DRINKING WATER GUIDE: A RESOURCE FOR ADVOCATES

river NETWORK
connecting people · saving rivers

Written by Chi Ho Sham & Carolyn Gillette, ERG, Jumana Vasi, JVasi Consulting, and Katherine Baer & Paco Ollervides, River Network (2019)

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The following Drinking Water Advisory Committee members guided the development of this Guide and we are grateful for their expertise and time:

Sheyda Esnaashari, Alliance for the Great Lakes

Oluwole McFoy, Buffalo Water

Lynn Thorp, Clean Water Action

Juani Olivares, Genesee County Hispanic and Latino Collaborative

Laura Rubin, Huron River Watershed Council

Justin Nickels, Mayor, City of Manitowoc, WI

James Clift, Michigan Environmental Council

Irene Folstrom, Minnesota Environmental Partnership

Oday Salim, National Wildlife Federation

Zoë Roller, US Water Alliance

David Reckhow, University of Massachusetts

Monica Lewis-Patrick, We the People of Detroit

This report was also strengthened by review and input from the following:

Adam Carpenter, American Water Works Association

Katie Rousseau, American Rivers

Amanda Monaco, California Environmental Justice Network

Tom Neltner, Environmental Defense Fund

Kristen Meyer, Freshwater Society

Stacey Isaac Berahzer, IB Environmental

Satya Rhodes-Conway, Mayors Innovation Project

Kristy Meyer, Ohio Environmental Council

Diana Toledo & April Ingle, River Network

Caroline Koch, WaterNow Alliance

Angie Rosser, West Virginia Rivers Coalition

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ACRONYMS

AWWA – American Water Works Association

CCL – Candidate Contaminant List

CCR – Consumer Confidence Report

CWS – Community Water System

DWSRF – Drinking Water State Revolving Fund

EPA – Environmental Protection Agency

GAC – Granulated Activated Carbon

MCL – Maximum Contaminant Level

MCLG - Maximum Contaminant Level Goal

MRDL – Maximum Residual Disinfectant Level

MRDLG – Maximum Residual Disinfectant Level Goal

NPDWR – National Primary Drinking Water Regulations

NSDWR – National Secondary Drinking Water Regulations

NTNCWS - Non-Transient Non-Community Water System

PFAS – Per- and Polyfluoroalkyl Substances

PWS – Public Water System

PWSS – Public Water System Supervision

PVC – Polyvinyl Chloride

RCRA – Resource Recovery and Conservation Act

SDWA – Safe Drinking Water Act

SDWIS – Safe Drinking Water Information System

SMCL – Secondary Maximum Contaminant Level

SWAP – Source Water Assessment Program

TT – Treatment Technique

TNCWS – Transient Non-community Water System

UCMR – Unregulated Contaminant Monitoring Rule

WQS – Water Quality Standard

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BACKGROUND

River Network, a national organization that empowers and unites people and communities to protect and restore rivers and other waters that sustain all life, **has developed this drinking water guide to serve as a resource for individuals and organizations** seeking to engage on drinking water safety, sustainability and access at the local, state or national level. River Network developed this resource as the first step in fulfilling a need for systems to educate, train and support environmental and community leaders in understanding drinking water.

This Guide could not have been completed without the assistance of our Advisory Committee as well as many reviewers and participants in our peer call outreach series, all of whom helped to improve this Guide and provided insights we otherwise would have missed. We are grateful and look forward to continued input.

CONTEXT

In 2013 and 2014, two communities in Ohio (Carroll Township and Toledo) had their source water contaminated by toxic algal blooms in Lake Erie. That same year, Detroit, Michigan made international headlines when tens of thousands of Detroit residents had their water shut off.[i] In 2015, the residents of ***Flint, Michigan*** began to face the consequences of a switch in water sourcing that led to a surge in elevated levels of lead in their blood, legionella cases and other ongoing health impacts.[ii]

Communities across the country have faced similar drinking water crises, which have led to a cascade of public health, economic, and social consequences. In West Virginia, a 2015 chemical spill shut down the drinking water for 300,000 residents ***in the Charleston area***, and fluorinated industrial chemicals (PFAS) are showing up in drinking water sources from North Carolina to Michigan to California.

Access to drinking water is also an issue in places such as California's Central Valley where wells have gone dry and for families whose water is shut off when they can no longer afford to pay their bills. Water affordability and water shutoffs are recognized as serious issues that communities must address to ensure that no one is denied access to an essential amount of water. Additionally, certain ***vulnerable groups or populations***, such as the young, elderly, racial and ethnic minorities and families living in poverty are more likely to lack secure access to water and sanitation services and are at higher risk during natural and human-made water emergencies (e.g. hurricanes, floods, drinking water system failures).

Challenges to our drinking water are varied and include: aging infrastructure, active and legacy resource contamination, climate change, mismanagement, a convoluted regulatory framework, and a shortage of funding to address problems. Our drinking water systems are fundamental to our health,

economy and well-being, and water suppliers continue to invest billions of dollars annually, mostly at the local level, to keep our water safe to drink. Nevertheless, given that drinking water is essential, even a small number of mishaps can create skepticism and mistrust of drinking water providers, leaving many families and businesses to wonder:

- How do drinking water systems work?
- I'm worried about my own tap water – who can I trust to answer my questions?
- What can I do to make sure my community has access to clean, safe and affordable drinking water?

While many water and environmental groups have historically focused on stopping pollution and improving water quality through the Clean Water Act, they may have less experience or expertise on drinking water issues, such as the Safe Drinking Water Act or practices related to drinking water treatment, distribution and rate setting. Because drinking water safety, sustainability and access is a concern for communities across the country, many groups are looking for ways to support and work with their fellow community members to advocate for safe, clean, and affordable drinking water. We hope that this guide will serve as a key resource for anyone who wants to engage in these important issues.

Water Equity and Justice

Water equity is the underlying philosophy that grounds this guide, and as defined by the U.S. Water Alliance:

> "Water equity occurs when all communities have access to safe, clean, affordable drinking water and wastewater services; are resilient in the face of floods, drought, and other climate risks; have a role in decision-making processes related to water management in their communities; and share in the economic, social, and environmental benefits of water systems."[iii]

In short, water equity helps define the path for moving forward to ensure safe, affordable, accessible, and sustainable drinking water in a way that addresses the needs of all communities. The concept of water justice incorporates the ideals of water equity (forward-thinking), which could include adopting a policy recognizing a human right to water, while also looking for ways to address past injustices related to drinking water access, safety, and affordability.

River Network hopes that this Drinking Water Guide will support groups and individuals working on these issues better understand, integrate and elevate issues of equity as part of their drinking water advocacy.

THE HUMAN RIGHT TO WATER

The United Nations (UN) first adopted the "human right to water" as a resolution in 2010 to address poverty reduction and sustainable development worldwide. The resolution declared safe and clean drinking water and sanitation a human right, as defined by earlier work of a UN Committee stating that "[t]he human right to water entitles everyone to sufficient, safe, acceptable, physically accessible and affordable water for personal and domestic uses." The UN has further defined many of these terms, and clarified that while the human right to water and sanitation calls for affordable water, it does not entitle people to free water.

Although some countries have applied this right through their laws and legal systems the United States abstained from the UN vote and does not officially recognize water as a human right. Two years after the UN resolution, California, adopted its own human right to water into state law, declaring that:

> **"every human being has the right to safe, clean, affordable, and accessible water adequate for human consumption, cooking and sanitary purposes." (Cal. Water Code §106.3(a))**

In California, relevant state agencies must consider the human right to water when they make decisions and policies, but it does not apply to public water systems. Because the state's human right to water did not come with funding or implementation mechanisms, subsequent state action was required and has included new laws on affordability and system consolidation as well as executive action by the State Water Board. Although progress is being made, many Californians, many of whom are too often low-income or people of color, still lack access to clean, safe and reliable water and sanitation.

The Human Right to Water can be an important new policy tool to help governments address the interconnected issues of public health, environmental sustainability, and economic costs as they relate to the provision of safe drinking water for all residents. However, there is still much to learn about the best ways to implement the Human Right to Water – which must be adapted to the unique contexts of each community.

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GUIDE OVERVIEW

River Network's Drinking Water Guide is a first step in helping to create a more informed and engaged national network of advocates for safe, clean, affordable and sustainable drinking water systems. This resource provides in-depth information, which is organized into each of the following sections:

1. ***Where does our drinking water come from and how can we protect it?***
2. ***What does my drinking water system do?***
3. ***What frameworks are in place for making sure our water is safe to drink?***
4. ***What does drinking water cost and what is my water bill paying for?***
5. ***How will climate change affect my water and what can we do about it?***
6. ***How can I support community advocacy and engagement on drinking water issues?***

This guide focuses primarily on explaining how systems work in urban and rural communities regulated under the Safe Drinking Water Act but does not focus on the roughly 15% of the U.S. population who rely on private wells, nor does it explain the oversight of non-public drinking water systems (serving fewer than 25 people or with fewer than 15 service connections). Additionally, while this guide provides an overview of these topics, it is one of several excellent regional and national resources that offer relevant information about drinking water and which are listed below and throughout the Guide.

Finally, we include a number of case studies where groups have worked together to address our current challenges. These stories are both insightful and inspiring and we have no doubt that there will be many more to come.

RESOURCES

ACLU Northern California and Pacific Institute: ***California's Human Right to Water Remains Unrealized in Many Communities***
American Rivers and Great Lakes Environmental Law Center: ***Protecting Drinking Water in the Great Lakes: a primer on existing state policies and using the Safe Drinking Water Act***
California State Water Resources Control Board: ***Human Right to Water Portal***
Circle of Blue: ***Timeline: California Human Right to Water***
FLOW: ***The Sixth Great Lake: The Emergency Threatening Michigan's Overlooked Groundwater Resource***
Lead Service Line Collaborative Replacement Collaborative
Metropolitan Planning Council: ***Drinking Water 1-2-3***
Michigan Environmental Council, ***Drinking Water Toolkit***
United Nations: ***The Human Right to Water and Sanitation***, media brief
West Virginia Rivers Coalition and Safe Water for West Virginia, ***Drinking Water Protection: A Citizen's Guide to Getting Involved***

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SECTION 1 - WHERE DOES OUR DRINKING WATER COME FROM AND HOW CAN WE PROTECT IT?

BACKGROUND

Knowing the source of your drinking water can help you determine what the risks of contamination may be and whether it is adequately protected. Unless you are getting your drinking water from a private well, if you or your landlord receives a water bill, you are most likely getting your water from a public water system. For more information on public water systems, ***see Section 2***.

Many water systems lack the full authority or financial ability to protect their source water from contamination. For example, some drinking water systems draw from major waterways such as the Ohio or Mississippi River. These rivers are used for many purposes, including barge transportation, industrial withdrawal and discharge, and recreation. Water systems must contend with pollution generated from these activities. Nonetheless, some water systems have found ways to collaborate with local and regional partners to protect source water using creative strategies.

SOURCES OF DRINKING WATER

Sources for Public Water Systems

In general, public water systems in the U.S. use either groundwater (below ground) or surface water (above ground) sources. Many of the nation's larger water systems use surface water sources such as lakes, reservoirs, rivers, and streams. Approximately two-thirds of the population of the United States receives drinking water that originates from surface water.

For communities that are not located near surface water or for which groundwater is considered a better option, water is extracted from water-bearing underground rock formations or sediment deposits (usually referred to as aquifers) through wells.

Surface water sources are directly exposed to natural and human activities at the land surface. In general, they are more vulnerable to contamination by microorganisms such as bacteria, viruses and parasites. Surface water is also more vulnerable to contamination from chemical spills. Groundwater

SEATTLE, WASHINGTON - **Seattle Public Utilities (SPU) supplies drinking water to the City of Seattle and its regional customers. SPU has an aggressive watershed management and protection plan for the 91,000 acres of the Upper Cedar River Municipal watershed and the 13,300 acres of the South Fork Tolt River watershed. This plan includes the elimination of timber harvesting for commercial purposes and the removal of approximately 40 percent of forest roads. Agricultural, industrial and recreational activities are prohibited in the watersheds, and access to these watersheds is highly restricted. As a result, the only treatment the water receives before delivery to the consumer is disinfection using ozone, ultraviolet light and chlorine.**

aquifers, however, are protected to some extent by soil and overlaying rocks and sediment. While this natural filtration happens as the water travels from the land surface to the aquifer, groundwater is still susceptible to contamination or problems associated with the construction or age of the well.

In addition to surface water and groundwater, there is a third common designation of drinking water sources: groundwater under the direct influence of surface water (GWUDI). Generally, GWUDI drinking water sources are those that are close enough to a surface water source to be affected by surface water recharge, and they are considered at risk from microbiological contamination.

Water systems should aim to use the highest quality source water that is available. Although high quality water was abundant prior to rapid urbanization, agricultural expansion and industrialization, many existing water supply sources are now contaminated or susceptible to contamination from human activities. Industrial, commercial and residential activities can deposit harmful chemicals and pathogens in drinking water sources, through pathways including point source discharge pipes, stormwater and agricultural runoff and more. Contaminants can also enter aquifers when they move from the surface into the subsurface or through the direct placement or injection of fluids and disposal of wastes underground. These challenges can make it difficult for water systems to easily access a high-quality water source.

Identifying Your Drinking Water Source

If your drinking water comes from a public water system, there are publicly available resources, including the U.S. Environmental Protection Agency's (EPA's) Safe Drinking Water Information System (SDWIS), that will identify the ultimate source of your water. If your water system does not obtain its water directly from surface or groundwater, it purchases its water from another public water system or systems. Appendix A includes information on how to use EPA's SDWIS database to find out where your water comes from. EPA's Drinking Water Mapping Application to Protect Source Waters (DWMAPS) tool also provides information on public drinking water systems and their sources. Further, EPA's Enforcement and Compliance History Online (ECHO) system can be used to retrieve regulatory enforcement and compliance data, along with some drinking water facility data.

You can also find source water information in your water system's annual water quality report, also known as a Consumer Confidence Report (CCR) or Water Quality Report. Water systems are required to send CCRs or distribute them electronically to their customers twice per year. Contact your water system, visit your water system's website, or use EPA's Consumer Confidence Report search tool to obtain a copy of your CCR. For more information on CCRs, ***see Section 2***.

Private Wells

If you are not getting your water from a public water system, you are most likely getting your water from a private drinking water well. As described earlier, although nature offers some filtering of the water as it travels from the land surface to the aquifer, groundwater can be vulnerable to chemical contamination. In addition, problems with the physical condition and age of a well can also make the groundwater source vulnerable to bacterial and viral contamination. Because of the cost of well drilling and construction, many private wells are shallow and are easily affected by activities at the land surface where contaminants can migrate downward into the groundwater. These contaminants can include nitrate from land-applied fertilizer, viruses from septic system wastewater, pesticides and more. There are also specific types of aquifers that are highly susceptible to contamination because they allow rapid movement of water and contaminants (e.g., prominent underground flow paths in limestone formations, fractured rock formations and highly permeable sediment deposits).

MASSACHUSETTS WATER RESOURCES AUTHORITY -
The Quabbin Reservoir serves as the primary source of drinking water for the greater Boston metropolitan area. The reservoir's 186 square mile watershed is well protected in part due to low population density and heavy forest cover. As a result, EPA has allowed the Massachusetts Water Resources Authority to avoid filtration treatment. Currently, the only treatment the water receives before delivery to the consumer is disinfection using ozone, ultraviolet light and monochloramine.

In areas like California's Central Valley, overuse of groundwater has also led to wells going dry, as agricultural operations and other water-intensive activities have used up groundwater reserves over time.

MONITORING AND MANAGING PRIVATE WELL WATER QUALITY

If you are getting your water from a private well, the property owner is responsible for the quality of the well water. The federal Safe Drinking Water Act does not require testing or reporting of drinking water quality for private wells. However, your state or local municipality may have specific requirements for private wells. Your local or state public health or environment departments may be able to provide additional information on testing and monitoring your well water, and any requirements that may apply. For more information, see the National Ground Water Association's *suite of tools for well owners*, and the Community Water Center's *Guide to Community Drinking Water Advocacy*.

PROTECTING SOURCE WATER

Protecting the source of drinking water can be a very cost-effective approach to ensuring high quality water and is a front-line defense in drinking water protection. Communities including Boston, New York, Seattle, Portland and Salt Lake City took early efforts to secure and protect their water sources through land acquisition, purchase of permanent protective easements and use of best management practices such as installing or protecting stream buffer zones and fencing out farm animals. These preventative approaches can help water systems improve the sustainability of water resources, engage with the broader community, build consumer confidence and save costs.

The Safe Drinking Water Act (SDWA) requires each state to conduct source water assessments. Through Source Water Assessment Programs, states conducted assessments within source water protection areas—the areas from which rain and melting snow drain into the waterbody or aquifer that is used by a water system as its source. A source water protection area can cover the entire watershed upstream of a surface water intake or a portion of that watershed as defined by distance from the intake or by jurisdiction, such as a state boundary. For groundwater, a source water protection area can be defined by the "time-of-travel" of groundwater to the well or the zone of contribution or recharge area for the well—the area from which water is moving from land surface and underground locations into a specific well.

Source water assessments were conducted for all public water systems under the state's jurisdiction. The purpose of the assessments was to identify activities that are likely to impact the quality of the water supply source and to give the state and each water system the information they need to identify and implement measures to proactively protect source waters from contamination.

SOURCE WATER COLLABORATIVE

In 2006, several organizations joined together to form the national Source Water Collaborative (SWC) with the goal of combining their strengths and tools to protect drinking water sources for generations to come. Comprising almost 30 federal, state, and local partners, the SWC works to further the goals of protecting sources of drinking water—recognizing the challenge of source water protection and the value of coordinated action.

***Source Water Collaborative* resources include case studies on successful source water protection, funding sources, suggestions for potential partners, and resources on emergency response. Additionally, Clean Water Action's *Source Water Stewardship* Guide provides good background on how to foster engagement.**

To gain a better understanding of your water system's source water assessment activities associated with your water system, contact your water system to ask about the source water assessment report or contact the state drinking water regulatory agency to request access to the assessment report for your water system. For a list of state agencies that oversee the implementation of drinking water regulations, visit the Association of State Drinking Water Administrators website, click on the "Drinking Water Primacy Agencies" tab and select your state. Some states have made source water assessment reports available online, along with maps and data. In other states, digital copies of the source water assessment reports can be downloaded from designated websites. However, because of security and public health concerns associated with revealing the exact location of drinking water sources, your state may restrict access to these reports and advocacy will be required to obtain them.

A number of recent drinking water crises, including in Toledo, Ohio, and West Virginia, have highlighted the need for and catalyzed action around better source water protection and emergency response. While source water assessments are largely completed for all water systems in the U.S., they are

not required under SDWA. As a result, many water systems have not developed or implemented a source water protection program. Many water systems also lack the financial and human resources to take on voluntary source water protection and other initiatives. What limited resources they do have are needed to address regulatory compliance and major infrastructure needs. Source water protection efforts are further complicated if the water system lacks the authority to act within its source water protection area.

Although a small number of very large water systems have been able to effectively protect their source water through land purchase and land use control, with continuous land development nationwide it is increasingly difficult, and sometimes impossible, to identify and effectively protect source water areas. In addition to applying water treatment to remove known contaminants (more information on water treatment can be ***found in Section 2***), water systems can also work with partners to develop strategies to protect their source water such as:

- Working with watershed organizations and land conservancies to purchase land or conservation easements in their source water watersheds and groundwater recharge areas
- Working with government agencies such as the U.S. Department of Agriculture Natural Resources Conservation Service and local and state environmental and public health agencies to promote the use of best management practices with private landowners to control pollution
- Working with other professionals such as land use planners and municipal officials to address effective management of land use and activities in their source water protection areas
- Incorporating emergency preparedness and response protocols in their source water protection programs to address short-term emergency events such as chemical spills and harmful algal bloom outbreaks

To support improved source water protection, look for opportunities to encourage and support your water system in updating its source water assessment and developing and implementing a source water protection program. Revisiting and updating outdated assessments can identify and create opportunities for new and innovative source water protection measures and partnerships. For more information on engagement opportunities, see ***Section 6, Question 12***.

CASE STUDY – FROM CRISIS TO ACTION: CITIZEN ACTION FOR SOURCE WATER PROTECTION

In January 2014, West Virginia experienced a coal-washing chemical (crude 4-methylcyclohexanemethanol, or MCHM) spill from an above-ground storage tank. The tank was located along the Elk River upstream of the intake of West Virginia American Water. The spill resulted in a "do not use" drinking water advisory for up to 300,000 residents within nine counties in the Charleston, West Virginia metropolitan area. In the four days before the "do not use" advisory was lifted, local businesses *lost close to $61 million*.

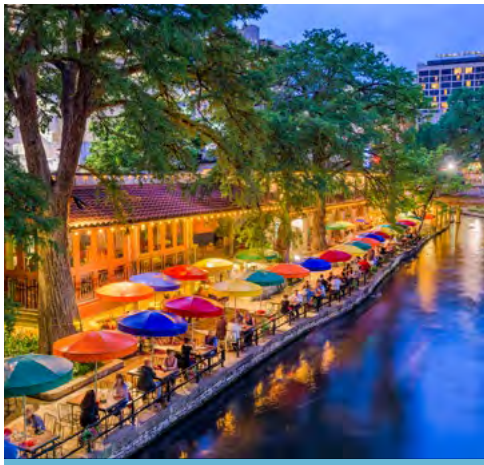
Following the spill, the West Virginia Rivers Coalition (WVRC) mobilized the community to advance policy reform that mandates public-informed source water protection planning. The spill highlighted the vulnerability of clean and safe drinking water for all communities and provided a clear opportunity to move people to action. Throughout this crisis, WVRC engaged a broad range of community members to develop plans for safeguarding their water sources for the future and created a diverse coalition to demand better protections from state policy-makers. As a result, the state legislature passed a law requiring water systems to develop source water protection plans and to substantially involve the public in this process. These actions were just the first step. WVRC then developed Safe Water for West Virginia, a community education program that expanded their engagement effort, including reaching out to under-represented communities to ensure that community groups could play a constructive role in developing and implementing these plans. WVRC developed and deployed a *Citizen's Guide to Getting Involved in Drinking Water Protection* and engaged over 3,000 community members in the source water protection process. WVRC's outreach efforts are highlighted in the *Expanding the Circle* report.

CASE STUDY – HARMFUL ALGAL OUTBREAKS THREATENING DRINKING WATER

In August 2014, the City of Toledo, Ohio issued a Do Not Drink/Do Not Boil order in response to detection of microcystin in their treated water in their treatment plant. Microcystin is a toxin generated by cyanobacteria—also referred to as blue-green algae. About 500,000 people were affected by the Do Not Drink/Do Not Boil order, and a preliminary study on the economic impacts of the event estimated that lost recreation and property values and increased water treatment costs totaled approximately $65 million. Subsequently, EPA issued Health Advisories for two cyanotoxins, microcystins and cylindrospermopsin. Health Advisories are intended to provide information regarding the concentration of a contaminant in drinking water at which adverse health effects are not anticipated. However, they are not linked to federal standards nor are they legally enforceable. In 2015, the Ohio Environmental Protection Agency revised its Public Water System Harmful Algal Bloom Response Strategy and the Ohio legislature directed the Ohio Environmental Protection Agency to implement actions to protect public water supplies against cyanobacteria in the western basin of Lake Erie.

The "Do Not Drink/Do Not Boil" advisory in Toledo fueled public discussions and actions about what created the problem and how to prevent it from happening in the future. This pivotal event provided evidence that existing efforts to reduce harmful algae and toxins in Lake Erie are not working. Community advocates looked to other efforts to reduce harmful algae and toxins across the U.S. for guidance and best practices. Communications with community leaders in the Chesapeake Bay region revealed two approaches that resulted in the reduction of algae: (1) an economic study of the watershed and (2) a report card for grading sub-watersheds on nutrient reductions. The Lake Erie Foundation is spearheading the use of these approaches locally. The Lake Erie Economic Analysis and the Western Lake Erie Report Card are aimed at reducing phosphorous in Lake Erie. Additionally, a group of activists, Toledoans for Safe Water, introduced a ***Lake Erie Bill of Rights*** and campaigned for it to be included on the 2018 November ballot. While the Lucas County Board of Elections blocked the proposal, the group is continuing to pursue this effort.

Groundwater is also susceptible to contamination, and there are numerous examples of groundwater contamination that have impacted drinking water. Because the slower movement of "out of sight" groundwater, many drinking water contamination incidents are from legacy chemicals as well as active application. For example, as described in the book A Civil Action, the 1979 testing of two drinking water wells in Woburn, Massachusetts showed that they were heavily contaminated with two industrial solvents, trichloroethylene (TCE) and tetrachloroethylene (PCE), along with other chemicals



EDWARDS AQUIFER, SAN ANTONIO, TEXAS -

The Edwards Aquifer is the primary source of drinking water for nearly two million residents in central Texas, including all of San Antonio. The aquifer stretches beneath 12 Texas counties with lands that are crucial to the replenishment of the aquifer. The drainage area and the recharge zone allow the seepage and drainage of rainwater into the porous limestone through fissures, cracks and sinkholes. Under development pressure, San Antonio has developed a program to support the protection of the Edwards Aquifer. In 2000, voters approved the city's first publicly-financed water fund measure to protect the aquifer through purchases of property within the aquifer's most sensitive area. This program has received continuous support and has been expanded to surrounding regions.

that were improperly disposed of in the areas around the wells for decades. Levels of both TCE and PCE exceeded the federal health-based standards and were linked to childhood leukemia and birth defects. These wells were shut down in 1979, and the famed lawsuit was filed in 1982 and settled out of court. Groundwater can also be contaminated by active application of fertilizers such as nitrogen and phosphorus, and pesticides such as atrazine, simazine, and diazinon in agriculture and urban settings. Pathogenic viruses from septic systems, including Norwalk-like and hepatitis A viruses, are also a concern, especially in shallow aquifers.

GROUNDWATER CONTAMINATION BY PFAS

In recent years, the detections of Per- and Poly-fluoroalkyl Substances (PFAS) in groundwater across the country have raised awareness of the susceptibility of our drinking water sources. PFAS are a group of human-made chemicals that includes perfluorooctanoic acid (PFOA), perfluorooctane sulfonic acid (PFOS), GenX, and many other chemicals that have been manufactured and used since the 1940s. PFOA and PFOS are very persistent in the environment and in human body; they do not break down and can accumulate over time.

PFOA and PFOS are also the most extensively produced and studied of this family of chemicals. PFAS have been used in stain- and water-repellent fabrics, nonstick cookware, cleaning products, and fire-fighting foams. Although certain PFAS chemicals have been phased out of production and are no longer used in the U.S., many of these chemicals were released to the environment and have entered and been discharged into rivers and aquifers over past decades. These chemicals are still produced overseas and can be imported into the U.S. in consumer goods such as carpets, leather, textiles and coatings.

Studies indicate that some PFAS can cause reproductive, developmental, liver and kidney, and immunological effects, along with tumors, in laboratory animals. In May 2016, EPA issued Health Advisories for PFOA and PFOS. However, these Health Advisories are not federal standards nor are they legally enforceable; they are intended to provide information regarding the concentration of contaminants in drinking water at which adverse health effects are not anticipated to occur over a lifetime. EPA convened a national leadership summit in 2018 to share information, identify specific near-term actions and discuss risk communication strategies of PFAS in the environment. In February 2019, EPA released a PFAS action plan. In the meantime, some states are already taking their own regulatory actions to protect public health (*see Section 3*).

For more information, see the following resources:

- **EPA's *PFAS Information, Updates and Action Plan***
- **Environmental Working Group's *Map of Toxic Fluorinated Chemicals in Tap Water and at Industrial or Military Sites***

CASE STUDY – PAYING FOR SOURCE WATER PROTECTION

The Middle Cedar Partnership Project (MCPP) is a 16-partner project intended to improve water quality and soil health and mitigate flood events in the Cedar River Watershed. The watershed covers a 2,417 square mile portion of the Cedar River in east central Iowa that serves as the drinking water source for the City of Cedar Rapids. MCPP brings together local conservation partners, farmers and landowners to install best management practices such as cover crops, nutrient management, wetlands and saturated buffers. Iowa has dedicated significant funding to establish demonstration conservation projects in priority watersheds, including two projects in the Middle Cedar. MCPP has expanded the scope, outreach and longevity of these projects. MCPP advanced implementation of conservation practices by creating a partnership between Cedar Rapids and local producers and conservation groups to protect Cedar Rapids' drinking water supply for their residential customers and industrial users. In 2015, Cedar Rapids received a $2 million Regional Conservation Partnership Program grant from the U.S. Department of Agriculture's (USDA) Natural Resources Conservation Service to provide financial and technical assistance to MCPP. The 16 MCPP partners are contributing $2.3 million in technical and financial assistance to the project. The 2018 Farm Bill includes additional ***funding for source water protection*** through the Regional Conservation Partnership and other USDA programs.

In central North Carolina, the Upper Neuse Clean Water Initiative was developed to protect drinking water supply resources drawing from the Upper Neuse watershed. In 2005, the Upper Neuse Clean Water Initiative partners, subject matter experts, and local stakeholders began developing a conservation plan that identified important conservation land and served as a framework to leverage funding from partners and others to support the program's goals. The City of Raleigh instituted a dedicated revenue source for the Initiative through a volumetric rate charged to customers of $0.1122 per 100 cubic feet of water. This revenue supports purchases of properties and conservation easements, outreach, monitoring, stewardship, and other Initiative activities. In addition, the City of Durham has a tiered rate system that generates about $200,000 per year for watershed protection.

QUESTIONS TO ASK

- Where does my drinking water come from?
- Where I can find a copy of the source water assessment for my water system?
- When was the source water assessment completed? Have there been major land use and development changes in the source water protection area since the completion of the assessment?
- According to the source water assessment, is my water system's source water susceptible to contamination, and from what?
- What is my water system doing to protect the source water?
- Who are the partners involved in protecting my source water and how can I be involved?

RESOURCES

American Water Works Association: ***Source Water Protection Resources***
Source Water Collaborative
U.S. Environmental Protection Agency: ***Conducting Source Water Assessments***
U.S. Environmental Protection Agency: ***Source Water Protection Basics***
World Resources Institute, ***Protecting Drinking Water at the Source: lessons from watershed investment programs in the United States***

SECTION 2: WHAT DOES MY DRINKING WATER SYSTEM DO?

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BACKGROUND

Drinking water systems manage safe drinking water from its source to our tap. Their primary responsibilities include maintaining an adequate supply of water; assessing water sources and identifying potential threats; treating water to potable standards; communicating essential information about drinking water safety to customers; and maintaining the infrastructure needed to deliver potable water. Water systems vary greatly in terms of size (number of customers served and connections), ownership and management, treatment used and other characteristics. Knowing which type(s) of system provides your community's drinking water and how it operates will help you understand the challenges and opportunities for providing safe, affordable and sustainable drinking water in your area.

TYPES OF WATER SYSTEMS

It is important to understand the different categories of regulated drinking water systems, as regulatory requirements differ by system type. For more information on regulatory requirements, ***see Section 3***.

The legal definition of a **public water system** is a water system that provides water for human consumption through pipes or other constructed conveyances to at least 15 service connections or serves an average of at least 25 people for at least 60 days a year. "Public" refers to the fact that the water is being consumed by the public, not to the ownership of the water system. A public water system may be owned by a public entity such as a municipality or a private entity such as a for-profit company.

For the purposes of regulating drinking water, the U.S. Environmental Protection Agency (EPA) has defined three types of public water systems:

1. **Community Water System (CWS):** a public water system that supplies water to the same population year-round. Of the approximately 151,000 public water systems in the U.S., about 51,500 are CWSs. Some of these systems, like New York City's, serve very large populations, but most do not. However, that relatively small number of large and very large systems serves the majority of the people in the U.S., because of the concentrations of people in these large cities (see the "Overview of Community Water Systems in the United States" summary table).

2. **Non-Transient Non-Community Water System (NTNCWS):** a public water system that regularly supplies water to at least 25 of the same people at least six months per year. This includes, for example, schools, factories, shopping malls, office buildings, and hospitals that have their own water systems.

3. **Transient Non-Community Water System (TNCWS):** a public water system that provides water in a place such as a gas station or campground where people do not remain for long periods of time or that may only be operated on a seasonal basis.

Compared to their larger counterparts, small and very small systems face exceptional challenges in consistently delivering safe drinking water to customers, including, but not limited to:

Overview of Community Water Systems in the United States[1]

System Service Population	Very Small <=500	Small 501-3,300	Medium 3,301-10,000	Large 10,001-100,000	Very Large >100,000	Total
% Total Systems (of 51,535)	55	27	10	7	0.8	100
Service Population	4,738,080	19,688,745	28,758,366	109,769,304	137,250,793	300,205,288
% Total Population	1.6	6.6	10	37	45.7	100

- Attracting and retaining qualified operational and managerial staff
- Ensuring staff capacity—water system staff may play multiple roles and may have other jobs outside of the water system
- Staying adequately informed of and trained on evolving regulatory requirements, operational and managerial best practices and technological advancements in the drinking water sector
- Grappling with higher per capita cost of drinking water service to their customers compared to larger systems and with constraints on customers' ability to pay for water services
- Geographical distance from other communities and water systems and from state and other technical assistance providers

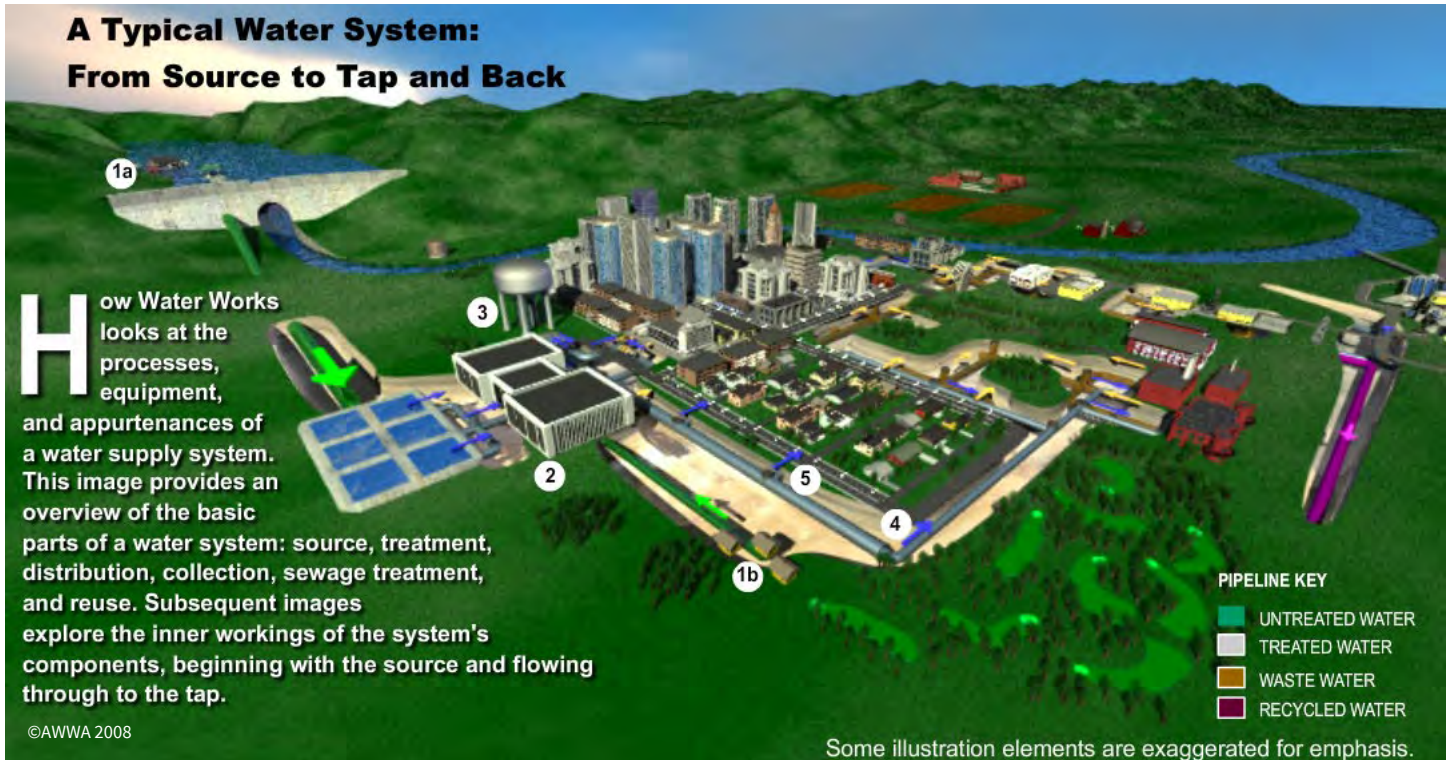
Some of these challenges translate into higher costs of service due to inefficiencies and workforce turnover. Sometimes, these costs are passed on to customers, resulting in higher water bills that may impose hardship. The equity and justice implications of higher water bills across small and large water systems are ***discussed further in Section 4***. In other cases, recognizing the economic challenges that customers face and lacking adequate understanding of the full cost of water services, water system services are very underpriced (i.e. they do not cover capital and operations and maintenance costs). This can create significant challenges when the system faces a major infrastructure upgrade or new regulatory requirement.

MANAGEMENT AND OVERSIGHT OF DRINKING WATER SYSTEMS

In the U.S., about 80% of water systems are publicly owned. These water systems serve about 88% of the U.S. population. The rest are privately owned, for example by a for-profit organization such as American Water, SUEZ and Aqua America, corporations that own and operate public water systems across the United States.

Management and oversight of drinking water systems varies by state. In general, publicly owned water systems are overseen by their boards, if the water system is set up as an independent entity, or by the city council or equivalent, if the water system is part of the local government. Privately owned water systems are regulated by Public Utilities Commissions (PUCs) or Public Service Commissions (PSCs) and are managed by their boards of directors and executive staff. PUCs or PSCs regulate the rates that privately-owned water systems charge consumers. In some states, including Wisconsin, PUCs and PSCs also regulate rates of publicly owned public water systems.

In addition to local and municipal water systems, regional water authorities exist in some places to manage drinking water and wastewater. Many regional water authorities secure water sources, treat and deliver water to "consecutive" or "purchaser" systems that deliver the purchased water to their customers. Some consecutive systems may provide additional treatment such as disinfection to the purchased water, but most only maintain their distribution systems to deliver water to their customers and issue water bills on a regular basis.



1a and 1b Water is taken from its source, which may be a reservoir (1a), river, or well (1b). Water is pumped or flows by gravity to the treatment plant.

2 At the treatment plant, impurities in the water are removed or inactivated, and fluoride may be added.

3 Clean drinking water is stored in an elevated tank.

4 Distribution mains carry water from the treatment plant or tank to service lines. Mains also provide water to hydrants for fire protection.

5 Service lines connect distribution mains to residential and building plumbing systems.

COMPONENTS OF A DRINKING WATER SYSTEM

Source Water

Water systems generally get their water from surface water or aquifers (groundwater). To the extent feasible, water systems seek out raw water of the highest quality and of sufficient quantity. Raw water is water, including rainwater and water collected directly from lakes, rivers, wells, and springs that has not been treated and does not have any of its minerals, particles, bacteria, or parasites removed by water treatment processes.

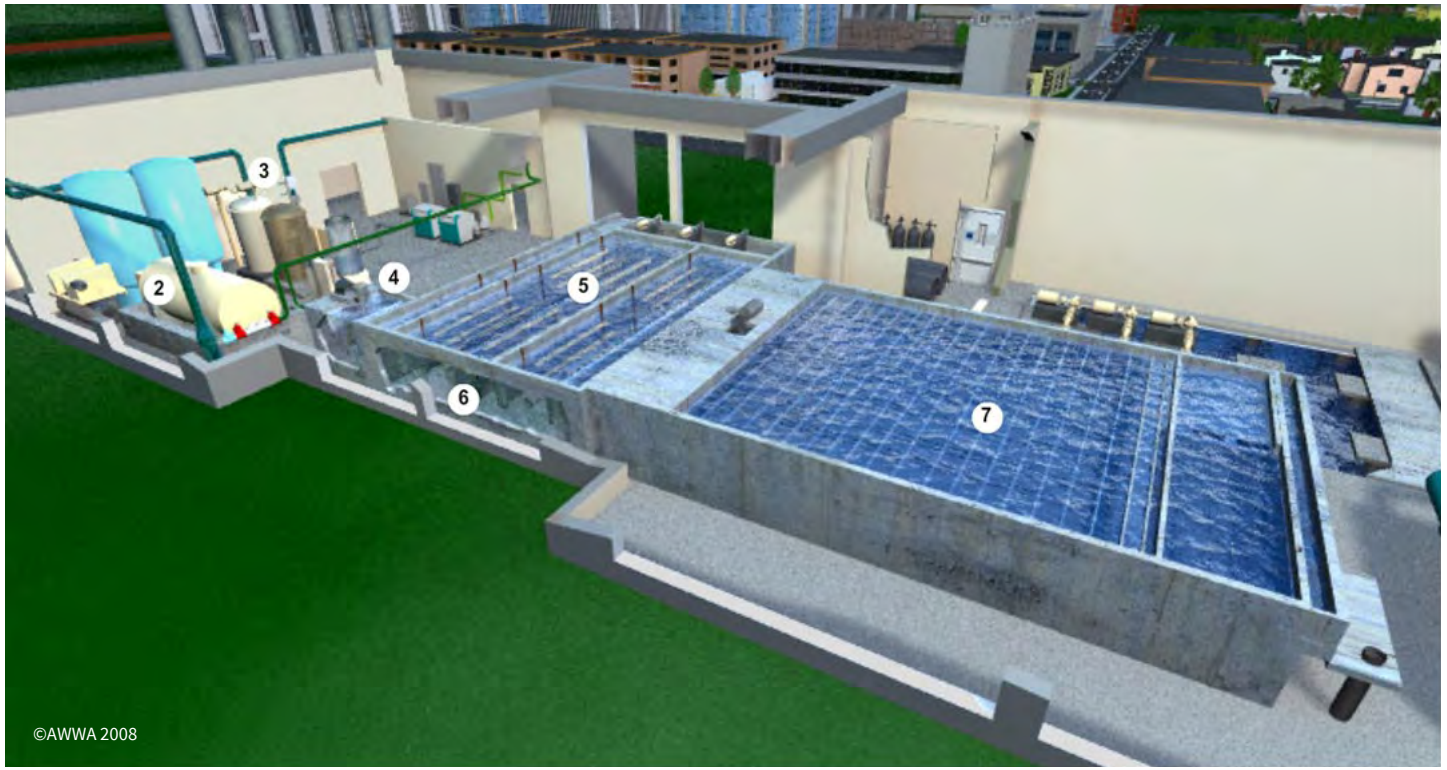
Under the Safe Drinking Water Act (SDWA), each state must conduct source water assessments within source water protection areas for all public water systems under their jurisdiction. The purpose of the source water assessments is to identify activities that are likely to impact the quality of the water supply source and to give the state and each water system the information they need to identify and implement measures to proactively protect source waters from contamination. Source water protection, however, is not required. More information on source water assessments and source water protection is ***included in Section 1***.

Water Treatment

Surface water sources are vulnerable to microbiological contaminants including bacteria, viruses and parasites. Public water systems using surface water sources are subject to federal regulations known collectively as the suite of Surface Water Treatment Rules, among other regulations. The Surface Water Treatment Rules require these water systems to filter and disinfect the water. To keep water rates affordable, drinking water systems commonly install treatment designed to handle a normal range of water quality conditions, but not rare and extreme conditions. If cost is less of an issue or water quality is more variable, water systems can install more expensive advanced treatment to address extreme scenarios. In general, surface water systems use conventional water treatment, a combination of mixing, flocculation, sedimentation, filtration and disinfection to remove raw water turbidity, algae, harmful bacteria and pathogenic protozoa such as *Giardia lamblia* and *Cryptosporidium*.

1. Pre-sedimentation basins slow the water's velocity after it passes through an intake structure, allowing heavy particles to settle to the bottom of the basins before the water enters the treatment plant.
2. Storage tanks hold bulk chemicals – dry and liquid.
3. Metering pumps feed liquid chemicals directly to the water.
4. Chemical coagulants are added in a mechanical mixing tank.
5. Flocculation basins gently agitate the water.
6. Baffles separate the basin into chambers.
7. The flocculated water flows into a sedimentation basin.
8. Settled water is then filtered by gravity through media of graduated sizes.
9. Dual-media filters typically have a bed of sand covered by a layer of crushed anthracite coal.
10. An underdrain collects the filtered water uniformly across the filter bottom.
11. Troughs over the filter media collect the backwash water and carry it to waste or recycle.
12. Chlorine is added for disinfection. A chlorinator meters chlorine gas from a chlorine cylinder or other container (in a separate room, 12a) and then delivers a dosage based on water quality parameters.
13. Treated water contact basins ensure enough time is allotted for the chlorine to provide adequate disinfection.
14. A covered clear-well stores water before it enters the distribution system.
15. Pumps send clean, safe water to underground distribution pipes throughout the community, or to treated water storage tanks (15a) that provide water pressure for systems operations and water supply for firefighting.
16. Used water is collected in underground pipes and delivered to the wastewater treatment plant.

Source: American Water Works Association, How Water Works – Conventional Water Treatment Process Part I



2 Storage tanks hold bulk chemicals – dry and liquid.

3 Metering pumps feed liquid chemicals directly to the water, or a chemical may be diluted in a smaller "day tank" first.

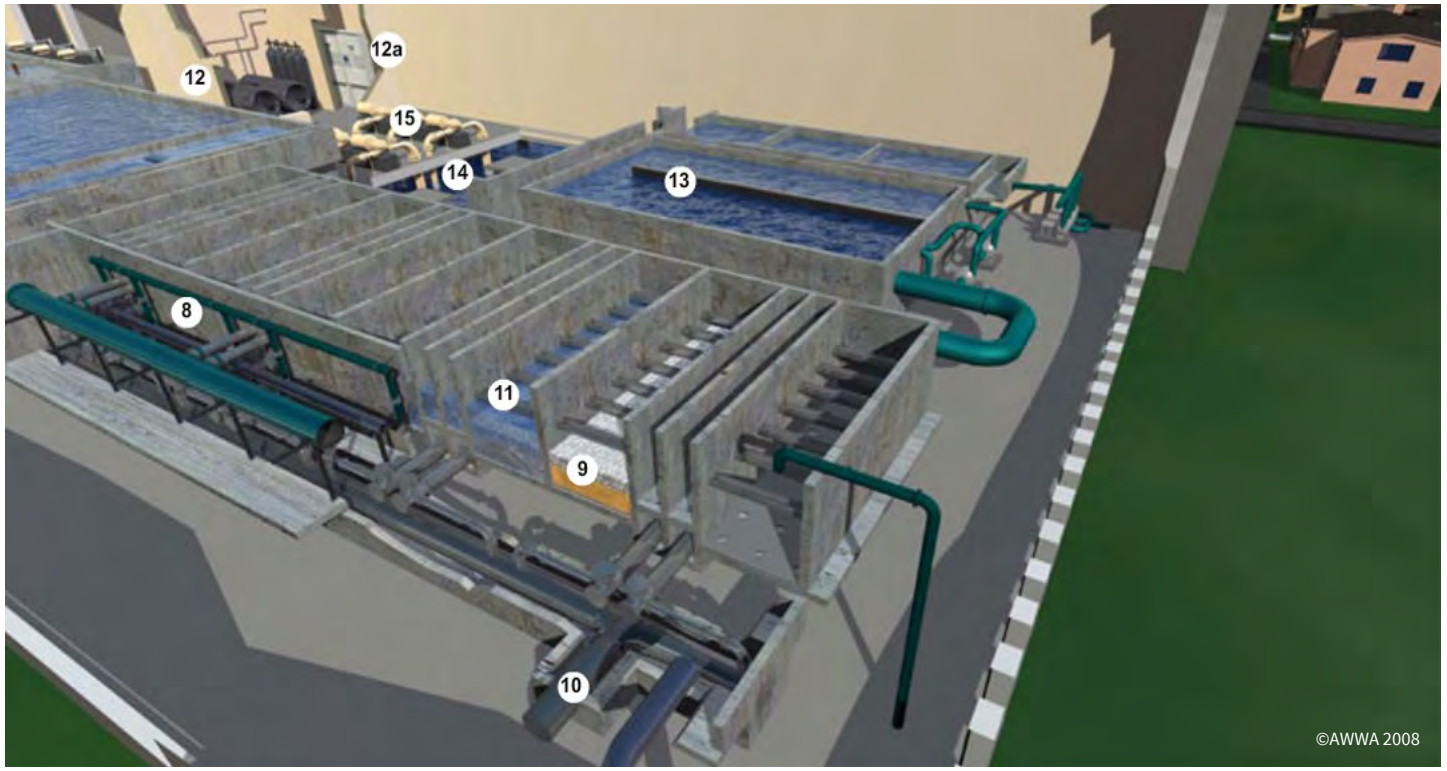
4 Chemical coagulants are added in a mechanical mixing tank react with small particles in the water to form particles large enough to settle out. Rapid mixing distributes the coagulant evenly throughout the water.

5 Flocculation basins gently agitate the water with large submerged paddles so smaller particles collide to form larger particles call "floc."

6 Baffles separate the basin into chambers where the mixing rate tapers from greatest intensity to lowest.

7 The flocculated water flows into a sedimentation basin, a large tank where water flows slowly so floc can settle to the bottom by gravity. The inlet distributes the influent evenly across the basin so water flows uniformly.

Source: American Water Works Association, How Water Works – Conventional Water Treatment Process Part I



8 Settled water is then filtered by gravity through media of graduated sizes to remove any remaining particles. Filter tanks are usually constructed side-by-side along one or both sides of a pipe gallery.

9 Dual-media filters typically have a bed of sand covered by a layer of crushed anthracite coal. Sometimes, a layer of granular activated carbon provides taste and odor control. The coarse layer on top removes most of the suspended particles. The particles that do pass through this layer are removed by finer media below.

10 An underdrain collects the filtered water uniformly across the filter bottom and distributes backwash water evenly when a filter is cleaned by water forced up through the media.

11 Troughs over the filter media collect the backwash water and carry it to waste or recycle.

12 Chlorine is added for disinfection. A chlorinator meters chlorine gas from a chlorine cylinder or other container (in a separate room, 12a) and then delivers a dosage based on water quality parameters.

13 Treated water contact basins ensure enough time is allotted for the chlorine to provide adequate disinfection. Snake-like flow through the basins maximizes contact between chlorine and effluent.

14 A covered clear-well stores water before it enters the distribution system.

15 Pumps send clean, safe water to underground distribution pipes throughout the community.

Source: American Water Works Association, How Water Works – Conventional Water Treatment Process Part II

Because of their stringent source water protection programs and other circumstances, a limited number of water systems in the country have "filtration avoidance" status. This allows them to limit water treatment to disinfection. For examples of water systems with filtration avoidance status, ***see Section 1***.

In general, groundwater sources are less vulnerable to microbiological contaminants because of the filtration provided by soil and sediments above an aquifer. Groundwater sources can be vulnerable to naturally occurring chemical contaminants, as well as human-made chemicals like Trichloroethylene (TCE), Tetrachloroethylene (PCE) and Per- and Poly-fluoroalkyl Substances (PFAS), which have been released through manufacturing and other activities and entered aquifers. Additionally, because of the slower movement of groundwater and lack of sunlight and airflow, once chemicals enter groundwater, many of them do not break down, and can accumulate over time. To provide additional public health safeguards, many states require water systems using groundwater to disinfect the water.

Depending on the water quality issues, a water system may add a range of treatment technologies, usually at higher costs, to remove the contaminants of concern and meet drinking water standards. Common treatment technologies include:

- Membrane technologies (e.g., reverse osmosis, microfiltration, ultrafiltration and membrane bioreactor) to remove dissolved solids (salinity), disinfection byproduct precursors, inorganic contaminants (e.g., nitrate, fluoride, and heavy metals), microorganisms, natural organic matter, pharmaceuticals and personal care products and other substances
- Ozone, a strong oxidant and disinfectant, to manage disinfection byproducts. It also helps to manage taste and odor issues.
- Ultraviolet (UV) light, to effectively disinfect water containing bacteria, viruses and certain protozoa, without generating high concentrations of disinfection byproducts
- Ion Exchange to soften water when the source water contains elevated concentrations of minerals. Ion exchange can also effectively remove nitrate, arsenic, selenium, barium, radium, lead, fluoride and chromate
- Granular activated carbon (GAC) and related adsorbents to remove organic compounds of concern

CASE STUDY – INSTALLING ADVANCED TREATMENT TO ADDRESS PFAS CONTAMINATION

The former Pease Air Force Base is located in Portsmouth and Newington, New Hampshire. Officially closed in 1991, historical fire-fighting and training activities conducted by the U.S. Air Force resulted in PFAS contamination of public and private water supply wells. Under an EPA Administrative Order, the Air Force has been required to design and construct two treatment systems to address groundwater contamination that continues to threaten drinking water supplies. Based on a treatment *cost alternative report*, installation of granular activated carbon treatment at three well sources is estimated to have an upfront one-time capital cost of approximately $13 million and an ongoing annual operating and maintenance costs of approximately $163,000.

In general, water systems deploy these advanced treatment technologies only in response to specific contaminants of concern, poor water quality and regulatory requirements. Typically, it can take over a year for engineers to design, install and optimize treatment to harmonize with existing treatment to ensure the combined system will not introduce new problems.

If a water system is unable to deliver drinking water that meets health-based standards or aesthetic expectations, the water system can install point of entry or point of use water treatment devices. Such fixes may be critical to address immediate term health impacts but are better used as short-term solutions while the water system identifies a more systematic and centralized solution to the problem. Installation and maintenance of these devices must be carefully coordinated with customers.

POINT OF ENTRY AND POINT OF USE TREATMENT DEVICES

A point of entry (POE) device treats water entering a building before the water is distributed to taps in the building. A point of use (POU) device is installed on a single faucet, spigot or water fountain. POU devices can sit on a counter, attach to a faucet or be installed under a sink. If you have an installed POU or POE device, be sure to read the operation and maintenance information for the device, including how often the filter should be changed and when chemicals should be added. Improper operation and maintenance of these devices can trigger other water quality problems such as bacteria growth in the filter and changes in chemical properties of the water over time. For more information on water filters *see Section 6, Question 6*.

Water Storage

Water storage is important to providing uninterrupted water service to a community. In addition to maintaining adequate flows during normal conditions, storage plays an essential role in meeting water demand during events such as chemical spills, wildfires and treatment problems. Water can be stored prior to treatment, which helps provide safe drinking water if the treatment process is still functional. After treatment, water tanks, water towers, covered in-ground reservoirs and uncovered reservoirs can be used for storage.

1 Elevated tanks may be constructed of steel and concrete. The thickness of the walls varies within the tank, depending on the pressure exerted on the tank walls. The upper walls may be relatively thin, by the lower walls may have a thickness of 2 in. or more.

2 A riser pipe is generally used as both the inlet and outlet pipe on an elevated thank. In cold climates, risers are typically 6 ft in diameter or larger.

3 An overflow pipe is necessary on all tanks to safeguard the tank if water-level controls fail. The pipe discharges to a splash plate or drainage inlet structure to prevent soil erosion.

4 A drain connection empties the tank for maintenance and inspection.

5 Covered air vents allow for pressure changes as the tank's water level changes. The water level is measured either by a pressure sensor at the tank base or a level sensor inside.

6 Batches are installed for entry and sampling during maintenance and inspection.

7 Multicolumn thanks generally have a ladder that runs from the ground to the balcony (7a) and another that goes up through the access tube to the top of the tank (7b).

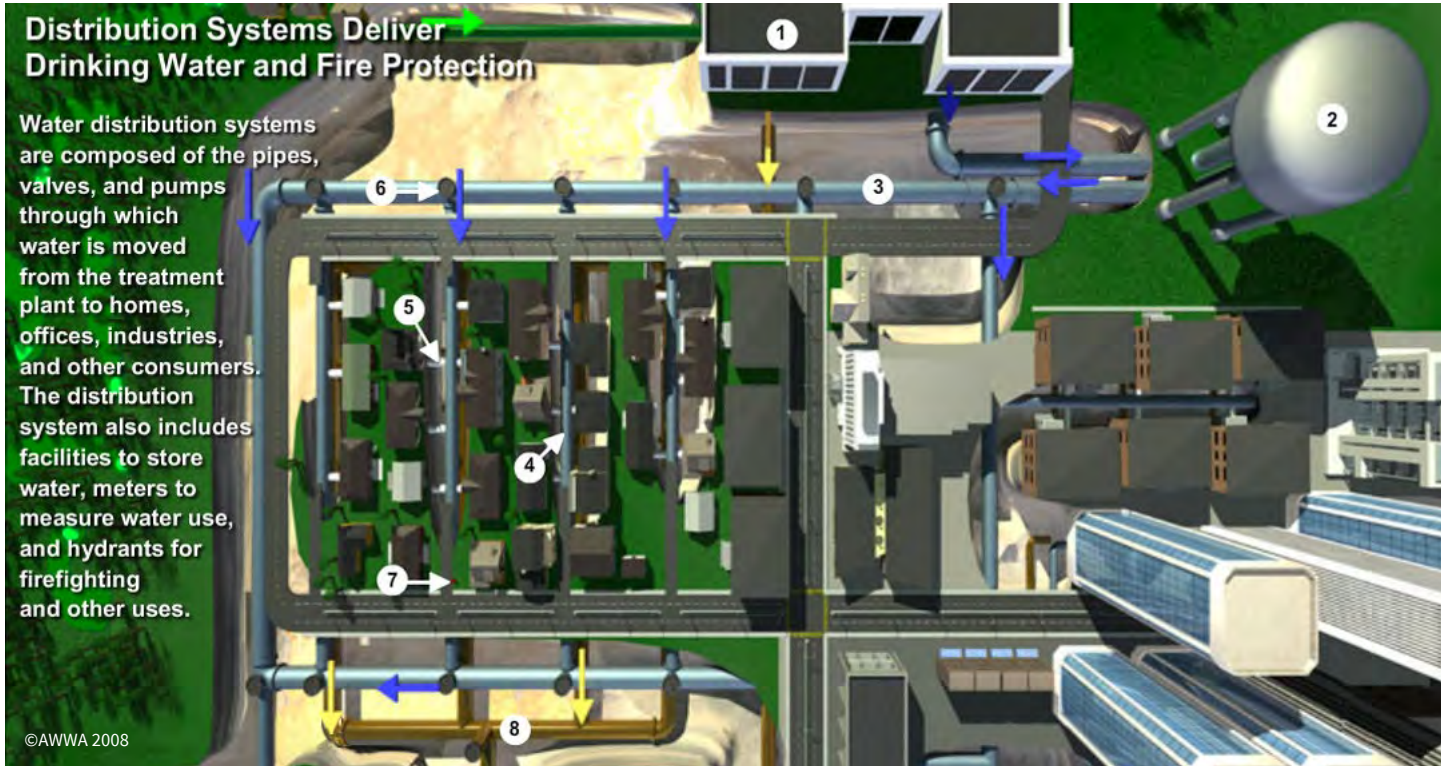
8 Obstruction lights or strobe lights on an elevated tank may be required by the Federal Aviation Administration to warn aircraft in the tank's vicinity, depending on the tank's height and location.

9 The same general comments for elevated tanks also apply to ground-level tanks.

Source: American Water Works Association, How Water Works – Water Storage Structures Meet Diverse Needs

For some water systems, storage reservoirs for treated water are an important distribution system "barrier" against contamination of water as it travels to the customer. Treated water storage facilities are designed to equalize water demands, reduce pressure fluctuations in the distribution system, and provide reserves for fire-fighting, power outages and other emergencies.

Uncovered storage reservoirs provide the greatest opportunity for contaminants to enter into the distribution system and are being phased out. These uncovered reservoirs are subject to contamination from bird and other animal waste that can potentially transmit disease-causing organisms to the treated water. Microorganisms can also get into open reservoirs from windblown dust, debris, and algae. Algae proliferate in open reservoirs with adequate sunlight and nutrients, and impart color, taste and odor to the water on a seasonal basis. Organic matter such as leaves and pollen are also a concern in open reservoirs, as are waterfowl that carry waterborne pathogens and human activity. In 2014, the Portland, Oregon Water Bureau dumped 38 million gallons of drinking water after a man urinated into an uncovered treated water reservoir. Uncovered storage reservoirs are being replaced by underground storage systems to avoid these problems and meet drinking water regulations. Water systems that still use uncovered finished water reservoirs have developed strategies to protect their water from contamination.



1 At the treatment plant, impurities in the water are removed or inactivate.

2 Water storage facilities are sized and operated to provide reserves for firefighting and to meet consumer demands.

3 Transmission lines are large pipes that carry large quantities of water from the treatment plant and storage tanks into the distribution system. Transmission pipes generally run in straight lines, have few side connections, and aren't tapped for customer services.

4 Distribution mains carry water from transmission lines and distribute it throughout a community. These pipes have many side connections and are frequently tapped for customer connections.

5 Service lines are small-diameter pipes that run from the distribution mains to customers' premises.

6 Shutoff valves are located at regular intervals so areas within the system can be isolated for repair or maintenance.

7 Hydrants are located near street intersections, so hoses can be used to fight a fire in any of several directions.

8 Collection pipes carry used water from sewers and drains to the wastewater treatment plant.

Source: American Water Works Association, How Water Works – Distribution Systems Deliver Drinking Water and Fire Protection

Water Distribution

After treatment, potable water is delivered to customers via pipes, with assistance from valves and pumps. The distribution system also includes storage facilities (water tanks and storage reservoirs), meters, and fire hydrants.

Typically, potable water travels through a series of underground water mains (large diameter pipes) from the water treatment plant to the service area. A service line is a smaller diameter pipe that connects a building's plumbing system with the water main. Over the past decades, many water systems have postponed replacement of their infrastructure or deferred maintenance due to high costs. ***As illustrated in Section 4***, many of these water systems are facing more frequent and severe infrastructure failures.

Responsibility for the components of a distribution system can vary. In many municipalities, the water system is responsible for the service line from the private property line, the water meter or the curb stop to the water main, and the property owner is responsible for the service line from those locations into the building. In other municipalities, the water system is responsible for the entire service line. In others, property owners are responsible for the entire service line from the building to the water main. Contact your water system to find out which part of the service line is the system's responsibility and which part is the property owner's responsibility. This is important in case of a leak or contamination issue, such as contamination from lead service lines.

LEAD SERVICE LINE REPLACEMENT

Homes built in the U.S. before 1986 are more likely to have lead pipes, brass or chrome-plated brass fixtures containing lead and fixtures with lead solder. The *Lead Service Line Replacement Collaborative* provides information to help communities to learn about and facilitate full lead service line replacement with examples of policies, mapping and financing for this work. The goal of the Collaborative to "accelerate voluntary leaded service line replacement" across the country by providing models for lead service line replacement. The Collaborative also has produced fact sheets in English and Spanish. One of the Collaborative's members, Environmental Defense Fund, also *tracks state and local initiatives* to replace lead service lines. Some communities, like *Madison, Wisconsin*, have already replaced lead service lines.

Water is distributed within a building via premise plumbing, or plumbing associated with the building. The most commonly used materials for drinking-water supply piping are galvanized steel or iron, copper, polybutylene, unplasticized polyvinylchloride (PVC), chlorinated polyvinylchloride (CPVC) and polyethylene (PE). Metal alloys such as alloys of copper mixed with zinc, lead, tin and silver that exceed the performance specifications of each metal alone are also common. New materials and construction technologies for the plumbing and building industries are continually being developed, so it is important to understand what materials are available and recommended. Additional information about concerns related to lead in premise plumbing and service lines is included in ***Section 6, Question 5***.

REGULATORY COMPLIANCE RESPONSIBILITIES

Public water systems are required to comply with regulations developed by EPA under the authority of the SDWA. Depending on the type of water system, the primary source of water and population served, a water system must monitor and report non-compliance findings (e.g., a water sample that exceeds a maximum contaminant level). EPA's Enforcement and Compliance History Online (ECHO) system can be used to retrieve regulatory enforcement and compliance data, along with some drinking water facility data.

To date, EPA has established legal limits on more than 90 contaminants in drinking water through National Primary Drinking Water Regulations (NPDWRs). The legal limit for a contaminant reflects the level that protects human health and that water systems can achieve using the best available technology. EPA rules also set water sampling schedules and methods that water systems and laboratories must follow. More information on NPDWRs is included in ***Section 3***.

CASE STUDY – COMMUNITY ENGAGEMENT IN FLINT, MICHIGAN

San Juana Olivares, known as Juani, is the President and CEO of *Genesee County Hispanic and Latino Collaborative* (GCHLC). She began as a volunteer when she saw the great need for Spanish-speaking residents of Flint to better understand the dangers of high levels of lead in their drinking water and options for getting safe water supplies for their families. Juani and her staff have translated into Spanish and distributed countless materials from the County's Health Department and Michigan's Department of Environmental Quality. The GCHLC provides specialized social services and additional locations for residents to pick up drinking water and faucet filters. GCHLC also serves as a food pantry and occasionally hosts health fairs. As a voice of the City's Hispanic and Latino populations, Juani has made presentations across Michigan and the country about the lessons learned from Flint. Juani also went to Washington, D.C. to inform elected officials about the needs in Flint and funding of water infrastructure programs.

In addition to the monitoring and reporting requirements for each contaminant, water systems are required to provide public notification under certain conditions as specified by EPA. In general, public notice is required in the case of:

- Exceedances of maximum contaminant levels (MCLs) or maximum residual disinfectant levels (MRDLs)
- Violations of treatment techniques
- Monitoring and testing procedure violations
- Failure to comply with the schedule of a variance or exemption

Other situations (not violations) which require notice include:

- Occurrence of a waterborne disease outbreak or other waterborne emergency
- Fecal indicator-positive source water samples
- Exceedance of the nitrate MCL in certain noncommunity systems
- For community water systems only, exceedance of the secondary MCL for fluoride

- Operation under a variance or exemption
- Availability of unregulated contaminant monitoring results

There are 10 required elements in a public notice.

- A description of the violation that occurred, including the contaminant(s) of concern, and the contaminant level(s)
- When the violation or situation occurred
- The potential health effects
- The population at risk, including subpopulations vulnerable if exposed to the contaminant in their drinking water
- Whether alternate water supplies need to be used
- What the water system is doing to correct the problem
- Actions consumers can take
- When the system expects a resolution to the problem
- How to contact the water system for more information
- Language encouraging broader distribution of the notice

In addition, EPA specifies three categories, or tiers, of public notification, depending on the severity of the situation. Each tier specifies the delivery timeframe. Delivery methods depend on water system type and tier. For more information, see EPA's Public Notification Rule resources.

Community water systems are required to develop and disseminate Consumer Confidence Reports (CCRs). The 2018 America's Water Infrastructure Act increased the required distribution frequency of CCRs from once to twice a year. At a minimum, the CCR should contain the following information:

- The lake, river, aquifer or other source of the drinking water
- A summary of the risk of contamination of the local drinking water source
- The regulated contaminants found in local drinking water
- The potential health effects of any contaminant detected in violation of an EPA health standard
- An accounting of the system's actions to restore safe drinking water

CASE STUDY – WATER MANAGEMENT FAILURES IN FLINT, MICHIGAN

In Flint, Michigan, high lead content in residents' tap water was attributed to a change in the city's drinking water supply and treatment. Flint was purchasing treated water from the Detroit Water and Sewerage Department but in 2014, as a cost cutting measure under a state-appointed emergency manager, it began to withdraw, treat and distribute its own water from the Flint River. Previously a back-up system, the system was rushed into becoming fully operational and did not apply required corrosion control treatment. While Flint's drinking water was treated to meet public health standards, the chemistry and mineral content of the water increased the leaching of lead from service lines and household plumbing. All residents had potential lead exposures over the course of months to years.

The results of an independent academic water expert's data showing lead in drinking water and a doctor's documentation of high blood lead levels in children broke the gridlock of inaction by local, state and federal government. Free bottled water, water filters and water testing was provided for Flint residents and the city switched back to using Detroit water. Use of point of use filters was controversial, as they were not tested for such high levels of lead and can foster bacterial growth if not replaced and maintained properly. Public notification of the lead problems was also uneven across the city. Some areas and groups did not receive timely information about the crisis and faced barriers in accessing filters, safe water and other support.

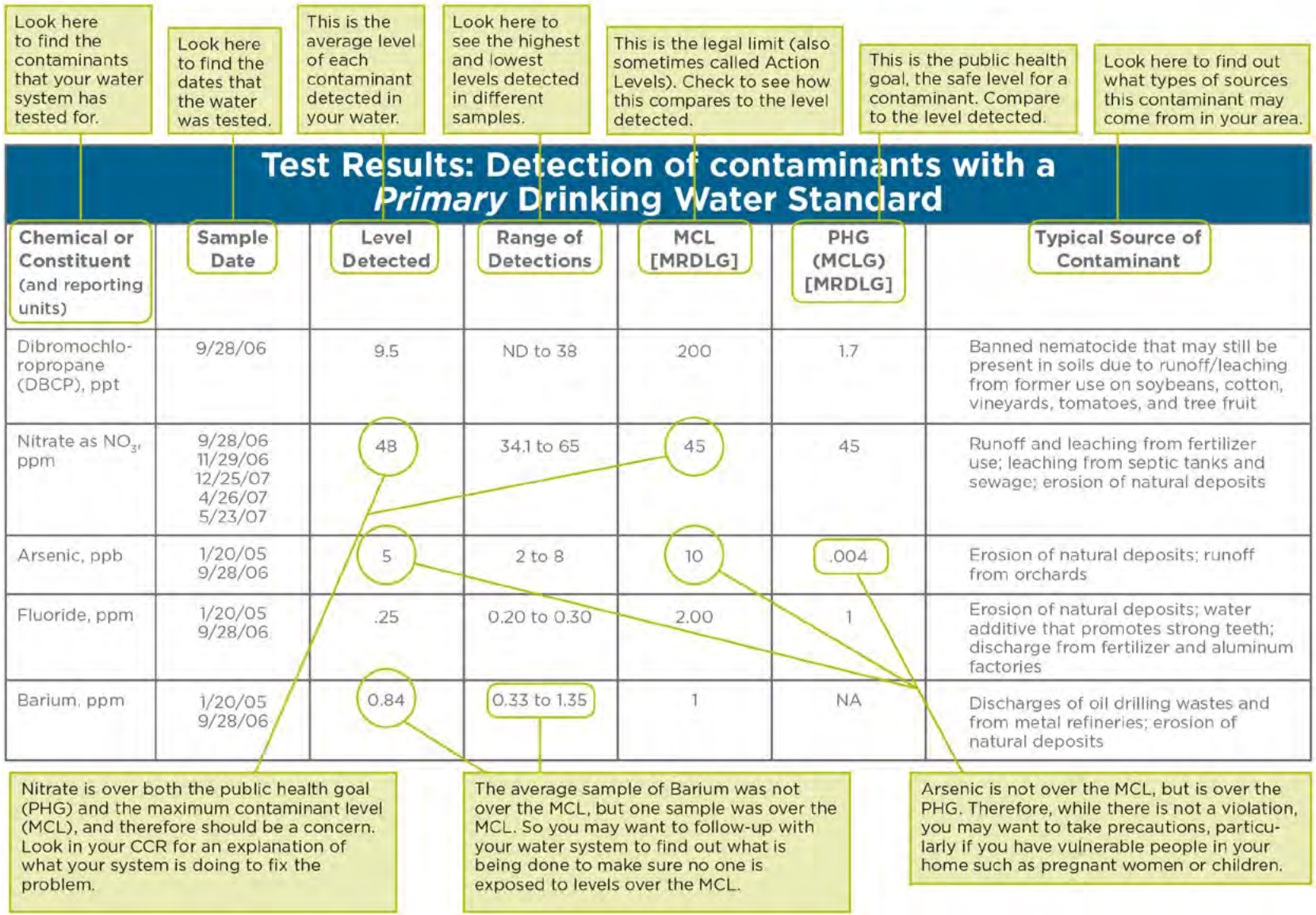
Funding and support from the federal and state government and philanthropic organizations supported the replacement of water fixtures in public facilities, replacement of the city's lead service lines, health and educational resources for children under six years of age with elevated lead levels, and increased resources for schools.

For more information, see the following resources:

- **Michigan Civil Rights Commission: *Race and Racism Played Roles in Causing Flint Water Crisis, and both blacks and whites are victims***
- **US EPA, Office of Inspector General: *Management Weaknesses Delayed Response to Flint Water Crisis***

- An educational statement for vulnerable populations about avoiding Cryptosporidium
- Educational information on nitrate, arsenic, or lead where these contaminants may be a concern
- Phone numbers of additional sources of information, including the water system
- EPA's Safe Drinking Water Hotline access information

How to Read Your Consumer Confidence Report



Adapted from the Community Water Center ***Guide to Community Drinking Water Advocacy***

QUESTIONS TO ASK

- Which regulated public water system(s) am I getting water from?
- How many public water systems are there in my community?
- Is my community water system publicly or privately owned?
- Does my water system purchase its water from a "wholesaler"?
- Who oversees my water system? Are they appointed or elected?
- How is my drinking water being treated? If the source water is from a river, reservoir, or lake, is it being filtered? If not, is the watershed associated with the source water adequately protected?
- Has the type of treatment changed recently, or does my system anticipate changing treatment in the future?
- How does my water system store drinking water? Is there adequate storage for my water system to handle emergency situations (e.g., contamination incident in source water)?
- Are there any uncovered storage reservoirs? If so, what does my water system do to prevent contamination of the water in these uncovered storage reservoirs?
- Does my water system know the average age of pipes in the distribution system?
- Does my water system have a process for evaluating distribution system pipe age and condition?
- Who is responsible for the portion of the service line on private property, the property owner or the water system?

RESOURCES

American Water Works Association: ***Source Water Protection Resources***
Centers for Disease Control and Prevention: ***Understanding CCRs***
U.S. Environmental Protection Agency: ***Infographic: How does your water system work?***
U.S. Environmental Protection Agency: ***Understanding Your Water Quality Report***

REFERENCES

[i] American Water Works Association. 2015. State of the Water Industry Report. Available on-line at: https://www.awwa.org/Portals/0/AWWA/Development/Managers/2015SOTWI%20(2).pdf

SECTION 3 – WHAT FRAMEWORKS ARE IN PLACE FOR MAKING SURE OUR WATER IS SAFE TO DRINK?

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NEXT

BACKGROUND

The Safe Drinking Water Act (SDWA) is our nation's main law to protect the quality of our drinking water at the tap. Originally passed in 1974, this law has been amended several times to address gaps and new issues. Like the Clean Water Act (CWA), responsibility for oversight and implementation of the SDWA rests with the U.S. Environmental Protection Agency (EPA) and, to varying degrees, states and tribal governments.

The SDWA has provided many safeguards against drinking water contamination, including the regulation of over 90 specific contaminants. However, potential threats to the health and safety of our drinking water supplies remain, including unregulated contaminants, deteriorating water infrastructure and oversight failures. Further, the SDWA only regulates public water systems. It does not apply to private wells, water systems serving fewer than 25 persons or bottled water, which is regulated separately by the Food and Drug Administration. Understanding the basic framework and context for drinking water regulation can help advocates evaluate strengths and gaps in the current legal framework for drinking water, identify key leverage points, and determine who to contact for further questions and action.

HISTORY AND PURPOSE OF THE SAFE DRINKING WATER ACT

The SDWA was signed into law by President Gerald Ford in 1974, four years after EPA was established. The intent of the law is to protect public health through regulation of drinking water supplies. Congress was prompted to improve drinking water protection in the United States "after nationwide studies of community water systems revealed widespread water quality problems and health risks resulting from poor operating procedures, inadequate facilities, and uneven management of public water supplies in communities of all sizes."

Under the SDWA, EPA is authorized to establish national health-based standards for naturally occurring or human-made drinking water contaminants. These standards are the core protection of our nation's drinking water sources. The process for establishing these standards is described in detail below. In short, if EPA decides to regulate a contaminant, the Agency first establishes a non-enforceable maximum contaminant level goal (MCLG). An MCLG is the level below which there is no known or anticipated public health risk based on adverse health risks to sensitive populations, including infants and children, the elderly, immunocompromised individuals and individuals with chronic diseases. For disinfectants that will be regulated,

EPA sets a Maximum Residual Disinfectant Level Goal, or MRDLG, rather than an MCLG. Next, EPA establishes an enforceable health standard, depending on contaminant type:

- A maximum contaminant level (MCL), which is the highest allowable level of that contaminant in drinking water, or
- A treatment technique (TT), which is a treatment process required for a contaminant to effectively reduce the level of that contaminant in drinking water, or
- A maximum residual disinfectant level (MRDL), which is specific to disinfectants, and is the highest level of that disinfectant allowed in drinking water

The SDWA has been substantially amended three times, in 1986, 1996 and 2016, with additional minor amendments in the intervening years. Under the 1986 amendments, for example, Congress accelerated the pace of regulation for new contaminants in response to the very limited expansion of contaminant regulations between 1974 and 1986. New requirements under the 1986 Amendments include those related to pace of issuance for new regulations, filtration and disinfection of water supplies, monitoring for unregulated contaminants, underground injection well monitoring and a prohibition on the use of lead solders, flux and pipes in new water systems, among others.

The 1996 SDWA Amendments modified the schedule for contaminant regulation, recognizing that EPA could not meet the pace required under the 1986 Amendments. The 1996 Amendments were intended to help target resources where they were most needed, in part by implementing a health risk and cost-based analysis framework for determining whether to regulate additional contaminants. The 1996 Amendments also required community water systems to prepare and distribute to customers an annual Consumer Confidence Report (CCR) that includes information on their drinking water source(s), levels of contaminants and any associated regulatory violations, and health effects of those contaminants. For more information on CCRs, ***see Section 2***.

The Amendments also included new directives related to certification programs for water system operators and introduced the capacity development framework for evaluating and building the technical, managerial and financial capabilities of a water system to provide safe drinking water consistently to their customers. Finally, the 1996 Amendments established a mechanism for financing water infrastructure improvements, the Drinking Water State Revolving Fund (DWSRF). For more information on the DWSRF, ***see Section 4***.

FEDERAL, STATE AND TRIBAL RESPONSIBILITIES

While EPA is ultimately responsible for implementing the SDWA through development of regulations and establishment of voluntary programs, states and tribes can be given primary implementation and enforcement responsibility for the SDWA. "Primacy" is handled separately across EPA's full suite of drinking water programs. For example, a state may have primacy for National Primary Drinking Water Regulation (NPDWR) implementation, but not for regulatory implementation of certain underground injection wells (also regulated under the SDWA).

Very generally, the division of federal and state and tribal responsibility is as follows:

EPA:

- **Establishes national drinking water standards**
- **Oversees SDWA programs nationally**
- **Develops guidance, training and other resources for states and water systems on compliance, capacity and financial management**
- **Evaluates state/tribal programs and compliance data**
- **Regulates the construction, operation and permitting of underground injection wells**
- **Intervenes in a state/tribe where there are problems**
- **Manages and oversees the Drinking Water State Revolving Fund (DWSRF) and distributes annual capitalization grants**

State and tribal governments with primacy:

- **Adopt drinking water standards at least as strict as federal requirements**
- **Oversee public water systems, including inventorying public water systems, providing technical assistance, and overseeing consumer notification**
- **Develop state regulatory programs**
- **Maintain a compliance database, monitor system compliance and enforce regulatory requirements**
- **Administer individual DWSRF programs**

DRINKING WATER PROTECTION BEYOND THE SAFE DRINKING WATER ACT

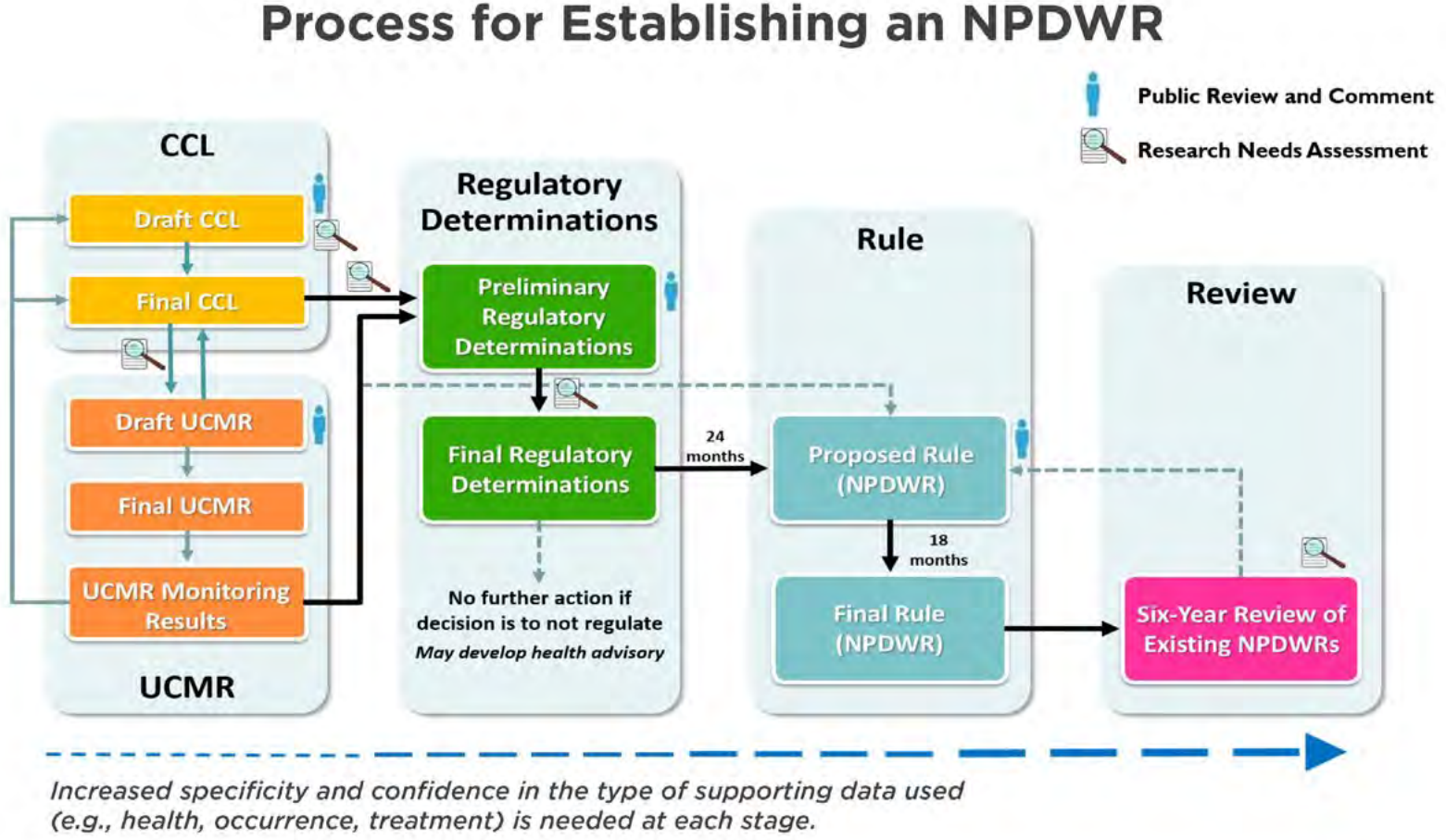
While the SDWA is the primary legal authority for regulating drinking water safety, there are other environmental and public health laws that can have a significant impact on protection of our sources of drinking water in particular. Under the CWA, EPA and states with primary authority to implement the CWA regulate entities or activities that have the potential to contaminate surface water, including discharges from point sources of pollution (e.g., industrial operations or wastewater treatment facilities) and nonpoint sources of pollution (e.g., urban runoff). EPA or authorized states and tribes set water quality standards (WQSs) for surface water bodies and, through total maximum daily loads, establish the allowable levels of pollutants that can be discharged to surface water bodies that are not meeting the established WQSs. The Resources Conservation and Recovery Act, Toxic Substances Control Act and Federal Insecticide, Fungicide, and Rodenticide Act, among other statutes also help to control the impacts of potential pollutants and contaminants on source waters and watersheds.

The Water Infrastructure Improvements for the Nation (WIIN) Act, signed into law in 2016, further amended the SDWA to strengthen and enhance public notification requirements related to exceedances of national standards for lead in drinking water. The WIIN Act also provided additional temporary funding for replacement of drinking water infrastructure containing lead in communities and schools and for small and disadvantaged community compliance with drinking water and water quality standards.[iii]

EPA'S REGULATION OF LEAD IN DRINKING WATER

EPA published the original Lead and Copper Rule, regulating levels of lead and copper in drinking water, in 1991. The Lead and Copper Rule set treatment technique requirements for both contaminants that requires monitoring at customer taps, as well as "action levels" for both contaminants. Exceeding either action level in over 10% of sampled taps can trigger consumer notification, additional monitoring and other requirements. EPA has revised the Lead and Copper Rule multiple times since 1991 but has been working on planned major revisions to the Rule for almost a decade. The 2016 Water Infrastructure Improvements for the Nation Act included a provision requiring EPA to develop a strategic plan for public education, technical assistance and risk communication to communities impacted by lead in drinking water, and provisions for additional funding to address lead in communities and schools. In the meantime, communities continue to identify elevated levels of lead in their water and are grappling with how best to protect customers from this significant public health threat. No "safe" level of lead in children has been identified, and even low levels of lead can lead to health impacts that cannot be reversed.[iv] *Groups in states including Michigan* have advocated for additional state protections, while federal progress lags behind.

The 2018 America's Water Infrastructure Act (AWIA) requires community water systems serving over 3,300 people to develop or update risk assessment and emergency response plans.



The Process for Establishing National Primary Drinking Water Regulations

The backbone of the SDWA is the regulatory standards that the Act requires. Under the SDWA, EPA must establish and enforce these drinking water quality standards for public water systems. The law specifies the lengthy process that EPA must follow for doing so.

1. **Contaminant Candidate List:** The SDWA requires EPA to publish a **Contaminant Candidate List** (CCL) every five years. The CCL includes contaminants that are known or anticipated to be detected in public water supplies but are not currently regulated. EPA must evaluate the public health effects and occurrence of contaminants when considering which contaminants to include in the CCL. As part of this process, EPA solicits public input on contaminants for consideration in compiling the CCL. The final CCL identifies the highest priority contaminants for further evaluation. The most recent CCL (CCL4) was published in 2016 and includes 97 chemical or chemical group contaminants and 12 microbial contaminants. EPA provides notices in the Federal Register throughout the CCL identification process and seeks public input on the listed contaminants to assist with prioritization of top contaminants that would be considered for next steps of assessment and rulemaking. From October to December 2018, EPA requested public input on contaminants to be included in the fifth CCL.

2. **Monitoring for Unregulated Contaminants:** The 1996 Amendments to the SDWA required EPA to issue a new list of up to 30 unregulated contaminants, every five years, for which public water systems will monitor. This monitoring effort generates nationally representative data on the occurrence of the selected contaminants in drinking water across the country and the extent and level of human exposure to those contaminants.[v] It can inform future CCLs and the process through which EPA determines whether to further evaluate

a contaminant for possible regulation, and ultimately decides whether to regulate a contaminant. These requirements are implemented through the **Unregulated Contaminant Monitoring Rule** (UCMR). The fourth cycle of monitoring under the Unregulated Contaminant Monitoring Rule (UCMR 4) is taking place between 2018 to 2020. It covers 30 contaminants, including metals, pesticides, byproducts of disinfection processes and more. The selection of contaminants for inclusion under UCMR monitoring is based in part on the CCL, contaminants monitored under previous UCMR efforts and other relevant research on occurrence and possible health effects.

All community water systems and non-transient, non-community water systems serving over 10,000 people and a representative sample of smaller community and non-transient non-community water systems are required to participate in monitoring under this rule. The contaminants for which each system will monitor depends on source water type.

3. **Deciding Whether to Regulate New Contaminants:** After publication of the Contaminant Candidate List, EPA moves into the **Regulatory Determination** process. The SDWA requires EPA to select at least five contaminants from the CCL and evaluate whether to establish a NPDWR for those contaminants. UCMR data are one of the primary sources of data used in determining which contaminants to consider further, for possible regulation.

The SDWA specifies that the following criteria must be used for that evaluation:[vi]

- The contaminant may have an adverse effect on the health of persons;
- The contaminant is known to occur or there is a substantial likelihood the contaminant will occur in public water systems with a frequency and at levels of public health concern; and
- In the sole judgment of the EPA Administrator, regulation of the contaminant presents a meaningful opportunity for health risk reductions for persons served by public water systems

If there is not enough data to evaluate a contaminant against these criteria, EPA issues a finding of "no regulatory determination." If EPA can answer "yes" to all three criteria, EPA initiates development of a drinking water regulation. If the answer to any one of the three criteria is "no," EPA will not develop a regulation, but may choose to develop a non-regulatory, non-enforceable health advisory. Health advisories provide information on contaminants that can have human health effects and are known or anticipated to occur in drinking water. They can also be issued for contaminants that have not gone through the Regulatory Determination process. Health advisories can include information on treatment technologies to remove the contaminant, analytical methods to evaluate the presence and concentration of the contaminant in drinking water, and specific health effects.[vii] Recently added unregulated chemicals and microbiological contaminants include perfluorooctanoic acid (PFOA) and perfluorooctane sulfonic acid (PFOS), two of a family of per- and polyfluoroalkyl substances (PFAS), as well as Cylindrospermopsin and Microcystin, two of a family of cyanotoxins generated by various cyanobacteria.

EPA issues and requests public comments on preliminary determinations as part of the Regulatory Determination process. Following preliminary determinations, EPA also generally holds open public stakeholder meetings.

The most recent Regulatory Determination process—the third, which evaluated contaminants on the third Contaminant Candidate List, or CCL3—concluded in early 2016, with EPA's final determination not to regulate four of the five contaminants evaluated. While EPA had made a preliminary regulatory determination in 2014 to regulate the fifth contaminant, strontium, in 2016, EPA delayed any decisions in favor of further evaluating existing data and the extent to which regulation would reduce health risks. Through the second Regulatory Determination process, concluded in 2011, EPA determined that the chemical perchlorate met the SDWA criteria for regulation, but has not yet developed a draft regulation for perchlorate. Because of legal challenges to this timeline, EPA is now under an extended Consent Decree to develop a draft regulation for perchlorate by April 30, 2019.

FEDERAL PUBLIC COMMENT OPPORTUNITIES

Check *Regulations.gov* to identify and search for opportunities for public comment, including on EPA rulemakings and other activities. Most EPA program offices also publish regular newsletters or maintain listservs that anyone can join for routine updates on EPA actions and planned public comment opportunities. Your state environment department may also provide similar services.

4. **Developing a Drinking Water Regulation:** If EPA makes a positive regulatory determination, the effort to develop a national regulation begins. While EPA has an established process for developing a regulation, the path is not always linear, and can be significantly affected by political, financial, or other concerns, depending on the contaminant under consideration. In theory, the process takes the following path:[viii]

- ***Establishment of MCLG:*** EPA establishes an MCLG based on adverse health risks to sensitive populations, including infants and children, the elderly, immunocompromised individuals and individuals with chronic diseases. An MCLG is the level below which there is no known or anticipated public health risk. MCLGs are not enforceable and are therefore not tied to any legal requirements. For disinfectants, which are added to improve drinking water quality, EPA sets a maximum residual disinfectant level goal (MRDLG), or the level below which there is no known or anticipated public health risk from the disinfectant. EPA's approach to determining MCLGs or MRDLGs depends on the type of contaminant.

- ***Establishment of enforceable health standard:*** As noted previously, EPA then sets an MCL, TT or MRDL enforceable health standard (as close to the MCLG or MRDLG as is feasible and cost-effective), depending on contaminant type.

EXAMPLES OF DRINKING WATER STANDARDS

MCL: EPA has set MCLs for contaminants including disinfection byproducts, arsenic, uranium, nitrate, and radium, among any others.

TT: EPA has set TT requirements for lead and copper, microorganisms such as Cryptosporidium, Legionella, and E. Coli, as well as for turbidity (cloudiness of water), for example.

MRDL: EPA has set MRDLs for disinfectants including chlorine, chloramines, and chlorine dioxide.

- ***Development of Regulatory Impact Analysis:*** EPA develops a regulatory impact analysis that considers the health risk reduction and cost, which evaluates the quantifiable and non-quantifiable anticipated benefits and costs of compliance with the new standard. Specifically, EPA evaluates the following factors:[ix]
  - Costs associated with installation and operation of treatment technologies for the contaminant
  - Costs associated with collecting and analyzing water samples for the contaminant
  - Costs associated with management and oversight
  - How these costs may ultimately affect consumers
  - Benefits from avoided human health impacts
- EPA may conduct additional evaluations of the impact of the new regulation on various groups, to comply with other statutes that apply to the regulatory development process, including the Paperwork Reduction Act, Unfunded Mandates Reform Act and Regulatory Flexibility Act/Small Business Regulatory Enforcement Fairness Act.

Public Participation in the Regulatory Process

EPA usually provides several opportunities for public comment on draft proposed regulations. EPA may also conduct additional, varying levels of targeted stakeholder or general public outreach throughout the process of draft rule development. When proposing a regulation, EPA publishes a Notice of Proposed Rulemaking in the Federal Register, the official legal publication of the federal government. The Federal Register notice provides information on how to submit public comments on the proposed rule. EPA evaluates all submitted public comments when developing the final regulation. EPA also develops and makes available to the public formal responses to public comments. These responses include reasoning for why the comment was or was not addressed in the final rule. Generally, public comments include those submitted by individuals and those submitted by large, national environmental non-profit or industry organizations. Comments may be unique to the submitter or can be coordinated responses (with multiple groups sending the same comments to EPA) and can be submitted online via EPA's docket.

As noted earlier, states, tribes and territories can receive primary enforcement responsibilities, or primacy, to regulate drinking water. As more contaminants and requirements are added by EPA, states will need to modify their regulations to include updated requirements. During the initial process to receive primacy and subsequent adoption of new drinking water rules, states follow their own rule making processes that include public participation opportunities such as hearings and public comment periods. For more information on participating in the regulatory development process, ***see Section 6, Question 13***.

Local, state and national groups benefit from coordinating with each other on their comment strategies and public awareness efforts. National advocacy groups benefit from place-based, on-the-ground insights and local and statewide groups can benefit from the name recognition and influence of larger organizations. By working together, groups of all sizes can reduce the chance of working at cross-purposes, bring greater power by aligning efforts and ensure broader representation.

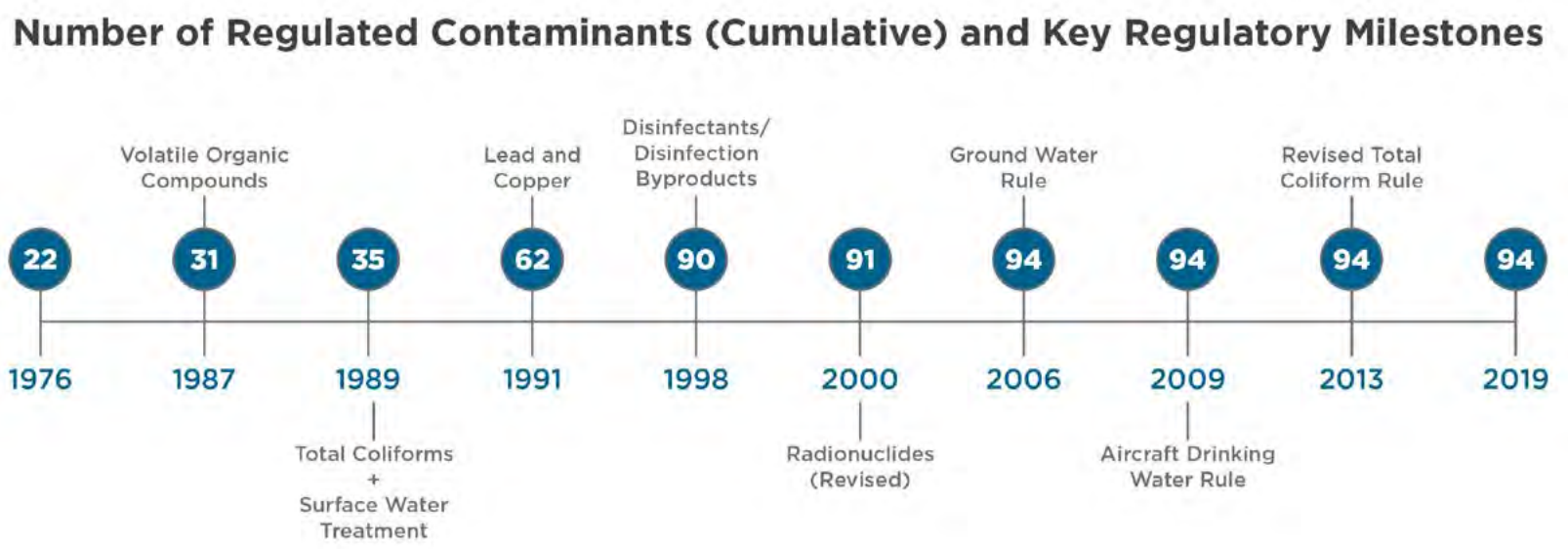
Regulated Contaminants

EPA currently regulates more than 90 contaminants in drinking water. These contaminants can be classified under the following categories:

- **Microorganisms:** Regulated microorganisms include viruses, bacteria, and parasites that can cause negative health impacts on their own, and/or serve as an indicator of other potentially harmful microbial contaminants in drinking water
- **Disinfectants:** While disinfection can be essential treatment for managing contaminants in drinking water, disinfectants can also pose human health risks above a certain level. Water systems that use regulated disinfectants must carefully balance their need to treat for harmful contaminants against the regulatory limits that EPA has established for such disinfectants in treated water.
- **Disinfection byproducts:** Disinfectants can react with natural organic matter or other substances present in source water to form potentially harmful disinfection byproducts. While there are hundreds of known disinfection byproducts, to date, EPA has evaluated and decided to regulate a limited number of them.
- **Inorganic chemicals:** Regulated inorganic chemicals are metals or minerals that may be naturally occurring in drinking water (e.g., arsenic), or present as the result of human or industrial activity (e.g., cyanide) or the material through which the water is being delivered (lead and copper or asbestos, for example).
- **Organic chemicals:** EPA regulates dozens of synthetic organic chemicals—human-made chemicals such as pesticides—and volatile organic compounds—human-made or naturally occurring compounds (primarily industrial chemicals, in this context) that can easily move between air and water.
- **Radionuclides:** EPA regulates naturally occurring (e.g., radium and uranium) and human-made radionuclides that are known to cause increased risks of cancer (and in the case of uranium, kidney toxicity)

Not every contaminant is regulated in the same way. Some regulations focus on the type of source water that a water system uses (e.g., the suite of Surface Water Treatment Rules and the Ground Water Rule, all of which address microbial contaminants). Some are targeted to a specific contaminant (e.g., the Arsenic Rule and Lead and Copper Rule). Others are targeted to the type of water system (e.g. the Aircraft Drinking Water Rule).

The timeline below shows the progression in the number of regulated contaminants since 1974, including some key regulatory milestones (note that not all promulgated regulations are included in the timeline.



Review of Primary Drinking Water Standards

The SDWA also requires EPA to review all existing NPDWRs every six years. Known as the **Six-Year Review**, the outcome of this process determines whether any of the regulations need to be revised. This generally consists of an initial review of all NPDWRs followed by a more focused, in-depth review of the regulations identified as candidates for potential revision during the initial review. EPA also excludes from the Six-Year Review process any NPDWRs for which there are other ongoing or pending regulatory actions. The most recent Six-Year Review was completed in 2016. Through that process, EPA determined that 68 of the 76 existing NPDWRs were appropriate, and that eight NPDWRs were candidates for revision. For those NPDWRs determined to be candidates for revision, EPA opens a public comment period to initiate more in-depth evaluation on whether to revise the regulations.[x]

Secondary Contaminants

EPA has also established National Secondary Drinking Water Regulations (NSDWRs) and associated secondary maximum contaminant levels (SMCLs) for the fifteen contaminants covered under the NSDWRs. The NSDWRs and SMCLs are generally not federally enforceable (although states may choose to make them enforceable), with the exception of fluoride. However, they do provide helpful guidance to public water systems in addressing contaminants that pose human health risks and tend to generate the most customer complaints due to their impact on the taste, odor and appearance of water. In addition to possible aesthetic effects on drinking water, secondary contaminants may have cosmetic effects on consumers (e.g., tooth or skin discoloration) or impacts on the effectiveness or operation of water treatment equipment and other infrastructure.

The exception noted previously is for fluoride, for which there is also an established MCL under the NPDWRs. If fluoride levels are between the SMCL and MCL, public water systems must notify customers within one year of the date of the exceedance of the SMCL.

THE ROLE OF EPA

The SDWA sets out the requirements that EPA must follow for establishing NPDWRs and other regulatory and voluntary programs aimed at drinking water protection and consumer notification. EPA develops regulations and oversees implementation of SDWA-directed programs at the national level, and, in some cases, at the state and tribal level. EPA also develops guidance, training and other technical resources to educate states and public water systems on regulatory compliance, capacity-building, financial management and other key topics.

EPA conducts federally required on-site or desktop reviews of most state programs to evaluate program management and effectiveness and the accuracy of data reported to the Safe Drinking Water Information System, the federal compliance database.

STATE DRINKING WATER STANDARDS

States can adopt standards that are more stringent than the federal standards. In the Great Lakes region, for example, Wisconsin's standard for vinyl chloride is more stringent than that set by EPA. For more information, see American Rivers' ***primer on drinking water protection in the Great Lakes***.

Other states have established standards for contaminants that EPA is not regulating at all. New Jersey, for example, adopted an MCL for perfluorononanoic acid (PFNA), one of the many chemicals known as per- and polyfluoroalkyl substances (PFAS), none of which EPA has decided to regulate. However, other states have set restrictions on setting standards that are more stringent than federal regulations.

CASE STUDY - PROVIDING INPUT TO RULEMAKING AT THE STATE LEVEL

In 2018, the ***Ohio Environmental Council*** (OEC) filed a Petition for Rulemaking to regulate perfluorooctanoic acid (PFOA), an industrial chemical used to create nonstick cookware, firefighting foams, and cleaners. Similarly, the OEC included provisions in its Petition that would regulate perfluoroalkyl substances (PFAS), PFOA's molecular family. While public visibility of PFAS as a class of water pollutants has increased significantly in recent years, PFOA has plagued Ohioans for nearly two decades. The Ohio River has been a focal point of the emerging PFAS crisis, as local residents learned that their drinking water sources had been contaminated from DuPont's Washington Works chemical plant.

Since the early 2000s, numerous studies have linked PFOA to many health problems, including ulcerative colitis and testicular cancer. However, little research has been done to investigate the dangers of the thousands of other PFAS. To date, EPA has not regulated PFOA or any PFAS. EPA has issued a non-binding Health Advisory that suggests limits for PFOA and its cousin, PFOS. This led OEC to file its Petition for Rulemaking requesting promulgation of maximum contaminant levels under the SDWA and water quality criteria under the Clean Water Act for PFOA individually and PFAS as a class.

Under the Administrative Procedure Act, EPA must respond to a Petition for Rulemaking. In February 2019, EPA released a ***national plan*** to address PFAS that includes following the regulatory development process to evaluate the possibility of regulating PFOS and PFOA.

Additionally, under a separate program, EPA regulates the construction, operation, permitting and closure of underground injection wells to protect underground sources of drinking water from injected fluids. For some states, territories and tribes, EPA directly implements the Underground Injection Control (UIC) programs and is responsible for on-the-ground oversight and implementation of UIC regulations for some or all classes of regulated injection wells.

Under the SDWA, EPA also has authority to intervene in a state or tribe with SDWA primary enforcement authority under certain circumstances. EPA can take targeted actions to address a problem or could withdraw primary enforcement authority from the state or tribe entirely and assume control of the program. In emergency situations, such as a substantial risk to human health or a threat of terrorist attack, the EPA Administrator is also given the broad authority under the SDWA to take any action necessary to protect the health of the public.

To facilitate national oversight and implementation of drinking water and other environmental programs under EPA, EPA has ten regional offices, each of which is led by a Regional Administrator. While the focus and priorities of each regional office may vary depending on the issues that the states, tribes and territories in that region are facing, they are all responsible for consistent implementation and oversight of federal statute and regulations. Staff at EPA regional offices are the primary interface between state environmental agencies and programs and EPA Headquarters.

THE ROLE OF STATE REGULATORS

Public Water System Supervision Programs

Public Water System Supervision (PWSS) programs provide oversight of the NPDWRs, among other core activities. Every state and territory (except Wyoming and Washington, D.C.) and one tribe, the Navajo Nation, has primary enforcement responsibility, or primacy, for all NPDWRs. To receive primacy, the state or tribe must meet requirements set out in the SDWA, EPA regulations and EPA guidance. These requirements include adoption of regulations for NPDWR contaminants that are no less stringent than EPA's regulations, having programs and processes in place for effective oversight and having an EPA-certified principal laboratory, among others. EPA is responsible for distributing annual grants to support PWSS program implementation. Alaska has primacy for PWSS program oversight of the state's Alaska Native Villages.

Under the PWSS program, primacy agencies are responsible for activities including, but not limited to the following:

- Development and maintenance of drinking water regulations, an inventory of public water systems and a compliance database
- Conducting required on-site reviews (referred to as "sanitary surveys") of public water systems' capabilities to provide safe drinking water

SAFE DRINKING WATER ACT COMPLIANCE AND ENFORCEMENT

Primary enforcement is delegated to the 49 states, six territories and one tribe (Navajo Nation) that have primacy under the SDWA. Primacy agencies must enforce the health standards and monitoring and reporting rules and provide this data on violations and enforcement actions to EPA's searchable *Safe Drinking Water Information System* (SDWIS). *EPA's Enforcement and Compliance History Online* (ECHO) system also includes regulatory enforcement and compliance data.

If a water system does not return to compliance despite the primacy agency exercising its full authority, EPA may step in to ensure compliance or if there is "imminent and substantial endangerment" to human health. However, as the situation in Flint, Michigan shows, EPA oversight of state programs is sometimes ineffective.[xi] Additionally, the SDWA does include a citizen suit provision for citizen enforcement, but it is limited by a waiting period and a failure to impose penalties. Finally, an examination of SDWA compliance, race and poverty over a four-year period revealed that health-based violations are higher in poor communities with a high percentage of Black and Hispanic residents compared to poor, white communities, reflecting a troubling inequity.[xii]

For more information, see the following resources:

- **EPA, *National Public Water Systems Compliance Report***
- **NRDC, *Threats on Tap: Widespread Violations Highlight Need for Investment in Water Infrastructure and Protections***
- **Journal of the American Water Works Association, *The Color of Drinking Water: Class, Race, Ethnicity, and Safe Drinking Water Act Compliance***

- Providing technical assistance to water system operators and managers
- Reviewing plans and specifications for new public water systems
- Enforcing state regulatory requirements, when necessary
- Overseeing consumer notification efforts

Primacy agencies also review and evaluate the results of drinking water monitoring by regulated public water systems and ensure that the water systems are meeting requirements associated with monitoring frequency, location sample handling and more. Each regulation specifies the actions that water systems (with oversight from the state) must take if they are in violation of monitoring and reporting or public notification requirements or health-based standards or trigger intermediate additional monitoring requirements. Primacy agencies are responsible for using their authorized enforcement authority under each regulation.

Primacy is handled separately across EPA's drinking water programs. A state may have primacy for NPDWR implementation, but not for regulatory implementation of certain underground injection wells, for example.

Source Water Protection and Underground Injection Control

As discussed in ***Section 1***, EPA oversaw establishment of state Source Water Assessment Programs, under which states assessed source water protection areas for all public water systems. While EPA develops technical tools and resources for source water protection and helps to promote the program with states and stakeholders, states are primarily responsible for developing and implementing voluntary strategies to initiate and sustain source water protection. States may also provide funding for source water protection efforts in communities through the DWSRF or other sources (e.g., wellhead protection program).

Those states that have primacy for implementing UIC programs for some or all regulated well classes are also responsible for oversight, permitting and data tracking of regulated wells.

Capacity Development and Operator Certification

The Capacity Development and Operator Certification programs were introduced under the 1996 Amendments to the SDWA. Under EPA oversight, each state developed a program designed to help public water systems, and small public water systems in particular, build the technical, managerial and financial capacity necessary to deliver safe drinking water. States were required to provide the following to EPA for approval:[xiii]

- Statutory and regulatory authorities used to ensure that all new community water systems and non-transient non-community water systems demonstrate adequate technical, managerial and financial capacity
- Identification of the state agency primarily responsible for developing and administering the program
- Description of control points, or milestones in the development of a water system at which a state can use its authority to evaluate whether the new system has adequate capacity
- List of the documentation required to demonstrate adequate technical, managerial and financial capacity
- Description of how the state will implement and measure the success of the program

As part of their Capacity Development program implementation efforts, states provide general and one-on-one technical assistance support to public water systems and monitor public water systems with longer histories of non-compliance with one or more NPDWR.

Each state produces a publicly available Capacity Development program annual report that details the progress made in implementation of their program and compliance with the SDWA requirements for the program, among other information. EPA maintains a list of state capacity development program contacts on its website.

QUESTIONS TO ASK

- What agency in my state administers federal drinking water programs?
- Does my state have stricter limits for any contaminants regulated under the SDWA or regulate any contaminants that are currently unregulated under the SDWA?
- Are there ongoing state or federal regulatory processes with upcoming public opportunities?
- What is my state doing to support the technical, financial, and managerial capacity of drinking water systems?
- Is PFAS contamination a concern in my state? If so, what is my state doing to address it?

RESOURCES

American Rivers and Great Lakes Environmental Law Center: ***Protecting Drinking Water in the Great Lakes: A Primer on Existing State Policies and Using the SafeDrinking Water Act***
Center for Effective Government: ***Regulatory Resource Center***
Congressional Research Service: ***Safe Drinking Water Act (SDWA): A Summary of the Act and Its Major Requirements***
Environmental Law Institute: ***A Citizens Guide to Influencing Agency Action***
EPA: ***Safe Drinking Water Act***
River Network: ***Drinking Water Webinar 101 Series: Understanding the Basics of Drinking Water Sources, Treatment and Quality***
Safe Drinking Water Act Primacy Agencies

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SECTION 4: WHAT DOES DRINKING WATER COST AND WHAT IS MY WATER BILL PAYING FOR?

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BACKGROUND

In many communities in the U.S., drinking water is paradoxically both underpriced and unaffordable. Collecting, treating and distributing clean and safe drinking water is expensive. While there are some sources of federal funding for water systems, most funding comes from the local level. Ideally, water rates would be set and structured to recover the full cost of providing safe drinking water without placing an undue burden on any individual ratepayers.

Many water systems, however, have not kept pace with needed investment in infrastructure or adopted a proactive approach to operations and maintenance and long-term capital planning. Additionally, water rates are often subject to approval by elected officials in a community. Raising rates, especially when such increases are significant, is rarely a popular decision. The combination of these and other factors has resulted in artificially low water rates in many communities in the U.S., increasing the already significant gap between drinking water sector infrastructure needs and ongoing investment. When a major infrastructure investment becomes unavoidable, the result can be unexpected and potentially significant rate hikes.

Water prices, and the way pricing is structured, generally do not communicate the true value of water to customers. At the same time, even in communities where rates are far lower than the actual cost of providing drinking water services, many customers have difficulty paying their water bills. This means some people face very difficult choices about how they use their income from month to month. Customers, who are unable to pay their bills regularly can end up having their water shut off.

Water shut offs disproportionately affect low income communities and communities of color, depriving citizens of a fundamental resource and potentially creating a significant public health risk to vulnerable individuals, including infants and children and the elderly, among others. Affordable access to sufficient supplies of safe water for everyone is essential. Some communities have been able to find an effective balance between environmental and financial sustainability for their drinking water system and customers.

COST OF DELIVERING POTABLE WATER

Although water falls from the sky, runs across land, flows in streams and rivers, and moves underground, there are costs related to delivering clean and reliable drinking water to your home. These costs fall into two general categories: capital costs (i.e., physical infrastructure) and operations and maintenance costs.

Capital costs include those associated with, among other things:

- Constructing and replacing infrastructure for capturing water from surface water or ground water sources
- Constructing and replacing infrastructure treatment and distribution infrastructure, including water intakes, pumps, valves, pipes, storage tanks and meters, as well as all equipment associated with managing water system operations (e.g., computers, vehicles, excavation and construction machines, GPS equipment, etc.)
- Protecting source water through purchase of land or permanent conservation easements.

Operations and maintenance costs include those associated with, among other things:

- Monitoring source water in the contributing watersheds, reservoirs, rivers, and aquifers
- Pollution management practices within the watershed
- Treating water to remove contaminants
- Storing water and pumping water from the treatment plant or well house to customers
- Maintaining and inspecting infrastructure and equipment
- Recording water usage and issuing bills
- Paying technical, management, and other support staff to manage and operate the water system, including conducting all monitoring, reporting, recordkeeping, and public notification activities required under federal and state regulations
- In some cases, purchasing water from water wholesalers or making payments for water rights

WHAT YOU'RE PAYING FOR

For a short video on the costs of treating and distributing water, see the Alliance for *Water Efficiency's Water: What You Pay For video*. For more information on how to better understand what you are paying for in your own water bill, see EPA's *Understanding Your Water Bill* and the *American Water Works Association's Questions About Water Bills* resources. Note that in many communities, drinking water charges are included on the same bill or combined with charges for other municipal services, such as sewer, stormwater, waste disposal and more.

Drinking Water Infrastructure Needs

Many drinking water systems across the country are facing a significant challenge in maintaining and paying for aging infrastructure. The American Water Works Association (AWWA) estimates that $1 trillion is needed to maintain and expand service to meet drinking water demands over the next 25 years.[1] Understanding and budgeting for expensive, long-term infrastructure improvements is essential to a well-run water system and municipality but takes time and resources that are often in short supply. A water system and the community it serves must carefully weigh the infrastructure investments needed to secure clean and safe drinking water against what customers can afford to pay, and the relative costs and benefits of those investments against other needs in the community. As an advocate and community member, understanding the infrastructure challenges your community faces will help you to advocate for the most effective solutions.

GRADING AMERICA'S INFRASTRUCTURE

The American Society of Civil Engineers (ASCE) produces a "report card" on the state of America's infrastructure every 4 years. In the *2017 report card*, the ASCE gave the nation's water infrastructure a "D" grade and outlined several recommendations to raise the grade, including pursuing more innovative funding approaches to finance infrastructure improvements, combining water systems to take advantage of economies of scale, and encouraging water systems to determine the true cost of supplying clean and reliable drinking water. ASCE also generates *state-specific reports cards*.

Many pipes across the U.S. were put into the ground in the early to mid-20th century. In some cities, some sections of pipe may be even older. Given most pipes have a designed lifespan of 75 to 100 years,

much of the estimated 1.2 million miles of pipes in our nation has reached or gone beyond useful life, causing an increase of water main breaks across the country. Reacting to such emergencies, over the long-term, is generally more expensive than proactively addressing them before they occur.

In many communities across the country, current drinking water infrastructure was installed using investments made by past generations, often via funding from the federal government. The result is that local water systems often have not been keeping up a pace of infrastructure renewal that spreads the costs equally across generations of consumers, and water bills often do not reflect the true cost of providing water. At the same time, many water systems have not evolved their approaches to pricing water either to address looming infrastructure needs, changing demographics, customer behavior regarding water usage, and the financial circumstances of the community, its residents and businesses.

REDUCING WATER LOSS

For drinking water systems, water "loss" refers to the water that is treated and pumped for delivery to customers but ultimately never paid for. Billions of gallons of treated water is lost every year. Water can be "lost" due to physical problems such leaks or other infrastructure failures, theft, administrative errors, and problems with water meters, among other issues.

Reducing water loss through comprehensive evaluations or audits of the amount of water being lost in the system, installation of water meters to monitor usage and leaks and establishment of a water loss control program, is a win-win for water systems and consumers. Modern "smart" meters can provide immediate, real-time data to quickly identify more significant water loss issues. Identifying and addressing water loss problems can save a water system a significant amount of money, and these cost savings can be passed on to the customer. Reducing water loss also helps to conserve the use of water supplies that may be limited, reducing or eliminating the need for new water supplies or greater restrictions on customer water use.

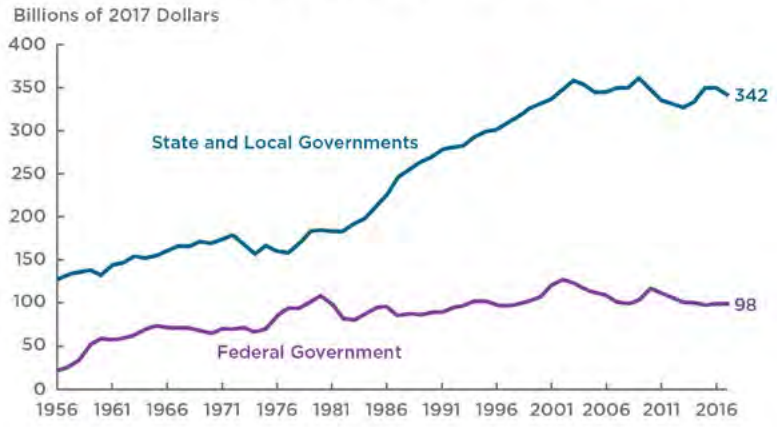
For more information on reducing water loss, see the Center for Neighborhood Technology's *Water Loss Control* and NRDC's *Cutting Our Losses* resources.

Paying for Water Infrastructure

Most funding for drinking water operation and infrastructure (including source water, treatment and distribution) comes from ratepayers. Water systems may also receive additional funding from other municipal sources, and use additional financing sources from the local, state or federal levels (e.g., municipal bonds, state or federal low-interest loans such as those provided by EPA's Drinking Water State Revolving Fund, or grants) when facing a more significant investment need. Ultimately, however, unless the external financing is in the form of a grant that does not have to be repaid, customers will bear the responsibility for repaying borrowed money through their water bills. As most funding is coming from local sources, place-based environmental and community groups are well-positioned to be part of the conversation on community investment priorities and making the case for needed water infrastructure upgrades.

Across the nation, drinking water rates and rate structures vary greatly, with a national average of $40 per month.[ii] Between 2009 and 2014, state and local governments reduced capital spending for both drinking water and wastewater by 22%, whereas capital spending provided by the federal government did not change much.[iii] Although overall investments have since increased and water infrastructure funding has been a high-profile discussion topic across the federal and state governments, the needs among water systems continue to out-pace investments made to maintain and replace existing infrastructure. For many communities, unless water rates go up, their water system will not have sufficient funds to keep pace with operations and maintenance and capital (infrastructure) needs.

Public Spending on Transportation and Water Infrastructure, by Level of Government



Source: Congressional Budget Office, 2018

Communities with growing populations and economies may have more opportunities to get ahead of financial shortfalls. At the same time, serving a rapidly growing population can create additional challenges related to infrastructure and water supply capacity. For communities facing declining or shifting populations and economies, contaminated or stressed water sources or other health emergencies, the fixed cost for maintaining drinking water infrastructure can exceed current revenues from a reduced customer base. This will further widen the gap between the water system's needs and the investments being made to meet those needs. To learn more about how your organization can advocate for increased water infrastructure funding, see ***Section 6, Question 15***.

Federal and State Funding for Drinking Water

Although federal funding for drinking water is limited relative to total need, the Drinking Water State Revolving Fund (DWSRF) authorized under the Safe Drinking Water Act (SDWA), provides an important source of funding that can be leveraged in creative ways. Congress appropriates funding to EPA, and EPA provides annual capitalization grants to state DWSRF programs. States use these grants to provide assistance, in varying forms, for water system capital improvement projects. States must provide a 20% match for their federal grant each year. In addition to the annual grant and state match, principal repayments and interest from previously executed assistance agreements, and in some cases, bond proceeds, feed back into each state's loan fund. This allows the state to maintain a perpetually revolving assistance pool for local borrowers.

Every state and Puerto Rico have established revolving loan funds to address the most serious risks to human health, support compliance with the SDWA requirements, and provide assistance to the drinking water systems most in need on a per household basis. State DWSRF programs and program contacts are provided on EPA's website.

Up to 31% percent of the federal capitalization grant can be used as "set-asides" to fund technical assistance for small water systems (2%), program administration and technical assistance (4%), state program management (10%), and local assistance and other state programs (15%). The program includes additional flexibilities to allow states to meet the needs of small and disadvantaged communities, and funding can also be used for water efficiency and source water protection.

States use established project priority ranking systems to generate a Project Priority List (PPL) that ranks assistance recipients according to specified criteria. While ranking criteria vary by state, all states prioritize eligible projects that meet the three core goals of the program, as previously described. All states provide comprehensive information on the eligible projects they expect to fund each year through an Intended Use Plan (IUP), which is required to receive the federal capitalization grant from EPA. The IUP is made available to the public for review and comment prior to capitalization grant award. The PPL is generally either included in the IUP or with the capitalization grant application. This is an important opportunity for advocates to comment and get engaged to ensure that projects that will do the most for people and the environment are prioritized.

Eligible funding recipients include publicly- and privately-owned community or nonprofit non-community water systems, though some states do not permit DWSRF funding to be used by privately-owned systems. Borrowers must demonstrate adequate technical, managerial and financial capacity and compliance with National Primary Drinking Water Regulations.

Each state produces a publicly available DWSRF program annual reports that include information on program progress, financial status and loan portfolio, among other information.

The 2014 Water Infrastructure Finance and Innovation Act (WIFIA) of 2014 created an additional EPA credit program for large-dollar-value water and wastewater infrastructure projects. Eligibility is limited to projects of at least $20 million for large communities and $5 million

for smaller communities with populations under 25,000. WIFIA can fund up to 49% of eligible project costs. Further information is available on EPA's website.

Additionally, there are other federal programs that provide some funding for drinking water, like the U.S. Department of Agriculture's funding for rural communities. Provisions in the 2018 Farm Bill also direct a percentage of conservation program funding toward source water protection.

Many states have also set up funding programs for water infrastructure projects, technical assistance, and other support to improve the safety and sustainability of water infrastructure and water supplies.

EQUITABLE INFRASTRUCTURE INVESTMENT

In addition to the need to fund infrastructure, it is critical to ensure that investments are made in a way that provides equitable benefits across the community. PolicyLink has developed the following principles for infrastructure equity:

1. **Develop a commitment to infrastructure equity principles, including:**
   - **a. Regional outcomes**
   - **b. Attention to community infrastructure**
   - **c. Criteria for infrastructure priorities**
   - **d. Equitable distribution**
   - **e. Economic opportunities**
   - **f. Fair financing mechanisms**
   - **g. Community engagement**
2. **Focus on resident capacity building to ensure community control**
3. **Develop buy-in from local government and other stakeholders**
4. **Be prepared for long term engagement**

To learn more, see PolicyLink's *Community Campaigns for Infrastructure Equity*.

WATER RATE DESIGN

Water systems use a range of approaches to charge for water. A well-designed rate structure will recover the full costs of providing water service to customers. Generally, water rates differ depending on the customer class (e.g., residential, commercial or industrial). Water systems can apply one or a combination of the following rate structures across customer types:

- **Flat fee:** All customers are charged the same fee regardless of the amount of water used
- **Uniform rate:** A constant per unit price is applied to all metered units of water consumed on a year-round basis
- **Increasing block rates:** The unit price of each succeeding block of usage is charged at a higher unit rate than the previous block(s) to discourage excessive water use. This approach is common in urban areas and areas with limited water supplies.
- **Declining block rates:** The unit price of each succeeding block of usage is charged at a lower unit rate than the previous block(s). This approach is common in rural areas, areas with large industrial users and areas with plentiful water supplies.
- **Seasonal rates:** Rates vary according to the time of year. This is common for areas with seasonal demand (e.g., vacation communities where the population increases significantly in the winter or summer months)
- **Water budget-based rates:** Households are given a water budget based on the anticipated needs of that household either by the number of people living in the house and/or property size

Water systems may also apply temporary pricing structures under extreme circumstances. For example, in periods of extended drought, water systems may apply drought rates to reduce water use and maintain water availability for everyone (higher rates, adjusted based on the drought level and availability of water).

Setting Water Rates

Depending on where you live, the process through which water rates and rate structures are set, the authority responsible for setting them, and the time horizon over which rates will be set varies. For many water systems, rate increases must be approved by local authorities that hold public meetings to obtain community input as part of that process. For investor-owned public water systems, and publicly owned water systems in some states, any rate increases must be approved by the state's Public Utility Commission with public input. These Commissions also regulate rates for services such as

natural gas and electricity. Additionally, rate setting for investor-owned (private) water systems includes consideration for return on investment for their shareholders and owners, which may drive rates up.

Setting—in particular, raising—water rates is an inherently political issue. This can be detrimental or beneficial to water systems and customers. Elected officials who are responsible for approving water rate increases may be reluctant to do so if it has a negative impact on their public approval and their ability to retain their positions between elections. Advocates and community members can play an important role in balancing political considerations with the public health, economic and environmental needs of the community, and supporting rate structures and rates that address all these considerations For more information, see ***Section 6, Question 15***.

CONSIDERATIONS FOR WATER AFFORDABILITY

For purposes of this Guide, we use the Pacific Institute's definition of water affordability: the "cost of essential water and sanitation should be inexpensive enough that cost does not prevent access, nor interfere with other essential expenditure."[iv]

On average, as a percentage of household income, U.S. households pay less for water than other developed countries, leading to a general perception that water is readily available and water services are generally inexpensive. Within any one community, particularly those with significant income disparities, the cost of water may seem like a bargain to some customers and make little or no impact on their monthly cost of living. For others, the same rate can pose a significant financial burden that requires difficult choices on what bills to pay from month to month. Access to reliable, safe water is essential for public health and safety, and maintaining an adequate standard of living. This is particularly critical for vulnerable low-income populations, including infants, children, the elderly, and disabled or immune-compromised individuals. As such, water affordability is a key issue for many communities.

Measuring Water Affordability

Just as there is no single definition for water affordability, there is also no perfect approach to measuring it. Traditionally, water affordability has been measured by the annual cost of water bills as a percentage of median household income (MHI). Households paying above a certain threshold are considered to be paying a cost that is unaffordable (e.g. water bills above 2.5% of the MHI). However, MHI does not always accurately capture the vulnerability of certain households and may overstate needs in other ways.[v] This approach

MAPPING THE IMPACT OF WATER SHUTOFFS IN DETROIT

Water affordability has reached a crisis level in many communities, including Detroit, Michigan, where aging infrastructure, a declining population and rising water costs have led the water system to shut off service to tens of thousands of residents unable to pay their water bills. The mass shutoffs started in the wake of Detroit's 2014 bankruptcy, and they continue unabated, with no provisions for vulnerable populations such as pregnant and nursing women, children, elderly, disabled or chronically ill individuals.

We the People of Detroit **takes an approach to the water affordability crisis that merges research with action and empowerment for a more secure water future. In 2014, during the initial wave of water shutoffs, We the People of Detroit served as the on-the-ground coordinator for the** ***People's Water Board Coalition***, **which has grown to more than 50 community-based organizations, providing emergency water relief. We the People of Detroit has continued to build youth leadership and social justice programs, trained volunteers to undertake community-based health assessments, and continues to distribute emergency drinking water.**

We The People of Detroit also developed a research collaborative to map and illustrate the extent and impact of water shutoffs on health. The final report, ***Mapping the Water Crisis***, **describes the impact of emergency management, rate setting and shutoff policies that disproportionately affect Detroit's African-American and working class population compared to the predominantly white suburban areas. These shutoffs lead to displacement and neighborhood instability, which contribute to foreclosure and sometimes demolition. We The People for Detroit continues to fight for water as a human right for Detroit's residents and all humanity worldwide. (Adapted from Monica Lewis Patrick, Detroiters' Fight for Affordable Water Access Has Lessons for America's Future, in** ***River Voices*** **2017.)**

was originally developed to measure the financial capability of an entire community to pay for infrastructure investments and did not consider the individual or neighborhood level.

Other metrics of affordability include poverty levels, unemployment rates and percentage of people receiving other federal benefits (e.g. Supplemental Nutrition and Assistance Program benefits). More recent approaches include using an "affordability ratio" that looks at costs of water and sewer as compared to disposable income for a community's 20th income percentile and determining the hours of labor at a community's minimum wage needed to pay a family's water bill.[vi] These approaches better reflect where water and sewer rates need to be addressed to ensure essential access.

WHY IS MY WATER BILL GOING UP?

Water bills may increase for several reasons:

- **You are using more water than in the past. Note that usage fluctuations often happen during certain times of year, such as in summer when more outdoor irrigation occurs.**
- **There is a leak or other problem such as a faulty appliance leading to excess water loss**
- **Your water system has increased water rates to account for increased costs in operations and maintenance, planned capital improvements or changes in their customer base**
- **Your water system has changed its pricing structure**

If your water bill remains consistently higher than in the past, despite efforts to reduce your water usage or address water los, the increase is likely linked to things beyond your personal control but could be something the community can address collectively. For more information, see *Section 6, Question 7*.

Approaches to Improving Water Affordability

Communities are developing new approaches to reduce the financial burden of water bills on lower income households and others at risk of losing service. Consumer Assistance Programs include approaches such as a discount on bills, changing payment plans, debt forgiveness, temporary assistance and free water efficiency upgrades.

In addition to Customer Assistance Programs, some communities are designing rate structures that integrate affordability considerations. The difference between affordability and assistance is important to understand, as they have different implications for low-income and vulnerable groups. Assistance programs are intended to help consumers deal with short-term challenges and emergencies that may disrupt their ability to pay their water bills. Affordable rates ensure that residents on fixed and low incomes can keep up with their water bills over the long term. They can also be used in tandem, to maximize support for those customers most in need.

For example, Philadelphia has instituted a first-of-its-kind tiered assistance program tied to pre-tax income levels that meet federal poverty guidelines. Rates vary depending on the number of individuals living together, and bills include drinking water, sewer and stormwater charges:

- A household with an income at 0 to 50% of the federal poverty line will pay 2% of their monthly income for the water bill
- A household with an income at 51% to 100% of the federal poverty line will pay 2.5% of monthly income
- A household with an income at 101% to 150% of the federal poverty line will pay 3% of monthly income

The minimum bill will be $12 per month. Additionally, the program allows for lower payments from higher income earners in the case of hardship, like job loss.

Note that some states have legal restrictions on funding Customer Assistance Programs and other mechanisms for providing more affordable water. To find out whether your state addresses this issue, see the Navigating Legal Pathways to Rate-Funded Customer Assistance Programs guide.

THE AMERICAN WATER WORKS ASSOCIATION'S 2018 POLICY STATEMENT ON AFFORDABILITY

"The American Water Works Association (AWWA) recognizes that providing reliable and high-quality water, wastewater, reclaimed water, and stormwater services at fair and reasonable rates and charges to all customers is fundamental to a utility's mission. To be financially sustainable, utilities optimize expenditures through operating efficiencies, implement water conservation and resource management best practices, and prudently manage capital, operating, and financing costs. However, even with sound planning and budgeting practices, some utilities are faced with affordability challenges among some of their low-income residential customers, which in turn affect their customer-based revenues. Such affordability challenges can occur in any community, regardless of size, location, demographic makeup, and income distribution.

AWWA strongly recommends the adoption of policies and procedures by utilities, regulators, and governmental entities to address the affordability challenges experienced by some of their residential customers. Utilities should work closely with their local, state, provincial, and national governments to ensure that applicable laws and policies do not impede utility efforts to address affordability challenges and evaluate new policies that allow low-income households to have access to utility services, while maintaining the fiscal sustainability of utilities.

Low-income customer assistance can take many different forms that should be designed and implemented to meet the unique challenges of individual communities and may be considered as an appropriate component of system revenue requirements. Effective communication and education programs targeting low-income households are also important to build awareness about available assistance programs and strategies to use water more efficiently.

Implementing long-term solutions to meet affordability challenges entails applying both existing tools and modification of current government policies. Along with non-water service providers, effective locally appropriate solutions can deliver assistance to low-income households through collaboration with existing community service programs, customer assistance programs operated by other utilities (such as energy service), and community housing assistance programs." (Adopted by the AWWA Executive Committee, October 24, 2018)

Addressing the Risk of Shut-Offs

As described above, many water systems have programs that can help low-income individuals with their bills, or payment mechanisms that can help with high-peak load months—like a cost-averaging plan that keeps the bill consistent throughout the year. Furthermore, some water systems may be able to arrange a payment term for customers who owe money. Contact your water system to find out how to initiate such an arrangement. If your water system does not have such a program, reach out to other community groups to develop an advocacy and outreach strategy for encouraging development of an assistance program and a rate structure that incorporates affordability considerations. For more information, see ***Section 6, Question 8***.

MAKING THE BUSINESS CASE FOR AFFORDABILITY PROGRAMS

Community advocates can help to make the business case for incorporating affordability considerations into water rates, to their local water system. By ensuring more regular payment, even at lower levels, a water system can save money by avoiding the administrative costs of shut-offs and bill collection. In Atlanta, Georgia, where estimates show that 50% of households face water affordability issues, the city's Care and Conserve program helps single-family, low-income customers facing financial hardships manage water bill payments through financial assistance and promoting conservation. Atlanta considers affordability support as a benefit to both the city and customers, alleviating a financial burden, while addressing plumbing problems and installing more efficient devices that save the city money and conserve valuable water resources in the long-term. Nonetheless, reaching and assisting all customers remains a challenge.[vii]

QUESTIONS TO ASK

- Can I understand my water bill?
- Does my water system have infrastructure upgrade and replacement needs?
- What is my water system's plan for funding infrastructure upgrades and replacements?
- Does my water system have a water loss audit program in place?
- What rate structure is used in my community?
- Does my water system have a way to assist people who are struggling to pay their water bills to ensure they have essential water service?
- What is the policy for water shutoffs—how quickly, if at all, will the water system shut off service following non-payment?

RESOURCES

American Rivers: ***Drinking Water Infrastructure: Who pays and how (and for what?)***
Mayors Innovation Project: ***Making Ends Meet: A Workshop on Water Affordability***
Manny Teodoro: ***Water & Sewer Affordability in America***
Michigan Environmental Council: ***Drinking Water Toolkit***
National Resources Defense Council: ***Go Back to the Well: States and the Federal Government are Neglecting a Key Funding Source for Water Infrastructure***
Pacific Institute: ***Water Rates: Water Affordability***
University of North Carolina Environmental Finance Center: ***Navigating Legal Pathways to Rate-Funded Customer Assistance Programs***
U.S. Environmental Protection Agency: ***Compendium of Drinking Water and Wastewater Customer Assistance Programs***
U.S. Environmental Protection Agency: ***Resources on Financing Resilient and Sustainable Infrastructure***
U.S. Environmental Protection Agency: ***Water Finance Center***
U.S. Water Alliance: ***An Equitable Water Future***
Water Environment Foundation: ***Words on Water: Manny Teodoro on Affordability of Rates***
Water Research Foundation: ***Customer Assistance Programs for Multi-Family Residential and Other Hard to Reach Customers***
WaterNow Alliance: ***Financing the Future of Water Infrastructure Just Got A Whole Lot Easier***

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SECTION 5: HOW WILL CLIMATE CHANGE AFFECT MY WATER, AND WHAT CAN WE DO ABOUT IT?

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BACKGROUND

Changing climate patterns will continue to have a disruptive and unpredictable impact on our drinking water resources and communities. In some places, this includes increased frequency and intensity of floods and sewer overflows. Other areas will experience more frequent droughts, water scarcity and increased fire risk. These changes can disproportionately affect the most vulnerable members of society and those already facing significant health and economic burdens in our communities.

The impacts of climate change on water resources and drinking water services are highly variable across the country and are very difficult to anticipate or predict. This uncertainty makes the already complex job of managing water quantity and quality, protecting infrastructure sustainability, managing affordability, and building consumer trust even more challenging. Responding to and mitigating these impacts requires careful long-term planning, smart financial investments and close communication between drinking water systems, municipal leaders and consumers.

Water systems and communities must be prepared to respond to cyclical and unexpected climatic changes and their impacts on the water resources on which a community relies. While many water systems have invested significant resources in preparing for and adapting to the impacts of climate change, balancing climate change considerations with other priorities, particularly under varying scenarios of potential climate impacts, remains a significant challenge.

IMPACTS OF CLIMATE CHANGE

Extreme Weather

Certain types of extreme weather events, such as heavy precipitation, flooding, hurricanes and winter storms have increased in number and intensity in recent years.[i] Extreme weather events can cause unexpected, significant damage to drinking water infrastructure, interrupting service to the community and necessitating expensive and sometimes disruptive infrastructure repairs or replacement. Extreme events can also affect water quality, particularly for those communities that rely on surface water sources of drinking water and may require the temporary use of an alternative water source or bottled water. The cost and timeline for recovering from extreme events can vary significantly and may require changes to water system infrastructure and operations. Extreme events can also lead to population changes over time, impacting the size and make-up of a system's customer base, which in turn can affect a system's revenue.

EXTREME WEATHER AFFECTS DRINKING WATER SUPPLIES

Following Hurricane Florence in September 2018, dozens of drinking water systems in North Carolina either temporarily stopped operating or issued boil water notices to their customers.[ii] Water quality in the state was further threatened by flooding, releasing livestock waste, dead livestock, untreated sewage and coal ash into surface water.

In Texas, thousands of citizens were still without a safe and reliable drinking water source even months after Hurricane Harvey hit the state in August 2017.[iii] Flooding triggered by the hurricane disabled drinking water systems and led to the release of toxic chemicals and other pollutants into drinking water supplies. While communities worked to arrange for delivery of potable water, options for doing so were not immediately available and hospitals had to evacuate patients due to lack of safe drinking water.[iv]

In 2013, Hurricane Sandy affected more than 80 drinking water facilities and 200 wastewater facilities on the east coast, leading to drinking water system shutdowns and the release of more than 10 billion gallons of raw sewage. Contractors had to install an emergency underwater gate to prevent the release of untreated sewage into a major drinking water supply, and EPA and other agencies provided hundreds of millions of dollars in federal funding to rebuild and replace damaged infrastructure.[v]

Rising Temperatures

Climate change can have significant impacts on the hydrologic cycle. Rising temperatures are expected to lead to increased precipitation, changes in the intensity and frequency of precipitation and changes in water runoff and evaporation. In regions where water supplies rely on winter snowmelt, the amount of snowmelt, and when and how fast the snow melts may also change.

Rising temperatures can also promote biological activities in drinking water sources, such as harmful cyanobacteria blooms, that may require expensive and rapid response changes to treatment operations, or temporary bans on the use of that water source.

For coastal water systems, sea level rise from melting of glaciers due to rising temperatures is another significant concern. Rising seas can threaten infrastructure, cause saltwater intrusion into drinking water sources and worsen the effects of extreme events such as hurricanes on coastal communities and the water systems that serve them.

RISING TEMPERATURES AND WATER SUPPLY AND DEMAND

Salt water intrusion into ground water supplies has led water managers in Broward County and other southern Florida communities to discontinue use of or move drinking water wells. This problem will accelerate if sea level rise continues to increase, threatening highly populated areas of southern Florida from the Keys up through Palm Beach County.[vi]

One study estimated that the timing for snowmelt-driven runoff, which is a critical water supply source for many agricultural and metropolitan areas in America's west, could be significantly earlier due to rising temperatures.[vii] Early runoff can overwhelm infrastructure designed to handle the timing and capacity of snowmelt as it has occurred historically. Heavy precipitation and early runoff in California in 2017 led to severe damage to the Oroville Dam, prompting large-scale community evacuations.[viii]

Many of the projections associated with these impacts, and how these impacts will vary across the country, are uncertain. Therefore, for communities, anticipating and responding proactively to these potential changes is complicated. Rising temperatures and the effects of decreased or increased precipitation can also lead to significant, long-term changes in both the natural environment and human-made structures and systems.

Drought

Drought is characterized by insufficient precipitation over an extended period of time. The impacts of drought are often made worse by rising temperatures. Some regions of the country have been experiencing more frequent and longer droughts. Drinking water systems in drought-prone regions of the country have the added challenge of not knowing how long drought conditions will last, or how severe they will become. Drought can:[ix]

- Decrease the quantity of water available
- Increase demand for an increasingly limited supply of water leading to other impacts such as dropping groundwater levels and sinking land
- Impact water infrastructure (e.g., changing soil structure can lead to more frequent water main breaks)
- Affect surface water and groundwater quality (e.g., salt water contamination of freshwater sources on coasts or higher concentrations of nutrients and other contaminants)

Prolonged droughts may have very serious environmental, economic, and social impacts on a community and can require difficult decisions about using and paying for water.

DROUGHT AND DRINKING WATER

In 2007-2008, Georgia experienced one the state's most severe droughts in more than a century. The total economic impact of the drought was estimate at over $1 billion. Lake Lanier, the City of Atlanta's primary water supply, dropped 20 feet.[x]

In 2018, Lake Mead, the largest reservoir in the U.S. by capacity, was less than half full. The reservoir, which straddles Arizona and Nevada and provides water to almost 20 million people in the southwestern U.S., has been depleted by years of sustained drought coupled with unceasing population growth in the region. Groundwater in the west has fared little better, with levels in the High Plains aquifer system in the Plains states and western and southwestern U.S. estimated to have decreased by over 100 feet in some places.[xi] In areas including *California's Central Valley*, some wells have run completely dry, forcing residents to drill deeper, and more expensive wells, or exclusively use purchased, bottled water from suppliers.

Wildfires

Climate change is expected to contribute to more frequent wildfires, which are generally related to drought or rising temperatures. Wildfires can have significant impacts on drinking water, in part because they often deposit ash and other debris in water sources. When heavy rains follow a wildfire, flash flooding can move large deposits of dirt, debris, sand, heavy metals, and other contaminants into drinking water sources. Such events can lead to very costly and time-intensive clean-up and treatment efforts.

WILDFIRES AND DRINKING WATER IMPACTS

Flash flooding after the Denver, Colorado-area Buffalo Creek (1996) and Hayman (2002) fires led to contamination of drinking water sources with sediment and debris, and major infrastructure damage. Denver water spent nearly $30 million to repair infrastructure, remove sediment and other debris, and conduct land restoration activities. These fires prompted Denver Water to form the From Forests to Faucets initiative, a partnership with state, federal and other entities to better manage forests in priority watersheds.[xii]

In 2017, wildfires in California resulted in contamination of one community's water supply with benzene, a known carcinogen. The source was believed to be burned and melted plastic pipes and other water system components, and the contamination event was thought to be the first of its kind in the U.S. While the benzene levels ultimately dropped, the City of Santa Rosa spent several million dollars replacing service lines and providing filtration devices to residents.[xiii]

RESILIENCE AND ADAPTATION PLANNING

For many water systems, how to be more resilient in the face of climate change has become a routine consideration for future planning and investment. For many more systems, climate change will become a reality in the near future. Water advocates and community-based organizations can play an important role in educating community members on the effects of climate change on their water resources and water services and involving them in decisions related to climate change planning. It is especially important to have trusted and knowledgeable local leadership given the disproportionately negative impact that climate change will have on vulnerable populations.

Water Availability and Resilience and Adaptation Opportunities

Drinking water systems aim to provide a safe, reliable supply of drinking water to customers at a reasonable price. Climate change can make that task much more difficult. In areas that are at the greatest risk of extreme weather, drought and other types of weather events, proactive water systems need to find practical ways to develop and implement the environmental, financial, physical and educational measures to maintain an adequate, high quality supply of drinking water. Community advocates can play a critical role in helping to evaluate and promote these measures.

Conserving the existing source of water is generally the first option that communities should evaluate and pursue in response to climate change.[xiv] Encouraging customers to reduce water use can protect existing water supplies, preserve other water resources and avoid more expensive alternatives.

Customer behavior plays a powerful role in helping drinking water systems better manage their supplies. The impact of how much and when customers use water (e.g., for industrial, commercial, drinking, bathing, irrigation, and other purposes), manage water in their home or business (e.g., through use of low-flow devices), and monitor for potential water losses happening within their properties or residences (e.g., through leaking pipes or faucets) can have a significant effect on overall water usage.

DEFINING WATER CONSERVATION AND WATER EFFICIENCY

While water conservation and efficiency have the same goal of reducing overall water use, and the terms are often used interchangeably, they are different approaches toward the same end. Water conservation is about using less water through "policies, programs and practices,"[xv] whereas water efficiency is defined as the "[m]inimization of the amount of water used to accomplish a function, task or result."[xvi] In other words, water efficiency is more technology-driven, and water conservation is more behavior-driven: installing a low-flow high-efficiency showerhead would be considered water efficiency, while taking a shorter shower would be considered water conservation. Similarly, water conservation is planting native or drought-tolerant species to reduce outdoor water demand, while water efficiency is using moisture sensors or other types of technology to reduce the water used. Water systems in communities including Denver, San Diego, San Antonio and many more have worked closely with city governments to invest in large-scale and high-profile conservation programs.

Water systems can use the following approaches to encourage less water use in their communities:

- Educational and outreach campaigns (e.g., web resources, public meetings or workshops, printed materials, on water usage and best practices for reducing and managing water use)
- Providing greater transparency and up-to-date information on water usage (e.g., through mobile apps that allow customers to track usage electronically and/or compare their water usage to other customers, through metering of previously unmetered customers, or through installation of updated water meters)
- Providing financial incentives (e.g., rebates) for installing water-saving devices, xeriscaping (landscaping that requires little or no irrigation), use of gray water (wastewater from sinks, showers, bathtubs, washing machines, etc.) for irrigation, and other conservation measures
- Conducting a water loss audit, to evaluate how much water is being treated and pumped into the entire distribution system versus how much is actually being used and begin to determine how much water loss is occurring. Water systems can then deploy leak detection measures to evaluate why and where water is being lost in the system.
- Pricing water to incentivize conservation. Any decision to manage water demand through pricing must be accompanied by careful evaluations of how to influence customer behavior with price signals, what the impact of any conservation pricing would be across all customer categories, and what the impacts of effective conservation pricing would be on system revenue. Water systems must also consider historical water usage (and how usage varies by season, customer type, usage type, etc.). Typical conservation rate structures involve increasing block rates (which may vary depending on customer and/or water usage type). During periods of more significant water shortage, some water systems may also choose to add a special surcharge to customer bills, and/or fine customers who do not adhere to the water use restrictions put in place. For more information on water conservation and pricing, see ***Section 4***.

For information on water efficiency policies, practices and funding, visit the Alliance for Water Efficiency and the WaterNow Alliance.

In coastal communities that are vulnerable to the effects of sea level rise and coastal and inland communities vulnerable to prolonged drought, water conservation alone will not be enough to effectively manage the impacts of climate change. Long-term adaptation planning may need to consider more cost-intensive investments, such as identifying alternative sources for water supply and water reuse strategies and technologies. Options for alternative sources may include adding a new source of water (e.g., purchasing water rights or drilling a new well) for back-up or regular use, creating a new connection to a neighboring water system, or having an agreement to purchase water from another system under certain emergency circumstances. Reuse strategies and technologies include, but are not limited to treating and re-using wastewater, desalination (removing saline from saltwater water so it is suitable for drinking) or aquifer storage and recovery.

Beyond longer-term impacts such as sea level rise and rising temperatures, more intense storms, including extreme precipitation and coastal or inland flooding, can disrupt system services and cause significant, lasting damage to water supplies and water infrastructure. To prepare for these unpredictable events, water systems can develop detailed preparation and response plans, and make sure that they have the personnel, support network and equipment such as extra chemical supplies and back-up generators in place to effectively respond to extreme events. For more information, see EPA's Water Security Division resources and tools.

FINANCIAL CONSIDERATIONS

The costs of supply and demand management strategies can vary from relatively minimal (e.g., public outreach) to extreme (e.g., desalination technologies). Therefore, water systems must carefully evaluate the costs and benefits of each option, weigh such costs against the ability of their customers and municipalities to pay, and proactively plan to avoid significant, unexpected investments in response to an emergency situation.

Water systems must also anticipate any new financial challenges that may arise with successful climate change strategies. For example, while conserving water improves the sustainability of a community's drinking water supply, decreased water usage may mean decreased revenue for a water system and may require the system to price water differently. Additionally, decreases in water consumption can have other unintended consequences that can impact infrastructure and public health, for example, insufficient water to move waste through wastewater collection systems.

Before implementing conservation measures, water systems need to carefully evaluate the implications of successful reductions in water usage for revenue, and how that could be offset by a change in how water is priced or achieving other cost reductions. For example, some water systems have evaluated their energy usage—which can be one of the most significant operating costs for a water system —to identify opportunities for energy conservation and increased efficiency. These opportunities may include upgrading pumps and motors; using more appropriately sized equipment; managing the timing of energy demand; upgrading heating, ventilation and air conditioning and lighting systems; enhancing equipment cleaning and maintenance procedures; or installing renewable energy sources such as solar panels or wind turbines.

While there are federal, state and other comparatively low-cost programs available to finance these efforts, customers will ultimately shoulder at least some of the financial burden. Therefore, as a customer or community advocate, it is important to understand how your water system is or is not planning to address the impacts of climate change, and what the process is for weighing the short and long-term costs and benefits of potential adaptation or resilience measures against each other, to arrive at a final decision.

There may also be state or municipal legal restrictions on some of the strategies identified here, which will affect the range of options available to a water system and its customers.

QUESTIONS TO ASK

- What are the anticipated climate change impacts for my region?
- How is my community and water system preparing for the impacts of climate change on drinking water?
- What water conservation and efficiency programs are in place?
- What emergency response measures are in place?
- How will my water system pay for short- and long-term resilience efforts?

RESOURCES

Association of Metropolitan Water Agencies: ***Implications of Climate Change for Urban Water Utilities***
Great Lakes Integrated Sciences and Assessments Program: ***Climate Summary***
National Association for the Advancement of Colored People: ***Climate Justice Toolkit***
Pacific Institute: ***Drought and Equity in California***
Resilient Midwestern Cities: ***Improving Equity in a Changing Climate***
U.S. Climate Resilience Toolkit: ***Municipal Water Supply***
U.S. Environmental Protection Agency: ***Creating Resilient Water Utilities***
Water Utility Climate Alliance

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SECTION 6: HOW CAN COMMUNITY ACTION AND ADVOCACY ENSURE SAFE AND AFFORDABLE DRINKING WATER?

INTRODUCTION
SECTION 1
SECTION 2
SECTION 3
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BACKGROUND

The previous sections of this guide are intended to help individuals and advocacy organizations improve their overall understanding of drinking water sources, systems, regulations, and opportunities and challenges for providing safe and affordable drinking water. This section is intended to answer specific questions related to either a drinking water crisis such as water contamination, water shutoffs and rate hikes, or opportunities to influence drinking water decisions at the local or state levels.

The content of this section is framed around specific questions and includes links back to relevant information in the previous sections of the guide. This section also gives particular attention to drinking water challenges specific to vulnerable groups and populations.

WATER EQUITY AND JUSTICE

Water equity addresses the inter-related environmental, social and economic aspects of ensuring safe, affordable, accessible and sustainable drinking water that meets the needs of all residents of a community. The Human Right to Water, as detailed in ***the Introduction***, is an example of one policy tool that advocacy groups can promote to achieve water equity for current and future generations.

Water justice incorporates the forward-thinking goals of water equity while also addressing past discrimination that has prevented certain groups from having fair access to safe and affordable drinking water. For example, past housing segregation practices often forced African-Americans and other people of color to reside in neighborhoods that had inadequate city services, including drinking water and sewer. Therefore, achieving drinking water justice may require prioritizing the needs of certain groups of people to ensure everyone has access to the same resources as they relate to drinking water.

KEY DEFINITIONS

Accessible water. Adequate drinking water and sanitation services and facilities must be available at home, in schools, at clinics, in low-income and elderly housing and to homeless persons.

Safe water. Drinking water must be free from microbes, parasites, chemical substances, heavy metals and radiological hazards that constitute a threat to human health.

Affordable water. The cost of essential water and sanitation should be inexpensive enough that cost does not prevent access, nor interfere with other essential expenditures (e.g. food, health care, housing, transportation education).

(Adapted from the ***Unitarian Universalist Service Committee's Invisible Crisis report*** and the ***Pacific Institute's Measuring Progress Toward Universal Access to Water and Sanitation report***).

The First People of Color Environmental Leadership Summit, held in 1991, laid out Principles of Environmental Justice that uphold the values of the environmental justice movement. These include: addressing the legacy of global colonization and oppression; re-establishing interdependent ties with the Earth; respecting all unique cultures, languages and beliefs; and promoting economic alternatives for building safe neighborhoods.[i] These build on the Jemez Principles of Democratic Organizing, developed in 1986 by 40 environmental justice and health advocates working on globalization and

trade. The Jemez Principles provide guidance for achieving equity and justice in collaborative and organizing efforts, such as making space for people who are directly affected, to speak for themselves.[ii]

VULNERABLE GROUPS AND POPULATIONS

This section of the guide gives special attention to the needs of vulnerable groups and populations. Below are broad categories of individuals who face the greatest risks from, and which may have the least resiliency to manage, drinking water challenges:

- **Over the age of 65**
- **Under the age of 5**
- **Rural or isolated households**
- **Homeless or transient populations**
- **Individuals living in low-quality housing stock**
- **Individuals or families in poverty**
- **Women and the LGBTQ community**
- **Racial and ethnic minorities**
- **Indigenous groups/Native Americans**
- **New Americans (i.e. immigrants and refugees)**
- **Undocumented residents**
- **Limited English language proficiency**
- **Individuals with mobility limitations, cognitive and physical disabilities or other illnesses**

One way to understand the extent and impact of potential water equity and justice challenges in your community is to assess its social vulnerability. At the municipal or neighborhood level, social vulnerability refers to the ability of specific geographic areas to withstand negative impacts from environmental, societal and public health stressors.

Certain groups are more likely to lack secure access to water and sanitation services and are at higher risk during natural and human-made water emergencies (e.g. hurricanes, floods, drinking water system failures, etc.). A review of U.S. Census data and housing amenities found that Native Americans, Hispanics and African Americans are all more likely than other groups to live without modern plumbing.[iii] Recent natural and human-made disasters such as hurricanes Katrina, Sandy and Maria and the Flint drinking water crisis also showed that the elderly and the young, low-income families, undocumented residents, the homeless, certain racial groups and those suffering from medical challenges or physical and mental disabilities were more highly impacted by these emergencies.[iv] To compound the issues, many vulnerable individuals will fall into several categories. For example, elderly residents can also be low-income and have mobility challenges. Those that fall into multiple risk categories are also more likely to have trouble receiving, understanding and responding to emergency instructions and to access available help.

THE "SOCIAL VULNERABILITY INDEX"

The *Social Vulnerability Index* (SVI) is a useful, free web-based tool developed by the Centers for Disease Control and Prevention. The SVI was designed to help emergency managers identify and map communities that will most likely need support before, during and after a disaster. The SVI can help communities identify areas where vulnerable groups may be concentrated, to ensure emergency outreach and communications reach everyone. SVI community maps include the location of schools, day care centers, nursing homes and hospitals.

To access the SVI you may need to use a computer with the appropriate Adobe software, which is free to install. You may also be able to access this information through your local library's computer or by connecting with a local watershed group or other partner to help access this information.

COMMUNITY QUESTIONS ABOUT DRINKING WATER

River Network solicited input from watershed and water advocacy groups and environmental justice and community-based organizations throughout the development of this guide through participation in an Advisory Committee, a series of peer calls and individual outreach. The questions included below reflect issues and concerns raised by these groups.

The questions are ordered based on the immediacy and severity of the issue they address and whether they reflect short- or long-term issues, starting with natural or human made disasters impacting drinking water access and quality through funding for drinking water infrastructure. The solutions and approaches recommended bring together elements of diversity and inclusion that offer guidance for developing and implementing advocacy efforts with authentic community representation and engagement to help achieve fair outcomes for all.

Click on the links below to navigate directly to discussion on a specific question.

Individual and Community Action Questions

1. My community has experienced a natural disaster (earthquake, fire, flooding, hurricane, etc.). How can I find out if my drinking water is safe?
2. There has been a spill, leak or other type of discharge in or near my community's drinking water supply OR there is suspicious activity in my area that might break water protection laws. What should I do and who should I notify?
3. I received a notice about a problem with my drinking water. What does it mean?
4. How can I help make sure my community is informed about a drinking water advisory or emergency?
5. There might be lead in my water, OR, the drinking water in my residence is discolored, smelly, or unpleasant to drink. Who can help me test my water?
6. Can I use a water filter or other device to make sure my water is safe to drink? How do I know what kind to use?
7. My water bill is too high for me to pay. What can I do?
8. My water has been shut off. What can I do?
9. My drinking water comes from a private well. Where can I go for help?
10. I live on tribal lands. Where can I go for help?

Local, State and Federal Engagement and Advocacy Questions

11. How can I persuade my water system to address community-wide issues (e.g., adjust unaffordable rate structures, improve water shut-off policies or improve or develop a plan to protect our drinking water source)?
12. How can I encourage my state agency to revise drinking water rules or develop new guidance for managing drinking water? If these processes are already underway, how can I participate?
13. How can my organization participate when new national drinking water regulations are being developed?
14. How can my organization advocate for increased water access for all in public spaces?

Question 1: My community has experienced a natural disaster (earthquake, fire, flooding, hurricane, etc.). How can I find out if my drinking water is safe?

During a major disaster, you should not drink your drinking water until you have received guidance from your water system or tested your private well water to make sure it is safe. Federal Emergency Management Agency (FEMA) guidance advises residents to store an ample supply of emergency drinking water prior to a predicted disaster. Use this emergency supply until you are sure that your drinking water is safe.

If your water system declares your water is unsafe to drink, it is likely your community will be offered water supplied by a neighboring, operational water system, bottled water or locally produced water (e.g., water from your system that has been treated with mobile treatment units). Call your water system or check your community's website for updated information about the safety of your drinking water.

Most water systems are required to prepare emergency response plans before disasters hit. Water systems with emergency response plans in place will most likely have identified actions they will take to respond to the problems in hand, although other governmental entities such as state government, the National Guard and others may be responsible for implementing responses during an emergency.

Contact your water system to obtain information on how the system plans to respond to emergency situations, and how and where vulnerable groups might be most affected during a drinking water disaster. This will help ensure all community members have access to the information you are sharing. For more information on community outreach and education and how to reach vulnerable groups, ***see Question 4***.

If you are connected to a private supply (e.g., well water), after a disaster, drinking bottled water or another clean supply is recommended until you are certain that your water is safe to drink. Contact your local, state, or tribal health department for specific advice on wells and testing. During or after an emergency, such as a flooded well:

- Do not use water from your well for washing or drinking
- Keep away from the well pump to avoid electric shock
- Work with a qualified professional (e.g., electrician and/or a well or pump contractor) to clean and disinfect your well, and only turn the well back on when it has been approved to do so.
- Once the well pump is safely turned back on, pump the well until the water runs clear. If the water does not run clear – do NOT use - and get advice from the county or state health department or extension service.

It is recommended to test your well water before using it after an emergency

For more information, visit EPA's Protect Your Home's Water resource.

Question 2. There has been a spill, leak or other type of discharge in or near my community's drinking water supply OR there is suspicious activity in my area that might break water protection laws What should I do and who should I notify?

Residents, watershed and community organizations play an important role in alerting authorities to environmental violations. Oil or chemical spills, radiation leakage, discharges from vehicles or pipelines, or other incidents caused by human error or natural disaster can threaten the safety of drinking water supplies. If you notice or have been informed about a spill, leak or other type of discharge or contamination incident near a drinking water supply, there may be an immediate threat to public health.

If you are the first to identify the problem, take immediate measures:

- If you are not sure that an area is safe, stay away
- Call 911 to report the emergency
- Do not enter confined spaces or low-lying areas
- Do not lean over open waste containers, or kick, rock or puncture waste containers
- Do not enter into dangerous or contaminated areas and do not take samples unless trained to do so
- Keep others away from the scene until assistance arrives
- Note as many details about the situation as possible, including the time, location, smell, description of the scene, number of people and animals exposed, and any visible health impacts

- Take videos or photographs only if it is safe to do so. If you are able, note the impact and proximity of the hazard to nearby waterbodies and drinking water sources.
- Do not track toxic material into your car or home
- Do not drink your tap water until you have checked to make sure it is safe. ***See Question 1*** for more information on how to know when water is safe to drink.

Other steps to take include contacting your state's emergency management agency and filing a report with the National Response Center at 1-800-424-8802. Notifying the federal, state and local authorities helps to ensure that the appropriate entity will take action as soon as possible.

In a drinking water emergency, your organization can help inform the community by sharing accurate information, holding meetings or making calls to explain the issue, and encouraging community members to follow the public health directives. ***See Question 4*** for more information on local outreach and education and how to reach vulnerable groups in your community.

The following are examples of activities or conditions that may not be an immediate public health concern in terms of drinking water impacts, but may violate existing environmental laws or regulations and may be worthwhile reporting:

- Smoke or other illegal emissions from local industrial facilities
- Tampering with emission control or air conditioning systems in automobiles
- Improper treatment, storage or disposal of hazardous wastes
- Exceedances of pollutant limits at publicly-owned wastewater treatment plants
- Unpermitted dredging or filling of waters and wetlands
- Any unpermitted industrial activity
- Late-night dumping or falsifying reports or other documents

For non-emergency reporting, you can file a report with the EPA in English or Spanish. The EPA enforcement website provides photographs and descriptions of possible environmental law violations to help you know what to look for. This Spanish-language brochure provides more information on reporting environmental violations.

Once submitted, your information will be forwarded to the appropriate environmental enforcement personnel or regulatory authority. You may also reach out to your state environmental agency from the list here.

Some environmental issues of concern are handled at the local level. For concerns related to trash, litter, strange odors, recycling pickup, and household chemical disposal, including paints, pesticides, oil and antifreeze, try contacting your local government office first. You can do so by:

- Calling 311, if that service is available in your area. The 311 service is a non-emergency phone number where you can report problems or find the appropriate number to call.
- Identifying the responsible local government department using your municipal government's website or your telephone book's blue pages
- Contacting your public library or United Way organization for guidance

Question 3: I received a notice about a problem with my drinking water. What does it mean?

Water systems must issue public notice under certain circumstances, including exceedances of standards for regulated contaminants, failure to comply with established schedules for monitoring or regulatory compliance, violations of treatment requirements, and other circumstances. In some cases, but not all, public notice will indicate that the water is not safe to drink for vulnerable populations such as infants, the elderly or immune-compromised individuals. In others, the water may not be safe for anyone to drink. It is important to read the notice very carefully, as the instructions will vary depending on the type of contaminant or other problem your water system has experienced. For example, the notice may instruct you to boil water to make it safe for drinking, or it may instruct you not to boil the water because doing so can further concentrate the contaminant.

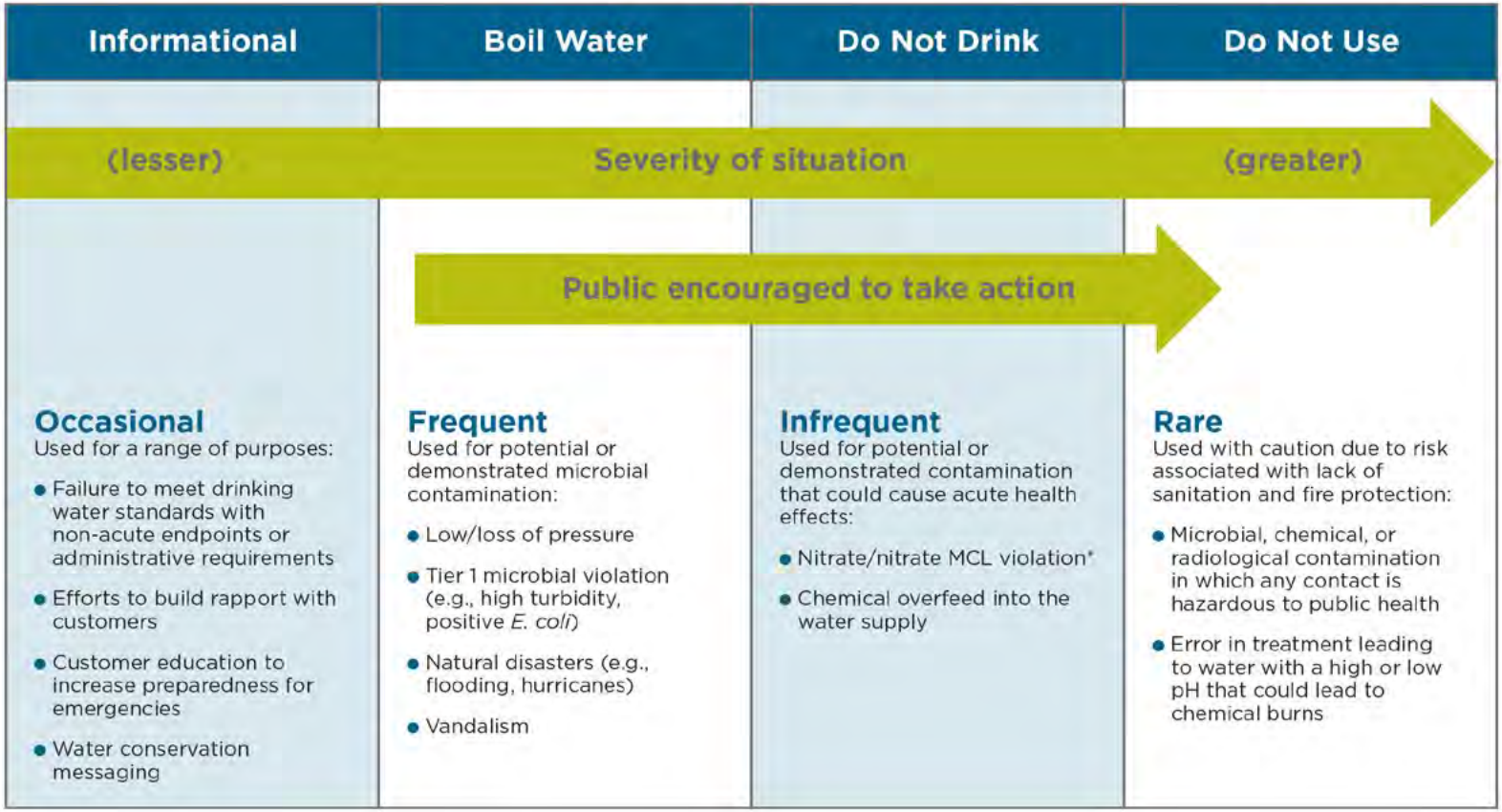
If the public notice indicates that the water is not safe to use for some or all members of the community, it will likely specify one of the following:

- **Boil Water (Most frequent):** Tells customers to boil water before use, most likely due to concerns about potential or confirmed microbial contamination. Customers are instructed to boil water before use for possible ingestion (e.g., drinking, brushing teeth, preparing food, etc.) until further notified. In most cases, you can still launder clothes with water from the tap without boiling it, but carefully read your advisory instructions to make sure.
- **Do Not Drink (Infrequent):** Tells customers NOT to use tap water and to find alternative drinking water sources instead (e.g., bottled water). Do Not

Drink advisories are typically issued for chemical contamination. Boiling water will not make your water safe to drink and might concentrate existing pollutants, possibly making your water more dangerous than before. Follow all instructions carefully, including whether or not to use tap water for flushing toilets and washing clothes.

- **Do Not Use (Rare):** Warns customers not to use tap water for any purpose, including drinking, cooking, and bathing. Do Not Use advisories are typically used only in cases of microbial, chemical, or radiological contamination when any contact, even with the skin, lungs, or eyes, can be dangerous. Follow all instructions carefully, including whether or not to use your tap water for flushing your toilet.

Drinking Water Advisories



Source: *Centers for Disease Control and Prevention*

The U.S. Environmental Protection Agency (EPA) has developed an annotated example public notice that identifies the required elements. For more information on public notice, ***see Section 2***.

Advisories are typically issued because there is some type of contamination of your community's drinking water system. For more information on regulated contaminants in drinking water, ***see Section 3***.

The notice issued will give you more information about the contaminants present in the drinking water, where they came from, the level at which the contaminant was detected and possible health impacts, among other required information. If your household is under a water advisory and use of drinking water is restricted, pay attention to instructions related to all the ways you use water:

- Drinking (for your family and all pets)
- Making baby formula or mixing with medicines
- Making tea, coffee or any drink made with tap water (e.g. Kool-Aid or lemonade)
- Making ice
- Brushing teeth, washing face and bathing or showering
- Preparing food (including washing fruits and vegetables)
- Washing dishes and clothes

Question 4. How can I help make sure my community is informed about a drinking water advisory notice or emergency?

In most cases, how and how often your water system alerts customers to a drinking water problem—including exceedances of standards for regulated contaminants, failure to comply with established schedules for monitoring or regulatory compliance and violations of treatment requirements—is specified by EPA. When the problem is serious enough to trigger a drinking water advisory, your organization can play an important role in making sure everyone in your community is aware of the drinking water emergency and understands what to do. Water systems may also benefit from additional help sharing information with and understanding the unique needs of vulnerable populations. It is important not only to understand the number of your residents that may fall into one or more vulnerable categories, but also how they are geographically distributed across your community and their ability to access support. In a drinking water crisis, for example, it would be important to know which of these groups are more dependent on public transportation and may have difficulty accessing alternative drinking water supplies or other support services.

TIPS FOR COMMUNICATING IN AN EMERGENCY

In crafting communications to meet the needs of all residents, keep these tips in mind:[v]

- **Ensure that all neighborhoods and groups are receiving information. Pay special attention to reaching New Americans, undocumented residents and the homeless as they are less likely to be connected to traditional communications systems.**
- **Develop messages that correspond to each communication method you will use (e.g., door-to-door, phone, word-of-mouth)**
- **Provide all information both visually and audibly**
- **Use short sentences and plain language to allow for easy translation of materials. Consider using a sixth-grade reading level or lower.**
- **Provide the most important information at the beginning and the end of your message**
- **Provide written materials in bilingual or multi-lingual format**
- **Repeat all important information and explain the situation**
- **Include contact information for relevant groups**
- **Use large-sized fonts**
- **Pay attention to how often communications are sent, the pace and tempo of audio messages (don't speak too fast), the length of time written messages are shown on a screen (provide enough time for slow readers to absorb the information), and reducing audio and visual distractions (no background noise or distracting colors)**
- **Prioritize using media channels where your messages are most likely to be seen or heard. These could include social media, non-English radio programs and foreign-language church services.[vi]**

Your water system or government entities will likely share information through television, radio, newspapers, automated calls and bill inserts. Local groups and residents can help relay information further through church and community gatherings, by distributing flyers, working with social and community networks and by word-of-mouth and social media.

Any communication from you or your organization should be prompt, accurate and trustworthy. It may be difficult to decide when to send out information, especially if you don't have all the answers. But it is also important to communicate as early as possible, so people are not hearing rumors from unreliable sources.

When you are ready to share the water system's advisory notice with your community and networks, consider using social media or text messaging to communicate quickly. Keep in mind, however, that people who use social media and text messaging will try to respond and ask more questions, and they will want their answers immediately. If you plan to use either of these methods, it is best to have someone dedicated to responding to these requests in a timely manner. It is also helpful to coordinate with your water system on your plans to respond to these questions to reduce confusion.

If your organization has a communications or emergency communications plan, you can use it. In all likelihood, it will require some level of review and adjustment for the current situation. If you do not have such a plan in place, you will need to spend time thinking about how to reach vulnerable groups within your community. To do so, it is important to understand how vulnerable groups are geographically distributed across your community. Certain neighborhoods or areas may have a higher number of low-income individuals; others may have concentrations of groups who come from different countries and speak different languages. Schools, hospitals and transit stops are likely to be areas for special consideration in reaching these groups.

Vulnerable groups include those who live in higher-risk areas (e.g., on floodplains or in substandard housing) or may not receive or understand emergency alerts. Some groups may also have language differences or physical or cognitive impairments that make it difficult to understand the information. Others may have difficulty accessing transportation to take appropriate action, such as buying bottled water.

Pay special attention to reaching groups that may fear interactions with government officials, such as the homeless, ex-offenders or undocumented residents. ***Trusted community organizations***, places of worship and local leaders can help reach these groups and share information.

For more information, see Spitfire Communications' Tools for Developing Communication Plans.

Question 5: I'm worried there might be lead in my water, OR, my tap water is discolored, smelly or unpleasant to drink. Who can help me test my water?

A change in your water's taste, color or smell is not always indicative of a public health concern. However, sometimes changes can be a sign of problems. If you notice a change in your water, the first step is to call your water system. You should be able to find contact information on their website or on your water bill.

Every community water supplier must provide a Water Quality Report or a Consumer Confidence Report ("CCR") to its customers twice a year. As discussed in ***Section 2***, this report provides information on your local drinking water quality, including the water's source, contaminants found in the water, and how consumers can get involved in protecting their drinking water. ***The CCR provides an overview of the entire drinking water system, not a specific report for the drinking water in your home or for your neighborhood***.

The CCR is a starting point to understanding the levels of regulated contaminants found in your community's drinking water supply. After reading this report, you may wish to test for specific contaminants in your home. Note that each faucet in your house may show different results but testing tap water from your kitchen sink is probably the place to start. The cost of a single water test can range from $15 to hundreds of dollars. EPA's Safe Drinking Water Web Site provides information on testing methods.

Your local health department should be able to explain the tests that you need for different types of contaminants. If your health department is not able to help, you can contact a state-certified laboratory. To find a state-certified laboratory in your area, call your water system or your state environmental agency or check EPA's website.

Certain groups, including undocumented residents or families living in sub-standard housing, may be reluctant to contact anyone about problems with their water or allow anyone to enter their home to test the water. Community organizations, churches, or other trusted leaders can help communicate with these groups and share information when community-wide drinking water concerns emerge.

If testing shows high levels of lead in your tap water, you will want to try to identify the source. For example, the pipe bringing water to your home (your water service line) may be partially or completely made of lead or may have lead-based solder connecting multiple copper pipe segments. Your home may also have lead-containing brass fixtures, accumulated lead particles in filters or aerators, lead plumbing or some other source of lead. The best way to identify the source of lead in your water is to call on a plumber. You can also check your own pipes and find safety tips for what to do if you learn your home has a lead service line using resources provided by the Lead Service Line Replacement Collaborative.

If you believe you have a lead service line and want to have it replaced, the first step is to call your water system. You may also check with your local watershed organization or public welfare organizations to see if there are others in your community working on this issue. If there is lead in your water, you should not drink the water.

Question 6. Can I use a water filter or other device to make sure my water is safe to drink? How do I know what kind to use?

If your water system is unable to deliver drinking water that meets health-based and/or aesthetic (e.g., color, taste and odor) standards, the water system or its customers can install point of entry (POE) or point of use (POU) water treatment devices. Such fixes may be critical to address immediate term health impacts, but ideally these are short-term fixes while the water system identifies a more systematic and centralized solution to the problem.

Installing a home water treatment unit can provide additional safety measures and could improve the taste, look, and smell of water. Also, many water treatment units such as filters are a less expensive and more environmentally-friendly option to purchasing bottled water.

Before purchasing a water treatment device, be sure to choose one that is certified to treat your particular concern. Also, make sure you understand, and can follow, the maintenance requirements (e.g., frequency of installing new filters).

As discussed in Section 2, a point of entry (POE) device treats water entering a building before the water is distributed to taps in the building. A point of use (POU) device is installed on a single faucet, spigot or water fountain. POU devices can sit on a counter, attach to a faucet or be installed under a sink.

POU and POE devices employ different technologies to remove contaminants. These include filtration, ion exchange, reverse osmosis, and distillation. NSF International tests and certifies certain water treatment options to ensure they meet safety standards and will actually remove the contaminants you care about.

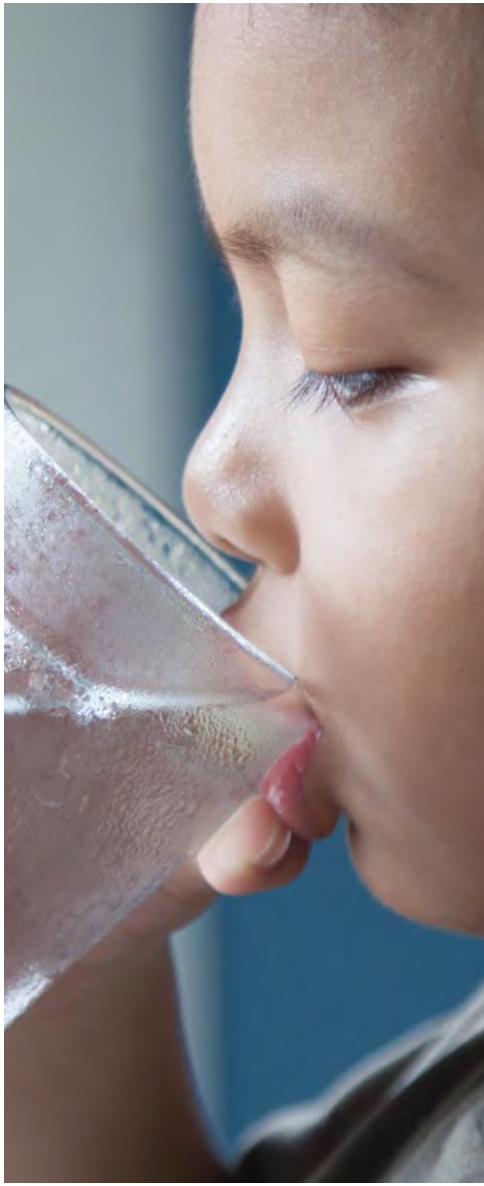
Underwriters Laboratories (UL) and the Water Quality Association (WQA) also certify water treatment systems based on NSF standards. The Community Water Center has a guide to water treatment systems (in English and in Spanish).

Warning: Keep in mind that there is not one type of treatment device that can remove everything. Do not trust a salesperson that tells you their product can do it all! Prior to purchasing a device, have your water tested by a certified laboratory so you know what contaminants you are trying to remove and can select a system designed to address your specific issues.

The total cost of a treatment system will depend on your unique installation and plumbing needs. Prices generally fall between several hundred to several thousands of dollars. The Environmental Working Group includes costs on their Water Filter Buying Guide website, where you can also search for a treatment device based on the contaminant you are most concerned about.

Be aware there may be risks and liabilities associated with the type of water treatment device you choose. More complicated systems, such as those that involve reverse osmosis or ion exchange, may be more expensive upfront and they may also increase your energy costs or water bill on an ongoing basis. Water filters can also be expensive and used filter cartridges often cannot be recycled. Some filters might also remove beneficial minerals such as iron, calcium, manganese. In other cases, a water filter may change the chemistry of your water leading to other unintended consequences.

IMPORTANT: Be sure to also read the operation and maintenance information for the device, including how often the filter should be changed and when chemicals should be added. Improper operation and maintenance of these devices can trigger other water quality problems such as bacteria growth in the filter and changes in chemical properties of the water over time. Finally, keep in mind that a water filter may not protect you in the case of a drinking water advisory and emergency.



POU and POE Technologies[vii]

Treatment Device	What it Does to Water	Treatment Limitations
Activated Carbon Filter (includes mixed media that remove heavy metals)	• Adsorbs organic contaminants that cause taste and odor problems • Some designs remove chlorination byproducts • Some types remove cleaning solvents and pesticides	Is efficient in removing metals such as lead and copper Does not remove nitrate, bacteria or dissolved minerals
Ion Exchange Unit (with activated alumina)	• Removes materials, particularly calcium and magnesium that make water "hard" • Some designs remove radium and barium • Removes flouride	If water has oxidized iron or iron bacteria, the ion-exchangee resin will become coated or clogged and lose its softening ablility
Reverse Osmosis Unit (with carbon)	• Removes nitrates, sodium, other dissolved inorganics and organic compounds • Removes foul tastes, smells or colors • May also reduce the level of some pesticides, dioxins and chloroform and petrochemicals	Does not remove all inorganic and organic contaminants
Distillation Unit	• Removes nitrates, bacteria, sodium, hardness, dissolved solids, most organic compounds, heavy metals, and radionucleides • Kills bacteria	Does not remove some volatile organic contaminants, certain pesticides and volatile solvents Bacteria may recolonize on the cooling coils during inactive periods

Question 7. My water bill is too high for me to pay. What can I do?

Your water bill may be too high to pay due to sudden increases in the bill and/or due to a change in personal circumstances (e.g. job loss), and the appropriate approach to addressing this problem will vary according to the cause. Sudden increases in your water bill may be a result of leaks, an increase in the amount you use or an increase in water rates charged to customers. In general, property owners are responsible for leaks found on the service water lines that connect the public water main to the residence, or travel from the property lines to the residence. Owners are also responsible for leaks inside the home. Renters should check their lease agreement to confirm whether they or the landlord is responsible for paying the water bills.

If your water bill has recently increased and as a result is unaffordable to you:[viii]

1. **Review your water bills.** Do you notice any major changes in your water bill over the last 2-6 months? Are you using and being charged for more water than before? If the bill shows your water use is going up in ways that don't make sense (e.g., you haven't increased the number of people staying in your home or aren't using more water for your lawn or garden), then take the steps below to investigate further. In case you need to dispute your water bill, compile your previous water bills, payment receipts/canceled checks and any other documentation that seems relevant.

2. **Check for leaks or plumbing problems.** Running toilets are the number one source of costly indoor water leaks. This website can help you identify and address a running toilet problem in your home. Also check your sinks, showers and other outdoor water connections to rule out obvious leaks. An open or running water hose or broken sprinkler may be an outdoor source of unintentional water use. Your water system may be able to send someone to your house to help check for leaks. You can also ask your water system for a kit to test for hidden plumbing leaks or purchase one at a hardware store. This resource provides more information on checking for leaks.

3. **Get credit for reducing leaks or water-efficient purchases.** Check to see if your water system has a water leak adjustment policy or other way for customers to submit "courtesy leak adjustment" claims. If your water system provides this service, contact the agency's customer service department or fill out a form on the agency's website. You will need to provide proof of repair, so make sure to keep your receipts for plumber costs or parts purchased. You can also check EPA's WaterSense website to see if your water system offers rebates for purchasing water-efficient toilets, showerheads, or services. You can identify qualifying purchases by looking for a WaterSense label, indicating certified, highly water-efficient products.

4. **Check your water meter, if you have one.** If you have ruled out increased water usage and have found no leaks inside your home, there is a chance your water meter is not functioning properly, or your system is not reading or recording the information from your water meter properly. However, sometimes a new water meter is simply reporting your water use more accurately than an old one. You can check your water meter by turning off all water, both inside and outside the home. No appliances (dishwaters, washing machines, etc.) or irrigation systems should be in use. While all the water is turned off, note the water meter reading. Take a second reading after 15 minutes. If the meter shows water use, it may indicate either the presence of a leak or a faulty water meter. Call your system and request their assistance. If your community does not have individual water meters in every home, local community groups may want to advocate for your water system to take this step to provide more accuracy and transparency.

5. **Contact your water system.** If the higher bill does not coincide with a period of increased usage, work with the system to resolve the discrepancy. You may also be able to recover money that you have already paid as the result of an undetected leak. Ask the water system to review and explain your current water bill to you. Have your file of prior bills and documentation available for reference. Be prepared to request that they take a specific action, such as reducing the excessive bill to your average rate or having authorized personnel initiate an investigation. Look at a recent bill to find the phone number and mailing address for disputed residential bills and follow the instructions for filing a complaint. You may be required to request an investigation in writing, describing why you think the bill is incorrect and providing documentation supporting your claim.

6. **Make a good faith payment.** During an investigation, the system will continue to bill you for ongoing usage and may charge a late fee for any amount due but not paid. You might be asked to make a good faith payment comparable to the average monthly amount you paid in the months preceding the disputed period. If it ends up that the system determines you are at fault, you will probably be required to pay the full amount and late fees accrued during the investigation. If the system is at fault, pay only the actual, reduced monthly bill for the disputed month and insist that the system remove any late charges from your account.

7. **Request Outside Help.** If you have no luck dealing directly with the system and you have ruled out leaks, excessive usage and a faulty meter, you may need to request help from a third party. Your system may refer you to a customer dispute mediator, but also consider contacting your state's public utilities commission or attorney general's office to request assistance. A community organization such as the United Way or a legal aid society or welfare rights group may be able help. Another option might be to contact your closest ACLU office. If all else fails, a local news organization's consumer advocate might agree to examine the issue. ***In all cases, keep copies of all written documentation to support your claim and as proof of what has transpired during the disputed period.*** Do not ignore the problem, as repeated late or non-payment can result in having your water shut-off even if you are not at fault.

If your water bill is unaffordable to you because of change in personal circumstances (e.g. job loss, high medical bills, etc.) check with your water system to see if they offer a ***customer assistance program***, alternative rate structure, or other payment relief program. Many water systems offer support such as bill discounts or flexible payment plans to alleviate the financial burden to customers, as needed. Some water systems may also have affordable rate structures that are based on income and/or hardship. If so, contact your water system to join the program. If not, contact the water system in any case and see if arrangements can be made. Also, raise the issue with local community partners and water groups to see if there is ***an opportunity to advocate for such programs***.

Question 8. My water has been shut off! What can I do?

The main reasons water systems shut off water without homeowner consent are late or non-payment. If you have been paying your bills in full, or are slightly behind on payments, you should not receive a water shutoff notice. However, mistakes can happen. If your water system has been shut off, or you receive notice that your service will be shut off, **call you water system immediately**. Make the call even if you think this is a mistake. Such an error is not likely to be fixed on its own and letting the problem slide can cause more hassle and expense down the road.

If you are behind on payment, it is very important to communicate with your water system and work with them to find a solution, as described under ***Question 7***. Many water systems have customer assistance programs that offer help with paying water bills by lowering bills, offering long-term payment plans, or forgiving past debt.

To learn more about water affordability and assistance programs see ***Section 4***.

Question 9. I have private well water. Where can I go for help?

Roughly 15% of Americans depend on a household well for their drinking water. EPA regulates public water systems, but not water sources that serve fewer than 25 people or 15 service connections. As such, households that depend on private well water should take special steps to ensure the protection and maintenance of their drinking water.

To help ensure your well water is safe:[ix]

- Set and follow a regular maintenance schedule for your well and keep up-to-date records
- Learn if there are any local contaminants of concern that may impact your well by reaching out to your local health department or environmental department.
- Connect with your local health or environmental departments, or county government, for a list of the state-certified (licensed) laboratories in your area that test for a variety of substances.
- Have your well water tested regularly. Conduct additional testing if:
  - You notice a change in water quality (i.e., taste, color, odor)
  - Your local health or environmental department has identified problems with well water in your area
  - You have experienced disturbances or problems near your well (i.e., flooding, land disturbances, and nearby waste disposal sites)
  - You have replaced or repaired any part of your well system
- Have the test results interpreted and explained clearly.
- Work with your health department or other official to immediately address any problems that are noted in the test results
- Explore other long-term options for safe, adequate, and affordable drinking water, such as connecting with a public drinking water system or installing additional health protection barriers

EPA recommends that households with private wells test their water every year for total coliform bacteria, nitrates, total dissolved solids, pH levels, and any other suspected contaminants. As the tests can be expensive, you may want to test only for the specific contaminants of concern that have been flagged by your local health department or environmental agency.

Question 10. I live on tribal lands. Where can I go for help?

Many tribal water systems face financial, technical or managerial challenges. As in many other areas of the country, water infrastructure on tribal lands can be very old and additional investment is needed to meet the needs of residents. In some cases, residents must haul water from a central location to their homes. It is estimated that 12% of tribal homes lack access to safe water or adequate sanitation, which is 20 times higher than the percentage for non-tribal homes.[x]

Much like the overall gap between drinking water infrastructure needs and available funding, the grants and loans available to tribes for water infrastructure development and improvement are insufficient relative to need; further, tribes received fewer State Revolving Loan Fund (SRF) dollars per amount of need compared to each of the states between 1987 and 2012. Federal funds are available through EPA's SRF, the U.S. Department of Agriculture, and the Indian Health Service but are not as targeted and coordinated as they could be to address the most significant public health problems and needs.[xii]

Currently, only one tribe—the Navajo Nation—has primacy in regulating drinking water systems on tribal lands. Although other tribes may take on responsibilities to maintain and operate their water systems to meet Safe Drinking Water Act (SDWA) requirements, EPA has enforcement authority over tribal water systems outside the Navajo Nation.

If you are receiving drinking water from a public water system on tribal lands, you should contact your water system if you are having problems with water quality, billing or other drinking water issues. If you get no response or are not satisfied with the responses from the water system, contact your tribal council members or other leaders to make sure your problem is heard and recorded.

If you have trouble getting responses from the water system and your leaders, a next step is to contact Drinking Water Program staff at the appropriate EPA Regional Office to seek advice. EPA provides technical assistance and helps tribal water systems meet regulatory requirements and financial needs. For more information, you can visit the EPA's Safe Drinking Water on Tribal Lands website.

Question 11. How can I persuade my water system to address community-wide issues (e.g., adjust unaffordable rate structures, improve water shut-off policies, or improve or develop a plan to protect our drinking water source)?

There are many potential benefits for individuals and groups to work more closely with your local water system. Below is a list of ways your water system could improve services for all its consumers, for which you or your organization can advocate:

- Strengthening public input through open and transparent procedures that encourage community involvement, including vulnerable groups
- Developing and implementing water affordability programs by adjusting water bills to a level that low-income residents can afford to pay and, potentially, offering credits to qualifying households (see ***Section 4*** for more information)
- Eliminating policies that allow for mass water shut-offs
- Improving coordination with other departments to maximize efficiencies, improve services and reduce costs
- Investing in the local economy and workforce development by hiring from within the community (especially in most vulnerable areas) and reducing reliance on contracting in support of full-time positions, investing in job training for current staff, and training local youth for water system jobs;
- Strengthening source water protection by updating source water assessments and developing and implementing source water protection plans (see ***Section 1*** for more information)
- Implementing water conservation and efficiency programs, including customer rebates, and water loss audits to reduce water usage (see ***Section 5*** for more information)

Because water systems vary greatly in their structure and governance, there is no standardized guideline for how to reach out to water system decision makers. All water systems must comply with the Safe Drinking Water Act, but there are differences across states and cities in how water systems make decisions and the rights to which customers are entitled. In most (but not all) areas, publicly owned water systems are regulated by their board (if independent) or by the city council or equivalent (if the system is a part of the local government.) Privately-owned water systems are regulated by the Public Utilities or Public Service Commission.

If your publicly owned water system is independent (i.e. not a part of your local government), joining your local water board is one way to influence its choices and the way it serves your community. Contact your water board to learn about their eligibility requirements for serving on the board and to learn whether board members are appointed or elected. If your water system is a governmental agency, you may be able to call your County Elections Office for information on their oversight structure and to find out whether its members are appointed or elected to their seats.

Meeting with your water system's decisionmakers (e.g., Public Utility Commission, local water board, city council, privately-owned system executive, etc.) can be one way to voice your concerns or offer suggestions. When meeting with water system decision makers:

CASE STUDY – ALLIANCE FOR THE GREAT LAKES ON AFFORDABILITY

Over a two-year period, the Alliance for the Great Lakes has been holding conversations with community members in Cleveland. In Fall 2018, the Alliance hosted a water affordability clinic with residents, system providers and local community and environmental organizations. Participants shared concerns about rising, and at times unpredictable, water and sewer rates. The event was supported by the Office of Congresswoman Marcia L. Fudge, the Northeast Ohio Regional Sewer District, Cleveland Water, Northeast Shores Community Development Corporation and the Collinwood Nottingham Community Development Corporation.

Local community members spoke directly with the Sewer District and Cleveland Water in a roundtable discussion about water affordability. After the roundtable, residents were invited to address individual bill concerns face-to-face with Cleveland Water and Sewer District staff. Leaders of community organizations also learned about utility assistance programs that they can share with residents, and agencies connected around opportunities for collaboration. This important event was a response to community need, helped to raise awareness about affordability issues and connect residents to advocacy opportunities, such as Representative Fudge's Low-Income Sewage & Water Assistance Program legislation.

To learn more, see Alliance for the Great Lakes, *Shut Up and Listen*

- Identify the correct person to talk with, whether it is a water board member, city councilperson, system official, or public system commissioner. Request a meeting and set a date that is mutually convenient.
- Prepare for your visit by selecting the group of people that will represent your community. Giving people affected by the issue a chance to speak for themselves is important. Together, develop talking points and decide what you will be asking for. Assign talking points ahead of the meeting so that each participant contributes to the conversation. Rehearse and be prepared to answer questions.
- Bring materials to leave behind, such as bills, documents, fact sheets or data that back up your points.
- Follow up afterwards and try to maintain a respectful relationship. Do not be afraid to talk to the media if that would be helpful to shine a light on a specific issue.

There may also be opportunities to engage your system in the case of a problem. EPA requires that public notices (as discussed in ***Question 3***) include contact information for more information or answers to questions.

Question 12. How can my organization encourage my state agency to revise drinking water regulations or develop new guidance for managing drinking water? If these processes are already underway – how can I participate?

State agency regulations or guidance are any official statements that 1) explain or advance a law or policy, or 2) describe an agency's organization or procedures. Nonprofit organizations can work with communities to inform these decisions that impact all residents.

The EPA gives states the option to adopt drinking water regulations that are stricter than federal standards (***see Section 3***). As a result, every state except for Wyoming has its own specific drinking water rules and standards, though in many cases they are very similar or identical to federal regulations. Some states have used this authority to establish stronger drinking water rules or standards, sometimes after a major water crisis has occurred. In response to toxic algal blooms that disrupted drinking water service in the Toledo area, for example, Ohio enacted new requirements for public water systems to monitor and report harmful occurrences of cyanobacteria and algal blooms from their surface source water supplies. In response to the Flint drinking water disaster, Michigan approved new Lead and Copper Rule requirements that require Michigan's water system owners and managers to identify all water service line materials, be transparent in communicating the number and location of all lead service lines and remove all of them by 2041. A number of states are also starting to set standards for PFAS.

States can also adopt policies related to source water protection, paying for water infrastructure and addressing affordability.

Each state has its own process for gathering public input regarding proposed regulations or guidance. Michigan's process for updating the state's Lead and Copper Rule offers one example that shows the steps that took place over a sixteen-month time period:[xiii]

- Request for Rulemaking: March 2017.
- Stakeholder Process: July-November 2017
- Public Information Session: November 2017
- Draft Rules and Regulatory Impact Statement to Office of Regulatory Reform (ORR): January 29, 2018
- Public Comment Period: February 8, 2018 through March 21, 2018
- Public Hearing: March 1, 2018
- Final rules filed with ORR: June 14, 2018

The first step, a Request for Rulemaking, can come from professional boards or commissions, advisory committees, the department or the public. Additionally, state legislatures can pass laws that require new regulations to be developed. A rulemaking request must be approved by the relevant state authority (e.g. the Office of Regulatory Reform in Michigan). The public engagement and stakeholder process differs for each state and may depend on the type of regulation or guidance under consideration. A general explanation of opportunities for public engagement are as follows:

- Provide a written comment to the relevant state agency (online or by mail)
- Request a public hearing (through the appropriate channels) if one is not already planned. You will also want to pay attention to the following, and ask for changes as necessary:
  - The timing and location of the public hearing (parking options, location next to public transit, a time that is most convenient to the community, etc.)
  - Accommodations for all stakeholders (language translation, room size, mobility, etc.)
- Mobilize and coordinate community representatives at the public hearing
- Attend the public hearing

TIPS FOR MAKING PUBLIC COMMENTS

- **Test your message and proposed solutions with your community and your partners, to make sure you are in alignment with their needs and interests. Consider filing a joint statement or consolidated comments.**
- **You may be able to add data charts, maps, pictures, or anything you need to make your point. Check to see if those can be added to your written comments.**
- **Comments need not be a specific length but are generally most effective when you can provide specifics on why the agency should or should not take a specific action. You can show support for the proposed rule as-is, suggest revisions, offer alternatives, or request that the agency abandon proposed rules. Provide constructive criticism or offer solutions based on your personal, or your organization's experience.**
- **Don't miss the deadline!**

Comments (in writing or in person) can speak to:

- Whether the proposed rule follows federal requirements and potential legal challenges
- Potential impacts on the community, e.g., examples and stories
- Opportunities for ongoing community engagement, such as serving on any advisory committees

In most cases you will need to provide your first and last name, city, state and country in order for your comments to be reviewed. Your name and comments will become part of the public record and can be viewed by others.

Agencies are not allowed to base their final rules on the number of comments received (either for or against the proposal.) The final rule or guidance must rely on the rationale and conclusions from a review of the rulemaking record, scientific data, expert opinions, facts accumulated during the review period, and content of the comments. Also, mass write-ins (such as postcards with standardized language) are treated differently, and generally given less weight, than individualized comments.

Question 13. How can my organization participate when new national drinking water regulations are being developed?

The Safe Drinking Water Act prescribes the process for developing new or revised national drinking water regulations that is described in depth in ***Section 3***. Much like state regulatory processes, there are opportunities to provide comments and advocate for changes. Because federal standards apply nationwide and require technical expertise, it makes sense to work with other local, state and national organizations to develop and collaborate on campaigns.

If you are seeking information from EPA for a federal rulemaking or regarding drinking water information that is relevant at the state or local level, and are not receiving a response, you can submit a Freedom of Information Act (FOIA) request. Some states also have similar transparency laws that allow access to information (see the National Freedom to Information Coalition to find information on your state). Public Citizen's website explains the FOIA process, shows a sample request, and offers tips. If you are unsuccessful in reaching positive outcomes or accessing the information you seek following your meeting with system representatives, you may want to explore using the legal system. You can start by reaching out to a public interest law clinic (see list here) or another public interest law group in your area.

Question 14. How can my organization advocate for increased water access for all in public spaces?

All community members benefit from increased access to free and safe water in parks, public transportation routes, schools and playgrounds, and other public spaces. Some specific populations and groups, such as children, commuters, joggers, tourists and the homeless, are frequent users, and sometimes even depend on, public water fountains for drinking water. Not only are water fountains important for public health but increasing their availability and accessibility can also reduce the individual and community costs associated with the purchase and disposal of bottled water.

The American Planning Association and the Pacific Institute recommend the following ways to offer safe and accessible drinking water sources in your community:

- Increase the number of water fountains to improve access to safe drinking water in public places, paying attention to how needs might vary at different times of the day and in different seasons (e.g., ensuring there is drinking water access at night and in winter) to ensure equitable access throughout the community
- Upgrade the type and function of older drinking fountains, for example, by installing filters and offering water bottle refilling stations
- Use social media and other technology to share

information on where to find drinking fountains and to assess and report on their condition

- Establish thorough monitoring and testing plans for all drinking fountains
- Develop and implement standards for water fountain cleaning, maintenance, repair and replacement
- Support city governments (including planning departments), schools, park districts and all those responsible for maintaining drinking fountains to obtain public input on drinking fountain locations and to work with residents to build confidence in drinking fountain cleanliness and safety
- Support nationwide efforts to replace old water infrastructure systems with modern pipes and plumbing to eliminate sources of lead, copper, and microbial contamination (see ***Question 16*** for more details).

Advocating for accessible and safe drinking water sources in your community should start by bringing residents together to engage with your local officials, city planners, parks department, and school systems. Placing and maintaining drinking water fountains can be incorporated into city planning efforts, municipal codes, and special initiatives. Some of the strategies noted in ***Question 12*** above (on how to meet and influence your water system) can be applied to other city, county, and state officials as well.

School buildings and grounds are especially important places to support public health by ensuring access to clean and safe drinking water fountains. Strategies to encourage students to drink public water instead of bottled water include providing cups near water sources, installing bottle fillers and offering chilled water. State school building standards can be updated to ensure that drinking water access is provided in all spaces where children are physically active, including gymnasiums, playgrounds and sports fields.

Unfortunately, lead has been found in drinking water in schools across the country, leading some schools to shut off their water fountains out of an abundance of caution. EPA has a lead reduction toolkit for schools and daycare centers that focuses on testing and taking action and also provides grants to states for voluntary lead testing.

Examples and funding strategies from projects nationwide that have successfully increased the number, accessibility, and safety of water fountains are featured in this American Planning Association report.

Question 15. How can my organization advocate at the local, state, and/or federal levels for drinking water affordability and to prevent mass water shut-offs?

Advocacy organizations play an important role in promoting policies and practices that make safe and affordable drinking water available to all. Safe and sufficient drinking water is a basic human need but not all U.S. residents are able to access the water they require for health and sanitation. While the full extent of affordability challenges in the U.S. is unknown, it is clear that some customers cannot afford to pay their water bills without sacrificing other basic needs. For example, Food and Water Watch estimates that in 2016, 15 million people in the U.S. experienced a water shut off and found that cities with higher rates of poverty and unemployment also had the highest rates of homes that experienced water shut offs (for a full discussion of measuring water affordability see ***Section 4***).

IMPACTS OF LACK OF ACCESS TO DRINKING WATER

Not having water in one's home can impact families in many ways. Access to running water is necessary for preparing and cooking food, maintaining personal hygiene, and keeping one's clothes and home clean. Water is also needed for mixing baby formula and operating medical appliances such as asthma nebulizers and machines to help with sleep apnea. Nursing mothers, infants and children, seniors, and those suffering from illness or medical conditions are most vulnerable to insufficient, or unavailable, water. As of 2013, 21 states have laws that consider a parent's inability to provide running water in the home as "child neglect," and there are documented cases of parents having their children removed following a water shutoff.

AFFORDABLE WATER

The cost of essential water and sanitation should be inexpensive enough that cost does not prevent access, nor interfere with other essential expenditures (e.g. food, health care, housing, transportation, education).

(This definition was adapted from the *Pacific Institute's report Measuring Progress Toward Universal Access to Water and Sanitation report*)

For many communities, setting affordable water rates and setting fair water shut-off policies are high-priority concerns. The U.S. Water Alliance notes that the most effective affordability programs are comprehensive in nature; they include affordable rate design, bill payment assistance programs and support for addressing in-home leaks and reducing water waste. There is an important difference between affordability and assistance, as they have different implications for low-income and vulnerable groups. Customer Assistance Programs (CAP) are intended to help consumers deal with short-term challenges and emergencies that may disrupt their ability to pay their water bills, and a many water systems have some sort of CAP in place. Affordable rates ensure that residents on fixed and low incomes are able to keep up with their water bills over the long term. The two can also be used in tandem, to maximize support for those customers most in need.

Affordable water rate design could include "inclining block" approaches in which the first tier of water use (ideally calculated at an amount that is equivalent to minimal health and sanitation standards) is priced at a very low rate that is affordable for all. Additional tiers of water usage are priced at higher rates. Another approach to affordability is to develop income-based rates, which can be calculated for your community's unique needs. However, income-based rate programs can have high administrative costs and some states have legal barriers that prevent utilities from adopting block or income-based rates.

Cities are taking different approaches to addressing their own affordability and access needs. In 2017, ***Philadelphia*** became the first big city to adopt income-based rates that allows poor residents to pay a percentage of their income for water. Boston has developed a right-to-service policy, stating it will not cut water service to households with serious illness or households where the residents are over age 65.

Policy change at the state level can help ensure that all municipal water systems are implementing best practices and serving all state residents fairly. For example, while most utilities do offer CAPs, only a few states have laws requiring that they do so. Other states restrict options for funding assistance plans (e.g., they do not allow use of general revenue from ratepayers for CAPs). Updating such state policies can be an effective way for advocates to influence water system operations within their communities.

Similar opportunities for policy reform may also be possible at the national level. The Bipartisan Policy Center, Unitarian Universalist Service Committee, and U.S. Water Alliance conducted separate research efforts on water affordability and offer the following recommendations to advance drinking water access and affordability in state and federal policies:[xiv]

- Ban water shutoffs for nonpayment when consumers do not have the ability to pay. At a minimum, require protections against water shutoffs for low-income children (under age 18), the elderly (over 65), persons with disabilities, pregnant and lactating women, and persons with chronic and catastrophic illnesses.
- Establish clear metrics and guidelines for utilities as they strive for more reliable, affordable service. This includes developing improved affordability standards and programs for safe drinking water and sanitation for urban and rural communities.
- Prioritize and target all water and sanitation funding to those who do not currently have it and vulnerable populations first, followed by other investments as needed
- Provide matching funds to supplement local water affordability programs. This might include subsidizing water services for qualifying low-income households.
- Offer technical support for utilities to develop customer assistance programs
- Recognize and remove legal barriers to affordability solutions such as those that limit rate structure options
- Collect data at the household level on water and sanitation costs, lack of access, and the impacts of water shutoffs. Reporting should be transparent, publicly accessible, and free of jargon
- Study by regulatory agencies to address the impacts of regulated and unregulated pollution on the cost of water and sanitation for consumers and households
- Consider pacing implementation of regulatory compliance to minimize the economic impact on vulnerable communities, while ensuring that needed investments result in all communities having equal access to safe and clean water

The ***Human Right to Water*** can be pursued as a policy at both the state and federal levels. Currently, California is the only state with a Human Right to Water policy, although state legislation has been proposed in past years in Michigan. Placing human rights at the center of national policy could help ensure that each community's basic human needs are prioritized and protected. Adopting a human right to water and sanitation in domestic state law would further support universal, non-discriminatory access to safe, affordable drinking water and sanitation for all residents. For both national and state policies, however, an effective Human Right to Water policy must be paired with clear enforcement mechanisms and remedies to ensure that the law is applied and enacted comprehensively.

Question 16. What can my organization advocate for to increase state and federal infrastructure funding to ensure water is clean, safe and affordable for everyone?

As discussed in ***Section 4***, drinking water systems across the country are facing a significant challenge in maintaining and paying for aging infrastructure. The American Water Works Association (AWWA) estimates that $1 trillion is needed to maintain and expand service to meet drinking water demands over the next 25 years.[xv] While federal funding for water infrastructure is available from EPA, USDA and other agencies (described in more detail in ***Section 4***), cities and states now pay the majority of costs of treating and supplying drinking water to residents. For communities like Flint, Michigan that have seen declining populations, as well as mid-sized and smaller water systems serving more rural communities, this financial burden can be significant.

The following recommendations from the Bipartisan Policy Center and U.S. Water Alliance can inform your advocacy for strengthening federal and state support for drinking water systems. Obtaining community input to assess these strategies through an equity and justice lens will ensure they do not exacerbate inequalities in some communities:

- Increase government funding and support for finance programs for drinking water infrastructure improvements with terms that can support affordable rates for vulnerable residents. The federal government has an important role to play, and additional resources are needed overall for existing national programs such as the SRFs, the WIFIA credit assistance program, and USDA's rural water grant and loan programs. While grant funding would be the most beneficial for struggling communities, there would also be benefits from the creation of new programs that can lower the cost of borrowing money through low-interest or no-interest loans, guarantees, and other strategies.

- Provide incentives for water systems to adopt best practices (e.g. making them a condition for receiving any federal funding). These could include:

  - Promoting internal management practices such as asset management that can lower overall system expenses and improve system and infrastructure management

  - Encouraging water conservation and water efficiency measures and reducing water loss in a way that does not reduce revenues as water use declines over time

  - Pursuing fair regional collaboration options to help reduce the fragmentation of water decision making, decrease costs, and improve service delivery. Regional collaboration can occur on a continuum from partnership options and agreements with neighboring communities to the full consolidation of two or more systems. The equity implications of any agreements and consolidation efforts should be addressed, particularly if there is a power imbalance between wealthy and low-income communities.

  - Support partnerships with the private sector when they are based on meaningful community participation and have an explicit intent to reducing inequalities and providing fair benefits to all consumers

- Promote and support the development of innovative solutions and new technologies in the water infrastructure sector. Water technologies such as new devices, processes, or financial structures, can reduce the costs and improve service delivery of drinking water to consumers. Supporting the development and adoption of new technologies and processes could include the direct funding for research and development, increasing regional collaboration opportunities, incentivizing performance and reducing barriers to innovation.

Finally, PolicyLink's Water Equity and Climate Resilience Caucus is developing a set of recommendations for water infrastructure policy that can be found here.

RESOURCES

Access and Equity

- Community Water Center: ***Publications and Resources***
- Food and Water Watch: ***Our Right to Water: A Peoples' Guide to Implementing the United Nations' Recognition of the Right to Safe Drinking Water and Sanitation in the United States***
- ***National Drinking Water Alliance***
- U.S. Water Alliance: ***An Equitable Water Future: A National Briefing Paper***

Advocacy and Policy

- American Rivers and Great Lakes Environmental Law Center, ***Protecting Drinking Water in the Great Lakes***
- Bipartisan Policy Center: ***Increasing Innovation in America's Water Systems***
- Brookings Institute: ***Renewing the water workforce: Improving water infrastructure and creating a pipeline to opportunity***
- ***National PFAS Contamination Coalition***
- National Resources Defense Council: Threats on Tap: ***Widespread Violations Highlight Need for Water Investment in Infrastructure and Protections***
- U.S. Water Alliance: ***Sustain Adequate Funding for Water Infrastructure***

Affordability

- Bipartisan Policy Center: ***Water Affordability: The Federal State of Play***
- Manny Teodoro: ***Measuring Water and Sewer Utility Affordability***
- Unitarian Universalist Service Committee (P. Jones and A. Moulton): ***The Invisible Crisis: Water Unaffordability in the United States***
- University of North Carolina Environmental Finance Center: ***Ensuring Drinking Water Affordability: Challenges and Opportunities in Local and State Policy Making***
- U.S. Environmental Protection Agency and the National Academy of Public Administration: ***Developing a New Framework for Community Affordability of Clean Water Services***
- U.S. Water Alliance: ***Redefine Affordability for the 21st Century***

Communications and Outreach

- Centers for Disease Control and Prevention: ***Planning for an Emergency: Strategies for Identifying and Engaging At-Risk Groups***

General Resources

- Centers for Disease Control and Prevention: ***Drinking Water FAQs***
- For more resources on where our drinking water comes from, and how to protect it, see ***Section 1***.
- For more resources on what drinking water systems do, see ***Section 2***.
- For more resources on the frameworks in place for making sure our water is safe to drink, see ***Section 3***.
- For more resources on the cost of drinking water, and what your water bill is paying for, see ***Section 4***.
- For more resources on how climate change will affect drinking water, and what you can do about it, see ***Section 5***.
- Michigan Environmental Council, ***Michigan Drinking Water Toolkit***
- River Network: ***Drinking Water 101 Webinar Series***

Safety

- American Water Works Association Resources: ***Drinktap.org***
- Environmental Working Group: ***Tap Water Database***
- ***Lead Service Line Replacement Collaborative***
- U.S. Environmental Protection Agency: ***Planning for an Emergency Drinking Water Supply***
- U.S. Water Alliance: ***Reduce Lead Risks, and Embrace the Mission of Protecting Public Health***

Tribal Resources

- ***National Tribal Water Council***
- U.S. EPA: ***Safe Drinking Water on Tribal Lands***

Water Use

- U.S. Geological Survey: ***Public Supply and Domestic Water Use in the U.S.***

Well Water

- Community Water Center: Guides on Private Wells in ***English*** or ***Spanish***
- U.S. Environmental Protection Agency: ***Private Drinking Water Wells***

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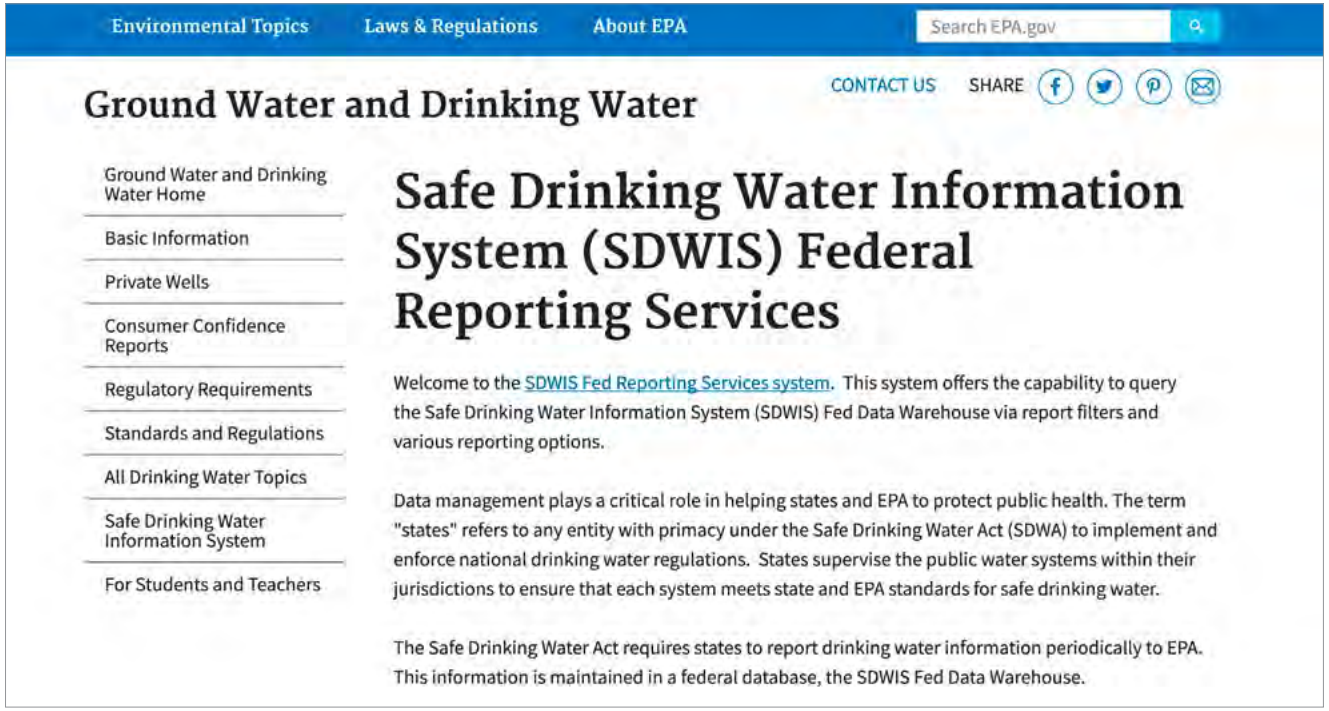
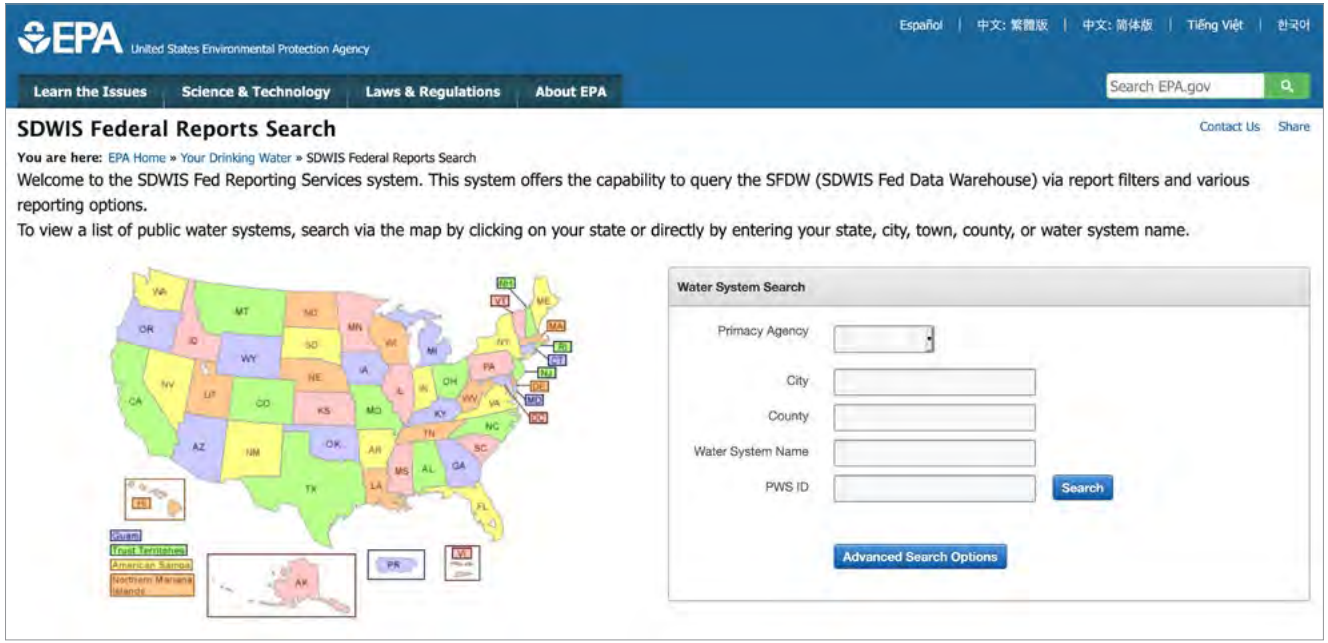
APPENDIX A – USING THE SAFE DRINKING WATER INFORMATION SYSTEM (SDWIS)

INTRODUCTION
SECTION 1
SECTION 2
SECTION 3
SECTION 4
SECTION 5
SECTION 6
HOME
PREVIOUS
NEXT

ACCESS EPA'S MAIN SDWIS WEBSITE



Clicking on the SDWIS Fed Reporting Service system link get you to the main search page



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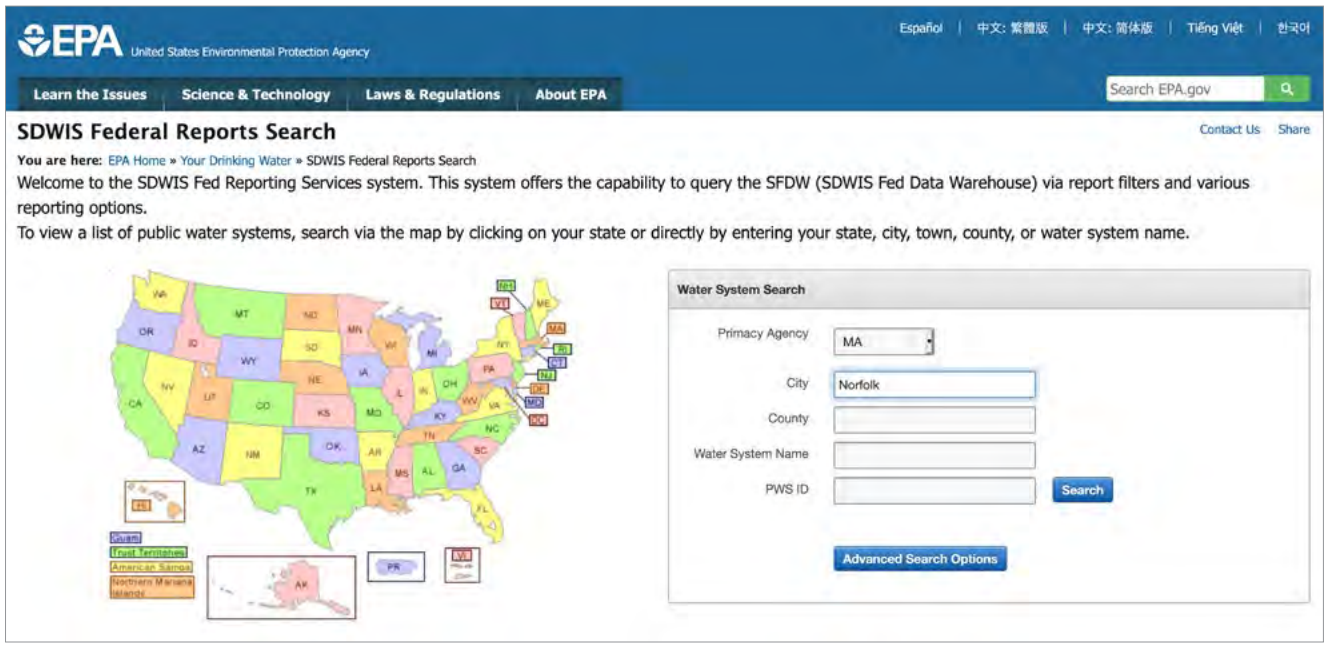

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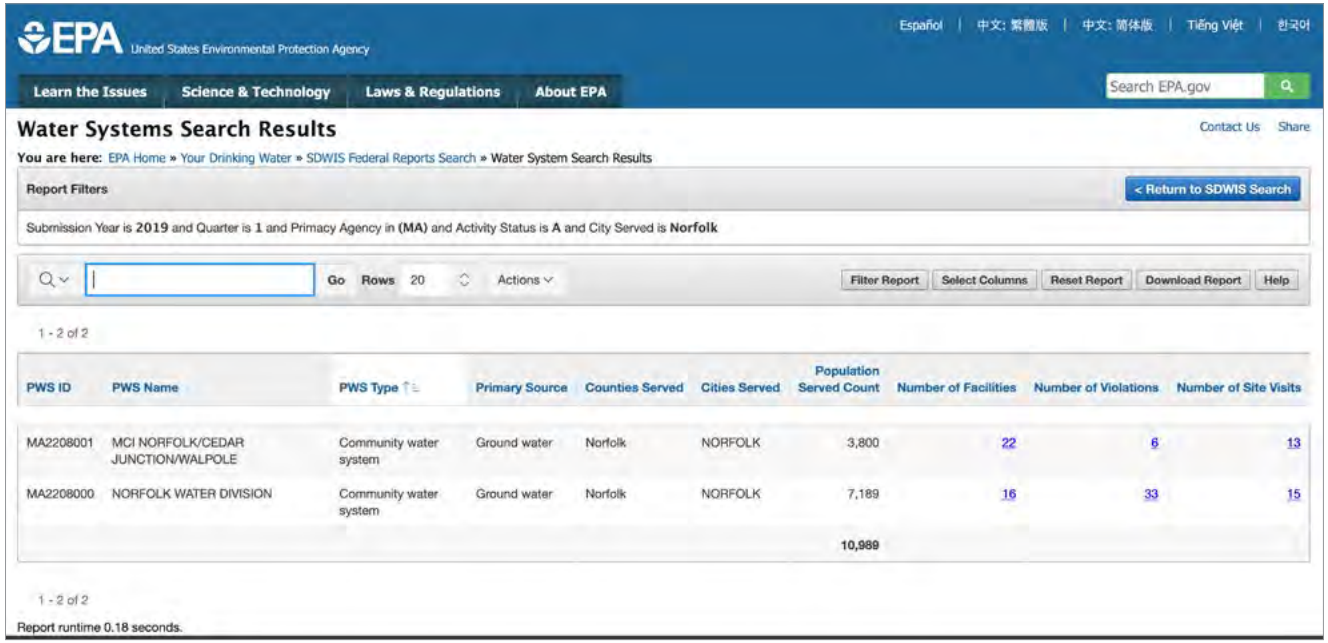

EPA United States Environmental Protection Agency

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Submission Year is **2019** and Quarter is **1** and Primacy Agency in **(MA)** and Activity Status is **A** and City Served is **Norfolk**

Go Rows 20 Actions

Filter Report | Select Columns | Reset Report | Download Report | Help

1 - 2 of 2

PWS ID	PWS Name	PWS Type	Primary Source	Counties Served	Cities Served	Population Served Count	Number of Facilities	Number of Violations	Number of Site Visits
MA2208001	MCI NORFOLK/CEDAR JUNCTION/WALPOLE	Community water system	Ground water	Norfolk	NORFOLK	3,800	22	6	13
MA2208000	NORFOLK WATER DIVISION	Community water system	Ground water	Norfolk	NORFOLK	7,189	16	33	15
						10,989			

1 - 2 of 2

Report runtime 0.18 seconds.

APPENDIX B: LIST OF COMMUNITY OUTREACH PARTNERS

To search for water groups across the country, visit River Network's Water Protectors Map and search in your areas.

COMMUNITY GROUPS

Community councils

Community leaders (e.g., representatives from specific groups: seniors, minority populations, and non-English speakers)

Faith-based organizations (churches, synagogues, temples, mosques, etc.)

Individual citizens

EDUCATIONAL INSTITUTIONS

Pre-schools and daycares

K-12 Schools (public, private, charter, etc.)

School boards

Community colleges, vocational schools, & universities

Local Cooperative Extension System offices

HEALTHCARE PROFESSIONALS AND FACILITIES

Home care services

Medical facilities

CITY OR GOVERNMENT OFFICES OR AGENCIES (ALL LEVELS AND DISCIPLINES)

Airports

Animal control agencies

Chambers of commerce

Councils, Local Emergency Planning Committees

Embassies

Libraries

Local Planning Councils (e.g., Citizen Corps

Public transportation systems

Utility providers

MEDIA

Radio stations

TV stations

Newspapers

Local bloggers/social media personalities

NONPROFIT ORGANIZATIONS

Advocacy groups

Animal welfare organizations

Disability services

Food pantries

Homeless shelters

Volunteer organizations (e.g., local Voluntary Organizations Active in Disaster, Community Emergency Response Team programs, volunteer centers, etc.)

COMMERCIAL AND RETAIL

Businesses that serve target audiences (e.g. located in vulnerable neighborhoods, providing services or supplies to the elderly, etc.)

Grocery stores (big box, local, ethnic, etc.)

Hardware stores

Malls

Small, local retailers

Supply chain components, such as manufacturers, distributors, suppliers and logistics providers