WATER LOGGED

SUMMER 2023

THE OFFICIAL PUBLICATION OF THE NEVADA RURAL WATER ASSOCIATION

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Features

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Our Mission:
"To provide the best available technology, resources, support, assistance and training to our members serving Nevada Communities."

An Update From Your Favorite Executive Director

By Kevin Baughman, NvRWA Executive Director

Hello all,

Like Hazen Nevada, it's happening at NvRWA! We have had some new program work introduced to us that is scheduled to begin in July. We are giving some staff members the opportunity to switch roles and take on new work challenges. It is my hope that we are doing things that both please and serve you well. I, again, invite you to give me direct feedback via call, cell, or text as you see fit. It is our goal to do things to serve you well. It is my hope that by switching the roles of some of our staff and bringing on a couple of new people that we will be giving you a new, refreshing, and updated experience with us.

So, what are these new programs, you may ask? Well, one of them is that we are bringing on an apprenticeship program. The goal of this is that we want new operators to have a standard much like other trade skills that enable someone to call themselves a "Professional Operator" this means that we will offer to coordinate for the systems that want to hire "Operators in Training". We will track that the trainee completes and records four thousand hours of work and two hundred eighty eight hours of training. Upon completion of this we would like to issue a Water Professional" Certification for this work. Without this, can you tell me what the standard is to earn the title of "Water System Operator"? Do you believe that six months of working at a water system, running a string trimmer, should earn you the right to call yourself a water system operator?

It is my belief and the reason I came back to work from retiring, that we do NOT educate the public about our work, roles, and responsibilities well enough. We are seriously starting to build the "Workforce Development" and Outreach programs. It is a concerted effort to raise the awareness and perceived value of our industry and its workers. This has been my personal goal since a (presumably educated) couple informed me that they thought their water came from fire hydrants which were refilled at night by city water trucks. How can we expect people to value us when they believe this is the way they get their drinking water? We are engaging Max Sosa in an all-out effort to address this shortcoming in understanding. Parts of the current plan are to employee various forms of outreach through radio, television, and social media to address this need. Your input could be valuable here. Please let us know about opportunities to address the public such as career days in your local schools, job fairs in your communities, and heck, if you can, partner up with us to coordinate to do an "Open House" at your facility! We are looking to setup the chances to get the public interested and informed about the service and products we provide. You can be a help by just talking to you neighbors and friends about what it is you do. As I close this thought, let me ask you, "How did you find yourself connected with water or wastewater?" For many people, I survey, it was a pure accident that got them into water. ALSO, the vast majority are pleased about this "Happy Accident".

Currently, I am concerned. Do you see the trends for electric cars and the news that the government also wants to "clear the air" by removing gas stoves from service. Google tells me that there are about 286.9 million registered cars on the road in the US in 2020. There are 290.8 million cars in the U.S. as of September 2022! So, I read that when you plug in and charge your car it is about the same size electrical load as an air conditioner. This makes me think about the recent summers and winters when the temperature varied a little above or below "Normal". With numbers like this, if each of these cars became electric today and contributed ONE SECOND to a power "glitch" when plugged in, do you know how long that "glitch" would last? Yes, it calculates to NINE YEARS! I think that we all need to re-evaluate our power awareness. Do you have a backup generator at your home and business? Do you/ can you have or provide a solar power car charging system for your employees and customers to help reduce the inevitable extra loading on the grid? Can you imagine your operator leaving a freezing or frying family at home to try to get your utility running? Can your operator's family cook food during a power outage? Is your operator going to be willing to go to work and leave their family during these events? Can your company still produce water or collect and treat the wastewater? There are a variety of questions and answers for this. My plan is that we look and think ahead so that we do not have to deal with this as a failure in the future.

PFAS and Lead Service lines are in the news. There have been BILLIONS of dollars agreed to be set aside into a trust to help pay for the efforts needed to detect and correct this contaminant. If you have not signed up. There is a link on our website. It is about a 10-question form to get signed up. There are more lawsuits coming so please, try to look at this now.

I will close this article by sharing a couple thoughts. Hopefully you are having a great summer! I know we are all missing the winter snow. Don't worry, it is heading back soon. We at NvRWA are working on new projects. Last November we completed our first "Networking session" at AVK in Minden. This July 06 we are doing one at the Western Nevada Plumbing Supply. IF you have a business or factory that supports the water / wastewater industry, please, reach out to us to schedule a session at your facility. It is a plan to do these with a facility tour and if you are so inclined, you can provide the attendees some beverages (coffee?) and snacks (Sandwiches?)

We are beginning our annual membership campaign. This is not mandatory, but it helps us provide nice things like SWAG at training sessions. We would really appreciate and enjoy any of the "bigger" systems contributing as we do not exclude these companies and their employees from attending our training and getting their required CEUs. This is one of the few ways we can get your support (bigger companies) to do this. Most of our program funding requires us to focus our efforts on the smaller systems / communities. Please, do consider the option to support us through our membership program. We want to give you the best experience. For those of you who are members, THANK YOU for your support!

Enjoy the weather, good luck with your projects.

Quality On Tap!

Our Commitment Our Profession

Mike: A Brief Description

By Michael Boney

Hello All! Most of you know me already. But this time, Mike is going to take a little time to explain a little bit more about himself.

Let's start from the beginning. Mike was born in Tremonton, Utah ... and later in life Mike earned his Bachelor of Science in Mathematics with a Minor in Archaeology. Some of my Graduate Study courses were in Civil Engineering with a class in Environmental Engineering.

While earning an associate degree in mathematics at Western Nevada Community College, Mike peer tutored several peers in math, physics, general chemistry, and organic chemistry.

During Mike's educational career, he taught classes at Western Community College and University of Nevada-Reno.

Later on, Mike started working with the City of Fallon. While employed, Mike advanced his Class B Commercial Driver's License to a Class A Commercial Driver's License. During Mike's employment with the City of Fallon, he started his placement into the drinking water and wastewater fields, not with job placement, but with earning operator-in-training, OIT, certificates. Mike earned his Distribution 1 to Distribution 4 OITs, Treatment 1 to Treatment 3 OITs, and a Wastewater 1 Restricted certificate.

Mike moved on to Lovelock Meadows Water District, LMWD, where he was able to convert his Distribution 3 OIT to a Full Certificate. While with LMWD, Mike earned his backflow and Cross-Connection Control certifications. From LMWD, Mike moved on to Nevada Rural Water Association, NvRWA, through the help from a previous circuit rider.

Mike started with the Drinking Water Circuit Rider program. Mike met with most of the water systems throughout Nevada. Mike met with board members, managers, public works directors, operators, and wastewater operators. Most of the operators Mike met are dual or triple certified for their water and wastewater system. The operators are drinking water, water treatment, and wastewater certified to meet the immense responsibility required by the system.

While visiting the systems, Mike knows that each system, like the operator, is unique. However, problems or issues can be similar between systems. This is where learning how one water system took care of an issue can benefit another system. A good example of this is a certain system had to go through a Level 1 assessment. While assisting the operator complete the assessment, leaky valves were found and the operator used a flame to sanitize the sample location, and took the sample almost immediately. The leaks were fixed. Mike suggested that the operator then place bleach in a bag to disinfect the sample tap. The operator needs to submerge the opening of the sample tap, squeeze the bag to move bleach into the throat of the sample tap, and then run water long enough to receive water from the main water line. The follow-up coliform samples came back absent of coliforms. The water system continued operations without the need of a Level 2 assessment.

While with NvRWA, Mike has extended his knowledge with upcoming drinking water regulation changes. While visiting systems, he advises the systems of the changes coming down the line. Most importantly, when the changes will take effect. A couple of the current changes are the PFAS and PFOA changes and the Lead and Copper Rule Revisions coming down the line, (Remember the deadline for system inventory is in October 2024).

Mike has assisted many systems with issues that the systems can't find the required time to commit to these issues. These issues include: leak detection, valve location, updating operation and maintenance manuals, emergency response plans, rate studies, Level 1 and Level 2 assessments, preparing for sanitary surveys, assisting with repairs, seasonal start-ups, sampling, training, technical assistance, smoke detection, and many other programs offered at NvRWA.

Currently, Mike is in the Wastewater Training and Technical Assistance Program. This is the second time that Mike has been in the Program. The first time was in the Covid times.

Mike enjoys the time spent with the staff of the water and wastewater systems he visits.

When Mike is not at work, he enjoys time with his wife, dogs, and church. On occasion, Mike will play a round of golf either at home or after work at the system being visited.

Mike can be called at any reasonable time to assist any system with any issues the system is having. Max Sosa may have to be called for assistance but an answer will be given as soon as possible.

The systems, operators, and other staff deserve to have the best technical support and training brought to them. Nevada Rural Water Association is the best place to receive that support and training.

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NEVADA RURAL WATER ASSOCIATION

2023 Earth Day / Arbor Day Festival in Pahrump

By Max Sosa, Work Force Development Manager

An Earth Day / Arbor Day Festival? What a great idea! Kudos to all who made this event possible and to the people of Pahrump for their great participation!

This free annual event took place on Saturday April 22, 2023. The Earth and Arbor Day Festival was an excellent outing for the entire family. The indoor exhibits at the Bob Ruud Community Center were very informative and attendees walked away with lots of giveaway goodies that were enjoyed by all ages. There was food, live music, raffle prizes, and tree saplings available.

The yearly 2023 Earth and Arbor Day Festival 4-hour event was well attended and a good time for all. A great informative interactive event where visitors of all ages can participate. If you would like to know more about the Earth Day / Arbor Day Festival and the great folks that put this event together every year, please contact: Debby.Woodland@greatbasinwaterco.com

Do you know why we celebrate Earth Day and Arbor Day every year and why they are so unique?

While most holidays celebrate something that has already happened and is worth remembering, Earth Day and Arbor Day both represent hope for the future. Even though it is not a Federally Recognized Holiday in the United States, Earth Day is typically celebrated on April 22 while Arbor Day is celebrated in mid to late April depending on the planting season for the area. Both are celebrated throughout the world depending on the climate of the region and promote the future of our planet.

What does this have to do with Work Force Development?

Nevada Rural Water is launching a statewide Work Force Development Program to "grow" ***Careers in Water.*** It was a huge honor for Nevada Rural Water to participate in the 2023 Earth and Arbor Day Festival in Pahrump to promote the future of Careers in Water for our water infrastructure in the great State of Nevada and a step forward towards providing an avenue for new workers learn about a future in water utilities.

Why are Careers in Water so important?

According to Bureau of Labor Statistics (BLS) from 2016, nearly 1.7 million U.S. workers were directly involved in designing, constructing, operating, and governing the U.S. water infrastructure. The infrastructure workforce is aging across the country, and 8.2% of existing water operators will need to be replaced annually between 2016 and 2026 due to retirements and other employment shifts. America's water infrastructure will require a skilled workforce to construct, operate and maintain facilities for decades to come. Today replacing workers in the water workforce is already a challenge for utilities.

Nevada Rural Water is diligently working to appeal to a wider audience who wouldn't initially approach the water industry. From veterans to new high school or college graduates and to anyone looking for a career change, the water workforce offers many stable career opportunities in both rural and urban areas.

For more information regarding the Nevada Rural Water Association Work Force Development Program please contact
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The Emergency Call-out

By Joe Mathein, EPA Training and Technical Assistance Specialist

A guide to handling emergency repairs.

The emergency callout is a facet of the water and wastewater industry that is a constant, yet unscheduled after hours return to work activity. Many of the callouts are reported to us by our customers and some alert us by alarm. Generally, there is an answering service that routs the calls or alarms to assigned standby staff. Whatever the means of notification, we have designated standby personnel to respond, assess the situation and determine the course of action.

After spending thirty years in a call back rotation, I have developed some insights I felt were necessary and helpful for those participating in that position and those in the administration part of call backs. One cannot adequately perform without the support of the other. The interaction is not as close as a first line supervisor to the responding staff but there are some key areas that must be kept up to support the success of the emergency call back.

The Duties of Standby

When we designate one of our staff to perform standby for emergency call backs, there are some criteria that must be established for the duty. Above all, the staff should be aware and able to respond and assess the situation. This may sound simple but, the reality is that an inexperienced member of your team may not be able to identify the problem correctly. This could cost the District monies that did not necessarily need to be spent, or worse, compromise the safety and welfare of the public, and the operation of the system.

For some systems they are required to have certified operators on call. This helps the investigation and assessment of the call back situation. A certified operator should bring a level of confidence to the emergency callback.

Many systems have a time requirement for response. Some have a 30-minute response for a callback to the customer or the answering service, and some have a set time to be onsite after the callback is received. Whichever the case may be there is an element of urgency with the associated callback.

It is the responsibility of the standby personnel to be on scene within an appropriate time, capable of performing their duty, and having an assortment of tools for the response.

DO NOT SPEED

when responding to the callback. If you get a ticket or get in an accident the response time is blown and you have put the public in danger. It is natural to want to hurry to the response, but it is reckless and puts the District in a negative perception by the reckless driving. Drive at the posted speed limits and obey all traffic laws on your way to the callback.

Once Onsite

The first thing standby personnel should do once they arrive on scene is perform an assessment of the situation. Is anyone injured or in danger of injury by the emergency situation? Is the situation clear of hazards for the responder and the public? Is there a need for additional assistance and who authorizes and designates who will respond? Will the public be affected by shutdowns or road closures?

There are a lot of considerations for the responder and there are times when there is very little time to make good decisions.

The one thing that I always insisted on was safety first! Do whatever is needed to make the site safe and secure to the public. Traffic control, barricades, caution tape. All these should be immediately available in the responder's vehicle or readily obtainable. There should be all the tools that would be needed to provide first response actions on the call back vehicle. Valve keys, hand tools, multi testers, asbuilts, and phone numbers for key organizations; Dig Alert, the on call supervisor, neighboring utilities, BSDW, police, fire dept. sheriff, highway patrol etc...

The reality is that once your staff get onsite, they will be there to the end of the repair or remediation of the problem, so make sure they have the equipment they need to get the repair started or done.

A Typical Scenario

One of the most common call backs in my many years was the waterline leak. There are a couple of different leaks. The service line and the main line. Sometime there is a call for a main leak, and it turns out to be the customer's main line from the meter. This is good for the District but bad for the customer. So, the explanation of who is responsible can be a delicate matter. So, let's say it is in the street and when we arrive, we're not sure if it's a main leak or a service line leak. We have some questions to answer first. Is this presenting a safety hazard to the public and homeowners in the area? Will this have a negative affect on the system's storage and supply capabilities? Can we barricade it off and get it repaired in the morning?

If the answer was no to the first two, then you have gotten lucky and spared the District a huge cost for repair and your customers for not disturbing them in the middle of the night or shutting down their water!

If there was a yes in those first two questions, then you're about to have a long night! If you have a locator that you're able to operate then you can identify where the leak is and whether it is a main or service line. Sometime the location can give you insight. Nevertheless, if you are on a dirt road then start digging! If you are on a paved road it's time to call for help.

Depending on the decision tree of management it is usual for the emergency crew to put a repair clamp on and come back during regular hours and make a permanent repair. Some supervisors and managers will opt to make the permanent repair during the emergency call back. Check with management for the correct procedure where you work.

The Night is Long and Dark

Don't be shortsighted and forget to bring support lighting, more than a flashlight! But don't forget a flashlight! Make sure the cargo light works in the bed of the service truck and the cab light. We don't need a trailer with million candle power lights although they are great! A couple of work lights on an adjustable stand can be purchased for under $50 and really help the situation. Did I mention an AC converter? These handy little items can power lights and small powered pumps and are minimal costs. The darkness poses additional hazards as we know, people seem to appear out of the darkness when we never expect someone to be there. There is a real hazard with traffic during these late night emergency repairs. Make sure you have taken the precautions to set up traffic control, including a flagger if needed.

What do Customers See?

The customers that are adjacent to or nearby the jobsite are always interested in what is going on. They want to know what is wrong, will my water be turned off, and when will it be turned back on? If the project takes hours they also want to know when are you leaving and stopping all the noise!

Honesty is the best policy! It is usually a good policy to inform customers about the situation with as much information that you have and can share. There will be those customers that are angry and will have demands that are difficult or impossible to meet. There are different responses to these customers that are best suited for supervision or management if they are available. Remember, your job is to restore the integrity of the water distribution system as quickly as possible. And to that end, we need to make good decisions about the situation; can we cone off the site and schedule the repair for the first thing in the morning during regular work hours?

The last thing that we want when we're making a repair after hours is to create a negative perception for our customers. If you're responding staff can't be in uniform, then please be as clean and professional as can be. Think about this, does the fire department, police or paramedics respond without being in uniform?

Administrative Support

During the response nobody is thinking about administrative actions and financial support for the emergency call back. This needs to be part of the planning and budgeting processes when management is developing Emergency Response and Preparedness Plans. The cost of supporting after hour work is difficult to forecast for budgeting. When it is all lumped into the salaries budget it can be difficult to track and evaluate. If it's possible to break out the standby costs as well as other emergency overtime. It can be tracked and compared to prior years, preventive maintenance activities, and other proactive efforts. The last district I worked in had some old plastic service line that would fail catastrophically, often in the street late at night. It was quite a large effort to make repairs often creating a great deal of difficulty for our customers as well. We developed a service line replacement program and reduced the monies spent on emergency overtime, equipment, and materials to less than the PM budget for the service line replacements. The savings continued for the following years.

As a manager, be reasonable when your field staff make requests for standby equipment. It is an opportunity for your staff to provide input and feel that they are part of the process as well as appreciated. Of course, there are some requests that can't be fulfilled, so the process of understanding by staff, helps them to understand management's limitations working within a budget.

Lessons Learned

To have an effective response to an afterhours call back is a mix of personnel, equipment, experience, guidance, and preparedness. The infrequent or sometime frequent occurrences can be challenging. If there is time to sit down and talk about the emergency itself, the response, the finished product, and what was encountered along the way, improvement may be possible. Did we have all the parts?

Did we have staff available to assist? Do we have an emergency contractor? Was our equipment in good working condition? Did we respond and perform in a professional manner? What can we do better?

The ability to rehearse a response or take part in a tabletop exercise helps people understand what management's expectations for certain situations are and how they are involved in those situations. This makes a good training session as well as learning experience for your new personnel. It brings together all levels of personnel. From the first responder to managers, giving all involved a chance to communicate and understand, and a chance to make the response better for everyone.

For more information and assistance please contact
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Brought to you by the Nevada Rural Water Association.

Water Scarcity & Water Stress: Understanding Problems and Identifying Solutions

By Brian Helphand, Account Manager, Badger Meter

We often hear the terms water scarcity and water stress used to describe situations where water availability is compromised. While the two terms sound similar, they're not interchangeable. The first step towards a more sustainable, resilient water distribution system is understanding the distinctions and similarities.

Water scarcity describes the condition of not having enough water to sustain a population. Several regions in the U.S.–including the West Coast, parts of the Midwest and areas in the Southwest–are experiencing water scarcity. In some cases, water scarcity is the result of the demand for water exceeding the available supply (e.g., due to population growth). In other cases, it's because once-reliable water sources have been depleted over time (e.g., impacts on the Colorado River from prolonged drought).

Water stress takes into consideration not only water availability but also broader parameters, such as water quality. For example, in Flint, Michigan, water was abundant but poor infrastructure rendered it undrinkable, leading to severe water stress in the city.

What Can Be Done?

There are many factors to consider when addressing the impacts of water scarcity or water stress–but often, the same solutions can be applied to both.

Let's explore some of the long-term and short-term solutions:

Water Conservation

As a long-term strategy, water conservation is a good place to begin–but it's only part of the answer. How water is allocated plays an important role in the effectiveness of a water conservation program. For instance, approximately 70% of the water withdrawn from Lake Mead is used for agricultural irrigation. This leaves only 30% for public supply. Even if every citizen conserved 10% of their water, the total impact would only be a 3% reduction in usage. Regardless, every utility should include water conservation as a component of a sustainable approach to water management.

Water Reuse

Water reuse is another long-term solution that can help reduce dependence on freshwater sources. Advanced treatment technologies can provide access to otherwise unusable sources, like wastewater, for both direct and indirect potable use.

Desalination

In the U.S., about 40% of the population live within 100 miles of an ocean, which makes seawater an easily accessible resource.

Water Scarcity & Water Stress: Understanding Problems and Identifying Solutions (continued)

Desalination, or removing the salt and contaminants from seawater, is a solution–but it's an expensive one, so the cost-benefit must be carefully weighed.

Smart Water Systems

In the short term, utilities serving communities impacted by water scarcity or water stress can realize quick returns by maximizing the efficiency of their water distribution systems. With visibility into every aspect of the system–including flow rates, pressure and, in some cases, temperature–utilities have actionable data for assessing, analyzing and monitoring water across their distribution networks.

By collecting timebound measurements from accurate instrumentation, utilities can gather repeatable and relatable data that allows them to analyze their distribution systems and translate these numbers into actions. Utilities can quickly react to problems like leaks, pipe bursts, storage depletion and pressure loss–and, more importantly, proactively spot trouble before it occurs.

Smart water systems give utility personnel the tools to set conservation goals, track results and evaluate successes and failures, moving their utilities one step closer to their ultimate goals of improving resiliency, conserving water resources and protecting water quality.

What's more, utilities can take advantage of user-friendly, consumer-facing portals that smart water systems provide to make it easy for customers to curb their own water usage. Informed by the extensive data collected from the distribution network, customers can view and track their consumption and make real-time decisions about how to reduce it.

A More Sustainable Future

Water scarcity and water stress pose difficult challenges, but there are strategies and technologies that can help. With the right tools in place, water utilities can begin to make both long- and short-term plans to conserve water and start the journey toward a more sustainable water future.

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Why Is Work Force Development Important for Water Utilities?

By Max Sosa, Workforce Development Specialist

Did you know that the average water and wastewater utility employee is 60 years old? Why should you care? Over the next decade, the water sector is expected to lose between 30 – 50 percent of its workforce due to retirement. Many of these water professionals will leave with decades of valuable knowledge.

It takes more than 380,000 highly skilled water and wastewater professionals to ensure the public supply of safe drinking water and to protect our lakes, streams and groundwater.

This means that even in rural communities, job opportunities exist in the water and wastewater industry.

Other issues determining a need for work force development are:

- New and more advanced technologies for water and wastewater treatment.
- Population growth requires more advanced water distribution and storage systems.
- Advances in reclaimed clean water uses are creating larger reclaimed water irrigation systems.
- New increased regulatory requirements on Emerging Contaminants and PFAS have increased the skills and training required for the Water and Clean-water workforce.

This is a real crisis, our industry must address the need to train the next generation of skilled workers in order to protect and provide the most valuable resource essential to all life.....water.

Utilities can no longer afford to simply put out an employment add and expect to "train and pray."

How did you become an operator?

Before 1988, I never knew that there were career jobs available in water. Did you? I was originally hired as a maintenance helper and did not set out to be an operator. Most of the operators that I know originally applied for a job at municipality and ended up working at a water or wastewater treatment facility.

What is Work Force Development?

In the water field, Workforce Development is a method by which employers improve the skills of their employees to develop the required level of competency required by the utility. This is not simply just on the job training, which gives employees the tools to do their job today.

The goal of Workforce Development is to enable long-term success for both the employee and the utility.

This program is administered by a training partner that manages the training required to meet the needs of both the employees and the utility through continuous training and development to ensure the maximum level of competence.

How is a Work Force Development Program benefited by an Apprenticeship Program?

A Work Force Development Program is supplemented with an Apprenticeship Program that provides a specialized Training Matrix for utilities managed by the training partner. This training matrix would outline a training program for the water or clean water system and track training for participating utility employees. This is an important tool defining direction in learning and development to keep track of progress. Please see the following safety training matrix sample.

SAFETY TRAINING MATRIX

Course ID	Description	Management, Supervisors of low risk work	Supervisors of high risk work	Supervising Faculty	Graduate Students/Post Docs/Visiting Scholars	Teaching Assistants
SO1001	Employee Safety Orientation	M	M	M	M	M
SO1081	Workplace Violence	M	M	M	M	M
SO2017	WHMIS 2015	M	M	M	M	M
SO1100	Supervisor Safety Awareness	M	M	M		
SO1003	Supervisor's Safety Training		M			
SO1007	Inspecting the Workplace	R	M	R		
SO1012	Incident Investigation	R	M	R		
SO1019	Job Safety Analysis	R	M	R		
SO1010	Lab Safety		1		1	1
SO2016	Safe Chemical Handling		1		1	

Legend
M - Mandatory
R - Recommended
1 - Mandatory if hazard present or supervising employees or students working with hazard

The Training Matrix monitors which qualifications are expiring, identifying skill gaps that could be filled by offering further training opportunities in the utility to improve work force development and ensure a journeyman level of competence.

What water careers are available to me by participating in a Work Force Development Program / Apprenticeship Program at Water or Clean Water facility?

Drinking Water Operators:

Perform skilled tasks in the operation, maintenance, and repair of drinking water system facilities. Operators of drinking water facilities provide safe drinking water to the public.

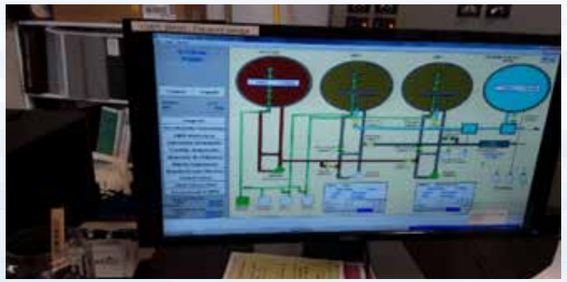
Maintenance Workers:

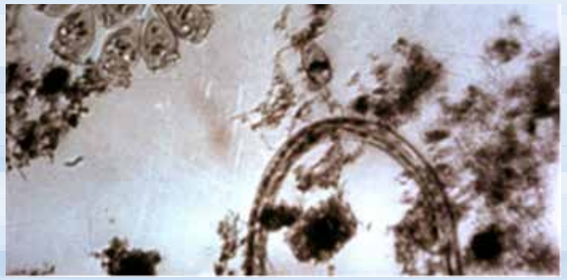
Install, maintain, and repair water services, valves, mains, meters, and hydrants; operate heavy equipment used in water service work; and employ a variety of skilled maintenance trades.

Clean Water (wastewater) Operators:

Ensure water contamination is removed during the wastewater treatment process, through testing samples, proper disposal of bio-solids, and the distribution of recycled clean water to aid in water conservation.

Supporting Careers:





Computer Programmers, Electricians, Instrumentation and Computer Technicians, Cybersecurity, Biologists, Chemists, Laboratory Technicians, Attorneys for Water Rights, Engineers, Water Utility Managers, Supervisors and Administrative Staff.

Renewing the Water Workforce: Improving Water Infrastructure and Creating A Pipeline to Opportunity

By Joseph W. Kane, Fellow - Brookings Metro and Adie Tomer, Senior Fellow - Brookings Metro

At a time when many Americans are struggling to access economic opportunity and many of the country's infrastructure assets are at the end of their useful life, infrastructure jobs offer considerable promise.[1] Workers in these jobs earn competitive wages and face lower educational barriers to entry.[2] They develop extensive knowledge and transferable skills that cut across multiple disciplines.[3] And the coming wave of retirements and other employment shifts in the infrastructure sector means prospective workers can find long-term careers.

The country's water infrastructure is emblematic of this significant opportunity. From pipes and pumps to rivers and lakes, water systems are in urgent need of repair, maintenance, and restoration. At the same time, water workers are in relatively short supply, both for public utilities and a wide range of other employers.

To seize this infrastructure and economic opportunity, the report provides a benchmark of the nation's 1.7 million water workers and lays out a set of actionable strategies–a new water workforce playbook–that local, state, and national leaders should use in future hiring, training, and retention efforts. In the process, the report emphasizes that modernizing the country's water systems and approaches to workforce development offers scalable lessons for other infrastructure sectors.

Water workers fill a variety of jobs and are present in every region

In 2016, nearly 1.7 million workers were directly involved in designing, constructing, operating, and governing U.S. water infrastructure. From water utilities, to specialty trade contractors, to heavy and civil engineering construction, these workers carry out specialized activities crucial to the long-term operation and maintenance of the country's drinking water, wastewater, storm water, and green infrastructure facilities.

Employed across 212 different occupations, including plumbers, electricians, and instrument technicians, water workers embody many of the skilled trades. However, there are tens of thousands of other workers involved in administration, finance, and management roles. Perhaps most importantly, water workers are not isolated to only a few areas across the country, but are employed everywhere, speaking to their enormous geographic reach; they consistently represent 1 to 2 percent of total employment in the country's metro areas and rural areas.

Water workers earn more competitive and equitable wages Water occupations pay well. Their average wage exceeds the national average, and their wage advantage is especially apparent at lower ends of the income scale. Water workers earn hourly wages of $14.01 and $17.67 at the 10th and 25th percentiles, respectively, compared to the hourly wages of $9.27 and $11.60 earned by all workers at these percentiles. These higher wages are also nearly ubiquitous across the water sector, with 180 of the 212 water occupations (or more than 1.5 million workers) earning higher wages at both of these percentiles. This means most water occupations earn a more livable wage in most places.

Water workers often have less formal education and boast many transferable skills

Even with higher pay, water occupations often do not demand much formal education. While 32.5 percent of workers across all occupations have a high school diploma or less, a majority of water workers (53 percent) fall into this category, including carpenters, welders, and septic tank servicers. Instead, water workers need extensive knowledge and skills developed on the job, underscoring the importance of applied learning opportunities. For example, 78.2 percent of water workers need at least one year of related work experience, and water treatment operators, plumbers, and HVAC technicians are among the many large occupations that require two to four years of related work experience.

Water workers tend to be older and lack gender and racial diversity in certain occupations, pointing to the need for younger, more diverse talent

Thousands of water workers are aging and expected to retire from their positions in coming years, leading to a huge gap to fill for utilities and other water employers. Some water occupations are significantly older than the national median (42.2 years old), including water treatment operators (46.4 years old).

Water workers are predominantly male as well, particularly among positions in the skilled trades. Although women make up 46.8 percent of workers across all occupations nationally, they account for only 14.9 percent of the water workforce.

There is a notable lack of diversity in certain water occupations. While nearly two-thirds of the water workforce is white, similar to the ratio found across all occupations nationally (65.3 percent), black and Asian workers only make up 11.5 percent of the water workforce, compared to 18 percent of those employed in all occupations nationally. While the Hispanic share of the water workforce (21.8 percent) actually exceeds the national average across all occupations (16.7 percent), this is primarily due to their concentration in construction jobs. People of color, in particular, tend to be underrepresented in higher-level, higher-paying occupations involved in engineering or management.

Overcoming barriers to water workforce development: Developing a water workforce playbook

Together, water utilities, other water employers, community partners, and federal and state leaders have a long list of "to-do's" to further elevate and expand the country's water workforce opportunity. Not all places are equally equipped to accelerate their workforce development efforts, even if they have an appetite to test out new ideas.

Ultimately, locally-driven actions are crucial to develop new strategies and target new investments, but the scale of the issue demands broader regional collaborations and national support to build additional financial, technical, and programmatic capacity. The country needs a water workforce playbook to accelerate thinking, action, and investment. Informed by site visits across three different regions (California's Bay Area [4]; Louisville, Kentucky [5]; and Camden, New Jersey [6]), an expert roundtable in Washington, D.C., and multiple other conversations with industry leaders, this playbook calls for several actions:

1. Utilities and other water employers need to empower staff, adjust existing procedures, and pilot new efforts in support of the water workforce

Hire and train dedicated staff to meet with younger students, connect with more diverse prospective workers, and explore alternative recruitment strategies

Create a new branding strategy to more effectively market the utility or organization to younger students and a broader pool of prospective workers

Account for workforce needs as part of the budget and capital planning process, while creating more detailed and consistent labor metrics

Update or create new job categories to provide greater flexibility for potential applicants

Develop competency models–or customize existing models–to promote continued learning and skills development among staff

Design and launch new bridge programs, including "water bootcamps," to provide ways for younger workers and other nontraditional workers to explore water careers and gain needed experience

Implement a formalized mentorship program to provide interns and younger workers a clear point of contact and better monitor their career progression

2. A broad range of employers and community partners need to hold consistent dialogues, pool resources, and develop platforms focused on water workers

Identify a common regional "point person"–or organization–to schedule and steward consistent meetings among a broad range of community partners

Hold an annual water summit/meet-and-greet where prospective workers, employers, and community partners can connect with one another regionally

Out of these dialogues, develop a comprehensive water workforce plan, highlighting regional training needs and avenues for additional collaboration

Develop a more predictable, durable channel of funding to support these efforts, driven by public fees and private sector support

Strengthen local hiring preferences in support of more minority and women business enterprises

Create a new web platform to connect water workers and employers, serving as a simple, consolidated site for regional job postings

Launch a new regional academy–designed and run by employers and community partners–in support of more portable infrastructure education, training, and credentials

3. National and state leaders need to provide clearer technical guidance, more robust programmatic support, and targeted investments in water workforce development

Hire or assign specific program staff to serve as common points of contact across relevant federal agencies, with a focus on water workforce development

Supported by federal agencies or other national organizations, conduct a series of dialogues and learning sessions in a broad range of markets to assess water workforce needs and priorities

Develop a common landing page, or repository, that highlights regional best practices and other innovative water workforce development strategies

At a national level, form a "water workforce council" among leading groups to serve as an advisory body, with an eye toward future priorities

With guidance from employers, industry associations, and other stakeholders, establish more versatile and streamlined water certifications nationally

Expand federal and state funding via existing workforce development programs and educational initiatives, including apprenticeships

Expand federal and state funding via newly targeted and competitive grant programs, in support of alternative bridge programs and other innovative training programs

FOOTNOTES

1 Joseph Kane and Robert Puentes, "Beyond Shovel-Ready: The Extent and Impact of U.S. Infrastructure Jobs." Brookings, 2014).

2 Joseph Kane and Robert Puentes, "Expanding Opportunity through Infrastructure Jobs" (Brookings, May 7, 2015).

3 Joseph Kane and Adie Tomer, "Infrastructure Skills: Knowledge, Tools, and Training to Increase Opportunity" (Brookings, 2016).

4 Joseph Kane, "Investing in water infrastructure and workers: Examining the Bay Area's regional approach" (Brookings (blog). March 7, 2018).

5 Joseph Kane, "Looking to hire: Louisville's efforts to expand and diversify its water workforce" (Brookings (blog). April 3, 2018).

6 Joseph Kane, "The water workforce opportunity: How Camden is driving collaborative solutions around its infrastructure and economy" (Brookings (blog). May 14, 2018).

Infrastructure Update: Combating the Mass Exodus of the Water Industry

By Stefanie Massey, licensed professional engineer and certified project manager at AECOM

The water and wastewater sector is witnessing a decline in workers across the country, says AECOM's Stefanie Massey.

Whether it be rivers and lakes or pumps and sewers, water systems are in urgent need of repair and restoration all around the country. According to the American Society of Civil Engineers, by 2019, utilities were replacing between 1% and 4.8% of their pipelines per year on average. Though maintaining and working on such water systems are of grave importance, the water and wastewater industry is witnessing a harsh decline in workers throughout the nation. Texas water experts have expressed concerns about a coming wave of retirements and attrition accompanied by inadequate recruitment to the water workforce. The Bureau of Labor Statistics has projected that 8.2% of existing water operators will need to be replaced annually between 2016 and 2026.

To help bridge this gap, colleges such as Southern Methodist University have created a program and partnered with AECOM and other area consultants and utility owners to prepare and educate future leaders in the water industry. In fact, I was a part of this same program during my senior year at SMU. I have since served as a mentor for nine senior design/capstone project teams, guiding students through the same real-world experience I was given as a part of this program. Programs like SMU's help promote the water industry as well as provide students with real-world, hands-on experience. Each project spans a full school year and includes a real-life problem with public entities that the students address with guidance from their mentor.

Projects have included transportation planning projects with Dallas County, wastewater treatment biological nutrient removal process improvements with the Trinity River Authority, and master planning of a sustainable community with a private client. Introducing students to tangible tasks, such as developing deliverables and presenting them to clients, maintaining a schedule, and receiving feedback from their mentor, will provide them with a springboard to succeed in their early careers.

After going through the program, I know these students feel like they are contributing to something bigger than themselves, and that's unique when you're still a student. For one of my capstone projects, our team looked at creek flows in Grand Prairie, providing analysis and a final report. AECOM used the report to continue the project beyond just the capstone and prepared a final design for the city, which further demonstrated to myself and my teammates the importance and value our research provided to bring this project to life.

Our industry is not one that's advertised widely, so we believe real-world experience is the best way to spark an interest in our field. Many students may come into the workforce with an engineering degree but are unsure of what they can do with it. The program helps them see the possibilities and enhances the overall educational experience.

Climate change, population growth, and aging infrastructure are driving us to adopt new ways of managing water. However, we need more water professionals to meet this growing need to devise solutions to relieve pressure on natural water sources and sewer systems to reduce flood risk, improve water quality and enhance the built environment. As business leaders and professionals, it is up to us to partner with area schools, local organizations, and nonprofits to introduce more students to our respective industries. My passion is centered around educating the next generation of water professionals to help bridge the widening gap between the water industry and young STEM professionals.

Though the water industry is predicted to face several challenges in the years to come, supporting programs and organizations that value STEM mentorship within the industry may be the spark needed to ignite change.

Stefanie Massey is a licensed professional engineer and certified project manager at AECOM.

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