



Drinking Water Action Plan



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Executive Summary

Safe drinking water is critical to our Nation’s public health and economic vitality. The U.S. drinking water system – supported by the Safe Drinking Water Act (SDWA) and the work of federal, tribal, state, and local governments and utilities nationwide – is one of our country’s greatest public health achievements. While America’s drinking water remains among the safest in the world, the drinking water sector faces a growing array of challenges that, if left unaddressed, can pose serious risks to public health and local economies including:

Safe drinking water is critical to our Nation’s public health and economic vitality

- aging infrastructure
- limited funding and management capacity, especially for small and disadvantaged (i.e. low-income, economically stressed, or environmentally overburdened) communities
- challenges with maintaining robust state oversight programs
- degradation of sources of drinking water
- risks from unregulated contaminants
- threats associated with climate and extreme weather events

At the same time, this is a moment of tremendous opportunity for innovation and progress in health protection, thanks to advances in drinking water treatment and monitoring technology; new approaches to information management, communications, and water infrastructure finance; emerging partnerships spanning government, utilities and the public; and lessons learned in over 40 years of implementing SDWA.

This Plan is a national call to action, urging all levels of government, utilities and other key stakeholders to work together – to reinvigorate the safe drinking water enterprise and make investments that will impart healthy thriving communities nationwide. The Plan is organized around six Priority Areas in which there is significant opportunity for leadership from states and other partners, as summarized in this document. Each offers compelling opportunities for government and stakeholders to work together on creative and pragmatic new approaches – leveraging information to empower consumers and promote robust accountability, promoting equity in infrastructure financing and management, creating new partnerships to protect drinking water sources and promote regional cooperation to solve drinking water challenges, and driving new technologies to better protect public health.

The Priority Areas include:

- Priority Area 1: Promote Equity and Build Capacity for Drinking Water Infrastructure Financing and Management in Disadvantaged, Small, and Environmental Justice Communities
- Priority Area 2: Advance Next Generation Oversight for the Safe Drinking Water Act
- Priority Area 3: Strengthen Source Water Protection and Resilience of Drinking Water Supplies
- Priority Area 4: Take Action to Address Unregulated Contaminants
- Priority Area 5: Improve Transparency, Public Education, and Risk Communication on Drinking Water Safety
- Priority Area 6: Reduce Lead Risks through the Lead and Copper Rule

The Plan identifies a series of proposed actions in each of the six Priority Areas, summarized in Table 1 below. Together, these actions can transform America’s drinking water system into one that will help lead the world

into the 21st Century - modernizing technology and infrastructure, providing consumers with readily available information on drinking water quality, ensuring robust and efficient oversight of drinking water safety, preventing source water contamination before it happens, safeguarding drinking water against climate and extreme weather events, and promoting equity in access to safe drinking water and public health protections. EPA has already commenced action in some of these areas, but most will require additional resources and further stakeholder engagement and participation to initiate and complete. Additionally, the actions proposed here go far beyond what EPA alone can do; all levels of government, utilities, the private sector, and civil society have critical roles to play. State and tribal primacy agencies¹ in particular, as the primary implementers of SDWA across most of the country, are central to drinking water safety. Many of the key authorities and tools discussed in this Plan – including source water protection, direct oversight of utility management, and capacity development and infrastructure finance – are exercised primarily by the primacy agencies. Local governments – who exercise considerable control over water infrastructure finance and management, land use, and other key areas – are also central players in this effort. Utilities must take many of the critical actions needed to strengthen drinking water safety, and communities must be actively engaged in supporting these actions. Partnership and collaboration – as well as leadership from states, tribes, local governments, and utilities in particular – will be essential to success.

To inform development of this Plan, EPA engaged a diverse array of stakeholders, including state and tribal environmental and health officials, local government officials and community organizations, drinking water utilities, technical assistance providers, and nongovernmental organizations (NGOs) dedicated to public health and safe drinking water. EPA gained valuable insights from this consultation and found broad agreement that there is a compelling and urgent need for action – as well as a tremendous opportunity to revitalize and modernize our Nation’s drinking water system.

In tandem with the development of this Plan, the President’s Council of Advisors on Science and Technology (PCAST) has undertaken a study on science and technology for drinking water safety. The PCAST’s recommendations, issued in November 2016, provide an opportunity to consider advances in drinking water science and technology research and development that can support and complement the proposed actions set forth in this plan.

¹ Throughout the Drinking Water Action Plan, any reference to “primacy agencies” includes EPA, states, tribes, and territories with primary responsibility for implementation of the public water system program.

Table 1

Priority Area 1: Promote Equity and Build Capacity for Drinking Water Infrastructure Financing and Management in Disadvantaged, Small, and Environmental Justice Communities

<p>Challenges</p> <ul style="list-style-type: none"> • Economically stressed and disadvantaged communities, and small drinking water systems, are facing disproportionate risks as a result of underinvestment in drinking water infrastructure and limited technical, financial, and/or managerial capacity. • Small systems, which constitute 97 percent of the nation’s public water systems, can be particularly difficult to operate and sustain due to their limited economies of scale. • “Shrinking cities” that are larger but have experienced significant decreases in population, also face a host of technical, managerial and financial challenges exacerbated by aging and now oversized infrastructure; for example, many ‘rust belt’ cities have lost a large percentage of their population since the 1960’s. Many rural communities face similar challenges. • EPA’s most recent safe drinking water needs survey estimates an overall need for drinking water infrastructure in the next 20 years of \$384 billion, in addition to the \$271 billion needed for the nation’s clean water infrastructure over the same period of time. 	<p>Proposed Actions</p> <ul style="list-style-type: none"> • Develop a <i>national initiative to promote regional partnerships</i> that support equity and capacity building. • <i>Update the Operator Certification guidelines</i> to help modernize requirements and encourage states to take advantage of the flexibility to set aside Drinking Water State Revolving Fund (DWSRF) funds for implementation. • <i>Identify and promote best practices for successful funding and capacity-building for disadvantaged communities</i> and work with key partners to ensure robust communication and education opportunities. • <i>Establish new State Revolving Fund (SRF) metrics</i> that will allow the tracking of assistance agreements and additional subsidization based on the income status of the communities served by these programs. • Establish a “<i>one-stop on-line water infrastructure funding portal</i>” to assist communities with identifying funding sources, financing approaches, and case studies for funding water infrastructure capital projects and predevelopment or other planning requirements. • <i>Promote best practices in SRF management for disadvantaged communities</i>, including leveraging of SRF funding, promotion of asset management, creating investment opportunities for green infrastructure, and expanding the use of available SRF flexibilities to support small and disadvantaged communities.
<p>Goals</p> <p>Support and strengthen infrastructure investment and management capacity at drinking water utilities, particularly in disadvantaged communities, to advance equity in drinking water protection, including through promotion of regional water system partnerships, sharing and replicating best practices, and building community capacity.</p>	

Priority Area 2: Advance Next Generation Oversight for the Safe Drinking Water Act

<p>Challenges</p> <ul style="list-style-type: none"> • Safe drinking water requires effective oversight of over 150,000 public water systems across the country – at the level of state and tribal primacy agencies and at the federal level. • In addition to the challenge of working to ensure simultaneous compliance with over 90 NPDRs for 150,000 public water systems nationwide, regulators are facing increasing challenges associated with unregulated contaminants, aging infrastructure, and extreme weather impacts with limited and often declining resources, and recent events have eroded public confidence. 	<p>Proposed Actions</p> <ul style="list-style-type: none"> • Develop a <i>national e-reporting rule</i> under SDWA to require water utilities and states to report SDWA compliance data electronically. • <i>Implement the Compliance Monitoring Data Portal (CMDP)</i>, a compliance monitoring and analysis tool that facilitates electronic reporting. • <i>Publish regular, triennial on-site reviews of primacy agency drinking water programs.</i> • Develop <i>priority indicators for troubled drinking water systems</i> that can be used to best focus primacy agency and EPA oversight resources and technical assistance on troubled systems. • Collaborate with the Centers for Disease Control and Prevention, primacy agencies, and the Association of State and Territorial Health Officials, to support local efforts to <i>integrate public health surveillance data (such as childhood blood lead levels) with community drinking water quality data.</i> • Promote Use of <i>Advanced Monitoring Technology and Citizen Science.</i>
<p>Goals</p> <p>To work together with regulators, utilities and a broad cross section of stakeholders to better leverage the power of information – to ensure timely identification of problems, efficient use of oversight and technical assistance resources, promote quicker mitigation of problems and robust public accountability for utilities and regulators.</p>	

Priority Area 3: Strengthen Source Water Protection and Resilience of Drinking Water Supplies

<p>Challenges</p> <ul style="list-style-type: none"> • As a nation we are facing growing threats to drinking water sources. These include surface and ground water contamination from industrial and nonpoint sources, potential impacts to underground sources of drinking water from induced seismicity, as well as growing risks to water availability due to overuse, drought and other extreme weather events. • Nutrients and other contaminants from agricultural practices and urban storm water continue to contribute significantly to source water protection challenges. • The costs of failure to protect source water quality and assure reliable access to water supplies can be substantial. 	<p>Proposed Actions</p> <ul style="list-style-type: none"> • <i>Update and take action on source water assessments.</i> • <i>Develop modern online platforms and GIS tools</i> to facilitate public access to watershed data that are critical to source water protection efforts. • Undertake <i>source water monitoring pilot projects</i> through technical assistance and funding. • <i>Support source water protection through expanded, watershed-based approaches,</i> including collaborative approaches to source water protection between programs at the federal, state, and local levels. • Work with state Clean Water Act (CWA) and SDWA partners to <i>promote greater integration and leveraging of both the clean water and drinking water programs.</i> • Work with key partners to <i>develop a national community resilience initiative</i> to comprehensively address community water
<p>Goals</p> <p>Energize efforts to protect source water and build resilience to drought and other hazards – by focusing on source water assessments, better</p>	

<p>leveraging land conservation resources, building collaborative partnerships for watershed protection, developing new tools to assess and manage source water risks, and advancing water efficiency and reclamation efforts.</p>	<p>resilience challenges (flood, drought, spills, harmful algal blooms, and other hazards).</p> <ul style="list-style-type: none"> • Promote efforts to increase water efficiency and reuse, such as: the release of a summary of best practices in potable reuse in 2017; Cooperative Agreements among public and private sector entities to evaluate and demonstrate advanced treatment technologies; and water efficiency guidelines to help promote water conservation by state and local governments and utilities.
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Priority Area 4: Take Action to Address Unregulated Contaminants

<p>Challenges</p> <ul style="list-style-type: none"> • The past few years have underscored the vulnerability of drinking water systems across the country to localized contamination from unregulated contaminants, ranging from algal toxins related to harmful algal blooms, to industrial chemicals such as perfluorinated compounds (PFCs). • EPA, state primacy agencies and utilities must be prepared to address potential contaminants in the context of the time consuming process of the SDWA regulatory approach. 	<p>Proposed Actions</p> <ul style="list-style-type: none"> • Through the National Drinking Water Advisory Council (NDWAC), identify a risk-based prioritization framework for consideration of new contaminants for regulation. • Strengthen the effectiveness of drinking water health advisories through enhanced collaboration and an increased focus on risk management and risk communication approaches. • Develop a guidance framework to help utilities and primacy agency and local regulatory officials in proactively assessing and managing risks to individual systems from unregulated contaminants. • Enhance available tools and information for quantitative assessment of the comparative costs of source water protection and advanced drinking water treatment technologies that can address a broad spectrum of regulated and unregulated contaminants. • Promote the development of low cost and innovative technologies to remove a broad spectrum of contaminants, particularly in small systems.
<p>Goals</p> <p>To provide the opportunity for creative new approaches to prioritize regulatory actions, better leverage non-regulatory tools, protect sources of drinking water, address drinking water system vulnerabilities and promote affordable treatment technologies that address a range of contaminants.</p>	

Priority Area 5: Improve Transparency, Public Education, and Risk Communication on Drinking Water Safety	
<p>Challenges</p> <ul style="list-style-type: none"> • Safe drinking water is a basic necessity of daily life upon which we rely for our very existence. Yet consumers have relatively little information on drinking water quality or related risks and operational challenges. People need more than just data; they also need better communication about the context and meaning of drinking water information. 	<p>Proposed Actions</p> <ul style="list-style-type: none"> • Strengthen existing and new or revised rules, including through updated implementation guidance, to support more robust communication of key information to the public. • Develop indicators of drinking water quality utilizing enhanced water system and primacy agency data on drinking water quality that are communicated to the public through a web portal featuring key indicators and infographics. • Conduct an evaluation of the effectiveness of the required Consumer Confidence Reports. • Invest in strengthening risk communication expertise to better meet the needs of all members of the community.
<p>Goals</p> <p>Provide the public with timely, clear and understandable information about drinking water quality, potential health risks, and the investments and actions needed to reliably deliver safe drinking water.</p>	
Priority Area 6: Reduce Lead Risks through the Lead and Copper Rule	
<p>Challenges</p> <ul style="list-style-type: none"> • While EPA’s Lead and Copper Rule has resulted in substantial reductions of lead and copper in drinking water, it is now 25 years old and both the rule and its implementation are in need of a substantial overhaul. • The rule is one of the most challenging for primacy agencies and utilities to implement and there is a clear opportunity to improve the public health protections it affords. 	<p>Proposed Actions</p> <ul style="list-style-type: none"> • Continue to engage in enhanced oversight activities. • Provide information to utilities and local communities on best practices, costs, and mechanisms for lead service line replacement. • Enhance training and technical assistance to primacy agencies on Lead and Copper Rule implementation. • Update and improve EPA’s Training, Testing and Telling (3Ts) guide for protection of drinking water in schools. • Develop proposed revisions to the Lead and Copper Rule as outlined in EPA’s Lead and Copper Rule Revisions White Paper. • Continue enhanced engagement with partners and stakeholders on the development of proposed revisions to the Lead and Copper Rule.
<p>Goals</p> <p>To strengthen implementation of the current Lead and Copper Rule and improve public health protection through updates to the rule.</p>	

Introduction

The Drinking Water Action Plan is a national call to action, urging all levels of government, utilities and other key stakeholders to work together – to reinvigorate the safe drinking water enterprise and make investments that will impart healthy thriving communities nationwide. The Plan is organized around six Priority Areas in which there is significant opportunity for leadership from states and other partners, provided in detail below. Each offers compelling opportunities for government and stakeholders to work together on creative and pragmatic new approaches – leveraging information to empower consumers and promote robust accountability, promoting equity in infrastructure financing and management, creating new partnerships to protect drinking water sources and promote regional cooperation to solve drinking water challenges, and driving new technologies to better protect public health.

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The Plan identifies a series of proposed actions discussed in detail below. EPA has already commenced action in some of these areas, but most will require additional resources and further stakeholder engagement and participation to initiate and complete. The actions proposed here go far beyond what EPA alone can do; all levels of government, utilities, the private sector, and the public each have critical roles to play. State and tribal primacy agencies, in particular, as the primary implementers of SDWA across most of the country, are central to drinking water safety. Many of the key authorities and tools discussed in this Plan – including source water protection, direct oversight of utility management, and infrastructure finance – are exercised primarily by primacy agencies. Local governments – who exercise considerable control over water infrastructure finance and management, land use, and other key areas – are also central players in this effort. Utilities ultimately must take many of the critical actions needed to strengthen drinking water safety, and communities must be actively engaged in supporting these actions. Partnership and collaboration – as well as leadership from states, tribes, local governments, and utilities in particular – will be essential to success.

Priority Area 1: Build Capacity for Drinking Water Infrastructure Financing and Management in Low-Income, Small and Environmental Justice Communities

Our Nation is facing a substantial need for investment in drinking water infrastructure renewal, repair, and replacement across all drinking water systems. One indication of the scope of this problem is the 700 water main breaks that occur across the United States every day – over 200,000 per year – each of which causes significant disruption in service and has the potential to put the local public at risk of exposure to dangerous pathogens and other contaminants in their drinking water supply. EPA’s most recent (2011) Drinking Water Infrastructure Needs Survey identified a total of \$384.2 billion in capital improvement needs over the next 20 years (2011 through 2031), in addition to the \$271 billion in clean water infrastructure investments that will be

EPA’s most recent (2011) Drinking Water Infrastructure Needs Survey identified a total of **\$384.2 billion** in capital improvement needs over the next **20 years** (2011 through 2031), in addition to the **\$271 billion** in clean water infrastructure investments that will be necessary over the same period of time

necessary over the same period of time. While pipe replacement costs make up the largest portion of the overall need, these costs are largely based on the current national annual pipe replacement rate of 0.5 percent – and an assumption that pipe installed today will have a useful life of 200 years. This estimate does not capture the full potential pipe replacement need based on pipe’s expected useful life, nor does it capture all potential lead service line replacement costs. Public water systems that provide a safe and adequate supply of drinking water are necessary for maintaining

healthy, sustainable and economically-viable communities. Aging infrastructure can have substantial impacts on water quality. Without increased and sustained investments, communities of all sizes will face greater public health risks over time as their critical drinking water infrastructure approaches or exceeds the end of its service life.

Economically stressed, minority and otherwise disadvantaged communities are facing disproportionate challenges due to limitations in funding for infrastructure investments and establishing and maintaining the technical and managerial capacity needed to support necessary levels of operations and maintenance. Of the over 150,000 public water systems across the country, 97 percent serve fewer than 10,000 people, and 94 percent serve fewer than 500 people. These systems face serious challenges to achieve sufficient scale to sustainably finance and manage a modern drinking water system, and small systems are disproportionately represented among those with SDWA violations or compliance challenges. While many disadvantaged communities are small, it is also important to recognize that infrastructure and management challenges are often present in larger communities serving vulnerable populations, particularly in shrinking cities that have experienced significant population loss in recent decades, as underscored by the recent crisis in Flint, Michigan. Further complicating this picture, a community that is relatively strong economically may still have a significant number of low-income households that may be significantly challenged to meet the costs of their monthly water and wastewater utility bills.

Many disadvantaged communities also face fundamental pressures such as declining, aging, or low-income populations, a declining community economic base, and/or oversized drinking water distribution systems, and may require substantial technical and financial support to sustainably provide safe drinking water to their customers. Lower-income communities also often face challenges with antiquated infrastructure and insufficient

training and retention of qualified water system operators. Taken together, these challenges represent compelling environmental justice issues – as they frequently compound to create a situation in which poor and minority communities bear disproportionate health risks as a result of disparities in the provision of safe and reliable drinking water.

These challenges are not new, and EPA and our federal and primacy agency partners are already engaged in significant efforts to support small and disadvantaged communities through funding and technical assistance to provide equity in drinking water protection, as highlighted by the examples here.

- EPA oversees the DWSRF program, administered through the primacy agencies, which, since its inception in 1997, has provided over \$30 billion in support including \$11 billion to small drinking water systems for infrastructure improvements.
 - The DWSRF program provides important options for primacy agencies to assist minority, low-income and otherwise disadvantaged communities. The DWSRF enables primacy agencies to provide subsidization to water systems in the form of below-market rate financing for infrastructure projects, with interest rates as low as zero percent. The SDWA requires that primacy agencies, to the maximum extent practicable, prioritize infrastructure projects that address the most serious risk to human health; are necessary to ensure compliance with the SDWA; and assist systems most in need on a per household basis according to affordability criteria established by the state. Additional subsidization is also available to water systems in the forms of principal forgiveness, negative interest rates, or grants.
- The U.S. Department of Agriculture (USDA), which provides substantial support for rural drinking water systems through its Rural Development program actively works with EPA to partner with technical assistance providers to assist communities with system partnership options as well as identify funding opportunities to support partnership activities. EPA and USDA Rural Development actively work together to promote asset management planning, encourage water and energy efficiency practices, and conduct training and technical assistance to increase the adoption of effective utility management strategies to ensure long-term technical, managerial, and financial capacity. Since 2009, USDA Rural Development has funded \$12 billion for nearly 5,000 projects that will provide access to affordable water and wastewater service to 17 million rural residents. In fiscal year (FY) 2015, USDA funded 959 projects and technical assistance and training (TAT) grants totaling \$1.66 billion.
- EPA has established a Water Infrastructure and Resiliency Finance Center (WIRFC), which is undertaking a range of activities in support of water infrastructure finance in disadvantaged communities, including our WaterCARE program which provides technical assistance, a compilation of utility best practices on customer assistance programs, and other new efforts described below.
- EPA provides support for 10 university-based Environmental Finance Centers across the country, which in turn provide technical assistance on water infrastructure finance to disadvantaged communities.
- Over the past 20 years, EPA has provided over \$1.4 billion to support water infrastructure in disadvantaged communities in Indian country, on the U.S.-Mexico border, and in Alaska Native Villages.
- EPA is working to expand the overall level of federal support for infrastructure finance by preparing to implement the Water Infrastructure Finance and Innovation Act (WIFIA), which authorizes EPA to provide direct loans or loan guarantees to support water infrastructure projects. EPA is establishing the foundation for this program and will be prepared to implement it at such time as Congress appropriates funding to support the program.

EPA and our partners see an opportunity to take these efforts to the next level – through a combination of new strategies and better integration of existing work. One priority is to energize our activities to promote water system partnerships to help communities and utilities work together – to achieve better economies of scale, spread costs, and leverage technical, financial, and managerial capacity. Partnerships can play a critical role in supporting equity in public health protections across communities. Primacy agencies have a key role to play in

this area, as they have the authority and tools to promote a variety of successful water system partnership approaches ranging from sharing of financial or managerial expertise to regional system consolidation. In addition, we propose actions to promote sharing of information on available resources and best practices, and to strengthen coordination among all federal, primacy agency, and local financial and technical assistance resources.

Proposed Actions

1. Launch National Initiative to Promote Regional Partnerships: Over 300 million Americans rely on more than 50,000 community water systems (i.e., drinking water systems that serve a minimum of 15 service connections used by year-round residents or 25 year-round residents) to provide safe drinking water. Over 90 percent of these systems serve fewer than 10,000 people; over 27,000 community water systems serve fewer than 500 people. Many small and disadvantaged communities experience technical, managerial and financial capacity challenges that can complicate their efforts to sustainably provide safe drinking water to the populations they serve. The number and small scale of these systems is one of the single greatest challenges facing the U.S. drinking water system. The technical, managerial and financial challenges facing these systems can seriously impact their ability to provide modern drinking water treatment and management, and even to meet basic regulatory standards. For example, public water systems serving less than 10,000 people account for 97 percent of the total systems inventory, and account for 97 percent of the Total Coliform Rule (TCR) Maximum Contaminant Level violations, and 99 percent of TCR Monitoring and Reporting violations. In some cases, medium and large systems may also present challenges in meeting basic requirements. State and federal regulators spend a disproportionate amount of their overall oversight resources working to get and keep troubled systems in compliance with drinking water safety requirements. These and other disparities in system performance reflect troubling inequities in public health protections among communities.

One successful approach to address this suite of challenges is the formation of partnerships between water systems to leverage limited resources and enhance system capacity. A broad range of partnership options are available, ranging from financial or management agreements between water systems, financing agreements including public-private partnerships, to physical interconnections between systems. A number of states are actively pursuing strategies to address these issues – ranging from incentives for consolidation to provision of technical assistance to support the formation of water system partnership agreements. Beyond small systems, utility partnerships can also provide a mechanism through which higher capacity utilities and cities can share expertise, technical support and services with lower-capacity utilities in economically stressed medium and large cities.

A key principle of water system partnership agreements is that the most effective solutions are locally driven. Further, the critical authorities and resources to promote water system partnerships are at the state and local level. EPA proposes to work with primacy agencies and local governments, utilities, and other stakeholders on a national initiative to promote regional partnerships. In support of this goal, EPA plans in the coming year to convene a national forum to engage our partners to identify successful regional strategies that can support local communities in establishing successful partnership agreements to increase the sustainability and public health protection within the water utility sector. This initiative will provide enhanced opportunities for communities, primacy agencies, utilities and private funders and technical assistance providers to share experiences and leverage expertise, guidance and assistance in establishing water system partnership efforts. In addition, the initiative can support development of tools to help utility efforts to begin the partnership process, establish connections amongst the systems and address challenges that could otherwise discourage partnership development.

2. Reinvigorate Certification, Capacity Development and Workforce Training Programs for Drinking Water System Operators: A well-trained and knowledgeable workforce that implements proper assessment and management of water utility assets is vital to providing safe drinking water and ensuring the long-term sustainability of public water systems. The SDWA established a holistic approach to preventing contamination problems by emphasizing enhanced water system management and establishing the Capacity Development Program and Operator Certification Program. States implement the Operator Certification Program, utilizing the EPA issued program guidelines which specify minimum standards for certification and recertification of operators. If a state does not implement the operator certification program, then EPA must withhold 20 percent of its annual DWSRF capitalization grant. EPA proposes to work with the states to update the Operator Certification guidelines to help modernize requirements to ensure safe and sustainable operation of drinking water systems. Maintaining up-to-date Operator Certification guidelines will also be important as requirements evolve to account for emerging challenges such as *Legionella* in premise plumbing and water reuse. EPA will also encourage states to take advantage of the flexibility to set aside DWSRF funds for implementation of the program.

Operators were identified by the industry as one of the mission critical positions in utilities, and predicted workforce shortages in the water sector can affect a utility's ability to reliably provide safe water. Current estimates place the anticipated loss of current utility employees at between 30 to 50 percent within the next 10 years due to the aging workforce in the water sector. Utilities will feel the impact of these retirements most severely in areas requiring technical skills and knowledge, such as engineering and operations. Estimates are that the water supply and sanitary services sector will experience a growing need for additional employees in the coming years – due to new regulations, growth in infrastructure, security challenges, and customer demands, at the same time that the industry is facing a wave of retirements from the aging workforce.

Attracting and training the next generation of water system operators is a major priority across the sector, but particularly for small and disadvantaged communities. A growing number of states, utility associations, and individual utilities are investing in workforce development programs – including through innovative partnerships with local community colleges – to recruit and train the drinking water system operators of the future. These efforts, coupled with a reinvigorated operator certification program – can help to ensure that drinking water systems are run by experienced, well-trained people as technology, industry, and regulatory requirements change, maintaining the highest level of drinking water quality to support healthy communities.

3. Identify and Promote Best Practices in Technical Assistance for Disadvantaged Communities: States and technical assistance providers have developed a substantial body of experience in delivering technical assistance to small and disadvantaged communities. There is a lot of innovation happening in this space – including state-level mechanisms to coordinate and integrate different funding sources, programs to provide predevelopment assistance to build a “pipeline” of projects for small and disadvantaged communities, and efforts to promote regional and other partnerships through technical assistance. There are substantial opportunities for better sharing of information and replication of success across states, regions and agencies. EPA plans, within the coming year, to work with federal, primacy agency, and local partners and key external stakeholders to develop and disseminate an interactive compendium of best practices related to successful funding and capacity-building programs for low-income and small communities. This resource, which will evolve and develop over time, will also identify attributes of successful technical assistance to communities in need. EPA proposes to work with key partners to ensure robust communication and education opportunities for communities and primacy agencies using this resource.

4. Implement Transparent Metrics on SRF Support for Disadvantaged Communities: The Drinking Water and Clean Water SRF programs provide flexibility to primacy agencies to assist low-income and otherwise disadvantaged communities by providing additional subsidization to water systems in the form of below-market rate financing, with interest rates as low as zero percent. Primacy agencies prioritize infrastructure projects that address the most serious risks to human health; ensure water system compliance with SDWA requirements; and assist systems most in need on a per household basis, according to state-established affordability criteria. EPA will work with the primacy agency SRF programs to establish new metrics that will allow the tracking of assistance agreements and additional subsidization based on the income status of the communities served by these programs. These metrics will support the efforts of the SRF programs in identifying, disseminating and promoting primacy agency best practices for assisting water systems most in need by enhancing public transparency and communication about how SRF funds are utilized to help communities in need.

5. Establish a “One-Stop” Online Water Infrastructure Financing Portal: In coordination with water sector stakeholders, EPA proposes to develop an on-line water infrastructure funding portal to assist local communities with identifying funding sources, financing approaches, and case studies for funding water infrastructure capital projects and predevelopment or other planning requirements. These water infrastructure finance resources will help communities make informed decisions for their drinking water, wastewater, and storm water infrastructure needs and facilitate local community efforts to obtain funding to address critical infrastructure investment needs.

6. Promote Best Practices in SRF Management – Including Leveraging SRF Funds, Incentivizing Asset Management, and Fully Utilizing SRF Flexibilities to Support Disadvantaged Communities: State administration of the SRFs can play a critical role in supporting disadvantaged communities. The current infrastructure funding needs in many disadvantaged communities far outstrip the currently available resources to fund these projects. While many primacy agencies currently leverage their SRF funding – e.g. through issuance of bonds or integration/coordination with other funding sources – there are opportunities to create greater program demand to expand these practices. These practices can help to increase the overall availability of infrastructure funding, providing an opportunity to promote greater equity among communities. EPA will work with primacy agencies to develop publicly available information on the different types of primacy agency leveraging practices – and the degree to which these are being implemented across state programs – to identify opportunities for greater use of leveraging to expand available resources.

In addition, it is critical that states structure SRF funding to ensure that recipients are adopting asset management practices that will support safe and sustainable operation of their systems. A number of primacy agencies have built asset management requirements into SRF agreements, with disadvantaged communities receiving additional subsidization under the DWSRF. This critical work, which helps to strengthen the long-term sustainability of these systems, should be an important focus for every primacy agency. EPA plans to work with all primacy agencies to promote the use of asset management across a broader set of communities served by the DWSRF program.

Finally, EPA and our primacy agency partners see key opportunities to expand the use of available flexibilities in the SRF program to better support small and disadvantaged communities. These flexibilities include the use of DWSRF set-asides for small system technical assistance and operator certification programs and additional subsidies for disadvantaged communities. EPA intends, within the coming year, to provide training and technical assistance to primacy agencies tailored to promote broader utilization of opportunities to use SRF funding to support small and disadvantaged communities.

Priority Area 2: Next Generation Oversight for Safe Drinking Water Act

State, territorial and federal regulators play a critical role in ensuring the safety of our Nation’s drinking water. Under SDWA, EPA authorizes primacy agencies to assume primary enforcement responsibility for regulation of public water systems to states, territories, and Indian Tribes if they meet certain requirements. Forty-nine states, five territories (American Samoa, the Commonwealth of the Mariana Islands, Guam, Puerto Rico and the Virgin Islands) and the Navajo Nation have been granted primacy under SDWA, and this National Action Plan provides important opportunities for leadership by primacy agencies. EPA leads the national drinking water enforcement and compliance program in part by developing and implementing enforcement policy and providing the public with easy access to public water system compliance data. Primacy agencies must have regulations that are no less stringent than the National Primary Drinking Water Regulations (NPDWRs) promulgated by EPA. Primacy agencies must conduct sanitary surveys, adopt enforcement programs that are adequate to ensure compliance with drinking water regulations, and report violations and other data to EPA. As a condition of their DWSRF grant, primacy agencies are also required to have a program to build and maintain water system technical, managerial, and financial capacity. Primacy agencies receive support for their programs through the Public Water System Supervision (PWSS) grants and the State Drinking Water Revolving Loan Fund (DWSRF) set asides. EPA promulgates the NPDWRs implemented nationwide, develops regulatory guidance, and provides scientific and technical information critical to the effective implementation of SDWA. In addition, EPA provides oversight of state programs and develops draft and final grant allocations, as well as guidance and communication materials.

State, territorial and federal regulators play a critical role in ensuring the safety of our Nation’s drinking water

In the case of Wyoming, the District of Columbia and most of Indian country, EPA has direct implementation responsibility, including enforcement. The EPA Administrator has broad authority to act to protect the health of persons in situations where there may be an imminent and substantial endangerment to human health.

Primacy agencies and EPA are under increasing pressure. In addition to the challenge of working to ensure simultaneous compliance with over 90 NPDWRs for 150,000 public water systems nationwide,

regulators are facing increasing challenges associated with unregulated contaminants, aging infrastructure, and extreme weather events. Regulators have had to meet these challenges in the context of flat or diminishing resources. The Association of State Drinking Water Administrators (ASDWA) recently estimated that to fulfill the minimum required functions, state drinking water programs need at least \$625 million per year, or \$240 million more than they currently receive from all funding sources. ASDWA stated that for more robust, comprehensive programs, the requirement would be \$748 million, leaving a gap of \$308 million. The EPA continues to provide important support for the implementation of primacy agency drinking water programs through both the PWSS program and DWSRF set-asides, however, these resources alone have been insufficient for the states to develop and implement comprehensive drinking water protection programs. Thus, additional funding beyond the current levels of federal support to primacy agencies will be a critical factor in strengthening oversight.

It is critically important that the Nation provide sufficient resources to support both primacy agencies and federal regulators. There is a range of mechanisms available to states to provide adequate and consistent funding to primacy agencies, including dedicated funding supported by utility fees, and this is an area that warrants further attention. In addition, it is critical that regulators develop and implement new tools and approaches that strengthen the effectiveness and efficiency of oversight, technical assistance, and enforcement activities.

We propose a series of actions that leverage the power of information in support of those goals – increasing speed and public transparency in sharing compliance data, establishing more consistent and objective public reporting on EPA’s oversight of primacy agencies, developing better indicators of troubled systems in need of technical assistance or oversight response, and enhancing communication with the public on the implications of this information for the safety of their local drinking water supply. By improving the quality of compliance information, and sharing that information more quickly and effectively between EPA and primacy agencies and with utilities and the public, we can boost accountability to the public, help prevent problems before they arise, strengthen communication and collaboration between primacy agencies and federal regulators, and promote quicker responses to and mitigation of problems with individual systems. All of this will also support more sustained public attention and investment – both in local drinking water systems and in primacy agencies and federal regulatory programs.

Proposed Actions

1. National E-Reporting Rule and Data Systems to Support Electronic Reporting for SDWA: In collaboration with our primacy agency partners, we propose to initiate development of a national rule requiring mandatory electronic reporting for SDWA compliance data, to increase the timeliness, completeness and quality of information transfer between drinking water systems, primacy agencies, EPA, and the public. Currently, electronic reporting is not nationally required; some primacy agencies have implemented electronic reporting for SDWA compliance data, but many others have not. In addition, EPA currently administers a national information system (the Safe Drinking Water Information System, or SDWIS) to which primacy agencies input compliance information. The agency is in the process of implementing a new system – SDWIS Prime – that will greatly enhance the capabilities of SDWIS. As part of that effort, we are working with primacy agencies to implement the SDWIS Prime Compliance Monitoring Data Portal (CMDP), which will support electronic reporting of drinking water quality data under SDWA.

CMDP and SDWIS Prime will greatly strengthen transparency and oversight, while facilitating significant reductions in reporting burden for the drinking water sector. To be effective, however, they must be used to report full and accurate information from regulated entities and primacy agencies to EPA. A national e-reporting rule, similar to those that have been implemented for other environmental programs, would support that goal. EPA plans to collaborate with our state partners to identify and overcome implementation challenges states with limited digital expertise could experience. National reporting of electronic compliance information will also support development of key performance indicators to identify problem drinking water systems and target oversight and technical support, discussed below.

2. Triennial, Publicly Released EPA Reviews of Primacy Agencies’ Programs: EPA engages in ongoing regular oversight of state, territorial and tribal primacy agencies. Consultations and recent reviews, however, make clear that there is a need for greater consistency and public transparency in the conduct of primacy agency activities under SDWA. Accordingly, in collaboration with our primacy agency partners, EPA proposes to publish regular, triennial on-site reviews of primacy agency drinking water programs, based on clear, objective metrics that leverage electronic reporting of data on the quality of drinking water in publicly accessible reports. This transparent approach to EPA oversight of primacy agencies will help to strengthen public confidence in the consistency and integrity of our collective implementation of SDWA – supporting accountability and public understanding of actions at all levels of government.
3. Develop Priority Indicators to Identify Troubled Drinking Water Systems: In a world of limited oversight resources, it is critical the EPA and primacy agencies become more effective at proactively directing oversight and technical assistance resources to systems that are most likely to face problems or risks that

may adversely affect public health. Indicators may also be used to identify systems that are likely to be in violation, and follow-up with the appropriate compliance assistance and enforcement response. Building on existing efforts in this area, EPA plans to work with our primacy agency partners to develop priority indicators that can be used to best focus primacy agency and EPA oversight resources and technical assistance on troubled systems. EPA will build on the Agency's existing Drinking Water Enforcement Response Policy for this proposed action.

4. Integrate Public Health Surveillance Data with Drinking Water Quality Information: There needs to be a more concerted national effort to advance programs that facilitate exchange or integration of drinking water quality information collected by local utilities and drinking water regulators and public health data held by public health officials. Closing this gap represents an opportunity to better understand potential drinking water-related health risks (e.g. the relationship between exposure to drinking water contaminants and adverse health effects) at the local level; greater integration and analysis of such information could better inform local and primacy agency decisions, for drinking water system management and oversight and public health interventions. EPA proposes to work in collaboration with the Centers for Disease Control and Prevention, primacy agencies, and the Association of State and Territorial Health Officials, to support local efforts to integrate and analyze public health surveillance data (such as childhood blood lead levels) with community drinking water quality data. Ultimately, such integration could provide a means to improve early identification of emerging drinking water-related public health risks as well as better prioritization of actions to mitigate exposure to potentially harmful drinking water contaminants.
5. Promote Use of Advanced Monitoring Technology and Citizen Science: Outside of the treatment plant, real-time monitoring of water quality and hydraulic parameters is limited at most drinking water utilities. Extending the application of real-time, online monitoring of these parameters into source water and the distribution system can improve a drinking water utility's ability to detect and manage emerging problems. In source waters, online water quality monitoring can be used to detect emerging water quality problems such as algal blooms and taste and odor episodes, as well as accidents such as spills into the waterbody. In distribution systems, online water quality and hydraulic monitoring can be used to detect a deterioration in disinfectant residual, onset of nitrification, and other common water quality problems, as well as detect distribution contamination incidents. Real-time data from advanced monitoring technologies provide utilities with information to proactively address emerging water quality issues and better protect public health. Further, engaging citizen science can greatly expand the reach of critical information on source water quality. EPA proposes to work with other federal agencies, partners and stakeholders to continue to promote efforts to develop and deploy advanced monitoring technology and citizen science on drinking water quality.

Priority Area 3: Strengthen Source Water Protection and Resilience of Drinking Water Supplies

The SDWA is designed to protect drinking water quality from the source to the tap. Maintaining a focus on drinking water quality across this continuum is essential to the protection of public health. Over the past three years, significant drinking water challenges have emerged, highlighting an urgent need for greater focus at the state and local level on the protection of drinking water sources. Failure to adequately protect source water has considerable public health and economic consequences. These events have highlighted the vulnerability of our ground water and surface water sources of drinking water, including:

- the August 2014 drinking water advisory for algal toxins in the drinking water of the City of Toledo, Ohio, as a result of a Harmful Algal Bloom in Lake Erie;
- a Harmful Algal Bloom in the summer of 2015 that spanned nearly 700 miles of the Ohio River, requiring multiple drinking water systems to close off their intakes;
- contamination of groundwater and surface water drinking sources with nitrates in states across the country as a result of improper application and management of fertilizers and other agricultural activities;
- the January, 2014, contamination of the Charleston, West Virginia, water supply with an unregulated contaminant (MCHM), following a release from a leaking tank at a coal washing facility located a mile upstream of the drinking water intake structure for the community, resulting in an estimated economic impact to the state of over \$70 million;
- contamination of underground sources of drinking water with unregulated perfluorinated compounds such as PFOS and PFOA from airfields and industrial sources in a number of communities across the country; and
- nutrients and other contaminants from agricultural practices and urban storm water continue to contribute significantly to source water protection challenges.

The Safe Drinking Water Act is designed to protect drinking water quality from the source to the tap

These events and others are symptomatic of broader challenges associated with degradation or contamination of source water across the country, underscoring the need for new approaches and intensified source water protection efforts. There are numerous opportunities for primacy agencies to provide leadership on source water protection, and these efforts also provide the opportunity to increase drinking water source resiliency to challenges associated with climate and extreme weather events such as persistent drought.

Source water protection is a proactive, cost-effective, and sustainable approach to protecting our nation's drinking water. The strength of source water protection is showcased by cities like New York, which maintains clean drinking water for 9 million people using upstate land conservation, "watershed" law enforcement officers, real-time source water monitoring, and other watershed protections. As we face growing risks to water quality and availability, source water protection stands as an important frontline strategy for addressing priority challenges to providing safe drinking water, in particular, point and nonpoint pollution sources, emerging and unregulated contaminants, and the impacts of climate and extreme weather events such as severe flooding and persistent drought.

States, local communities and partners across multiple sectors must collaborate to address key source water protection challenges.

- *Contamination of underground and surface sources of drinking water by industrial pollution.* Industrial activities, and the contaminants they discharge, are constantly evolving. While the EPA Toxics Release Inventory reports a decrease over the last several years in the number of facilities reporting toxic discharges, many communities across the country face contamination of drinking water supplies from bromides, PFOS and PFOA, and other industrial chemicals.
- *Nutrient pollution impacts on drinking water.* Nutrient pollution from nitrogen and phosphorous remains one of the greatest challenges to our Nation's water quality and presents a growing threat to public health and local economies, resulting in impacts such as toxic harmful algal blooms, nitrate contamination of drinking water sources, and costly impacts on recreation, tourism and fisheries. Nutrient pollution comes from diverse sources, including wastewater treatment plants, livestock operations, and storm water runoff. Recent surveys found that over 40 percent of lakes and streams in the United States have harmful levels of phosphorous and/or nitrogen.
- *Storm water runoff in urban areas.* Urban and suburban storm water can create rapid and sporadic spikes in hydrocarbons, sediments, pesticides, fertilizers, nutrients, and pathogens in sources of drinking water, and can contribute to combined sewer overflows, with significant impacts to source waters.
- *Climate and extreme weather events.* Two-thirds of the country has faced drought in the past several years, with severe consequences to the economy and public health. The recent drought in California has significantly challenged the efforts of drinking water utilities to provide safe and reliable drinking water to the communities they serve. Water quantity and quality are often linked, as drought may force public water systems to revert to emergency drinking water sources of lesser quality, which can significantly raise treatment costs and complexity. Water availability challenges may also amplify the impact of contamination. The country is also experiencing more frequent and larger storms and extreme flooding, which can compromise source waters and damage water utility treatment equipment.

These challenges highlight the value of a holistic approach to water resource management and a recognition that policies across multiple sectors potentially impact source waters and drinking water system resilience. Failure to adequately protect drinking water at the source has major public health and economic consequences. EPA and other federal agencies have already made considerable strides through a broad range of efforts including:

- promulgation of the Clean Water Rule, which clarifies the scope of surface water protection under the CWA, including coverage of headwater streams that are the source of drinking water for over 100 million (nearly in one in three) Americans;
- extensive efforts to address nutrient pollution through nonpoint-source program grants under CWA section 319; collaboration with USDA; and technical assistance to states, as described in [EPA's renewed call to action to reduce nutrient pollution](#) and support for incremental actions to support water quality and protect public health (<https://www.epa.gov/sites/production/files/2016-09/documents/renewed-call-nutrient-memo-2016.pdf>)
- the Source Water Collaborative, established in 2006, which is a national partnership of 26 federal agencies, state associations, utility associations, and NGOs that identifies and supports implementation of strategies to protect drinking water sources, such as the CWA-SDWA Coordination Toolkit, which supports state actions to leverage CWA tools to protect critical drinking water supplies;
- regional workshops across the country to promote state and local actions to protect watersheds that serve as sources of drinking water;
- the development of publicly available data-sharing tools like the [Drinking Water Mapping Application to Protect Source Waters \(DWMAPS\)](#), a GIS-based tool which provides drinking water professionals, Source

Water Collaboratives, watershed groups, and the public with information to update source water assessments and prioritize source water protection measures in any location or watershed in the country (<https://www.epa.gov/sourcewaterprotection/dwmaps>);

- EPA's Climate Ready Water Utilities (CRWU) initiative, which helps water utilities plan for extreme weather events by providing drinking water, wastewater, and storm water utilities with practical tools, training, and technical assistance needed to adapt to potential weather related impacts such as degradation or loss of source or receiving water quality or quantity;
- the National Drought Resilience Partnership, which brings together nearly twenty federal departments and agencies to collaborate on measures to build resilience to drought through collaborative work with states and other stakeholders.

While a great deal of progress has been made, much work remains to be done and there are substantial opportunities for gains in source water protection and increased resilience through state, tribal, local and utility leadership.

Proposed Actions

1. Update and Take Action on Source Water Assessments: Under the 1996 amendments to SDWA, states were required to establish Source Water Assessment programs for all public water systems to provide local officials, utilities and citizens with appropriate information to protect drinking water sources against contamination. EPA strongly encourages states, tribes, local governments and utilities across the country to update and strengthen source water assessments, to share information with the public on source water risks and opportunities for mitigation, and to take actions to protect drinking water sources against contamination or overuse.

Updating and strengthening source water assessments will be a shared effort among all levels of government, with states taking the lead. States, tribes, local governments, utilities and other stakeholders are the critical actors in these efforts, as they have the key land-use and other regulatory authorities necessary to protect source water. With adequate resources, EPA can help to support their efforts by developing modern online platforms and GIS tools to facilitate public access to federal data. Electronic data-sharing will help states and others easily access information such as data on point and nonpoint sources of pollution, land cover, CWA designations, Above-Ground Storage Tanks and models of contaminant fate. EPA can also provide guidance and training on critical components of Source Water Assessments such as developing spill response plans, establishing water quality monitoring systems, and improving tank inspection programs.

2. Source Water Monitoring Pilot: One key dimension of source water protection is source water monitoring. Under this proposed initiative, EPA, states and other partners would provide technical assistance and funding to design and deploy online source water quality monitoring systems that would address the utilities' highest source water contamination risks – using EPA's *Online Source Water Quality Monitoring for Water Quality Surveillance and Response Systems*. EPA is also supporting a nutrient sensor challenge to provide low cost remote sensors for nitrogen and phosphorous that can be used to monitor source waters.
3. Support Source Water Protection through Expanded Partnerships: Watershed partnership efforts are an effective means of protecting source water through land conservation, implementation of best management practices, and other measures. States, local governments and utilities must play a leadership role in these efforts, engaging stakeholders to: identify and implement source water protection measures; leverage funding opportunities and green infrastructure finance; establish partnerships with land trusts and

organizations, such as the National Association of Conservation Districts and Trust for Public Land; and promote innovative approaches, such as The Nature Conservancy and Environmental Defense Fund's efforts to expand land conservation in areas that are critically important for protecting drinking water.

While watershed partnerships must ultimately be locally driven and state-supported, the federal government can promote and support collaborative approaches to source water protection through, for example, USDA conservation and forestry programs (e.g., the [National Water Quality Initiative](#) and the [Regional Conservation Partnership Program](#)), EPA grant programs (e.g., Urban Waters, CWA Section 319 nonpoint source grants, and the Healthy Watersheds Initiatives), and other government/private initiatives such as the Source Water Collaborative. EPA will promote efforts to leverage 319 grants program and funding through the USDA Natural Resource Conservation Service Environmental Quality Incentives Program to contribute to critical source water protections efforts, including nutrient reductions in watersheds that serve as sources for community drinking water supplies. State and local governments can share best practices from successful partnerships such as the Salmon Falls Source Water Collaborative, which brought together natural resource experts, municipalities, land trusts, local water districts and community and watershed organizations to develop and implement an Action Plan to protect clean drinking water supplies for over 47,000 residents in Maine and New Hampshire.

4. Work with States to Leverage the Clean Water Act Programs and Authorities to Protect Water Supplies: A holistic and coordinated approach between CWA and SDWA regulatory programs – particularly at the state level – is necessary to advance source water protection. EPA proposes to work with our state CWA and SDWA partners to promote greater integration and leveraging of clean water and drinking water programs. Some key opportunities to better connect these programs include, but are not limited to, the following:
 - use new tools such as the online platform for water quality research planned by the Source Water Collaborative to develop EPA-recommended water quality criteria (reflecting EPA's water quality recommendations based on the best available science) or Health Advisories (HAs) for drinking water contaminants for which there are no standards under the CWA;
 - prioritize development of total maximum daily loads (TMDLs) – which identify water quality-based limits on pollution loads for a given water body – based on source water protection needs (for example, many states prioritize TMDL development for drinking water reservoirs);
 - showcase ways that state clean water programs can leverage the high value consumers place on public health protection and safe drinking water to increase public support for addressing surface and ground water quality challenges more effectively (for example, citizen science programs can be used to engage the community that is adversely impacted by degraded source water quality, empower them with information about their watershed and its relationship to their drinking water, and provide them with an opportunity to contribute through monitoring and protection activities);
 - use the 2014 CWA-SDWA Coordination Toolkit and the Source Water Collaborative interactive infographic to work with state and local agencies to outline the opportunities to link federal and state CWA and SDWA programs;
 - coordinate with the Superfund program to prioritize remediation of contaminated sites that threaten drinking water supplies; and
 - promote activities to reduce urban stormwater runoff, including through green infrastructure, to ensure protection of groundwater resources from contamination with nitrate and other pollutants.
5. Develop a National Initiative to Enhance Community Resilience to Extreme Weather Events: EPA proposes to work with key partners to develop a comprehensive effort to address a community's water resilience challenges (flood, drought, spills, harmful algal blooms, and other hazards), rather than efforts compartmentalized by program. For instance, EPA can offer coordinated training sessions for a community

on utility preparedness, storm water management, and other tools and measures, in order to undertake a more coherent and compelling approach to assisting the community. This initiative could target communities most at risk from service disruptions resulting from climate and extreme weather events and other hazards. It would adopt a holistic, community-based approach to water-related issues by engaging multiple program areas across EPA's Office of Water and across statutes, including source water protection, emergency preparedness, green infrastructure, WaterSense, permits/compliance issues, the Water Infrastructure Resilience and Finance Center, Climate Ready Estuaries, and storm water/water quality modeling. Such a program could begin through piloting of technical assistance in a defined number of communities. Based on the lessons-learned from these pilots, EPA could develop an innovative technical assistance tool which could be adopted nationwide by communities of all sizes.

6. Promote Efforts to Increase Water Efficiency and Reuse: As many regions of the country confront increasing risk of drought and water scarcity, there is a growing focus on efforts to increase water efficiency and water reuse. These efforts are largely driven by state, local and utility efforts, including development of state regulatory frameworks for indirect and direct potable reuse of water and a growing number of implementation projects. EPA has participated in these efforts through the development of guidelines on water reuse (<https://nepis.epa.gov/Adobe/PDF/P100FS7K.pdf>) and participating on the project advisory council for the development of the Water Reuse Association white paper on direct potable reuse. EPA will continue to support state efforts through the release of a summary of best practices in potable reuse in 2017 and supports ongoing work by our partners and stakeholders.

In addition, EPA and our partners will explore opportunities to foster Cooperative Agreements among public and private sector entities to evaluate and demonstrate advanced treatment technologies that allow communities to utilize previously untapped water sources, which cannot be made potable by traditional treatment methods. This would provide an opportunity to work with primacy agencies and localities to define the conditions where the use of these advanced technologies is cost-effective and sustainable. Finally, EPA intends to issue voluntary water efficiency guidelines to help support state, tribal and local governments and utilities in promoting water efficiency at the local level.

Priority Area 4: Proactive Strategy to Address Unregulated Contaminants

In its 2001 report, *“Classifying Drinking Water Contaminants for Regulatory Consideration,”* the National Research Council (NRC) estimated that the total number of chemical, microbial, and other types of potential drinking water contaminants is likely on the order of “tens of thousands,” noting that “the Toxic Substances Control Act (TSCA) inventory of chemical contaminants alone includes about 72,000 substances.” The latest version of EPA’s Contaminant Candidate List, which the agency uses to evaluate contaminants for potential regulation under SDWA, includes 97 chemicals/groups and 12 microbial contaminants EPA considers to represent the highest priorities. One of the key insights that emerged from our consultations with partners and stakeholders is that there is a need both to more effectively communicate near-term priorities among these drinking water contaminants and to work together to develop and implement proactive risk management approaches that will protect against multiple threats to drinking water safety.

Under SDWA, EPA has established National Primary Drinking Water Regulations for over 90 contaminants. These regulations address many of the most common contamination challenges facing the nation’s 150,000 public drinking water systems, and have been instrumental in the dramatic improvements in drinking water quality across the U.S. over the course of the four decades since SDWA’s enactment. Since 1996, SDWA has identified a lengthy multi-step process for EPA to consider whether the development of a new NPDWR is appropriate to address health risks for unregulated contaminants. SDWA requires that EPA evaluate the feasibility of removing the contaminant, the affordability of contaminant removal technologies for small water systems, and the costs and benefits of the regulation when proposing and promulgating a drinking water standard. Taken together, these steps can require many years to complete. To date, EPA has not regulated any new contaminants through this process, often because the contaminants were not frequently found at levels of health concern in national occurrence studies. EPA is also required, each six years, to review all existing NPDWRs to determine which if any are candidates for revision. EPA has completed two Six-Year Reviews and will complete a third in 2016. EPA has already strengthened the surface water treatment rules and the Total Coliform Rule through this process and anticipates identifying additional rules that are candidates for revision in its 2016 Review. Finally, EPA in 2011 made a positive regulatory determination for perchlorate and is proceeding with peer review of key scientific work to support development of a NPDWR for that contaminant, which the Agency expects to propose in 2018.

EPA has established National Primary Drinking Water Regulations for **over 90 contaminants**. These regulations address many of the most common contamination challenges facing the **nation’s 150,000 public drinking water systems**, and have been instrumental in the dramatic improvements in drinking water quality across the U.S. over the course of the four decades since SDWA’s enactment

Drinking water regulations focus risk reduction requirements on those systems where health risks are present. For example, systems may reduce their monitoring frequency if they do not detect regulated contaminants or find contaminants at concentrations that are reliably and consistently lower than the maximum contaminant level (MCL). Similarly, the treatment techniques required under the Long Term 2 Enhanced Surface Water Treatment Rule are triggered based upon the results of source water monitoring for pathogen indicators.

In addition to the regulatory process outlined above, SDWA also authorizes EPA to issue non-regulatory health advisories or take other appropriate actions for contaminants not subject to regulation. EPA has used the best available peer-reviewed science to develop and publish hundreds of Health Advisories for particular contaminants – including most recently for cyanotoxins in 2015 and for PFOA and PFOS in 2016. Health Advisories provide federal, primacy agency, and local officials with information to aid in their decisions regarding actions to address drinking water containing unregulated contaminants. Health Advisories identify the concentration in drinking water for contaminants, at or below which, adverse health effects are not anticipated to occur over a specific period of time (e.g., one-day, ten-day, lifetime), and provide information on monitoring and treatment.

While unregulated contaminants addressed by Health Advisories may be present in a relatively small proportion of systems, these contaminants may present significant risks to the consumers served by those individual systems. This presents challenges for the SDWA regulatory regime, which focuses on conducting a robust evaluation of nationally applicable regulations, including whether the health benefits justify the costs.

Unregulated contaminants have also led some primacy agencies and drinking water systems to proactively address potential public health concerns. A number of states have exercised their independent authority to regulate drinking water contaminants that are not regulated at the federal level but pose locally significant issues in that state. In addition, drinking water systems often consider higher priced, broad spectrum drinking water treatment technologies – such as activated carbon or reverse osmosis – to provide an additional barrier to contaminants not removed by conventional treatment systems. Source water protection provides an important additional opportunity to help address these concerns. By enhancing efforts to protect drinking water sources through the creative use of partnerships, communities can reduce the costs of treatment and protect local drinking water supplies.

Under this Priority Area, EPA proposes to work with federal, primacy agency and local partners and stakeholders to identify key priorities and new approaches for joint action through primacy agency and federal regulatory processes, drinking water health advisories, and a new focus on source water protection and other preventative strategies to address risks from unregulated contaminants before a problem arises.

Proposed Actions

1. Establish a Framework for Prioritizing Federal Regulatory Action and Promoting Multi-Contaminant Regulatory Approaches: Given the multiplicity of unregulated contaminants, EPA and other key actors need to effectively prioritize efforts to assess and address risks from these contaminants. EPA proposes to collaborate, through the NDWAC, to identify a risk-based prioritization framework for consideration of new contaminants for regulation. This effort would need to be undertaken in close coordination with other EPA efforts to prioritize chemical risk assessment and risk management work, including under the recently reformed Toxic Substances Control Act. This effort should also consider opportunities to prioritize regulatory requirements that, while focused on one or more priority contaminants, may incentivize treatment technologies that provide broad spectrum protection against multiple unregulated contaminants. It is also important that any framework for prioritization of action also take account of the vulnerability of subpopulations identified as having a greater risk from exposure to drinking water contaminants (e.g. minority, low-income, and tribal-indigenous populations) and consider how to more effectively address contaminants that are found to occur regionally. This prioritization framework would assist EPA and our partners with most efficiently targeting limited resources to address the most significant emerging risks to the safety of local drinking water supplies.

2. Work with Primacy Agencies and Stakeholders to Strengthen the Health Advisory Program: Health Advisories provide an important tool under SDWA to provide high-quality scientific and treatment technology information to help inform efforts to address unregulated contaminants. EPA and our primacy agency partners see important opportunities to strengthen the effectiveness of this program through enhanced collaboration and an increased focus on risk management and risk communication approaches related to Health Advisories. EPA has initiated an EPA-State workgroup and will work with stakeholders to develop and implement actions to strengthen the Health Advisory program through (1) a transparent process involving federal, primacy agency and local partners and stakeholders for identification and prioritization of candidates for Health Advisories, and (2) enhanced collaboration with primacy agencies and other federal agencies and external stakeholders on public messaging to support local communities with developing risk management strategies to address emerging contaminants impacting their water supply.
3. Promote Planning for Local Assessment and Management of Unregulated Contaminant Risks at Individual Drinking Water Systems: There is a need and opportunity for promotion of non-regulatory preventative approaches that can address vulnerabilities at individual systems, while recognizing that different localities and systems face different risks. Building on existing work in this area, EPA proposes to work with primacy agency partners and regulated utilities to develop a framework to help guide utilities and primacy agency and local regulatory officials in proactively assessing and managing risks to individual systems from unregulated contaminants. Source water protection is a critical element of this framework, as prevention of contamination – instead of reacting after the fact – has multiple benefits. The framework would also look at the potential role of broad-spectrum treatment technologies that could address risks from multiple potential contaminants.
4. Develop Tools for Assessment of Comparative Costs for Source Water Protection and Broad-Spectrum Treatment Technologies: Closely related to the preceding action, utilities and regulators could benefit from stronger information and tools to assess the comparative costs of different approaches to proactively manage risks from unregulated contaminants. EPA proposes to partner with federal, primacy agency and local partners to identify and enhance available tools/information for quantitative assessment of the comparative costs of source water protection and advanced drinking water treatment technologies that can address a broad spectrum of regulated and unregulated contaminants. These tools would be designed to assist primacy agencies and local communities with strategically targeting limited resources to address emerging drinking water contaminants.
5. Promote the development of low cost and innovative technologies to remove a broad spectrum of contaminants, particularly in small drinking water systems. Work with partners through the water technology clusters on the development and deployment of innovative technologies to address multiple contaminants at an affordable cost for small drinking water systems.

Priority Area 5: Strengthen Transparency, Public Information, and Risk Communication

One of the key insights from our engagement with stakeholders is that better public understanding of drinking water quality, utility operations, and the resources required to sustainably deliver safe drinking water is essential to making well informed local decisions on drinking water. There is a need to strengthen communication to the public, in an accessible and understandable format, of more timely information on drinking water quality and impacts to public health. What's needed is not just more information, but also better communication of the context and meaning of that information.

There is a need to strengthen communication to the public, in an accessible and understandable format, of more timely information on drinking water quality and impacts to public health

Better public understanding of risks and the risk balancing decisions that utilities and regulators have to make is important to support needed investments in drinking water system infrastructure and management, and also to building and maintaining public trust in utility managers and regulators.

We propose a series of actions intended to advance these goals – recognizing that much more engagement with the public health community, communications experts, state, tribal and local officials, community advocates and others will be needed to frame and advance these efforts.

Proposed Actions

1. Enhance Transparency and Public Education in New and Revised Rules and Guidance: There have been important advances in information technology and communications since the promulgation of many of EPA's key SDWA regulations. In addition, there is a growing understanding that public communication of information can play a critical role in promoting accountability and compliance with regulatory requirements, and in empowering individuals and other actors to take action to address risks. EPA sees opportunities to strengthen existing and new or revised rules, including through updated implementation guidance, to support more robust communication of key information to the public. As discussed below, implementation of the existing Lead and Copper Rule and the Lead and Copper Rule revisions provide an important near-term opportunity in this area. In addition, we propose to work with partners and stakeholders on transparency and public education efforts in other upcoming SDWA rulemakings, and to explore opportunities to strengthen the implementation of existing rules – for example through guidance and/or sharing of information on best practices.
2. Web Portal on the State of the Nation's Drinking Water: Currently, there are limited "one-stop-shop" opportunities for the public to access readily understandable information about drinking water quality issues and the state of drinking water quality in communities across the country. EPA proposes to work together with primacy agency partners, regulated utilities, and other key stakeholders, to develop indicators of drinking water quality utilizing enhanced water system and primacy agency data on drinking water quality produced from the steps in Priority Area 1 discussed above, including information on both regulated and unregulated contaminants. This information could then be communicated to the public through a publicly accessible web portal featuring key indicators and infographics in a way that supports citizen-science and

considers accessibility challenges among vulnerable subgroups, including minorities, low-income populations, and overburdened communities identified as at greater risk than the general population.

3. Improved Risk Communication and Public Education Tools and Programs: While SDWA requires community drinking water systems to provide their customers with an annual Consumer Confidence Report, there are significant opportunities to expand the availability and timeliness of public information on drinking water quality within the community. In collaboration with primacy agency partners and stakeholders, EPA proposes to lead the development of improved public education efforts and products to communicate drinking water safety and risk information. This would include an evaluation of the effectiveness of the required Consumer Confidence Reports for use by primacy agencies and local water sector organizations as well as public communication opportunities that extend beyond these reports. In conjunction with this effort, states and EPA will collectively need to invest in strengthening risk communication expertise to better meet the needs of all members of the community, including disadvantaged and non-English speaking populations.

Priority Area 6: Reducing Lead Risks through the Lead and Copper Rule

Exposure to lead is known to present serious health risks to the brain and nervous system of children. The recent crisis in Flint, Michigan, and concerns raised in other cities, have brought increased attention to the challenge of lead in drinking water systems across the country. Lead can enter drinking water when leaded plumbing materials such as pipes and fixtures corrode, especially where the water has high acidity or low mineral content. Congress in 1986 amended the SDWA to prohibit the use of pipes, solder or flux that were not “lead free” in public water systems or plumbing in facilities providing water for human consumption. At the time, “lead free” was defined as solder and flux with no more than 0.2 percent lead and pipes with no more than 8 percent lead. In 1996, Congress further amended SDWA to expand the prohibition to encompass plumbing fittings and fixtures and to prohibit the introduction into commerce of any pipe, fitting, fixture, solder or flux that is not lead free. The Reduction of Lead in Drinking Water Act further reduced the allowable amount of lead in plumbing materials to not more than 0.25 percent of the wetted surface and became effective in 2014. Despite these prohibitions, there are millions of buildings with leaded plumbing materials installed before these requirements went into effect. Available estimates indicate that customers are served by 6.5 to 10 million lead service lines in thousands of drinking water systems across the country. In addition, most homes and buildings have premise plumbing materials that contain a higher percentage of lead than plumbing materials that are currently allowed to be sold under SDWA.

In accordance with SDWA, EPA establishes NPDWRs which either establish a MCL or a treatment technique “to prevent known or anticipated adverse effects on the health of persons to the extent feasible.” The Lead and Copper Rule (LCR) is a treatment technique rule, which requires water systems to conduct tap sampling for lead and copper to determine the actions water systems must take to reduce exposure. Recognizing that there is no safe level of lead in drinking water, the LCR set a health-based maximum contaminant level goal of zero. The LCR established action levels of 0.015 mg/L (15 ppb) for lead and 1.3 mg/L (ppm) for copper; the lead action level was based on EPA’s assessment that it is generally representative of effective corrosion control treatment, which involves the addition of orthophosphate or other chemicals to reduce water corrosivity. Whereas an MCL is an enforceable level that drinking water cannot exceed without violation, an action level is a screening tool for determining when certain treatment technique actions are required.

Recognizing that there is **no safe level of lead** in drinking water, the LCR set a health-based maximum contaminant level goal of zero

In the LCR, if the action level for lead is exceeded in more than ten percent of tap water samples collected during any monitoring period (i.e., if the 90th percentile level > the action level), a water system must take certain actions. The type of action that is triggered depends upon the size of the system and the actions it has taken previously. Small water systems that are not currently applying corrosion control treatment must work with the state to install corrosion control. Systems that are already applying corrosion control treatment must undertake public education about lead in drinking water and must begin lead service line replacement programs. Water systems conducting lead service line replacements must offer building owners the opportunity to replace their portion of the line at the time the system is replacing the portion of the service line owned by the system, but the system is not obligated to pay for replacing portions of the line it does not own.

EPA is actively working on revisions to the LCR and expects to issue a proposed rule in 2017. Given the 3-year window prior to implementation of new and revised drinking water rules, EPA, primacy agencies and local communities will be implementing the existing LCR for at least the next 5 years, and there is an immediate need to strengthen implementation by primacy agencies and the nation's drinking water systems. EPA and the primacy agencies will initiate enforcement actions, as appropriate, where there is evidence of treatment technique violations.

As part of EPA's increased oversight of the implementation of the LCR, EPA sent letters on February 29, 2016, to primacy agencies under SDWA to promote consistency with EPA regulations and guidance. The letter requested that primacy agencies work collaboratively with EPA to address deficiencies and improve transparency and public information regarding the implementation of the rule. Every primacy agency responded in writing to EPA. Virtually every response expressly confirmed that protocols and procedures are fully consistent with LCR and applicable EPA guidance, including protocols and procedures for optimizing corrosion control.

In their responses, many primacy agencies identified best practices that they and many public water systems have implemented to enhance public transparency and public health protection under the LCR. Some primacy agencies are promoting transparency by posting individual lead compliance sampling results, not just 90th percentile values, on their public websites utilizing Drinking Water Watch or similar database tools. Some primacy agencies are speeding up reporting and notification templates by adopting stringent timelines for water systems to provide consumer notices to all who receive water from sites that were sampled and resulted in a lead action level exceedance. While the LCR allows up to 30 days, some primacy agencies are requiring notice to consumers as quickly as 48 hours after sampling. Some primacy agencies are seeking ways to enhance rule implementation by requiring water systems to update their materials evaluations, which help identify locations that may be susceptible to high lead concentrations. Others are identifying funding mechanisms, such as the DWSRF, to help communities replace lead service lines by providing principal forgiveness and low interest loans, and maximizing the use of the DWSRF set-asides to fund corrosion control studies when an action level exceedance is triggered. EPA will continue to work closely with the SDWA primacy agencies to ensure that the LCR is being properly implemented across the U.S., and to promote best practices in LCR implementation to maximize protection of public health.

In March 2014, EPA established a working group under its NDWAC to advise the Agency on potential revisions. In December 2015, the NDWAC provided the EPA with extensive recommendations addressing a range of topics, including: lead service line replacement, public education, corrosion control treatment, monitoring requirements, establishment of a household action level and copper requirements. In addition, EPA has received input from a number of other concerned stakeholders. EPA is carefully evaluating the recommendations from these groups and will also consider the national experience in implementing the current rule as we develop proposed revisions. EPA is considering an approach that will incorporate both technology-based and health-based elements – to ensure effective reductions of lead in drinking water at the water system level, while at the same time providing consumers with the information, tools and protections needed to address remaining risks. EPA anticipates that these elements will be supported by clear and robust revised sampling requirements by ensuring sample locations are appropriate and reducing opportunities for sample error, strengthened reporting through consideration of e-reporting, transparency by ensuring consumers have access to information about lead service lines (LSLs), tap sampling and public education requirements. The key issues and elements under consideration are described in [the Lead and Copper Rule Revisions White Paper](https://www.epa.gov/sites/production/files/2016-10/documents/508_lcr_revisions_white_paper_final_10.26.16.pdf).
https://www.epa.gov/sites/production/files/2016-10/documents/508_lcr_revisions_white_paper_final_10.26.16.pdf.

Proposed Actions

Current LCR implementation

1. Enhanced Oversight Activities: As noted above, EPA is actively engaged in enhanced oversight activities related to identification of LCR sampling locations and specific sampling procedures at those sites, actions to promote transparency in LCR implementation through sharing of the results samples conducted for LCR compliance determinations, and enhanced public health education through more rapid sharing of LCR sampling results and outreach to communities where elevated lead levels have been identified in drinking water.
2. Highlight and Disseminate Best Practices on LCR Implementation and Lead Service Line Replacement: EPA will continue to work with our primacy agency partners, utilities and the NGO community to highlight and disseminate best practices in LCR implementation, including tools to assist the public with the identification of locations of lead service lines, rapid sharing of LCR sampling results, enhanced technical assistance on optimizing corrosion control, and successful approaches to lead service line removal. In addition, EPA proposes to work with primacy agencies and key stakeholders to provide information to local communities on best practices, costs, and mechanisms for lead service line replacement, recognizing that LSL replacement must be carefully managed in order to avoid increased short-term exposures to lead. EPA will partner with utilities, environmental organizations and other stakeholders in the implementation of best practices for lead service line replacement identified in EPA guidance and stakeholder resources, such as the Lead Service Line “toolkit” to support ongoing community efforts in this area.
3. Technical Support Documents, Training and Assistance: EPA will continue to enhance assistance to primacy agencies through the development of technical support documents, training and assistance on key issues, including on-site training at Regional offices on the recently developed Optimal Corrosion Control Treatment (OCCT) Technical Recommendations Manual and regular webinars on various aspects of the LCR (including the LCR Webinar 101 series and the Small System Webinar Series).
4. Revise the 3Ts for Reducing Lead in Drinking Water in Schools: EPA has produced a Training, Testing and Telling (3Ts) guide to inform voluntary efforts by schools and communities to assess and address lead in drinking water risks at schools. EPA proposes to work with key partners to update and improve this guide including: enhancing tools for communication and recordkeeping, updating routine measures a school can undertake to reduce lead in drinking water and providing school decision-makers with updated tools to reduce lead levels in school drinking water.

LCR Revisions

1. Lead and Copper Rule Revisions White Paper: To support continued dialogue and engagement as we prepare to issue proposed revisions to the LCR, EPA recently released a white paper describing our current thinking and ongoing work related to the development of the proposal. This paper, available at https://www.epa.gov/sites/production/files/2016-10/documents/508_lcr_revisions_white_paper_final_10.26.16.pdf, identifies key principles that EPA is using to guide our work on the proposed revisions, including: a focus on public health objectives; establishment of clear and enforceable regulatory requirements; promotion of public transparency; supporting environmental justice and children’s health; and integrating drinking water with cross-media lead reduction efforts. The paper outlines the main design elements and issues for the rule, and identifies options under consideration and key analytical issues they present. Key focal areas include:
 - lead service line replacement;
 - optimal corrosion control treatment;

- identification of a health-based value to guide household level interventions;
 - sampling requirements; and
 - transparency measures and enhanced public education requirements.
2. Continued Stakeholder Engagement: Through the development of this Action Plan and through regular meetings with federal, primacy agency and local partners and national and community-level stakeholders, EPA is continuing to gather information on key implementation challenges related to the current LCR. The Agency anticipates that the issuance of the LCR Revisions White Paper will support EPA's on-going close work with all interested partners and stakeholders as we develop proposed revisions to the LCR.

Conclusion – Integration and Broader Context

It is important to recognize that the Priority Areas, strategies and proposed actions identified above are not isolated from one another. There is intensive overlap between actions, and success will require that these elements be considered and addressed in an integrated and strategic way, working closely with our federal, primacy agency and local partners, the regulated community and external stakeholders. As we move forward, EPA will work with stakeholders in an iterative manner to assess progress, resources and priorities.

The Priority Areas identified above – while extensive – do not cover the full range of drinking water priorities that EPA and our partners are addressing. Notably, there is extensive work going on – both within EPA and other federal agencies, as well as at the primacy agency and local levels and in the private sector – to address drought and promote resiliency to climate and extreme weather events, and other water

security issues, and to protect the nation’s extensive ground water resources through the underground injection control provisions of SDWA. These issues, to the extent they are not fully reflected above, are being advanced through a multitude of other efforts, including the National Drought Resilience Partnership, the Water Sector

Coordinating Council, and partnerships with the Environmental Council of States, the Association of State and Territorial Health Officials, the Association of State Drinking Water Administrators, the Ground Water Protection Council and the Interstate Oil and Gas Compact Commission. It is critical to emphasize the essential role that these additional efforts play in protecting the nation’s drinking water resources now and into the future.

EPA is cognizant of the central role that science and technology play in all of the areas and actions described above. One of the important next steps as we move forward with our partners will be to take full advantage of the synergies between this Plan and the PCAST report on drinking water science and technologies. All partners need to work to help integrate the actions and proposals in this plan with a forward-looking science and technology research and development strategy for the country.

Finally, as emphasized above, this Plan is intended to provide a platform for continued engagement between EPA and its partners. The elements in this plan provide important leadership opportunities for primacy agencies and greater opportunities for public involvement. The successful advancement of these elements will require extensive continuing engagement of all relevant parties, and a dedication of resources as we work together to protect the safety of our nation’s drinking water supply. We look forward to, and invite continued input from, partners and stakeholders on this effort and the proposals outlined above.

The successful advancement of these elements will require extensive continuing engagement of all relevant parties, and a dedication of resources as we work together to protect the safety of our nation’s drinking water supply



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