NATIONAL ACADEMY OF PUBLIC ADMINISTRATION®

Enhancing Water Delivery and Waste Water Systems in the United States: An Agenda for 2021

Academy Election 2020 Project

Working Group:
Create Modern Water Systems for Safe and Sustainable Use

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ABOUT THE ELECTION 2020 PROJECT

The Academy formed a series of Working Groups of its Fellows to address Grand Challenges in Public Administration. These Groups were charged with producing one or more papers to advise the Administration in 2021 (whether reelected or newly elected) on the key near-time actions that should be taken to begin addressing Grand Challenges. This is a paper of the Create Modern Water Systems for Safe and Sustainable Use Working Group. It includes these Fellows' recommendations for the American government to build safe, sustainable, and affordable water systems for all.

ENHANCING WATER DELIVERY AND WASTE WATER SYSTEMS IN THE UNITED STATES: AN AGENDA FOR 2021

A REPORT OF AN ACADEMY WORKING GROUP

NATIONAL ACADEMY OF PUBLIC ADMINISTRATION
ELECTION 2020 WORKING GROUP:
CREATE MODERN WATER SYSTEMS FOR SAFE AND SUSTAINABLE USE

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THE CHALLENGE

In November 2019, the National Academy of Public Administration (the Academy) announced 12 Grand Challenges in Public Administration. One of these Grand Challenges is Create Modern Water Systems for Safe and Sustainable Use. Across the nation, America needs collaboration from all levels of government to address the pressing issues of climate change and create new water plans to ensure safe drinking water and efficient distribution of water to industry, agriculture, and the general public. While each aspect of the country's water systems needs attention, the Administration in 2021 can make an immediate impact on the quality of life of its citizens and foster social equity by improving the public's access to clean drinking water and sanitation systems. Clean water across every community is essential to improving Americans' health, for achieving social equity, and for developing the economy. While state and local governments enact the majority of policy concerning water systems, the federal government establishes a minimum policy and regulatory framework that the states are free to exceed. Leadership from the federal level is necessary to ensure the standards for clean water systems are equally and uniformly applied. Leadership from the federal level can also accelerate the adoption of new technologies and tools that can achieve greater public health and environmental protection at less cost.

As America plans its economic recovery from the coronavirus pandemic, it has the opportunity to address stubborn challenges that have continued to harm U.S. economic growth including an outdated workforce system, deteriorating infrastructure, and climate change. These issues are multi-faceted and cut across several sectors of the economy. A focused strategy to improve the infrastructure supporting America's water systems, and especially the water supply and treatment systems, could lay the foundation for success in each of these related.

Before going to work or school, each American must first be assured that the water for themselves and for their household is safe to drink. Teachers, staff, and children going back to school amidst a pandemic must have safe water to drink and wash their hands. We assume that in America, a first-world country, everyone has access to safe and

clean water. Unfortunately, our deteriorating water supply and treatment infrastructure and a lack of safe and sustainable water are not outdated issues. While the Flint water debacle brought home to Americans how risky their water system can be, it is not an isolated instance. The latest indicator came in August 2020, as schools around the country reopened, only to find bacteria causing Legionnaire's disease in their water. In 2019, just before the eruption of the pandemic, the U.S. Water Alliance and the DigDeep Water organization found that at least 2,000,000 Americans do not have access to safe sanitation and clean drinking water. If we hope to ensure recovery from this pandemic, it is imperative that every resident has access to clean drinking and sanitation water, and yet that is still not the case. At the international level, the United Nations has made Clean Water and Sanitation one of its primary Sustainable Development Goals (SDG). SDG 6 is a topic of international focus, and the United States is not in any way at the head of the pack in terms of meeting the goals.

Water supply and treatment are critical issues of social equity and environmental justice, as seen in places like Flint, MI; Newark, NJ; and California's Central Valley. In some communities, unsafe drinking water means that individuals have to pay for bottled water in addition to their monthly payments to water districts, and this has a disproportionate impact on the economically disadvantaged. Similarly, issues of persistent flooding from storm water and rising rivers often have disproportionate effects on historically marginalized communities. Approximately 58 out of 1,000 Native American households lack complete clean water plumbing and 5 out of every 1,000 African-American and Hispanic families are without working plumbing systems in their homes. A Food and Water Watch study found that 15 million people in the U.S. in 2016 experienced a water shutoff, with the highest shutoff rates occurring disproportionately in cities with higher rates of poverty, a higher rate of unemployment, and more people of color. The COVID-19 pandemic exacerbated this issue as citizens were asked to use more water for frequent cleaning of hands, clothes, and household areas, while many citizens also found themselves unemployed and unable to pay their water bills. (Fortunately, quite a few states put moratoria on water shut-offs, but big bills are likely to come due when those moratoria end). According to CDC documents, COVID-19 has infected Black and Hispanic people at three times the rate of white

people. While there is incomplete data on Native Americans, COVID-19 appears to disproportionately affect them at even greater rates. There are many factors at play in this disparity, but the absence of clean, affordable water and sanitation is likely significant.

RECENT FEDERAL INITIATIVES

The Administration's efforts to combat these various challenges include the following:

The Environmental Protection Agency (EPA) is implementing several programs.

- **2018 America's Water Infrastructure Act** requires community drinking water systems serving more than 3,300 people to develop or update risk assessments and emergency response plans;
- **2019 Water Workforce Initiative** helps cities and communities across the country that are facing critical staffing shortages for the operation and maintenance of essential drinking water and wastewater infrastructure; and
- **2020 Financial Capability Assessment for Water Services in Disadvantaged Communities** helps local communities afford services required by the unfunded Clean Water Act mandate. Through a proposed financial capability assessment, the EPA plans to identify the extent to which customers and communities can afford CWA requirements.

The EPA, through its National Compliance Initiatives for FY 2020-2023, is also working on the following efforts:

- **Reducing Noncompliance with Drinking Water Standards at Community Water Systems**. This effort, through the EPA's Office of Water, initiated a circuit rider program to provide effective on-the-ground assistance to help public water systems and wastewater systems achieve and sustain environmental compliance. EPA worked with state partners to identify facilities in need of circuit rider technical assistance and also developed resources to aid small systems.

- **Reducing Significant Non-Compliance with National Pollutant Discharge Elimination System (NPDES) Permits.** In order to improve surface water quality and reduce potential impacts on drinking water by assuring that all NPDES permittees are complying with their permits (public agencies and not just industrial contributors), this effort identified permittees that were in significant noncompliance and increased the number of state inspections of permittees.
- **Keeping Raw Sewage and Contaminated Storm Water Out of Our Nation's Waters**. This effort, a collaboration between EPA and state co-plaintiffs, builds on previous initiatives since 2000 to enforce Clean Water Act standards in the largest municipal sewer systems. The goal of this initiative is to ultimately reduce unlawful discharges of raw sewage that degrade water quality in communities.

While these initiatives contribute to improved water quality and reliability, far more can and should be done.

Collaboration with Other Levels of Government

The federal government must consider its state and local partners when making decisions for both the short- and long-term. The issue of clean and sustainable water use is primarily delegated to state, county, and municipal governments, with the federal government providing guidance on regulations and financial support. However, this current approach faces challenges, especially in an era when federal financial support has dwindled from its significant role in funding the nation's water infrastructure upgrades in the 1970s and 1980s. The federal government can also take a more collaborative role working with state and local governments, and should take advantage of their vast experience in dealing with thorny issues in protecting public health and the environment. When the federal government employs an inclusive decision-making process with its partners, it can help foster creative solutions tailored to local needs and can do so without sacrificing its bottom line focus on meeting drinking water and clean water minimum standards.

Climate change, which may limit the availability of water in many basins, will exacerbate tensions stemming from access to increasingly limited water supplies. In other basins, increased precipitation may increase the threat of flooding that causes loss of lives, housing, businesses, farms, and infrastructure. At the local level, some financially constrained communities do not prioritize investment in updating water infrastructure or lack the resources, whether technical, managerial, or financial, to do so. This, in turn, leads to poor quality water in low-income households and inadequate drainage in neighborhoods. Outdated water infrastructure increases water prices in these communities as 50-70% or more of their treated water is lost to leaks, and repeated fixes are required. Rate increases can force families to decide between paying for water, rent, or food. While an increase in federal funding to these communities would certainly help, the Federal government can and must also help find long-term solutions as quickly as possible. The Federal government is uniquely positioned to leverage dollars, apply technical innovations, and share best management practices. A strategic approach to bring best management practices, new technologies, and supportive funding to state and local communities could yield enormous results, especially if focused on the most disadvantaged communities. While the total cost of action might be steep, the cost of inaction is greater in terms of public health, public wellbeing, and confidence in government.

CONNECTION TO NATIONAL INFRASTRUCTURE CHALLENGES

The majority of these issues stem from the inadequately maintained water infrastructure in the U.S., a system that simply has not kept up with demand or opportunities to find multiple benefits in innovative water supply and treatment. While this paper focuses on water quality and supply, the country's water systems as a whole are in decline and will also need to be addressed. The grades for water categories in the latest infrastructure report card from the American Society of Civil Engineers (ASCE)—which has a scale of D as poor, C as mediocre, B as good, and A as exceptional—are shown in Table 1 below. ASCE

estimated that water infrastructure would need $472.6 billion over the next 20 years to improve these grades.

Infrastructure Category and Grade	
Dams: D	Inland Waterways: D
Drinking Water: D	Levees: D
Hazardous Waste: D+	Wastewater: D+

Table 1. Infrastructure Report Card (2017)

Inadequate or poorly maintained water infrastructure limits a community's resilience toward natural disasters and pandemics, hinders the country's economic growth, and harms the health and quality of life of citizens. A September 2018 House Budget Committee hearing found bipartisan agreement regarding the importance of infrastructure and the nation's current water systems. Attendees at the hearing noted that the lack of investment in infrastructure causes citizens or communities to shift their money away from other areas of the local economy to pick up the tab for water (such as buying bottled water) and that those community members also have a poorer quality of life, lower quality drinking water, and inadequate flood control structures. This combination can be literally lethal to a community's resilience. Increased investment in water infrastructure will lay a solid foundation for the rest of the country's infrastructure needs. Further, investment in water infrastructure appears to provide a significant return. The American Water Works Association (AWWA) posits that:

- Each $1 investment in water and sewer infrastructure could yield $6.35 in GDP in the long term.

- Every increase of $1 in revenue in the water and sewer industry increases economic output in all industries by $2.62 in that same year.
- One job in water and sewage can create as many as 3.68 jobs in the national economy to support that job.
- Investing in water promotes longer term economic growth, builds community resilience, and raises the quality of life for citizens.

The aging of the water sector's workforce, especially in the water supply and treatment area, poses its own challenges to the country's water systems. A 2018 Brookings Institution study on the overall water workforce—which includes utilities and water infrastructure such as dams and levees—identified issues in hiring and retaining water workers throughout the sector. It found that:

- Workers in the overall water workforce tend to be older and lack gender and racial diversity in certain occupations. Brookings noted that, in 2016, 85 percent of these workers were male and two-thirds of them were white;
- Water sector employees earn more, on average, compared to other occupations nationally;
- 53 percent of water sector employees have a high school diploma or less; and
- On-the-job training and familiarity with the trade's tools and techniques are more important for success.

That same study recommended several actions, including:

- Federal support of a dialogue among national organizations to assess water workforce needs;
- Forming a national advisory "Water Workforce Council" among relevant entities to plan for current and future challenges; and
- Expansion of federal and state grants for workforce training and development programs.

The 2018 Task Force on Workforce Sustainability Report by the Government Accountability office further noted the need for future water sector employees and divided the needs among different areas of the

sector. The GAO report projected that, in the next 10 years, 37 percent of the water utility workers and 31 percent of wastewater utility workers would retire. This report also found:

- The Bureau of Labor Statistics (BLS) estimates from May 2016 show that 77 percent of water operators were employed by local governments; 12 percent were in water, sewage, and other systems, which are primarily in privately owned drinking water and wastewater utilities; and 11 percent were employed in state government or in various other private industries, such as waste treatment and disposal.
- At that time, the current water sector workforce population aged 55 or older was approximately 25 percent, while the national average was approximately 23 percent. The median age for water operators was 46, while the overall national median age was 42.

Table 1: Annual Average Projected Growth Rates and Occupational Separations Rates for Various Occupations Employed by Drinking Water and Wastewater Utilities, 2016 through 2026

Occupation	Projected growth rate (percentage)	Projected labor force exit rate (percentage)	Projected occupational transfer rate (percentage)	Projected total occupational separations rate (percentage)
Average of all occupations nationwide	7.4	4.7	6.2	10.9
Electricians	9.0	3.5	7.4	10.9
Plumbers, pipefitters, and steamfitters	15.8	3.6	6.7	10.3
Stationary engineers and boiler operators	4.8	3.2	7.0	10.3
Machinists	2.1	3.5	6.5	10.0
Maintenance workers, machinery	5.6	4.3	5.8	10.0
Water and wastewater treatment operators	**-3.2**	**2.8**	**5.3**	**8.2**

Source: GAO analysis of BLS data. | GAO-18-102

Table 2. GAO Occupational Analysis.

As noted in the table from the report, the GAO further found that the number of water and wastewater treatment operators was projected to decline for the period of 2016 to 2026. As of the GAO report, neither industry associations or the EPA had analyzed whether unmet workforce needs would contribute to compliance issues.

The EPA has undertaken several important actions to address water workforce issues:

- A Memorandum of Understanding between EPA and USDA captures an understanding designed to help rural water systems

with the challenges of aging infrastructure, workforce shortages, increasing costs, limited management capacity, and declining rate bases;

- M.O.S. to J-O-B: A Guide for Applying Military Occupational Specialties (M.O.S.) to Civilian Drinking Water and Wastewater Operations offers a reemployment program for veterans of the armed services who held Military Occupations Specialties;
- A Selection of Training Programs for Water and Wastewater Operators provides a guide for new and experience water operators to training programs, internships, and mentoring programs;
- A Memorandum of Understanding between EPA and Department of Veteran Affairs Vocational Rehabilitation and Employment (VR&E) Service documents joint promotional activities to connect veterans with disabilities to career opportunities in the water sector;
- EPA's "Water You Waiting For?" created recruitment videos for water sector employment targeted toward high school and vocational technical school students; and
- Work for Water Campaign presents a public outreach campaign informing the public about water careers.

RECOMMENDATIONS FOR IMPROVING THE NATION'S WATER DELIVERY AND WASTE WATER SYSTEMS

RECOMMENDATION 1: Strengthen Federal Interagency Coordination and Build More Cooperative Relationships with States and with Local Partners for Water Delivery and Waste Water Systems

In a previous Election 2020 paper, the Develop New Approaches to Public Governance and Engagement Working Group recommended several actions to enhance collaboration among federal, state, and local governments. The Administration in 2021 should take into account those recommendations when crafting efforts to enhance intergovernmental collaboration on water supply and treatment. Specifically, the Administration should:

- Establish a mechanism that enables state and local government and other community experts to participate in designing and planning collaborative approaches to their water challenges. More frequent interagency and intergovernmental communication cycles will promote a more closely matched supply and demand of services to meet the specific needs of communities. The convening power of the federal government is an under-appreciated tool for empowering communities and transferring knowledge and experience.
- Work with OMB to include water sector issues, especially water supply and treatment, in national strategies and encourage all levels of government to strengthen data, analytics, and evaluation capacity.
- Use the federal government's powerful convening, research, and technology sharing capacity to harness, accelerate, and illuminate rapid advances in technologies that can employ satellites, sensors, and data analytics to improve water treatment at less cost and assess infrastructure repairs in a more cost-effective manner.
- Embrace and support the "One Water" movement led by local governments across the nation to integrate multi-benefits and integrated planning in implementation of water projects, including "green" infrastructure to meet flood control, water supply, water quality, and urban greening or ecosystem needs—to get more results from each scarce dollar.
- Bring back federal investment in water infrastructure as part of our collective investment in the health of all our communities. Federal investment leverages state, local, and philanthropic resources to do more now, at a time when interest rates are low and the need for jobs is high (see below).
- Ensure that coordination among federal, state, and local governments follows effective practices of:
    - Mutual respect among the parties to allow for constructive discussion on current regulations and future planning;
    - Clarity of the mission, which states the concrete objectives of the collaboration efforts;
    - Networks of entities focused on achieving a common mission, which includes not only the government actors but also private and non-profit actors;

- Use of facilitative technology that will allow the public to observe the process and progress of the mission; and
- Use of financial, enforcement, and regulatory tools to encourage watershed or community-based integrated water planning across the flood control, water supply, and water quality organizational and planning regimes.

RECOMMENDATION 2: Incorporate Water in Social Equity Goals

In a previous Election 2020 paper, the Social Equity Working Group recommended a White House Initiative on Social Equity Evidence responsible for conducting a Social Equity Evidence Review, developing a Social Equity Data and Statistical Inventory, establishing a Social Equity Cross-Agency Priority (CAP) Goal, and incorporating a Social Equity Measurement System.

Access to clean water is a major environmental justice and social equity issue. Accordingly, the Water Working Group concurs with the Social Equity Group's recommendations—and further recommends that the Administration include water as a core part of these initiatives. Specifically, this Working Group recommends that the Administration set goals for community and demographic access to clean sanitation and drinking water, establish an intergovernmental strategy, and track the nation's progress by:

- Including data on the country's water systems in a Social Equity Data and Statistical Survey;
- Incorporating Water into the Social Equity CAP Goal, charging appropriate agencies (including EPA, USDA, HHS, DOI, DOE, and HUD) with responsibilities to work individually and collectively to achieve these goals, and coordinating with their state and local counterparts;
- Including water equality in any overarching social equity measurement framework, which guides public administrators on social equity issues through relevant data, research, and expertise; and

- Start collecting, analyzing, and reporting data for the small systems below which national standards apply (communities that service fewer than 25 people or serve water for less than 60 days per year) to elevate the issue and consider whether further federal regulation is appropriate.

Although there are several aspects to achieving a more equitable society, the administration in 2021 must prioritize access to safe, sustainable, and affordable water across all demographics. The COVID-19 pandemic illustrates the critical importance of safe and sustainable water supply and treatment systems. As America moves forward, it must identify the underlying causes of this inequity and create a sustainable plan to secure this resource for every citizen of future generations.

RECOMMENDATION 3: Strengthen the water supply and water treatment workforce through an overall water workforce initiative for current and future needs

The coronavirus pandemic provides an opportunity to address the water sector's workforce issues. The interruption of businesses during the outbreak led to one of the highest unemployment rates in U.S. history. Some of these unemployed individuals could be reskilled to perform work in the water sector. In order to meet current and future workforce needs, the Administration in 2021 should work to strengthen the water supply and water treatment workforce through a water workforce initiative that encompasses all areas of the water sector. As the American economy rebounds, it needs an intentional increase in the workforce focused on water infrastructure assets to improve the quality, sustainability, and equity of this country's water systems. Special attention must also be given to the workforce in the water and wastewater area of this sector as its population is expected to decline.

The water workforce has seen a demographic imbalance similar to other parts of the U.S. workforce. The average age of this sector's workers continues to rise, and increasing demand for these workers has left a shortage in supply. Opportunities for those working in the water sector, however, are plentiful.

With a large increase in permanent job losses from the coronavirus pandemic distributed across the country, the Administration in 2021 should include specific investment in the water sector's workforce as a whole, especially in the water treatment and sanitation areas, as part of any recovery plan, and:

- Work with Congress to obtain multi-year authorizations to demonstrate a long-term commitment toward the water workforce;
- Solicit frequent feedback from state and local entities, with the goal of more accurately assessing demand for water sector jobs and resource needs;
- Begin and sustain a dialogue across all levels of government to evaluate and improve current reemployment services, apprenticeships, and partnerships between community colleges and vocational/technical schools and the industry;
- Provide funding for pre-apprenticeship and apprenticeship programs;
- Provide incentives for employers to provide on-the-job training that would facilitate reemployment and help local economies in every region of the country;
- Establish a point of contact for the water sector workforce within each relevant federal agency including DOL, EPA, USDA, HHS, DOI, DOE, and HUD; and
- Ensure that federal funding in the bipartisan Workforce Innovation and Opportunity Act supports initiatives in the water workforce.

CONCLUSION

Humans cannot survive without water. As discussed in this paper, the United States faces serious challenges to ensure that Americans have safe, secure, and clean water for drinking and the necessary wastewater systems to protect public health and the environment. This Working Group's recommendations are intended to identify concrete actions that the Administration in 2021 (whether reelected or newly elected) should take to improve interagency and intergovernmental coordination, address social inequities, and ensure that the nation has the water workforce it needs.

Create Modern Water Systems: Working Group

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