

Unraveling Jackson's Water Crisis:
A Study of Jackson, Mississippi vs. Flint, Michigan



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Abstract

The ongoing water crisis in Jackson, Mississippi, exemplifies the severe water quality challenges millions of Americans face due to crumbling infrastructure, systemic neglect, and environmental injustices. Jackson's predominantly Black population has grappled with a "slow-moving disaster" of repeated boil advisories, water shortages, and contaminated water for decades, rooted in long-standing racial inequities and chronic underinvestment. This paper examines the root causes through a comprehensive case study analysis of historical events, demographic shifts, policies, and socioeconomic factors that contributed to the crisis. It conducts a comparative analysis with Flint, Michigan, which faced similar challenges, shedding light on effective strategies and pitfalls. The paper synthesizes policy guidance from experts on water equity and justice issues to inform an integrated framework tailored to Jackson's circumstances. The culminating case study report diagnoses the root causes and provides evidence-based policy recommendations encompassing robust infrastructure investment, equitable governance mechanisms, community engagement, and measures to combat environmental racism. By examining this case through a multifaceted lens, the research contributes to discourses on urban water equity, environmental justice, and the urgent need to uphold the human right to clean, safe, and affordable water for all communities.

Chapter I

Federal water policies

Safe and readily available water is essential for public health. In 2010, the United Nations (UN) General Assembly explicitly recognized the human right to water and sanitation (UN-Water, 2021). Everyone should have the right to sufficient, continuous, safe, acceptable, physically accessible, and affordable water for personal and domestic use. However, poor water quality affects millions of Americans (Mueller & Gasteyer, 2021). Americans do not just receive drinking water from surface water but from groundwater as well. Nearly 40 percent of Americans rely on groundwater, pumped to the Earth's surface, for drinking water (Melissa Denchak, 2023). Water pollution is often caused by the agricultural sector, sewage and wastewater, oil pollution, and radioactive substances (Melissa Denchak, 2023). The agricultural sector is the major contributor of contamination as every time it rains, fertilizers, pesticides, and animal waste from farms and livestock operations wash nutrients and pathogens into our waterways (Melissa Denchak, 2023). When rainfall carries road salt, oil, grease, chemicals, and debris from impermeable surfaces into our waterways it is a common source of water contamination (Melissa Denchak, 2023). The overwhelmed wastewater treatment facilities end up releasing untreated wastewater (Melissa Denchak, 2023). In the United States, 9 out of 10 people get their tap water from regulated public water systems (Gerdes, 2023). Yet an estimated 43 million US residents are served by private wells or domestic water systems that are not regulated by the Environmental Protection Agency Safe Drinking Water Act (Gerdes, 2023). Cases of waterborne infections are estimated at more than 7.15 million annually in the United States (Gerdes, 2023). Yet the annual incidences of illness associated with drinking water in community drinking water systems have been estimated at 4-20 million (Gerdes, 2023). These alarming statistics present the persistent challenges in ensuring safe drinking water for all, particularly for marginalized communities who are often disproportionately exposed to contaminated water sources. Without stronger regulations and investment in infrastructure, millions of Americans will remain vulnerable to preventable waterborne diseases, further exacerbating existing public health disparities.

In the United States, the Clean Water Act (CWA) was established in 1972, establishing the basic structure for regulating discharges of pollutants into surface waters. It also began

regulating quality standards for surface water (EPA, 2023). The CWA implemented pollution control programs that set industry wastewater standards while pushing the Environmental Protection Agency (EPA) to develop national water quality criteria for numerous pollutants in surface waters (EPA, 2023). The CWA was the first step to getting less polluted water in the United States and developing the standard for better water quality. In 1974, the Safe Drinking Water Act (SDWA) was implemented to protect drinking water quality. The SDWA focuses on all water actually or potentially used for drinking, whether from above-ground or underground sources (EPA, 2023). The SDWA helped the EPA establish minimum standards to protect tap water and required all owners or operators of public water systems to comply with the new standards (EPA, 2023). The SDWA standards are implemented to protect public health by regulating the nation's public drinking water supply, including requiring actions to protect against drinking water and its sources – rivers, lakes, reservoirs, springs, and groundwater wells (EPA, 2023). The nation's health-based standards for drinking water protect both naturally occurring and man-made contaminants that may be found in drinking water (EPA, 2023). The US EPA, states, and water systems then work together to meet these standards.

While the EPA has set the legal limit on over 90 contaminants in drinking water, there are also many unregulated contaminants. The EPA uses the Unregulated Contaminant Monitoring Program to collect data for contaminants suspected to be present in drinking that do not have health-based standards set under the SDWA (EPA, 2024b). To ensure that contaminants do not affect people's health, the EPA reviews the list of contaminants based on the Contaminant Candidate List every five years, with the possibility of updating the regulated contaminants (EPA, 2024b). However, while there is an Unregulated Contaminant Monitoring Program that collects data on suspected contaminants, a vast number of chemicals out in the world can contaminate the water. Testing all of those chemicals takes a lot of time, and by only reviewing the list every five years, the program is very far behind in testing all the chemicals, especially with regard to chemicals that we might not even know about. Since the Unregulated Contaminant Monitoring Program only reviews the list every five years, chemicals could come into the water during those five years that would not be tested and would continue to be undetected. In 1996, an amendment to the Safe Drinking Water Act created the Drinking Water State Revolving Fund program, which allows states to provide loans for public water systems that must be repaid by local communities with interest (Mizelle, 2023). This was created as a

way for municipalities to be able to fund projects that they otherwise probably could not have paid for up front. In 2018, the America's Water Infrastructure Act (AWIA) was passed. Its job is to improve drinking water and water quality, deepen infrastructure investments, and enhance public health and quality of life (EPA, 2024a). The AWIA helped to authorize the Drinking Water State Revolving Fund (DWSRF) to allow extended infrastructure loan terms, require the provisions of additional subsidy to state-defined disadvantaged communities, and expand source water protection-related eligibilities under the Local Assistance set-aside (EPA, 2024a). Every year Congress appropriates a certain amount of money that is put aside for set-aside use and gives States capacity to provide loan agreements with communities to build, repair, and improve drinking water infrastructure (McLain Jennifer & Office of Ground Water and Drinking Water, 2019). Under the DWSRF program, states may establish separate eligibility criteria and special funding options for economically disadvantaged communities (EPA & Office of Ground Water and Drinking Water, 2000). Under the SDWA, Section 1452 defines a disadvantaged community as "the service area of a public water system that meets affordability criteria established after public review and comment by the State in which the public water system is located" (EPA & Office of Ground Water and Drinking Water, 2000). The state may provide additional subsidies to communities that meet the established criteria, or that are expected to meet these criteria as a result of a proposed project (EPA & Office of Ground Water and Drinking Water, 2000). The amount of loan subsidies that a state can provide to its disadvantaged communities is limited to 30 percent of the state's capitalization grant (EPA & Office of Ground Water and Drinking Water, 2000). The state capitalization grant is based on the state revolving grant (SRF) each year. The EPA assesses whether there exists any unobligated SRF funds meeting at least one of the following circumstances. First, if such funds exist, the EPA will initiate a reallocation procedure. The Clean Water Act (CWA) and the Safe Drinking Water Act (SDWA) direct EPA to reallocate capitalization grant funds under certain circumstances: 1) If allotted funds remain unobligated after the second fiscal year of availability (e.g., if a state has chosen not to apply); 2) If a state has made unsatisfactory progress with corrective actions under notices of noncompliance and EPA deobligated suspended grant payments from the state; 3) If, in the DWSRF, a state loses primary enforcement responsibility for public water systems (i.e., primacy) and funds remain available after EPA reserves funds to directly implement primacy in the state; or, 4) If, in the DWSRF, a state fails to meet the SDWA's capacity development and/or operator certification

requirements and the EPA makes the associated mandatory capitalization grant withholdings, and those withheld funds remain unobligated after the second fiscal year of availability (EPA & Office of Ground Water and Drinking Water, 2000).

In addition to states choosing to establish a disadvantaged community program, they must describe the program in their intended use plans to the EPA for the DWSRF. These guidelines include a definition of disadvantaged community, the total amount of the capitalization grant that may be used for providing additional subsidies, to the maximum extent practicable, an identification of systems that will receive additional subsidies and the amount, and a description of affordability criteria that the state will use to determine the level of disadvantaged assistance (EPA & Office of Ground Water and Drinking Water, 2000). The “loan subsidies under this provision cannot be banked for future use.” Therefore, whatever money is not used cannot be saved for later or used for another purpose (EPA & Office of Ground Water and Drinking Water, 2000).

Another thing that AWIA requires is that community water systems serving more than 3,300 people must develop or update risk assessments and emergency response plans (ERPs) (EPA, 2024a). The risk assessment and ERP’s components must address and establish deadlines for the water systems so they can be certified by the EPA for their completion. The AWIA also included amendments to the Emergency Planning and Community Right-to-Know Act, which requires state and tribal emergency response commissions to notify the applicable State agency (i.e., the drinking water primary agency) of any reportable releases and provide community water systems with hazardous chemical inventory data (EPA, 2024a). The AWIA also helps to make improvements for the Nation Act Grant Programs by providing funding to assist public water systems in small and disadvantaged communities with reducing lead in drinking water systems, and financial assistance to homeowners for lead line replacement and testing drinking water in schools and child care facilities for lead (EPA, 2024a). In 2022, the EPA released the “America’s Water Infrastructure Act Report to Congress - *Drinking Water Compliance Monitoring Data Strategic Plan. SDWA 1414, as amended by Section 2011 of America’s Water Infrastructure Act.*” The report details the strategic plan which will improve the accuracy and availability of data collection monitoring which will demonstrate compliance with National Primary Drinking Water Regulations (NPDWRs) and the submitted public water systems (PWSs) to states or by states to the EPA (EPA, 2024a). It also evaluates the challenges faced in ensuring the accuracy and

integrity of drinking water quality data submitted, challenges in implementing electronic submission, and challenges by users accessing data (EPA, 2024a). The report provides recommendations on practicable, cost-effective methods and means that can be employed to improve the accuracy and availability of data that gets submitted (EPA, 2024a). Lastly, it also identifies a plan for further actions, as the EPA intends to continue to work with stakeholders to expand the use of electronic reporting and to improve the accessibility of drinking water data (EPA, 2024a). In 2022, the EPA also released the “*America’s Water Infrastructure Act (AWIA) – Section 2003 Report to Congress - Study on Intractable Public Water Systems Serving Fewer Than 1,000 People: Compliance with National Primary Drinking Water Regulations, Barriers, and Case Studies*”. Section 1459C of the Safe Drinking Water Act, as amended by Section 2003 of the AWIA defines “intractable water systems” and directs the EPA to conduct a study of the water infrastructure in consultation with the U.S. Department of Agriculture (USDA) and the U.S. Department of Health and Human Services (HHS) (EPA, 2024a). An intractable water systems means a community water system or a noncommunity water system (1) that serves fewer than 1,000 individuals; (2) the owner or operator of which (A) is unable or unwilling to provide safe and adequate service to those individuals; (B) has abandoned the community water system or noncommunity water system, as applicable; (C) has defaulted on a financial obligation relating to the community or noncommunity water system as applicable; or (D) fails to maintain the facilities of the community water system or noncommunity water system, as applicable, in a manner so as to prevent a potential public health hazard; and (3) that is, as of the date of enactment of America’s Water Infrastructure Act of 2018 (A) in significant noncompliance with this Act or any regulation promulgated pursuant to this Act; or (B) listed as having a history of significant noncompliance with this title pursuant to section 1420(b)(1) (Office of Water EPA, 2022). In regards to section 1420(b)(1) b means that a study is required that (1) no later than 2 years after the date of enactment of this section, the Administrator, in consultation with the Secretary of Agriculture and the Secretary of Health and Human Services, shall complete a study that (A) identifies intractable water systems; and (B) describes barriers to delivery of potable water to individuals served by an intractable water systems (2) REPORT TO CONGRESS. Not later than 2 years after the date of enactment of this section, the administrator shall submit to Congress a report describing findings and recommendations based on the study under this subsection (Office of Water EPA, 2022). The report identifies intractable water systems and

describes the barriers to delivering potable water to individuals served by these systems as specified in AWIA (EPA, 2024a). The report summarizes the characteristics of the public water systems analyzed from 2016 to 2018, common challenges faced, and recommendations, strategies, and implementation tools to improve small system compliance (EPA, 2024a). The EPA classifies small systems as those serving 3,300 or fewer people per year (Office of Water EPA, 2022). An upcoming action that the AWIA will implement is The Water System Restructuring Rule. The rule will require that the EPA issue a regulation that authorizes primary agencies to mandate restructuring assessments for public water systems (PWSs) that frequently violate health-based standards, and have been unsuccessful in attempting feasible and affordable actions that comply and describe the liability protection for a complaint PWS consolidating with an assessed PWS (EPA, 2024a).

The purpose of this project aimed to uncover the root causes and systemic failures that precipitated the Jackson, Mississippi water crisis and the Flint, Michigan water crisis by reconstructing a chronological account of events, demographic shifts, and policy developments. The identification of gaps, flaws, or missing components in Jackson's current water governance frameworks are achieved by conducting a comparative analysis with Flint, Michigan. This highlighted areas that needed improvement or overhaul in Jackson's approach. The project also synthesizes a set of evidence-based policy recommendations drawn from expert sources, academic institutions, and activist groups focused on water equity and justice issues. These recommendations reveal common themes, best practices, and contextually appropriate solutions tailored to Jackson's unique circumstances. The case study diagnoses the root causes and provides an integrated policy framework to address the underlying issues.

Chapter II

Jackson's Historical Background

Jackson is Mississippi's capital and largest city, with a population of 153,463 (Meng, 2022). According to the 2020 census data, 82.5% of the population is Black (Meng, 2022). During the 1970s, a white flight occurred, and more than 11,000 white families left Jackson to avoid integrated schools (Southern Poverty Law Center, 2023). The population of white residents dropped from 52 percent to 15 percent between 1980 and today (Younes, 2023). The population of Jackson is more than 80 percent Black, with 25% of the overall population living in poverty (Younes, 2023). The employment rate of Jackson sits at 58%, while home ownership sits at 49% (The National Association for the Advancement of Colored People, 2023). Jackson, Mississippi, has a water system with more than 71,000 water connections across the city (EPA, 2025). The water utility system that is currently being used in Jackson is JXN Water. Federal spending on water utilities peaked at more than 30% of the total long-term investments in the 1970s; however, in 2017, federal government funding fell to just 4% of capital spending (Southern Poverty Law Center, 2023). As federal funding for municipal water systems dwindled, Jackson's tax base decreased considerably (Southern Poverty Law Center, 2023). The decrease in federal government spending means that state governments and individual water utilities are left to close the funding gap and bear the costs of water infrastructure needs. Jackson, Mississippi has fallen victim to the decrease in federal government spending and has been relying on the state government to help cover the costs of updating the water infrastructure.

For decades, Jackson, Mississippi, has been dealing with a water crisis that can be called a "slow-moving disaster" (Mizelle, 2023). The city has grappled with persistent water quality issues dating back to the 1940s (Mizelle, 2023). The roots of the crisis can be traced back to the 1963 completion of the Ross Barnett Reservoir (Southern Poverty Law Center, 2023). The Ross Barnett Reservoir serves as Jackson's largest source of drinking water and gets its water from the Pearl River (Southern Poverty Law Center, 2023). However, when the reservoir gets too high, the water discharges into the Pearl River, which flows through Jackson. When this happens, it can cause the water treatment plants to become overwhelmed meaning that there is too much water flowing through the system, which can then lead to low water pressure and contamination, leaving people in Jackson without safe, reliable running water (Hastings Danny, 2022). By 1985, Jackson prepared to repair its water infrastructure by outlining recommended maintenance and

repairs to the whole system. During the following years, Jackson kept making repairs and general maintenance to the water system. In 1993, the O.B. Curtis Water Treatment Plant was built near the Ross Barnett Reservoir to use its water and authorized 25 million gallons per day of water production (Darsey Damon & Craig Jim, 2023), which is how much water they are authorized to treat per day to put out to the public. Before the O.B. Curtis Water Treatment Plant was built, the City of Jackson depended on the J.H. Fewell plant, built in 1914 and fed by the Pearl River, which was authorized for 20 million gallons per day (Darsey Damon & Craig Jim, 2023). The City of Jackson's current consumption needs is about 30 million gallons per day (Darsey Damon & Craig Jim, 2023). Therefore, the City of Jackson's water needs should be taken care of with both water treatment plants currently being operational.

In the early 2010s, Jackson, Mississippi, faced several water-related crises. A severe storm resulted in weeks of water shortages as hundreds of water mains burst. By 2012, it became clear that the city's pipeline repair needs were paramount. They were nine times more in need of repair than the national average for similarly sized systems, partially due to some of the pipes being over 100 years old (Southern Poverty Law Center, 2023). Subsequently, Jackson was placed under a federal consent decree for violating the Clean Water Act, with the EPA identifying over 2,300 unauthorized sanitary sewer overflows in the previous five years. The consent decree mandated the city to pay a civil penalty of \$437,916 in fines and implement remedial actions for its sewer systems (Southern Poverty Law Center, 2023). In response, the Jackson Master Plan was updated in 2013, revealing the dire need for nearly \$600 million in infrastructure updates and repairs. The plan exposed multiple issues: 112 miles of unlined cast iron water pipes, many eroding pipes that were a century old, and a distribution system that since 1997 has been deteriorating and displaying unmistakable signs of system failure (Southern Poverty Law Center, 2023). Water main pipes and fittings are normally made of either metal, clay, concrete pipe, or plastics (Duffy P. Daniel, 2019). Whatever a pipe is made of can determine the life of the pipeline, and each type of material can have its pros and cons. For example, a cast iron pipe which was the original metal pipe for most urban water main construction throughout the 20th century until the 1970s was easy to manufacture but had a short expected lifetime due to the metal being very brittle (Duffy P. Daniel, 2019), which highlights why learning about the material of water main pipes is important when looking at updating pipelines.

The most common pipe diameter for water mains is 6 to 16 inches, with 8, 10, and 12 inches also being used (Duffy P. Daniel, 2019). The best pipe diameter is determined by where the water is coming from and where it is being delivered. An additional factor that could influence the best pipe diameter is the elevation. A smaller diameter can mean less distance for the water to travel across the pipe's cross-section, which can affect flow rate and pressure. This can also mean that a smaller diameter pipe is going to be more prone to freezing temperatures and breakages. More than 97 miles of water mains running beneath Jackson are less than 6 inches in diameter, causing more than 40% of all water main breaks and more water issues for the city (Southern Poverty Law Center, 2023). As a result, storms and freezes in 2014 and 2018 left thousands of residents without access to clean water. This caused issues because intense freezes create ice growth in the water pipes and ice blockages, which, in turn, can cause dangerously elevated pressure inside of a given water line (Gordon Jeffrey, 1996). The freezing, therefore, can cause the pipes to freeze or even burst. When the pipes are frozen, it can cause the stoppage of water flowing through, and when the water pipes burst it can create an even larger financial issue because the damage caused by the burst pipe must be fixed and then the pipe replaced. During the beginning of 2019 there was a higher than average rainfall in Jackson that overwhelmed the aging sewer lines that are crumbling and collapsing in many areas (Pearl Riverkeeper, 2019). The increased rainfall, in addition to collapsed pipes, grease/fat buildup, and blockages from roots and solids, helped to cause a massive release of over 3 billion gallons of sewage into Pearl River which prompted authorities to advise residents to avoid water-related activities (Pearl Riverkeeper, 2019, Southern Poverty Law Center, 2023).

In 2020, Jackson's water crisis became even worse. Crews had to repair five or six pipe breaks or leaks each day due to record rainfall, which caused the city's sewage system and dumps to overflow nearly half a half-billion gallons of raw sewage and 5.7 billion gallons of minimally treated sewage into the Pearl River (Southern Poverty Law Center, 2023). Due to all of the leaks and line breaks, there were multiple boil water notices, and to this day, over 750 boil water notices have been issued in Jackson since 2016 (Southern Poverty Law Center, 2023). Amidst its ongoing water system issues, Jackson, Mississippi, has had to contend with the financial burdens associated with repairing the water infrastructure and addressing the costs arising from unauthorized sanitary sewer overflows. Senate Bill 2856, authored by State Senator John Horhn (D-Jackson), and introduced in the Mississippi Legislature in 2020, would have

allowed the Jackson Public Works Department far more flexibility when it comes to billing, allowing for payment plans in cases of high bills and forgiveness in others, depending on the circumstances (LeMaster C.J., 2020). The bill sailed through with unanimous support in the Senate and the House. The bill would also have allowed the city to designate some portions of bills as uncollectable which means that it would no longer count against the city's bond rating (LeMaster C.J., 2020). If those bills were no longer counted it would help the city when borrowing money in the future for infrastructure improvements (LeMaster C.J., 2020). In June 2020, Mississippi Governor Tate Reeves vetoed Senate Bill 2856 stating that "it allows politicians to say individuals are not responsible for paying their water bill. It's supposed to be for the impoverished or needy, but there are no safeguards in place to make sure that's the case. It's totally up to them" (Lee China, 2020).

In 2021, a February storm left the residents of Jackson without access to drinking water for an entire month. In March, following the crisis, Mayor Chokwe A. Lumumba urgently appealed to Governor Reeves, spotlighting the critical need for immediate repairs and improvements to the city's water system (Southern Poverty Law Center, 2023). By May, Mississippi received the initial half of the \$1.8 billion allocated from the American Rescue Plan Act (ARPA) (Southern Poverty Law Center, 2023), which was passed to infuse substantial funding to eligible state, local, territorial, and tribal governments to help recover from the economic hardship created by COVID-19 pandemic. ARPA allocated \$195.3 billion in aid which was to be split between states, District of Columbia, tribal governments and U.S. territories (*American Rescue Plan Act Funding Breakdown*. 2021). These funds were to help private, non-private water utilities and counties, municipalities and public utilities that are not regulated by the Public Service Commissions for qualifying water, wastewater and/or stormwater projects (*American Rescue Plan Act (ARPA): Rural Water Associations Infrastructure Grant Program*. 2025). However, the release of these funds was contingent upon a state Legislature meeting to determine the distribution process. Unfortunately, no special session was convened in Mississippi, causing the funds to remain unused until 2022 (Southern Poverty Law Center, 2023). In April 2022, the state Legislature finally approved a measure allowing cities like Jackson to seek funding for water and sewer projects. Jackson was granted a one-to-one matching opportunity using its own direct ARPA funds. 65.1 billion dollars in population adjusted payments was provided to every county in America (*American Rescue Plan Act*

Funding Breakdown. 2021). However, smaller municipalities with less than \$1 million in ARPA funds could request a two-to-two match (Southern Poverty Law Center, 2023). In August of the same year, further floods led to the failure of the city's water system, leaving 153,000 residents without access to safe drinking water. Responding swiftly, President Joe Biden declared a 90-day state of emergency, authorizing federal funds to cover 75% of emergency-related costs. Subsequently, the Mississippi Department of Environmental Quality awarded Jackson (and only Jackson) \$35.6 million, which the city matched for \$71 million (Southern Poverty Law Center, 2023) (Rozier Alex, 2022). However, these funds remained in Capital City Water/Sewage Projects Funds pending state approval for disbursement. The Capital City Water/Sewage Project Funds were developed for projects in consultation with the Capital City Water/Sewage Projects Oversight Committee (Yates et al., 2022). The projects would be coordinated with the City of Jackson, Mississippi to make improvements to the city of Jackson's water and sewer systems (Yates et al., 2022).

Adding to the city's woes, the U.S. Department of Justice filed a complaint against Jackson in November 2022, alleging non-compliance with the Safe Drinking Water Act. In December of 2022, Congress passed its annual funding bill, which authorizes some funding to be sent directly to communities (The National Association for the Advancement of Colored People, 2023). Congress proposed that \$600 million of the appropriations funding should go to Jackson for the water crisis (The National Association for the Advancement of Colored People, 2023). Of the \$600 million, \$150 million must be used for technical assistance such as research, analysis, operating or maintaining the water system, and \$450 million must be used for capital projects like physical updates needed in the water system or changes to the infrastructure that supports the water system (The National Association for the Advancement of Colored People, 2023). However, to this day it is unclear how much of the \$600 million was spent on the water system, as state government officials have been reported to have withheld funds from the predominantly Black state capital (Center for Constitutional Rights, 2023).

Throughout 2023, there were minimal significant advancements. Jackson continued to lack the financial resources to cover expenses until additional federal funds hopefully become available, and the available funds cannot cover operations, maintenance, or repairs (Southern Poverty Law Center, 2023). The sole notable development occurred on May 2 when The Southern Poverty Law Center complained to the U.S. Department of the Treasury Office of Civil

Rights and Equal Employment Opportunity about perceived discrimination in the distribution and allocation of millions of federal dollars Mississippi received under the American Rescue Plan Act. The city has been unable to access federal relief funds because of obstacles set up by the Mississippi Legislature, even though Jackson has desperately needed significant improvements to the city's water infrastructure for decades (Southern Poverty Law Center, 2023). Grassroots organizations representing Jackson residents filed an emergency petition with the EPA (Center for Constitutional Rights, 2023). The petition urges the EPA and local and state entities to take immediate action to provide relief. The petition was filed under the Safe Drinking Water Act (SDWA) provision to request that the EPA use its emergency powers (Center for Constitutional Rights, 2023).

While there are a number of policies in place to ensure that people have clean drinking water, there are several systemic shortcomings in water governance that have helped to create the Jackson water crisis. The programs like the Drinking Water State Revolving Fund (DWSRF) and America's Water Infrastructure Act (AWIA) provide access to loans for infrastructure upgrades; however, the required repayments with interest often leave disadvantaged communities, like Jackson, unable to afford necessary improvements. An additional issue with funding opportunities is that subsidies for disadvantaged communities are limited, and the existing funding mechanisms may not adequately address systemic inequities, which leaves communities like Jackson underfunded for critical improvements. Two additional issues that stem from the shortfalls of water infrastructure and water policy that contributed to Jackson's water crisis were the challenges in monitoring, reporting, and ensuring data accuracy while trying to enforce the standards and the ineffective emergency response plans that left the system unprepared for crisis such as storms, freezes, sewage overflows, leaks and line breaks. With the upcoming action of The Water System Restructuring Rule, the city of Jackson can hope that they will receive help by restructuring evaluations that can help to find better solutions for their ongoing water system issues (EPA, 2024a).

Water Health Concerns

A review of the 2021 Annual Drinking Water Quality Report for the City of Jackson reveals that they had five violations, including the exceedance of a single water sample turbidity limit (City of Jackson, 2022). Turbidity describes the cloudiness of water caused by suspended particles such as clay and silts, chemical residues such as manganese and iron, and organic

particles such as plant debris and organisms (World Health Organization, 2017). Under certain conditions, iron, manganese, aluminum, zinc, and other metals can leach from city or residential pipes and plumbing and rock and soil and enter water passing through (Stricklin Tommy, 2024). Water quality issues in Jackson stem from turbidity, which occurs when metallic elements and organic matter form larger particles that discolor the water (Stricklin Tommy, 2024). During water treatment, coagulants like alum help bind particles into removable “flocs,” but residual chemicals can remain, contributing to cloudiness (Stricklin Tommy, 2024). Disinfectants like chlorine can also react with organic matter, creating byproducts that further reduce water clarity. Increased turbidity allows microbes to multiply, blocking sunlight and potentially indicating contamination (World Health Organization, 2017). High turbidity suggests that harmful pathogens may have bypassed filtration, necessitating further testing. Regular turbidity monitoring is crucial for detecting and addressing water quality problems early (World Health Organization, 2017).

A water sample taken on 2/23/2021 showed turbidity levels greater than 1.0 NTU, which is above the standard of 0.30 NTU. Since there was an increase in the turbidity levels there was an increased chance that the water may contain disease-causing organisms. The disease-causing organisms can cause symptoms such as nausea, cramps, diarrhea, and associated headaches (City of Jackson, 2022). Achieving low turbidities in drinking water is a proven indicator of pathogen removal and, hence, of drinking water safety (World Health Organization, 2017). The second violation exceeded the monthly turbidity limits, which can cause the same effects as those listed in the previous violation. The third violation was for water quality parameters not meeting minimum values. During the monitoring periods of 2018, 2019, 2020, and 2021, the City of Jackson failed to consistently meet treatment technique requirements for the system, violating the Lead and Copper Rule (City of Jackson, 2022). The Lead and Copper Rule requires systems to monitor drinking water at customer taps and if lead exceeds an action level of 15 ppb or copper concentrations exceed an action level of 1.3 ppm in more than 10% of customer taps sampled, the system must undertake a number of additional actions to control corrosion (EPA, 2024d). If the action level for lead is exceeded, then the system must also inform the public about steps they should take to protect their health and may have to replace lead service lines under their control (EPA, 2024d). The impact of lead has a range of health effects, from behavioral problems, learning disabilities and neurotoxic effects to seizures and death (EPA,

2024). According to the health effect language that is used, infants and children who drink water containing lead in excess of the action level over many years could experience delays in their physical or mental development. Children's bodies are still growing and are more likely to absorb lead than adults (EPA, 2024). The high lead level in the blood can cause developmental delays. Lead is a neurotoxin, and exposure to it, especially among children, causes damage to the brain and nervous system, learning and behavioral difficulties, slowed growth, hearing problems, and headaches (EPA, 2024). It also states that children could show slight deficits in attention span and learning abilities (City of Jackson, 2022). Meanwhile, adults who are exposed to lead can suffer from reproductive problems (in both men and women), high blood pressure and hypertension, nerve disorders, memory and concentration problems, and muscle and joint pain (EPA, 2024).

The fourth violation of water quality standards in Jackson is the failure to install corrosion control. It is important that water treatment facilities have corrosion control as corrosion is a dissolving or wearing away of metal caused by a chemical reaction between water and the plumbing (EPA, 2024e). Lead often enters drinking water as a result of corrosion of plumbing materials (EPA, 2024e). Lead and Copper Rule also requires that there is a corrosion control treatment to prevent lead and copper from contaminating drinking water (EPA, 2024e) which means that the water utilities must make the drinking water less corrosive to the materials it comes into contact with on its way to the consumer's taps (EPA, 2024e). The corrosion control installation has been completed at O.B. Curtis Water Treatment Plant. Still, however, it is incomplete at J.H. Fewell Water Treatment Plant, and Jackson's water system will continue to be in violation until the installation of the corrosion control treatment (City of Jackson, 2022). The health concerns associated with corrosion issues are the same as for the third violation.

The final violation is due to the HAA5 (Total Haloacetic Acids) MCL (maximum contaminant level) exceeding the limit in Jackson. The standard for HAA5 is 60 ug/L; during the violation, the HAA5 was 66 ug/L (City of Jackson, 2022). Total Haloacetic Acids or HAA5 are five Haloacetic acid compounds that form when disinfectants react with natural organic matter in the water (City of Jackson, 2022). People who drink water containing haloacetic acids in excess of the MCL over many years have an increased risk of cancer (City of Jackson, 2022).

One issue that often reoccurs in the City of Jackson's water systems is the loss of pressure and low pressure in a drinking water distribution system, which can cause siphonage. Siphonage

is when the normal flow of a system is reversed. This can introduce contaminants into the water system, including but also not limited to total coliform bacteria and other bacteria, parasites, viruses, or pathogens (Fingerhood et al., 2021). The EPA considers total coliforms an indicator of the presence of other pathogens in a drinking water system, and their presence is used to determine the adequacy of water treatment and the integrity of a distribution system (Fingerhood et al., 2021). Among the pathogens that the presence of total coliforms may indicate are fecal contamination (*E. coli*) and waterborne pathogens (including *Cryptosporidium*, *Giardia*, *Legionella*, and certain viruses), all of which can cause diarrhea, abdominal discomfort, nausea, vomiting, cramps, headaches, or other symptoms, if ingested (Fingerhood et al., 2021). Other more severe illnesses that can result from being exposed to such pathogens include hemolytic uremic syndrome (kidney failure), hepatitis, and bloody diarrhea (Fingerhood et al., 2021). Infection by a waterborne pathogen can also result in chronic conditions such as irritable bowel syndrome, renal impairment, hypertension, cardiovascular disease, and reactive arthritis (Fingerhood et al., 2021). Pathogens may also pose a greater health risk for infants, young children, the elderly, and people with severely compromised immune systems (Fingerhood et al., 2021).

Current Situation in Jackson, Mississippi

After months of public advocacy, legal challenges, and community mobilization thanks to the petition that was filed by Grassroots organizations representing Jackson, Mississippi, residents, a federal court in November 2022, granted Mississippi Poor People's Campaign and the People's Advocacy Institute intervention in the U.S. Environmental Protection Agency's lawsuit. This resulted in a de facto takeover of Jackson's water system by Ted Henifin (Forward Justice, 2024). Henifin retired in 2022 from working as the former manager of Virginia's Hampton Roads Sanitation District. Therefore he knew the details of system infrastructure, processes and management (Tyson Daniel, 2024). By being granted intervention, they are now an official party to the lawsuit and have a voice in the proceedings. This lawsuit has dramatically shifted residents' access to information and say about the direction of their water system — grassroots organizations believe that this victory marks a crucial step toward the transparent, equitable, and community-centered management of Jackson's water system (Forward Justice, 2024). A federal court order on November 29, 2022, authorized by United States District Judge Henry Wingate, allowed Ted Henifin, an interim third-party manager of a Mississippi water

utility, JXN Water, to reestablish sustaining water infrastructure (JXN Water, 2024). Under the interim agreement, Henifin is overseeing the response to the crisis, however, he has excluded community members from the regular institutionalized engagement (Center for Constitutional Rights, 2023). He is also failing to consistently and transparently inform residents about the status of the water system and repairs that had led to the EPA filing the SDWA suit which led to contracting with a non-local business, JXN Water (Center for Constitutional Rights, 2023). Since February 2023, JXN Water has repaired nearly 2,000 leaks and opened 3,300 closed valves (JXN Water, 2024). JXN Water has also helped to plug more than 5,000 leaks in city water supply lines that lost an estimated 5 million gallons of water per day (Tyson Daniel, 2024). To have better meter readings, more than 61,000 new water meters have been installed (Tyson Daniel, 2024).

While there are steps to begin helping the Jackson water crisis, issues continue to arise. The January - March 2024 quarterly report had one city-wide precautionary boil-water notice (EPA, 2024). A routine system sample tested positive for e-coli, and the Mississippi State Department of Health (MSDH) issued the boil-water notice (EPA, 2024). Confirmation samples that were taken at the test sites to confirm initial results, tested negative, and the MSDH was able to lift the boil-water issue. JXN Water believes that the positive sample was a false positive, perhaps contaminated in the lab, as a sample from the City of Flowood, a suburb of Jackson, tested positive on the same day (EPA, 2024). However, 233 boil water notices were issued throughout the city in this quarterly report. The second quarterly report from March - June 2024 reported that one city-wide precautionary boil-water notice was issued due to a power outage during a significant storm event that took power out at O.B. Curtis Water Treatment Plant for 8 hours (EPA, 2024). Due to the power outage, the pressure in the system dropped. Entergy was the energy company that was hired for electric power production throughout the Deep South of the U.S., and due to the high volume of power outages in the area, Entergy's response time to O.B. Curtis Water Treatment Plant was delayed more than normal, which caused the system pressure to drop enough to issue city-wide boil water notice (EPA, 2024). The second quarterly report of 2024 states that 184 boil water notices were issued throughout the city between March 1 and June 30 (EPA, 2024).

On October 10 and 11, 2024, the U.S. Environmental Protection Agency (EPA) and the U.S. Department of Justice (DOJ) sought input regarding the City of Jackson's drinking water system from members of the public during a public meeting (EPA, 2024). The meeting was

intended to inform the EPA's oversight of the public drinking water system to ensure that it meets the requirements of the Safe Drinking Water Act and provides clean, safe, and reliable water to all customers and members of the community. Before the meeting, the EPA and DOJ recognized that improvements had been made; however, there was still work to be done (EPA, 2024). Six drinking water system improvements have been implemented. This includes repairs to the water treatment plants that have greatly improved system reliability and repairs of leaks in the distribution system, resulting in a 25% decrease in average daily demand (EPA, 2024). There was more reliable water production over the winter of 2024 as the plants had completed winterization (EPA, 2024). Corrosion control treatment was completed at the J.H. Fewell Water Treatment Plant and corrosion control treatment completion at the O.B. Curtis Water Treatment Plant is expected by the end of 2024 (EPA, 2024). Work is ongoing to stabilize pressure and water reliability throughout the system, including repairing and replacing valves, pipes, and hydrants. Work has started on all Priority Projects identified in the Interim Stipulated Order (EPA, 2024). While there have been improvements to the water infrastructure listed on the public meeting agenda, it also details the Grants and Funding that have helped Jackson, Mississippi. According to meeting notes, under the EPA's emergency grant authority, the Agency awarded over \$148 million in funding to address the City's drinking water emergency (EPA, 2024). Of the \$148 million, more than \$100 million has been used in action to address the drinking water emergency and restore the system, including activities to find and fix leaks in the distribution system, improve pressure in the system through valve and hydrant assessment and make critical repairs (EPA, 2024). The Mississippi State Department of Health (MSDH) approved using nearly \$300 million in Drinking Water State Revolving Funds by JXN Water for capital improvement projects at the two water treatment plants and in the distribution system (EPA, 2024). A congressional directed community grant of \$1.5 million to JXN Water for facilities to support the management of operations and to provide safe, reliable drinking water (EPA, 2024). While the City of Jackson has benefitted from these grants and funds, individual and commercial customers' timely payment of bills for water and sewer remains critical to the long-term financial stability of the Drinking Water and Sewer system (EPA, 2024). The next JXN Water Quarterly Public Meeting is scheduled for November 9, 2024. As of March 21, 2025, the Public Meeting notes have yet to be published.

If the Public Meeting notes had been published, this chapter would have addressed more of the recent events in Jackson that were brought up. It would have helped to see what Jackson, Mississippi is currently doing for the water infrastructure and how the residents are being informed about the water crisis. As a result of it not being published, those that are not in Jackson, Mississippi are excluded from what is happening and what JXN Water is currently doing. It can be speculated that the meeting either did not happen, something happened during the meeting that JXN Water does not want the general public to know, or that JXN Water is genuinely behind on informing the general public of what is happening as there is so much happening with updating the water infrastructure in Jackson, Mississippi.

Chapter III

Flint, Michigan Background

Flint, Michigan, has a population of 81,863 people in 2022 (Data USA, 2022). According to the U.S. Census, 55.6% of the population is Black, 33.7% is White (Non-Hispanic), and 5.31% is Two+, meaning two plus races that are non-Hispanic (Data USA, 2022). The median household income is \$35,451; meanwhile, the poverty rate is at 33.3% (Data USA, 2022). The population of Flint has been decreasing over the years, even before the lead water crisis began. It is the birthplace of General Motors (GM) and the United Auto Workers Union, making Flint known as the "Vehicle City" (Chariton Jordan, 2024). However, the city began experiencing significant white flight after the 1970s, leading to GM reducing its operations in Flint (Chariton Jordan, 2024). While lifelong residents remained, the city's economic stability declined as GM reduced its presence throughout the 1990s and 2000s, causing more residents to move (Chariton Jordan, 2024).

Flint's water treatment plant, originally built in the 1950s, processed water from the Flint River until the late 1960s when the city opted to purchase treated water from Detroit instead (Chariton Jordan, 2024). Detroit sourced fresh water from Lake Huron, fully treating it at its own facilities before piping it to Flint, where the local water plant added final treatment chemicals before distributing it through 600 miles of main pipes. For Flint's water treatment plant to retain its permit to run and remain in business, the final chemical treatment of the water had to be done at the Flint water treatment plant (Chariton Jordan, 2024). The Flint River, which flows through the heart of the town, has been the unofficial waste disposal site for treated and untreated refuse from the many local industries that sprouted along its shores (Denchak Melissa, 2024). The waterway has also received raw sewage from the city's waste treatment plant, agricultural and urban runoff, and toxins from nearby leaching landfills (Denchak Melissa, 2024). General Motors alone had dumped 10 million gallons of waste into the river daily for decades, contaminating it with hazardous substances like cyanide and hexavalent chromium (Chariton Jordan, 2024). This practice began in Flint's nineteenth-century lumber mills and evolved into the next century with the boom of General Motors (Chariton Jordan, 2024). The river was brimming with bacteria and organic matter due to all the waste produced throughout the decades, making it 19 times more corrosive than the treated Lake Huron water Flint had previously

received from Detroit's pipeline (Chariton Jordan, 2024). The pollution in the river made it difficult for Flint's water plant to chemically treat the water (Chariton Jordan, 2024). Before the switch to the Flint River as a water source, the city had been paying \$12 million annually to purchase treated water from the Detroit Water and Sewerage Department (DWSD). However, throughout the 2000s, DWSD steadily increased Flint's water rates by an average of 11 percent per year, placing a growing financial burden on the already struggling city. In 2009, Elgar Brown, a key environmental official in Flint, signed the intake withdrawal permit allowing the Karegnondi Water Authority (KWA) to extract 85 million gallons of water per day from Lake Huron, circumventing regulations under the newly established Great Lakes Compact, which restricted water diversions outside the basin (Chariton Jordan, 2024). Brown failed to obtain the necessary signatures, yet Michigan governor Jennifer Granholm still approved the permit. Brown soon after joined John O'Malia's engineering firm, the lead consulting firm for KWA, which raised further concerns about conflicts of interest since Brown was the one to have signed the permit and is now working with KWA, which would allow Brown to cash in on the private sector (Chariton Jordan, 2024). In 2000, Jeff Wright was elected as the drain commissioner for Genesee County, home to Flint, making him one of the few elected officials in Michigan with the power to impose taxes and borrow money without public approval or oversight from the county commission or state legislature (Chariton Jordan, 2024). However, his tenure was mired in controversy; in 2003, he faced bribery accusations over dealings with a local real estate developer (Chariton Jordan, 2024). Wright became CEO of the proposed KWA pipeline in 2010, fueling suspicions that this was an attempt to privatize Michigan's water. (Chariton Jordan, 2024).

By December 2011, Flint faced several water options: continuing to purchase water from Detroit, joining the KWA pipeline, using the Flint River as a primary water source, or blending Detroit water with Flint River water (Chariton Jordan, 2024). If Flint opted to use its own river or join KWA, its outdated water plant would require up to \$61 million in upgrades to safely treat water full-time (Chariton Jordan, 2024). While Flint faced several water options, the city's deficit rose to \$25 million, making the City of Flint fall under state control (Denchak Melissa, 2024). If a city cannot run independently, meaning that the city government “failed” the people, then the state will step in to make improvements. This can mean the state government will appoint outside managers to make decisions in place of the city's actual elected officials. Michigan

Governor Rick Snyder, elected in 2011, appointed Ed Kurtz as Flint's emergency manager, an unelected official chosen to set local policy and oversee and cut city costs (Denchak Melissa, 2024). Kurtz responded by cutting 27 city jobs in safety, traffic engineering, planning, and engineering while proposing a 0.5 percent income tax increase (Chariton Jordan, 2024). These drastic financial and political maneuvers set the stage for Flint's impending water crisis, driven by cost-cutting measures and unchecked power.

In November 2012, the Karegnondi Water Authority (KWA) was framed as an "economic development" opportunity that would provide Flint businesses with "low-cost water" (Chariton Jordan, 2024). The cheapest option, however, was for Flint to use the Flint River as its primary water source. Emergency Manager Ed Kurtz, Mayor Walling, and other officials remained determined to push Flint into joining KWA, disregarding serious concerns from officials at the Michigan Department of Environmental Quality (MDEQ), about water safety (Chariton Jordan, 2024). MDEQ was not supportive of the long-term use of the Flint River (Chariton Jordan, 2024). Despite alarming facts, Flint City Council members were intentionally misled by Mayor Dayne Walling and the state environmental department, who provided inaccurate information about the true costs of the KWA project (Chariton Jordan, 2024). On March 25, 2013, the city council voted 7-1 in favor of Flint joining the new water system (Chariton Jordan, 2024). On April 15, 2013, Detroit Water and Sewerage Department (DWSD) director Sue McCormick made a last-ditch effort to keep Flint in the system, offering a 48% reduction in water rates and a seat on its board of commissioners (Chariton Jordan, 2024). Just days later, on April 19, Governor Rick Snyder summoned all parties involved in the Flint water standoff to his office, making it clear that Flint was leaving DWSD regardless of how competitive or cost-effective Detroit's offer was (Chariton Jordan, 2024). Despite this, the emergency manager had a temporary solution: During the two-year KWA construction period, Flint would rely on the Flint River, using its outdated and deteriorating water plant to treat the highly corrosive water (Chariton Jordan, 2024). Flint had no concrete plan to finance the millions of dollars in upgrades needed to modernize its aging water treatment plant to safely process raw water from the Karegnondi Water Authority (KWA) (Chariton Jordan, 2024). Despite the dangers, Flint water plant workers were falsely told that Detroit was "cutting off" service to Flint, a fabrication pushed by plant manager Croft and Emergency Manager Ed Kurtz to justify the switch (Chariton Jordan, 2024). In reality, Flint's water plant lacked the proper permit to operate full-time. Plant

officials knew from a 2011 engineering analysis by ROWE, a local engineering consultant company, and Warren Green of Lockwood, Andrews & Newman, Inc. (LAN), an engineering company, that the facility required \$61 million in upgrades to function safely (Chariton Jordan, 2024). In June 2013, Warren Green of Lockwood, Andrews & Newman, Inc. (LAN) estimated that the plant required \$34 million in upgrades to function properly (Chariton Jordan, 2024). While there are two different numbers, the two numbers mean different things. The \$34 million means being able to have the plant function how it is supposed to, but the \$61 million upgrade would be to make the water safe for the citizens of Flint. However, Emergency Manager Ed Kurtz refused to invest in the necessary improvements, promising that the city would conduct a brief 60- to 90-day test run of the Flint River water before distributing it to residents (Chariton Jordan, 2024). When officials sought to cut costs by switching to the Flint River, they failed to account for the tens of millions of dollars needed to upgrade the city's water plant to safely treat the highly corrosive river water (Chariton Jordan, 2024).

It is rare for a city to change its water supply. When such a transition occurs, standard practice involves testing the new water source for contaminants for at least six months to a year before distributing it to residents (Chariton Jordan, 2024). However, rather than conducting rigorous preemptive testing, the Michigan Department of Environmental Quality (MDEQ) planned to assess the water for a year after distribution to determine if chemical treatments were necessary, a decision that disregarded federal regulations (Chariton Jordan, 2024). Stephen Busch, a supervisor at the Michigan Department of Environmental Quality (MDEQ), warned colleagues about the risks of using the Flint River as a water source, noting the "increased microbial risk to public health" and the "increased risk of disinfection by-products (carcinogens)" (Chariton Jordan, 2024). These warnings were issued a full year before Flint residents received a drop of water from their river, meaning state officials, including the governor, were aware that switching to the Flint River would jeopardize public health long before the decision was finalized, though they may not have known the extent of the damage that the underlying lead issues would cause (Chariton Jordan, 2024). Like much of the U.S., Flint's water infrastructure was severely outdated, with millions of lead pipes corroding daily and posing significant health risks, especially to children (Chariton Jordan, 2024). Despite these warnings, the Snyder administration allowed the switch to move forward, setting the stage for one of the worst public health crises in modern American history. In July 2013, Emergency Manager Kurtz resigned, and

Governor Snyder reappointed Michael Brown, Kurtz's predecessor (Chariton Jordan, 2024). However, shortly after reassuming Flint's emergency manager role, Brown's brother passed away, so Brown resigned, and Governor Snyder appointed Darnell Earley (Chariton Jordan, 2024). Earley was known to fixate on dollars and cents above all else, which did not help when the State Treasurer Andy Dillon resigned in 2014. (Chariton Jordan, 2024). With Earley at the helm of the financial decisions, the state had complete control over Flint without the regard of the people of Flint.

As the appointed outside officials prioritized cost-cutting measures over public health and infrastructure integrity, it marked a critical turning point in the unfolding crisis. Flint had committed to financing 35% of the Karegnondi Water Authority (KWA) pipeline construction despite needing to put money into their Water Treatment Plant and its large budget deficit (Chariton Jordan, 2024). By February 2014, the city had reached its legal borrowing limit. It would not be permitted to take on additional debt unless it was deemed an emergency, such as a "fire, flood, or other calamity" (Chariton Jordan, 2024). To circumvent these financial constraints, the state issued an administrative consent order (ACO) mandating Flint to use its own water treatment plant and the Flint River for new water production, sealing the city's fate to the Flint River (Chariton Jordan, 2024). This reckless decision, combined with years of neglect and deception, set the stage for one of U.S. history's most devastating public health disasters. In February 2014, the Michigan Department of Environmental Quality (MDEQ) approved a permit for the Flint water plant to operate full-time in preparation for the city's switch to the Flint River (Chariton Jordan, 2024). Shortly after, on March 7, Earley rejected an offer from Detroit to continue supplying Flint with water while the Karegnondi Water Authority (KWA) pipeline was still under construction (Chariton Jordan, 2024). City officials framed the decision as a cost-saving measure, claiming that by abandoning the Detroit Water and Sewerage Department (DWSD) and temporarily relying on the Flint River, the city would save millions and "stabilize the city funds" (Chariton Jordan, 2024). However, not everyone supported the transition. In April 2014, Matthew McFarland, the Flint water plant's chief operator, refused to approve the switch to the new water source, raising concerns about its safety (Chariton Jordan, 2024). However, the switch was still scheduled and happened right on April 25, 2014 (Chariton Jordan, 2024). Within a few weeks of the switch, residents started complaining about the color, taste, and odor of their drinking water (MASTEN et al., 2016). In May 2014, residents informed officials that the water

was causing rashes, especially in children (MASTEN et al., 2016). In addition to the health of the residents, there was an unusually large number of water main breaks, and General Motors Corporation complained about the corrosiveness of the water on its engines' parts (MASTEN et al., 2016). In October 2014, General Motors Corporation switched to using water from Flint Township instead of from Flint (MASTEN et al., 2016). During the summer of 2014, a number of violations involving drinking water occurred. *Escherichia coli* (*E. coli*) and total coliform violations resulted in the issuance of three boil-water alerts within a 22-day period (MASTEN et al., 2016). MDEQ requested a preemptive operational evaluation in September 2014 and notified Flint of an initial quarterly violation of the Safe Drinking Water Act (SDWA) Disinfection/Disinfection Byproducts (D/DBP) Rule in December 2014 (MASTEN et al., 2016).

In September 2015, one house had MDEQ come to their house to test their water. The results were alarming. Water coming from the basement tested at 7,324 parts per billion (ppb), a stunning 488 times the EPA's "allowable" limit of 15 ppb (Chariton Jordan, 2024). After running the water, the number improved but was still at 22 ppb. Test results for the water coming into the house tested at 125 ppb, over eight times more than the limit (Chariton Jordan, 2024). The state replaced the severely corroded pipes inside the home and the lead service line that delivered water from the city into the house (Chariton Jordan, 2024). However, even with the brand-new pipes, tests still showed elevated lead levels (Chariton Jordan, 2024). In September 2015, a team led by a local pediatrician, Mona Hanna-Attisha, published data showing that blood lead levels (BLLs) in children increased significantly after the switch to the Flint River as a water source (MASTEN et al., 2016). In the Flint area with the highest lead levels in the water, the BLLs in children who were tested increased by a factor of 2.5 (MASTEN et al., 2016). The SDWA Lead and Copper Rule required the city of Flint to conduct sampling for lead and copper in homes (MASTEN et al., 2016). However, concerns mounted over the discrepancies in water testing, with independent officials detecting significantly higher contamination levels than those reported by EPA-funded scientists and the Snyder administration (Chariton Jordan, 2024).

Health of Citizens

The situation worsened when, on April 25, 2014, city officials switched the water supply from the Detroit pipeline to the Flint River. Soon after, residents began experiencing alarming health issues, yet government officials downplayed the concerns. One resident's dog was starting to act sick, so he took him to the vet. After receiving his dog's blood test results, the resident

stated, "Do not drink the water! Do not drink the water!" when he saw the elevated level of lead in the dog's blood (Chariton Jordan, 2024). Despite state and city officials knowing about rising lead levels, governmental officials continued to assure residents that "Flint's drinking water is meeting federal requirements, and that is the story we are sticking to" (Chariton Jordan, 2024). However, testing revealed dangerously high lead levels, with water from one resident's basement in 2015, measuring 7,324 parts per billion (ppb), 488 times the EPA's allowable limit of 15 ppb (Chariton Jordan, 2024). Even after running the water for ten minutes, levels remained unsafe, and brand-new pipes failed to solve the problem (Chariton Jordan, 2024).

Meanwhile while lead testing was happening, families suffered devastating health consequences. Children were exhibiting mood swings and unexplained pain, while newborns began being born with high levels of lead and other heavy metals in their blood (Chariton Jordan, 2024). Flint residents also endured neurological symptoms, debilitating fatigue, muscle weakness, brain fog, and memory loss (Chariton Jordan, 2024).

Water Health Concerns

An examination of the Flint, Michigan case offers essential insight into the issue of lead contamination in a municipal water supply. As previously mentioned in Chapter II, the impact of lead has a range of health effects, from behavioral problems, learning disabilities and neurotoxic effects to seizures and death (EPA, 2024). It was estimated in 2016 that 6,000 to 12,000 children, or over 12 percent of the total population and 43 percent of the population of children under eighteen years old, were exposed to elevated levels of lead water throughout the Flint water crisis (International Social Science Review, 2017). According to the CDC National Center for Environmental Health, elevated blood lead levels (around five micrograms per deciliter) are extremely detrimental to children's ability to learn (International Social Science Review, 2017). The Flint Michigan Water Crisis began on April 25, 2014, and during the first year seven percent of Flint children in 2014 had a peak blood lead level of greater than five micrograms per deciliter (International Social Science Review, 2017). While the citizens of Flint, Michigan, were exposed to dangerous levels of lead, there were also outbreaks of Legionnaire disease, a severe waterborne illness, caused by Flint's water (Michael Ray & The Editors of Encyclopedia Britannica, 2024). Legionnaire disease is a severe form of pneumonia, which is lung inflammation usually caused by infection (Mayo Clinic Staff, 2021). Most Legionnaires' disease cases are caught by inhaling the bacteria from water or soil (Mayo Clinic Staff, 2021).

Legionnaires' disease usually develops two to 10 days after exposure to legionella bacteria, with beginning symptoms including headache, muscle aches, and fever that may be 104 F or higher (Mayo Clinic Staff, 2021). By the second or third day, those exposed can develop other signs and symptoms that can include cough, which might bring up mucus and sometimes blood, shortness of breath, chest pain, gastrointestinal symptoms (such as nausea, vomiting, and diarrhea), and confusion or other mental changes (Mayo Clinic Staff, 2021). Severe cases of Legionnaires' disease can lead to several life-threatening complications, including respiratory failure, septic shock, and acute kidney failure (Mayo Clinic Staff, 2021). When Legionnaires' disease is not treated promptly, the disease can be fatal (Mayo Clinic Staff, 2021).

Current Situation in Flint

Eight years after their water was poisoned, Flint residents were still suffering, with their bodies continuing to bear the consequences of the crisis. For many, the prolonged devastation felt like more than negligence—it felt like murder. As one resident put it, "You cannot help but think that they are trying to get away with downright murder, not attempted manslaughter – it seems like murder" (Chariton Jordan, 2024). The city has failed to meet its court-ordered deadlines to check the service line material at all eligible homes and replace the lead services lines it finds (Denchak Melissa, 2024). Flint was supposed to replace the thousands and galvanized-steel service lines that connect city water mains to local homes beginning in March 2016 and was supposed to be scheduled to be completed within three years of the start date but the work of identifying and replacing lead service lines to this day remains unfinished (Denchak Melissa, 2024). This means that potentially hundreds of Flint residents are still getting their water from lead pipes. Meanwhile, the city's population has declined by nearly 20,000 people since the crisis began (Denchak Melissa, 2024). After many years of denial by Governor Synder, he had admitted to the crisis, but the damage had already been done (Chariton Jordan, 2024).

Chapter IV

Conclusion

Clean water is a fundamental human right—or is it? There are 7.88 billion people on this planet, and over 2 billion live in water-stressed countries (UN-Water, 2021). Water-stressed does not just mean that there is limited water, but that the water can be contaminated (UN-Water, 2021). At least 1.7 billion people use a drinking water source contaminated with feces (UN-Water, 2021). Meanwhile, 6 billion people use a safely managed drinking water service located within the area they reside, available when needed, and free from many forms of contamination (UN-Water, 2021). Safe and readily available water is important for public health. However, most of the municipal water systems in the United States have contamination problems, with a large percentage of them having severe issues. In 2010, the United Nations (UN) General Assembly explicitly recognized the human right to water and sanitation (UN-Water, 2021). Everyone should have the right to sufficient, continuous, safe, acceptable, physically accessible, and affordable water for personal and domestic use. Poor water quality affects millions of Americans (Mueller & Gasteyer, 2021). In Chapter I, there was a discussion about all of the water policies that the United States have implemented throughout the years. With these acts and standards in place, one would expect everyone in the United States to have safe drinking water, but that is not the case, as has been detailed in this study.

Access to clean water is a fundamental human right, yet the ongoing water crisis in Jackson, Mississippi, highlights the stark inequalities and injustices that persist in the United States. The city's predominantly Black population has been grappling with a "slow-moving disaster" for decades, facing repeated boil advisories and water shortages due to crumbling infrastructure and chronic underinvestment. This crisis is not an isolated event but rather a manifestation of systemic environmental racism, historical neglect, and the disproportionate burdens placed on marginalized communities (Southern Poverty Law Center, 2023). Addressing the Jackson water crisis requires a comprehensive approach that acknowledges the deep-rooted racial and socioeconomic disparities that people in the city have faced for decades. The City of Jackson should have substantial federal funding, robust infrastructure investment, and a genuine commitment to upholding the human right to clean, safe, and affordable water for all communities, regardless of their demographic makeup or economic status. Without such efforts, the cycle of injustice and deprivation will continue, perpetuating a violation of fundamental

human rights that should be unacceptable in a nation that prides itself on its ideals of equality and opportunity.

Meanwhile, Flint, Michigan's water crisis was thought to have been resolved. Still, after doing a deep dive into the history and what is currently happening, we can acknowledge that while the United States thinks that the Flint water crisis has been solved, the community is still being heavily affected. When I started to think about different comp topics, I automatically gravitated toward the Jackson, Mississippi, Water Crisis after learning about it in a different class. I wanted to find out why this water crisis was happening and begin to develop ideas and potential policies that could be a solution. In order to do this, I thought about the Flint, Michigan, water crisis, how it received public attention, and how the issue of water quality has been resolved. However, after starting to do some research, I quickly learned that the City of Flint was still grappling with the water crisis and the effects that have taken place. So, when I was looking at policy recommendations that could be implemented in Jackson, Mississippi, I was at a loss. So, I started looking into what recovery efforts and recommendations that have been brought forward after the Flint Water Crisis became public knowledge that could be applied to Jackson, Mississippi.

A practice that was recommended was partnerships between private, public, and nonprofit organizations to provide opportunities for collaborations that can help guide innovative strategies for primary lead prevention, raise awareness, extend outreach and communication efforts, and promote a shared sense of ownership (Ruckart et al., 2019). In Jackson, Mississippi, community groups and residents listed a few things that they wish they had in order to be more knowledgeable about the water crisis and to prevent the water crisis from getting worse. This included full transparency into Ted Henifin and JXN Water's actions to manage the water system. This includes subjecting them to public records laws and state procurement laws, from which Jackson is currently exempt (Tallman Sarah, 2024). This would allow the residents and community members to start trusting what Henifin and JXN Water are doing with their water system. Residents also wished that if residents were partners with the water infrastructure in creating long-term, sustainable solutions to the water crisis would allow a community member to serve as a connection point between residents, Henifin, and the government (Tallman Sarah, 2024). Allowing a resident to take part and partner would bring trust back to the water system and to the community. Residents wish that Jackson would reject attempts to privatize the city's

water system as it would result in higher costs for residents and increase the risk of corruption and health and safety violations (Tallman Sarah, 2024). As Chapter III discussed, privatizing the water system allowed for corruption to take place and contributed to making and creating the water crisis. The people of Jackson do not wish for this to happen to them as they have already been struggling with their own water crisis for years. The last request that Jackson residents wanted was increasing educational resources to help residents understand their water quality, how they can test their water, and information about what improvements have been made to the water system (Tallman Sarah, 2024). By increasing the knowledge of the community this would allow Jackson residents to decrease their chances of being lied to and manipulated.

In the meantime, while the quality of water is questionable, there are many different ways that residents can ensure that they are not going to be harmed by the water. This includes drinking and cooking with treated bottled water when possible (Tallman Sarah, 2024). Residents can also use reverse osmosis under-the-sink filters certified to meet National Sanitation Foundation (NSF) Standard 58 or use other filters that meet NSF Standard 53 for both lead and cyst reduction, and these are often faucet-mount or refrigerator-installed filters (Tallman Sarah, 2024). Based on the quality of reverse osmosis under-the-sink filters that meet NSF Standard 58, the starting price is around \$125 and goes up from there. There is no assistance to pay for this approach which makes it only available to those with the funds. Even if there is not a water crisis, other residents in the United States that want to feel better about the water that they are drinking, installing the previously mentioned filters would increase the peace of mind of residents if they were able to afford the filters.

Overall, there needs to be more funding and support for updating water infrastructures promptly and keeping water systems under the control of the public and not privatizing them. This will put citizens of the United States at peace with the idea that their drinking water is safe and they can trust the officials word that their drinking water quality is safe.

Limitations and Future Questions

When looking over this entire project, I wish there were more things I could have accomplished. There were no accounts of a Jackson, Mississippi resident and their feelings towards the water crisis or how it has impacted them or how they think it has affected the community. There were no first-person accounts from JXN Water public meetings. By not going to a JXN Water public meeting or hearing from someone that did go to the public meetings, a

limitation was created. As a result of JXN Water public meeting notes not being published on the internet, I have not been able to learn of what JXN Water has recently been working on, their goals or what they are telling and not telling the residents of Jackson.

An additional issue or limitation that Jackson, Mississippi will face is how the 2025 President of the United States (POTUS) will affect water policies and funding. Many of the EPA websites that I was receiving information from have been taken down and therefore, many of the EPA websites that I needed to continue doing revisions and research on no longer have the data and information available. This can create a limitation for those who would like to do future research on this project.

If I were to have more time on this project, I would look at how Jackson, Mississippi and Flint, Michigan treated their water (chemicals vs UV light) and how the different ways to treat water can affect the water crisis. Are chemicals or UV light more effective? Is one way cheaper to maintain? Does one of the water treatments affect the health of people? Is there a better way to treat drinking water? Could there be different ways to treat drinking water to be better for certain water crises'?

There are many different ways that this comp could continue on and I am aware that my information is limited but when researching this topic I realized that there were going to be many things that I wish I could dive deeper into. Hopefully, someone continues looking into solutions for Jackson, Mississippi and how it can help other cities avoid a water crisis.

References

- American Rescue Plan Act (ARPA): Rural Water Associations Infrastructure Grant Program.*
ARPA Rural Water Grants - Mississippi State Department of Health. (2025, March 13).
<https://msdh.ms.gov/msdhsite/index.cfm/30,0,76,1000,html>
- American Rescue Plan Act Funding Breakdown.* (2021, April 12). National Association of Counties.
<https://www.naco.org/resources/featured/american-rescue-plan-act-funding-breakdown>
- Boskabady, M., Marefati, N., Farkhondeh, T., Shakeri, F., Farshbaf, A., & Boskabady, M. H. (2018). The effect of environmental lead exposure on human health and the contribution of inflammatory mechanisms, a review. *Environment International*, 120, 404–420.
<https://10.1016/j.envint.2018.08.013>
- Breslow Jason. (2022, August 31). *The water crisis in Jackson follows years of failure to fix an aging system.* NPR. Retrieved September 25, 2024, from
<https://www.npr.org/2022/08/31/1120166328/jackson-mississippi-water-crisis#:~:text=For%20years%2C%20residents%20of%20the,to%20upgrade%20Jackson's%20aging%20in%20infrastructure.>
- Chariton Jordan. (2024). *We the Poison: Exposing the Flint Water Crisis Cover-Up and the Poisoning of 100,000 Americans.* Rowman & Littlefield.
- City of Jackson. (2022). *2021 Annual Drinking Water Quality Report.* .
- Darsey Damon, & Craig Jim. (2023). *Crisis in Mississippi: The Emergency Management and Hospital Response to the City of Jackson's Water Outage*
- Data USA. (2022). *Flint, MI.* Data USA.
<https://datausa.io/profile/geo/flint-mi/#:~:text=Flint%2C%20MI%20is%20home%20to,a%20ny%20other%20race%20or%20ethnicity.>
- Denchak Melissa. (2023, January 11). *Water Pollution: Everything You Need to Know.* NRDC.
<https://www.nrdc.org/stories/water-pollution-everything-you-need-know>
- Denchak Melissa. (2024, October 8). *Flint Water Crisis: Everything You Need to Know.* NRDC.

- <https://www.nrdc.org/stories/flint-water-crisis-everything-you-need-know#summary>
- Duffy P. Daniel. (2019, Feb 25). *The Perfect Pipe*. WaterWorld.
<https://www.waterworld.com/home/article/14071043/the-perfect-pipe>
- EPA. (2024a, Feb 7). *America's Water Infrastructure Act of 2018 (AWIA)*. United States Environmental Protection Agency.
<https://www.epa.gov/ground-water-and-drinking-water/americas-water-infrastructure-act-2018-awia>
- EPA. (2024b, November 26). *Drinking Water Regulations*. United States Environmental Protection Agency.
<https://www.epa.gov/dwreginfo/drinking-water-regulations#:~:text=Overview,that%20water%20systems%20must%20follow.>
- EPA. (2024c, October 17). *Jackson, MS Drinking Water*. United States Environmental Protection Agency. Retrieved October 25, 2024, from
<https://www.epa.gov/ms/jackson-ms-drinking-water>
- EPA. (2024d, Oct 8). *Lead and Copper Rule*. United States Environmental Protection Agency.
<https://www.epa.gov/dwreginfo/lead-and-copper-rule>
- EPA. (2024e, Dec 5). *Learn About Lead*. United States Environmental Protection Agency.
<https://www.epa.gov/lead/learn-about-lead>
- EPA. (2024f, November 4). *What are some of the health effects of lead?* United States Environmental Protection Agency.
<https://www.epa.gov/lead/what-are-some-health-effects-lead>
- EPA Water Consultants. . *How Does E. coli Contaminate Drinking Water and How Can You Avoid It?* EPA Water Consultants Total Water Treatment. Retrieved September 25, 2024, from
<https://epa-water.com/how-does-e-coli-contaminate-drinking-water-and-how-can-you-avoid-it/>
- EPA, & Office of Ground Water and Drinking Water. (2000). *The Drinking Water State*

Revolving Fund Program.

<https://nepis.epa.gov/Exe/ZyNET.exe/901V0700.TXT?ZyActionD=ZyDocument&Client=EPA&Index=2000+Thru+2005&Docs=&Query=&Time=&EndTime=&SearchMethod=1&TocRestrict=n&Toc=&TocEntry=&QField=&QFieldYear=&QFieldMonth=&QFieldDay=&IntQFieldOp=0&ExtQFieldOp=0&XmlQuery=&File=D%3A%5Czyfiles%5CIndex%20Data%5C00thru05%5CTxt%5C00000011%5C901V0700.txt&User=ANONYMOUS&Password=anonymous&SortMethod=h%7C-&MaximumDocuments=1&FuzzyDegree=0&ImageQuality=r75g8/r75g8/x150y150g16/i425&Display=hpfr&DefSeekPage=x&SearchBack=ZyActionL&Back=ZyActionS&BackDesc=Results%20page&MaximumPages=1&ZyEntry=1&SeekPage=x&ZyPURL>

Fingerhood, K., Mo, A., Bachman, S., & Flanagan, D. (2021). *VIII. RELATED CASE(S) IF ANY*

Forward Justice. (2024, March 21). *Jackson Water Crisis Update: March 2024*. Forward Justice.

Retrieved October 25, 2024, from

<https://forwardjustice.org/jackson-water-crisis-update-march-2024/>

Gerdes, M. E., Miko, S., Kunz, J. M., Hannapel, E. J., Hlavsa, M. C., Hughes, M. J....Collier, S. A. (2023). Estimating Waterborne Infectious Disease Burden by Exposure Route, United States, 2014. *Emerging Infectious Diseases*, 29(7), 1357-1366.

<https://doi.org/10.3201/eid2907.230231>.

Gordon Jeffrey. (1996). An Investigation into Freezing and Bursting Water Pipes in Residential Construction. <https://www.ideals.illinois.edu/items/54859>

Hastings Danny. (2022, Sept 21). *The Water Crisis in Jackson, Mississippi*. Close Up Washington DC. <https://www.closeup.org/the-water-crisis-in-jackson-mississippi/>

House Bill 1031, 1, 2022Cong. (2022).

<https://billstatus.ls.state.ms.us/documents/2022/html/HB/1000-1099/HB1031IN.htm>

Judin Nick, & Mississippi Free Press. (2024, August 16). *Decrepit Pipes Put Jackson, Mississippi, on the Edge of Catastrophe. State Regulators Didn't Act*. Retrieved October 25, 2024, from

<https://www.propublica.org/article/jackson-mississippi-water-crisis-state-inspection>

- JXN Water. (2024). *About JXN Water*. JXN Water. Retrieved October 25, 2024, from <https://jxnwater.com>
- Lee China. (2020, June 29). *Governor Reeves vetoes Jackson water bill relief legislation*. WLBT3. <https://www.wlbt.com/2020/06/29/governor-reeves-vetoes-jackson-water-bill-relief-legislation/>
- LeMaster C.J. (2020, June 22). *After unanimous passage of Jackson water bill relief legislation, leaders await governor's signature*. WLBT3. <https://www.wlbt.com/2020/06/22/after-unanimous-passage-jackson-water-bill-relief-legislation-leaders-await-governors-signature/>
- Leonardi, J. M., & Gruhn, W. J. (2001). *Flint River Assessment*. Michigan Department of Natural Resources, Fisheries Division.
- MASTEN, S. J., DAVIES, S. H., & McELMURRY, S. P. (2016). Flint Water Crisis: What Happened and Why? *Journal American Water Works Association*, 108(12), 22–34. <https://10.5942/jawwa.2016.108.0195>
- Mayo Clinic Staff. (2021, May 24). *Legionnaires' disease*. Mayo Clinic. <https://www.mayoclinic.org/diseases-conditions/legionnaires-disease/symptoms-causes/syc-20351747>
- McLain Jennifer, & Office of Ground Water and Drinking Water. (2019). *Expanded Source Water Protection-Related Eligibilities Under the Drinking Water State Revolving Fund's Local Assistance and Other State Programs Set-Aside*
- Michael Ray, & The Editors of Encyclopedia Britannica. (2024, November 11). *Flint Water Crisis*. Britannica. <https://www.britannica.com/event/Flint-water-crisis>
- Michaels, R. A. (2020). Legacy Contaminants of Emerging Concern: Lead (Pb), Flint (MI), and Human Health. *Environmental Claims Journal*, 32(1), 6–45. <https://10.1080/10406026.2019.1661947>
- Office of Water EPA. (2022). *America's Water Infrastructure Act (AWIA) – Section 2003*

Report to Congress

Pearl Riverkeeper. (2019, May 8). Sewage Overflows Continue. *Pearl Riverkeeper*

<https://www.pearlriverkeeper.com/blog/more-sewage#:~:text=23.6%20million%20gallons%20of%20raw,Hanging%20Moss%2C%20Eastover%20and%20others.>

Rising Scholar: Flint Water Crisis: Impacts on Human-Environmental Interactions and

Reflections for Future Solutions. (2017). *International Social Science Review (Online)*, 93(2)

<https://www.proquest.com/scholarly-journals/rising-scholar-flint-water-crisis-impacts-on/docview/1985146227/se-2?accountid=8268>

https://allegheny.alma.exlibrisgroup.com/discovery/openurl?institution=01ACO_INST&vid=01ACO_INST:Services&ctx_ver=Z39.88-2004&ctx_enc=info:ofi%252Fenc:UTF-8&rft_id=info:~url_ver=Z39.88-2004&rft_val_fmt=info:ofi/fmt:kev:mtx:journal&genre=article&sid=ProQ:ProQ%253Asocscijournals&atitle=Rising+Scholar%253A+Flint+Water+Crisis%253A+Impacts+on+Human-Environmental+Interactions+and+Reflections+for+Future+Solutions&title=International+Social+Science+Review+%2528Online%2529&issn=&date=2017-01-01&volume=93&issue=2&spage=0_1&au=Anonymous&isbn=&jtitle=International+Social+Science+Review+%2528Online%2529&bttitle=&rft_id=info:eric/&rft_id=info:doi/

http://illiad1.allegheny.edu/illiad/illiad.dll/OpenURL?ctx_ver=Z39.88-2004&ctx_enc=info:ofi/enc:UTF-8&rft_id=info:sid/ProQ%253Asocscijournals&rft_val_fmt=info:ofi/fmt:kev:mtx:journal&rft.genre=article&rft.jtitle=International+Social+Science+Review+%2528Online%2529&rft.atitle=Rising+Scholar%253A+Flint+Water+Crisis%253A+Impacts+on+Human-Environmental+Interactions+and+Reflections+for+Future+Solutions&rft.au=Anonymous&rft.aulast=Anonymous&rft.aufirst=&rft.date=2017-01-01&rft.volume=93&rft.issue=2&rft.spage=0_1&rft.title=International+Social+Science+Review+%2528Online%2529&rft.issn=

Roy, S., & Edwards, M. A. (2019). Preventing another lead (Pb) in drinking water crisis: Lessons from the Washington D.C. and Flint MI contamination events. *Current Opinion in Environmental Science & Health*, 7, 34–44. <https://10.1016/j.coesh.2018.10.002>

- Rozier Alex. (2022, November 4). *State awards \$180 million in ARPA water and sewer funds, includes \$36 million for Jackson*. Mississippi Today.
<https://mississippitoday.org/2022/11/04/arpa-funds-awarded-water-sewer/>
- Ruckart, P. Z., Ettinger, A. S., Hanna-Attisha, M., Jones, N., Davis, S. I., & Breysse, P. N. (2019). The Flint Water Crisis: A Coordinated Public Health Emergency Response and Recovery Initiative. *Journal of Public Health Management and Practice*, 25 Suppl 1, *Lead Poisoning Prevention*(1), S84–S90. <https://10.1097/PHH.0000000000000871>
- Stricklin Tommy. (2024, Feb 19). *Understanding Turbidity in Drinking Water and Why It Matters*. Spring Well Water Filtration Systems.
<https://www.springwellwater.com/turbidity-in-drinking-water/?srsltid=AfmBOooMteMgj hJpIALWzNZyx Eh56fFuBreyOoCAn6-rld-ioiwBb2tk>
- Tallman Sarah. (2024, Jan 16). *Jackson Water Crisis*. NRDC.
<https://www.nrdc.org/resources/jackson-water-crisis#:~:text=The%20drinking%20water%20system%20in,and%20water%20with%20floating%20particles.>
- The White House. . *American Rescue Plan*. The White House.
<https://www.whitehouse.gov/american-rescue-plan/>
- U.S. EPA Enforcement and Compliance History Online database (ECHO). (2021). *City of Jackson*. EWG's Tap Water Database. Retrieved September 25, 2024, from
<https://www.ewg.org/tapwater/system.php?pws=MS0250008>
- World Health Organization. (2017). PDF. World Health Organization.*
- WHO. (2018, Feb 7). *E. coli*. World Health Organization. Retrieved September 25, 2024, from
<https://www.who.int/news-room/fact-sheets/detail/e-coli>