STATE of the WATER INDUSTRY

EXECUTIVE SUMMARY

2024

American Water Works Association

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Our industry is facing

significant challenges and opportunities. On the one hand, there is a growing awareness of the criticality of clean and safe drinking water, driving increased scrutiny and demand for ever higher standards. On the other hand, aging infrastructure, water scarcity and emerging contaminants are putting pressure on water systems to innovate and adapt. Cyber threats are also an ever-evolving concern. AWWA's water professionals are navigating this complex landscape through collaboration, education and investments in people and technology. We are focused on moving water forward to ensure reliable and sustainable access to safe drinking water the world over in 2050 and beyond.

– Pat Kerr, AWWA President

The American Water Works Association's (AWWA) annual *State of the Water Industry* (SOTWI) report provides valuable insights into the challenges and priorities facing the water sector. This year's report, based on a survey of more than 2,400 water professionals conducted in late 2023, highlights key trends and emerging concerns.

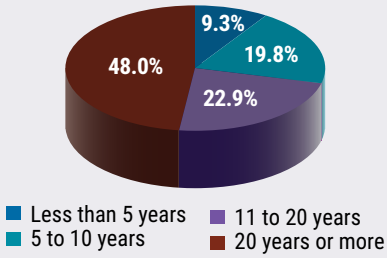
The largest group of respondents (68%) represented water utilities, followed by 20% of respondents providing goods and services to the water sector.

As in previous years, the individuals who responded to the SOTWI survey tended to be seasoned water professionals, with 48% reporting 20 or more years of water sector experience.

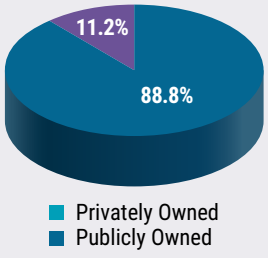
Number of Participants Indicating Organization Type

Total	Total, %	
740	29.9%	Drinking Water Utility
747	30.2%	Combined Water/Wastewater Utility (may include other services)
53	2.1%	University/Educational Institution
108	4.4%	Wastewater Utility
309	12.5%	Consulting Firm/Consultant
118	4.8%	Non-utility Government (municipal, provincial, federal, etc.)
72	2.9%	Technical Services/Contractor
26	1.1%	Water Wholesaler
40	1.6%	Nonprofit Organization
57	2.3%	Retired
10	0.4%	Other, please specify
1	0.0%	Law Firm/Legal Organization
113	4.6%	Manufacturer (including products, representatives, and/or distributors)
69	2.8%	Regulatory Authority/Regulator
2	0.1%	Stormwater Utility
8	0.3%	Reuse/Reclamation Utility

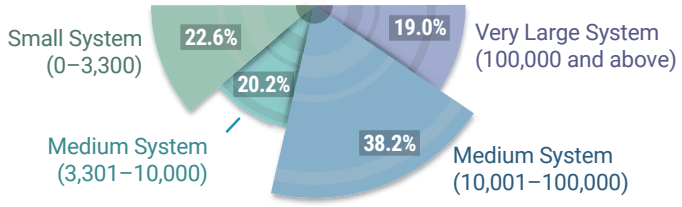
Time in the Water Sector



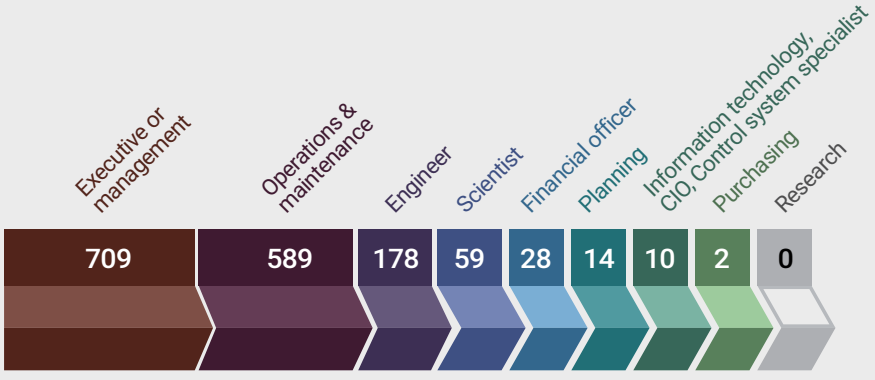
Utility Ownership



Utility Respondents by # of Connections



Utility Respondents by Job Category



Source water protection emerges as the water sector's top challenge.

Daniel Reynaga/shutterstock.com

Like no time in recent history, source water protection is top of mind for members of AWWA, the 2024 State of the Water Industry report shows.

Respondents ranked watershed/source water protection as the water sector's most pressing challenge for the first time in the survey's 21-year history, unseating the perennial challenge of aging infrastructure for the top spot. The shift highlights a growing recognition of the importance of safeguarding water at its source in order to ensure a safe, affordable and sustainable water supply.

Several factors likely contributed to this shift. Long-term concerns related to climate change and drought affecting the Colorado River Basin certainly had an impact. Additionally, there are growing concerns about emerging contaminants such as per- and polyfluoroalkyl substances (PFAS) that threaten water quality at the source. The Bipartisan Infrastructure Law (BIL) may have mitigated some concerns about funding for capital projects, easing the anxiety about aging infrastructure.

Top 10 Issues Facing the Water Sector as Ranked by All Respondents, 2024

1.	Watershed/source water protection
2.	Financing for capital improvements
3.	Renewal and replacement of aging water and wastewater infrastructure
4.	Long-term water supply availability
5.	Financial sustainability
6.	Public understanding of the value of
7.	water systems and services
8.	Workforce issues
9.	Groundwater management and overuse
10.	Drought or periodic water shortages
11.	Cybersecurity issues

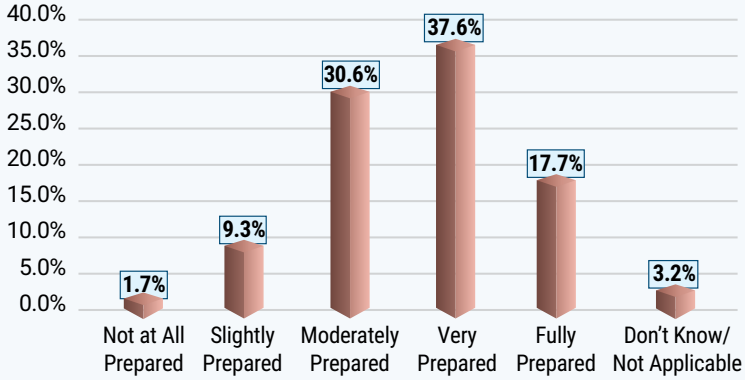
61.3%

of utility respondents have implemented or in the process of implementing source water protection plans and programs.

Respondents from utilities listed "protect drinking water supplies" as the second-highest priority among a list of key water system objectives. Further, 61.3% of utility respondents report having implemented or being in the process of implementing source water protection plans and programs, demonstrating proactive action to address this mounting challenge.

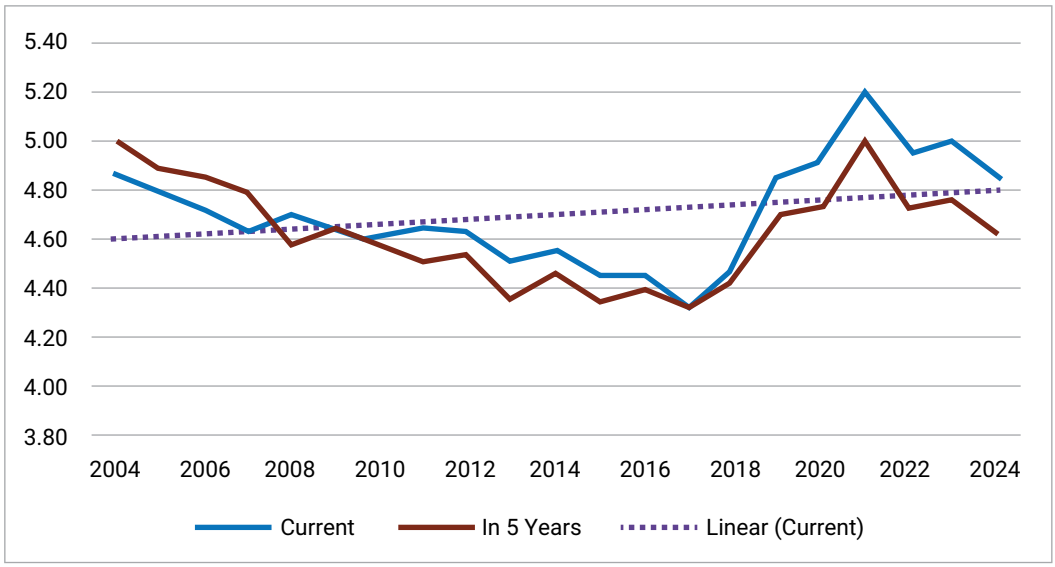
These priorities also align with concerns about long-term water supply availability, which ranks as the fourth most challenging issue facing the water sector. In response to a survey question about ability to meet long-term water needs, 11% of utility personnel indicated their utilities are not at all or only slightly prepared, and 31% are moderately prepared.

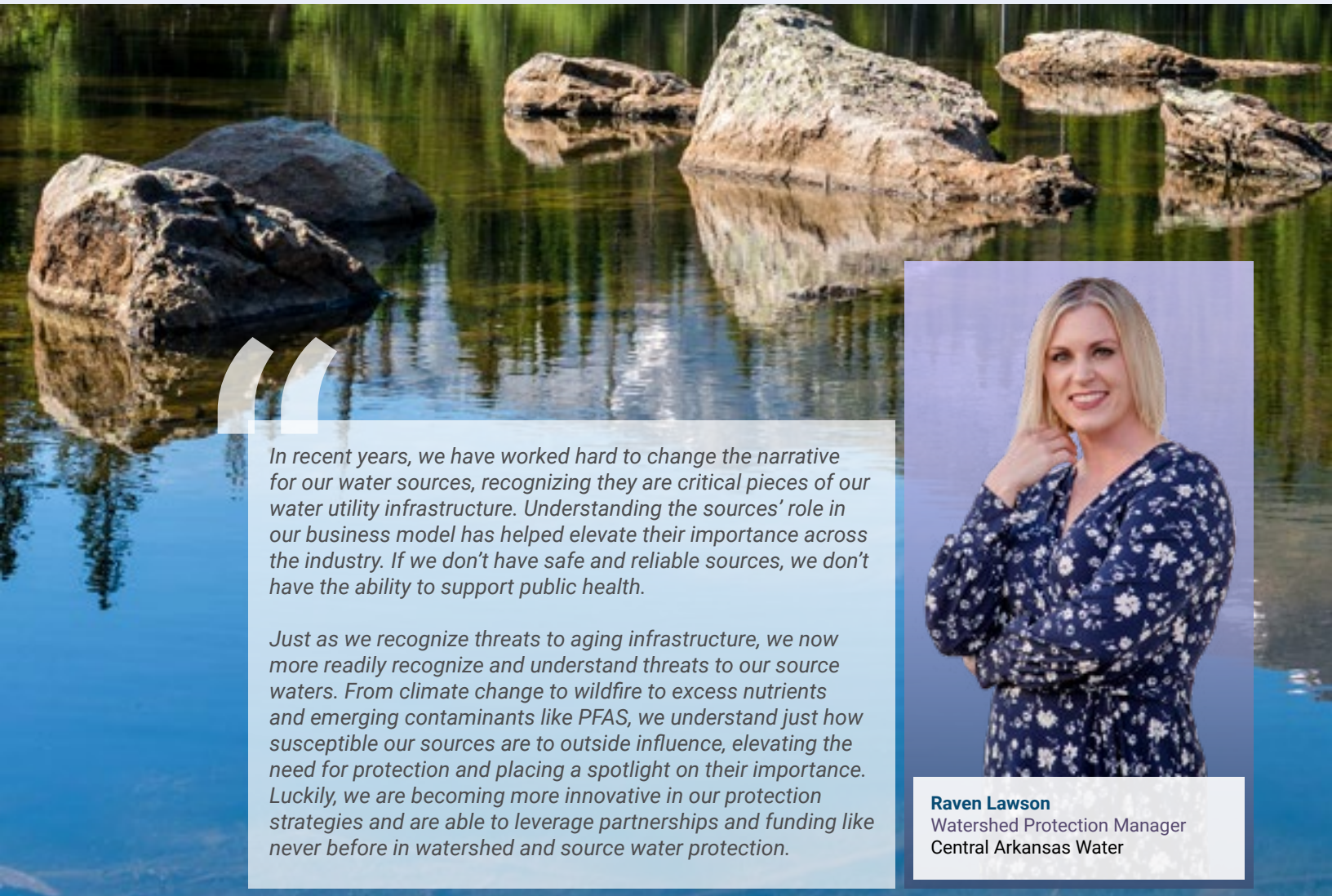
How prepared is your utility to meet long-term water needs?



State of the Water Industry 2004–2024

Industry health, based on a scale of 1–7





In recent years, we have worked hard to change the narrative for our water sources, recognizing they are critical pieces of our water utility infrastructure. Understanding the sources' role in our business model has helped elevate their importance across the industry. If we don't have safe and reliable sources, we don't have the ability to support public health.

Just as we recognize threats to aging infrastructure, we now more readily recognize and understand threats to our source waters. From climate change to wildfire to excess nutrients and emerging contaminants like PFAS, we understand just how susceptible our sources are to outside influence, elevating the need for protection and placing a spotlight on their importance. Luckily, we are becoming more innovative in our protection strategies and are able to leverage partnerships and funding like never before in watershed and source water protection.

Raven Lawson
Watershed Protection Manager
Central Arkansas Water

Sean Xu/shutterstock.com

AGING INFRASTRUCTURE

Sergey Klopotov/shutterstock.com

While watershed protection has emerged as the top concern this year, aging water infrastructure continues to be a critical challenge, ranking third among water sector priorities. A closely related issue, financing capital improvements ranks as the second-greatest challenge.

Utility respondents report a strong commitment to maintaining and upgrading their systems. For example, 81% indicate they have implemented or are in the process of implementing capital improvement plans, and 73% have implemented asset management programs. Recent infrastructure funding initiatives, such as the BIL, provide a much-needed boost to these efforts, enabling utilities to accelerate the renewal and replacement of critical assets.

Technological advancement is also a prominent factor in infrastructure renewal, with investments in new treatment technologies, digital solutions and green alternatives anticipated to more than double in the next 1–3 years. When asked to rank the importance of topics related to the future of water, utilities ranked adoption and advancement of new technologies as "very important." Service providers and consultants ranked the same topic as "extremely important." Overall, both groups are expressing a growing interest in innovative solutions to maximize the life span and performance of aging systems.

Implementation Status of Utility Plans and Programs

Plan/Program	Status: % Full and In Progress
Capital improvement plan	81.2%
Asset management program	73.4%
Customer communication plan	59.1%
Water loss control program	67.7%
Lead service line replacement program	66.1%
Source water protection program	61.3%
Water conservation plan	53.7%
Drought/water shortage plan	53.1%
Groundwater protection program	41.3%
Business continuity plan	37.7%
Energy program	35.3%
Integrated water plan	33.0%
Environmental, social, & governance plan	27.2%
Digital water strategy	24.5%
Climate action plan	22.0%

In our quest to manage our precious water resources, we are committed to exploring diverse and innovative approaches. As we repair, refurbish and renew our infrastructure, we are dedicated to integrating and advancing eco-friendly technologies that bolster the resilience of our water systems. United in purpose, we forge ahead on the journey toward a sustainable future, where innovation thrives, and every drop is valued.

Heather Collins
Assistant Group Manager, Water System Operations
Metropolitan Water District of Southern California

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PFAS

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The growing public concern about PFAS illustrates the link between source water protection and public health. PFAS, found in a wide range of products and industrial processes, are increasingly being detected in water sources and are in the pipeline for U.S. drinking water regulation. Survey respondents ranked PFAS as the number one water quality concern.

Managing PFAS contamination poses a significant challenge for water utilities, both in terms of characterizing health risks for consumers and paying the high cost of treatment—nearly $40 billion by AWWA's estimate in capital improvement investments. Fifty-eight percent of respondents said that they are very to extremely concerned about the issue. The widespread concern highlights the need for measures to keep harmful PFAS out of source water, protect utilities from liability due to PFAS pollution they did not create, and increase federal funding for treatment upgrades.

Contaminants of Concern

Top Ranked Water Quality Concerns

1. Per- and polyfluoroalkyl substances (PFAS)
2. Pathogens
3. Lead and copper
4. Disinfection byproducts (DBPs)
5. Nonpoint source pollution
6. Microplastics
7. Cyanotoxins
8. Nutrient removal

Respondents also expressed anxiety about the water sector's ability to comply with evolving regulations addressing an old problem—particularly lead and copper, pathogens and disinfection byproducts.

Nearly
$40 Billion

AWWA's estimate for PFAS treatment cost

PFAS occur widely in drinking water sources, and the new EPA MCLs for six PFAS will impact many drinking water providers around the country. Installing treatment for PFAS removal will enhance consumer confidence in the nation's drinking water and can bring with it ancillary benefits such as further controlling disinfection byproduct formation and having a barrier in place against other contaminants that may become a concern in the future. While the rule has the potential to increase the cost of drinking water, it is my hope that, where possible, responsible parties will be held accountable for the costs of compliance with the new PFAS MCLs.

Dr. Detlef Knappe
Professor, Civil, Construction, and Environmental Engineering
North Carolina State University

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CYBERSECURITY

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Cybersecurity has emerged as a major concern for the water sector, with cyberthreats posing a significant risk to both the operations of water utilities and the privacy of customer data. In this year's SOTWI data, cybersecurity ranked as the 10th most challenging issue, and in a list of potential water system objectives, utilities ranked ensuring cybersecurity and privacy as the fifth most immediate priority.

When asked to rate the importance of addressing cybersecurity issues in the water sector, 67% of survey participants indicated these issues are "very" to "critically" important. More than 82% of respondents indicated cyberthreats would have a "slight" to "significantly negative" impact on the water sector. These opinions were shared across all utility sizes and types.

67%

of survey participants rate the importance of addressing cybersecurity issues as "very" to "critically" important.

82%+

of respondents indicated cyberthreats would have a "slight" to "significantly negative" impact on the water sector.

Recognizing the potential consequences of cyberattacks, utilities are taking steps to strengthen their digital defenses. This is evidenced by the prioritization of and financial commitment to cybersecurity and privacy initiatives, with 49% of utilities investing in cybersecurity programs.

Innovation	Ranking
A secure cyber culture	Very Important
Adoption and advancement of new technologies	Very Important
A technology-savvy workforce	Very Important
Investment in innovation	Important
Expanded data network technology	Important
Advancements in material science	Important
Fit-for-purpose treatment technologies	Important
Generative artificial intelligence	Slightly Important
Robotics	Not Important
Augmented reality technologies	Not Important

While demonstrating that cybersecurity and privacy are critical priorities for water utilities of all sizes, the survey reveals a concerning trend: 17% of small water systems report limited or no ability to enhance their cybersecurity posture. This security gap highlights the need for targeted support and resources to ensure that smaller utilities can adequately protect their systems against the growing threat of cyberattacks.

Utility Level of Priority for Ensuring Cybersecurity and Privacy

Priority	All Utility Respondents	Small Systems	Medium Systems	Large Systems	Extra Large Systems
Immediate priority–Currently working on this objective	81.2%	81.2%	81.2%	81.2%	81.2%
High priority–Action planned in the next 5–10 years	73.4%	73.4%	73.4%	73.4%	73.4%
Medium priority–Would like to advance, but requires additional support	59.1%	59.1%	59.1%	59.1%	59.1%
Low priority–Unlikely to advance this objective	67.7%	67.7%	67.7%	67.7%	67.7%
Not considered	66.1%	66.1%	66.1%	66.1%	66.1%

Cyber intrusions on utilities are occurring more than ever before, both internationally and domestically. The cyber landscape is evolving quickly, and understanding Critical Infrastructure vulnerabilities is key to proactively mitigating the risks. AWWA provides many resources to help secure our infrastructure, including the ANSI/AWWA J100-21 Standard and the AWWA Cybersecurity Guidance and Assessment Tool. AWWA actively works with partners and members at all levels to identify industry needs and help close the gaps.

Christian Manalo
Lead Associate, Infrastructure & Environment
Booz Allen Hamilton

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CLIMATE CHANGE

Jonathan Manjeot/shutterstock.com

Climate change and its associated extreme weather events pose a mounting threat to water resources and infrastructure. This concern is evident in this year's SOTWI data, where drought and water shortages ranks ninth and climate risk and resilience ranks 12th among the most challenging issues for the water sector.

Related to this, survey respondents ranked climate change as the eighth and extreme weather events as the fourth most negatively impactful large-scale phenomena.

The data show that water professionals recognize the connection between climate change and sustainable water management. Watershed/source water protection, groundwater management and drought planning all ranked in the top 10 challenges this year. Fifty-three percent of utilities have implemented or are in the process of implementing both water conservation and drought response plans.

Building climate resilience in the water sector requires a multipronged approach. This includes proactive resource management, investment in resilient infrastructure, regional collaboration, and a recognition that climate adaptation is critical to ensuring safe and sustainable water services in the future.

Ranking the Impacts of Large-Scale Phenomena on the Water Sector

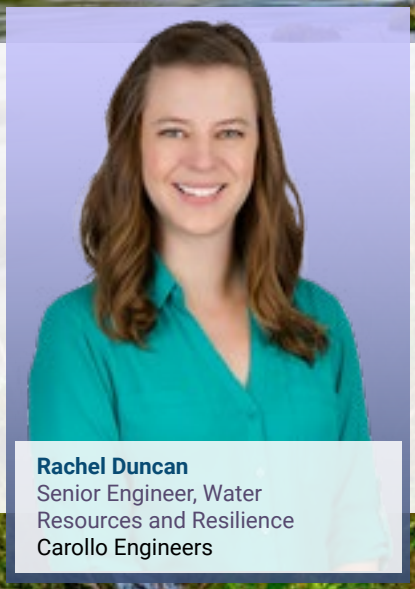
Positive Impacts on Water

1. None

Negative Impacts on Water

1. Supply chain issues
2. Inflation
3. Population
4. Extreme weather events
5. Cyberthreats
6. Political instability
7. Recession
8. Climate change
9. War
10. Terrorism
11. Financial markets
12. Unemployment
13. Agriculture
14. Population growth
15. Urbanization

The water industry is on the front lines of climate change as we must continue to provide reliable, clean water to our communities in the face of intensifying climate hazards, including droughts, floods, wildfires and extreme heat. We also have an opportunity to be part of the climate solution through reducing our energy footprint, and thereby greenhouse gas emissions, for water treatment and conveyance. The water sector is making an important shift toward being more proactive in addressing our climate change challenges with data-driven approaches to better quantify climate risks and with investments in creative, collaborative, and forward-thinking solutions.



Rachel Duncan
Senior Engineer, Water Resources and Resilience
Carollo Engineers

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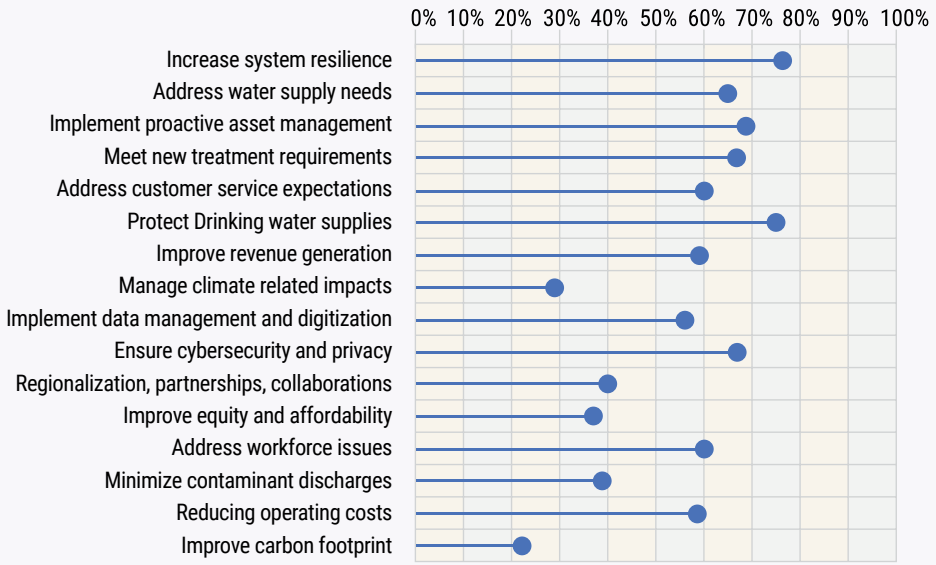
WORKFORCE


AWWA

Workforce issues have consistently ranked among the SOTWI survey's top 10 challenges. Retiring talent, difficulty recruiting new workers, inadequate compensation, and evolving skill requirements are all obstacles in ensuring a sustainable water workforce.

Reflecting themes from AWWA's Water 2050 initiative, survey respondents increasingly recognize the importance of developing a workforce equipped to manage the digitized water systems of the future. Utilities are prioritizing the implementation of data management and digitization, with 55% considering this an immediate to high priority. Executives, managers and financial officers are particularly contributing to this shift, with 57% investing in digital solutions and workforce training.

Water Utility Priorities Ranked High to Immediate



Utility Investment Horizons

Issue	Program Is Fully Funded	1- to 3-Year Investment Horizon	3- to 5-Year Investment Horizon	5- to 10-Year Investment Horizon	10 or More Years Before Investing
Meeting regulatory requirements	59.9%	22.9%	8.1%	2.4%	0.5%
Workforce training	57.8%	23.3%	5.9%	2.5%	1.0%
Cybersecurity	49.6%	21.9%	7.9%	3.4%	2.2%
Asset renewal, rehabilitation, and/or replacement	42.8%	25.3%	14.1%	9.8%	3.5%
Digital solutions	19.5%	21.9%	15.1%	7.4%	3.8%
New water supplies	15.6%	16.1%	11.7%	13.5%	14.0%
New treatment technology	13.5%	25.2%	19.1%	11.8%	4.7%
Expanding water supply portfolio	13.4%	10.4%	11.7%	6.6%	9.3%
Resilience (e.g., climate adaptation)	11.6%	18.4%	16.0%	11.9%	8.7
Green solutions (e.g., EV Fleet)	6.3%	12.7%	13.2%	11.8%	12.9%

However, survey responses point to several roadblocks hindering the development of a digitally proficient workforce. These include legacy systems, a lack of internal urgency, and the challenge of attracting and retaining tech-savvy talent. To successfully bridge this gap, respondents emphasized the need for specialized training programs, from the operations level to management. Competitive compensation packages are also essential. Fifty-eight percent of respondents indicated workforce training is fully funded, and another 23% are planning investments within 1–3 years.

Like so many others, my utility is investing time and resources to meet today's needs and tomorrow's demands. Meeting the needs of an evolving workforce is critical to our ability to successfully meet these demands. We support our workforce through research, apprenticeships, intern programs and operator training initiatives.

There is also a significant focus on the deployment and incorporation of technology as a resource to support the water professional as they work to ensure a sustainable water future. I encourage us to continue to share and to work creatively and flexibly to develop training programs and career opportunities for the water workforce of tomorrow.

Cheryl Porter
Chief Operating Officer
Great Lakes Water Authority

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FINANCIAL MATTERS

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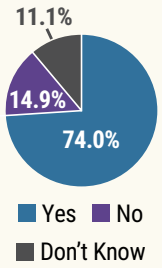
Water utilities deal with a complex set of financial challenges. On one hand, investments to replace aging infrastructure and ensure regulatory compliance and cybersecurity are urgently needed. On the other hand, utilities are under constant pressure to maintain affordable water rates for their customers. Survey data underscore this tension, with financing capital improvements ranked as the second most challenging issue and overall financial stability ranking fifth.

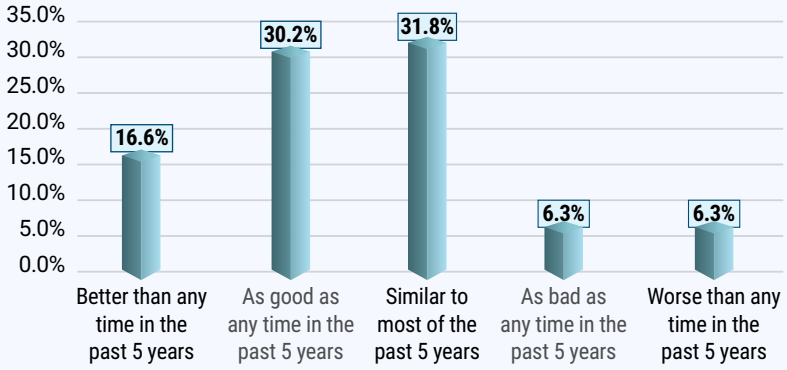
SOTWI survey results revealed that 73% of water and/or wastewater utilities are planning a rate increase in 2024. While rate increases remain the primary funding source, water utilities are increasingly seeking alternative financing methods.

Utilities Intending to Raise Rates in 2024



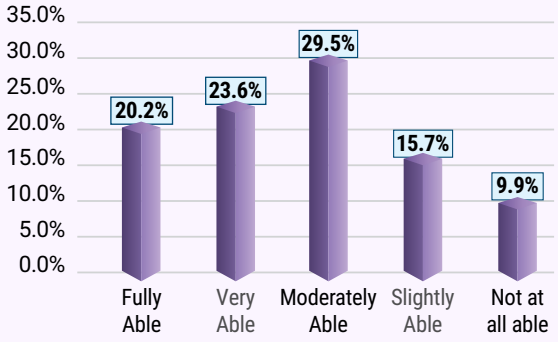
A significant portion of utilities, particularly smaller systems, expresses concerns about current and future ability to access capital. This trend has worsened in recent years, with 13% of utilities reporting their access to capital is as bad as or worse than any time in the past 5 years, primarily impacting medium and small utilities (16% and 14%, respectively).

Access to Capital in the Past Five Years



These financial pressures are compounded by declining water sales in some regions, potentially making it more difficult to generate revenue. While 44% of utilities believe they can meet the full cost of providing services through rates and fees, over a quarter of those surveyed struggle to implement full-cost pricing models. This highlights an area where innovative pricing structures and targeted financial assistance programs could provide significant relief.

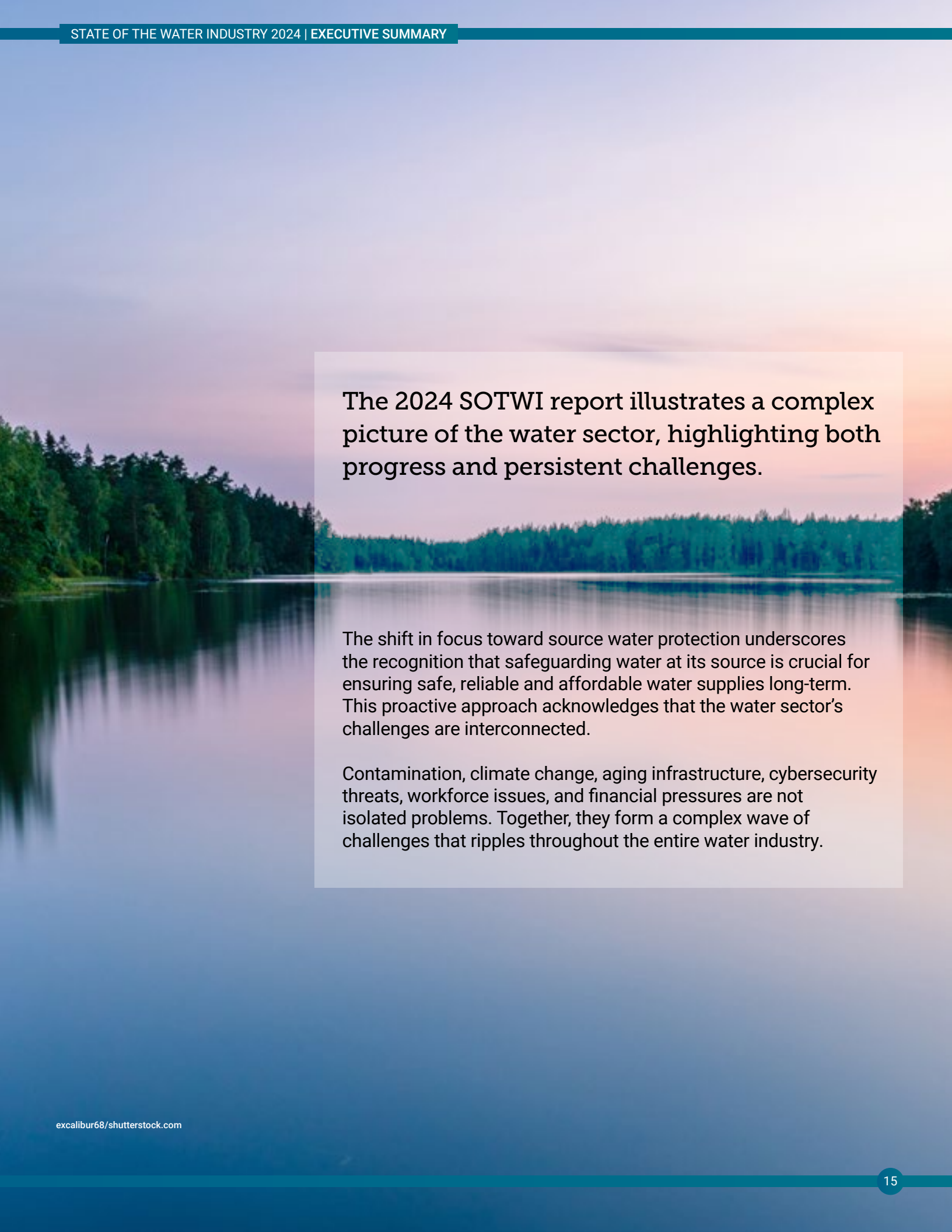
Current Ability of Utilities to Cover Full Cost of Service



The financial challenges are reaching a tipping point for some utilities, threatening their long-term sustainability. Today's water utility contends with the legacy issue of aging infrastructure, the possibility of expensive new treatment to address PFAS, the replacement of lead service lines, the investments necessary to protect against cyberattacks, and the cost of securing future supplies against the backdrop of a changing climate. While federal assistance will certainly help ease this complexity, utilities will inevitably need to set rates that cover the full cost of providing water service and, at the same time, find ways to assist households with lower incomes.

David LaFrance
CEO
AWWA

Daniele Mezzadri/shutterstock.com



The 2024 SOTWI report illustrates a complex picture of the water sector, highlighting both progress and persistent challenges.

The shift in focus toward source water protection underscores the recognition that safeguarding water at its source is crucial for ensuring safe, reliable and affordable water supplies long-term. This proactive approach acknowledges that the water sector's challenges are interconnected.

Contamination, climate change, aging infrastructure, cybersecurity threats, workforce issues, and financial pressures are not isolated problems. Together, they form a complex wave of challenges that ripples throughout the entire water industry.

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American Water Works Association

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