



# Harvard Model Congress

## Boston 2024

---

## WATER QUALITY

*By Ava Winer*

---

### INTRODUCTION

---

The issue of water quality has sparked many heated debates in the United States. Water is an essential resource – one that every individual needs to survive. Therefore, access to clean and fresh water is a necessity that should be provided to every citizen.

However, many of the nation's water sources, including rivers, lakes, and groundwater, have now become contaminated with chemicals such as arsenic, lead, and notorious Polyfluorinated Substances (PFAS) chemicals, which have been constructed to withstand oil, water, heat, and numerous other substances.

This particularly affects under resourced neighborhoods, as many of these communities have diminished access to clean and safe drinking water due to factors such as aging infrastructure, lack of funding, inadequate maintenance, and unequal resource allocation.

One such example of this is the water crisis that occurred in Flint, Michigan. The city switched its water supply from Detroit's water system to the Flint River to save money. However, the water was not adequately tested to ensure that was safe for drinking. Despite numerous complaints from Flint residents, the government overlooked the issue. Eventually, scientists discovered that the water was contaminated with a high quantity of lead, which endangered the health and wellbeing of every resident of Flint, including the city's children (Denchak, 2018).

As water pollution in Flint, Michigan, demonstrates, water quality is a complex and pressing political issue that must be addressed in order to ensure the livelihood of communities across the nation.



*President Obama  
drinks tap water  
from Flint,  
Michigan*

*TIME Magazine*

## EXPLANATION OF THE ISSUE

---

### *Historical Development*

The issue of water quality in the United States has developed in a variety of ways throughout the country's history. Beginning with the onset of the Industrial Revolution in the 19<sup>th</sup> and 20<sup>th</sup> centuries, the rise of factories and new technological developments led to significant water contamination — bodies of water were quickly polluted with large amounts of sewage, waste, and various chemicals. Despite many efforts to improve water quality, water pollution persisted.

*The CWA, passed in 1972, was a historic step in the fight to improve water quality.*

The Clean Water Act (CWA), passed in 1972, aimed to restore and maintain the chemical and physical quality of the nation's water. The Act did so by establishing regulatory measures for pollution control, wastewater treatment, and water quality standards (US EPA). Fortunately, the CWA was successful in reducing pollution and improving water quality across the country. However, the CWA only targeted pollution that stemmed from identifiable sources, such as factories or treatment plants. As such, pollution from non-point sources that are non-identifiable due to the combination of untraceable sources, like run-off, became a growing concern. This type of pollution began to be addressed through measures such as erosion control, better agricultural practices, and stormwater management.

In recent times, ensuring the safety of drinking water has become a priority, as water infrastructure ages and contaminants such as pharmaceuticals and personal care products have increased in popularity. People have begun to advocate and raise awareness for water quality issues, as poor water quality particularly affects marginalized communities.

### *Scope of the Problem*

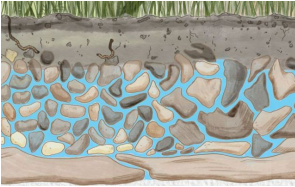
There are several key policy issues related to water quality; these include water availability, water pollution, and environmental justice and equity. Each of these issues will be detailed in the subsequent sections.

#### Water Availability

*Roughly half of the US population is dependent on groundwater.*

Groundwater is an essential source, supplying countless individuals with the substance they need to survive; rivers or lakes are not readily accessible in many communities, so they pump groundwater instead. More specifically, roughly half of the entire United States population is dependent on groundwater (USGS). However, due to this continued pumping, groundwater levels are

**Water table** – below this level, the ground is saturated with water



Groundwater beneath a surface of grass.

*The Nature Conservancy*

depleting rapidly; in essence, groundwater is being pumped faster than it can naturally replenish.

There are several pressing consequences of groundwater depletion. Firstly, the **water table** will lower. Wells allow people to pump groundwater by reaching below the water table; if the water table lowers, wells will need to be deepened, new ones might need to be created, or pumps might have to be lowered. Also, wells might begin to yield less water, which will raise the cost of water (USGS). Secondly, the quantity of water in streams and lakes will likely diminish. Groundwater contributes substantially to the amount of water in rivers, streams, and lakes; it does so by seeping into streambeds or riverbeds. If the quantity of water in these bodies diminishes, so too will vegetation and wildlife habitats. Thirdly, **land subsidence** can occur, since a lack of water in the soil often causes it to collapse. Finally, water quality will likely deteriorate, as deep groundwater is saltwater rather than freshwater. Excessive pumping will cause this saltwater to integrate with the higher-up freshwater (USGS).

As groundwater is being depleted, so too are the nation's aquifers. Shortage of groundwater is one factor that can deplete aquifers; some other factors include changes in rain or snowmelt and the construction of paved surfaces, which in turn prevent rainwater from replenishing groundwater.

**Land subsidence** – when the ground collapses or drops

## Water Pollution

Pollution occurs when water is contaminated by chemicals or other toxic substances, ranging from trash to bacteria, often stemming from air and land pollution.

Contaminated water, if consumed, can lead to numerous problematic diseases and illnesses. Certain substances might cause rashes or skin irritation. Bacteria and parasites can cause cholera and diarrhea. Pesticides or herbicides can lead to cancer, severe neurological issues, or even immediate death. Sometimes, animals or plants consume these chemicals and subsequently pass them on to humans upon consumption (HSPH).

There are two primary categories of pollution: **point source pollution** and **nonpoint source pollution**. Point source pollution occurs when contamination originates from a single identifiable source. An oil spill is an example of point source pollution. On the other hand, nonpoint source pollution originates from multiple unidentifiable sources, such as agricultural or stormwater runoff (NRDC). Unfortunately, nonpoint source pollution is the primary cause of water contamination in the United States.

Several key sources contribute to nonpoint source water pollution: agriculture, sewage and waste, oil, and radioactive substances. Farms generate and utilize many pollutants, ranging

**Point source pollution** – originates from a single identifiable source

**Nonpoint source pollution** – originates from multiple unidentifiable sources

***Nutrient pollution***  
– an excess of  
nutrients such as  
nitrogen or  
phosphorus in water

from animal waste to fertilizers and pesticides. These substances runoff into nearby bodies of water, bringing bacteria and viruses, and contribute to an excess of nitrogen and phosphorus in the nation's water. This excess causes **nutrient pollution**, which greatly harms water quality and results in algal blooms. Further, studies by the Environmental Protection Agency (EPA) have recently shown that sewage treatment systems are no longer as effective at filtering wastewater. More specifically, nearly 850 billion gallons of untreated wastewater are released back into the environment every year (US EPA, 2004). In addition to this wastewater, consumers and tankers are responsible for releasing massive quantities, roughly 1 million tons of oil to be exact, into bodies of water each year (Safe Drinking Water Foundation). Concerningly, radioactive waste, which can persist for thousands of years, has entered the water supply after being generated by uranium mining, nuclear power plants, and the testing of radioactive weapons.

### Environmental Justice and Equity

Water pollution has a multitude of devastating impacts on the environment. Ecosystems consist of complex webs of animals, plants, and bacteria, which depend upon and interact with one another. As such, when one subset of these organisms is harmed, in this case due to pollution, the entire ecosystem suffers.

Algal blooms, which are often caused by agricultural runoff, result in diminished levels of oxygen in bodies of water. This creates “dead zones,” in which plants and wildlife cannot survive (US EPA). Chemicals and heavy metals can also poison marine life, which eventually can affect humans due to biomagnification. For instance, mercury accumulates in big fish such as tuna; if humans consume large amounts of tuna, they may become ill due to mercury poisoning (US EPA). Beyond chemical threats, solid debris from human trash also present a formidable threat, often strangling animals.

Concurrently with causing direct environmental degradation, water pollution has also become a dangerous threat to human health across the country. People in impoverished communities are disproportionately affected by water contamination. The Environmental Working Group (EWG) has conducted research demonstrating that low-income communities are far more likely to consume contaminated water than wealthier communities. These marginalized communities are often served by smaller, underfunded drinking systems, which are less capable of filtering out high quantities of toxins (University of Rhode Island, 2019).

### *Congressional Action*

As mentioned above, the Clean Water Act (CWA) of 1972 is one of the most important water safety measures passed by Congress. This act created a nationwide plan to combat water contamination;

it requires the EPA to monitor the quality of U.S. bodies of water. Congress passed several other acts around the same time including the Coastal Zone Management Act (CZMA), the Endangered Species Act (ESA), the Federal Insecticide, Fungicide, and Rodent Act (FIFRA), and the Safe Drinking Water Act (SDWA). The CZMA established a plan of action to effectively manage pollution in the coastal zone, the ESA protects native plants, animals, and their habitats, the FIFRA allows the EPA to regulate and study the impact of pesticides, and the SDWA legislates the EPA to identify contaminants that could harm human health (ANR University of California). However, despite significantly improving the quality of lakes, rivers, and streams, threats to water quality have remained urgent.

Congress passed the Oil Pollution Act (OPA) in 1990. The OPA aimed to prevent and establish effective responses to oil spills. It enacted fines of up to \$4300 per barrel or unit released into bodies of water. During the mid-1990s, Congress began to focus on improving municipal sewer systems. Systems in large areas experiencing rapid population growth such as Los Angeles, Atlanta, and Boston required Federal action in order to improve their sewage systems (US Department of Justice, 2023).

In the 21st century, Congress has shifted focus to target runoff from large-scale construction projects. The government has begun to enforce the CWA in such a way as to target large corporations including Walmart and Target. These actions have heightened awareness about the consequences of stormwater runoff, particularly when caused by large corporations (US Department of Justice, 2023).

Nonetheless, water quality remains a significant issue in the United States, one that Congress has not yet effectively and entirely addressed.

### *Other Policy Action*

Numerous state laws have been passed with the goal of improving water quality. Notably, such measures in California have found significant success. In 1928, California passed the Public Trust Doctrine, which legislated that the state cannot make decisions to endanger natural resources such as water, wildlife, and land. In 1969, it passed the California Porter-Cologne Water Quality Control Act which established a program to protect water quality by giving water quality planning authority to the State Water Resources Control Board. Then in 1970, it passed the Environmental Quality Act (CEQA), which requires that public projects be reviewed to determine their potential environmental impact. Finally, in 1976, the state passed the Coast Act, which instituted the California Coastal Commission. Other states have followed California's lead and have passed similar measures (ANR University of California).

In addition to these state legislations, private organizations are contributing significantly to efforts to improve water quality. Several such organizations are the Pacific Institute, the World Water Council, Project WET, Clean Water Action, Water Aid, and Columbia Water Center. All of these organizations help to generate research, raise awareness, and spread information about water quality and water conservation. (Seametrics, 2023)

## IDEOLOGICAL VIEWPOINTS

---

**Cooperative federalism**—when the federal government shares responsibility with state and local governments

### *Conservative View*

Conservatives have various opinions about the importance of improving water quality. However, in general, conservatives prioritize economic growth, individual liberty, and limited government intervention. This interacts with water policy in a few ways. Conservatives might argue in favor of policies that empower local communities rather than the federal government to address pollution. They also often promote market-based solutions and technological innovation as solutions to environmental challenges. Such methods could entail communities investing in technology to improve methods of water treatment. Finally, rather than the federal government having complete control, conservatives often support **cooperative federalism**, which is the idea that federal, state, and local governments should collaborate.

### *Liberal View*

Liberals typically tend to prioritize environmental protection, public health, and social equity when addressing water quality. They advocate for strong environmental regulations to control water pollution; this involves supporting strict enforcement of the Clean Water Act and the Safe Drinking Water Act. They also may support government intervention through increased funding for infrastructure upgrades, pollution prevention programs, and further research about emerging contaminants. Additionally, they advocate for sustainable water management practices, including water conservation programs, efficient irrigation methods, and green infrastructure.

Liberals emphasize the need for equitable access to clean water for all individuals in the United States. They aim to address environmental disparities affecting marginalized communities; liberals typically advocate for community engagement and the inclusion of affected populations in these processes. Lastly, liberals recognize the connection between water quality and climate change. Thus, they advocate for policies to reduce greenhouse gas emissions

and promote renewable energy to improve the quality of water resources.

## AREAS OF DEBATE

---

Multiple policy solutions have been proposed to improve water quality across the United States. These policies aim to combat the issues of water availability, water pollution, and environmental justice and equity.

### *Managed Aquifer Recharge (MAR)*

Managed Aquifer Recharge (MAR) aims to address the pressing issue of groundwater and aquifer depletion. It uses surface or deep injection techniques to recharge aquifers; deep injection methods use wells to channel excess water directly into aquifers. This ensures that stored water will be available when surface water supplies are low.

One issue with MAR is that finding water for this process is not always simple. Current MAR projects primarily depend upon stormwater, river-water, and treated wastewater (American Geosciences Institute, 2017). None of these sources of water are entirely dependable – in particular, river water is only available in wetter seasons, and stormwater is only available during periods of heavy precipitation. Despite its sporadic availability, stormwater is a popular water source because MAR projects that use stormwater decrease flooding.

There are numerous arguments in favor of MAR projects. Primarily, as the name states, MAR projects replenish aquifers, which are necessary to provide the water millions of Americans need to survive. However, there are also several drawbacks to MAR projects. Firstly, MAR can have negative effects on groundwater quality; deep injection methods have the potential to be harmful because this water is not naturally filtered by soil and rock. Additionally, aquifers must be suitable for MAR; water storage can only occur in “semi-closed” or “closed” aquifers (American Geosciences Institute, 2017). One could argue that the aforementioned reasons limit MAR’s practicality and efficacy.

### Political Perspectives on this Solution

Liberals generally support MAR projects as a tool to combat groundwater and aquifer depletion. MAR generally aligns with practices that liberals support, including sustainable water management, climate change resilience, conservation, and environmental protection. Further, MAR projects often involve collaboration between local communities, farmers, and individuals. Liberals advocate for this type of inclusivity. Therefore, more

progressive politicians would support the government coordinating efforts to implement MAR projects.

Some conservatives do not support MAR projects due to concerns about cost, efficiency, and government involvement. However, other conservatives may find MAR appealing because it has the potential to align with traditionally conservative viewpoints. MAR can lead to economic benefits, can allow individuals to retain local control and property rights, and can constitute a market-based solution.

## *Agricultural Practices and Nutrient Management*

One solution to the issue of water pollution is to implement agricultural policies that encourage sustainable farming and nutrient management. Such policies include promoting precision agriculture, optimizing fertilizer use, implementing buffer zones, and providing incentives for farmers to adopt practices that minimize runoff. Specifically, farmers should apply the right amount of fertilizer at specific times of the year to reduce how much fertilizer enters nearby bodies of water. They should also prevent animals from entering and leaving waste in streams (US EPA).

If implemented, stricter regulations on agricultural practices could greatly reduce nutrient pollution and subsequent algal blooms in the nation's waters. This would help to combat damage to the environment caused by water pollution. Some drawbacks to increasing agricultural regulations include heightened financial burdens on small farmers as they must invest in new equipment, administrative burden that might distract farmers from important tasks, and reduced crop yield as farmers will no longer be permitted to use certain pesticides.

### Political Perspectives on this Solution

Conservatives might be opposed to agricultural regulations due to their strong belief in the importance of property rights and individual freedom. Additionally, conservatives are likely to be alarmed by the fact that regulations might increase costs for farmers and reduce the profit and yield of farms. Finally, conservatives tend to favor local level decision making rather than federal control, so they would typically not support large scale federal policies to regulate agriculture.

Liberals tend to see agriculture regulations as essential policies to address environmental and health concerns. Agricultural policies align with liberal goals such as protecting the environment, improving food safety, and increasing equity by providing cleaner and safer drinking water.

*Agricultural practices are a major contributor to nutrient pollution and algal blooms.*



## *Stormwater Management*

Effectively managing stormwater runoff has the potential to greatly reduce water pollution. Heavy rains often oversaturate the ground, resulting in debris, chemicals, and bacteria entering bodies of water. Stormwater management can involve practices such as implementing green infrastructure, including permeable pavement and rain gardens. Such infrastructure can reduce the volume of stormwater as well as the amount of pollutants that runoff into nearby waters (EEC).

People argue for the implementation of stormwater management practices because removing pollutants from stormwater will greatly diminish water contamination. However, some argue against it due to the high costs of new infrastructure, potential land or space constraints, issues with maintenance, and aesthetic considerations.

### Political Perspectives on this Solution

Conservatives might be hesitant to support government involvement in stormwater management. They are likely to argue that property owners should have the freedom to manage their own stormwater runoff, rather than being forced to adhere to government regulations. Additionally, the potential economic burden associated with stormwater management practices will likely alarm many conservatives.

On the other hand, liberals typically view stormwater management as a critical policy to protect the environment and ensure public health. Since stormwater management can combat climate change and improve the quality of drinking water for citizens, liberals support government action to implement these policies.

## *Infrastructure Investments*

Allocating funding towards the development and maintenance of water infrastructure in low-income and marginalized communities can help to combat inequitable access to clean drinking water. This includes investing in water treatment plants and distribution systems and replacing aging infrastructure. In order to decrease spending, the government can first identify and address critical areas in which water is inaccessible or clearly does not meet drinking standards (US EPA).

Investing in water infrastructure comes with many benefits: improved access to safe water in communities across the United States, economic growth, environmental conservation, job creation, and reduced climate change. However, investing in infrastructure is also expensive in the short term, posing potential financial challenges to the government.

## Political Perspectives on this Solution

Conservatives have ranging perspectives about infrastructure investment. Ultimately, they would rather have private sector innovation and market forces drive infrastructure investment than the government. They also want to minimize the economic impact on taxpayers of creating new infrastructure. However, they do support the economic growth and job creation that can result from infrastructure development.

Liberals support government action to address societal needs, and thus support government-led investment in infrastructure in marginalized communities. They tend to believe that this is a more effective and sure way to ensure equitable access to drinking water than depending on the private sector.

## BUDGETARY CONSIDERATIONS

---

All of the aforementioned policies come with significant economic costs. Firstly, infrastructure upgrades require monetary investment not only to purchase materials and equipment, but also to fund labor and construction. Secondly, investing in research and innovation to create new agricultural practices, MAR projects, and stormwater management plans requires effective budgeting strategies. Finally, frequent testing of water sources to ensure cleanliness and safety can be costly. The government must determine a long-term financial plan to fund these efforts.

*Investing in new water infrastructure can create new jobs and facilitate economic growth.*

## CONCLUSION

---

Addressing issues in water quality is fundamental to ensuring the health of our nation and the protection of our environment. Currently, individuals living in underserved communities across the nation do not have access to clean and safe drinking water. At the same time, groundwater and aquifers are being depleted and ecosystems are being ruined by toxic pollutants. If we do not allocate funding towards improving our waters, we risk further harming wildlife and deepening inequity.

As such, representatives need to consider which policies to implement to best improve water safety. They should consider the potential economic and societal costs associated with each policy, as well as the potential benefits. Individual representatives will need to reconcile the interests of their political party with the interests of the country at large; they will need to consider the importance of the interests of low-income communities, climate change, and environmental protection.

Ultimately, the issue of water quality is one that must be addressed. It can be tackled in a variety of ways, including by combining policy solutions and working across party lines.

## GUIDE TO FURTHER RESEARCH

---

The issue of water quality is one that should be understood from both a scientific and policy perspective. It's beneficial to make sure you understand the relevant environmental science surrounding the issue of water quality, so that you have a strong foundation for crafting policy solutions.

Delegates should look for information from sources such as the EPA and universities across the United States. They can also look at the US Department of Justice or directly at bills passed by Congress by visiting Congress.gov.

In general, delegates should look for academic research articles about various potential policies in addition to bills or articles written by the US government.

## GLOSSARY

---

**Cooperative federalism** – when the federal government shares responsibility with state and local governments

**Land subsidence** – when the ground collapses or drops

**Point source pollution** – originates from a single identifiable source

**Nonpoint source pollution** – originates from multiple unidentifiable sources

**Nutrient pollution**– an excess of nutrients such as nitrogen or phosphorus in water

## BIBLIOGRAPHY

---

“8 Organizations Making a Difference in Global Water Issues.”  
*Seametrics*, [www.seametrics.com/blog/water-organization-issues/](http://www.seametrics.com/blog/water-organization-issues/). Accessed 2 June 2023.

Denchak, Melissa. “Flint Water Crisis: Everything You Need to Know.” *Be a Force for the Future*, 8 Nov. 2018,  
[www.nrdc.org/stories/flint-water-crisis-everything-you-need-know](http://www.nrdc.org/stories/flint-water-crisis-everything-you-need-know).

“Ground Water.” *EPA*, [www.epa.gov/report-environment/ground-water#:~:text=Aquifer%20depletion.,precipitation%20from%20recharging%20ground%20water](http://www.epa.gov/report-environment/ground-water#:~:text=Aquifer%20depletion.,precipitation%20from%20recharging%20ground%20water). Accessed 2 June 2023.

“Groundwater Decline and Depletion.” *Groundwater Decline and Depletion | U.S. Geological Survey*, [www.usgs.gov/special-topics/water-science-school/science/groundwater-decline-and-depletion#overview](http://www.usgs.gov/special-topics/water-science-school/science/groundwater-decline-and-depletion#overview). Accessed 2 June 2023.

“Groundwater: Our Most Valuable Hidden Resource.” *The Nature Conservancy*, 13 Mar. 2022, [www.nature.org/en-us/what-we-do/our-insights/perspectives/groundwater-most-valuable-resource/](http://www.nature.org/en-us/what-we-do/our-insights/perspectives/groundwater-most-valuable-resource/).

“Harmful Algal Blooms.” *EPA*, [www.epa.gov/nutrientpollution/harmful-algal-blooms](http://www.epa.gov/nutrientpollution/harmful-algal-blooms). Accessed 2 June 2023.

“How People Are Exposed to Mercury.” *EPA*, [www.epa.gov/mercury/how-people-are-exposed-mercury](http://www.epa.gov/mercury/how-people-are-exposed-mercury). Accessed 2 June 2023.

“Managed Aquifer Recharge.” *American Geosciences Institute*, 18 June 2019, [www.americangeosciences.org/geoscience-currents/managed-aquifer-recharge](http://www.americangeosciences.org/geoscience-currents/managed-aquifer-recharge).

“New Data Show Severity of Water Contamination in Poor Neighborhoods.” *STEEP*, 7 Nov. 2019, [web.uri.edu/steep/new-data-show-severity-of-water-contamination-in-poor-neighborhoods/](http://web.uri.edu/steep/new-data-show-severity-of-water-contamination-in-poor-neighborhoods/).

Office, U.S. Government Accountability. “50 Years after the Clean Water Act-Gauging Progress.” *U.S. GAO*, [www.gao.gov/blog/50-years-after-clean-water-act-gauging-progress](http://www.gao.gov/blog/50-years-after-clean-water-act-gauging-progress). Accessed 2 June 2023.

“The Sources and Solutions: Agriculture.” *EPA*, [www.epa.gov/nutrientpollution/sources-and-solutions-agriculture](http://www.epa.gov/nutrientpollution/sources-and-solutions-agriculture). Accessed 2 June 2023.

“Summary of the Clean Water Act.” *EPA*, [www.epa.gov/laws-regulations/summary-clean-water-act](http://www.epa.gov/laws-regulations/summary-clean-water-act). Accessed 2 June 2023.

“Water Infrastructure Investments.” *EPA*, [www.epa.gov/infrastructure/water-infrastructure-investments](http://www.epa.gov/infrastructure/water-infrastructure-investments). Accessed 2 June 2023.

“Water Pollution Control Legislation .” *ANR Catalog*,  
anrcatalog.ucanr.edu/pdf/8088.pdf. Accessed 2 June 2023.

“Water Pollution.” *HSPH*, 11 Sept. 2013,  
[www.hsph.harvard.edu/ehep/82-2/#:~:text=Water%20pollution%20is%20the%20contamination,make%20their%20way%20to%20water](http://www.hsph.harvard.edu/ehep/82-2/#:~:text=Water%20pollution%20is%20the%20contamination,make%20their%20way%20to%20water).

White, Daniel. “Obama Drinks Filtered Flint Tap Water to Show It’s Safe.” *Time*, 4 May 2016, [time.com/4318358/obama-drinks-flint-tap-water/](http://time.com/4318358/obama-drinks-flint-tap-water/).