Texas' Water and Wastewater Workforce Crisis: Challenges and Solutions for Infrastructure Resilience

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Introduction

Mike steps out of his work truck on an early, humid morning in East Texas. It's one of those mornings that promises nothing but the uncomfortable feeling of sweat dripping down his face most of the day as he works with his team to repair a water line that began leaking in the middle of the night. Upper management has stressed the urgency of getting the leak under control, something Mike has grown used to over the years. After three decades in the industry, working on aging infrastructure has become routine: patching pipes, applying one temporary fix after another to systems well past their prime.

As their work continues, Mike's mind wanders. He thinks about his thirty years in the water industry and how it all began. It was his father who introduced him to the work those many years ago, who showed him what a good, hard day of work was worth to his family, to put food on the table, keep a roof above their heads, and provide all they ever needed in life. But now, looking around, Mike can't help but notice that most of the faces beside him look a lot like his own: graying hair, stiff backs, and conversations that increasingly drift toward retirement dreams, grandkids, or the idea of slowing down.

At the same time, the job itself is changing. New technologies and digital systems are becoming more common, tools Mike never expected to need when he started his career. He knows these innovations may be second nature to a younger generation, but those workers aren't showing up in the numbers the system needs. Hiring hasn't kept pace, and retirement feels closer than ever. Mike wrestles with a familiar tension: loyalty to the community that relies on his skills versus the growing pull to step away from a job that feels both essential and increasingly unfamiliar.

What Mike is experiencing is not unique. It reflects a broader challenge facing drinking water and water treatment systems across Texas – a workforce at a crossroads, carrying the weight of aging infrastructure, evolving technology, and an uncertain path forward.

The industry often refers to this moment as the “silver tsunami,”[20] a shorthand for the wave of experienced operators and utility workers nearing retirement and exiting the workforce in large numbers. Across Texas, drinking water and water treatment systems, both public and privately operated, are facing the same challenge: retaining institutional knowledge while struggling to recruit and train the next generation of workers needed to maintain these systems.

This workforce shortage is not just an industry concern; it is a statewide issue with far-reaching consequences. Water is foundational to daily life in Texas. Farms, homes, schools, hospitals, businesses, and entire communities depend on reliable drinking water and water treatment services to function. Where water systems are strong and dependable, people and industry follow. When they are not, public health and economic stability are placed at risk.

The state's ability to sustain reliable, resilient drinking water and water treatment infrastructure depends not only on the pipes in the ground or the treatment systems themselves, but on the people who operate and protect those systems every day. Here, we will make the case that the state’s growing water workforce crisis, driven by an aging labor force, recruitment and retention challenges, safety concerns, and rapidly evolving technological demands, poses a direct threat to public health, economic growth, and infrastructure security. Addressing this challenge will require deliberate investment in workforce development, improved safety and support for front line workers, and thoughtful integration of emerging technologies that enhance rather than replace human expertise. By examining the causes and consequences of workforce instability and identifying actionable policy and functional solutions, this research seeks to chart a path toward a stronger, more sustainable water workforce for Texas.

Identifying the Gaps

Despite a growing body of research documenting the shortages in Texas's drinking water and water treatment industry, the current policies, programs, and data collection efforts have not necessarily kept pace with the scale or complexity of the challenge. Significant gaps remain between what is acknowledged in format reports and the experience of water professionals across the state, specifically in how workforce data is tracked, how workers are supported and retained, and how emerging technologies are reshaping day-to-day operations. This gap between recognition and action has left many utilities ill-equipped to plan for long-term workforce sustainability.

Workforce Planning Without Reliable Data

In 2023, the Texas Water Foundation, in coordination with Houston Advanced Research Center, conducted one of the most comprehensive workforce surveys of Texas water organizations to date. Within that survey, 63% of respondents reported experiencing workforce challenges, many attributing that to talent attrition coupled with a need to provide more competitive wages. However, when respondents were asked how many employees had retired from their organizations in the previous five years, many either did not respond or indicated that they did not know. Survey results further revealed that most organizations did not formally track employee retention or retirements at all [5]. The

absence of consistent workforce data has real consequences for planning and decision-making across the industry. Without reliable information on retirement eligibility, turnover, or even succession, utilities are forced to make long-term infrastructure and operational decisions without a clear understanding of whether they will have the personnel needed to support them. This gap is particularly concerning as state and federal investments in water infrastructure increase, placing additional demands on a workforce that many organizations cannot accurately quantify. In practice, workforce planning is often reactive rather than proactive, relying on informal knowledge or last-minute hiring instead of coordinated strategies to recruit, train, and retain skilled operators before critical positions are vacated.

Compensation and Competitive Labor Markets

Now more than ever, affordability dominates our national discourse. A recent Marist Poll found that only 45% of Americans feel their income adequately covers their monthly expenses, while 29% report that their expenses exceed their income. Additionally, 33% say their family's financial situation has worsened over the past year [9]. Against this backdrop, compensation cannot be treated as secondary concern in discussions about the water workforce. This is not a matter of greed, but of necessity. Wages and salaries must allow workers to meet basic living expenses (and ideally maintain a reasonable quality of life) if the industry expects to recruit and retain a stable, skilled workforce.

Based on data from the U.S. Bureau of Labor Statistics shown in Figure 1, the national mean hourly wage among water and wastewater treatment plant and system operators is $29.15, with a mean annual wage of $60,620 [17]. By comparison, ZipRecruiter indicated that, as of February 2026, the average hourly wage across all occupations in the United States is $28.16, with an average annual salary of $58,563 [22]. Viewed in isolation, these figures suggest that employment as a water and wastewater operator is relatively stable and well-paying compared to the national average. However, when compared with adjacent critical infrastructure jobs, the story is much more complicated.

Despite comparable technical requirements, on-call expectations, and public safety responsibilities, power plant operators command significantly higher wages than their water and wastewater counterparts. According to the U.S. Bureau of Labor Statistics, the national mean hourly wage of a power plant operator is $46.15, with a mean annual wage of $95,990. This disparity represents a substantial wage gap and creates a structural disadvantage for water utilities competing for skilled labor in the same regional workforce markets.

Figure 1

51-8031 Water and Wastewater Treatment Plant and System Operators

Operate or control an entire process or system of machines, often through the use of control boards, to transfer or treat water or wastewater.

National estimates for water and wastewater treatment plant and system operators

Employment	Employment Relative Standard Error	Mean Hourly Wage	Mean Annual Wage	Wage Relative Standard Error
126,750	1.1 %	$29.15	$60,620	0.4 %

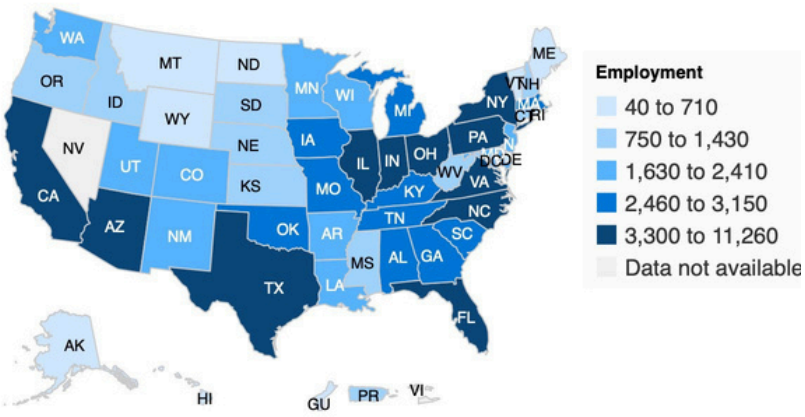
Percentile	10%	25%	50%	75%	90%
Hourly Wage	$18.21	$22.61	$28.01	$34.27	$41.42
Annual Wage	$37,870	$47,020	$58,260	$71,280	$86,160

Source: U.S. Bureau of Labor Statistics

That disadvantage is even more pronounced in Texas. The mean hourly wage for a water and wastewater operator in Texas is approximately $24, with a mean annual wage of $50,220, while a Texas power plant operator earns a mean hourly wage of $44.12 and a mean annual salary of $91,770 [17]. As shown in Figure 2, Texas is one of the largest employers of water and wastewater operators in the country, however, it continues to lag behind peer states in compensation, suggesting that workforce shortages could be driven less by labor availability and more by structural wage constraints. While California employs the largest number of operators, its mean hourly wage is $41.59, and its mean annual wage is $86,500. One might reasonably attribute this difference to California's higher cost of living; however, comparisons with Florida complicate that assumption. In Florida, the mean hourly wage for water and wastewater operators is $29.59, with a mean annual wage of $61,550, still significantly higher than wages than in Texas [16].

Figure 2

Employment of water and wastewater treatment plant and system operators, by state, May 2024



Source: U.S. Bureau of Labor Statistics (www.bls.go

At the end of the day, these wage disparities underscore a fundamental gap in how drinking water and water treatment work is valued relative to other critical infrastructure roles. That gap directly undermines recruitment, retention, and long-term workforce stability in Texas.

Retention, Burnout, and Workforce Stability

Although compensation is not the only factor to blame for why utilities struggle to retain workers, it is a good starting point of a larger conversation. Water professionals often face working conditions that make long-term retention increasingly difficult. As mentioned previously, long hours, on-call requirements, physically demanding fieldwork, and limited staffing levels place sustained pressure on existing employees, particularly in small and rural systems where there is even more reliance on the institutional knowledge of just a handful of individuals. And though it might sound like a simple explanation to a complex problem, rural communities that lack movie theaters, shopping malls, strong school districts and after-school programs will be at an even greater disadvantage when trying to recruit the next generation of workers. Cities with appealing amenities that attract young workers, young families, and foster a sense of community will have the upper hand in recruiting and retaining workers.

As workforce shortages persist, remaining staff are frequently asked to shoulder more and more responsibilities, increasing both workload and stress. This dynamic creates a negative feedback loop in which departures place greater strain on those who remain, accelerating burnout and driving additional staffing losses. Yet burnout and mental fatigue are rarely measured or formally addressed in utility workforce planning discussions, meaning utilities are operating with limited insight into why experienced employees choose to leave (or delay retirement out of obligation rather than sustainability). Some in the industry have tried to voice this concern among their peers in recent years. In a July 2025 blog post published through the Texas Water Utilities Association, a Senior Operations Manager noted that the "industry struggles with recruiting new talent, training inexperienced staff, and preventing burnout…" [10].

This is further evident via recent national data from Moodle, conducted by Censuswide, that found 66% of employees in the United States experienced some level of burnout in 2025. The burden is particularly acute among younger workers, with 81% of those aged 18 to 24 years old and 83% of those aged 25 to 34 years old reporting burnout, compared to just 49% of those aged 55 and older. Of particular relevance to this discussion, 19% of respondents cited stress related to taking on more work due to labor shortages in their industry – highlighting how staffing gaps directly affect burnout risks [7].

Worker Safety as a Retention and Workforce Risk

Discussions about workforce stability in the drinking water and water treatment industry often focus on wages, training, and recruitment pipelines, but far less attention is paid to the physical and psychological safety risks faced by front line workers. For many operators, safety concerns are not abstract or hypothetical at all, they are a routine part of the job. Field staff regularly work alone, enter private property, respond to emergency calls at all hours, and perform essential services under tense or emotionally charged circumstances. These risks are particularly evident in understaffed systems, where workers have fewer colleagues available to share workloads or provide backup in the field.

In recent years, incidents involving harassment, threats, and violence against utility workers of all trades have become more visible across the country, including in Texas [12]. In terms of where their work occurs (both on public and private property), responding to service disruptions, conducting maintenance, or enforcing shutoffs for nonpayment, drinking water and water treatment workers are increasingly placed in situations that expose them to confrontation and personal danger. During the 89th Legislative Session, additional measures were put in place to protect utility workers from harassment and assault (Senate Bill 482), though there is still work to be completed in that area of policy. Safety is often treated as an operational or compliance issue rather than a factor that directly influences employee morale, job satisfaction, and decisions to remain in (or leave) the profession.

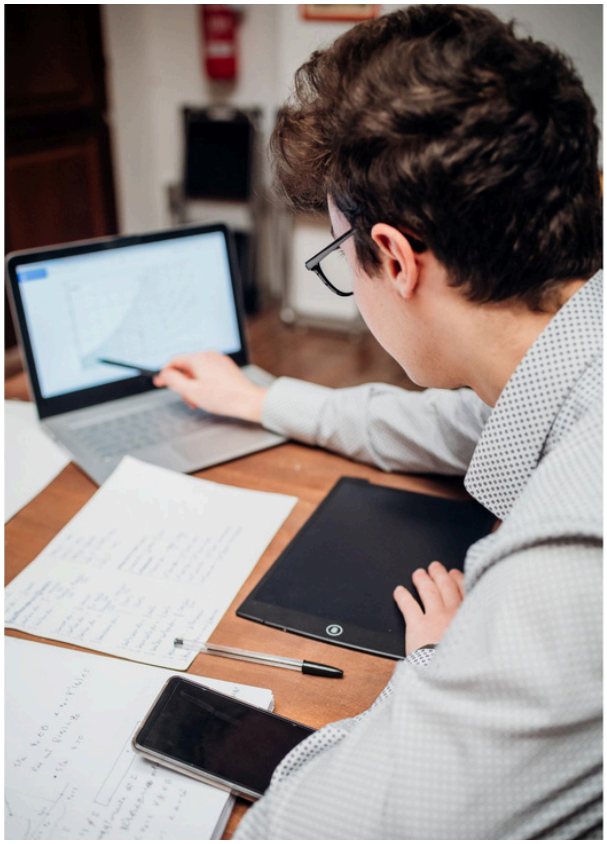
When safety concerns are layered on top of burnout, they can cause an employee or prospective employee to reconsider staying or entering the field altogether. A workforce that does not feel protected, supported, or prepared to manage these risks is unlikely to grow or sustain itself over time. Without coordinated efforts to address worker safety as a core component of workforce stability, utilities may continue to lose experienced operators while struggling to attract the next generation.

Licensing Requirements and Training Support

State operator licensing (governed by the Texas Commission on Environmental Quality) plays a critical role in protecting public health and ensuring the safe operation of drinking water and water treatment systems. Licensing standards help establish baseline competency and maintain public trust in essential services; however, workforce data suggests that those requirements may also function as an unintended friction point within the broader recruitment and retention landscape, particularly when training support and career pathways are inconsistent across utilities.

The Texas Water Foundation workforce survey found that only 7% of respondents reported that their organization provided internal training for "technical craft" roles. 32% of respondents indicated that challenges related to filling positions, employee turnover, and increasing retirements may be linked in part to expanding TCEQ licensing requirements [5]. This is not to suggest that licensing itself is misplaced, but rather that the systems supporting workers in meeting and advancing through these requirements are not well-conceived. For many operators, especially those in small or rural systems, access to training and exam preparation can be limited, making licensing progression feel burdensome.

Without coordinated investment in training, mentorship, and support, well-intentioned standards may inadvertently discourage entry into the field or accelerate burnout among experienced workers. Addressing this gap requires a balanced approach, one that preserves the critical public safety standards required of these jobs while ensuring workers are equipped with the resources, institutional support, and (perhaps most importantly) sufficient time needed to meet licensing expectations. For many employees, preparation occurs outside of work hours, placing additional strain on personal time and family obligations. Greater consideration of how and when workers are given time to study and advance may be an important factor in improving retention and reducing burnout.



Technology Adoption Without Workforce Alignment

Technology is increasingly shaping the daily lives and operations of drinking water and water treatment systems, yet workforce planning has not consistently evolved alongside it, nor has the legislative and regulatory framework necessary to maintain such systems. Utilities across Texas are adopting more advanced monitoring systems, automation tools, and data-driven technologies to improve efficiency and system reliability. However, the integration of new technology also introduces new workforce demands, including expanded training needs and baseline cybersecurity awareness for employees who access digital systems on-site or through utility-issued equipment.

Though systems like the Supervisory Control and Data Acquisition (SCADA) software program are not necessarily new (originally introduced in the mid-20th century on manufacturing floors), the capabilities of modern SCADA platforms have advanced significantly in recent years. Today's systems allow operators to access real-time data remotely, presenting huge opportunities for organizations to streamline operations, improve situational awareness, and enhance data-driven decision making [6]. At the same time, the artificial intelligence (AI) boom signals a broader shift that will have lasting implications for the water workforce. How the industry chooses to respond to this technological moment will shape the workforce for generations to come.

For experienced operators, rapid technological change can feel alienating, particularly when training is limited or occurs outside of regular work hours. For newer entrants, expectations around digital fluency, cybersecurity awareness, and system analytics may not be clearly defined or supported through formal career pathways. Smaller and rural utilities face additional barriers including limited budgets, fewer training opportunities, and reduced access to technical support. Without intentional alignment between technology adoption and workforce preparation, utilities risk intensifying burnout, widening skill gaps, and creating new vulnerabilities within already strained systems.

Taken together, these gaps illustrate that workforce challenges in Texas's drinking water and water treatment industry are driven by a convergence of interconnected pressures. Inconsistent workforce data, uncompetitive compensation, rising burnout, escalating safety concerns, uneven licensing support, and rapid technological change cumulatively create a system that struggles to recruit new workers while placing unsustainable demands on those who remain. Addressing these challenges will require coordinated, intentional action that treats workforce stability as a core element of infrastructure resilience rather than a secondary operational concern.

Topic Discussion

Workforce instability in Texas's water industry has consequences that extend well beyond individual utilities. When systems struggle to recruit and retain qualified operators, the effects are felt across communities, businesses, and emergency response efforts that depend on reliable water services. As Texas continues to grow and face increasingly complex environmental and infrastructure challenges, understanding how workforce capacity intersects with resilience and public safety is essential to safeguarding the state's critical water systems.

Community Impacts and Public Health

Reliable access to safe drinking water and effective water treatment underpins nearly every aspect of daily life, from household health and sanitation to school operations, healthcare delivery, and local economic activity. When utilities lack sufficient trained personnel to operate, maintain, and monitor these systems, the risks are ultimately borne by the communities they serve.

Beyond immediate service reliability, persistent workforce shortages can erode public confidence in essential services. Communities depend on the assurance that safe water will be available during normal conditions and crises alike. Repeated disruptions along with staffing instability or delayed responses may weaken that trust, especially in areas already facing infrastructure or resource constraints. Maintaining a stable, well-trained workforce is not only an operational necessity but also a cornerstone of public health protection and community resilience.

These concerns are not purely theoretical. In 2023, a survey conducted by the Texas Water Trade found that Black and Hispanic populations living in border communities, as well as Metro Houston and the Dallas Fort Worth Metroplex, expressed significant concerns about the safety of their drinking water. Many respondents reported traveling more than ten miles to purchase bottled water or some other alternative source, and 61% did not believe their tap water was safe to drink [15].

Once a community water system loses credibility (warranted or not), it becomes incredibly difficult to regain that trust again. Moreover, bottled water is not inherently safer than tap water; it is regulated differently, tested for different contaminants, and subject to different disclosure requirements[14]. As a result, reliance on bottled water may offer temporary reassurance without necessarily improving water quality outcomes.

Economic and Business Implications

Drinking water and water treatment infrastructure is foundational not only to public health, but also to economic activity across Texas. Businesses of every size – ranging from small local retailers to large industrial manufacturers – depend on reliable water service to operate safely and continuously. When utilities face workforce shortages that affect maintenance, monitoring, or emergency response capacity, the resulting instability can create uncertainty for everyone involved.

In rapidly growing regions of the state, workforce constraints within water utilities may also influence the pace and location of new development. Housing construction, commercial expansion, and industrial recruitment all rely on confidence that drinking water and water treatment systems can meet present and future demand. If staffing limitations delay infrastructure expansion, slow permitting, or reduce operational resilience, communities may face indirect economic consequences that extend well beyond the utility itself.

Recent U.S. Census Bureau estimates indicate that Texas added approximately 391,000 residents in 2025, more than any other state, bringing the total population to roughly 31.7 million. Although this growth remains significant, the annual increase of about 1.2% represents the slowest rate of expansion since 2021, and net domestic migration accounted for only about 67,000 additional residents [18]. These trends may suggest a plateau of population-driven demand on infrastructure systems. However, even moderated growth does not diminish the need for a stable and adequately prepared water workforce. Existing population levels coupled with ongoing development and a desire for long-term economic competitiveness all depend on reliable utility service capacity.

At the same time, a new economic driver places complex demands on water infrastructure: data centers. Texas has experienced rapid growth in data center development; currently 392 data centers exist in Texas [4], and TCEQ just approved permits for the West Texas GW Ranch, the largest permitted data center campus in the United States [4]. According to Berkeley National Laboratory and reported on by NPR, data centers use nearly 300,000 gallons of water a day for their cooling systems, equal to what 1,000 households consume [2], and with nearly 400 data centers operating in Texas, their water consumption conceivably reaches a little over 100 billion gallons a day. While an argument can be made that data centers provide economic benefits both locally and statewide, the fact remains that their existence signifies an elevated demand on resources and long-term system planning. A conversation surrounding where and how data centers source their water will likely be a significant policy discussion in the very near future.

As Texas continues to compete nationally for business investment and population growth, the reliability of its water infrastructure (and the workforce that sustains it) will remain a determining factor in long-term economic stability. Strengthening workforce capacity is not solely a utility concern; it is a prerequisite for sustained economic development across the state.

Emergency Response and Infrastructure Resilience

Reliable drinking water and water treatment services are especially critical during emergencies when communities depend on functioning infrastructure to protect public health. Severe weather events, prolonged drought, flooding, extreme heat, and other hazards increasingly test the resilience of the state's water systems. In these moments, the availability of trained operators, technical staff, and customer service becomes just as important as the physical condition of pipes, pumps, and treatment facilities.

Source: Julia Reihs / KUT

Workforce shortages can significantly constrain a utility's ability to prepare for, respond to, and recover from disruptive events. During Winter Storm Uri in February 2021, the historic winter event exposed the vulnerability of critical infrastructure across Texas, including our water systems. As record cold temperatures and system-wide power outages cascaded through the state, water treatment plants and distribution systems struggled to maintain pressure and service. According to state reporting, more than 1,180 public water systems in 160 counties experienced disruptions, affecting roughly 14.6 million residents with service interruptions and boil-water advisories [11].

The storm's impacts were both widespread and prolonged. Water outages occurred as pipes froze and burst, and utilities were challenged to respond to infrastructure failures triggered by electricity shortages. Some communities faced days without consistent running water, while boil-water notices were issued across major metropolitan areas and rural regions alike [1].

These events illustrate how workforce shortages and limited redundancy can magnify the consequences of extreme weather. When systems are already operating with minimal staffing, prolonged emergencies like Winter Storm Uri place additional strain on operators who must manage service restoration and emergency response coordination under extreme conditions. This case underscores the critical link between workforce capacity and infrastructure resilience in real-world crisis settings.

Workforce of the Future

Technological advancement is reshaping how drinking water and water treatment systems are maintained and secured, fundamentally altering the skills required of the workforce that operates them. Modern utilities increasingly rely on automated treatment controls, remote sensing, real-time data analytics, and networked supervisory control systems to maintain reliability and regulatory compliance. These tools improve efficiency and situational awareness, but they also expand operator responsibilities beyond traditional mechanical and chemical expertise.

The growing cybersecurity threat to critical infrastructure underscores the importance of this shift. In 2024, a water utility in Muleshoe, Texas was hacked by Russian-linked hackers, causing several thousands of gallons of water to overflow. The attack was detected and stopped by switching the water tank to manual operations [8]. This incident illustrates both the vulnerability of increasingly connected water systems and the continued necessity of a skilled, attentive workforce capable of recognizing and responding to digital threats. As utilities adopt more networked technologies, cybersecurity awareness and digital literacy will become core competencies for water professionals rather than specialized skills held by a few technical staff.

Preparing the next generation of operators to meet these expectations will require modernization of training pathways, recruitment strategies, and career development models. Traditional paths into the profession may be insufficient to attract workers who are considering long-term career opportunities in a competitive labor market. Younger workers, specifically Gen Z, have shown an intense interest in seeking employment that offers meaningful public impact.

The water sector is uniquely positioned to meet these expectations, providing mission-driven work that directly protects public health and community resilience. However, realizing this opportunity will require more intentional outreach including partnerships with educational institutions, expanded apprenticeships, and communication strategies that engage prospective workers through modern social media platforms. Real-world workforce programs reinforce this potential. Sarah Spralding, Associate Director of Career and Technical Education at Leander Independent School District, observed while supporting a local water apprenticeship initiative that she was “struck by the satisfaction the first apprentices expressed in having jobs with purposes, something that is important to Gen Z… ‘That makes me feel good about directing students to this type of work,’..." [13].

Failure to adapt workforce development to technological and generational change carries significant consequences for infrastructure resilience. Recruitment strategies that remain focused primarily on earlier generational cohorts (the Millennial Generation, for example) risk falling behind. As Gen Z enters the workforce and Gen Alpha begins forming early awareness of career pathways, engagement efforts should center on exposure to concepts such as drinking water treatment, water reuse, and advanced distribution systems and how they can help position the water sector as both technologically relevant and socially meaningful [21]. Expanding outreach at earlier stages of learning represents a strategic opportunity to strengthen long-term workforce sustainability.

The Way Forward

Policy Recommendations & Programmatic Solutions

For operators like Mike – the veteran water professional who began this discussion standing beside an aging pipeline and co-workers in the East Texas strengthen the people who operate its most essential infrastructure. The path forward requires coordinated action that treats workforce stability not as a secondary operational concern, but as a foundational element of public health, economic resilience, and homeland security.

The gaps identified throughout this research point not to a single solution, but to a coordinated set of actions that together can stabilize and strengthen Texas's water workforce. The following strategic priorities outline practical steps that can be taken to reinforce workforce resilience while preserving the safety, reliability, and public trust upon which Texas communities depend.

Recommendation 1: Establish Statewide Workforce Data and Planning Capacity

Reliable workforce planning begins with reliable information. Currently, Texas lacks a statewide mechanism for tracking key indicators such as operator retirements, vacancies, and regional workforce shortages across drinking water and water treatment utilities. Establishing a comprehensive workforce data collection system would provide policy makers, regulators, and utilities a foundation necessary to align infrastructure investment with human capacity.

Developing this capability does not require the creation of an entirely new regulatory agency or structure and could be initiated with a legislative interim-study to determine its viability.

Texas could build upon existing institutional roles and reporting channels to create a centralized workforce dashboard or annual assessment integrated with statewide water planning efforts. Strengthening workforce data and planning capacity ultimately enhances infrastructure resilience. When decision-makers understand where shortages are forming and which regions face the greatest vulnerability, they are better positioned to protect public health, sustain economic activity, and maintain reliable service during both routine operations and emergency conditions.

Recommendation 2: Strengthen Compensation Competitiveness and Retention Support

Compensation and working conditions play an important role in expanding workforce longevity in the state. As demonstrated in earlier analysis, Texas water utilities frequently compete regionally for labor with a similar technical background. Addressing this challenge requires a comprehensive approach that extends beyond base pay alone. One set of recommendations could be establishing retention incentives for licensed operators, mental health and burnout mitigation resources, and strengthened workplace safety measures.

These investments should be understood as resilience measures that protect continuity of operations rather than discretionary personnel costs. Utilities that can attract and sustain experienced operators are better positioned to maintain regulatory compliance, respond effectively to emergencies, and support economic and community stability.

Recommendation 3: Modernize Licensing, Training, and Career Pathways

Undeniably, operator licensing is essential to protecting public health and ensuring the safe operation of drinking water and water treatment systems. However, as identified earlier, uneven access to training, limited employer-supported study time, and unclear advancement pathways can unintentionally create barriers to entry and progression within the profession.

Improvement efforts should focus on expanding accessible, employer-supported pathways that help workers enter, advance, and remain in the field. This may include providing structured study time during the workweek, strengthening training partnerships with community colleges and technical programs, expanding apprenticeship and earn-while-you-learn models, and clarifying career ladders tied to licensing levels and compensation progression. Greater coordination among utilities, educational institutions, and state partners can help ensure that licensing functions as a mechanism for professional mobility rather than an unintended obstacle to workforce growth.

In a legislative or regulatory setting, this could take several practical forms. These may include streamlining licensing portability for military spouses transferring from state to state, aligning relevant Military Occupation Specialties (MOS) training with TCEQ licensing standards, studying possible redundancies within the state licensing curriculum, and reducing financial barriers through adjusted licensing fees or need-based scholarship partnerships supported by public and private stakeholders.

Recommendation 4: Align Technology Investment with Workforce Development

Aligning technology investment with workforce development is crucial to ensuring that modernization strengthens system resilience instead of getting ahead of it. Drinking water and water treatment utilities are rapidly adopting automated treatment controls, remote monitoring platforms, real-time data analytics, and increasingly networked supervisory systems to improve operational reliability and regulatory compliance. While these advancements offer greater efficiency and situational awareness benefits, their effectiveness ultimately depends on the workforce responsible for operating them. Without parallel investment, technological modernization risks introducing new operational and cybersecurity vulnerabilities without the labor background to support it.

Every significant technology deployment needs to be paired with deliberate workforce preparation. This includes establishing basic cybersecurity awareness for operational staff and expanding digital literacy. Training must be practical, continuous, and accessible …especially for small and rural utilities that may lack internal technical capacity or dedicated IT personnel. State infrastructure funding programs that support modernization should likewise incorporate dedicated resources for workforce training and technical assistance, ensuring that technology investments translate into sustained operational capability rather than underutilized or insecure assets.


Source: Port San Antoni

Closer coordination among utilities, state agencies, educational institutions, and technology providers can further strengthen this alignment. Regional training collaboratives, shared cybersecurity resources, and standardized guidance for technology implementation would help reduce duplication of effort while expanding access to expertise across diverse utility sizes. Texas is already investing in advanced cyber defense capabilities, including the development of the Texas Cyber Command Center in San Antonio designed to strengthen protection of critical infrastructure and public systems [19]. Establishing formal collaboration pathways through shared training and threat intelligence exchange along with incident response coordination could significantly enhance sector-wide preparedness while building a more cyber resilient utility workforce.

Recommendation 5: Build the Future Workforce Through Targeted Recruitment and Public Awareness

Long-term stability in Texas's water workforce depends on both the public and private sector's ability to intentionally recruit and inspire the next generation of water professionals. Demographic trends, accelerating retirements, and increasing technical skill requirements mean passive recruitment strategies are no longer sufficient to meet future workforce demand, and most importantly, recruitment must begin earlier in the education and career-awareness process. Building a sustainable pipeline will require coordinated outreach that communicates both career stability and the meaningful impact in providing this precious resource.

Water professions uniquely offer mission-driven work that directly protects public health, environmental quality, and community resilience. Communicating this value through contemporary outreach channels like social media platforms (i.e. TikTok, Instagram, Reddit) can help reposition the field as both culturally relevant and socially meaningful. Strengthening recruitment and public awareness ultimately secures the future of Texas's water infrastructure. Additionally, transition programs for military service members and outreach to underrepresented communities can further broaden the talent pool while strengthening local workforce resilience.

A consolidated inventory of federal, state, and sector workforce development programs relevant to Texas water utilities is provided in Appendix A.

In Conclusion

As the sun settles over the pine trees and the long day of repairs finally winds down, Mike rinses the grit from his hands and looks out across the community he has served for decades. The work is rarely noticed when it goes right, and yet everything depends on it from the water running in kitchen sinks, the hospitals caring for patients, and the schools opening their doors each morning. For years, he has carried that responsibility alongside a shrinking circle of experienced operators, quietly hoping that someone new would step forward to learn the trade and continue the work. What once felt uncertain now holds the possibility of renewal, if the choices made today match the scale of the challenge ahead.

Across Texas, similar moments unfold at water systems and along distribution lines stretching far beyond East Texas. The future of these systems will not be determined only by infrastructure funding or technological advancement, but by whether the state chooses to invest in the people willing to take on this essential calling. If that investment is made with intention, coordination, and care, the next generation of operators will inherit not only the responsibility Mike carried, but the support he often went without. And in that quiet continuity of service, community after community will continue to trust that when they turn on the tap, someone is still there, making sure the water flows.

Taken together, this research demonstrates that workforce instability in Texas's drinking water and water treatment industry represents a critical infrastructure challenge with direct implications for public health, economic resilience, emergency preparedness, and long-term system reliability. Through analysis of workforce data limitations, compensation disparities, burnout and safety pressures, licensing and training barriers, and the accelerating influence of technology, the research identifies a set of interconnected risks that cannot be addressed through isolated action. The strategic recommendations of strengthening workforce intelligence, improving retention and compensation, modernizing certification pathways, aligning technology with workforce development, and building intentional recruitment pipelines outline a coordinated approach to securing the human foundation of the state's water infrastructure. Ensuring that this workforce is stable, skilled, and prepared is essential not only to sustaining reliable service today, but to protecting the resilience and security of Texas communities for decades to come.

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Appendix

Appendix A
Federal and State Workforce Development Programs Relevant to Texas Water Utilities

Program / Initiative	Administering Entity	Type	Workforce Function	Status
Innovative Water Infrastructure Workforce Development (IWIWD)	EPA	Grant	Training, recruitment, workforce development	Active; future funding uncertain
Training & Technical Assistance for Small Public Water Systems	EPA	Grant	Technical, managerial, financial capacity building	Active
Water Technical Assistance (WaterTA)	EPA	Technical assistance	Workforce support & system capacity	Active
Drinking Water State Revolving Fund (DWSRF)	EPA / States	Financing	Indirect workforce via infrastructure funding	Active
Clean Water State Revolving Fund (CWSRF)	EPA / States	Financing	Indirect workforce via infrastructure funding	Active
Knowledge Retention Tool for Small Systems	EPA	Resource	Succession planning & workforce continuity	Active
Registered Apprenticeship System	U.S. DOL	Workforce program	Apprenticeships & career pathways	Active
Apprenticeship Building America (ABA)	U.S. DOL	Grant	Apprenticeship expansion	Active
Women in Apprenticeship & Nontraditional Occupations (WANTO)	U.S. DOL	Grant	General workforce access for women	Active; future uncertain

Program status reflects publicly available information as of 2025–2026. Several federal workforce initiatives face funding or structural uncertainty due to proposed administrative and budgetary changes.

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JobCorps	U.S. DOL	Training program	Youth workforce development	Active
YouthBuild	U.S. DOL	Training program	Pre-apprenticeship & construction skills	Active
Transition Assistance Program (TAP)	U.S. DOD / DOL / VA	Workforce program	Military-to-civilian transition	Active
Veteran Readiness & Employment (VR&E)	VA	Workforce program	Training & employment support	Active
SkillBridge	DOD	Workforce program	Military career transition	Active
Non-Paid Work Experience (NPWE)	VA	Workforce training	Practical job experience	Active
USDA Water & Waste Disposal Technical Assistance Grants	USDA	Grant	Rural workforce capacity & training	Active
USDA Wastewater Training & TA Program	USDA	Grant	Rural operator training	Active
Rural Economic Development Loan & Grant (REDLG)	USDA	Loan/Grant	Job creation & training facilities	Active

Program status reflects publicly available information as of 2025–2026. Several federal workforce initiatives face funding or structural uncertainty due to proposed administrative and budgetary changes.

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Federal and State Workforce Development Programs Relevant to Texas Water Utilities

Rural Business Development Grant (RBDG)	USDA	Grant	Rural workforce & economic development	Active
Carl D. Perkins Career & Technical Education (Perkins V) Career	U.S. ED	Formula grant	Career & technical education pipeline	Active
Connected High Schools Initiative	U.S. ED	Initiative	Workforce readiness	Active; future uncertain
Raise the Bar: Unlocking Career Success	U.S. ED	Initiative	STEM & career preparation	Active; future uncertain
Good Jobs Initiative / Good Jobs Principles	Federal Interagency	Policy initiative	Job quality & workforce standards	Rescinded (2025)
EDA Good Jobs Challenge	U.S. DOC (EDA)	Grant	Regional workforce systems	No future competitions planned
Critical Sector Job Quality Grants	U.S. DOL	Grant	Workforce quality improvements	Uncertain
TEEX Water & Infrastructure Training	Texas A&M System	Training	Operator & emergency training	Active

Program status reflects publicly available information as of 2025–2026. Several federal workforce initiatives face funding or structural uncertainty due to proposed administrative and budgetary changes.

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Appendix A
Federal and State Workforce Development Programs Relevant to Texas Water Utilities

TexasRural Water Association Apprenticeship	TRWA	Apprenticeship	Operatorworkforce pipeline	Active
SETH Water Operator Program (TAWWA / Pflugerville ISD)	Sector partnership	Training	Early career operator pathway	Active
Texas A&M–San Antonio Water Resources Degree	University	Degree program	Professional workforce pipeline	Active
NRWA Apprenticeship Program	NRWA	Apprenticeship	National rural operator training	Active
RCAP Workforce & Technical Assistance	RCAP	Training/TA	Small system workforce support	Active
WEF Workforce Initiatives (InFLOW, certifications)	WEF	Professional programs	Training & leadership	Active
AWWA Workforce & Scholarship Programs	AWWA	Professional programs	Training, reciprocity, leadership	Active
WorkForWater.org	National coalition	Outreach initiative	Recruitment & awareness	Active

Program status reflects publicly available information as of 2025–2026. Several federal workforce initiatives face funding or structural uncertainty due to proposed administrative and budgetary changes.