TESTIMONY OF
ERIK D. OLSON
SENIOR STRATEGIC DIRECTOR,
HEALTH AND FOOD
NATURAL RESOURCES DEFENSE COUNCIL

BEFORE THE
COMMITTEE ON ENERGY AND COMMERCE
SUBCOMMITTEE ON ENVIRONMENT & CLIMATE CHANGE
UNITED STATES HOUSE OF REPRESENTATIVES

HEARING ENTITLED
"TRUSTING THE TAP: UPGRADING AMERICA'S DRINKING WATER INFRASTRUCTURE"

MARCH 29, 2022

SUMMARY

- The good news is that the new Bipartisan Infrastructure Law—the BIL or formally the Infrastructure Investment and Jobs Act—will invest about $30 billion to address some of the urgent backlog in necessary repairs and upgrades for our drinking water systems.

- Decades of neglect and divestment have created an enormous buildup of badly needed repairs. Congress and the Biden Administration demonstrated the courage and will to make historic and truly significant investments in infrastructure. These investments will pay dividends well into the future.

- This is a historic investment that deserves celebration and will help many communities to address their pressing needs. We must ensure that these funds, especially grants, are prioritized to help the disadvantaged communities that need it most.

- The BIL will invest $15 billion to help remove lead service lines across the country. These lead pipes threaten the health of tens of millions of Americans, especially children and low-income communities. The BIL's investment will take a significant bite out of this problem; additional funding including the $10 billion for lead in drinking water included in the House-passed reconciliation bill (H.R. 5376) is needed.

- The BIL also invests $9 billion in to address emerging contaminants in drinking water, principally to help address the PFAS contamination crisis. Another $11.7 billion is invested via the Drinking Water State Revolving Fund for drinking water priorities.

- Infrastructure investment creates good jobs. For example, a 2021 study found that investing in replacing our lead service limes alone would create 560,800 job years—providing good-paying jobs for American workers.

- Safe drinking water we all take for granted in the U.S cannot be considered a given. Much of our nation's water infrastructure is like a rusty decades-old car that hasn't been maintained or had an oil change or brake job for years. It may still be barely running, but we need to make major investments to upgrade and fix it, or it will gradually die and may even catastrophically fail.

- The $30 billion BIL investments are historic, though according to industry estimates $1 trillion will be needed to address drinking water infrastructure needs. The profound level of disrepair means that more, like included in the House reconciliation bill is needed.

- Despite our successes and efforts to date, drinking water contamination still wreaks devastating impacts. There are 9 to 12 million lead service lines, lead contamination of school drinking water is widespread, and tens of millions, perhaps more than 100 million Americans, are drinking PFAS in the tap water.

- An estimated 7.1 to as many as 12 million Americans are sickened annually by pathogen-contaminated tap and other water. That doesn't include the impacts of toxics. Tens of millions are served by water systems violating EPA's health standards.

- There are three underlying causes: (1) underinvestment in our water infrastructure so water systems too often rely on outdated and inadequate treatment and distribution systems; (2) a broken Safe Drinking Water Act that leaves unregulated widespread and hazardous contaminants like PFAS and allows weak enforcement the drinking water standards that do exist; and (3) poor to nonexistent controls on many major water polluters. Often low-income areas lack any access to safe piped drinking water.

- Protecting water sources helps to safeguard health and reduces treatment costs.

- There are increasing challenges to water infrastructure from extreme weather, droughts.

- We envision a day when every person in this great nation—whether a resident of a major city, a small rural town, a Tribal community, or an underserved impoverished isolated community—will drink safe and affordable tap water. The BIL takes a major historic step to help us move forward towards this goal, but more will be needed.

Recommendations:

1. Implement the BIL by investing first in those communities that need it most.
2. Invest additional resources in fixing our water infrastructure, paying special attention to the affordability and needs of lower-income and disproportionately affected communities.
3. Fix lead in our water, including removing all lead service lines, fixing the Lead & Copper Rule, and addressing lead in schools and childcare centers.
4. Fix the broken Safe Drinking Water Act to ensure controls on key contaminants like the class of PFAS.
5. Protect source water to reduce infrastructure costs and health and environmental harms.
6. Protect water infrastructure from extreme weather events and possible terror attacks.
7. Invest in technologies including broad-spectrum treatment and real-time and other advanced monitoring.
8. Let citizens act immediately to address imminent & substantial health endangerment.
9. Vigorously enforce the Safe Drinking Water Act.

I. Introduction

Good morning Chairman Tonko, Ranking Member McKinley and members of the Subcommittee. I am Erik D. Olson, Senior Strategic Director for Health and Food at the Natural Resources Defense Council (NRDC). I have worked on Safe Drinking Water Act issues for over 35 years, beginning with my service as an attorney in the U.S. Environmental Protection Agency's Office of General Counsel in the 1980's, and continuing as a former member of the EPA's National Drinking Water Advisory Council and as a member of numerous EPA advisory committees relating to drinking water. I also have authored numerous reports and served on many expert panels on drinking water, including as an advisor to the Government Accountability Office's experts' assessment of how to improve water system security after 9/11.[1] I appreciate the opportunity to testify.

II. The Bipartisan Infrastructure Law: An Overview

Since my last testimony before this subcommittee a few years ago, there have been some exciting and important developments, in no small measure due to the arduous efforts of many members of this body. The new Bipartisan Infrastructure Law—the "BIL" or formally the Infrastructure Investment and Jobs Act[2]—will invest about $30 billion over the next five years to address some of the urgent backlog in necessary repairs and upgrades for our drinking water systems. This is a historic investment that deserves celebration and will help many communities to address their pressing needs. It must be implemented to ensure that the funds, especially grants, are prioritized to help the disadvantaged communities that need it most.

EPA's recent "Implementation Memo,"[3] issued on March 8, 2022, properly emphasizes the importance of steering BIL funding, and particularly the 49 percent of the drinking water State Revolving Fund (DWSRF) resources dedicated to grants or forgivable loans, to those disadvantaged communities that need the funds most. In the past, too often lower-income communities in rural as well as some urban areas have been unable to access federal water infrastructure funds due to state policies and practices that made it difficult or impossible

to get these funds. For example, some states established policies that they would only reimburse water systems for expenditures already made or buy bonds already issued. But many disadvantaged communities lack the resources to pay for the needed repairs up front or to float bonds in the first place. Similarly, low-income communities also often have a hard time affording to hire engineers and other experts to help them prepare sound applications for funds or are not even aware of the availability of funding. Some states have defined "disadvantaged community" in a way that excludes some water systems from obtaining grants—such as larger systems that as a whole may not meet the criteria for "disadvantaged" but that have substantial populations in their service areas that are impoverished. States and EPA must do everything possible to provide technical assistance to disadvantaged communities. They must revisit their definitions of disadvantaged community and prioritize public health investments over politically expedient economic development. States also must eliminate unnecessary impediments to lower-income communities or disadvantaged portions of a service area to obtain additional subsidies under the BIL and the DWSRF. EPA's new BIL Implementation Memo takes important strides towards these goals, but much will depend upon EPA's and states' willingness to change business as usual to reach disadvantaged communities most in need of assistance.

The BIL will invest $15 billion over the next 5 years to help remove lead service lines across the country.[4] As discussed below, these lead pipes, which connect the water main in the street to residences, threaten the health of tens of millions of Americans, especially children and low-income communities. The BIL's investment will take a significant bite out of this problem, though the additional funding including the $10 billion included in the House reconciliation bill (H.R. 5376) is needed. Moreover, EPA and states must be clear that partial lead service line replacements—in which a water system replaces a portion of the lead pipe and leaves part of it in use—are not allowed, as EPA's Implementation Memo states. These "partials" can cause a substantial increase in lead levels at the tap,[5] and are ill-advised, though many water systems continue to use this technique.

It also is important that water systems not charge individual homeowners for replacing the lead service line. It is well established—including in a recent published, peer-reviewed

journal article[6]—that charging property owners for lead service line replacements results in an environmental injustice. Low-income homeowners who can't afford to pay for replacement and tenants whose landlords generally refuse to pay, do not get their lead service line fully replaced and continue to drink lead-contaminated water. Wealthier people who can more readily afford replacement, do so disproportionately and do not suffer the same fate. Moreover, programs that require extensive documentation and justification for obtaining a subsidy for low-income people to replace their lead service line create extensive transaction costs and delays, place burdens on low-income families that make it unlikely they will apply, and overall result in a much less efficient and less equitable replacement program. For these reasons, Michigan's strengthened state Lead and Copper Rule sets an example by requiring all lead service lines to be fully replaced and for water systems to cover the full costs.

We strongly support the more efficient, faster, and more effective approach like that used in Newark, New Jersey. There, the utility paid for the full lead service line replacement, sweeping into communities and swiftly replacing in less than 3 years more than 23,000 lead lines. The city replaced lead lines on whole streets at a time with local workers trained by the local union to complete the task. They also used less disruptive methods for replacing the lines, generally using the "pull through" method that requires digging only small holes in front of the home instead of a large trench from the main to the home. NRDC and more than a dozen health, environmental and environmental justice organizations recently issued a brief set of "Principles for Lead Service Line Replacement"[7] based on our learnings from Newark, Flint, Pittsburgh, Benton Harbor, Washington D.C., and other cities. Newark's approach and our recommended principles will result in more efficient, less expensive, faster, more equitable and more effective results.

The BIL also invests $9 billion in to address emerging contaminants in drinking water, and an additional $1 billion to address these contaminants under the Clean Water Act, principally to help remedy the widespread PFAS contamination crisis, which I discuss later in this testimony.[8] Another $11.7 billion is invested through the Drinking Water State

Revolving Fund for state drinking water priorities, and a separate $11.7 billion is invested under the Clean Water State Revolving Fund to address water pollution discharges.[9]

Infrastructure investment creates good jobs. For example, a 2021 study[10] found that investing the $45 billion the Biden Administration has called for in removing all lead service lines over 10 years would create and support 56,080 jobs annually over that decade, or a total of 560,800 job-years. These include good-paying direct jobs—construction workers, plumbers, pipefitters, heavy equipment operators—as a direct result of this activity. It also includes thousands of jobs created throughout the value chain and jobs created when these workers spend their paychecks. Overall, a study by the American Society for Civil Engineers found that investing to fix and update our water infrastructure would create a total of 800,000 jobs, and disposable income would rise by over $2,000 per household.[11]

III. Urgent Backlog in Water Infrastructure Needs

The safe drinking water we all take for granted in the U.S cannot be considered a given. Much of our nation's water infrastructure is like a rusty decades-old car that hasn't been maintained or had an oil change or brake job for years. It may still be barely running, but we need to make major investments to upgrade and fix it, or it will gradually die and may even catastrophically fail.

Congress' investment in American water infrastructure could not have come at a better time. The American Society of Civil Engineers (ASCE) has been ringing the alarm bell about our water infrastructure for decades,[12] with its troubling report cards giving our drinking water and wastewater infrastructure a grade of "D"[13] or "C-"[14] every four years. The engineers highlight serious problems that result from the lack of investment in our water infrastructure, noting that pipes and mains are often 100 years old and nearing the end of their useful life, causing frequent pipe failures and other problems.

A. Aging & Deteriorating Drinking Water Infrastructure

There are about 250,000 to 300,00 water main breaks per year due to deteriorating and poorly maintained underground drinking water pipes.[15] Even more water is lost to unseen leaks and breaks that never reach the surface. Water losses waste not only enormous amounts of this precious resource, but they also can cause serious damage to roads and property, they can pose significant public health risks. For example, particularly when water mains are close in proximity to sewer lines, fecal contamination can get into the drinking water after a rupture or pressure loss, posing a threat of causing a waterborne disease outbreak.

In many cities, underground pipes are often a century old or more, and in too many cases municipalities are on track to take 200 years to replace their aging pipes.

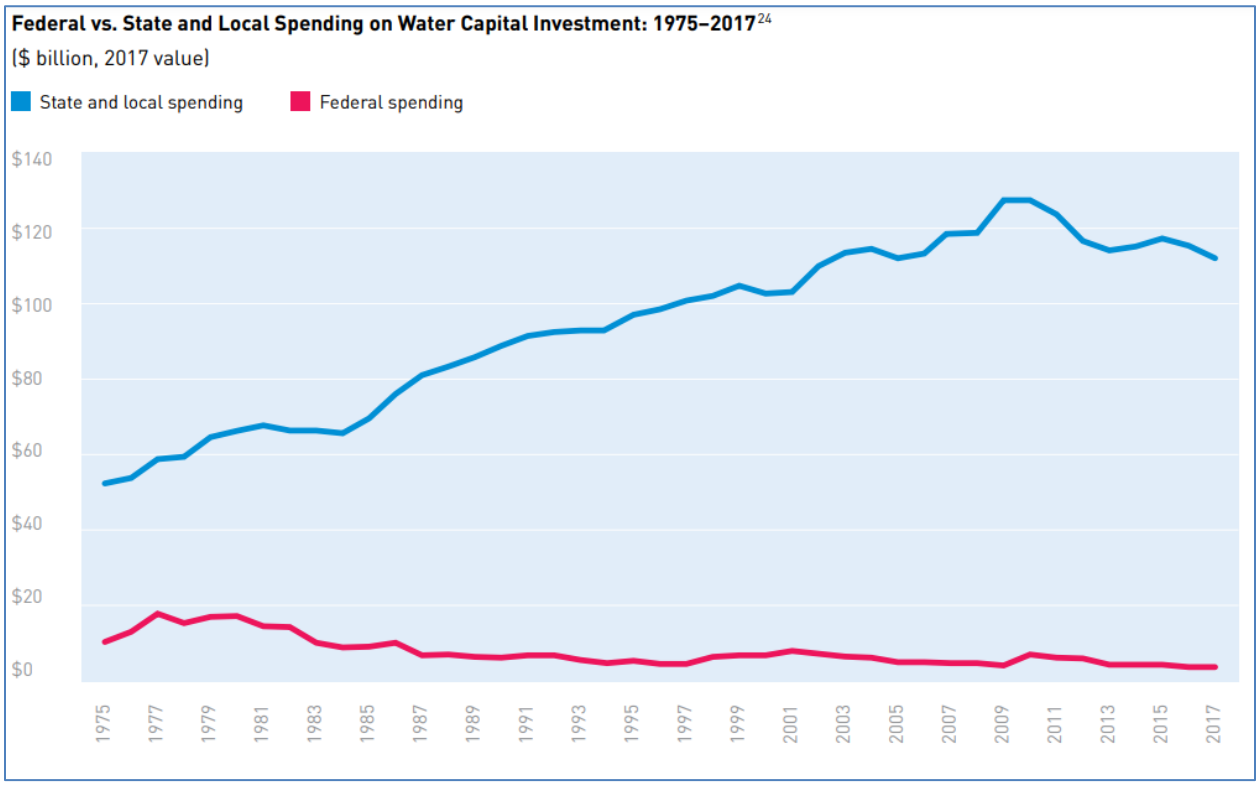
We routinely lose an average of 14 to 18 percent of our drinking water to leaking underground pipes,[16] although this is just an estimate, since standardized auditing and reporting of water loss is not required in most states.[17] In some cases, such as Flint, water loss rates of 40 percent or more have been estimated. These leaks represent an enormous waste of water, energy, treatment chemicals, and money used to collect, treat, and pump the water. Moreover, points of leakage of any size can provide pathways for contaminants to enter the water system during short-term pressure fluctuations, known as "transients." Thus, leaks can cause water pressure losses, which can, much like catastrophic pressure failures from water main breaks, allow pathogens to get into the drinking water, posing health risks. Improved pipe maintenance and pressure management are important components of both infrastructure stewardship and public health protection.

B. Total Cost to Fix Drinking Water Infrastructure & Need for Resources

The American Water Works Association estimates that it will cost $1 trillion dollars to upgrade, repair, and maintain our drinking water infrastructure to serve the population as it grows over the next 25 years.[18] Past funding for drinking water infrastructure has not kept pace with the needs. In recent years prior to the BIL, Congress has appropriated about $2.4 billion a year for water and wastewater infrastructure combined, funding a tiny

fraction of the work needed.[19] The BIL investments will be a major help and boost the federal investment, but prior to that BIL funding the federal share shrank substantially over the past three decades to about 4 percent, as shown in Figure 1. The BIL will raise the federal investment, but states and localities will bear much of the water infrastructure costs, and substantial additional federal investment is needed.

FIGURE 1
WATER INFRASTRUCTURE INVESTMENTS BEFORE ENACTMENT OF THE 2021 BIPARTISAN INFRASTRUCTURE LAW



Source: American Society of Civil Engineers, "The Economic Benefits of Investing in Water Infrastructure," 2020[20] This figure does not reflect the substantial boost of nearly $50 billion in federal investments over 5 years for water infrastructure provided by the 2021 Bipartisan Infrastructure Law, or BIL.

IV. Infrastructure Investment Creates Good Jobs

Congress' wise investment in our water infrastructure in the BIL and other legislation is good economic news. It helps to rebuild the base of the nation's economy, which is highly dependent upon reliable, safe drinking water and wastewater service. Major investment in water infrastructure also creates thousands of good-paying jobs.

For example, it has been estimated that for every $1 million dollars in state revolving loan fund spending, 16.5 jobs are created.[21] Thus, it was concluded, investing $34.7 billion in federal capitalization grants for the SRF would create more than 500,000 jobs.[22]

Clearly, the massive $50 billion in investments in water infrastructure in the BIL, including the $30 billion invested in drinking water infrastructure alone, will yield enormous jobs benefits. Additional aggressive investment in water infrastructure, such as envisioned in the House-passed reconciliation bill H.R. 5376, would yield more jobs. For example, a recent study found that an investment of $188.4 billion in water infrastructure (an EPA estimate of wastewater-related infrastructure needs) spread equally over five years would generate $265.6 billion in economic activity and create close to 1.9 million jobs.[23] The study found, based on the economics literature, that such infrastructure investments "create over 16 percent more jobs dollar-for-dollar than a payroll tax holiday, nearly 40 percent more jobs than an across-the-board tax cut, and over five times as many jobs as temporary business tax cuts."[24] Similarly, the study noted earlier by the American Society for Civil Engineers found that investing to fix and update our water infrastructure would create a total of 800,000 jobs, and disposable income would rise by over $2,000 per household.[25]

Lead service line replacement funded by the BIL and House-passed reconciliation bill serve as an excellent example of these kinds of good job-creating investments. As briefly mentioned above, a 2021 study by Environmental Entrepreneurs and United Association of Union Plumbers and Pipefitters (UA)[26] found that investing the $45 billion the Biden Administration has called for in removing all lead service lines over 10 years would create and support 56,080 jobs annually over that decade, or a total of 560,800 job-years. Most are good-paying direct jobs such as construction workers, plumbers, pipefitters, heavy

equipment operators—as a direct result of this activity. There also are thousands of jobs created throughout the value chain and when workers spend their paychecks. The BIL's $15 billion for lead service line replacements, plus the additional $10 billion approved by the House-passed reconciliation bill, will generate thousands of jobs for many years to come.

V. Continuing Health Threats from Drinking Water Contamination

Despite our successes and efforts to date, drinking water contamination still wreaks devastating impacts. The safe drinking water we all take for granted in the United States cannot be considered a given. Below I review some of the major contamination threats.

A. Lead Service Lines

Lead in drinking water remains a major issue, as the BIL's investment in lead service line replacement recognizes. The lead in drinking water crises in Flint, Michigan[27], Newark, New Jersey,[28] Benton Harbor, Michigan[29], Clarksburg, West Virginia,[30] and long before those in Washington, DC[31] are simply a few examples of literally hundreds of communities with lead in drinking water issues. According to NRDC's published analysis of EPA data, nearly 30 million people in the United States drank water from community water systems that violated the EPA's Lead and Copper Rule between January 2015 and March 2018. Furthermore, about 5.5 million people got their water from systems that exceeded EPA's Lead Action Level—which is not a safe level, but rather triggers mandatory additional steps that must be taken by water systems to reduce lead levels. EPA and health experts agree that no amount of lead is safe.

Moreover, these figures are serious understatements of the extent of the lead in drinking water violations problem. As EPA's former Assistant Administrator for Enforcement Cynthia Giles emphasized in 2020 comments to the agency,

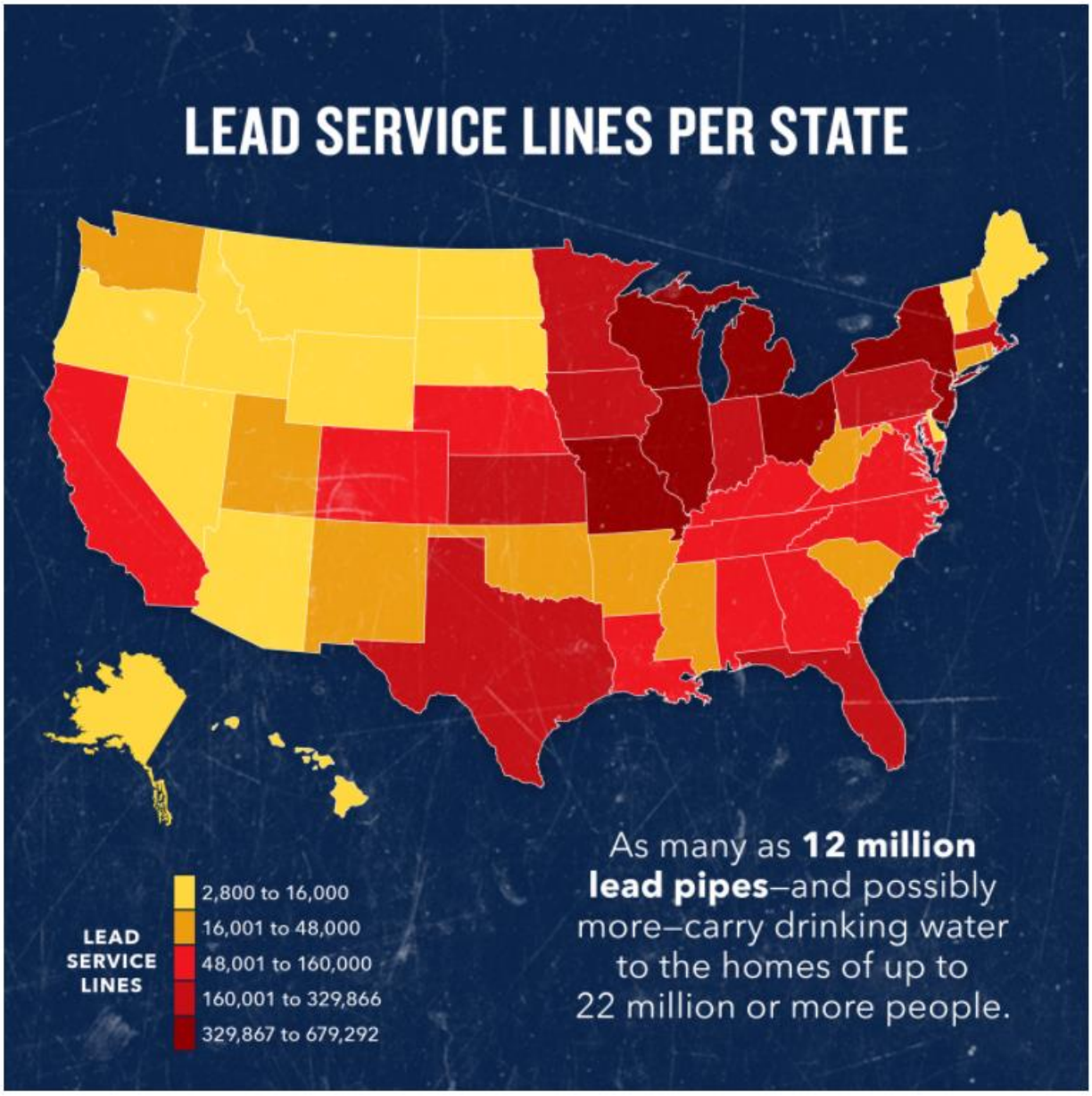
> A thorough EPA data audit…found states were only telling EPA about 8% of the health-based lead rule violations. *Eight percent.* That means that 92% of the lead health-based violations were not reported to EPA. Monitoring and reporting violation completeness was hardly better: states were not telling EPA about 71% of

> the monitoring and reporting violations. A subsequent review by GAO of more recent EPA audit data found that 84% of the monitoring and reporting violations by community water systems were not reported or were inaccurately reported to EPA. GAO confirmed in 2017 that the problem persists, further noting that more recent detailed information is not available because in 2011 EPA discontinued audits of drinking water data due to lack of funds.[32]

There has been a similar shortage of reliable data on how many lead service lines there are in the country. Due to this lack of up-to-date or comprehensive information on the extent of the lead service line problem, in 2021 NRDC conducted a survey of all 50 states requesting information about how many lead service lines they had. After gathering the limited information states could provide and other available data, we estimated that there are from about 9 million to more than 12 million lead service lines nationally.[33] For homes that have lead service lines, they are the predominant source of lead in drinking water.[34] As shown in Figure 2, every state is plagued by them, and our study provides state-by-state estimates of the number of these pipes. Unfortunately, our survey found that most states do not track how many of these lead pipes they have, so we had to base our estimates in some states on a voluntary industry survey[35] that the Government Accountability Office (GAO) found likely is a "lower-bound estimate."[36]

The $15 billion invested in removing these lead service lines included in the BIL will take a significant bite out of this problem but represents about one-third of the $45 billion the Biden Administration has estimated[37] is needed to replace all lead service lines. Some industry estimates are even higher. That is why the House-passed reconciliation bill includes $10 billion more to address lead in drinking water. Like the BIL, it also provides a powerful opportunity to create good jobs and promote public health by investing in America.

FIGURE 2



Source: NRDC, "Lead Service Lines are Widespread and Used in Every State," 2021.
https://www.nrdc.org/lead-pipes-widespread-used-every-state

B. Lead in School & Childcare Drinking Water

Millions of American children get a significant portion of the water they drink at school or their childcare center. Unfortunately, studies have shown that many schools' drinking

fountains and other outlets children (and often staff) drink from are contaminated with lead. While nationwide data are not available, in the few states that have collected substantial monitoring data, the results are startling. For example, New York State initiated a statewide school drinking water testing program that yielded deeply worrisome findings. The data showed that more than 80 percent of schools statewide found lead contamination exceeding New York's then-established state action level of 15 parts per billion (ppb) in at least one fountain or water outlet.[38] Results were often worse outside of New York City than they were in the city.[39] The highest school's water tested at 13,100 ppb, and more than 590 fixtures' water was contaminated with between 100 ppb and 13,100 ppb of lead. New York recently dropped its action level to 5 ppb and took other steps towards remediation of contaminated water. [40] The American Academy of Pediatrics recommends that children drink water containing no more than 1 ppb.[41]

Funding is needed to protect the this most vulnerable population (young children) from lead where they are supposed to be learning. If there isn't funding for lead in drinking water in schools and childcare centers, we are leaving open a big route of exposure. We should protect kids in home and at school; the lead funds in the BIL covers homes but we need to address the other place children spend most of their time. This is why the House-passed reconciliation bill includes an additional $10 million for lead in drinking water, $9 billion of which can be spent to address either lead in school water or lead service lines.

The current patchwork of testing and occasional remediation allows many children across the country to be exposed to lead in drinking water. Lead levels in water can vary wildly from day to day or even hour to hour, due to changes in hydraulics and other variables such as small lead particles lodged inside of plumbing and fixtures that can be released sporadically and unpredictably, causing big spikes in lead levels.[42] The EPA revised Lead and Copper Rule, discussed later, will not solve this problem, as it only requires extremely limited (indeed grossly inadequate) one-time testing at schools and childcares that is likely to miss the problem in many schools and mislead parents and staff into thinking there is no lead problem. The rule also doesn't require any action to respond to contamination that is found. This rule needs to be fixed.

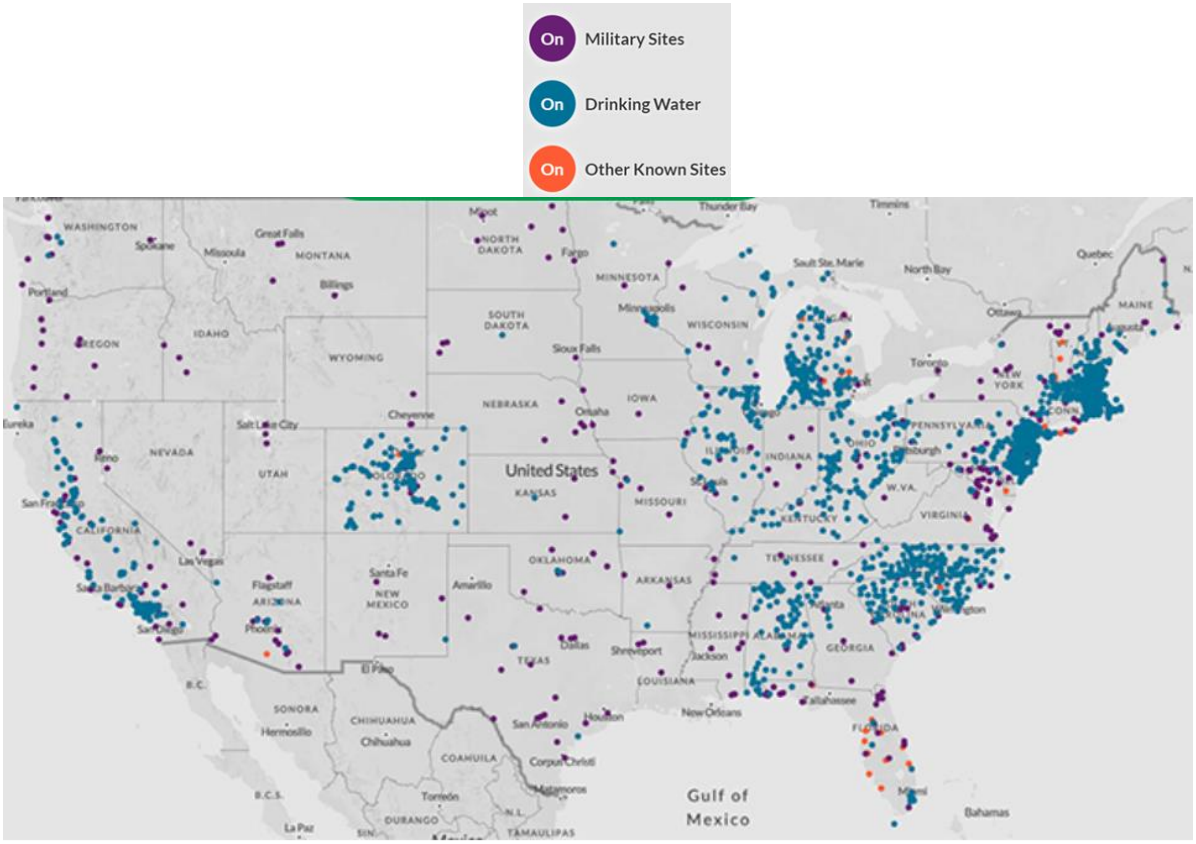
We suggest a "filter first" approach, whereby schools install filtration stations that are certified to remove lead.[43] This approach is less expensive, faster, and more effective than doing comprehensive ongoing lead testing and remediation, which ironically often reintroduces lead into the school drinking water.[44] Additional funding, as provided in the House-passed reconciliation, would be a significant step forward to addressing this issue.

C. Toxic "Forever Chemicals" PFAS are Found Virtually Everywhere

Of course, as serious as the lead problem is, contamination of drinking water with other contaminants is also widespread. Toxic "forever chemicals" per- and poly-fluoroalkyl substances, or PFAS, also are an emerging and extremely widespread problem. Thankfully, Congress recognized this problem in the BIL by dedicating $9 billion to help address PFAS and other emerging contaminants in drinking water. This is an unprecedented and welcome investment, but unfortunately that funding will be far from sufficient to fully address the PFAS crisis.

You, your family, and probably every one of your constituents has PFAS in your body. PFAS contamination has become increasingly widespread across the United States. Centers for Disease Control and Prevention (CDC) data show that more than 98 percent of U.S. residents tested are carrying PFAS in their blood or tissue. Millions of Americans who drink elevated amounts of PFAS in contaminated tap water or are otherwise more heavily exposed are at greater risk.

FIGURE 3: PFAS CONTAMINATION SITES



2,854 locations in 50 states and two territories are known to be PFAS-contaminated.

(Source: EWG & Northeastern University Social Science Environmental Health Research Institute, 2022)

These "forever chemicals" are extremely long-lived in the environment. They can concentrate and last a long time in our bodies and in those of animals. In the words of a 3M scientist working on the manufacture of these chemicals, PFOS ""is probably more damaging than PCB because it does not degrade, whereas PCB does; it is more toxic to wildlife," adding that its end point in the environment appeared to be plants and animals, not soil and sediment like PCBs.[45] Recall that Congress (in an effort led by this Committee and Mr. Dingell) banned PCBs in the original Toxic Substances Control Act in 1976, yet they still pollute our rivers and are still found in our bodies. Regrettably, toxic forever chemical PFAS will be with us and in our environment for generations.

Scientists are finding that certain PFAS likely have adverse effects on our health at vanishingly low levels of exposure—*at low parts per trillion* levels.[46] PFAS are a class of chemicals estimated to contain more than 9,000 industrial chemicals.[47] It has been estimated that from about 600[48] to more than 1,200[49] PFAS are in active use in the U.S. Subclasses of PFASs are still being discovered in products and in the environment.[50]

According to a 2016 study by Harvard researchers, PFAS are in the drinking water in at least 33 states, and they have been detected at levels exceeding EPA's weak Health Advisories for PFOA and PFOS (two PFAS) in the drinking water of more than 6 million Americans.[51] A more recent analysis by Evans et al. has mapped PFAS contamination of drinking water or ground water in almost 1,400 sites in 49 states.[52] An earlier EWG analysis of unpublished EPA data estimated that water supplies for more than 100 million Americans may be contaminated with PFAS.[53] The number could be higher.

Indeed, there are at least 2,854 PFAS contamination sites nationally, as is illustrated in the map reproduced in Figure 3 in this testimony.[54] Where scientists look closely, as in Michigan, they find much more PFAS contamination than previously identified.[55] These contamination sites blanket the landscape from hundreds of sites in Michigan,[56] to the former Chanute Air Force Base in Champaign County, Illinois,[57] Hoosick Falls, NY,[58] Parkersburg, WV,[59] and the Cape Fear River in NC.[60] PFAS also are found in many consumer products ranging from carpets and clothing to cookware and cosmetics, as well as in food, often due to food packaging.[61] These uses result in multiple—and cumulative—routes of exposure in the home including household dust, indoor air, and food.

Numerous studies, including a massive review of nearly 70,000 people exposed to PFAS in their drinking water in West Virginia,[62] and many other human (epidemiological) and animal studies,[63] suggest that the health impacts from these "hot spots" may be formidable.

Scientists have found certain PFAS may increase the risk of: thyroid and liver disease; asthma; lower fertility in women; high blood pressure or pre-eclampsia in pregnant women; increased cholesterol levels; decreased ability to respond to vaccines; and lower infant birth weights.[64] Studies of people exposed in West Virginia also found that PFOA

exposure is probably linked to kidney cancer and testicular cancer.[65] Additional evidence has shown links between early life exposures to PFOA and altered mammary gland development.[66] Animal studies have found that PFOA and PFOS can cause damage to the liver and the immune system, birth defects, delayed development, and newborn deaths.[67] A series of in-depth investigative articles by journalist Sharon Lerner[68] discuss extensive evidence that the risks of certain of these chemicals have long been known and hidden by the manufacturers, with reportedly devastating effects on communities.

But it is not only the older, "long-chain" PFAS like PFOA and PFOS that are harmful, Many of the newer "short-chain" PFAS also are highly toxic at low doses, as EPA's recent toxicity assessments and independent scientific reviews have shown.[69] With the knowledge that there are thousands of PFAS that will be impossible to regulate one-by-one, the 2014 Helsingør[70] and 2015 Madrid[71] Statements, based upon extensive reviews of the scientific literature, provided consensus from more than 200 scientists on the potential for harm associated with the entire class of PFAS. Several recent scientific publications have proposed methods that can be used to regulate PFAS as a class.[72] To better protect Americans from this public health threat, EPA and states should establish drinking water standards not only for PFOA and PFOS, which EPA recently determined must be regulated in drinking water, but should also use information on PFAS with greater amounts of data to generate a health-protective treatment technique and/or MCLs for PFASs as a class.[73]

D. Microbial and Other Contaminants

Unfortunately, it's not just about lead and PFAS. Our inadequate water infrastructure is posing very real health risks to millions of Americans from microbial pathogens. The Centers for Disease Control and Prevention (CDC) has noted that there are an estimated 7.1 million—and potentially as many as 12 million—Americans who are sickened by waterborne disease.[74] CDC further estimates that more than 600,000 of these (and possibly as many as 866,000) visit the hospital, and more than 6,600 (and possibly up to 8,870) die every year from waterborne disease caused by 17 pathogens. While some of this is attributable to recreational water use, CDC found "new waterborne disease challenges have

emerged" citing as examples aging infrastructure and chlorine-tolerant and biofilm-related pathogens in drinking water.[75]

VI. Ineffective Water Treatment, Source Protection & Rules

Deferred maintenance and the steady deterioration of the nation's water and wastewater treatment infrastructure have been a serious challenge for decades. Indeed, NRDC published a report nearly three decades ago calling for the modernization of our aging and outdated drinking water systems, noting that "Victorian water treatment" was "taking us into the 21st Century." Unfortunately, here we are in the 21st Century, and progress since our 1994 report has been slow. Similarly, we have long known that our wastewater and storm water treatment and collection systems badly need updating.

The health risks stem from several problems:

- ***Often outdated and inadequate drinking water treatment & monitoring technology*.** Most large drinking water systems still use basic coagulation, sedimentation, sand filtration, and chlorination as treatment. This technology has reduced waterborne disease and served us well since before World War I a century ago, but is not up to the task of removing many of today's contaminants like industrial chemicals such as PFAS, pesticides, nitrates and many other pollutants. The public health threat from our failure to invest in our water infrastructure is enormous. We remain at risk from lead, arsenic, bacteria and other pathogens, cancer-causing disinfection byproducts, the rocket fuel component perchlorate, PFAS and many other regulated and unregulated contaminants. We also continue to use outdated technologies for monitoring contaminants, instead of developing, certifying and widely using advanced testing technologies such as immune assay-based or other advanced technologies, or real-time chemical and pathogen monitoring. America needs to switch to 21st Century water treatment and monitoring infrastructure. Treatment technology such as deep bed granular activated carbon, membranes, and ultraviolet light or ozone for disinfection, still has been installed by only small minority of water systems. Moreover, while some water

systems are effectively using optimized corrosion control treatment, many others are not doing so, posing serious health risks.

- ***Inadequate Protection of Source Waters.*** The best and least expensive way to avoid drinking water contamination is to prevent pollution of the surface water or ground water used as a water source in the first place. Unfortunately, many water pollution sources still are poorly controlled, such as runoff from large industrial farms, mining waste, unregulated or poorly-controlled industrial pollution sources, and untreated or inadequately treated sewage. We anticipate that these problems could be made worse by efforts to weaken protections for waters of the U.S.
- ***Decaying, outdated and insufficient wastewater and storm water infrastructure.*** Our wastewater and storm water collection and treatment systems are too often not up to the task. Combined sewer overflows (CSOs) are common, when domestic sewage mixes with collected storm water in combined sewers and during precipitation events, causes raw or minimally treated sewage to flow into lakes and streams. CSOs are, according to EPA, "a major water pollution concern for the approximately 772 cities in the U.S. that have combined sewer systems."[76] These CSOs and other shortcomings in our wastewater and storm water systems are often causing sewage contamination of drinking water source waters, not to mention beaches and sensitive ecosystems.
- ***Underserved, often low-income areas lacking access to safe piped drinking water*.** While most Americans take piped drinking water systems for granted, in some areas, particularly lower-income rural areas and Native American lands, lack access to safe and sufficient piped drinking water. Areas ranging from the *Colonias* in Texas near the border, to parts of the Central Valley of California, to rural Alaskan Native villages, to parts of Appalachia simply don't have access to safe and sufficient tap water.
- ***Weak Lead and Copper Rule.*** In 1991, EPA established a complex treatment technique to control lead levels in tap water, known as the Lead and Copper Rule (LCR).[77] That rule was revised in 2021,[78] though many of the key problems with the original rule remain, and in some ways the revisions make matters worse.[79] Overall,

under the 2021 LCR Revisions, most of the 9 to 12 million lead service lines will not be required to be replaced, and tens of millions of Americans' health will remain at risk. After additional stakeholder input and review EPA issued a December 2021 Federal Register notice conceding that "there are significant opportunities to further improve upon [the 2021 LCR Revisions] to achieve increased protection of communities from lead exposure through drinking water."[80] Ten states and NRDC, as well as the NAACP and frontline community groups represented by Earthjustice, challenged the January 2021 LCR Revisions as unlawful and inadequate to protect public health.[81] That case is pending.

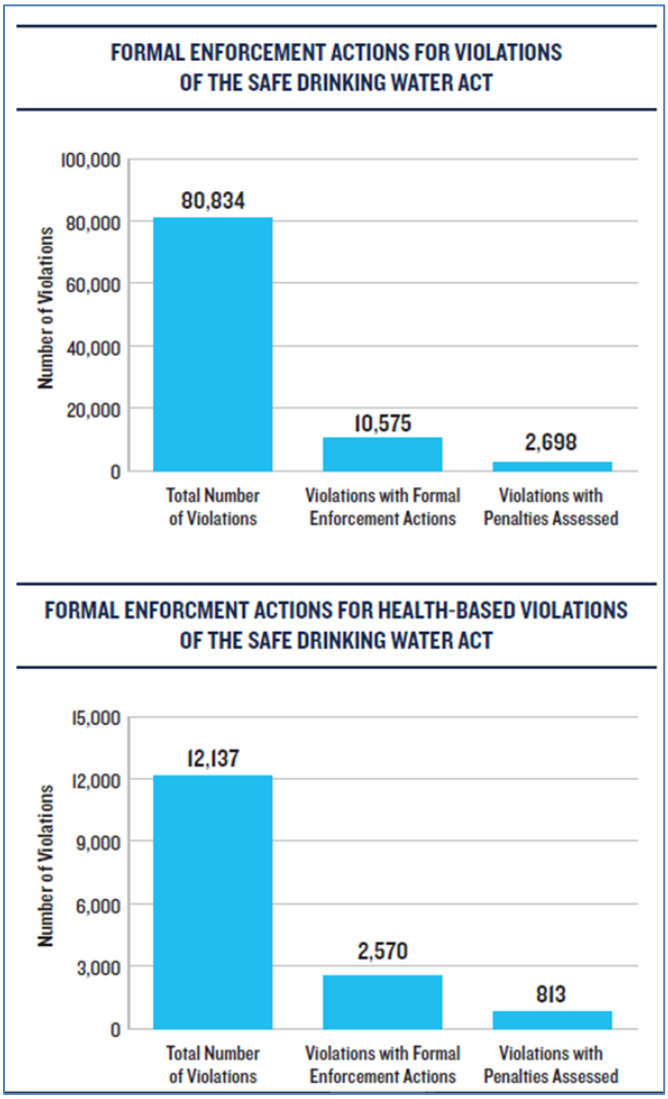
Under the 2021 LCR Revisions, smaller systems can avoid removing their lead service lines altogether by taking certain other steps (such as installing corrosion control, which may not work effectively). The 2021 LCR Revisions also provide that if a larger water system continually exceeds the action level, it is given more than 33 years to remove its lead service lines. The previous LCR required replacement within about 14 years, albeit with several loopholes, some of which the 2021 LCR Revisions tightened, and some of which remain. It is critical that the LCR be overhauled and strengthened to include a strict 5 ppb[82] Maximum Contaminant Level for Lead at the tap; or, if EPA decides it cannot establish an MCL for lead, the agency should establish a strict treatment technique that includes, among other measures: (1) a mandate to *fully* replace all lead service lines at utility expense within 10 years; (2) a Lead Action Level of 5 ppb; (3) improved corrosion control requirements; (4) robust monitoring requirements that fully and fairly monitor problems, and prohibit gaming the system to avoid detecting or reporting lead contamination problems; and (5) a mandate for clear, honest, ongoing, and culturally appropriate public education and notification of lead issues.

- ***The Broken SDWA.*** While this is not the subject of this hearing, we urge the subcommittee to take up legislation to fix the SDWA, which as noted above has failed to ensure protection of the public against many contaminants, including lead and PFAS as well as other contaminants like perchlorate, Legionella and numerous other widespread contaminants.

VII. Weak Enforcement of the Safe Drinking Water Act

Violations of regulated contaminants standards rarely lead to enforcement actions either by EPA or the states. States with primacy under the SDWA (all states except Wyoming) are supposed to carefully oversee drinking water systems to ensure that they are in

Figure 4: Weak Drinking Water Enforcement



Source: NRDC, Threats on Tap, 2017 (based on 2015 EPA data) [83]

compliance with any EPA requirements such as the LCR. As part of this requirement, primacy states are to regularly report violations and certain other information to EPA.

Under the Act, if EPA finds that a water system is in violation in a state with primacy, EPA is to notify the water system and state of the violation. If the state fails to take enforcement action within 30 days, EPA is legally required to issue an administrative order or file an enforcement case in court against the violator.[84] EPA and states often ignore these important mandates in the law.

Flint is but one example where neither state authorities nor EPA took enforcement action until literally years after the problem began. But lack of enforcement in Flint was not anomalous. In fact, according to an NRDC's 2017 report[85] analyzing EPA's 2015 enforcement data, as shown in Figure 4, nearly 9 in 10 violations faced no formal federal or state enforcement. Also startlingly, more than three-fourths of violations were not returned to compliance by the end of the year, and only 3.3 percent of all violations faced any penalties from states or the federal government. Moreover, as noted earlier in this testimony, states fail to even report a large percentage of violations to EPA (for example, EPA data audits found 92 percent of LCR health standard violations are not reported to EPA), so such unreported violations are not reflected in these statistics. This lack of accountability sends a clear message to water suppliers that violate the EPA rules, with state and federal complicity: There is no cop on the beat.

VIII. Disproportionate Impacts of Infrastructure Inadequacies on Low-Income Communities and Communities of Color

As is well-known, the Flint community is predominantly African American (57%) and has a high percentage of residents living at or below the poverty line (over 40%), or who are working but struggling to make ends meet. State officials were "callous and dismissive" of the concerns these citizens raised about the water, according to the governor's independent Task Force on Flint.[86]

The obfuscation by government officials, and the denigration of community members and experts who raised concerns, illustrates a pressing nationwide problem. Low-income communities and communities of color all over this country often bear the burden of environmental contamination and the resulting health problems.

In recent years a series of published studies have also documented that unsafe drinking water often is disproportionately associated with lower-income communities of color.[87] A major peer-reviewed 2020 study by Dr. Kristi Pullen Fedinick of NRDC and colleagues from Coming Clean and Environmental Justice Health Alliance carefully evaluated a massive amount of EPA compliance and enforcement data.[88] The authors found that race and low income were associated with violations, ineffective enforcement, and prolonged noncompliance with the Safe Drinking Water Act. Race and language spoken had the strongest relationship. Other studies have reached similar conclusions, for example with respect to nitrate and other contaminants in drinking water in California's San Joaquin Valley, contamination and substandard water infrastructure in U.S.–Mexico border *Colonias* and some minority communities in certain Southern rural areas, and bacteriological and chemical contamination on some Native American lands.[89] Balazs et al. have established that in areas of California "race/ethnicity and socioeconomic class were correlated with exposure to nitrate and arsenic contamination and noncompliance with federal standards in community water systems."[90] EPA's environmental justice analysis for its Lead and Copper Rule found that "Higher blood lead levels [are] observed among minority populations," and that a "[h]igher proportion of low-income children in older housing [are] likely to have lead service lines."[91]

So the Flint case is not sui generis. There is a wide array of factors, including lack of access of lower-income communities of color to resources and government political attention, that help to create a disproportionate and "persistent drinking water burden" in these communities.[92] In sum, researchers have found that "unequal access to infrastructure drives unequal access to safe drinking water."[93]

There are clear challenges to ensuring that every American gets safe drinking water. We don't want to create a two-tiered system where the wealthy get water that is clean and safe for their families, and the less well-to-do get second-class water that poses risks to their health.

IX. Water Infrastructure Investments and Water Affordability

We need to create an infrastructure investment and structuring system that ensures that communities that cannot afford to upgrade their water infrastructure get a helping hand. The National Drinking Water Advisory Council's Affordability Work Group report on how to address affordability concerns provides an important resource.[94] Among other ideas, the Work Group recommended the creation of a Low Income Water Assistance Program (LIWAP), modeled after the Low Income Heating and Energy Assistance Program (LIHEAP), which would help lower-income people afford their water bills if needed. Thus, rather than providing substandard water, all consumers should get top quality tap water, with some assistance to low-income people if necessary. Access to clean, safe, affordable drinking water should be available to everyone.

This committee's efforts to help ensure everyone including those most in need have access affordable drinking water has been strongly demonstrated by your vigorous efforts to fund water infrastructure investments targeted to disadvantaged communities, particularly in the BIL. It also was confirmed by the committee's efforts to ensure water utility customers do not lose access to essential services when they cannot afford to pay their water bills – both during the COVID-19 pandemic and beyond.[95] To equitably fund water infrastructure improvements needed to provide safe drinking water, we need robust federal water infrastructure funding, as well as federal water assistance program that helps low-income families with unaffordable water bills. But a key to solving the water affordability challenge is for water utilities to adopt equitable water rate structures including income-based and lifeline water rates. We urge the Committee to continue pressing to create a permanent water affordability program, and to ensure that it has a nationwide reach, as an important step toward more comprehensive water affordability solutions.[96]

X. Protecting Water Sources Protects Health, Cuts Treatment Costs

We need a greater focus on source water protection. Unregulated or poorly-controlled sources that can pose substantial pollution threats to drinking water include agricultural runoff and factory farm pollution, groundwater and surface water pollution from oil and

gas exploration and development, coal and mineral mining, certain industrial sources, and spills and leaks from above-ground hazardous substance tanks. State authorities and EPA could substantially reduce the public health and environmental threats from such polluters and could reduce the costs of drinking water treatment by better controlling these pollution sources.

One example was the spill/leak of toxic chemicals from a huge above-ground tank at Freedom Industries that contaminated the drinking water of 300,000 people in Charleston, West Virginia in January, 2014.[97] EPA had been charged in the 1972 Clean Water Act with issuing rules to prevent spills and leaks from above-ground tanks storing hazardous substances, but has still not done so. Citizen organizations and NRDC entered into a consent decree with EPA to have the agency finally issue those long-overdue rules,[98] but EPA turned around and refused to issue such rules in 2019.[99] More recently the agency has agreed to develop rules to address worst case releases from hazardous substance facilities.[100] However, the list of hazardous substances required to be covered by such rules still has not been updated to include the chemicals that caused the Charleston disaster.

Many municipalities like Des Moines Iowa have been forced to quietly install treatment to remove or protect against potential contamination from other contaminants from upstream polluters, without recourse against the polluters. A far better approach would be for Congress, EPA and states (and citizens through broadened citizen suit authority to address source water polluters) to crack down on uncontrolled or poorly regulated pollution sources such as agricultural runoff and factory farms, mining, and oil and gas activities, to save ratepayers the expense of cleaning up after the polluters.

XI. Protecting Waters of the U.S. Helps Control Infrastructure Costs

As a result of confusing court decisions and a deeply problematic EPA rule issued during the previous administration that is now on hold, and a pending Supreme Court case, the protection of millions of miles of streams and tens of millions of acres of wetlands may lack protection under the Clean Water Act. As a result, water sources that feed drinking water

supplies for 117 million Americans could be vulnerable to pollution. So may be wetlands that filter contaminants and recharge groundwater supplies, while also providing important flood protection and wildlife habitat. If these waters are not protected against pollution by the Clean Water Act, downstream drinking water systems will have a very heavy burden of cleaning up the water to remove the contaminants, costs that—as in the case of Des Moines and so many other utilities—will be borne by ratepayers rather than the polluters. We urge EPA to proceed with issuing a strong rule ensuring protection of these waters of the United States.

XII. Challenges to Water Infrastructure from Extreme Weather

With increasing challenges from extreme precipitation events, droughts, groundwater depletion, and saltwater intrusion in many coastal areas, our water infrastructure faces new and often unprecedented risks. We see this in the impacts of the California and Midwestern droughts, the steady depletion of the Ogallala Aquifer, and the intrusion of saltwater into the wells used for drinking water in many coastal areas in Florida and California, for example.

It has become crucial for water utilities to plan for these challenges by integrating their water and wastewater planning through approaches such as using "integrated water resources management" or IWRM. Some have referred to this approach as "sustainable integrated water management." IWRM is "a process which promotes the coordinated development and management of water, land and related resources, in order to maximize the resultant economic and social welfare in an equitable manner without compromising the sustainability of vital ecosystems."[101] Such integrated planning will become crucial as the impacts of climate change and other challenges become increasingly serious.

XIII. Major Recommendations

We envision a day when every person in this great nation—whether a resident of a major city, a small rural town, a Tribal community, or an underserved enclave in an impoverished isolated community—will drink safe and affordable tap water.

There is an emerging bipartisan consensus that we need to increase our investment in infrastructure. The enactment of the BIL is a significant and historic step forward, making over $30 billion in investments in drinking water infrastructure. The $10 billion approved by the House as part of the House-passed reconciliation bill is a welcome additional investment. But additional action is needed. NRDC has several recommendations for improving federal water infrastructure investments and controlling costs of such investments:

1. Implement the BIL by investing first in those communities that need it most.
2. Invest additional resources in fixing our water infrastructure, paying special attention to the affordability and needs of lower-income and disproportionately affected communities.
3. Fix lead in our water, including removing all lead service lines, fixing the Lead & Copper Rule, and addressing lead in schools and child care centers.
4. Fix the broken Safe Drinking Water Act to ensure controls on key contaminants like the class of PFAS.
5. Protect source water to reduce infrastructure costs and health and environmental harms.
6. Protect water infrastructure from extreme weather events and possible terror attacks.
7. Invest in technologies including broad-spectrum treatment and real-time and other advanced monitoring.
8. Let citizens act immediately to address imminent & substantial health endangerment.
9. Vigorously enforce the Safe Drinking Water Act.

NOTES

[1] General Accounting Office, "Drinking Water: Experts' Views on How Future Federal Funding Can Best Be Spent to Improve Security," GAO-04-29, 2003, available online at http://www.gao.gov/new.items/d0429.pdf.
[2] Pub. Law No. 117-38, 135 Stat. 429 (Nov. 15, 2021).
[3] Radhika Fox, Assistant Administrator, Office of Water, USEPA, "Memorandum: Implementation of the Clean Water and Drinking Water State Revolving Fund Provisions of the Bipartisan Infrastructure Law." March 8, 2022, available online at https://www.epa.gov/system/files/documents/2022-03/combined_srf-implementation-memo_final_03.2022.pdf
[4] Id., 135 Stat. at 1400-01.
[5] See, for example, Rebecca Renner, "Reaction to the solution: lead exposure following partial service line replacement." Environ Health Perspect. 2010 May;118(5):A202-8. doi: 10.1289/ehp.118-a202. PMID: 20435548; PMCID: PMC2866705.; Justin St. Clair, Clement Cartier, Simoni Triantafyllidou, Brandi Clark, and Marc Edwards, "Long-Term Behavior of Simulated Partial Lead Service Line Replacements," Environ. Engineering Sci., 2016, 33(1), DOI: 10.1089/ees.2015.0337; EPA Science Advisory Board, "SAB Evaluation of the Effectiveness of Partial Lead Service Line Replacements," Sept. 28, 2011, available online at https://www.epa.gov/sites/default/files/2015-09/documents/sab_evaluation_partial_lead_service_lines_epa-sab-11-015.pdf.
[6] Baehler, Karen J., Marquise McGraw, Michele J. Aquino, Ryan Heslin, Lindsay McCormick, and Tom Neltner. 2022. "Full Lead Service Line Replacement: A Case Study of Equity in Environmental Remediation" Sustainability 14, no. 1: 352. https://doi.org/10.3390/su14010352
[7] Alliance of Nurses for a Healthy Environment et al. "Principles for Lead Service Line Replacement." March 2022. Available online at https://www.nrdc.org/sites/default/files/principles-for-lead-service-line-replacements-20220228.pdf
[8] Id, 135 Stat. at 1401-02.
[9] Id., 135 Stat. at 1399-1400.
[10] BW Research Partnership, Environmental Entrepreneurs (E2) and United Association of Union Plumbers and Pipefitters (UA), "Getting the Lead Out: Employment & Economic Impacts from Replacing America's Lead Pipes," August 2021, available online at https://e2.org/wp-content/uploads/2021/07/E2-UA-Economic-Impacts-from-Replacing-Americas-Lead-Service-Lines_August-2021.pdf.
[11] American Society of Civil Engineers, The Economic Benefits of Investing in Water Infrastructure: How a Failure to Act Would Affect the US Economic Recovery." 2020, available online at http://uswateralliance.org/sites/uswateralliance.org/files/publications/The%20Economic%20Benefits%20of%20Investing%20in%20Water%20Infrastructure_final.pdf.
[12] American Society of Civil Engineers, "2001 Report Card for America's Infrastructure," http://ascelibrary.org/doi/pdf/10.1061/9780784478882.
[13] American Society of Civil Engineers, "2021 Report Card for America's Infrastructure: Stormwater: D," available online at https://infrastructurereportcard.org/cat-item/stormwater/ and "2021 Report Card for America's Infrastructure: Wastewater: D+," available online at https://infrastructurereportcard.org/cat-item/wastewater/
[14] American Society of Civil Engineers, "2021 Report Card for America's Infrastructure: Drinking Water: C-" available online at https://infrastructurereportcard.org/cat-item/drinking-water/.
[15] American Society of Civil Engineers, *supra,* "2021 Report Card."
[16] Center for Neighborhood Technology. "The Case for Fixing the Leaks Protecting people and saving water while supporting economic growth in the Great Lakes region," 2013, available online at http://www.cnt.org/sites/default/files/publications/CNT_CaseforFixingtheLeaks.pdf; see also, NPR, As Infrastructure Crumbles, Trillions Of Gallons Of Water Lost, (Oct. 29, 2014), available online at http://www.npr.org/2014/10/29/359875321/as-infrastructure-crumbles-trillions-of-gallons-of-water-lost
[17] See NRDC, "Cutting Our Losses," dedicated to tracking state policies requiring utilities to report leaks and losses of water from public water systems, at http://www.nrdc.org/water/water-loss-reduction.asp.

[18] AWWA, Buried No Longer: Confronting America's Water Infrastructure Challenge, http://www.awwa.org/Portals/0/files/legreg/documents/BuriedNoLonger.pdf

[19] Congressional Research Service, "Funding for EPA Water Infrastructure:

A Fact Sheet," (2015) http://nationalaglawcenter.org/wp-content/uploads/assets/crs/R43871.pdf

[20] American Society of Civil Engineers, The Economic Benefits of Investing in Water Infrastructure, *supra.*

[21] See §7002(b) of the bipartisan Water Resources Development Act of 2016, S. 2848, 114th Cong., 2016.

[22] Ibid.

[23] Emily Gordon, Jeremy Hays, Ethan Pollack, Daniel Sanchez, and Jason Walsh, "Water Works: Rebuilding Infrastructure, Creating Jobs, Greening the Environment," produced by Green for All, American Rivers, Economic Policy Institute, and Pacific Institute, 2011, at page 1, available online at http://pacinst.org/wp-content/uploads/sites/21/2013/02/water_works3.pdf.

[24] Ibid at 3.

[25] American Society of Civil Engineers, The Economic Benefits of Investing in Water Infrastructure: How a Failure to Act Would Affect the US Economic Recovery." 2020, available online at http://uswateralliance.org/sites/uswateralliance.org/files/publications/The%20Economic%20Benefits%20of%20Investing%20in%20Water%20Infrastructure_final.pdf.

[26] BW Research Partnership, Environmental Entrepreneurs (E2) and United Association of Union Plumbers and Pipefitters (UA), "Getting the Lead Out: Employment & Economic Impacts from Replacing America's Lead Pipes," August 2021, available online at https://e2.org/wp-content/uploads/2021/07/E2-UA-Economic-Impacts-from-Replacing-Americas-Lead-Service-Lines_August-2021.pdf.

[27] See NRDC, "The Flint Water Crisis," available online at https://www.nrdc.org/stories/flint-water-crisis-everything-you-need-know

[28] See NRDC, "Newark Water Crisis," available online at https://www.nrdc.org/newark-drinking-water-crisis.

[29] See NRDC, "EPA Orders Benton Harbor, Michigan to Protect Residents from Lead-Contaminated Drinking Water," available online at https://www.nrdc.org/media/2021/211102-0.

[30] See EPA, "EPA orders Clarksburg to identify homes, businesses with lead service lines," July 15, 2021, available online at https://www.epa.gov/newsreleases/epa-orders-clarksburg-identify-homes-businesses-lead-service-lines#:~:text=PHILADELPHIA%20(July%2015%2C%202021),certified%20to%20remove%20lead%20to.

[31] See, for e.g., Valerie Baron, "Drinking Through a Lead Straw in the District," July 29, 2021, available online at https://www.nrdc.org/experts/valerie-baron/drinking-through-lead-straw-district; Valerie Baron, "Getting the Lead Out of DC Water," May 3, 2019, available online at https://www.nrdc.org/experts/valerie-baron/getting-lead-out-dc-drinking-water; Neil Augenstein, WTOP, "Before Flint: D.C.'s drinking water crisis was worse." April 4, 2016, available online at https://wtop.com/dc/2016/04/flint-d-c-s-drinking-water-crisis-even-worse/

[32] Cynthia Giles, "Comments on the agency's proposed revisions to its Lead and Copper Rule in the National Primary Drinking Water Regulations, 84 Fed. Reg. 61,684; Docket No. EPA–HQ–OW-2017-0300." Feb. 4, 2020, available online at https://www.environmentalprotectionnetwork.org/wp-content/uploads/2020/02/Giles-LCR-comment-2-4-20.pdf (emphasis in original; footnotes and paragraph break omitted).

[33] NRDC, "Lead Service Lines are Widespread and Used in Every State," 2021, available online at https://www.nrdc.org/lead-pipes-widespread-used-every-state

[34] EPA, "How Lead Gets into Drinking Water," available online at https://www.epa.gov/ground-water-and-drinking-water/basic-information-about-lead-drinking-water#:~:text=In%20homes%20with%20lead%20pipes,and%20homes%20built%20before%201986.

[35] Cornwell, David A.; Brown, Richard A.; Via, Steve H., "National Survey of Lead Service Line Occurrence," April 2016, Journal of the American Water Works Association, vol. 108, no. 4, pages E182-E191, available online at http://dx.doi.org/10.5942/jawwa.2016.108.0086 .

[36] GAO, "Drinking Water: Approaches for Identifying Lead Service Lines Should Be Shared with All States." Sept. 2018, GAO-18-620, available online at https://www.gao.gov/assets/gao-18-620.pdf.

[37] The White House, "Fact Sheet: The American Jobs Plan," https://www.whitehouse.gov/briefing-room/statements-releases/2021/03/31/fact-sheet-the-american-jobs-plan/

[38] Joan Leary Matthews, NRDC, "Still High Levels of Lead in Drinking Water in NYC Schools." Aug. 20, 2019. Available online at https://www.nrdc.org/experts/joan-leary-matthews/still-high-levels-lead-drinking-water-nyc-schools

[39] Joan Leary Matthews, NRDC, "School Drinking Water Gets an F for Lead." Available online at https://www.nrdc.org/experts/joan-leary-matthews/school-drinking-water-gets-f-lead

[40] Joan Leary Matthews, NRDC, "Gov Hochul Signs Bill for Safer Drinking Water in Schools." Dec. 23, 2021. Available online at https://www.nrdc.org/experts/joan-leary-matthews/gov-hochul-signs-bill-safer-drinking-water-schools

[41] American Academy of Pediatrics, Council on Environmental Health. "Prevention of Childhood Lead Toxicity." Pediatrics. 2016 Jul;138(1):e20161493. doi: 10.1542/peds.2016-1493. Epub 2016 Jun 20. Erratum in: Pediatrics. 2017 Aug;140(2): Erratum in: Pediatrics. 2020 Jun;145(6): PMID: 27325637.

[42] See, e.g. Carter JA, Erhardt RJ, Jones BT, Donati GL. Survey of Lead in Drinking Water from Schools and Child Care Centers Operating as Public Water Suppliers in North Carolina, USA: Implications for Future Legislation. Environ Sci Technol. 2020 Nov 17;54(22):14152-14160. doi: 10.1021/acs.est.0c04316. Epub 2020 Nov 3. PMID: 33138370; Triantafyllidou, Simoni et al. "Variability and sampling of lead (Pb) in drinking water: Assessing potential human exposure depends on the sampling protocol." Environment international vol. 146 (2021): 106259. doi:10.1016/j.envint.2020.106259

[43] Joan Leary Matthews, NRDC, "Get the Lead Out of Drinking Water in Schools: Model Law.' April 24, 2019, available online at https://www.nrdc.org/experts/joan-leary-matthews/get-lead-out-drinking-water-schools.

[44] See, Joan Leary Matthews and Cyndi Roper, "Federal Push to Get the Lead Out of Water: Homes & Schools." Available online at https://www.nrdc.org/experts/joan-leary-matthews/biden-administrations-push-get-lead-out-water

[45] 3M employee Richard Purdy, quoted in Keith Matheny, "Internal documents show 3M hid PFAS dangers for decades," Detroit Free Press, May 9, 2019, available online at https://www.freep.com/story/news/local/michigan/2019/05/09/3-m-lawsuit-pfas-water-contamination-michigan/3291156002/

[46] ATSDR, Toxicological Profile for Perfluoroalkyls, Draft for Public Comment, June 2018, available online at https://www.atsdr.cdc.gov/toxprofiles/tp200.pdf (accessed September 3, 2018).(hereinafter "ATSDR, Toxicological Profile"). *See also* Anna Reade, Ph.D., Tracy Quinn, P.E., and Judith Schreiber, Ph.D., "Scientific and Policy Assessment for Addressing Per- and Polyfluoroalkyl Substances (PFAS) in Drinking Water, "NRDC, March 15, 2019, available online at https://www.nrdc.org/sites/default/files/assessment-for-addressing-pfas-chemicals-in-michigan-drinking-water.pdf

[47] CDC, National Institute for Occupational Safety and Health, "Per- and Poly-Fluoroalkyl Substances (PFAS)," 2021, available online at https://www.cdc.gov/niosh/topics/pfas/default.html.

[48] Chemical Watch, "US EPA announces PFAS action plan: Agency names TSCA a 'gatekeeper' for ensuring safety of new compounds, February 14, 2019, Available online at https://chemicalwatch.com/74353/us-epa-announces-pfas-action-plan.

[49] Sharon Lerner, EPA Continues to Approve Toxic PFAS Chemicals Despite Widespread Contamination, The Intercept, October 25 2018, available online at https://theintercept.com/2018/10/25/epa-pfoa-pfas-pfos-chemicals/

[50] Barzen-Hanson K. A., et al. (2017) Discovery of 40 classes of per- and polyfluoroalkyl substances in historical aqueous film-forming foams (AFFFs) and AFFF-impacted groundwater. Environ Sci Technol 51:2047-2057, available online at https://pubs.acs.org/doi/abs/10.1021/acs.est.6b05843 (accessed September 4, 2018).

[51] Hu, Xindi C. et al. "Detection of Poly- and Perfluoroalkyl Substances (PFASs) in U.S. Drinking Water Linked to Industrial Sites, Military Fire Training Areas, and Wastewater Treatment Plants." Environmental Science & Technology Letters 3.10 (2016): 344–350. PMC. Web., available online at https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5062567/ (accessed 4 Sept. 2018); "Unsafe levels of toxic chemicals found in drinking water of 33 states," The Harvard Gazette, August 9, 2016, https://news.harvard.edu/gazette/story/2016/08/unsafe-levels-of-toxic-chemicals-found-in-drinking-water-of-33-states/

[52] Sydney Evans, David Andrews, Ph.D., Tasha Stoiber, Ph.D., and Olga Naidenko, Ph.D., "PFAS Contamination of Drinking Water Far More Prevalent Than Previously Reported: New Detections of 'Forever Chemicals' in New York, D.C., Other Major Cities." Environmental Working Group, 2020, available online at https://www.ewg.org/research/national-pfas-testing/

[53] Environmental Working Group, "Up to 110 Million Americans Could Have PFAS-Contaminated Drinking Water." 2018, available online at https://www.ewg.org/research/report-110-million-americans-could-have-pfas-contaminated-drinking-water.

[54] EWG & Northeastern University Social Science Environmental Health Research Institute, PFAS Contamination Interactive Map, May, 2019, available online at https://www.ewg.org/interactive-maps/2019_pfas_contamination/map/.

[55] Michigan PFAS Action Response Team, "Taking Action to Protect the Public's Water," 2019, available online at https://www.michigan.gov/pfasresponse/.

[56] *See* Michigan Department of Environment, Great Lakes and Environment, "Michigan PFAS Action and Response Team's PFAS Geographic Information System." Available online at https://egle.maps.arcgis.com/apps/webappviewer/index.html?id=bdec7880220d4ccf943aea13eba102db; *see also,* Keith Matheny, "Is your water safe? Harmful chemical found in many Michigan systems," Detroit Free Press, August 22, 2018, available online at https://www.freep.com/story/news/local/michigan/2018/08/22/harmful-chemical-pfas-pfos-pfoa-hundreds-public-water-systems/1067165002/ (accessed September 3, 2018).

[57] See Northeastern University, Social Science Environmental Health Research Institute (SSEHRI), "SSEHRI PFAS Contamination Site Tracker (last updated July 26, 2018), available online at https://docs.google.com/spreadsheets/d/1HxLAzOmFdMh7V-mey4ExTPsnNKarEcGG6klBWZH8auA/edit#gid=676990244 (accessed September 3, 2018).

[58]Brendan J. Lyons . "Survey: Higher rates of cancer, illnesses followed PFOA exposure Health survey raises questions about earlier health department estimates." Albany Times-Union, August 21, 2018, https://pfasproject.com/2018/08/28/survey-higher-rates-of-cancer-illnesses-followed-pfoa-exposure-in-hoosick-falls/

[59] Arathy Nair, "DuPont Settles Lawsuits Over Leak of Chemical Used to Make Teflon," Feb. 13, 2017, available online at https://www.reuters.com/article/us-du-pont-lawsuit-west-virginia/dupont-settles-lawsuits-over-leak-of-chemical-used-to-make-teflon-idUSKBN15S18U (accessed September 4, 2018).

[60] Cheryl Hogue, "What's GenX still doing in the water downstream of a Chemours plant?" Chemical & Engineering News, Feb. 12, 2018, available online at https://cen.acs.org/articles/96/i7/whats-genx-still-doing-in-the-water-downstream-of-a-chemours-plant.html (accessed September 4, 2018).

[61] ATSDR, Toxicological Profile, supra; Zota, Ami R., Cassandra A. Phillips, and Susanna D. Mitro. "Recent Fast Food Consumption and Bisphenol A and Phthalates Exposures among the U.S. Population in NHANES, 2003–2010." Environmental Health Perspectives 124.10 (2016): 1521–1528. PMC. Web, available online at https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5047792/ (accessed September 4, 2018).

[62] C8 Science Panel, "C8 Probable Link Reports," available online at http://www.c8sciencepanel.org/prob_link.html (accessed September 3, 2018)(hereinafter "C8 Science Panel").

[63] See ATSDR, Toxicological Profile, supra.

[64] ATSDR, Toxicological Profile, supra.

[65] See C8 Science Panel, cited supra.

[66] Rudel, Ruthann A. et al. "Environmental Exposures and Mammary Gland Development: State of the Science, Public Health Implications, and Research Recommendations." Environmental Health Perspectives 119.8 (2011): 1053–1061. PMC. Web, available online at https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3237346/ (accessed September 4, 2018).

[67] ATSDR, Toxicological Profile, supra.

[68] Sharon Lerner, The Teflon Toxin, The Intercept, series available online at https://theintercept.com/series/the-teflon-toxin/ (accessed September 4, 2018).

[69] *See,* for example, EPA, Human Health Toxicity Assessment for GenX Chemicals, 2021, available online at https://www.epa.gov/chemical-research/human-health-toxicity-assessments-genx-chemicals; ATSDR, Toxicity Profile for Perfluoroalkyls, 2021, available online at https://www.atsdr.cdc.gov/toxprofiles/tp200.pdf; *See also* PFAS Central Data Hub, available online at https://pfascentral.org/data-hub (linking to extensive data on toxicity of many PFAS).
[70]Martin Scheringera, Xenia Trier, Ian T. Cousins, Pim de Voogt, Tony Fletcher, Zhanyun Wang, Thomas Webster, "Helsingør Statement on poly- and perfluorinated alkyl substances (PFASs)," Chemosphere, Volume 114, November 2014, Pages 337-339, available online at https://www.sciencedirect.com/science/article/pii/S004565351400678X (accessed September 4, 2018).
[71] Blum, Arlene et al. "The Madrid Statement on Poly- and Perfluoroalkyl Substances (PFASs)." Environmental Health Perspectives 123.5 (2015): A107–A111. PMC. Web, available online at https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4421777/ (accessed September 4, 2018).
[72] See, Cousins IT , DeWitt JC , Glüge J , Goldenman G , Herzke D , Lohmann R , Miller M , Ng CA , Scheringer M , Vierke L , Wang Z . "Strategies for grouping per- and polyfluoroalkyl substances (PFAS) to protect human and environmental health." Environ Sci Process Impacts. 2020 Jul 1;22(7):1444-1460. doi: 10.1039/d0em00147c. Epub 2020 Jun 4. PMID: 32495786; PMCID: PMC7585739; Kwiatkowski CF, Andrews DQ, Birnbaum LS, Bruton TA, DeWitt JC, Knappe DRU, Maffini MV, Miller MF, Pelch KE, Reade A, Soehl A, Trier X, Venier M, Wagner CC, Wang Z, Blum A. "Scientific Basis for Managing PFAS as a Chemical Class." Environ Sci Technol Lett. 2020 Aug 11;7(8):532-543. doi: 10.1021/acs.estlett.0c00255. Epub 2020 Jun 30. PMID: 34307722; PMCID: PMC8297807.*see also* Bălan SA, Mathrani VC, Guo DF, Algazi AM. "Regulating PFAS as a Chemical Class under the California Safer Consumer Products Program." Environ Health Perspect. 2021 Feb;129(2):25001. doi: 10.1289/EHP7431. Epub 2021 Feb 17. PMID: 33595352; PMCID: PMC7888260.
[73] See *id.; see also,* Anna Reade, Ph.D., Tracy Quinn, P.E., and Judith Schreiber, Ph.D., "Scientific and Policy Assessment for Addressing Per- and Polyfluoroalkyl Substances (PFAS) in Drinking Water, "NRDC, March 15, 2019, available online at https://www.nrdc.org/sites/default/files/assessment-for-addressing-pfas-chemicals-in-michigan-drinking-water.pdf; Anna Reade, NRDC, Comments on ATSDR Toxicological Profile on Perfluoroalkyls (2018 Draft), available online at https://www.nrdc.org/sites/default/files/comments-on-atsdr-toxicological-profile-on-perfluoroalkyls-2018-draft_2018-08-21.pdf (accessed September 4, 2018).
[74] Collier SA, Deng L, Adam EA, et al. Estimate of Burden and Direct Healthcare Cost of Infectious Waterborne Disease in the United States. Emerging Infectious Diseases. 2021;27(1):140-149. doi:10.3201/eid2701.190676, available online at https://wwwnc.cdc.gov/eid/article/27/1/19-0676_article .
[75] Id.
[76] EPA Region 1, "What are Combined Sewer Overflows (CSOs)?" available online at https://www3.epa.gov/region1/eco/uep/cso.html#:~:text=These%20overflows%2C%20called%20combined%20sewer,that%20have%20combined%20sewer%20systems.
[77] EPA Lead and Copper Rule, supra note 2.
[78] EPA, National Primary Drinking Water Regulation: Lead and Copper Rule Revisions," 86 Fed. Reg. 4198 (January 15, 2021), available online at https://www.federalregister.gov/documents/2021/01/15/2020-28691/national-primary-drinking-water-regulations-lead-and-copper-rule-revisions.
[79] NRDC, EPA's New Drinking Water Rule Leaves Millions of Toxic Lead Pipes in the Ground to Contaminate a Generation of Children, 2021, https://www.nrdc.org/media/2020/200927
[80] EPA, Review of the National Primary Drinking Water Regulation: Lead and Copper Rule Revisions (LCRR), 86 Fed. Reg. 71574, 71577 (December 17, 2021). Available online at https://www.govinfo.gov/content/pkg/FR-2021-12-17/pdf/2021-27457.pdf
[81] Newburg Clean Water Project et al. v. EPA, Case No. 21-1019 and consolidated cases (D.C. Cir. filed January 15, 2021).
[82] The 5 ppb standard has been established by FDA for bottled water in the U.S., and Canada has established a 5 ppb standard for lead in drinking water, see https://www.canada.ca/en/health-canada/news/2019/03/health-canada-sets-new-guideline-for-lead-in-drinking-water-latest-in-series-of-government-actions-to-protect-canadians-from-exposure-to-lead.html. The European Commission also has ordered that its current 10 ppb lead in drinking water standard be phased down to 5 ppb in coming years. DIRECTIVE (EU) 2020/2184 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL, of 16 December 2020,

on the quality of water intended for human consumption, available online at https://eur-lex.europa.eu/eli/dir/2020/2184/oj.

[83] Kristi Pullen Fedinick et al., "Threats on Tap: Widespread Violations Highlight Need for Investment in Water Infrastructure and Protections," 2017, NRDC. Available online at https://www.nrdc.org/sites/default/files/threats-on-tap-water-infrastructure-protections-report.pdf.

[84] Safe Drinking Water Act section 1414(a).

[85] Kristi Pullen Fedinick et al., "Threats on Tap: Widespread Violations Highlight Need for Investment in Water Infrastructure and Protections," 2017, NRDC. Available online at https://www.nrdc.org/sites/default/files/threats-on-tap-water-infrastructure-protections-report.pdf.

[86] Flint Water Advisory Task Force, "Final Report," March 2016, p. 2, available online at http://www.michigan.gov/documents/snyder/FWATF_FINAL_REPORT_21March2016_517805_7.pdf.

[87] *See, e.g.*, Switzer D and Teodoro M, The Color of Drinking Water: Class, Race, Ethnicity, and Safe Drinking Water Act Compliance, Sept. 2017, Journal AWWA, 109:9; available online at https://mannyteodoro.com/wp-content/uploads/2014/03/SwitzerTeodoro-JAWWA-2017-Color-of-Drinking-Water.pdf; Balazs C, and Ray I, The Drinking Water Disparities Framework: On the Origins and Persistence of Inequities in Exposure, Am J Public Health. 2014 April; 104(4): 603–611 (available online at http://www.ncbi.nlm.nih.gov/pmc/articles/PMC4025716/)

[88] Dr. Kristi Pullen Fedinick, Steve Taylor, and Michele Roberts, Watered Down Justice, 2020, available online at https://www.nrdc.org/sites/default/files/watered-down-justice-report.pdf

[89] Ibid; see also VanDerslice J, Drinking Water Infrastructure and Environmental Disparities: Evidence and Methodological Considerations, Am J Public Health. 2011 December; 101(Suppl 1): S109–S114, available online at http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3222486/; Balazs C, Morello-Frosch R, Hubbard A, Ray I. Social disparities in nitrate contaminated drinking water in the San Joaquin Valley. Environ Health Perspect. 2011;119(9):1272–1278 (available online at http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3230390/; Balazs CL, Morello-Frosch R, Hubbard A, Ray I. Environmental justice implications of arsenic contamination in California's San Joaquin Valley: a cross-sectional, cluster design examining exposure and compliance in community drinking water systems. Environ Health.2012;11:84, available online at http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3533865/.

[90] Balazs, *supra*.

[91] EPA Background Documents for Lead and Copper Rule, Abt Associates, Environmental Justice Analysis for the Proposed Lead and Copper Rule Revisions. Oct 22, 2019, available online at https://www.regulations.gov/document/EPA-HQ-OW-2017-0300-0008

[92] Ibid.

[93] Ibid.

[94] National Drinking Water Advisory Council, Affordability Work Group, RECOMMENDATIONS OF THE NATIONAL DRINKING WATER ADVISORY COUNCIL TO U.S. EPA ON ITS NATIONAL SMALL SYSTEMS AFFORDABILITY CRITERIA, July 2003, available online at https://www.nclc.org/images/pdf/energy_utility_telecom/water/recommendations_july2003.pdf.

[95] Thanks to this Committee's leadership, in the 2021 Consolidated Appropriations Act and American Rescue Plan Act, Congress provided $1.1 billion to create an emergency Low Income Home Water Assistance Program at the Department of Health and Human Services—the first-ever federal funding for low-income water assistance. (See https://www.acf.hhs.gov/ocs/programs/lihwap.) Subsequently, in the BIL (sec. 50109), Congress authorized, but did not fund, a modest pilot program at EPA to help local utilities provide water and wastewater bill assistance beyond the pandemic. The version of the BIL initially passed by the House (on July 1, 2021) included a provision, reported by this Committee, to authorize $8 billion for a more robust grant program at EPA to support local water assistance programs (sec. 13302-13303). It also included $150 million for a robust data collection effort to support a nationwide needs assessment (sec. 13304). The House's reconciliation bill, HR 5376, (sec. 30302) includes $225 million for EPA for water assistance.

[96] A proposed amendment to the BIL, submitted to the House Rules Committee, offers a template for a permanent low-income water assistance program with nationwide scope. See https://amendments-rules.house.gov/amendments/TLAIB_035_LIDWAP210628110017323.pdf.

[97] See e.g. Testimony of Erik D. Olson, NRDC, Before the Subcommittee on Water and Wildlife of the U.S. Senate Committee on Environment and Public Works, at the hearing entitled Examination of the Safety and Security of Drinking Water Supplies Following the Central West Virginia Drinking Water Crisis, February 4, 2014, available online at http://www.epw.senate.gov/public/index.cfm/hearings?ID=8CCDAFF7-CDC6-8A6F-CA6E-A7017498083C.

[98] NRDC et al., "After More Than 40 Years, EPA Will Act on Hazardous Industrial Spills," available online at https://www.nrdc.org/media/2016/160217-0

[99] NRDC, "Trump's EPA Ignores Threat of Hazardous Spills." August 22, 2019, available online at https://www.nrdc.org/media/2019/190822-2

[100] NRDC, "Court Approves Settlement Requiring EPA Rules on Most Dangerous Chemical Spills." March 13, 2020, available online at https://www.nrdc.org/media/2020/200313.

[101] UN International Decade for Action Water for Life 2005-2015, INTEGRATED WATER RESOURCES MANAGEMENT (IWRM), available online at http://www.un.org/waterforlifedecade/iwrm.shtml.