelines for water conservation plans for public water systems, to use in conjunction with the DWSRF.²⁶ The EPA has the inherent authority to update this guidance to reflect best practices from the last 16 years.
- The EPA’s regulations require environmental reviews for DWSRF-supported projects, equivalent to the review required under National Environmental Policy Act (NEPA). This includes “comparative evaluation of alternatives” to the proposed project. Reviews must consider “the beneficial and adverse consequences on the existing environment, the future environment, and individual sensitive environmental issues that are identified,” and identify “measures to avoid, minimize, or mitigate adverse impacts.”²⁷ Through enforcement of this provision, the EPA can ensure that states and DWSRF applicants evaluate water conservation strategies as alternatives that reduce water withdrawals and the

capacity of proposed infrastructure projects, thereby reducing adverse impacts on source waters and any direct adverse impacts from the construction and operation of drinking water facilities.

State authority

- The Safe Drinking Water Act gives states the authority to require that DWSRF projects “submit... a water conservation plan consistent with” the EPA’s guidelines for water conservation plans for public water systems.²⁸

CWSRF

- Under the Water Resources Reform and Development Act of 2014,²⁹ municipalities and utilities seeking CWSRF support will be required to maximize water efficiency and reuse as part of all wastewater and stormwater infrastructure projects. Additionally, projects for managing and reusing stormwater, recycling wastewater, and that reduce the need for wastewater treatment through water conservation and reuse measures are now specifically called out by Congress as eligible for funding assistance, codifying a practice that is already allowed under EPA guidance. Water efficiency and stormwater management projects are now not only eligible for low-interest loans but also eligible for loan forgiveness and negative interest loans (essentially, grants).

C. EXAMPLES OF SRF PROGRAMS THAT CONDITION ELIGIBILITY ON WATER CONSERVATION PRACTICES

It appears that no state has required water conservation plans consistent with the EPA’s Water Conservation Plan Guidelines as a condition of funding.³⁰ A number of states, however, require either (1) the evaluation of water conservation alternatives that would reduce or eliminate the need for the proposed project or (2) the implementation of certain water conservation practices. Examples are listed below:

DWSRF

California

- Effective July 2016, eligibility for DWSRF support will be contingent on compliance with the state’s per capita water use reduction targets for urban water suppliers (10 percent reduction by 2015 and 20 percent reduction by 2020).³¹

How water conservation strategies can reduce demand and infrastructure costs

It is well known that drinking water utilities use water conservation programs to reduce demand. They, thereby, avoid or minimize the need to develop new water sources, expand withdrawals for existing water sources, or construct new water delivery and treatment infrastructure.⁴⁰

Less well known is that many wastewater utilities and communities, large and small, have undertaken water conservation strategies to minimize the need for expanded wastewater treatment capacity. These include:

- Boston⁴¹ and Orleans⁴² in Massachusetts;
- Cotati,⁴³ East Bay Municipal Utility District,⁴⁴ Goleta,⁴⁵ Los Angeles, San Jose,⁴⁶ San Francisco,⁴⁷ Santa Monica,⁴⁸ and Sonoma County,⁴⁹ in California;
- New York;⁵⁰
- San Antonio;
- Olympia and Spokane⁵¹ in Washington;⁵² and
- Washington, D.C.⁵³

For example, the San Antonio Water System, an integrated water and wastewater utility, has kept water demand steady for 25 years, despite a 67 percent increase in the number of water customers, through an aggressive conservation program. This has allowed the city to avoid up to \$2.7 billion in additional water supply costs and over \$1 billion in expanded wastewater treatment capacity costs. In fact, despite its rapid population growth, the city has actually been able to close one of its four sewage treatment plants.⁵⁴

Similarly, the City of Los Angeles began a major water conservation initiative in 1988, which included mandatory retrofits of inefficient fixtures in existing buildings and use of “ultra-low flush” toilets in all new buildings. This initiative was expressly motivated by a desire to avoid overloading a municipal sewage treatment plant and protect water quality in Santa Monica Bay. Through this and other water conservation efforts, the city’s water usage remained relatively level even as population increased by nearly 1 million people.⁵⁵

Leading industry associations also believe that a wastewater “utility of the future” will proactively engage in water conservation efforts to reduce wastewater volume and avoid expansion of wastewater infrastructure.⁵⁶ Nonetheless, at present, demand-side management and planning is not nearly as common among wastewater utilities as it is among drinking water utilities. CWSRFs, therefore, have the potential to significantly increase the use of these approaches.

- Urban water suppliers—as a condition of eligibility for state funding for water use efficiency projects, drinking water treatment projects, or permits for new or expanded water supply—must meet specific requirements concerning metering and volumetric billing.³² The funding condition applies to DWSRF and CWSRF if the applicant is an integrated utility that supplies drinking water and treats wastewater.
- **Colorado:** Eligible applicants must have an updated water conservation plan.³³
- **Kansas:** Eligible applicants must have “adopted and implemented conservation plans and practices that are consistent with” state guidelines.³⁴
- **Nebraska:** Under the state’s 2012 DWSRF IUP, water meters are required if the applicant does not have individually-metered service connections.³⁵
- **Utah:** “The applicant must have adopted a Water Conservation Plan prior to executing the loan agreement.”³⁶

CWSRF

- **California:** As a condition of funding, integrated water and wastewater utilities must meet specific metering and volumetric billing requirements.³⁷
- **Nebraska:** Applications must include a cost-effectiveness analysis, including “evaluation of alternative flow reduction methods.”³⁸
- **New Jersey:** Applications must include evaluation of flow reduction methods.³⁹

INTEGRATING GREEN INFRASTRUCTURE INTO SRFs

Since 1950, heavy rainfall events in every region of the United States have become more intense.⁵⁷ Rising temperatures from climate change are expected to further increase the intensity and frequency of these events.⁵⁸ More extreme precipitation will likely increase flood risks to property and overwhelm infrastructure, including wastewater treatment plants. This could lead to discharges of untreated sewage, exposing people to pathogens and increasing infectious disease risks.⁵⁹

Green infrastructure techniques can reduce these flood risks. These techniques use soils and vegetation in urban areas to absorb runoff close to where it falls, limiting flooding and sewer backups. Green roofs, rain gardens, roadside plantings, porous pavement, and rainwater harvesting not only reduce flooding and protect water quality, they also transform rainwater from a source of pollution into a valuable resource. Further, these practices help to literally green the urban landscape, cool and cleanse the air, enhance water supplies, reduce asthma and heat-related illnesses, cut heating and cooling energy costs, create urban oases of open space, and enhance property values.⁶⁰

In section A, we recommend four complementary approaches for integrating green infrastructure into CWSRF and DWSRF programs. Section B explains the nuances of states' legal authority to implement these policies. In section C, we provide examples of a number of states already using these approaches or similar ones. In section D, we show examples of water and wastewater utilities that have successfully used (or are currently using) green infrastructure to improve water quality while simultaneously creating a host of co-benefits.

A. FOUR RECOMMENDED APPROACHES FOR STATES TO INTEGRATE GREEN INFRASTRUCTURE INTO CWSRFs AND DWSRFs

1. Assign a higher priority to green infrastructure projects on the Project Priority List through modification of state scoring criteria.

SRF assistance is allocated by evaluating proposals, assigning points based on a predetermined set of criteria, and tallying their total points. Applicants are then ranked on a Project Priority List. States can ensure that the ranking formula provides bonus points for the use of green infrastructure.

2. Require that projects intended to reduce sewer overflows or improve stormwater management evaluate and implement all cost-effective green infrastructure measures.

As part of this requirement, applicants should: (1) evaluate the costs, savings, and effects of green infrastructure measures that reduce the amount of stormwater entering sewer systems; (2) include all cost-effective green infrastructure measures; and (3) consider the reduction in stormwater entering sewer systems due to green infrastructure in the overall project design. States also should provide financial and technical resources (from SRFs and other sources) to help smaller utilities evaluate green infrastructure measures.

3. Promote the availability of CWSRF and DWSRF support for green infrastructure projects and programs.

Such activities have long been eligible for SRF support but have been underfunded. The EPA's GPR reports from FY2009 to FY2012 reveal that nine states did not fund any green infrastructure projects during that period. To address this, states could proactively encourage more applications that incorporate green infrastructure by offering reduced interest rates, extended repayment terms, or loan forgiveness.⁶¹

4. Commit to using a certain percentage of SRF project assistance for green infrastructure projects and programs.

The GPR requires each state to direct a portion (currently 10 percent) of its annual CWSRF capitalization grant to "green projects."⁶² The majority of GPR funds, however, are not used for green infrastructure,⁶³ and the GPR is now entirely optional for the DWSRF.⁶⁴ States should dedicate a certain percentage of their CWSRF and DWSRF assistance exclusively to green infrastructure projects.

B. LEGAL AUTHORITY FOR STATES TO PROMOTE GREEN INFRASTRUCTURE THROUGH SRFs

EPA policy makes it clear that green infrastructure projects and programs are eligible for funding under the CWSRF.⁶⁵ Moreover, states have the authority to require and promote green infrastructure measures as a condition of funding for all CWSRF and DWSRF projects. As mentioned earlier,

states can establish additional requirements for CWSRF and DWSRF project support, as long as they are not inconsistent with the minimum requirements imposed by federal law or EPA grant agreements.⁶⁶

C. EXAMPLES OF SRF PROGRAMS THAT HAVE ADOPTED OUR RECOMMENDED APPROACHES

Two of our recommendations for CWSRF programs have been implemented by several states: (1) active promotion of SRF support for green infrastructure and (2) higher ranking for projects that incorporate green infrastructure.

Actively Promoting Green Infrastructure

- **Maryland** has actively solicited green infrastructure projects to help restore tidal and non-tidal water resources as part of its larger Chesapeake Bay restoration efforts.⁶⁷ As part of a joint initiative with the EPA and the Chesapeake Bay Trust—the Green Streets, Green Towns, Green Jobs Initiative (G3)—the state provided \$3 million in 2013 to support projects that expand green space and reduce stormwater runoff.⁶⁸
- **Illinois'** Green Infrastructure Grants program supports green infrastructure projects with a particular emphasis on urban stormwater.⁶⁹ This program provides approximately \$5 million annually.⁷⁰ However, demand far exceeds that. Over the last four years, an average of \$37.5 million was requested for green infrastructure each year.⁷¹ Recent changes in law also expand the existing grants program and enable green infrastructure projects to receive CWSRF support.⁷²
- Through its CWSRF, **New York** has a dedicated Green Innovation Grant Program that “supports projects that utilize unique stormwater infrastructure design and create cutting-edge green technologies.”⁷³ In 2013, the program provided \$10.4 million to 17 green infrastructure projects.⁷⁴

Adjusting Scoring Criteria to Assign a Higher Priority to Green Infrastructure

- **Kentucky's** priority ranking system for the state's Intended Use Plan provides up to 10 bonus points per category for projects that incorporate components from the four green project categories, including green infrastructure.⁷⁵
- **Indiana** provides one bonus point per category for projects that incorporate sustainable infrastructure from the GPR categories, including green infrastructure.⁷⁶
- Other states—such as **Kansas, Maine, and New Hampshire**—have added criteria to their priority ranking systems to ensure that GPR projects score high enough to be ranked alongside traditional publicly owned treatment works projects.⁷⁷

REDUCING FLOOD RISKS FOR PROJECTS FUNDED BY SRFs

Floods are the most frequent and costly natural disasters in the United States. Direct flood damages increased from an average of almost \$6 billion per year in the 1990s to nearly \$10 billion in the 2000s.⁷⁸ Due to population growth and climate change, flood risks are only expected to grow. In 2010, more than 120 million people lived in shoreline counties. By 2020, that population is expected to grow by 10 million.⁷⁹ Millions more live in floodplains near rivers. By the end of the century, the size of the 100-year floodplain is projected to grow by an average of 40 to 45 percent due to more frequent and intense precipitation events, sea level rise, and population growth, increasing the number of federal flood insurance policies by about 80 percent.⁸⁰ Urban flooding—which occurs when heavy rainfall overwhelms drainage systems and waterways and leads to flooding in basements, backyards, and streets—is also expected to worsen.⁸¹

What is a floodplain?

A floodplain is the land area susceptible to inundation during a flood event. The Federal Emergency Management Agency (FEMA) develops and maintains flood maps of communities that are vulnerable to riverine and/or coastal flooding—known as Flood Insurance Rate Maps (FIRMs). The flood hazard areas delineated on these maps include areas that will be inundated by a flood event having a 1-percent chance of occurring in any given year, which is also known as a 100-year flood event. Land areas that are outside of the 100-year floodplain but that will be flooded by a 500-year (or 0.2-percent-chance-annual) flood event also are identified on FIRMs.⁸²

Water infrastructure is particularly vulnerable to these increasing risks. Intense rainfall and coastal storm surges present challenges for water management and flood control infrastructure, including increased risks for treatment plants and other facilities and jeopardized service reliability. Wastewater infrastructure is at high risk due to the facilities' typically low elevation.⁸³ Requiring recipients of SRF assistance to adequately consider existing and future flood risks will help to reduce damages, thereby, building climate resiliency by decreasing service interruptions and threats to public health and safety.

In section A, we recommend five complementary approaches for states to reduce flood risks for DWSRF- and CWSRF-supported projects. Section B explores the nuances of the states' and the EPA's legal authority to implement these policies. Section C provides examples of states already using these approaches or similar ones.

A. FIVE COMPLEMENTARY APPROACHES TO REDUCE FLOOD RISKS FOR DWSRF- AND CWSRF-SUPPORTED PROJECTS

1. Promote the availability of DWSRF and CWSRF support for flood risk reduction measures that better protect water and wastewater infrastructure.

Flood risk reduction projects have always been eligible for SRF support, but have yet to be widely funded. While projects that help utilities adapt to climate change are eligible under the GPR,⁸⁴ many have not addressed facilities' flood risks. States can proactively make applicants aware that flood risk reduction activities are eligible for SRF assistance. They can also offer reduced interest rates, extended repayment terms, or loan forgiveness for projects that incorporate flood risk reduction elements.⁸⁵ States could also incentivize community participation in the Community Rating System (CRS) under the National Flood Insurance Program (NFIP) by allocating priority points to proposals from participating communities.⁸⁶

2. Avoid funding water and wastewater infrastructure projects in the 500-year floodplain to the maximum extent practicable.

Presidential Executive Order 11988 and subsequent clarifying guidance from the U.S. Water Resources Council requires federal agencies to seek alternatives to locating critical facilities, such as water and wastewater infrastructure, in areas subject to inundation from the 0.2-percent-annual-chance (500-year) flood event.⁸⁷ As the federal agency in charge of SRFs, the EPA is responsible for ensuring that states also comply with this order.⁸⁸ Several states have enacted regulations to prohibit the construction of new or substantially redeveloped critical facilities in the 100-year floodplain.

3. If it is not practicable to avoid locating a project in the 500-year floodplain, require that the project protect against either the 500-year flood event or the highest historical flood event—whichever is most protective.

Elevating structures is one of the most effective means of reducing flood damage in high-risk floodplains.⁸⁹ In particular, water and wastewater infrastructure must be protected due to the critical services that these facilities provide. In recognition of these risks, federal agencies and states require that projects receiving Hurricane Sandy federal disaster recovery funding meet flood protection levels that exceed minimum standards.⁹⁰

4. Require that projects proposed in coastal floodplain areas consider and protect against sea level rise-related flooding and storm surge risks.

In coastal floodplain areas, much critical water-related infrastructure, particularly wastewater facilities, is located adjacent to or directly on the shoreline. Due to their potentially hazardous placement, these facilities may be vulnerable to rising sea levels and increasing flooding and storm surge risks. Rising seas will further increase the size of floodplains in many coastal areas of the United States.⁹¹ Applicants in coastal floodplains should be required to consider potential flooding and other risks from rising sea levels. By doing so, states will help ensure that projects are constructed in consideration of current and future flood risks.

5. Require that projects use natural and green infrastructure solutions to reduce flood risks to the maximum extent practicable.

Natural infrastructure or “soft edge” approaches—such as the restoration and protection of wetlands, oyster reefs, and dunes along coastlines—and green infrastructure within the built environment can help reduce flooding from storm surges and intense rainfall. This would offset the need for more expensive “hard infrastructure” approaches. These techniques utilize natural features to absorb storm surge and flood waters and dissipate wave energy, providing protection from coastal storms and flooding. They also provide wildlife habitat, enhance fisheries, maintain natural shoreline dynamics, filter water pollutants, and preserve public access to the shoreline.⁹² Green infrastructure techniques can be utilized to reduce local flooding risks associated with more frequent and intense rainfall events. These techniques use soils and vegetation in the built environment to absorb runoff close to where it falls, helping to reduce flooding and sewer backups.⁹³

States should require that these valuable climate preparedness techniques be integrated into all SRF projects as much as possible. Applicants who do not propose to integrate these measures should be required to explain why it would not be feasible.

B. LEGAL AUTHORITY FOR THE EPA AND STATES TO REQUIRE THAT PROPOSED SRF PROJECTS REDUCE FLOOD RISKS

Existing federal policy requires that the EPA avoid actions that have adverse impacts on floodplains and that the agency avoids direct or indirect support of floodplain development whenever possible.⁹⁴ State SRF programs are required to comply with the federal policy on floodplain management because they are capitalized with federal funds.⁹⁵ As explained previously, states also retain complete discretion

to place additional conditions on eligibility for CWSRF and DWSRF assistance, so as long as they are not inconsistent with the minimum requirements imposed by federal law or EPA grant agreements.⁹⁶

EPA authority

- Executive Order 11988 requires federal agencies to avoid actions that have adverse impacts from the occupancy or modification of floodplains and to avoid direct or indirect support of floodplain development by following an eight-step evaluation procedure as part of any environmental assessment prepared under NEPA.⁹⁷
- Subsequent EPA policy on floodplain management affirms that the agency will “[r]educe the hazard and risk of flood loss...” and “minimize the impact of floods on human safety, health, and welfare, as well as the natural environment” in all actions where the NEPA process applies,⁹⁸ including the Title II Construction Grants program.⁹⁹
- Executive Order 11988 applies a basic standard of the 100-year or 1-percent-chance-annual-flood to proposed actions in a floodplain. However, “critical actions” (defined as when essential utilities, such as water and wastewater services, are lost if flooded), are subject to the 500-year or 0.2-percent-chance-annual-flood standard.¹⁰⁰
- Executive Order 11988 and accompanying guidance also recognize “the natural and beneficial values served by floodplains” and seek to protect, restore, and preserve natural floodplain functions.¹⁰¹

State authority

- The federal regulations governing administration of CWSRF and DWSRF programs stipulate that states must conduct an environmental review process consistent with NEPA requirements.¹⁰² The EPA’s NEPA environmental review procedures require that proposed actions be reviewed to determine if they “significantly affect environmentally important natural resource areas” such as floodplains.¹⁰³ Additionally, the EPA guidance on environmental review includes floodplain management as a cross-cutter with which agency actions must comply.¹⁰⁴

C. EXAMPLES OF STATES THAT HAVE ADOPTED OUR RECOMMENDED APPROACHES

Several states have specific policies in place to minimize flood risks for SRF projects and broader state policies that address climate change and flood-related development risks. These include (1) prioritizing projects that reduce flood risks,

(2) evaluating flood risks during the environmental review process, (3) adopting more stringent floodplain development standards, (4) considering rising sea levels and other climate-related risks in project planning, and (5) prioritizing natural and green infrastructure solutions.

Prioritizing projects that reduce flood risks

- At least two states, **Missouri**¹⁰⁵ and **Virginia**,¹⁰⁶ allocate additional points through the project priority ranking system to public water systems proposing upgrades to protect against flood-related damages.

Evaluating flood risks during the State Environmental Review Process (SERP)

- Several states reference compliance with Executive Order 11988 in their guidance for applicants on completing the environmental review process. Examples include **California**,¹⁰⁷ **Oregon**,¹⁰⁸ **Georgia**,¹⁰⁹ **Tennessee**,¹¹⁰ and **Vermont**.¹¹¹

Adopting more stringent floodplain development standards

- In **Colorado**, critical facilities are subject to a higher regulatory standard. New and substantially changed critical facilities located in the 100-year floodplain are required to either relocate outside the floodplain or elevate or flood-proof to the base flood elevation, plus two feet.¹¹²
- **New York** requires recipients of funding from its Storm Mitigation Loan Program, which supports water and wastewater utilities affected by Hurricane Sandy, to incorporate flood risk reduction elements. Depending on a project's location within the floodplain, project components are required to meet minimum elevation criteria. For example, critical equipment, such as pumps or electrical systems, located in an area subject to sea level rise or tidal action must be elevated at least 5 feet above the 100-year flood level, 4 feet above the Sandy high-water mark, or to the 500-year flood level—whichever is the most protective.¹¹³
- **New Jersey** also requires applicants to its Environmental Infrastructure Finance Program, which disburses SRF support, to follow minimum flood elevation requirements. Critical infrastructure projects, such as water and wastewater, are to be constructed either outside of the 500-year floodplain when feasible or elevated above the 500-year flood level.¹¹⁴
- Additionally, many states' building codes are based off of the International Building Code (IBC), which requires that any building or structure proposed in a flood hazard area

adhere to the American Society of Civil Engineers (ASCE) 24 Flood Resistant Design and Construction standard.¹¹⁵ ASCE 24 requires that the lowest floor of Category IV structures, which includes essential facilities like “public utility facilities required in an emergency,” be at least two feet above the base flood elevation or at the community's design flood elevation—whichever is higher.¹¹⁶ While many state building codes have incorporated ASCE 24 by reference, the enforcement of state building codes is oftentimes left to local jurisdictions,¹¹⁷ which may lack the capacity to consistently enforce applicable floodplain design standards. Specific elevation and flood protection requirements for projects receiving public funding would help to reduce the potential flood damage risks associated with inconsistent local enforcement of building code standards.

Considering sea level rise and other climate-related risks

- In **California**, Executive Order S-13-08 directed all agencies planning construction projects in vulnerable areas to assess and reduce potential risks from sea level rise.¹¹⁸ The California Ocean Protection Council, which helps to coordinate ocean-related state agencies, has developed guidance for incorporating sea level rise projections from the National Research Council into planning and decision-making.¹¹⁹ Similarly, the California Coastal Commission, which regulates the state's coastal zone development, has created draft sea level rise policy guidance for local communities and coastal development permit applicants.¹²⁰
- In **Maryland**, the Climate Change and Coast Smart Construction Executive Order requires that new state structures and substantially damaged ones undergoing rehabilitation or reconstruction consider the risks from coastal flooding and sea level rise in design and siting.¹²¹ A subgroup of the Maryland Commission on Climate Change has developed recommendations on how to site and design state structures as well as those receiving state funding. They include avoiding locating structures in areas subject to inundation by sea level rise in the next 50 years.¹²²

Prioritizing natural and green infrastructure solutions

- Tidal wetlands regulations in **Maryland**, as mandated by the Living Shorelines Protection Act of 2008, require that shore erosion control projects use nonstructural stabilization measures, such as tidal wetland vegetation or a living shoreline, “to preserve the natural shoreline, minimize erosion, and establish aquatic habitat.”¹²³

CONCLUSION

To effectively tackle the existing challenges due to outdated and under-maintained water and wastewater infrastructure systems and the additional challenges that climate change presents, communities will need to implement sustainable and flexible solutions. Incorporating water efficiency and green infrastructure and addressing flood risks in SRF-supported projects will not only help communities meet their existing water infrastructure needs but also better equip them to handle storms, floods, droughts, and other extreme weather events in the future. These solutions not only make communities more resilient to climate change but also provide added benefits, improving water quality, wildlife habitat, and quality of life.

Furthermore, recent changes in federal law will help to expand the implementation of these solutions. The Water Resources Reform and Development Act of 2014 makes changes to federal statutes that will allow for water efficiency, green infrastructure, and climate change resilience measures to be further integrated into SRFs. Yet, implementation of these new provisions largely will be left to the states. It is critically important for the EPA and the states to work together to fully implement these changes. By carrying out our recommendations, they can ensure that communities have the resources and the solutions to be truly resilient to a changing climate.

ENDNOTES

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- 15 State SRF programs commonly promote certain practices through the use of financial incentives, such as reduced and zero interest rates, extended term financing of up to 30 years, and additional loan subsidization through principal forgiveness, grants, or negative interest loans. See e.g., U.S. EPA, *Sustainability and the Clean Water State Revolving Fund: A Best Practices Guide* (2012), 13-14, available at http://water.epa.gov/grants_funding/cwsrf/upload/CWSRF-Best-Practices-Guide.pdf.
- 16 U.S. EPA guidance states: "Properly planned and implemented, water conservation programs can defer, reduce, or eliminate the need for not only water supply facilities but wastewater facilities, as well. Significant capital cost savings can result, which in turn translates to smaller loan amounts for SRF Programs. This frees up money in limited loan funds to finance more projects to help achieve a state's compliance and public health goals." U.S. EPA, note 25. Similarly, a 1999 U.S. EPA CWSRF fact sheet states: "Because facilities that collect and treat wastewater are sized to meet flow projections, when flows are inflated by wasteful water use, it costs more than necessary in capital and operating costs to assure safe and efficient services. Water conservation and reuse programs can be developed to help systems avoid, downsize, or postpone wastewater projects. There are also benefits from increased treatment plant efficiency and reduced energy costs." See U.S. EPA, *Funding Water Conservation and Reuse with the Clean Water State Revolving Fund* (1999), available at http://water.epa.gov/grants_funding/cwsrf/upload/2002_06_28_cwfinance_cwsrf_cwreuse.pdf.
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- 22 42 U.S.C. § 300j-12(g)(3) (authorizing U.S. EPA to publish guidelines and promulgate regulations "...as may be necessary to carry out the [DWSRF program], including—(A) provisions to ensure that each State commits and expends funds allotted to the State under this section as efficiently as possible...").
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- 94 Direct support includes actions located in a floodplain, and indirect support includes actions located outside a floodplain, such as construction of water and wastewater systems, that foster additional development in a floodplain. See U.S. WRC 1978, note 87.
- 95 See Interagency Task Force on Floodplain Management, *Further Advice on Executive Order 11988 Floodplain Management*, available at http://www.gsa.gov/graphics/pbs/Advice_EO11988.pdf ("Federal actions include actions by applicants that are financed with Federal funds or that are otherwise assisted, regulated, or approved by the Federal government. This would include federally undertaken, financed, or assisted construction and improvements...").
- 96 See notes 6 and 7.
- 97 Exec. Order No. 11988, note 87. 42 Fed. Reg. 190 (September 39, 1977) describes the eight step process that agencies are to follow to evaluate a proposed action's flood risk and impacts as part of any environmental assessment prepared under NEPA: (1) Determine if a proposed action is in the base flood plain; (2) Early public review; (3) Identify and evaluate practicable alternatives to locating in the base floodplain; (4) Identify impacts of the proposed action; (5) Minimize, restore, preserve; (6) Reevaluate alternatives; (7) Findings and public explanation; and (8) Implement action.
- 98 U.S. EPA, *Statement of Procedures on Floodplain Management and Wetlands Protection* (1979), available at <http://www.epa.gov/compliance/resources/policies/nepa/floodplain-management-wetlands-statement-pg.pdf>.
- 99 The Title II Construction Grants program, authorized under Section 201 of the Clean Water Act, preceded the CWSRF.
- 100 See Interagency Task Force on Floodplain Management, note 95.
- 101 Exec. Order No. 11988 and U.S. WRC 1978, note 87 ["Floodplains in their natural or relatively undisturbed state serve water resources values (natural moderation of floods, water quality maintenance, and groundwater recharge), living resource values (fish, wildlife, and plant resources)...]. Maximizing the use of natural and green infrastructure solutions, which restores the hydrology and/or other natural processes at a site, would serve to restore and preserve natural floodplain functions in accordance with the Executive Order.

- 102 See 40 CFR §35.3140 and 40 CFR §35.3580.
- 103 40 CFR §6.204(b)(5).
- 104 Cross-cutters are federal statutes, executive orders, or implementing regulations that agencies must consider when taking action. See U.S. EPA, *Environmental Review Guide for Special Appropriation Grants* (2008), 159-161, available at <http://www.epa.gov/compliance/resources/policies/nepa/environmental-review-guide-grants-pg.pdf>.
- 105 See Missouri Department of Natural Resources, *Missouri Drinking Water State Revolving Fund Priority Points Criteria* (2013), available at <http://www.dnr.mo.gov/pubs/pub2362.pdf>.
- 106 See Virginia Department of Health, *Drinking Water State Revolving Fund Program Design Manual* (2014), 15, available at <http://www.vdh.virginia.gov/odw/financial/documents/2015Funding/03-SRF%20Program%20Design%20Manual.pdf>.
- 107 See State of California Water Resources Control Board, *Clean Water State Revolving Fund – Instructions and Guidance for 'Environmental Compliance Information'* (2013), available at http://www.waterboards.ca.gov/water_issues/programs/grants_loans/srf/docs/envcompliance/federal_cross_cutting_evaluation_form.pdf.
- 108 See Oregon Clean Water State Revolving Fund, *Applicant Guide to the State Environmental Review Process (SERP)* (2012), available at <http://www.deq.state.or.us/wq/loans/docs/SERPApplicantGuide.pdf>.
- 109 See Georgia Department of Natural Resources, *Georgia's Drinking Water State Revolving Fund State Environmental Review Process* (2004), available at http://www.gaepd.org/Files_PDF/techguide/wpbdwsrf_guide.pdf.
- 110 See Tennessee Department of Environment and Conservation, "Facilities Plan Environmental Information Requirements," available at http://www.tn.gov/environment/water/fund_planning-facilities-environmental-requirements.shtml.
- 111 See Vermont Department of Environmental Conservation, *DWSRF Guidance Document Number 15 – Environmental Review* (2012), available at <http://drinkingwater.vt.gov/dwsrfgd/pdf/guidancedoc15.pdf>.
- 112 2 Code Colo. Regs. § 408-1. Although Rule 6 specifically excludes wastewater treatment plants from classification as "critical facilities," owners of these facilities are encouraged to follow the rule when practicable.
- 113 NYSEFC, *Storm Mitigation Loan Program Fact Sheet* (2013), available at http://www.etc.ny.gov/DesktopModules/DNNCorp/DocumentLibrary/Components/FileDownloader/FileDownloaderPage.aspx?tabid=76&did=4093&pid=0&lf=/DesktopModules/DNNCorp/DocumentLibrary/App_LocalResources/DocumentLibrary&cl=en-US&mcs=%2fDesktopModules%2fDNNCorp%2fDocumentLibrary%2f&arn=Administrators&cd=false&tmid=258&if=1.
- 114 New Jersey Department of Environmental Protection, *Infrastructure Flood Protection Guidance and Best Practices* (2014), available at <http://www.nj.gov/dep/watersupply/pdf/guidance-ifp.pdf>.
- 115 International Building Code § 1612.4 (2012 ed.)
- 116 ASCE, Standard 24-05, Flood Resistant Design and Construction.
- 117 ASFP, "Appendix," *Floodplain Management 2010: State and Local Programs* (2011), 147-148, available at <http://www.floods.org/index.asp?menuid=732&firstlevelmenuid=186&siteid=1#appendix>.
- 118 Office of the Governor, State of California, Exec. Order No. S-13-08.
- 119 See The Coastal and Ocean Working Group of the California Climate Action Team (CO-CAT), *State of California Sea-Level Rise Guidance Document* (2013), available at http://www.opc.ca.gov/webmaster/ftp/pdf/docs/2013_SLR_Guidance_Update_FINAL1.pdf.
- 120 See California Coastal Commission, *Draft Sea-Level Rise Policy Guidance* (2013), available at http://www.coastal.ca.gov/climate/slr/guidance/CCC_Draft_SLR_Guidance_PR_10142013.pdf.
- 121 Executive Department, State of Maryland, Exec. Order 01.01.2012.29.
- 122 Adaptation Response Working Group of the Maryland Commission on Climate Change, *State of Maryland Climate Change and Coast Smart Construction: Infrastructure Siting and Design Guidelines* (2014), available at http://climatechange.maryland.gov/site/assets/files/1582/climate_change_and_coast_smart_final_report.pdf.
- 123 Md. Code. Ann Env. § 26-24-01.



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