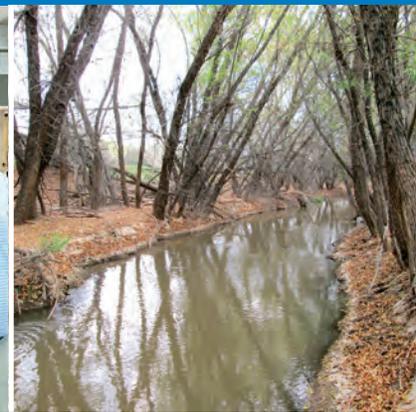




# Water and Health

## Opportunities for Nursing Action



Cara Cook, MS, RN, AHN-BC  
Kathleen Curtis, LPN  
Katie Huffling, MS, RN, CNM



Alliance of Nurses for  
Healthy Environments



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## REVIEWERS

Madeleine Foote, *Legislative Representative, League of Conservation Voters*

John Rumpler, *Clean Water Program Director, Environment America*

Jon Devine, *Senior Attorney, Water Program Natural Resources Defense Council*

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The **Alliance of Nurses for Healthy Environments (ANHE)** is a national coalition of nursing organizations and individual nurses who believe that the environment and human health are inextricably linked. Our mission is to promote healthy people and healthy environments by educating and leading the nursing profession, advancing research, incorporating evidence-based practice, and influencing policy. Learn more about the ANHE at [www.envirn.org](http://www.envirn.org)



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## Executive Summary

**H**ere in the United States, most of us take clean water for granted. When we turn on the tap, we assume the water is clean, healthy, and free from pollutants that could have negative health impacts. We expect our water to be safe for drinking, showering, and washing dishes.

As nurses, we know clean water plays a critical role in promoting good health. Many public health experts view water sanitation as one of the greatest health advances of the 20th century. Unfortunately, millions of Americans still experience waterborne illnesses every year, costing millions of dollars in healthcare costs. These illnesses may be caused by waterborne pathogens, such as bacteria or viruses; heavy metals such as lead or arsenic; animal or human waste; or industrial pollutants.

Clean water is also a crucial component for providing safe nursing care. Hospitals and other healthcare facilities are the most water-intensive facilities, and account for seven percent of the water used in industrial and commercial facilities in the United States.<sup>1</sup> Water is essential for tasks such as washing hands, giving newborns their first baths, and the staggering amount of laundry produced every day in healthcare facilities.

While the United States has made great strides in providing clean, drinkable water, water quality and safety still remains a major concern for public health. Without action now, this problem may only worsen. As outlined in this report, key environmental regulations such as the Clean Water Rule may be repealed or weakened by the U.S. Environmental Protection Agency (EPA) in the near future. Without these key public health protections, pollutant levels will increase and threaten public health. Also, upstream sources of water, such as streams and wetlands, may no longer be protected from degradation and their ability to be utilized as a source of drinking water will be diminished.

We now recognize how interconnected and fragile our water system is, from our mountain streams down through the pipes that bring us our water, and how crucial the regulatory system is in protecting clean water. Nurses need to be aware of the challenges that impact the water supply in their community and how they can jeopardize health.

In this report, nurses will find the tools they need to understand these complex issues and to take action to support healthier water in their communities. Examples of water quality issues in several states are reviewed and opportunities for engagement are provided. As the most trusted profession, nurses can, and should, lead the way to ensuring clean water for all.

# Overview

Access to clean water and adequate sanitation is an essential component of human health. According to the World Health Organization, over 2,300 deaths occur every day from diarrheal disease, with 1.5% of the global disease burden due to poor water, sanitation, and hygiene.<sup>2</sup> In the United States, as many as 32 million people every year suffer from gastrointestinal illness from drinking water systems.<sup>3</sup> Many more become ill from drinking water contaminated with toxic metals and chemicals. Overall, waterborne illnesses cause an estimated 40,000 hospitalizations each year at an annual cost of \$970 million.<sup>4</sup>

**Certain populations are more vulnerable to harm from unsafe drinking water such as children, the elderly, workers, and pregnant women.**

While the United States and the efforts of the U.S. Environmental Protection Agency (EPA) under the Clean Water Act have made great progress to ensure access to clean, drinkable water, water quality and safety still remains a major concern for public health. Communities are experiencing

challenges in maintaining access to clean and safe drinking water as a result of aging water infrastructure causing heavy metals, such as lead and copper, to leach into drinking water sources; climate change that contributes to worsening droughts, floods, and overgrowth of water pathogens that all affect water quality; and environmental contamination of water sources from industry and energy production.

Certain populations are more vulnerable to harm from unsafe drinking water such as children, the elderly, workers, and pregnant women. Additionally, low-income families and communities of color, who already experience an overwhelming disease burden and limited access to resources to maintain health, are disproportionately impacted by unsafe drinking water and illness. As highlighted by the crisis in Flint, Michigan, there are still communities unknowingly being exposed to toxic metals, such as lead, and harmful chemicals that have considerable short and long-term public health and economic consequences.

This report aims to inform nurses of the public health challenges presented by water quality and safety. Recommendations and opportunities to take action are also provided. By working together, we can ensure access to clean and safe drinking water for all Americans.



# Clean Water Rule

The Clean Water Act (CWA), enacted in 1972, is one of the cornerstones of environmental regulation in the U.S. Prior to its passage, sewage flowed freely into streams, lakes, and other sources of drinking water in many parts of the country and industrial pollution was wantonly discarded into our nation's waterways. In one of the most famous examples of industrial water pollution, the Cuyahoga River in Ohio, was so polluted with oil and other industrial waste that it caught fire numerous times throughout the 1950's and 1960's.<sup>5</sup>

By the early 1970s, Congress recognized the need for federal clean water protections and passed the CWA with overwhelming bipartisan support. The CWA provided a framework for the EPA to regulate the discharge of pollutants into America's waterways. While we have even more scientific data on this today, even 45 years ago it was well understood that our rivers and lakes could only be clean if we protected the streams that fed them and the wetlands that filtered pollutants out of them.

Over the past 40 years, scientists have learned more about how streams, wetlands, and other small bodies of water interact with larger water bodies. When pollutants are discharged in these upstream sources they do not stay there, but instead flow downstream, resulting in widespread contamination from sources such as industrial pollution, farm runoff, animal and human waste, and environmental pathogens that cause waterborne illnesses.<sup>6</sup> Protecting these headwaters and other small water bodies is a vital component to clean drinking water and for larger bodies of water to be safe for swimming, boating, and fishing.

In 2001 and 2006, Supreme Court decisions impacted how the federal government determined which upstream water sources could be regulated by the CWA. These rulings, as well as policy changes that occurred under the George W. Bush Administration, effectively deprived 20 percent of the wetlands in the continental U.S. of federal authorities' CWA protection. These court decisions made it much more difficult for the EPA to protect other upstream sources such as small streams, which help provide drinking water to 1 in 3 Americans. This confusion led the EPA to significantly pull back from prosecuting violations or polluters, citing the ambiguity in the CWA. For example,

in Arizona, rainfall in the San Pedro watershed recharges groundwater and is important source of drinking water for the surrounding region. These important waterways were being contaminated by storm water runoff from construction sites. However, when the EPA attempted to enforce regulations under the CWA to protect these waters, the agency ultimately decided to discontinue enforcement as it was so costly to prove that waters were protected under the law.<sup>7</sup>

While we have even more scientific data on this today, even 45 years ago it was well understood that our rivers and lakes could only be clean if we protected the streams that fed them and the wetlands that filtered pollutants out of them.

To clarify which bodies of water fell under the CWA, the EPA and the U.S. Army Corps of Engineers began a process of stakeholder engagement, rigorous scientific review, and legal analysis that culminated in the Clean Water Rule (CWR) finalized in 2015. As part of the process, they held over 400 stakeholder meetings and received over 1 million comments, 87% of which were in favor of the rule.<sup>8</sup>

The EPA also developed the peer-reviewed scientific report, *Connectivity of Streams and Wetlands to Downstream Waters*, which reviewed over 1,200 peer-reviewed papers. This report highlighted the public health implications of pollution in upstream sources that have downstream impacts and the importance of protecting those upstream water sources. Potential pollution avenues include: waterborne pathogens (bacteria, protozoa, viruses) being transported through headwaters to downstream waters; wastewater contaminants from both industrial and municipal sources that contain pollutants and pathogens; and the role of tributaries and storm drains in waterborne disease outbreaks as storm water can "overwhelm treatment plants and eventually contaminate drinking water sources."<sup>9</sup>

With the drinking water supplies of over 117 million (or 1 in 3) Americans impacted by this rule, the CWR has broad, positive public health impacts. In particular, by clearly specifying that the CWA’s pollution control programs apply to certain kinds of water bodies, the Rule ensures that those water sources will not be recklessly polluted. The CWR defines which “waters of the U.S.” will be regulated under the CWA and organizes them into three groups:

1. Those waters that are protected in all cases such as traditional navigable waters, interstate waters, the territorial seas, tributaries, and waters near other covered waterways.
2. A small number of waters that will be decided on a case-by-case basis that have a significant nexus to traditional navigable waters, interstate waters, or territorial seas.

3. Calls out specific waters that are exempt from the rule such as puddles, ornamental ponds and rain gardens, and continues existing farm permitting exemptions. (See Figures 1 and 2 for more details on what is and isn’t regulated under the CWR.)

In July of 2017, the Trump Administration formally proposed repealing the CWR, in keeping with an executive order the President signed on February 28. Following the planned repeal, the EPA and the Corps intend to initiate an entirely new rulemaking process to determine the scope of CWA coverage. If the new rule follows the direction laid out in the President’s executive order, it would dramatically shrink the scope of our nation’s bedrock clean water law. And, in the meantime, the protection of drinking water for millions of Americans will likely hang in limbo for years as the rule-making process goes through the required steps, such

FIGURE 1. Waterways with Guaranteed Protections Under the Clean Water Rule<sup>10</sup>

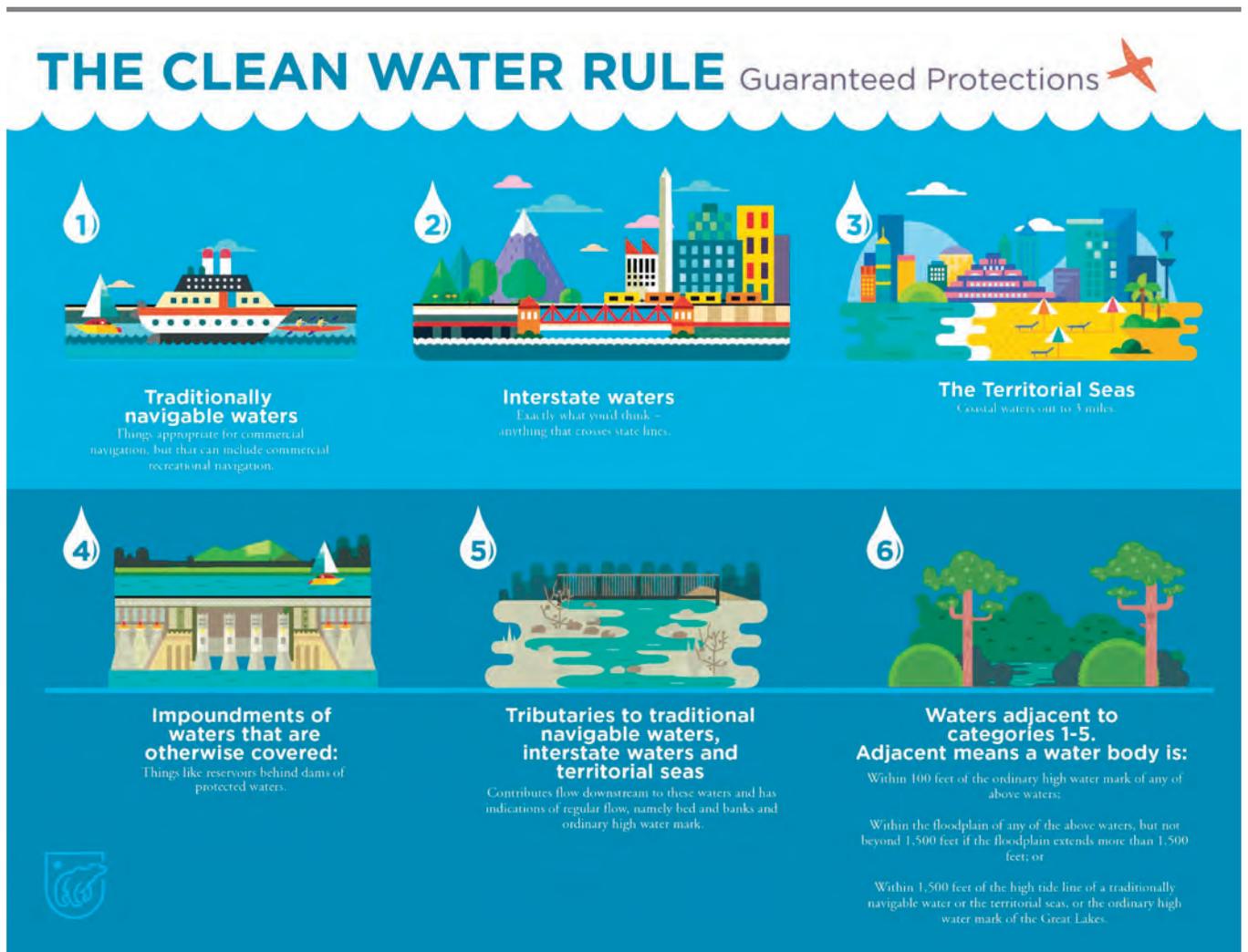
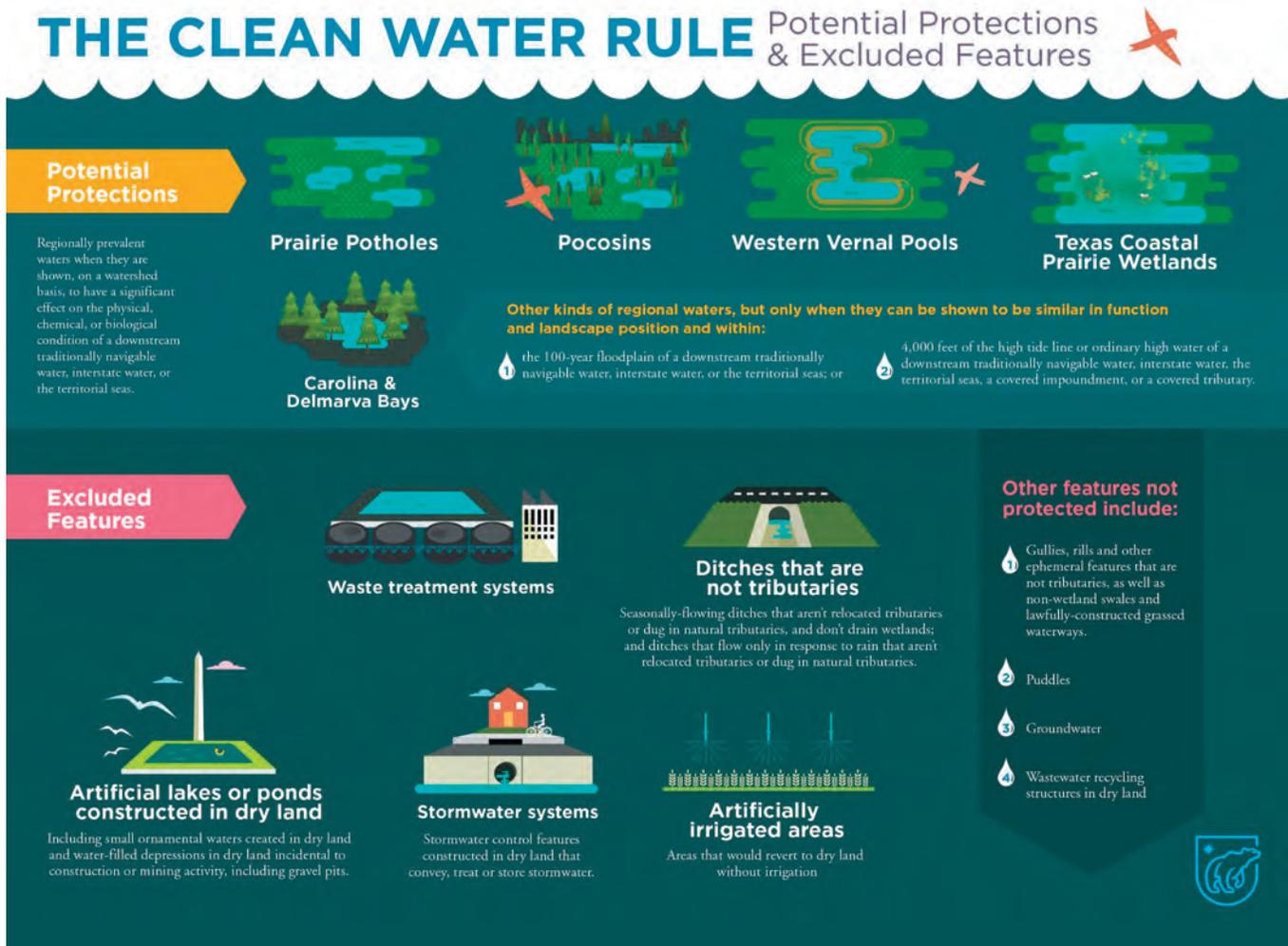


FIGURE 2. Waterways with Potential Protections and Those That Are Excluded Under the Clean Water Rule<sup>11</sup>



as stakeholder engagement, comment periods, and subsequent litigation.

Low-income communities and communities of color may be most impacted if implementation of the CWR is further delayed. These communities, along with rural communities, may be more likely to have poor infrastructure that is not able to handle contaminants in the water and to not have the resources to upgrade their systems. They may also be more likely to rely on well water that can be more susceptible to pollution from upstream sources. The EPA will be accepting comments on the CWR repeal until September 27, 2017 and holding meetings and listening sessions in Fall of 2017 about its follow-up plan to weaken the rules.

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## Energy Extraction

**W**ater is a necessary component of much of our power extraction and production from sources such as coal, natural gas, and nuclear energy. It is used in mining, oil and gas development, in fuel refining, during energy production in power plants, and may even be used to control power plant emissions.<sup>12</sup> Depending on the use, this water becomes contaminated or in some cases is permanently removed from

the water supply system altogether. As the country, and the world, increasingly grapples with diminished water supplies, we need to take a close look at how we're using this precious resource in our quest for energy. This is especially important for those involved in the healthcare industry, as healthcare is the second largest user of electricity of any industry and has the most water-intensive facilities of any commercial or industrial facility.<sup>13</sup>

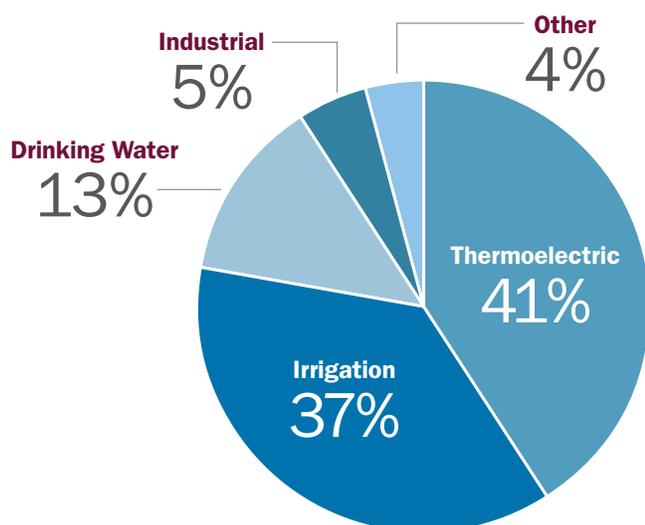
## Water Use

**A**pproximately 97% of the electricity in the US comes from power plants that produce energy through thermoelectric or hydroelectric generation.<sup>14</sup> Thermoelectric plants use a heat source, such as coal or natural gas, to produce steam that is used to generate electricity. These plants require massive amounts of water for energy production.

Thermoelectric plants withdraw over 40% of the fresh water in the US.<sup>15</sup> Every day, it is estimated that coal plants

withdraw 85 billion gallons of water, nuclear plants 45 billion gallons, and natural gas facilities 7 billion gallons.<sup>16</sup> Withdrawing such large amounts of water stress communities during times of drought when local water supplies are already under pressure. Following its use in steam-energy production, the water discharged from these plants can be highly contaminated with persistent, bioaccumulative heavy metals such as lead, arsenic, mercury, and cadmium.<sup>17</sup> Exposure to these contaminants is linked to a number of serious health effects including cancer, neurological impacts, and reproductive problems.

FIGURE 3. U.S. Freshwater Withdrawals

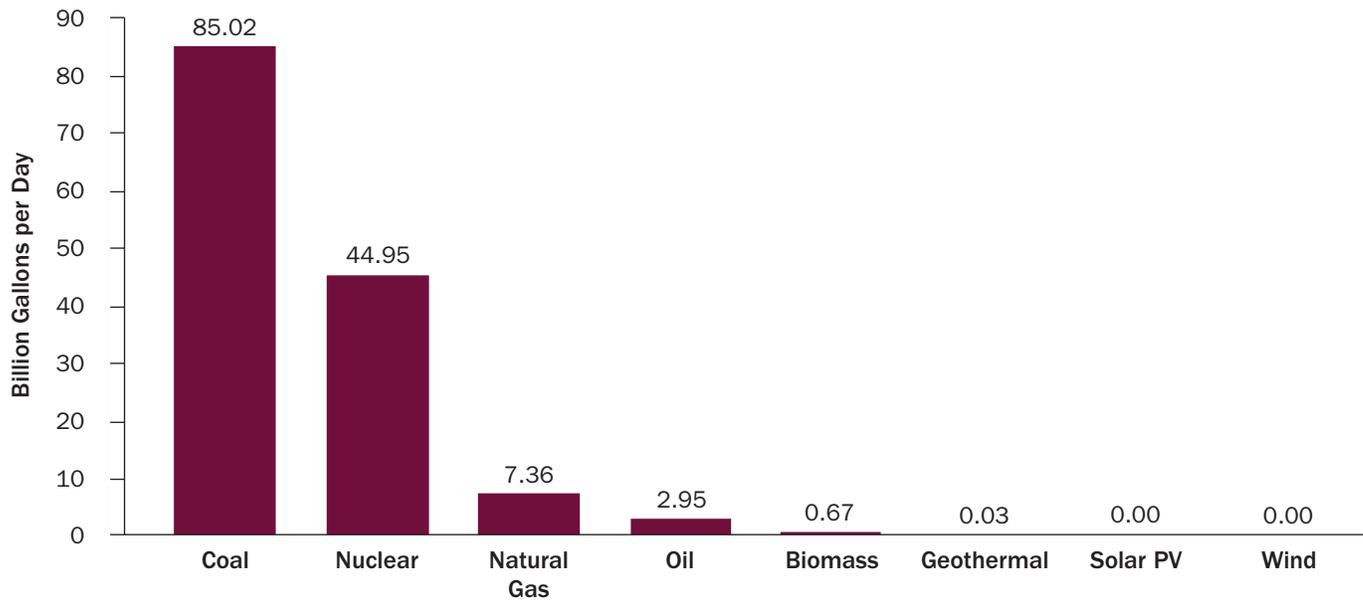


**Power plants account for the largest share of freshwater withdrawals in the United States.**

Source: The Energy-Water Collision: Ten Things You Should Know (UCS, 2010)

It is not just power generation that requires significant amounts of water. Energy extraction, such as coal mining and hydraulic fracturing for gas and oil, also uses large amounts of water. Coal mining uses 70 million to 260 million gallons of water every day.<sup>18</sup> Hydraulic fracturing, or fracking, is a process that uses water mixed with chemicals and silica sand to break up shale rock, releasing gas and oil, and uses between 2 and 6 million gallons of water for each well that's fracked. The water that is used in fracking sites becomes so contaminated, current technologies are not able to adequately clean the wastewater at traditional wastewater facilities. Most fracking wastewater is stored in injection wells where it is isolated from the fresh water cycle. There are a small number of specialized facilities designed to handle fracking wastewater. However, these are problematic with scientists finding residual contaminants in the wastewater, such as salts and disinfectant byproducts, that can pollute downstream drinking water sources if discharged into rivers or other waterways.<sup>19</sup>

FIGURE 4. Estimated Daily Water Withdrawals for Electricity Generation in the U.S.

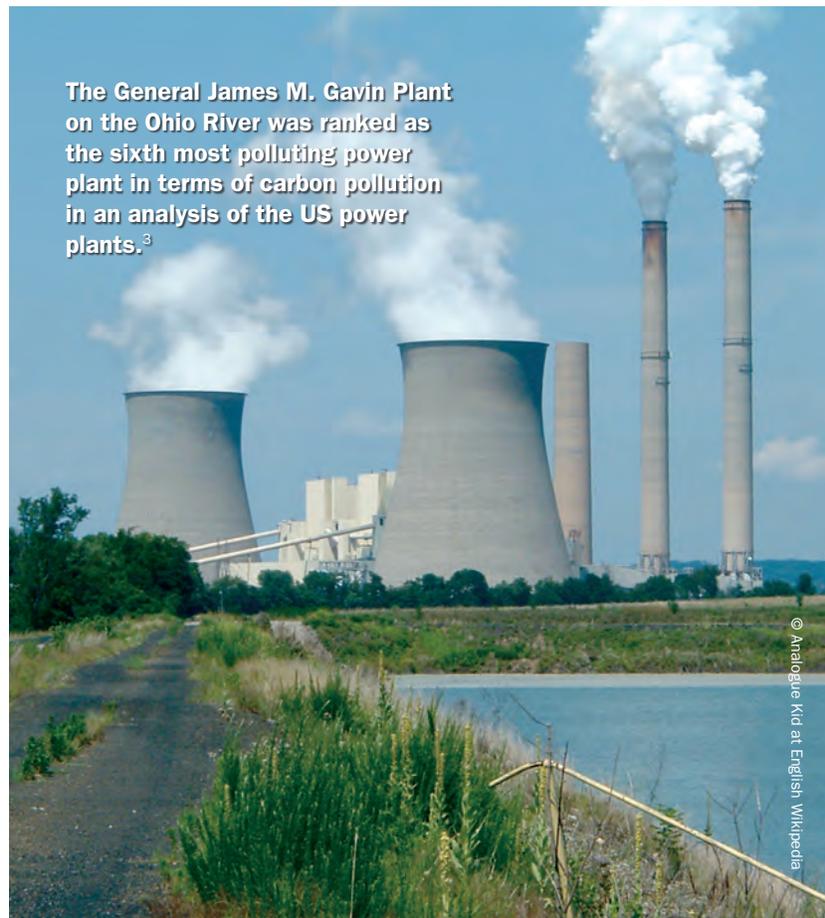


Source: Estimate by Synapse Energy Economics using the Union of Concerned Scientists' UCS EW3 Energy-Water Database V. 1.3, 2012. Database sources include EIA data and Macknick 2011 withdrawal.

## Water Contamination

Most of the coal currently mined in the U.S. is extracted via surface mining, including mountain top removal. These methods are extremely damaging to the local environment and can have significant impacts on local water quality, as streams and waterways are covered with debris or polluted with mine tailings. Chemicals released into the water during the mining process include ammonia, nitrates, sulfur, and cyanide.<sup>20</sup> Drinking water in areas near coal mines have also been found to have elevated levels of heavy metals such as arsenic. In studies examining the health impacts on communities near mining operations, the number of point sources of water pollution was strongly correlated with total mortality and cancer mortality.<sup>21</sup>

When coal is burned for energy production, the waste that remains is called coal ash. Power plants in the U.S. produce over 140 million tons of coal ash yearly and many of the plants store the ash in unlined open-air pits and holding ponds.<sup>22</sup> Coal ash contains high levels of heavy metals such as lead, arsenic, and selenium, as well as radioactive materials. These contaminants are linked to a number of



health impacts including cancer, birth defects, neurological effects, learning disabilities, and asthma.<sup>23</sup> Residents living within 1 mile of a coal ash holding pond have a cancer risk of 1 in 50.<sup>24</sup> This is 2,000 times higher than the levels EPA considers acceptable.

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Water contamination is also a concern during hydraulic fracturing for oil and natural gas. Contamination is possible during all parts of the drilling process, “acquiring water to be used for fracking, mixing the water with chemical additives to make fracking fluids, injecting the chemical fluids underground, collecting the wastewater that flows out of fracking wells after injections, and storing the used wastewater.”<sup>25</sup> There have been numerous cases of well-water contamination in areas where fracking is occurring, with homeowners no longer able to use their well-water for drinking, cooking or bathing.<sup>26</sup>

## Regulating Water Pollution from Energy Extraction and Production

Under the Obama Administration, the EPA promulgated two rules that would address some of the water pollution associated with steam-powered power plants. The EPA announced in April 2017 that it was putting regulations limiting coal ash pollution, that were scheduled to start going into effect later in the year, on hold indefinitely. The new regulations would have required power plants to address coal ash that is currently polluting waterways and properly store coal ash so future contamination does not occur. A number of environmental and public health groups have filed a lawsuit against the EPA in an effort to invalidate the hold.<sup>27</sup>

In September 2015, the EPA finalized the Steam Electric Power Generating Effluent Guidelines rule, which sets limits on the toxic metals allowed in water discharged from power plants. The EPA estimated that this rule would reduce the amount of heavy metals and other pollutants discharged by 1.4 billion pounds, as well as reduce water withdrawal by 57 billion gallons.<sup>28</sup> In April of 2017, the EPA announced that they would be delaying the compliance dates of the rule, which has been set to become effective starting in November, 2018.<sup>29</sup> While the EPA reviews the rule, toxic heavy metals will continue to be discharged into waterways near these power plants.

Hydraulic fracturing has been exempted from portions of many national environmental laws, including provisions of the Clean Air Act and CWA. Thus, it has largely fallen on states to regulate this industry. This has created a patchwork of regulation, with some states having more health protective regulations in place than others. States like Maryland and New York have banned fracking due to the known health hazards and the high potential for water and air contamination. In states where fracking is already occurring, nurses can advocate for a moratorium on new well drilling. More modest examples of regulations that can reduce water contamination and the resultant health impacts include banning open air wastewater pits and setting minimum setbacks from residences and settings such as schools and hospitals.

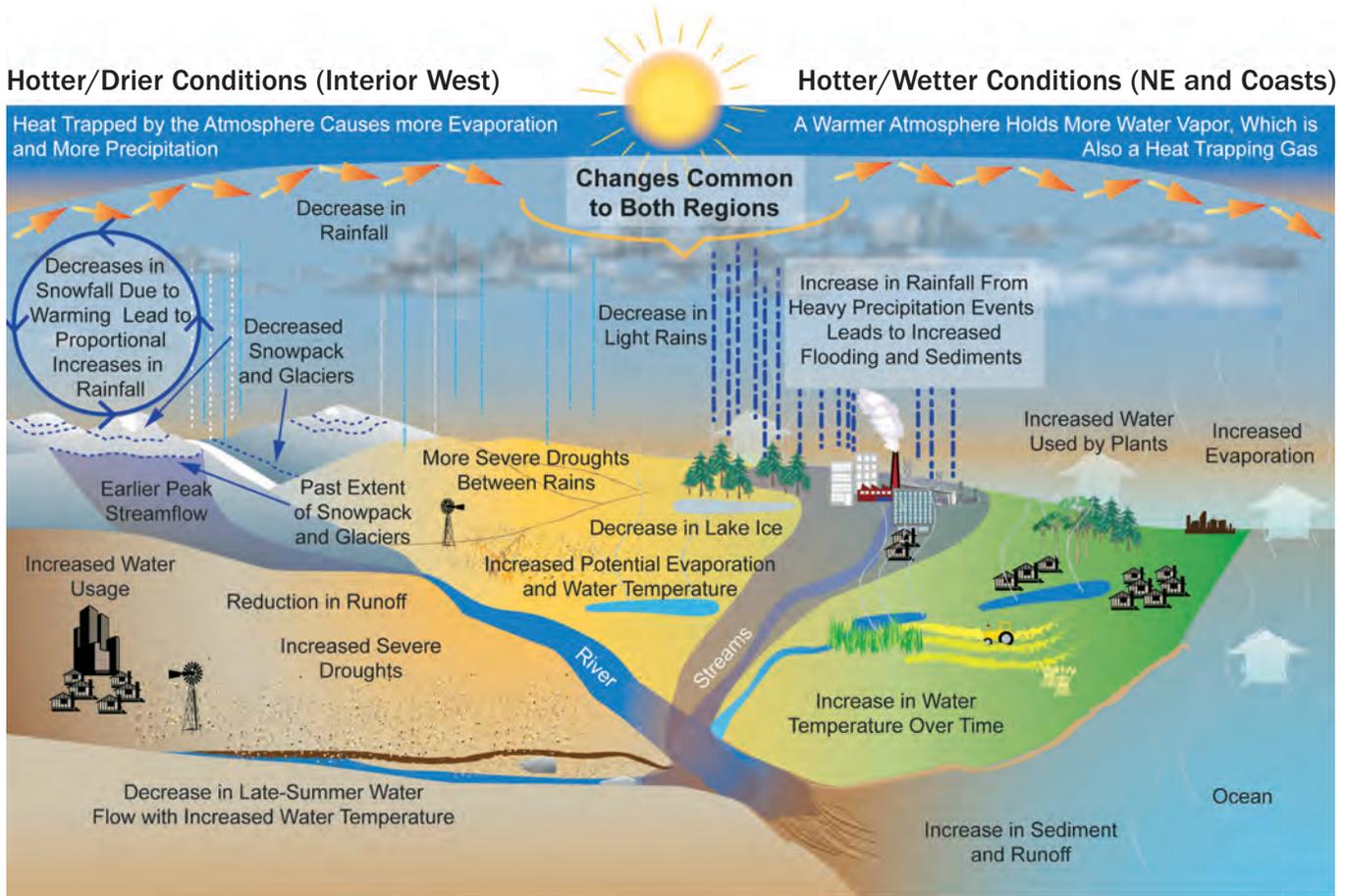
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# Climate Change and Water Quality

As climate change worsens, threats to water quality and supply will as well. Rising temperatures, more frequent and severe storm events, drastic changes in precipitation, and sea level rise threaten water resources, and with that, human health (see Figure 5). Storm water runoff can contaminate water sources, leading to an increased risk of gastrointestinal illness and other

waterborne diseases. Conversely, drought conditions lead to a limited water supply, reducing access to clean and safe drinking water. Changes that affect water resources impact both infrastructure and water-intensive sectors, such as manufacturing and agriculture, which can result in threats to livelihoods, mental well-being, and communities.

FIGURE 5. Projected Changes in the Water Cycle



The water cycle exhibits many changes as the earth warms. Wet and dry areas respond differently.

Source: NOAA/NCDC; USGCRP, 2009



Houston residents being evacuated due to flooding from Hurricane Harvey.

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## Sea Level Rise, Flooding, and Water Contamination

The frequency and intensity of heavy precipitation events has increased across the U.S., with the greatest increases noted in the Northeast and Midwest regions.<sup>30</sup> From 1958 to 2012, the amount of rainfall during heavy precipitation events increased by 37% in the Midwest and 71% in the Northeast.<sup>31</sup> Changing precipitation patterns, increases in heavy precipitation events, sea level rise, and storm surges all increase risk of flooding and subsequent contamination of water resources. Sea level rise creates further concern for freshwater sources along the coast, as a mixing of fresh and saltwater contaminates aquifers that are utilized for drinking water.<sup>32</sup>

Flooding and surface runoff can affect water quality by polluting water sources and damaging infrastructure, leading to contamination of drinking water supplies. The main pollutants that contaminate rivers and streams during floods are human and industrial waste.<sup>33</sup> Industrial waste can contain contaminants, such as fertilizers, pesticides, and animal waste used in agriculture practices.<sup>34</sup> As 100-year and 500-year flood events become more commonplace, the Midwest may be particularly vulnerable to flooding risks.<sup>35</sup>

Flooding and water overflow can also damage water infrastructure, as heavy rainfall inundates sewer systems creating an overflow of untreated sewage into bodies of water.

The frequency of sewer system overflows is predicted to increase by up to 70 percent in the Great Lakes Region,<sup>36</sup> creating health risks and need for costly repairs of damaged infrastructure. Sea level rise and coastal erosion also creates concern for damage to water infrastructure that is located close to coastal areas.<sup>37</sup> When drinking water is contaminated by pollutants and sewage, it is either too unsafe to drink or needs to be sent to treatment plants for decontamination. In heavy precipitation events or during flooding, water treatment plants may be overwhelmed, leading to a reduction in drinking water resources in impacted areas.

Flooding can increase the risk of water contamination and transmission of waterborne illness in healthcare facilities.<sup>38</sup> Out of the overall drinking water associated disease outbreaks in the United States, hospitals were noted to be common facilities associated with outbreaks of Legionella and non-Legionella bacteria from contamination of drinking water sources.<sup>39</sup> Since already more commonly experiencing outbreaks of water-borne illness and the vulnerability of patients, increases in flooding affecting healthcare facilities will likely lead to more outbreaks and incidence of disease. Without improvements to water infrastructure and assessment of climate threats to the water supply, flooding, and heavy precipitation events can increase disease burden.

# Drought and Impact on Water Supply

As extreme heat days and heat waves become more frequent and intense, the impact of droughts on water supplies becomes a concern for public health. Throughout the U.S., drought conditions are overall expected to increase, but Southern regions will be most at risk as long-term droughts are projected to worsen.<sup>40</sup> For example, climate change is estimated to have worsened the 2015 drought in California by 15 to 20 percent.<sup>41</sup> Reduced precipitation, declining mountain snowpack, and earlier snowmelt in recent years further threaten water resources, particularly in the Western regions of the country.<sup>42</sup> When drought or other factors deplete water resources, contamination of water supply is more likely, further reducing water quality.

Climate change is estimated to be one of the most significant burdens to the water cycle and availability of water.<sup>43</sup> Reductions in water supplies not only directly impact public health, but also create competition for water across

sectors. Limited water resources from shortages are already an issue in the Southern regions of the U.S. and the Caribbean and Pacific Islands.<sup>44</sup> Competition for water resources has indirect impacts on health, especially in the health and agriculture sectors. Water is utilized in health facilities for drinking water, hand washing, patient hygiene, laundry, and in the process of sterilizing equipment. Reductions in water supply can impact facility operations and quality of care delivered. Limited water resources available for agriculture, a water-intensive industry, can affect crop production and food supply,<sup>45</sup> worsening food security and availability.

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## Impacts to Water Ecosystems

Along with pollution from surface runoff, climate change also threatens water quality in rivers and lakes. As warming increases, surface water temperature also increases and affects aquatic life when species are unable to adapt to the rise in temperature.<sup>46</sup> Water temperature rise also contributes to proliferation of harmful bacteria and algal blooms, with algal bloom season projected to be longer and more severe in future droughts.<sup>47</sup> Algal blooms are toxic to humans and aquatic life and threaten water quality across the United States. Changes in aquatic life and harmful algal blooms can have social and economic impacts on the fishing industry and on the livelihoods of those reliant on fishing.



Algal bloom.

# Infrastructure

**W**ater infrastructure in the U.S. includes drinking water systems that collect water from sources after treatment and then distribute it to the public, and wastewater systems that collect wastewater that is treated prior to disposal back in the environment. In the U.S., water infrastructure consists of water systems that supply a large portion of the public and private water wells, with over 99% of the population receiving water from one of the two piped water systems.<sup>48</sup> Due to the complexity of water infrastructure and service to a large amount of people, expansion of infrastructure to accommodate a growing population and replacement of aging infrastructure is necessary to ensure access to safe drinking water and adequate sanitation.

A recent investigation of water and quality monitoring violations from the EPA found that over 63 million people, or 1 in 5 Americans, had been exposed to unsafe drinking water in the past decade.<sup>49</sup> Many local water treatment plants, especially those in poor or rural communities, are not able to afford necessary updates to filter out contaminants such as chemicals from industrial pollution, farm runoff, and naturally occurring elements like arsenic. Aging infrastructure adds to this problem as old, deteriorating pipes may break and leak, are more susceptible to bacterial growth, and may be contaminated with lead. The EPA estimates communities will need over \$384 billion dollars in the coming decades to keep their drinking water clean.<sup>50</sup>

## Drinking Water Infrastructure

**A**ccess to clean and safe drinking water is essential for health. However, in many regions this can be a considerable challenge. There are an estimated 170,000 public water systems in the U.S., that serve over 264 million people, with 54,000 of those systems being community water systems, which are public systems that provide services to the same consumers throughout the year.<sup>51</sup> The number of people relying on public water systems increases as the population rises. This increases the need to connect and build new water lines to public systems, often times adding onto already aging systems.<sup>52</sup>

There is a growing concern that as water infrastructure ages, the addition of new lines and updates of existing systems will not be adequate to ensure reliable and safe access to drinking water. The lifespan of parts used in water systems is anywhere from 15 to 95 years and as systems age, infrastructure can degrade, increasing risk of failing systems.<sup>53</sup> Older cities are particularly vulnerable, as water infrastructure is older. Approximately six billion gallons of clean drinking water are wasted from leaking pipes and water main breaks from aging infrastructure.<sup>54</sup> This is a waste of water resources and can contribute to disruptions in water supply for people and communities.

Due to the extensiveness of the public water system, when water infrastructure fails, drinking water supplies can become contaminated and large amounts of the population can be without access to clean water. Contamination of drinking water with lead exemplifies this issue. Factors associated with lead contamination of drinking water include aging infrastructure, changing water sources, and changes in water disinfectant practices.<sup>55</sup> There is no safe level of lead exposure, with exposure in children contributing to significant neurological and developmental harm. Lead contamination of drinking water from failing water infrastructure is a growing health concern.

The contamination of drinking water supplies with lead has created public health crises in areas such as Flint, Michigan and Washington, DC. Flint's aging water system, combined with a system that contains up to 80% lead pipes and the switch of water supply sources caused high amounts of lead to leach into drinking water.<sup>56</sup> In contrast, in Washington, DC a change from water disinfecting agent chlorine to chloramine caused corrosion in old water piping, leading to lead contamination of drinking water.<sup>57</sup>



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Cases of water were distributed to those affected during the Flint water crisis, as drinking water was contaminated with lead and deemed unsafe for drinking.

## Lead in Drinking Water in Schools and Child Care Facilities

There is no safe level of lead exposure. Given children's increased vulnerability to lead hazards, it is imperative that exposure to lead is eliminated to the greatest extent practicable. Children spend an average of 32.5 hours per week at school,<sup>58</sup> and the 42% of children under age 5 with employed mothers spend at least 35 hours a week in child care.<sup>59</sup> Identifying and eliminating lead in drinking water where children spend so much time is a key approach to avoiding elevated blood lead levels in children (See Figure 6).

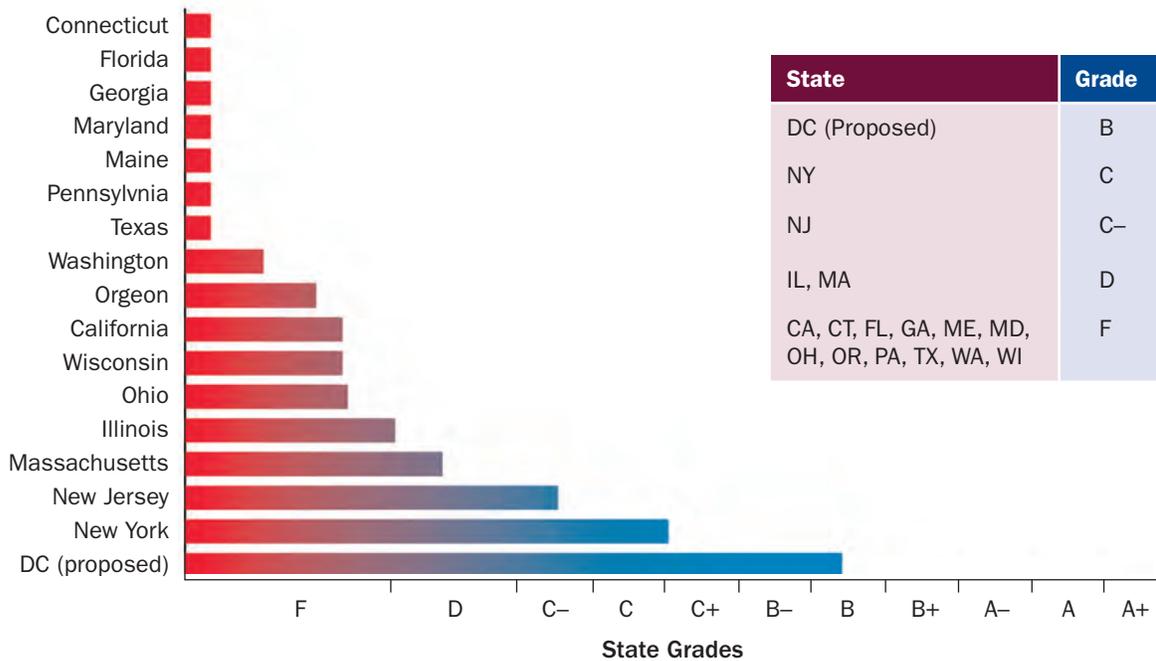
An analysis of U.S. EPA data showed approximately 350 schools and child care centers failed lead tests a total of about 470 times from 2012 through 2015. That represents nearly 20% of the water systems nationally testing above the agency's "action level" of 15 parts per billion.

Since there is no safe level of lead exposure, we should be striving for water that is free of any level of lead.

Compounding the problem is the fact that water isn't used just for drinking and washing, it's also used for cooking, where it winds up in foods like rice and pasta, or in infant formula, posing a greater risk to babies, who consume more water proportionate to their size. Lead concentrations increase as water sits in pipes when schools and child care facilities are vacant overnight, on weekends, and during school holidays. Lead particles can also release sporadically, making lead ingestion less predictable.

Further complicating this issue, existing primary prevention programs usually test babies, not school-aged children, so exposures to lead from water sources in schools may

FIGURE 6. Effectiveness of State Policies in Keeping Lead Out of Drinking Water in Schools (Evaluation of 16 States and DC by Environment America)<sup>60</sup>



not be identified. Symptoms often don't appear or can go unnoticed until dangerous levels of lead have accumulated. At that point, the damage—lowered IQ, poor impulse control and developmental delays—has been done.

There is no federal law requiring testing of drinking water in schools. So now a number of municipalities and states are taking the lead and confronting this problem by requiring mandatory testing of school drinking water sources for lead, notifying parents of the test results, providing safe potable water when contamination is found, and in some instances removing the lead hazard.

Two such states are Illinois and New York. Illinois Governor Bruce Rauner and the General Assembly passed Public Act 99-0922 requiring schools and daycares to sample for lead contamination in water. The Act requires school buildings constructed before January 1, 1987, to complete water testing by the end of 2017. Schools built between January 2, 1987 and January 1, 2000 must complete testing by the end of 2018. The Act requires parents and guardians be notified of lead results greater than or equal to five parts per billion (ppb). Daycares built on or before January 1, 2000 that serve children younger than six years old will also be required to conduct testing once rules are developed by the Illinois Department of Children and Family Services and Illinois Department of Public Health.

New York Governor Andrew Cuomo signed S.8158/A.10740 mandating that schools across the state test drinking water for lead contamination. The Department of Health issued emergency regulations requiring that school districts test their water for lead by Oct. 31, 2016 and report results to parents, the Department of Health and local government officials. Samples must be taken from a cold water outlet where the water has been motionless in the pipes for between 8 and 18 hours. If lead levels exceed the EPA threshold of 15 ppb, the school must discontinue use of that outlet, implement a lead remediation plan, and provide building occupants with an adequate alternate supply of potable water. Schools will be required to collect samples a minimum of every five years.

State passage of laws limiting lead in school and child care drinking water have the potential to create a tipping point for federal action. While these new laws are an important step in the right direction, there are a number of ways they can be strengthened. Minimum lead levels can be set at 1 ppb, schools could be required to use filters on all taps and be required to change the filters at the recommended frequency, and remove and replace lead bearing parts and all lead service lines.

# Wastewater Infrastructure

Inadequate or aging wastewater infrastructure can also lead to contamination of drinking water supply or poor sanitation. In comparison to drinking water infrastructure, there are nearly 20,000 wastewater systems in the U.S., with many constructed as combined systems that manage both rain and storm water runoff and sewage in the same system.<sup>61</sup> An estimated 772 cities, especially older cities in the Northeast, Midwest, and Pacific Northwest, utilize combined water systems for wastewater management.<sup>62</sup> In addition, the EPA estimates the percentage of wastewater infrastructure that can be categorized “in ‘poor,’ ‘very poor,’

or ‘life elapsed’ (older than its predicted life span) condition will rise from 23% in 2000 to 45% in 2020.”<sup>63</sup> As a result of aging pipes and limited capacity of wastewater systems to manage large amounts of rain runoff and sewage, an estimated 900 billion gallons of untreated sewage is discharged each year.<sup>64</sup> When systems are overwhelmed by wet weather and storm water, contaminants present in wastewater such as disease-causing pathogens, pharmaceutical waste, pesticides, and other pollutants can leak into clean water sources,<sup>65</sup> potentially contaminating surface and groundwater sources.

## Challenges to Water Infrastructure Updates

Challenges to undertaking the necessary repairs to reduce public health risks associated with aging water infrastructure include the extent of the repairs needed and the costs to update water systems. Repair costs for aging water infrastructure is estimated to cost the U.S. at least \$1 trillion in the next 25 years, with a delay in repairs increasing risk of water service disruptions and need for immediate repairs in emergency situations.<sup>66</sup> However, there is a large gap

When addressing infrastructure green components should be included, such as rain barrels, rooftop gardens, vegetative buffers, and other techniques that absorb stormwater and prevent runoff.

between the investments needed and the funding allocated for repairs. Current projections estimate that the U.S. will need \$196 billion by 2040 for water infrastructure repairs, with current funding levels leaving a gap of \$143.7 billion.<sup>67</sup> This large gap in funding will likely be transitioned to consumers, primarily in higher costs for water services.<sup>68</sup>

To prevent water contamination associated with aging water infrastructure, funding from federal and state governments is crucial, as many communities cannot afford to upgrade their infrastructure, especially low-income areas. Strengthening policy and enforcement of water quality regulations is also a key component to preventing contamination. Efforts should be made to build green infrastructure, including rain barrels, rooftop gardens, vegetative buffers and other techniques that absorb stormwater onsite and prevent runoff pollution and subsequent overflows.



# Vulnerable Populations

While all communities are at risk of contamination of drinking water supply, certain populations may be more at risk. Clean water access and water contamination disproportionately impacts low-income and communities of color, as well as pregnant women and children. In Native American communities, 61% of water systems were noted to have either a reporting or health violation versus 27% of public drinking water systems overall.<sup>69</sup> Additionally, reports of drinking water contamination are disproportionately linked to health impacts in communities of color. In Tucson, Arizona, elevated rates of adult cancer and neurological harm in newborns was linked to drinking water contamination in Latino populations.<sup>70</sup>

Lower-income and communities of color that are more likely to live in urban, impoverished areas may be disproportionately affected by rising water costs and adverse health outcomes from infrastructure damage and reduced water quality. African Americans and Hispanics are more likely to live in homes with incomplete plumbing systems compared to non-Hispanic Whites, and 12% of Native American and 30% of Alaska Natives live in communities without adequate plumbing.<sup>71</sup> Older or outdated plumbing systems contribute to increased risk of water contamination and increased vulnerability to water shortages in the event of infrastructure damage.

Those who are at an increased risk of illness are also more vulnerable to adverse health outcomes from drinking contaminated water, including the elderly, infants and children, those with chronic conditions, and those that are immunocompromised. For example, when exposed to lead, children are noted to absorb 40% to 50% of lead in water compared to much lower percentages in adults, with risk most prominent in young children ages one to five years.<sup>72</sup> Additionally, those that lack access to health services or resources in the event of a water crisis have a higher disease burden.

For those who obtain drinking water from private water wells, the responsibility to ensure that water is safe to drink is on the well owner. Those with private water wells as the main drinking water source are particularly vulnerable to adverse health effects from contaminated water. These populations include American Indian and Alaska



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Native populations,<sup>73</sup> rural communities, and those living near oil and gas operations. Further, communities that receive water from systems that are dependent solely on one or minimal water sources can also be at risk for water contamination and water shortages during extreme weather events. For example, systems that rely on groundwater sources only are vulnerable to water shortages during droughts, face vulnerabilities to water contamination, and have limited options when alternate water sources are needed.<sup>74</sup>

**Those who are at an increased risk of illness are also more vulnerable to adverse health outcomes from drinking contaminated water.**

Since energy extraction and production uses large amounts of water, there are significant environmental justice concerns relating to water contamination and shortages in communities that depend on water sources near industry operations. Worsening climate change poses similar environmental justice issues relating to reductions in water quality and supply. During extreme weather events, low-income populations and communities of color are disproportionately affected due to health inequities. How vulnerable populations are impacted by water quality and availability is vital to consider in policy and planning to reduce harm.

# State-Specific Case Studies

**Lake Erie's Harmful Algal Blooms:** The U.S. Great Lakes are vulnerable to proliferations of harmful algal blooms that can impact water supply and local economies. In 2015, a record-size algal bloom impacted Lake Erie, spreading an estimated 300 square miles.<sup>75</sup> Since the Great Lakes are a source of drinking water, algal blooms can lead to a disruption in water supply. In 2014, an algal bloom was responsible for 500,000 people being unable to drink tap water due to elevated levels of hepatotoxins,<sup>76</sup> mostly in the Toledo, Ohio area. The Great Lakes supply about 84% of North America's and 21% of the world's surface fresh water.<sup>77</sup> Due to the dependence on these lakes for drinking water, the worsening of algal blooms as a result of climate change could have a significant impact on access to water. Local economies are also impacted as fishing and tourist industries decline during blooms.

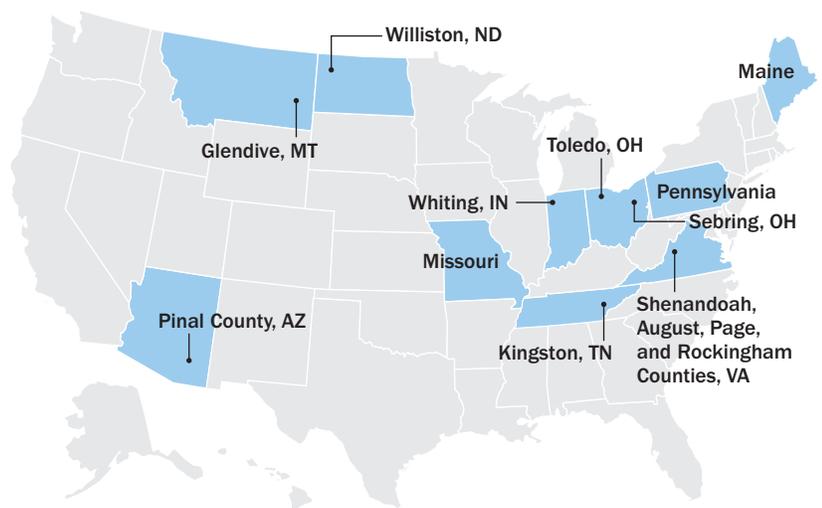
Barbara Gunning, a registered nurse from Toledo, OH described the event: "In the U.S. we take for granted that when we turn on the tap the water that comes out will be safe to drink. This event really highlighted for me how fragile our water systems really are. When I woke up early that Saturday morning to the news that we couldn't use our water, my first thought was concern for my elderly parents. They wouldn't be able to leave their home to buy water.

The water in stores ran out incredibly quickly. I ended up having to drive over 60 miles to buy water. I felt fortunate that I could do that because there are many in our community that don't have the resources to buy water or travel



**September 2009: Lake Erie harmful algal bloom, Kelley's Island, Ohio located in the western basin of Lake Erie.**

**FIGURE 7. Geographic Regions Outlined in State-Specific Case Studies**



**Communities across the United States are experiencing threats to water supply from a variety of environmental impacts as outlined in the state-specific case studies discussed in this section.**

long distances. Luckily, the emergency response system in Toledo quickly mobilized to get people fresh water. By about 11pm that night they had water distributed to many people in need."

**Lead and Drinking Water Contamination:** Flint, Michigan is not an isolated example when it comes to lead contamination in water. In 2016, Sebring, Ohio faced similar concerns when tap water tested in homes and schools had elevated levels of copper and lead above the U.S. EPA standards; noted mostly in older homes.<sup>78</sup> The Sebring public water systems provide service to over 8,000 people.<sup>79</sup> In response to the growing concern of contamination of drinking water from aging water infrastructure, the Ohio EPA is requiring the 1,878 public drinking water systems in the state to submit maps detailing lead services lines to ensure that proper monitoring and testing of copper and lead is done to prevent further incidents of water contamination.<sup>80</sup>

**Fracking Spills in North Dakota:** In January 2015, a pipeline leaked 3 million gallons of brine-rich wastewater, contaminating two creeks near Williston, North Dakota, Blacktail Creek and the Little Muddy River, and reaching up

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to the Missouri River.<sup>81</sup> Water and soil contamination from brine spills is an ongoing concern as the hydraulic fracturing industry grows in North Dakota. Brine wastewater contains high concentrations of salt, and heavy metals and radioactive elements that are naturally occurring in sedimentary rock or shale. This section of the Missouri River is a source of drinking water for town residents, with spills causing concern for water contamination. Over 3,900 brine spills have been recorded in the state, with research at spill sites showing a continued elevation of contaminants for up to four years after spills and leaks.<sup>82</sup> The 2015 North Dakota spill came shortly after an oil pipeline leaked 40,000 gallons of crude oil into the Yellowstone River, contaminating drinking water for residents in Glendive, Montana.<sup>83</sup> Benzene, a known human carcinogen, was detected in Glendive residents' drinking water two days after the spill.<sup>84</sup>

**Clean Water Rule and Protection of Arizona Watersheds:**

The Santa Cruz River is the main watershed for the Santa Cruz Basin and is a source of drinking water for communities in Southern Arizona, from Pinal County down to the Mexican border. Prior to the implementation of the Clean Water Act (CWA), the Santa Cruz River was contaminated with pollutants such as human and pharmaceutical waste, and contaminants from surrounding copper mines. Clean up of the river has been successful; however, ambiguity

under the CWA leaves small streams and rivers inadequately protected. This resulted in the bulldozing of thousands of acres of the lower Santa Cruz River, with developers arguing that there was no violation under the CWA because no damage was done to bodies of water protected under the law.<sup>85</sup> Due to recent clarification of protected waters under the CWR, the river's tributaries would now be more clearly protected against pollution and damage, yet this rule is in the process of being repealed. This is alarming for those whose water is supplied by the Santa Cruz River, as pollution in streams or rivers downstream can affect the larger watershed. The river is also economically important for industry and tourism.

**EPA Budget Cuts Threaten Maine's Water Supply:**

Maine's elected officials are concerned about EPA budget cuts and the state's ability to provide clean drinking water to residents. The state government receives grant funds from the EPA for upgrades to water infrastructure, clean water programs, and programs that protect lakes and small streams from pollution runoff.<sup>86</sup> Without grants from the EPA, state governments will not be able to fund programs, leading to elimination of protections that ensure access to clean and safe drinking water. Budget cuts could also threaten Maine's economy, as lakes are a large source of tourism income and jobs, providing \$3.5 billion to the state per year and responsible for 52,000 jobs.<sup>87</sup>

**Santa Cruz River.**





**Aerial View of Kingston Coal Ash Spill.**

© Tennessee Valley Authority, 2008

**Coal Ash and Tennessee Waters:** Coal ash and water contamination has been a major issue for Tennessee water sources. The Gallatin Fossil Plant, close to Nashville and located off the Cumberland River, produces over 200,000 tons per year of coal ash, a byproduct of coal burning that contains toxic metals such as mercury and lead.<sup>88</sup> In that state, coal ash has been contaminating groundwater and rivers, threatening drinking water sources. Some sites have a coal ash pond built right into rivers, and every major river in the Southeast contains at least one pond.<sup>89</sup> This creates an increased risk of spills, similar to the coal ash spill in 2008 that contaminated a large amount of land and bodies of water in Kingston, Tennessee.<sup>90</sup> Coal ash has been largely unregulated until a 2015 rule was developed to regulate monitoring and disposal practices to prevent environmental contamination. This rule is currently under review and industry is not required to comply, pending the outcome of the review.

**Indiana Leads the Nation for Toxic Pollution in Waterways:**

The EPA requires industrial facilities to report releases of certain toxic chemicals into the environment under the Toxic Release Inventory. However, this does not offer a complete picture of what pollutants are released into our



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**BP Oil Refinery in Whiting, IN, one of the facilities releasing into Indiana waterways.**

waterways, as only certain chemicals or types of releases are reported. Facilities must meet a certain production or use threshold to be required to report, and oil and gas drilling facilities are not required to report their releases at all. While not complete, it is the best available data. In an analysis of these reports, it was found that Indiana had the highest level of toxic releases, with over 17 million pounds of toxic releases reported into Indiana's waterways.<sup>91</sup> The chemicals being released are linked to a number of different health impacts including cancer, developmental toxicity, and reproductive harm.

**Lead Mining in Missouri:** Missouri has a long history of lead mining and is a worldwide leader in lead production. Lead mining can cause air and water contamination, which can continue for years, even after the mine has closed. In an example of how federal regulations protect the public and the environment when industries do not follow appropriate environmental controls, in 2010 the EPA issued a \$65 million fine to Doe Run, the nation's largest lead producer, due to violations under numerous federal requirements including the CWA.<sup>92</sup> In addition to mitigating pollution to the local waterways, this injunction also required the Doe Run facilities to address CWA violations to prevent further ground and surface water contamination with lead and other toxic chemicals.

**Water Contamination from Livestock:** The Shenandoah River in Virginia is a popular spot for outdoor recreational activities like swimming and rafting. Surrounding the river

in Shenandoah, Augusta, Page, and Rockingham Counties is a robust livestock industry that produces over 159 million chickens, 16 million turkeys, and over a half million cows every year, producing over 410,000 tons of poultry litter and one billion gallons of liquid manure annually.<sup>93</sup> This manure is spread on surrounding farmland as a fertilizer.

In an evaluation of pollution management plans for farms in these four counties, the Environmental Integrity Project found that farms were producing one and half times more phosphorous than needed by the fields for crop growth. When the manure is spread on the fields, the excess phosphorous and other nutrients run off the fields and into local waterways. Half the state's waterway monitoring sites found more than 50 mcg of phosphorous in the water (a level that ranks the water quality as poor) and unsafe levels of *Escherichia coli* (*E. coli*) in over 90 % of the areas where samples were taken from the river. The report also highlighted the excess nutrients are creating algal blooms that have a significant negative impact on water quality.

### **Impacts of Hydraulic Fracturing on Water in Pennsylvania:**

While citizens throughout Pennsylvania had been publicly registering complaints that their well water was being contaminated by hydraulic fracturing, or fracking, near their homes, Pennsylvania did not disclose their findings of contamination until 2014. In August of 2014, the Pennsylvania Department of Environmental Protection made publicly available a list of 248 confirmed cases of water contamination from fracking.<sup>94</sup> However, Pennsylvania had received over 2,300 complaints that were not publicly reported until they were threatened with legal action.<sup>95</sup> This contamination is very concerning, as the chemicals found in water sources from fracking are linked to number of negative health effects including cancer, impacts on the endocrine system, neurological impacts, and impacts to the nervous, cardiovascular and immune systems.<sup>96</sup>

## Nurses: Opportunity for Action

According to elected officials, constituents can have the most impact on their decision-making by creating and maintaining an ongoing relationship with their offices. The best way to achieve this is via in-person visits, both in-district and in the Capital, alone or as part of a group. Another important influencer of legislators and policy outcomes is testimony at public hearings. In between visiting or testifying, regular communication with your member and their staff maintains your influence in your absence. This communication (via email, social media and/or phone calls) may consist of press releases,

media coverage, newspaper editorials, opinion editorials (Op Eds) and Letters to the Editor, scientific studies, opinion polls, passage or implementation of government or corporate policies elsewhere that are aligned with your advocacy, or other data that support your campaign.

These diverse forms of communication are most effective when using a tiered approach, using the five “rights” of political advocacy: The right preparation, the right message, the right communicator(s), the right request, and the right repetition.

## In-person Visits with Elected Officials

It's easy to call your local, state or national elected officials' offices and make an appointment to come in and meet with them or their designated staff person. It can be difficult to achieve a meeting with a federal official, but is possible with advance planning, by bringing several constituents with you, especially those with a perspective they respect or care about, and by insisting you

will only meet with the member. But meeting with a Chief of Staff or Legislative Director can often be as, or more, effective than meeting with the actual elected official. Legislators do not have the time to read every bill and they may not know all of the details surrounding specific issues. If a high-level staffer is compelled that this issue is important and will be politically beneficial for their boss to adopt,



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### ANHE Nurses in Washington DC to speak with their Senator.

you will have an advocate in the office who has the ear of the actual leader. If going to speak with your legislator on water issues, you can speak as a nurse about how clean water impacts health in your community and can come armed with water statistics for your state.

When visiting with a legislator's office as a group, it's a good idea to research each legislator and familiarize yourselves with their position on protecting drinking water from contamination and their status in relation to clean water regulations (never heard of it, already sponsoring the policy, voted against it in the past, etc.). Participants should meet in advance to choreograph the meeting. At this time, it's helpful to designate a facilitator/timekeeper, an issue expert who can articulate the inadequacy of drinking water

infrastructure funding and regulations that prevent water pollution, and a storyteller who represents a healthcare or health-affected constituency. It's also essential to have a specific ask, moving the member farther than wherever they were before the meeting. These asks might include willingness to become educated on the topic of safe drinking water, agreement to sponsor the policy, commitment to working for its passage, or introduction of a policy based on the problem and solution that is the reason for your visit. It is okay not to have a specific bill or policy to discuss at the meeting. Educating the legislator on the issue can be just as valuable and help them keep your issue in mind when policies come up.

## Written or Spoken Testimony

**P**ublic hearings are an important part of the democratic process, and we encourage nurses to sign up to give testimony during EPA comment periods on clean water regulations. Public hearings with such significant impact on public health should never take place without nurse representation.

Rules for submitting written or spoken testimony are as varied as there are jurisdictions, and can even vary within

jurisdictions based on the choice of whoever is convening the hearing. Some government bodies require a hearing for each committee a policy must traverse. Some require at least one hearing before a policy is voted on. Some hold topical hearings (for example pharmaceutical recycling, food irradiation) that are not linked to a specific policy. Spoken testimony is often limited to a specific time length, usually 3-5 minutes. The hearing can be invitation-only, or may last as long as there is testimony to be heard. Some

## Opportunities for Nurses to Take Action

### 1. Learn about how clean water is threatened and the solutions needed to protect valuable water resources. Here are some resources to get you started.:

- Clean Water Action: <https://www.cleanwateraction.org>
- Healthy Energy Initiative: <http://bit.ly/2tPaAgw>
- Natural Resources Defense Council: <https://www.nrdc.org/issues/water>
- US Global Change Research Program: <http://bit.ly/1gg4aPq>

### 2. Educate patients, clients, and community members on the sources of water contamination and how to prevent exposure.

- Educate parents with children about sources of lead in drinking water, such as in child care, schools, or at home, and on the health threats of lead exposure.
- Discuss with patients actions to reduce lead in drinking water in the home: 1. Water testing (annually for those with private water wells); 2. Use cold water only for drinking and cooking, including in baby formula; 3. Clean or replace aerators on faucets regularly; and 4. Replace lead service lines.
- Educate patients living near oil and gas facilities or coal mines about how energy production can contaminate drinking water and the recommended frequency of monitoring or testing of water sources.

### 3. Work with local and state officials to identify and address water system vulnerabilities to prevent harm to communities.

- Work with public officials to develop plans to prevent harm from water contamination, such as routine monitoring and testing of water sources, notification of residents if at-risk, and regular surveillance of public beaches and water.
- Spearhead water pollution prevention and harm reduction programs.
- Advocate for funding and updates to aging water infrastructure, incorporating green infrastructure solutions (e.g. conserve ecosystems, restore wetlands, green roofs, rain barrels, permeable pavement).
- Nurses in health departments can work with state or local officials in developing climate adaptation plans that incorporate interventions to address vulnerabilities to water supply.

### 4. Advocate for strengthening of federal and state clean water protections.

- Submit Op Eds and LTEs to local news sources or provide written comments or testimony in support of the Clean Water Rule.
- Speak out in opposition to the repeal of standards that regulate byproducts or discharges from energy production, such as coal ash and toxic metals from power plants.
- Schedule meetings with legislators to discuss clean water concerns and encourage them to protect clean water programs.
- Advocate for funding to update and improve water treatment and delivery infrastructure.

### 5. Support a transition from fossil fuel and water-intensive energy production to clean energy, such as wind and solar.

### 6. Talk with other colleagues and health professionals about threats to water resources and the role of health professionals in protecting human health.

hearings require advance registration and advance submission of the written testimony you plan to give. Others allow you to just show up and sign in and testify in the order in which you arrive. You are usually required to bring a specific number of copies of printed testimony, for the entire committee or other legislative body. It's important to check the rules in the jurisdiction in which you plan to testify and follow the directions, or you may be disqualified.

Wherever possible, it's strategic to testify last. This gives you the "last word" and the opportunity to take notes during the hearing in order to incorporate reinforcements or rebuttals into your verbal testimony. Smartphones and search engines make it easy to find cited references for your reinforcements or rebuttals. It is not required that

your verbal testimony mirror your written testimony, which enables you to convey much more information while being agile and making your verbal testimony much more relevant to statements made at the hearing itself. It's wise to practice in advance, to gain confidence in the information, and ensure you're making all your points within the allotted time and you don't get cut off before you conclude. Broadcasting on social media during hearings amplifies your voice and that of others, as you quote experts or refute opposition inaccuracies. For example, polluting industries frequently cite "job killing" regulations, which you can rebut by citing healthcare costs, natural resource damage, loss of tourism dollars, and a devastated fishing industry as less well-factored economic and job impacts.

## Ongoing Communication

Visitors continually cycle through an elected official's offices. Given this continual input from constituents and stakeholders, your influence from a single meeting does not always leave a significant mark. Follow up is everything in order to have the greatest possible impact. First, follow up with an email to the relevant staff member, thanking them for taking time to meet with you, providing any follow up information you promised when you met (scientific studies, examples of policy templates, media coverage), checking in on any commitments

they made, and foreshadowing the next point of interest. Ideally, the office would hear from you on a regular, predictable basis. One effective approach is to keep a draft email that you throw items into such as crumbling water infrastructure and lack of funding, sewage overflows, breaches in containment ponds that contaminate a water supply, industrial accidents that pollute drinking water, innovative approaches that preserve water sources and save money, and other relevant information, and hit "send" on once a month.

## Earned Media

Earned media refers to media activity related to a company or brand that is not directly generated by the company or its agents, but rather by other entities such as customers or journalists. Examples include word-of-mouth, a news article, published interview, Op Ed, or Letter to the Editor. These strategies can be used in combination, and in sequence. For example, the government budget is reported in a newspaper article, and severe cuts to environmental protections are being proposed. You can respond with an Op Ed from a public health perspective not reported in the original article. You can then invite a colleague to follow up with a Letter to the Editor building

on your Op Ed. This gives you three bites of the apple, keeping the issue fresh and in the public eye.

**Op Ed**—Usually starts by referring to a recent article; The August 20 news article, "Insert Headline Here," missed the point by... or Hooray for the September 1st Editorial, "insert specific opinion piece here." There is a word count limit, which varies from paper to paper but is usually between 500-600 words. Your first paragraph has to be bold, and get your main point across. The core of your piece must reinforce your introductory bold statement with facts, statistics and third party opinions. It's important to

stay very focused and synthesize your message down to just a few major points that are directly tied to your opening statement. Whenever possible, include emotion and personalized storytelling to make people care about your facts. Make your style personal and conversational, and write at a level that appeals to the average reader. Given the frequency of extreme weather events that cause flooding and water contamination, the prevalence of drought, routine pipeline breaches, spills, and other industry accidents, and reports of incidents of algal blooms and chemical contamination, there is almost always a relevant article to which you can respond as a nurse.

**Letter to the Editor**—Similar to an Op Ed, a letter to the editor is in response to a recent article or opinion piece. It's important to follow the paper's directions and be timely

in your response to recent coverage of a topic. Share your expertise as a nurse and refer to your target by name. As with an Op Ed, open your letter by refuting or expanding upon the claim made in the original story, then use the next few sentences to back up your claims and advocate for your position.

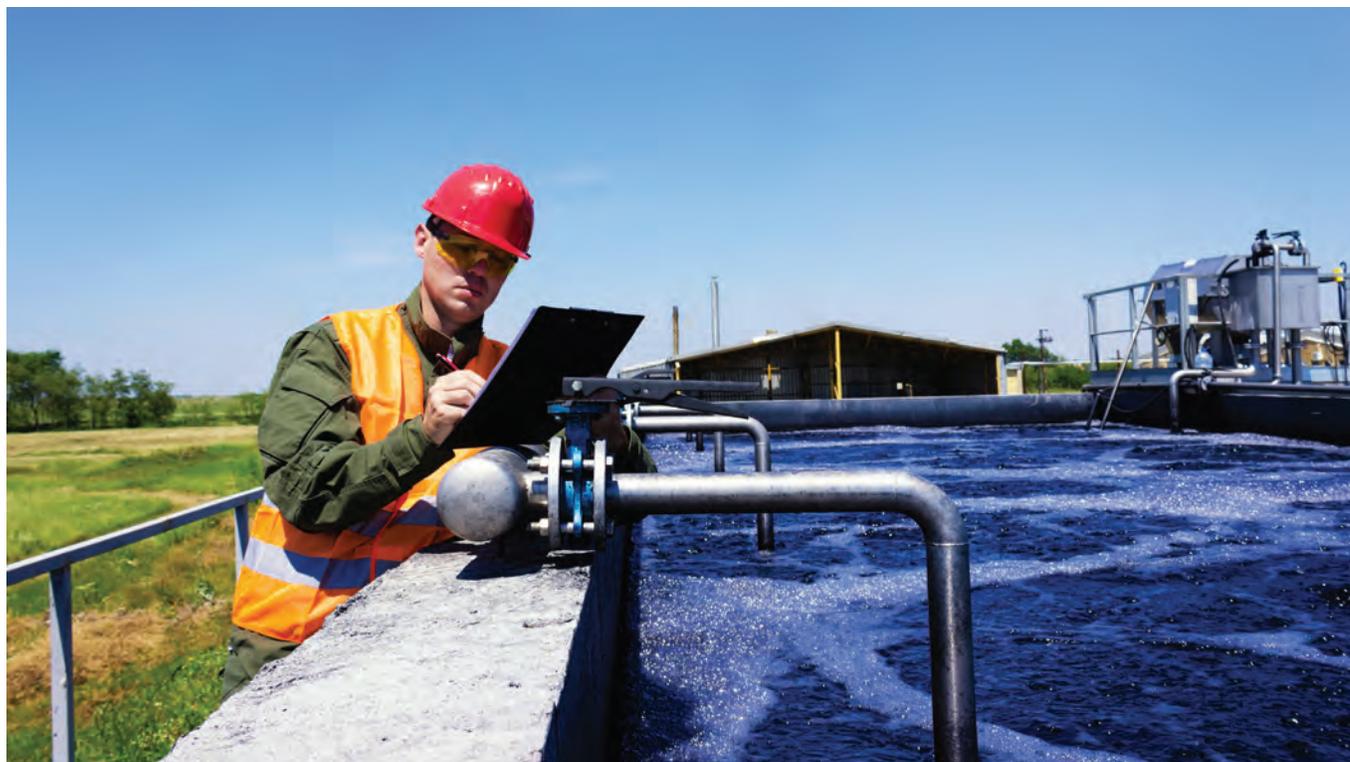
Once you've placed an Op Ed and/or Letter to the Editor, be sure to send them and the original article with a brief cover note to your elected official or other policymaker, thereby ensuring it is seen by the appropriate decision-maker. The cover note could refer back to the topic as having been discussed during your most recent visit, and gives you an opportunity to reiterate your fundamental concern about safe water and its inextricable connection to public health.

## Conclusions and Recommendations

**C**lean water is essential for life, yet there are many factors that are currently impacting access to clean and safe drinking water. Lack of clean water and adequate sanitation contributes to water-borne illness and disease outbreaks, and can lead to a shortage of water supply for water-intensive industries such as healthcare, energy production, and agriculture, and for basic human needs, such as bathing and cooking. Health inequities associated with access to clean water further contribute to the disease burden of water-related illness.

As trusted health professionals, nurses have a responsibility to advocate for clean water protections that keep our families, children, and communities safe.





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As trusted health professionals, nurses have a responsibility to advocate for clean water protections that keep our families, children, and communities safe. With many attempts to roll back these lifesaving protections, there is a great opportunity for nurses to take action. To start, nurses can learn more about how access to clean water is impacted by policy, energy extraction and production, climate change, and environmental contaminants. From this, nurses can identify the vulnerabilities their communities face and work collaboratively with local and state officials to address concerns to health and ensure action is taken to protect against harm.

In practice settings, nurses can incorporate education on the ways in which drinking water sources can be impacted and how to prevent harm. For example, nurses can educate patients who live in older homes how to best protect their household drinking water from contamination. During public health water crises, when an event occurs where people have been exposed to contaminated water, nurses can be on the frontlines ensuring patients are receiving the needed health services and have access to an alternative water source if necessary. Getting other colleagues and health professionals engaged in working to address water access issues is an important step in building a collective movement focused on advocating on behalf of the public and patients. This is also essential to make certain that the

health perspective is a consideration and driver of solutions to address water challenges.

Lastly, nurses must advocate for cleaner environments and access to clean drinking water. This includes advocating at a local, state, and federal level for adequate funding to repair aging water infrastructure. Educating elected officials on the need to implement strategies to mitigate climate change and assisting communities in adapting to extreme weather events that affect water resources will be essential to protect against threats resulting from climate change. At a federal level, nurses can advocate for strengthening clean water protections, such as the Clean Water Rule and the regulation of coal combustion residuals (coal ash). If repeal of these rules is successful, nurses will have the opportunity to provide testimony and submit written comments during the rulemaking process for a new rule. Speaking out against EPA budget cuts will work to maintain current EPA funding levels, protecting initiatives such as lead prevention and clean water programs that are essential for health promotion.

Our nation is facing significant health challenges relating to clean water access. As a profession, the nursing voice is strong in advocating on behalf of health. Collectively, nurses can make a difference in ensuring clean water is available to all.

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A close-up photograph of a man with dark, wavy hair, wearing a light pink polo shirt, leaning over a white sink. He is gently holding a newborn baby with dark hair, who has a small amount of white soap suds on their chest. The man's expression is focused and caring as he looks down at the baby. The background shows a typical bathroom sink with a chrome faucet and a white container on the counter.

Here in the United States, most of us take clean water for granted. When we turn on the tap, we assume the water is clean, healthy, and free from pollutants that could have negative health impacts. Unfortunately, millions of Americans still experience waterborne illnesses every year, costing millions of dollars in healthcare costs. In this report, nurses will find the tools they need to understand the complex issues surrounding our water supply and to take action to support healthier water in their communities.

**Alliance of Nurses for Healthy Environments**

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