

# H<sub>2</sub>Oregon

Winter 2012  
Vol. 34, No. 1

**OAWU's 34th Annual  
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*OAWU's mission is to provide service, support and solutions for Oregon water & wastewater utilities to meet the challenges of today & tomorrow.*

# Changing Cheese!

by Jason Green, Executive Director



Two small books shared with the OAWU staff over the years, both containing magnificent messages: *The Fred Factor* by Mark Sanborn concerning passion and service at work and in life — turning the ordinary into the extraordinary — going the extra mile; the second is *Who Moved My Cheese?* by Spencer Johnson, M.D. addressing the very thing many struggle with throughout life — change. *Who Moved My Cheese?*, an easy and provocative read, challenging the reader to consider thought process, attitude, perception, behavior, choices and action taken due to, or resulting from change. Many do not like or enjoy change, they fight it, hide from, seek sympathy or get angry about it. Those who choose to adapt will likely, later, identify the many benefits (if observant, thoughtful and humble). While in the midst of change, we are uncomfortable, challenged, tested, emotional, stressed out, holding no answers and, often, have no choice. We are assured the cheese will move or new cheese will be placed in front of us; will you smell it, find it, sample it? We need to prepare for the move; smell and monitor regularly, know when its getting old, adapt to the new or moved cheese, enjoy and savor the adventure of change and new taste, and be ready for the next change! It is an adventure!

I have thought of this cheese book many times this past year as we have faced new challenges and opportunities — each change. The cheese has been moved; not only moved, but as one of our staff commented “Our cheese has changed. It’s a new cheese and I don’t yet know if I like it.” This comment stirred a thought — in years past, I neither enjoyed the taste nor smell of extra sharp cheese; particularly, three year old Tillamook special sharp. Though some might say my taste buds and ability to recognize pungent odor has diminished as I have matured, I prefer refined and developed. Thinly sliced, crumbly, three year aged, sharp Tillamook cheese with a bite of grapes, good bread, possibly a sip of a favorite red wine — I now so enjoy and savor the treat, but ten years ago I would have turned my nose up to it!

A substantial, recent OAWU change (read: impact and change not enjoyed) has been the loss of two EPA programs and associated funding. This loss has directly affected two OAWU staff and the whole *team*. The first was an employee needing to establish a retirement date to match the program (job) ending; the second was a staff layoff. For over 30 years, OAWU has offered valuable free training and CEUs to thousands of utility operators and managers. This free rural water training, upwards of 150 instructional classroom hours per year, was provided through an annual appropriation authorized by the US Congress and through EPA. In the 2011 Continuing Resolution, which authorized the US budget, Congress failed to include this authorization. EPA has indicated they will provide funding for this program, but we have not yet realized this.

Because of the value in free training, OAWU will continue to offer the superior level of no-cost training throughout the state. Our staff have been cut from twelve to ten full-time employees, but our standard of excellence and service in training, technical assistance and legislative representation will remain at the professional level you have come to know, expect and take pride in.

We are challenged with change but not discouraged; optimistic rather than downcast; opportunistic, futuristic and realistic. These, along with dedication of the membership and the water and wastewater utility industry, help us to take pride in being part of and serving in your association. The voice and motto of the servant-minded water and wastewater utility worker, manager, supplier and professional is TEAM OAWU! The value of membership — a unified voice; service built upon hard work, dedication, trust and relationships; experience and expertise; connections in the industry; being a part of the whole; its what we do, its who we are! Take pride in your association and membership standing — you are OAWU!

Wishing you and yours a Happy NewYear! 💧

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# Sacrifice, Goals, Respons

by Hans Schroeder, Circuit Rider

**Sacrifice** the definition in Webster's is "the surrender or destruction of something valued for the sake of something having a higher or more pressing claim."

**Goal** the definition in Webster's is "the result or achievement toward which effort is directed; aim; end."

**Responsible** the definition in Webster's is "accountable, as for something within one's power."

**Prioritize** the definition in Webster's is "to arrange or do in order of priority."

You may be wondering why I am giving you the definitions of all these but these, are some important words I would like you to ponder. How do I achieve the above definitions in my life, with work, home, family and God?

When you set a goal for yourself it does not have to be a long term goal that will take years to obtain. I know when my wife goes to work every day she makes a mental prioritization of the goals she wants to achieve that day on her job. She works for ODOT as a Motor Carrier Enforcement Officer and I have sat with her before, thinking how boring it would be to inspect and weigh trucks for an eight hour shift. However, after sitting with her a few hours on the job, I saw that there is way more to her job than just weighing a truck. She looks for 57 things in the few split seconds it takes to weigh a truck. She makes daily and weekly goals of different deficiencies she wants to look for that may be wrong on the trucks. There are so many rules and she has to be able to explain them to a variety of nationalities when she does an inspection or issues a citation to a driver. She works on her own so she has to be able to prioritize her work and accomplish the things she needs to do on a daily, monthly and annual basis. That is why she sets goals for herself every day.

What sacrifice did my wife give up to become an MCEO with ODOT? First, she had to give up an office job and step out on a limb to apply for a job she wasn't sure was

totally within her comfort zone. Second, she moved away from our family home and children to Cascade Locks, as that is where the job opportunity was. We, as a family, were testing the water. I am away from home a lot and we wanted to try and find a place to live that was more centrally located in the state. This job change seemed like it was God opening the floodgates to help us out. My wife loved her new coworkers and probably got the best training in the State at Cascade Locks for her new job. However, after 4 months we knew it would be an impossibility to sell our family home and it was increasingly difficult to find something near Cascade Locks that would allow us to live with all of our animals. So after some heartfelt discussions we decided it would be best for her to put in for a job back in Umatilla and continue our life voyage here in Athena. My wife continues to sacrifice on a daily basis, she travels 100 miles per day to go back and forth to work. However, she realizes this is where she needs to be for the time being, so she sacrifices many things every day.

My youngest daughter set a goal that she wanted to be on a riding court someday. After dreaming of it for over a year, she set her goal into motion. She prepared my roping horse to be her court horse, prepared a five minute speech to give in front of a crowd of people, obtained and filled out her application, and picked out her clothes and prepared for her big day. She made her riding court and will be either a princess or queen on the 2012 Pioneer Posse Court, but it took her years to fulfill the goal and the aspiration that she had.

My daughter has decided to sacrifice many of the things she loves to be on the court which has become her obtainable goal. First, she has sacrificed playing softball, which she lettered in her freshmen year. She realizes she cannot do a spring sport and fulfill her court obligations to her fullest ability at the same time. Also, she is going to have to give up some of her rodeo activities as she will be riding in parades all over

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# Responsibilities And Prioritization

the Eastern part of Washington and Oregon almost every weekend. The other sacrifices she has agreed to are no summer job and she can't continue to raise hogs during the fair where she makes pretty good money. So, I guess in reality as I write this, her mother and I are sacrificing things too as she will not be able to have her own money to do the things she loves.

Goals and sacrifice: Do we understand that those two things combined can make us into responsible people? I know that is one of the main reasons we encouraged our daughter to try out for the court. Although she has always raised animals (we started off small with a kitten) she kept telling us she wanted to raise and show pigs. We told her if she took good enough care of the kitten she could raise and sell a hog, but it was a responsibility; the animals rely on you for

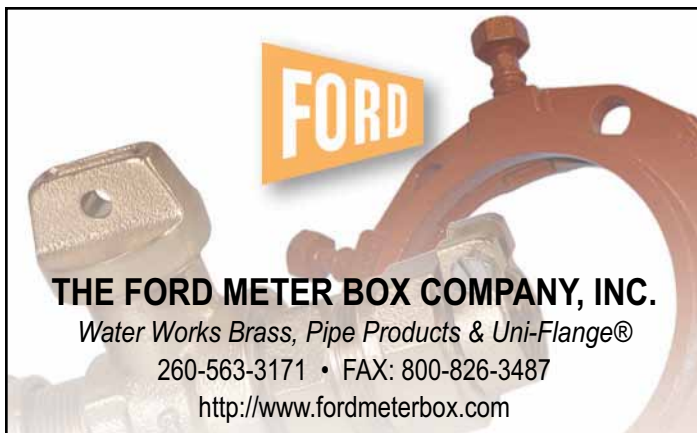
food, water, shelter and cleanliness. After she proved herself to us with the kitten feeding, watering, and cleaning the litter box daily, she had our trust that she was becoming a responsible person. She then got to start raising her hogs, which she has done for the last six years. Even though we instilled this responsibility, there are other responsibilities people need to learn on a daily basis. With her court she has a variety of responsibilities; mentoring younger adults, representing the Pioneer Posse and the City of Milton-Freewater at different parades, and social events, such as: other queen coronations, chamber events, luncheons and civic activities. This is her next step to figuring out the responsibilities of life and what sacrifices she needs to make in order to achieve her goals.

I guess, in my conclusion, it is good for each of us to think long and hard. Do we each have our priorities inline to improve our lives both personally and professionally through our sacrifices, goals, and responsibilities? ♦

## MAKE A NOTE! NRWA Events

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# Why Forgive?

*by Mike Collier, Source Water Specialist*

Doesn't it feel good to harbor resentment toward, give dirty looks to, and even hate someone who has wronged you? The empowerment you feel from these attitudes may be right, even justified. However, it is not worth it in the end because these little seeds of hatred and bitterness will grow and will begin to rule your life. To forgive is to give yourself freedom from the agony and anguish that wells up inside when you think of the person or event that has caused you so much pain.

Even when the perpetrator does not acknowledge your forgiveness or continues to act poorly toward you, the forgiveness that you have conveyed toward them will begin to free you from the self-inflicted torture. The internal release of these bad feelings may not happen immediately, but as true forgiveness takes place you will feel more and more at peace.

As Jesus once said in Luke 23:34, "forgive them; for they know not what they do." In case you don't know the history behind this statement, Jesus was asking God to forgive those that had decided to punish him (even to his death) for crimes he had never committed. His anger would have been justified, but he chose to show the example of forgiveness to us, even when wrongly accused and punished. This is true forgiveness.

Some people need forgiveness continually, they always seem to be hurting you or pushing your buttons. These people are especially hard to forgive, after you have decided to forgive them, it would be good to talk with them about how you feel. If they still do not change, it would make sense for you to try to avoid them and continue to try to forgive them. Removing yourself from their presence will give them less of an opportunity to harm you. At this point you have done all that you can to remedy the situation

and it is time to move on. Sometimes getting such a person out of your life may be the best option and at that point the forgiveness you have been attempting can be further realized.

When you don't think that you have the will to forgive someone for a wrong they have committed against, you think about these stories of forgiveness:

A few years ago there was a shooting of several Amish, the bishop whose granddaughter had been killed visited the wife of the killer a few hours after the shooting and told her that the Amish had already forgiven her husband of this horrible crime. It must have been very difficult for these families to forgive the killer of their children and grandchildren, but they managed to do so just hours after seeing their dead relatives.

This time we have killings of a family by another family member.

"The killings in my family were so senseless and wasteful; I hated the killer. A life sentence with the possibility of parole was way too good for him. I wanted him dead, just like my aunt and three cousins. Most of all, I wanted him to pay for hurting us so much. Bitterness ate me alive, and I knew I could no longer go on as if I were over it. I realized my hatred was no better than the hatred that caused this young man to pick up a gun and blow away his family. Hatred did nothing to bring them back; it only hurt me more. I could either let it consume me or let it go... I no longer harbor venomous thoughts toward the young man who murdered my relatives, nor do I wish him dead. Since he has still not expressed any remorse, I do feel he should be in jail and that justice must be served. But I am free from the bondage of bitterness." (Smith, Lynetta L.)

To forgive is a choice, and it will help relieve anger, hatred, and feelings of ill

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will. It is not easy, especially if you have been truly wronged; but by not forgiving you are allowing the person or situation that is behind your struggle to maintain power over you. Forgiving others is a difficult, but important choice.

Often times it is even more difficult, but is equally important to forgive yourself for the things you have done. As with others, you are only human and you make mistakes. If you are unable to forgive yourself of the things that you have done in the past, it can easily consume your time and continue to be a painful reminder to you. Forgiveness is not to forget. You will probably never forget your past failures, but you can move on from them, learn from them, and grow from these experiences. You don't have to allow them to depress you or stress you out for the rest of your days. You cannot run from yourself and you cannot hide from your feelings; it is much easier and better, in the long run, to choose to forgive. ♦

Reid, Tim. Nickel Mines, Pennsylvania. Times Online October 5, 2006. *Amish Bury Their Girls and Forgive Killer and His Family.*


Smith, Lynetta L. *Freedom from the Past is Possible in the Present.*

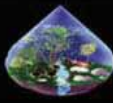
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# Tiny Bubbles

*Submitted by Heath Cokeley, Circuit Rider*

*For my magazine article this month, I was going to write an article on entrained air in the distribution system and possible causes for it. While doing research though, I found that a previous Circuit Rider for OAWU, Don Van Veldhuizen, had already written an article on just that topic. Since Don did such a good job capturing and explaining the issue of entrained air, I decided to republish his article from the winter 2005 issue of H2Oregon. I hope this article is helpful to those systems that are experiencing this problem and, like always, feel free to give one of your circuit riders a call for help, if need be. I'll see you all down the road.*

## **SATURATION POINT "TINY BUBBLES"**

*By Don Van Veldhuizen, OAWU Circuit Rider*

Does your water appear like champagne straight from the tap? Is it cloudy from all the tiny bubbles coming out of solution? Are you hearing, a not so sweet song of, complaints from your customers? This nuisance at the water tap does little to make you feel happy or make you feel fine. Besides being unpleasant at the tap and the singing of unhappy customers, it can lead to other problems such as increased corrosion problems and/or cavitation in pumps. So, let us take a closer look at this nuisance.

Tiny bubbles at the tap are usually caused by one of two items: trapped air in the distribution lines or water being supersaturated with gasses. Let us ask a few questions to focus in on the cause of this bubbly situation. Was recent construction done in your distribution system that may have introduced air? Does your system have high areas without the means of releasing air? What are the characteristics of your water entering the distribution system (Dissolved Oxygen, Temperature, etc.)? Is there a broad range of operating pressures in your distribution system? Being that oxygen is simple to test for, we will use Dissolved Oxygen (DO) as a reference.

Keeping it simple, try flushing your system. In most cases, this will remove large amounts of air from your system and may

be all that is required to solve the problem. Hopefully, no further action is required. If the customer complaints begin again we must look deeper in order to find the root cause that is giving you grief.

## **UNDERSTANDING WATER AND OXYGEN:**

All water can and will absorb oxygen. The amount of oxygen absorbed is determined by the following factors; temperature, pressure, purity of the water, source water characteristics, and treatment.

**Temperature:** Cold water will absorb and hold on to oxygen more readily than warm water. Here in the Northwest, with the colder temperatures and depending if your source is surface or ground water, it is not uncommon for DOs to exceed 10 mg/L. The relationship of the saturation point of oxygen directly relates with temperature, the colder the water, the higher the saturation point.

For example: water in the distribution system is 12 degrees C and is saturated, if that water is allowed to remain in a household plumbing it may warm up to, let us say 23 degrees C. The water coming out of the tap is now super-saturated and oxygen will come out of solution.

**Pressure:** Also, be aware that higher pressures have a higher saturation point. Taking for example a distribution system has a pressure of 40 psi; this water can have a higher saturation point than that of water coming out of the tap at zero psi.

**Purity of the Water:** Pure water more readily accepts oxygen, thus making many of the new, state of the art technologies more prone to having saturated water in the distribution system.

**Source Water Characteristics:** Surface water sources contain more oxygen than ground water and during high algae periods, water may become supersaturated. Depending on your system, this usually is reduced during treatment.

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**Treatment:** Disinfection using ozone also increases oxygen in the water and often requires stripping of the oxygen prior to distribution.

#### DETERMINING CAUSE:

If, after flushing your system, the tiny bubbles return a distribution profile will help tell the story about what is happening in your system. Samples should be taken in affected and unaffected portions of the systems with two samples taken at each site and at the cold-water tap. One immediately after the tap is turned on and the second after the tap has ran a few minutes. This will assist in determining if the problem is local to the sample point or in your distribution lines. The profile should contain both temperature and DO.

The samples should be taken in such a way that minimal turbulence occurs and it is recorded immediately. Compare the results with the following scale. If the DO is greater than or equal to the Saturation Concentration for the given temperature the water is supersaturated and gasses are being released.

Once the cause is determined, appropriate action can be taken to resolve the problem. The solution may involve pressure reduction, air

Temperature, °C	Saturation Concentration mg/L	Temperature, °C	Saturation Concentration mg/L
0	14.621	16	9.870
1	14.216	17	9.665
2	13.829	18	9.467
3	13.460	19	9.276
4	13.107	20	9.092
5	12.770	21	8.915
6	12.447	22	8.743
7	12.139	23	8.578
8	11.843	24	8.418
9	11.559	25	8.263
10	11.288	26	8.113
11	11.027	27	7.968
12	10.777	28	7.827
13	10.537	29	7.691
14	10.306	30	7.559
15	10.084		

Source: Adapted from *Standard Methods for the Examination of Water and Wastewater*. 15th ed. 1981.

stripping, source water changes or other items that may be appropriate to the systems equipment and resources. 💧



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# SB 3874 – Reduction of Lead in Drinking Water Act

*by Scott Berry, Circuit Rider/ Programs Manager*

I have recently received several questions about the Reduction of Lead in Drinking Water Act. What is it?

The most recent development in federal regulations governing the lead content of drinking water system components is the enactment of the Reduction of Lead in Drinking Water Act, signed into law by President Barack Obama in January 2011. The Act effectively reduces the permissible lead content in plumbing fittings and fixtures by further modifying the SDWA definition of lead-free. However, rather than setting new lead limit benchmarks, the Act effectively brings federal lead content limits in line with those already in force in California and Vermont and adopts lead content assessment protocols consistent with those developed in support of these state regulatory efforts.

Under the Reduction of Lead in Drinking Water Act, the SDWA definition of the term “lead-free” has been modified to reduce the maximum lead content to “not more than a weighted average of 0.25% (lead) when used with respect to the wetted surfaces of pipes, pipe fittings, plumbing fittings, and fixtures.” At the same time, the Act retains the 0.20% lead limit for solders and flux first implemented in 1986 and stipulates a method for calculating the weighted average lead content.

Exempted from the provisions of the Act are pipes and plumbing fixtures that are used exclusively for nonpotable water services, such as those found in manufacturing and industrial processing applications, and for those used in outdoor irrigation and watering systems. Also exempt are toilets, bidets, urinals, flushometer valves, shower valves and water distribution main gate valves two inches or larger in diameter.

The provisions of the federal Reduction of Lead in Drinking Water Act come into effect in January 2014. However, more restrictive state limits are already in effect in California and Vermont, and new lead content restrictions are set to take effect in Maryland in January 2012. Therefore, in an effort to achieve market acceptance in these and other states, it is anticipated that manufacturers will bring their products into compliance with the new federal lead content limits as soon as possible.

There has been very little “buzz” on the state level about this new legislation so far but it is generally perceived as a positive change to the SDWA by the regulatory agencies. There are a number of larger utilities considering maintenance, repair and replacement concepts and practices affecting water meters and associated cost.

In the next issue of H2Oregon, I will explain the amendments to NSF 61 that have been initiated as a result of this bill.

For further reading and a full text of the bill, refer to:

[www.ul.com/global/documents/offerings/perspectives/regulators/environmental/UL\\_Lead%20Levels%20DrinkingWater%20SystemComponents.pdf](http://www.ul.com/global/documents/offerings/perspectives/regulators/environmental/UL_Lead%20Levels%20DrinkingWater%20SystemComponents.pdf)

And:

[www.awwa.org/files/GovtPublicAffairs/PDF/S3874.pdf](http://www.awwa.org/files/GovtPublicAffairs/PDF/S3874.pdf) ♦



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# What Are The Results?!

by David Branham, Wastewater Technician

What!?! , you may be asking yourself, is old Dave up to this time? What does he mean “what are the results?” Well, back up on the soap box I go.

I am talking about your laboratory results of course; you *are* doing lab testing—aren’t you? We only have a lagoon may be the cry, or we are busy, we don’t have time, or the lab tests cost too much money.

OK, now that I have your attention let’s talk. Laboratory testing and your ability to interpret the results is the navigational system for your wastewater system. Without them you’re just taking a shot in the dark. With that said, let’s take a closer look at what the test results can and will tell you.

It has been said by some that “*we don’t need no stinking microscope*” or “*the city won’t buy us a pH meter*”, nonsense I say!!! GET THE TOOLS YOU NEED AND USE THEM. Does a mechanic work on a car without a computer analytical readout or a doctor analyze a problem and write a prescription without any lab work? Of course not, that would be ridiculous. The same thing applies to operating your wastewater system.

Two of the most important things you need to know in order to operate a wastewater system are a basic knowledge of chemistry and of microbiology. I have been told by more than one lagoon operator; “I have run this system for years without knowing any of that”. Operators that tell me such things have been very lucky. Many times I have been called and asked, “Why is the chlorine residual not registering?”, “Why is the pH at 11?”, or “Why is there an algae bloom happening?” What do you need to do? You can probably guess what the first question I am going to ask you will be, “*What are your lab results telling you?*” I don’t know is not an acceptable answer to give to the DEQ, EPA, or the River Keepers if they are monitoring your system.

What about the activated sludge plants? Little is more disturbing than to get a call for help from a system about a foaming problem and when asked what DO they are running at, to be told that the DO meter is broken and hasn’t worked for some time. OK, guess what type of “bugs” really, really like a low DO. Hmmm, maybe a little microbiology may come in handy here. Alkalinity, pH, and DO are critical factors in the operation of your plant. How much ammonia is entering your facility via influent and a side stream? What form is it in? Yes, it does make a difference, this is the chemistry part.

If I have sounded a little harsh, I meant to be. The days are gone when I could grab my tool box and fix a problem underneath the hood of my 57 Chevy, now it takes special equipment and training to fix a problem under the hood of my 2011 Chevy. The same goes for all of the new wastewater plants, no longer can one go out and just turn a valve, most operational controls are now done by computer.

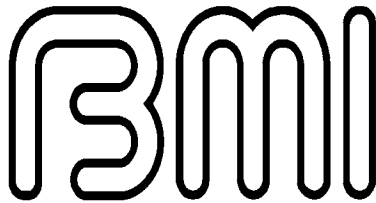
The environmental rules and regulations are getting more restrictive as each year passes. As my late, good friend, Jeff Swanson, used to say, “The days are gone when an operator could grab a coffee cup, fill it to the mark on the side of the cup, and say ‘yep, takes about this much chemical to do the job’.” SB 737 has changed all that. With 118 contaminants listed that are to be removed at the wastewater plant. We, as an industry, will be going from parts per million (PPM) to, in some cases, parts per billion (PPB). The cup will no longer work; measurements will need to be precise.

You, as an operator also need special training to keep up with the industry. Many classes are offered through OAWU and our community colleges. If you are weak in microbiology and/or chemistry, take the initiative and enroll in a course at your local college. 💧

See ya down the road, Dave

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# What Do The “Studies” Say

*by Jack Hills, Source Water Specialist*

How often do we see headlines and titles saying “Studies show that...” and wonder, where do all these studies come from? Are they valid? Has the work and effort put into this study been performed in an unbiased manner, or was there a certain result they wanted as an outcome to emphasize marketability? So, with curiosity, we review the studies, consider the data input and who is promoting something, with an eye for how it may be in their own best interest.

I receive cyber space notices of things pertaining to “drinking water” (and that can be taken both as a verb and a noun). There is a lot of information floating around out there that I thought would be interesting to share with you; both for education and entertainment.

## **Drinking Less Water Tied to High Blood Sugar**

Here’s a French study that says drinking less than two glasses of water a day may be tied to high blood sugar levels. So with more than 3600 participants over a nine year period they found that 19 % drank less than half a liter of water a day. Out of all the participants, 565 developed high blood sugar and over 200 developed type 2 diabetes. The report concluded no statistical link between water intake and risk of developing diabetes. One obvious connection with high blood sugar would be that people who drink less water might be reaching for the sugary drinks. However, the study said they accounted for sugary drinks, increased body weight, exercise levels and other health factors; still connecting a link between high blood sugar and low water intake. The final result was: further studies needed. Replacing sugary, high calorie drinks with water would be a good idea for anyone.

## **Drinking Water Can Up Your Resting Energy Expenditure by 25%**

Did you know that drinking water can up your resting energy expenditure (REE)? A study of overweight children concluded that consuming the recommended daily amount of water could result in an energy expenditure equivalent to an additional weight loss of about 2.6 lbs per year.

## **Water Treatment Disinfectants Up Alzheimer’s Risk**

All of you operators have heard about disinfection byproducts (DBPs) and know that the EPA regulates some eleven (11) of these, but studies have discovered more than 600 DBPs. Some of these are toxic and many have little biological information available. Result: more warnings that there is a possible connection to adverse health effects, including neurological diseases such as Alzheimer’s.

## **Clean Drinking Water on the Go**

How about a “clean water straw”? Actually this has been around for awhile (since 2005); a “straw”, similar to a small syringe, is used by an individual to effectively and instantly remove bacteria and protozoa. It claims to be good for some 4700 gallons of water. They have been effectively distributed in earthquake and flood disaster areas like Haiti, Pakistan and Thailand.

## **Pocket Sized Lightweight Water UV Sterilizer**

Here’s a handy looking gadget. A pocket sized lightweight water UV sterilizer. You know that some water systems use UV light as a method of treating drinking water for consumption. Now an individual can carry his own pocket sized unit to treat a pint of water in less than a minute. You charge it with a micro-USB and the unit’s life expectancy is for some 1000 gallons of water or about 80,000 uses.

## **Inexpensive System Can Disinfect Water**

Oh, so you don’t want to make UV from an artificial source? This research is using UV light from sunlight to disinfect drinking water on a larger scale. By capturing sunlight on a parabolic reflector focused onto a transparent pipe of continuously flowing water, larger amounts of water are being treated. This also has a great potential for inexpensive water treatment technology for developing countries.

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# ay About Drinking Water?

## Study Finds Traces of Drugs in Drinking Water in 24 Major US Regions

Here's one for Source Water Protection; an investigation by the Associated Press shows a vast array of pharmaceuticals have been found in drinking water supplies of at least 41 million Americans. The concentrations are extremely small, measured in parts per billion or trillion. But scientists are concerned about long term consequence to human health. People take medication but only some of it is absorbed. The rest is passed through and into the wastewater stream. Wastewater is treated before it is discharged to streams, reservoirs and lakes. Then water is treated again at drinking water treatment plants. However, most treatments do not remove all drug residues.

In Source Water Protection we advocate pharmaceutical drop offs as the preferred

disposal of unused medication and drugs and not to flush them into the water cycle.


Studies and new technology abound today. Those I've mentioned are only a few filling our cyber space information highway. I'm sure if you enter the topic titles into your internet search engine, you will find the same ones I've used and be able to get more of the study details than I've generalized here. You can also enter your specific topics of interest and tap into the vast source of available information. This is definitely an interesting age to be a part of, watching technologies and ideas flourish into ways to protect ourselves and improve the lives of others all over our planet.

Hot off the internet! Here's another study that just came in before sending this to press.

## Drinking Water from Plastic Pipes – Is It Harmful?

A Norwegian study was to investigate whether leakage of products from the manufacture of a plastic called cross-linked polyethylene (PEX) caused any harmful health effects and if they affect the taste or odor of drinking water. Well, that's an attention getter because we've been using PEX piping in new home construction now for quite some time. Good news! The study shows no health risks associated with drinking water from PEX pipes. There may be taste and odor but it dissipates over time. Some volatile organic compounds were found, but these were generally low and reduce with use. And they found no correlation between the production methods and any substance that leaked from the product. Whew! Keep your Source Water safe. Call OAWU if we can assist you. 💧

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# Asset Management: A New

by *Tim Tice, Projects Manager*

Emergency response planning, water system security, and now “asset management” are designed approaches to various areas of a water system in order to better prepare for both small and large occurrences that impede normal flows, and yes, looks at the future as it relates to being fiscally responsible, etc.

Asset management in a nut shell is the long-range managerial planning and financial projections required to maintain a quality level of service at your utility. This approach should be implemented and reviewed at regular intervals. Relating from a personal perspective, a number of us look at the roof or paint deterioration of our homes to determine the time-frame regarding repair. Many times we put these tasks off simply due to time or money. One aspect of asset management is getting the most value from each component. A good example of getting the most value from a component is a set of tires. Regular tire rotation, air pressure checks and driving habits are good management strategies for extending the life of tires. Straightening out the curves on a meandering road can reduce tire wear, yet never on a blind curve. We don't have to apply such strategies, but has anyone priced a set of tires lately?

Look at your assets in a straight-forward approach. Categorize the water system under four main headings: water source, treatment, storage and distribution. Each of the main headings can then be labeled into smaller components.

Not all assets hold the same monetary weight nor are they created equal. You as an operator/manager have to ask, what is the likelihood and/or the consequence of failure of any one specific component? The best case scenario for any water system is to completely rebuild the entire system and have it fully paid for the following month. Reality is, systems are becoming dilapidated as the savings envelope fades to non-existence. Components are not designed to last forever.

Knowing and understanding the utility through the process of asset management

will certainly make a better informed decision in regards to the system as a whole. To begin, review the remaining useful life of each asset, and attempt to figure the replacement cost. Review how the system operates, its shortcomings, the weak links that may prove a cause for concern both in near term and long term time frames. Example: System ABC only has 18 hours of stored water at normal flows if the system were incapacitated. System ABC is in need of more storage. Someone should pursue in obtaining an estimate for the cost of building an additional storage tank, or increasing the capacity of the existing tank, if possible. Other factors will certainly play a role in the overall cost, but an initial figure is the first step in the process.

There are many resources that can guide us in developing an asset management outline. The Environmental Protection Agency has a formula design to assist in determining the useful life of any one particular asset.

$$\text{RISK} = \begin{array}{l} \text{Probability of Failure (PoF)} \\ \text{multiplied by} \\ \text{Consequence of Failure (CoF)} \end{array}$$

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A while back a story was shared with us where a water system discovered eight repairs to a main water line within a span of one hundred feet. All eight repairs were completed at different times, all eight repairs spanned over fourteen months. Are we being forced to live in a mode of tripping over dollars to pick up pennies? It is due time to replace the line.

Once the assets have been categorized, the utility has a very decisive, proactive method to establish sustainability practices. Create a matrix and use it as a tool to inform the decision makers and consumers about the requirements necessary to keep the financial forecast under sunny skies. One would be surprised at how easily communicating these founded concerns with the decision makers and consumers can be as the system

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# v Approach

assessment reveals the weak links. Capital improvements plans are developed by asset management studies.

Keep in mind the timeframe that summarizes the study your utility is looking to develop. A ten year plan for all intense purposes seems to capture most utilities under one umbrella. Establish a benchmark of projected cash flows that will assist in future system growth or remain at current or better operating efficiencies.

Looking the other way when concerns arise will not make those needs go away. If you wish to place a bucket under the leak in your roof, that is one's prerogative. Operators today have more on their plate than in years past. Our ability to function at higher levels today is also a truth that we can realize and capitalize on, no pun intended.

The "financial" area of system operations is one of three core elements regulated under the rules 333-061-0061(2) (d) "Financial Capacity for Public Water Systems". The importance of being fiscally responsible is proving to be of greater importance as systems wear out. Asset management, like each of our major responsibilities, needs proper attention for continued sustainability.

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# Streamflows

by Bruce Hemenway, OAWU Retiree

Streamflow measurements are, or at least can be, critical to a water system that depends upon a surface water source to provide a domestic water supply for the customers they serve.

Streamflow measuring is a very interesting science and is also an accurate measurement of discharge in a stream or river. Both velocity (feet per second) and discharge (cubic feet per second) are determined. The USGS has been supplying dependable flow data on many of the streams and rivers in the United States for over 115 years.

Stream-gauging involves obtaining a continuous record of stage. Stage is the record of the height of the water surface at a location along a stream or river. Stage in conjunction with periodic discharge measurements, also referred to as streamflow measurements, can be applied to a stage-discharge relation, to obtain a continuous record of discharge.

Once a stream gauge, such as a staff gauge, has been installed in conjunction with concurrent flows at a given location, and a stage-discharge relationship has been built, a reading from that gauge can divulge the amount of water flowing in a stream or river. This information can be vital to a community water system in a drought water year, allowing the water system to allocate water accordingly. Information gathered from a staff gauge can also help predict when high water can become a threat and flooding may begin.

The velocity is measured using a current meter. The most commonly used is a Price AA current meter. This meter has a wheel of six metal cups that revolve around a vertical axis. An electronic signal is transmitted by the meter allowing the revolutions to be counted and timed. The rate at which they revolve is directly related to the velocity of the water. The Price AA meter is designed to

be attached to a wading rod for measuring flows that can be waded into. The AA meter can also be mounted just above a weight suspended from a cable and reel system for measuring in fast or deep water. In shallow water the Pygmy Price current meter can be used.

Once a location is chosen for flow measurements, an engineers tape is stretched across the stream perpendicular to the flow. To assure accuracy of the AA meter, a spin test must be preformed both before and after each set of measurements to assure the current meter is performing correctly. The meter must be held level, giving it one spin with your finger and then timing the meter until it comes to a complete stop. It must spin for a minimum of two minutes. This is to be done in a location free from any air movement, such as in the interior of a motor vehicle with all windows closed.

Subsequently, the AA meter is then attached to the wading rod. The cords used to transmit the signal from the meter to the head phones are to be secured to the desired lug, either giving one signal for each revolution or one signal for every five revolutions.

The stream is to be measured from the left edge of water to the right edge of water. This is determined by looking downstream. There will need to be at least twenty measurements made, called sections. Although one person can perform all the functions to gather this data, it is desirable to have two people for both ease and safety.

After the measurements are completed, the math will next be done to determine the velocity and flow of the water at that location. If a staff gauge has been installed, in a secure location along the bank of the stream or river, a correlation can then be made between the flow and the water level on the staff gauge. Periodic measurements will need to be

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made to parallel the flow in the watercourse to the gauge.

Oregon Association of Water Utilities Personal recently completed measurements on a stream in Eastern Oregon. One measurement was made in the fall during the low flow time of year. A second was completed in the spring during a more high flow period. Then, an average of the two measurements was made and used to determine the time of travel of the water in the watershed. Using this information, a watershed protection area could then be established.

OAWU personal have both the tools and the expertise to perform streamflow measurements, in flows that can be waded, to collect streamflow data. If your system has need of streamflow measurements for determining time-of-travel or for knowing the volume of water coming from your watershed, we are capable of providing that information for you. This is just one more way in which your association is able to serve you.

In closing, I'd like to share a true story that perhaps you may find interesting. This actually happened to one of the past OAWU employees, yet not while he was employed by OAWU.

He had spent the day doing stream flow measurements, yes, he was by himself.

Finished, he started back down the trail to where he had stashed the bosun's chair, also called a boatswains chair in the brush. The bosun's chair in this application, hung from a cable which was suspended across the main channel of the river. To access the far side of the river, one could ride the chair crossing to the other side.

As this person left the trail to get the chair, he noticed movement on the hillside to his left. It was two dogs that were, at one time, domestic. One was a German Shepherd mix and the other a Lab mix. They were running at him at a fast pace, teeth bared and growling. The two dogs then stopped and so did he.

They were about 150 feet apart at that point. What he did next was what came to mind next. He never knew where the thought came from, except it was from deep inside. He had already broken the first rule; don't make eye contact, as this is a sign of challenge.

He started running right at them, hollering at the top of his lungs and wildly waving his arms in the air as he ran. Once again the dogs started in his direction, but not at such a fast pace as at first. They stopped again and so did he. So he decided to do the same thing again, which brought him within 20 feet of them. At this point, the dogs turned

and went back up the hill in the direction from where they had come.

This person has always been glad that he thought to do that yelling thing, but also just as glad that nobody had seen him do it. If someone had, they may have been wondering, which was most in harm's way, the dogs or the human.

Two lessons were learned that day. The first lesson learned was, never again should he go by himself to do streamflows without some protection. The second, and possibly the most important lesson he learned from that experience, was we do not need to live our life in fear. Sure, sometimes bad things happen to good people. We can read about those accounts in the newspaper. But, for the most part, we can and should live our lives in confidence so that when we are faced with the rare and unusual circumstances in life, we will have the ability to make quick, sound decisions, "On The Run".

You can call to make an appointment for OAWU to do those streamflow measurements for you. Hopefully, this can be done without the presence of domestic dogs gone wild.

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# Cultural Exchange Experience

*by Doryana "Dory" De Gradi, International Exchange Student*

Ciao (Hello) everyone,

My name is Dory. I am an exchange student from Italy. I live in Viotto Di Scalenghe near the larger city of Turin. My little town is surrounded by the Alps, where every winter there are a lot of tourists that go there to ski and to relax in our spas.

My host family is Mark and Janet Russell. We live in West Salem where I am a senior at West Salem High School. I will be in Salem until after graduation in June.

I decided to come to the United States of America because I was really curious about the schools' organization (and to learn English, of course). Everything is really different! The teachers are wonderful; being a teacher is a good job and they are happy and proud to be teachers. Students can choose the subjects and their level of difficulty. This is really good, so if you are really smart, you can keep going. And you don't have to wait for who is slow or who doesn't care about school and doesn't want to study.

In the future I really hope to have a job that allows me to fly a lot, let me experience different cultures and food; this is something exciting. That's why in my country I am attending a school that is oriented to tourism and languages.

While I am here, I'm really looking forward to volunteering with OAWU at the 34<sup>th</sup> Annual Management & Technical Conference at the Sunriver Resort. That will help me to learn about the water and wastewater industry, which will provide a way for me to complete a community service requirement for my graduation in Italy.

I can't wait to participate at this year's Sunriver Conference.

See you there,

Dory 💧



# The Board Corner

by Mark Snyder, OAWU Board President

Greetings to our members, associate members and friends of OAWU!

This article begins a quarterly series that will feature opinions, comments and overviews by various members of the Board of Directors of OAWU.

This "corner" will be a means to communicate with the membership-at-large on issues that are important to all of us, as our association moves forward in this economic and political climate.

Many of the federal programs that have historically supported the National Rural water Association are being reduced or completely abandoned in this peculiar political arena. Reductions in support for circuit riders, throughout the United States is one example.

The Oregon Association of Water Utilities, under the leadership of Executive Director Jason Green, has seriously taken steps to evaluate alternatives for the OAWU Staff and our state-wide presence in Oregon.

As members of OAWU what can we do to support our association?

I would suggest the following:

First: Patronize the Associate members with your budget dollars. To me, it makes "no sense" to contact those firms that invest in OAWU, whether it is safety equipment, pipe and valves or radio telemetry systems.

Second: Support each other and our new members as we move forward together, in this new economic reality. Let others know that OAWU is a valuable resource in Oregon, and especially to their system's success.

Third: Use the professional services of OAWU in rate studies, training of staff, or compliance issues such as the water system operation and maintenance manuals. The long list goes on....

Thank you. We succeed together! 💧



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# Why is H<sub>2</sub>S Important To You?

## *H<sub>2</sub>S (Hydrogen Sulfide Gas) Odors and Corrosion*

By Rick Allen, CEO for BioLynceus

H<sub>2</sub>S gas is one of the most critical issues facing wastewater operators and collections professionals today. Of course, most town administrators, wastewater operators and collection professionals are aware of and concerned about odor complaints. These are inconsequential in comparison to the real reasons H<sub>2</sub>S is a critical issue.

There are many more reasons for it being a CRITICAL ISSUE, but most importantly because it is highly lethal at even small concentrations. Although we see varying graphs on the toxicity of H<sub>2</sub>S, every one of them agrees that H<sub>2</sub>S will kill you instantly at 1000 parts per million (see chart below). The tragic part of this is that we have over 1000 reported injuries and several deaths each year related to H<sub>2</sub>S exposure. Just recently in one western state two operators were killed. Ironically the national statistics are true. Twenty-five (25%) of all fatalities from H<sub>2</sub>S are rescuers. My recommendation is that you should always have at least 3 people on-site when doing any enclosed space work. If you do not have three employees in your department, then take the mayor or a town council person with you. It will be interesting to see the feedback I get from this suggestion! The person in the enclosed space has to be equipped with the appropriate rescue gear (i.e. vest, roped off to approved extraction equipment and any other devices recommended by OSHA).

**Do not be lulled into a false sense of security by the fact that you do not have anaerobic digesters or forced mains.** One of the down sides to H<sub>2</sub>S is that you never know where it exists unless you are using proper detection equipment. Your nose is not considered proper detection equipment! For many years, it has been accepted that H<sub>2</sub>S only exists in anaerobic environments, such as anaerobic digesters and usually forced mains. We

are finding that H<sub>2</sub>S can be anywhere in your system. Anytime you have bacterial degradation on sewage, you can have H<sub>2</sub>S. We have seen it in gravity collection systems due to low flows, bellies in the lines and blockages.

What do you need to know right now that could save you from injury or even death? If you are working in any enclosed space within a wastewater system, you have to have, at the very least, a hand held four-gas monitor. These are available from many sources such as Pollard Water, USA Blue Book, Hach and many others. The cost is minimal in comparison to being injured due to H<sub>2</sub>S. If your community is not willing to buy you the equipment, have them call OAWU or me. We will make every effort to educate them on the necessity of the monitor.

Here is another reason that H<sub>2</sub>S is considered a CRITICAL ISSUE. It is responsible for billions of dollars per year being spent to repair infrastructure damaged by corrosion. It is estimated that \$45 billion dollars a year is spent on these repairs. We have seen manhole covers and the surrounding concrete destroyed by H<sub>2</sub>S. I have seen the metal doors on the head works building destroyed by H<sub>2</sub>S. And there are many other stories and pictures we have accumulated over the years.

Now, after all this depressing news, what can you do to control H<sub>2</sub>S? There are many solutions on the market today. Some of them are really good and some are not. Some are really expensive and some are not. The one thing that is known for sure about H<sub>2</sub>S is that the most expensive solution may not be the best for your situation. The solutions come in many different forms of mechanical, chemical and biological. I am not going to address the effectiveness of any solutions in this article, however I would recommend doing your homework before

hand. There are many solutions being recommended that require hundreds of thousands of dollars in equipment and infrastructure to set up and use. There may be more cost effective controls. Also, investigate the O & M costs of any solution you are considering. Recently, one community decided to use raw water to flush the forced main to alleviate H<sub>2</sub>S. This means they will be treating 1.5 million gallons of sewage at the plant instead of 1 million gallons. What is the cost of processing an additional 500,000 gallons of sewage daily? Mechanical can include things like ventilation, filtration and dilution. Chemical solutions come in all kinds of compounds from peroxides to nitrates to even chlorides. Biological solutions come in many forms from live microbial to enzymes to chemicals that claim they are biological. Be aware that all solutions are not created equal and need to be researched. Many of the solutions being offered today are band-aids to the problem and some are the cure. Several of the solutions being offered in today's market are anti-bacterial in nature, meaning that the compound has properties that could be too low or too high in pH.

There are many positive and negative aspects to each solution. The first question you should ask is: if I use this solution will it be harming the bacteria that I need for my system to work properly? Biodegradable does not necessarily mean that it will not affect your microbial populations in your lines or WWTP.

Remember that when looking for solutions you need to look at the cost of installation, the cost of operations and maintenance, and any requirement to sign a long-term contract and obtaining third party verified analytical from the supplier. If you would like further information on H<sub>2</sub>S, please feel free to contact BioLynceus at 888-823-7404

Oregon Association of Water Utilities

Source for this information is Wikipedia:

- 0.00047 ppm is the recognition threshold, the concentration at which 50% of humans can detect the characteristic odor of hydrogen sulfide, normally described as resembling “a rotten egg”.
- Less than 10 ppm has an exposure limit of 8 hours per day.
- 10–20 ppm is the borderline concentration for eye irritation.
- 50–100 ppm leads to eye damage.
- At 100–150 ppm the olfactory nerve is paralyzed after a few inhalations, and the sense of smell disappears, often together with awareness of danger.
- 320–530 ppm leads to pulmonary edema with the possibility of death.
- 530–1000 ppm causes strong stimulation of the central nervous system and rapid breathing, leading to loss of breathing.
- 800 ppm is the lethal concentration for 50% of humans for 5 minutes exposure (LC50).
- Concentrations over 1000 ppm cause immediate collapse with loss of breathing, even after inhalation of a single breath. 💧

# System O&M Manuals Required

## *Have you completed your state-required Operations & Maintenance Manual?*

Oregon Association of Water Utilities has prepared a full day class to assist operators in outlining an operations and maintenance manual per the Oregon Administrative Rule 333-061-0065 which requires each water system to develop an operations and maintenance manual.

This class will assist the water and wastewater system operator in outlining the specific points in developing the draft of the O&M manual. Step by step, each attendee will create their draft as it relates to their utility system during class. The e-file may then be completed back at the system office.

Class cost is \$150, or if you are unable to attend a class you may purchase a thumb drive with e-files for \$150.

To sign up for the October class, or to have a thumb drive mailed to you, contact your Association for further information. 💧



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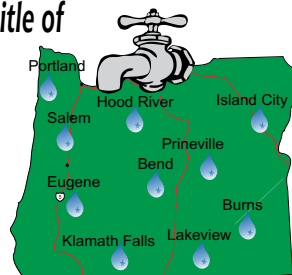
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### Contest Rules:

Entrants must be an OAWU Member and in State Compliance.

Bring a clear, clean container of no more than a gallon (mason jars work well) of your system’s drinking water to the Annual OAWU Conference in Sunriver. 

Entries must be submitted to the OAWU registration desk located in the Great Hall by 3:00 pm on Tuesday, March 6, 2012.

A panel consisting of non-partisan judges will determine the winning Ground and Surface water entries based on clarity, smell, and taste.

The overall “BEST DRINKING WATER” will go to the national drinking water contest in Washington, D.C.

The winners will receive a plaque of **Excellence!** to exhibit in their community.



OAWU’s mission is to provide service, support and solutions for Oregon water & wastewater utilities to meet the challenges of today & tomorrow.

# CWSRF Program Rulemaking Update

Oregon's Clean Water State Revolving Fund loan program, administered by the Oregon Department of Environmental Quality, provides low-interest loans for the planning, design and construction of various projects that will prevent or mitigate water pollution. Any public agency in Oregon is eligible for a CWSRF loan. Eligible public agencies include federally recognized Indian tribal governments, cities, counties, sanitary districts, soil and water conservation districts, irrigation districts and various special districts, and certain intergovernmental entities.

In early 2011, DEQ started a rulemaking process to amend the loan program's existing administrative rules. The purpose of the rulemaking is to improve DEQ's ability to provide financial assistance to public agencies that have diverse water quality improvement project needs and to provide clarity about the loan program's funding process.

As part of the rulemaking process, DEQ selected and appointed a 14-member CWSRF

Advisory Committee, which will provide recommendations to DEQ for this rulemaking. The group has met regularly with DEQ throughout this year and will continue its discussions into early 2012. The committee is reviewing program rules as well as identifying financial, technical and policy matters related to the program rules. A DEQ Internal Rulemaking Team also is providing input during the rulemaking process.

DEQ is reviewing its CWSRF rules to ensure the program is administered and implemented in a consistent and clear manner based on state statutes and federal regulations. Some issues already identified include:

Ensuring the statutory definition of public agency is clear in the program rules – thus eliminating any uncertainty about who is eligible to apply for a loan.

Reviewing project eligibility to ensure the rules do not limit or prevent water quality protection or improvement projects.

Reviewing application and documentation requirements necessary for loan approval to ensure the application process is clear.

Revising project ranking criteria to address federal guidelines for sustainable projects and other state water quality improvement priorities.

Analyzing rules to ensure the CWSRF program's financial integrity while enhancing project funding.

The rulemaking process will include an opportunity for public comment, targeted for mid-2012, on the proposed rules. DEQ plans to present proposed rules for adoption to the Oregon Environmental Quality Commission at the commission's December 2012 meeting.

Additional rulemaking and CWSRF Advisory Committee information can be found on DEQ's website at: <http://www.deq.state.or.us/wq/loans/advisory.htm>. You may also contact Manette Simpson, DEQ's CWSRF loan program coordinator, Portland, at 503-229-5622. ♦

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# OAWU's 34th Annual Management & Technical Conference and Exhibitor Event

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## OREGON ASSOCIATION OF WATER UTILITIES 2012 TRAINING & EVENTS SCHEDULE

Date	Class Title	Location	CEU Information	ESAC#	Fee/Free
January 12	Control Valves by GC Systems	Salem	0.7 Water/Wastewater	2286	FREE
February 9	Developing Your O&M Manual	Albany	0.6 Water/Wastewater	2113	FEE
March 5	Developing Your O&M Manual	Sunriver	0.6 Water/Wastewater	2113	FEE
March 5-9	34 <sup>th</sup> Annual Management & Technical Conference	Sunriver	2.0 Water/Wastewater	TBA	FEE
March 20-21	Wastewater Certification Review	Salem	1.4 Wastewater	2295	FEE
March 30	STATE WASTEWATER EXAM	STATEWIDE			
April 3	Water Meters	Newport Area	0.6 Water	2069	FEE
April 5	Water Meters	Portland Area	0.6 Water	2069	FEE
April 10	Excavation Safety	TVWD	0.6 Water/Wastewater	2285	FEE
April 24-26	Water (WT/WD) Certification Review	Grants Pass	1.8 Water/1.2 WW	1596	FEE
May 8-10	Water (WT/WD) Certification Review	Salem	1.8 Water/1.2 WW	1596	FEE
May 15	Safe Drinking Water Act Update	Island City	0.4 Water	2287	FREE
May 18	STATE WATER EXAM	STATEWIDE			
May 22	Excavation Safety	Salem	0.6 Water/Wastewater	2285	FEE
May 24	Developing Your O&M Manual	Portland Area	0.6 Water/Wastewater	2113	FEE
May 30	Control Valves by GC Systems	Eugene	0.7 Water/Wastewater	2286	FREE
May 31	Advanced Control Valve	Eugene	0.9 Water/0.4 Wastewater	1927	FEE
June 12	Safe Drinking Water Act Update	Salem	0.4 Water	2287	FREE
June 20	Developing Your O&M Manual	Pendleton	0.6 Water/Wastewater	2113	FEE
July 11	Hydrants and Valves	Salem	0.6 Water	TBA	FEE
July 19	Developing Your O&M Manual	K-Falls Comm. Col.	0.6 Water/Wastewater	2113	FEE
August 9	Hydrants and Valves	Bend	0.6 Water	TBA	FEE
August 20	Developing Your O&M Manual	Seaside	0.6 Water/Wastewater	2113	FEE
August 20-23	Summer Classic Conference	Seaside	1.7 Water/Wastewater	TBA	FEE
September 13	Water Treatment Process	Salem	0.6 Water/0.3 WW	1739	FEE
September 18-20	Water (WT/WD) Certification Review	Bend	1.8 Water/1.2 WW	1596	FEE
October 9-11	Water (WT/WD) Certification Review	Salem	1.8 Water/1.2 WW	1596	FEE
October 17	STATE WATER EXAM	STATEWIDE			
October 24-25	Wastewater (WWT/WWC) Certification Review	Salem	1.4 Wastewater	2295	FEE
October	WASTEWATER STATE EXAM	OPEN SCHEDULE			
November 6-8	Fall Water Operator's Conference	TBA	2.0 Water	TBA	FEE
November 21	Water Treatment Process	TVWD	0.6 Water/0.3 WW	1739	FEE
December 4-6	End of Year Operator's Conference	Hood River	2.0 Water/Wastewater	TBA	FEE

### 2012 State Water exam dates      Application Deadline

May 17, 2012      March 15, 2012  
October 17, 2012      August 15, 2012

For additional water exam information, please visit <http://oregon.gov/DHS/ph/dwp/certif.shtml>

### 2011-2012 State Wastewater exam dates      Application Deadline

March 30, 2012 (Statewide)      January 16, 2012  
Year round, open schedule

For further wastewater exam information, please visit <http://www.deq.state.or.us/wq/opcert/opcert.htm>

Training class dates, class topic and/or locations may be subject to change as needed.

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For more information on any class by OAWU, please contact the office at 503-837-1212, [office@oawu.net](mailto:office@oawu.net) or visit [www.oawu.net](http://www.oawu.net).

# QUIZ CORNER

Correction to the Spring 2011 Quiz Corner:  
The correct answer to question 6 is B, 1.0 NTU.

1. With salinity of about 20% by weight, an 8-inch glass full of water from the Great Salt Lake, when evaporated, will leave about how much granular salt in the bottom.  
A. 2-inches      C. 1 inch  
B. 1.5 inches      D. 0.5 inches
2. Is the pH value of seawater (A.) Higher or (B.) Lower than most natural fresh water?
3. Water boils at a (A.) Higher or (B.) Lower temperature at Denver, Co. than at the beach.
4. What percentage of a chicken is water?  
A. 30%      C. 10%  
B. 40%      D. 75%
5. An estimated how many households use private wells for their daily water supply?  
A. 17 million  
B. 1.5 million  
C. 5 million  
D. Less than 5 million
6. Approximately what percentage of the world is covered by some form of water?  
A. 40%      C. 80%  
B. 60%      D. 95%
7. Anaerobic digester gas is composed mainly of:  
A. Carbon dioxide and hydrogen sulfide  
B. Methane and carbon dioxide  
C. Methane and hydrogen sulfide  
D. Methane and carbon monoxide
8. Which of the following is not a consideration in the operation of a gravity thickener?  
A. BOD  
B. Type of sludge  
C. Age of sludge  
D. Temperature
9. What is the minimum pressure that you can have for at your service connections?  
A. 20 psi  
B. 25 psi  
C. 30 psi  
D. 35 psi  
E. There is no minimum
10. Which of the following is a finished water storage deficiency?  
A. Hatch not locked or adequately secured  
B. Roof and access hatch not watertight  
C. No flap valve, screen, or equivalent on drain  
D. No screened vent  
E. All of the above
11. What would your chlorine setting need to be in pounds to treat a flow of 3.5MGD with a dose of 3mg/L using 65% available chlorine?  
A. 47.5lbs  
B. 100.8lbs  
C. 134.7lbs  
D. 237.6lbs
12. A pump moves 110 gpm with a head of 175 feet. How much horsepower is being used?  
A. 4.86hp  
B. 5.33hp  
C. 4.86mg/L  
D. 5.33mg/L

ANSWERS

1-C, 2-A, 3-B, 4-D, 5-C, 6-B, 7-A, 8-A, 9-E, 10-C, 11-A, 12-D

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# Andragogical Teachers *Throwing My Loop* Michael Johnson

Goodness gracious, ain't that the biggest mouthful of words you ever saw in your life? An-dra-gog-i-cal. You gotta' chew on all those syllables for three minutes just to get them in the right order on your tongue so you can say it...but the word is important. The word describes perhaps the most important people in our lives.

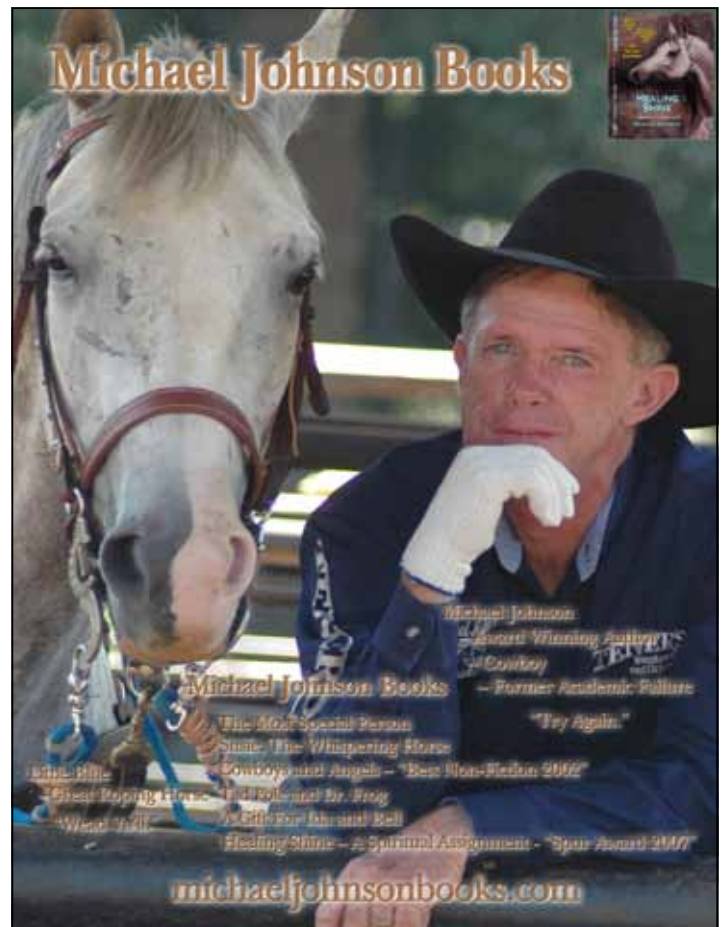
For some years now, I've been aware that certain people in my life have an ability to create "improvement" in me. When they are trying to help me learn something - to move me forward down the path - I actually move. After spending time with them - no matter what we are attempting to accomplish - if they are around, I do better than I normally do. In writing, roping, with horses, in my work, and my life in general, these special people - I call them "coaches" - help me do better. Self-esteem increasing, confidence boosting, real, squeeze it with your hand and feel it, tangible help. (And Lord knows every teacher I ever had in junior high would tell you, "That boy was sooo hard to help!") For years I had no idea how they were causing this change, or even what they were doing. But...my understanding of the mystery is improving. It's all in their teaching style.

There are two kinds of teachers - pedagogical and andragogical. Let's call them "P" teachers and "A" teachers. While we may not use the word "pedagogy" every day, we know all about "pedagogical" teachers. We've seen them, been with them, and taught by them all our lives. Those who teach in the "P" style have certain beliefs about themselves and about us students. First of all, they are superior to us. To most "P" teachers, we are dumb brutish beasts with little worth. All of the wisdom resides in the pedagogical teacher. He or she usually stands behind some sort of podium or lectern, and simply talks. (Think lecturers, teachers, horse trainers doing a clinic, etc.) "P" teachers must give us information because we don't know anything - or if we're lucky, they think at best we are a blank slate and assume our prior knowledge and our experiences are lacking in any real value. And our potential? They seldom worry about that since in their minds almost always... we have none. Most importantly, since "P" teachers see little value in us, they rarely get to know us. We are just one of the many. They may not actually dislike us, but don't plan on a friendship with these people. We just don't measure up to their standards.

There is another kind of teacher. I've found that describing them is difficult. Once I told my friend and wonderful stand-up comic, Kent Rader, about how much one of my coaches had helped me. "Darrell Buzan doesn't make a list of what you do right and a list of what you do wrong," I said to Kent.

"What on earth does he do then?" he asked. "What does he do that has helped you so?" I found that difficult to answer. Here are some characteristics of "A" teachers...

- Experience with "A" teachers usually begins because you seek them out.
- "A" teachers ask you a large number of questions. This seems odd because since we are so dumb and lacking in knowledge, why would our answers be important? Why would anyone want to hear what we think? "A" teachers do.
- They don't tell you much. If you ask them how to do something, they don't tell you how to do it. "Experts" do that. Ask an "expert" how to rope, play a violin, hit a golf ball, train a horse, or anything else you can think of, and they will talk all day. "A" teachers want you to do it.
- "A" teachers don't use much praise at all. Again, this seems to violate what we have heard most of our lives about what good teachers should do. That is, that when we do something well, teachers should praise and reinforce our correct action. "A" teachers don't hand out many compliments. They are too busy wanting you to see you do the thing.
- "A" teachers like us. They often become shining lights in our memories.





Examples of how an “A” teacher’s approach leadership, teaching, and coaching...

My wife, Sherry, holds an administrative position at the university. When she is asked to handle a particular organizational problem, she first visits with the group concerned. After she has assembled necessary facts and information, instead of telling people what they should do, she always begins by saying, “Tell me what happened. Tell me what you think.”

When I ask Bronc Fanning or Kenneth Colson – two of my best roping coaches – why I missed a steer, they rarely ever describe physical errors in my delivery of the rope. Instead, they will ask me where my horse was positioned. They make me think. They involve me in the solution.

When at a herding dog clinic, Orin Barnes talks a bit, but he requires the majority of the time be spent with me working my dog. All the while he’s asking me why is the dog doing what he’s

doing. He forces me to look at myself. He doesn’t tell me. He makes me do it.

I have watched countless horse trainers on television, but I never learned more than when Australian Joe Guy came to my farm, and watched me work with my horses. He didn’t tell me how to; he asked me why it was happening.

He forced me to think. He involved me in the solution.

Moral of the story? In our own lives, with our children, grandchildren, and with our animals, we should strive to be “A” teachers. And if we desire to improve personally at any task, we should seek out andragogical teachers. If you do, not only will you improve, but later in life when you have hard times, those shining lights will be in your memory – and they will give you strength.

They will help you find your way.

— Michael Johnson

## Operators of the Year • System Member Scholarships

Do you know an exceptional operator who deserves recognition? Nominate them for Water Operator, Wastewater Operator, Office Manager and/or Manager of the Year, or Rookie of the Year. Or, nominate a deserving student for a scholarship to attend the Annual Management and Technical Conference in Sunriver. For forms and information, visit

**[www.oawu.com](http://www.oawu.com)**

# Need to Review Water or Sewer Rates? OAWU Can Help!

*Take advantage of your Association’s services – We Do Rates!*

OAWU has built a solid reputation for providing water and wastewater systems with factual, user-friendly, and defensible Rate Studies. Our rate studies, once implemented, have allowed many systems to obtain Capitol Improvement funding from various private and government lending agencies. An OAWU rate study can also provide a plan for systems to gain the capitol to “pay as you go” by outlining a strategy to maximize and streamline revenue and thereby allow water/wastewater system administrators to forecast projects that may be funded in-house. OAWU will provide you a professionally compiled rate study and supporting documentation that will allow you and your council or board to adopt new rates necessary to meet your system needs.



For bids or estimates, call OAWU at 503-837-1212.

# MEMBERSHIP APPLICATION

Name: \_\_\_\_\_

Address: \_\_\_\_\_

City/State: \_\_\_\_\_

County: \_\_\_\_\_ ZIP: \_\_\_\_\_

System Email: \_\_\_\_\_

Phone: \_\_\_\_\_ Fax: \_\_\_\_\_

Operator: \_\_\_\_\_

Contact Person: \_\_\_\_\_

Number of Hook-ups: \_\_\_\_\_

Were you referred? By whom \_\_\_\_\_

## Type of System:

☐ Water ☐ Wastewater ☐ Both

## Membership Category Amount of Dues

<input type="checkbox"/> Regular Member	\$ _____ See schedule below
<input type="checkbox"/> Associate Member	\$400.00
<input type="checkbox"/> Individual Member	\$75.00

## Regular Member Dues Schedule

1 to 100	\$75 + 27 cents per hookup
101 to 500	\$80 + 27 cents per hookup
501 to 1,000	\$90 + 27 cents per hookup
1,000 and up	\$100 + 27 cents per hookup
Maximum dues is	\$900.00

**Mail payment to: OAWU**  
**935 N. Main Street**  
**Independence, OR 97351**

or Submit:

☐ VISA ☐ MasterCard ☐ AMEX

Card #: \_\_\_\_\_

Expiration Date: \_\_\_\_\_

Card Security Code: \_\_\_\_\_

Name on Card: \_\_\_\_\_

Signature \_\_\_\_\_

## Membership Types

### Regular Member

A Regular Member shall be any water or wastewater utility, public or private, engaged in the production, distribution or reclamation of water. A Regular Member shall have one vote.

*Annual Dues - See Dues Schedule*

### Associate Member

An Associate Member shall be any organization individual or corporation, supplying services or equipment to wastewater utilities. An Associate Member shall have one vote. For Associate Member Benefits, please contact OAWU.

*Annual Dues \$400.00 per year*

### Individual Member

An Individual Member shall be an individual involved in the water/wastewater industry or a user of such utilities. The membership is informational in nature and shall be non-voting.

*Annual Dues \$75.00 per year*

## Benefits of Membership

- On-site technical assistance
- Various free training programs
- Discounts on training courses
- Discounts on Annual Conference registration
- Access to on-site training program
- Subscription to quarterly *H2Oregon* magazine
- Direct mailings in your area about upcoming training courses
- Summaries of legislative issues
- Legislative representation at state and federal level
- Associate Member Services and Products Guide
- Access to technical assistance library
- Access to technical and testing equipment for loan
- Voting rights in Association affairs (Regular & Associate Members)
- Positive contacts with other organizations
- Camaraderie with water and wastewater professionals
- Operator Of Record services
- Job referrals, announcements and searches
- Well testing
- Plan review
- System performance evaluation and options
- Additional programs and services
- Disaster response assistance and planning





# MEMBERS



62nd Court Mutual Water Company  
 Adair Village, City of  
 Adams, City of  
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 Agate Water Company  
 Albany Rifle & Pistol Club  
 Alpine Crest Improvement Dist.  
 Alpine Water Company  
 Amigo Villa Water Service, Inc.  
 Amity, City of  
 Ananda Center at Laurelwood, Inc.  
 Arch Cape Service District  
 Arlington, City of  
 Arrah Wanna Water Company  
 Arrowhead Mobile Home Park  
 Aspen Lakes Utility Company, L.L.C.  
 Athena, City of  
 Aumsville, City of  
 Aurora, City of  
 Avion Water Company  
 Baker City, City of  
 Bandon, City of  
 Banks, City of  
 Barlow Water Improvement District  
 Barlow, City of  
 Bay City, City of  
 Bay Hills Water Association  
 Beaver Water District  
 Bella Casa Mobile Home Park  
 Bend, City of  
 Benton County Service District  
 Berndt Creek Water Corp.  
 Big Spruce MHP, LLC  
 Black Butte Ranch  
 BLM Eugene  
 Blue River Water District  
 Blue Spruce Estates  
 Bly Water & Sanitary Dist.  
 Boardman, City of  
 Bonanza, Town of  
 Boring Water District #24  
 Brandy Bar Landing, Inc.  
 Breitenbush Hot Springs  
 Bridge Water District  
 Brooks Community Service District  
 Brownsville, City of  
 Buell-Red Prairie Water District  
 Bunns Village Properties, LLC  
 Burns, City of  
 Burnside Water Association  
 Butte Falls, Town of  
 Canby Utility  
 Cannon Beach, City of  
 Canyon City, Town of  
 Canyonville, City of  
 Carlton, City of  
 Cascade Head Ranch Dist. Improv. Co.  
 Cascade Locks, City of  
 Cave Junction, City of  
 Cedarhurst Improvement Club, Inc.  
 Century Meadows Sanitary System, Inc.  
 Century Meadows Water System, Inc.  
 Chaparral Mobile Ranch

Charles Tracts Water Company  
 Chehalem Mt. Sun Ridge Water Co.  
 Chenoweth Water PUD  
 Chiloquin, City of  
 Christmas Valley Domestic Water  
 Cimmaron City Water Co., Inc.  
 Circle C Improvement District  
 Clarks Branch Water Association  
 Clatskanie, City of  
 Clayton Creek Water Association  
 Cline Butte Utility Company  
 Cloverdale Sanitary District  
 Cloverdale Water District  
 Coburg, City of  
 Colton Water District  
 Columbia City, City of  
 Columbia Hills Homeowners Association  
 Columbia River PUD  
 Conagra Foods  
 Condon, City of  
 Coquille, City of  
 Corbett Water District  
 Cornelius, City of  
 Country View Mobile Estates  
 Covanta Marion, Inc.  
 Cove Orchard Water Association  
 Cove, City of  
 Crater Lake National Park  
 Crescent Water Association  
 Creswell, City of  
 Crooked River Ranch Water Company  
 Crystal Springs Water District  
 Culver, City of  
 Dallas, City of  
 Dane Clark Water District  
 Dayton, City of  
 Dayville, City of  
 Deception Creek Mobile Park  
 Deer Creek Estates Water Assn.  
 Deerhorn Community Water Association  
 Depoe Bay, City of  
 Deschutes Valley Water District  
 Detroit, City of  
 Dexter Oaks Mobile Home Park  
 Dexter Sanitary Service  
 Dietz Airpark Water System  
 Donald, City of  
 Drain, City of  
 Drifter's MHP  
 Dufur, City of  
 Dumbeck Lane Water Association  
 Dundee, City of  
 Eagle Point, City of  
 East Yamhill Rural Water Company  
 Eastmont Water Company  
 Eastshore Water Improvement District  
 Echo, City of  
 Elkton, City of  
 Enterprise, City of  
 Estacada, City of  
 Eugene Mobile Village

Eugene Water & Electric Board  
 Fairview Water District  
 Fairview, City of  
 Falcon Cove Beach Water District  
 Falcon Heights Water & Sewer District  
 Falls City, City of  
 Fern Ridge School Dist. 28J-10  
 Fern Valley Estates Improvement Dist  
 Fernridge Mobile Estates  
 Fir View Water Company  
 Fischer's Place Mobile Home Park  
 Fishhawk Lake Recreation Club, Inc.  
 Florence, City of  
 Forest Park Mobile Village  
 Fossil, City of  
 Garden Valley Water Assn  
 Garibaldi, City of  
 Gaston, City of  
 Gates, City of  
 Gearhart, City of  
 Georgia Pacific-Wauna  
 Gervais, City of  
 Gilchrist Water Co., LLC  
 Gladstone, City of  
 Glenden Sanitary District  
 Glenmorrie Co-op Association  
 Glenridge Improvement District  
 Glide Water Association  
 Goble Water Association  
 Gold Beach, City of  
 Gold Hill, City of  
 Government Camp Water Company  
 Grand Prairie Water Supply Company  
 Grand Ronde Community Water Association  
 Grand View Mobile Home Park  
 Granite, City of  
 Grants Pass, City of  
 Green Oaks Mobile Ranch  
 Greenhoot Properties  
 Gresham, City of  
 Haines, City of  
 Halfway, City of  
 Hall's Trailer Court  
 Halsey, City of  
 Harbor Water PUD  
 Harrisburg, City of  
 Hebo Joint Water/Sanitary Authority  
 Heceta Water District  
 Heppner, City of  
 Hidden Valley Improvement District  
 High Lostine Owners Association  
 Highland Water District  
 Hiland Water Corporation  
 Hines, City of  
 Hood River, City of  
 Hopewell Water Company  
 Horizon View Hills Water, Inc.  
 Hubbard, City of  
 Hunnell Hills Water System  
 Huntington, City of  
 HWY 58 Trailer Park  
 Ice Fountain Water District

Idanha, City of  
 Idleway Improvement District, Inc.  
 Imbler, City of  
 Independence, City of  
 Indian Meadow Water Company  
 Interlachen Water PUD  
 Ione, City of  
 Irrigon, City of  
 Island City, City of  
 Jackson County Parks  
 Jacksonville, City of  
 John Day Water District  
 John Day, City of  
 Johnson Creek Water Services Company  
 Junction City, City of  
 Juniper Mobile Home Park  
 Keizer, City of  
 Kelly's Brighton Marina LLC  
 Kelso Water Association  
 Keno Water Company, Inc.  
 K-GB-LB Water District  
 Kingswood Heights Water Association  
 Klamath Falls, City of  
 Klippel Water, Inc.  
 Knappa Water Association  
 L.A. Water Cooperative  
 La Casa Mia  
 La Pine Special Sewer District  
 La Pine Water District  
 Lady Creek Water System  
 Lafayette, City of  
 Lake Grove Water District  
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 Lakeside Water District  
 Lakeside, City of  
 Lakeview, Town of  
 Lakewood Utilities, LTD  
 Lamontai Improvement District  
 Lamplighter Water Association  
 Lane County Parks  
 Langlois Water District  
 Lark Meadows Water Association  
 Laurelwood Water User's Co-op  
 Lawrence Subdivision Water Association, Inc.  
 Lebanon, City of  
 Lexington, Town of  
 Lincoln City, City of  
 Long Creek, City of  
 Lostine, City of  
 Lowell, City of  
 Luckiamute Domestic Water Co-op  
 Lyons-Mehama Water District  
 Madras, City of  
 Madrone Hill MHP  
 Malin, City of  
 Manzanita, City of  
 Mapleton Water District  
 Marshall Beach  
 Maupin, City of  
 McKay Acres Improvement District  
 McKenzie Palisades Water Supply Corp.  
 McMinnville Water & Light





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McNulty Water PUD  
 Medford Water Commission  
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 Metolius Meadows Prop. Owners Assn.  
 Metolius, City of  
 Midland Water Association  
 Mill City, City of  
 Milo Academy  
 Minikahda Water District, Inc.  
 Mitchell, City of  
 Modoc Point Sanitary District  
 Molalla, City of  
 Monmouth, City of  
 Monroe, City of  
 Monument, City of  
 Moran Water System Association  
 Moro, City of  
 Mosier, City of  
 Mossy Brae Water District  
 Mt. Angel Abbey  
 Mt. Angel, City of  
 Mt. Ashland  
 Mt. Bachelor, Inc.  
 Mt. Vernon, City of  
 Mulino Water Dist. #23  
 Myrtle Creek, City of  
 Myrtle Point, City of  
 Nantucket Shores Water Company  
 NeahKahNie Water District  
 Nehalem, City of  
 Nesika Beach-Ophir Water District  
 Neskowin Regional Sanitary Authority  
 Neskowin Regional Water District  
 Netarts Water District  
 Netarts-Oceanside Sanitary Dist.  
 New Bridge Water Supply District  
 Newport, City of  
 North Corvallis Mobile Home Park  
 North Hill Water Corporation  
 North Plains, City of  
 North Powder, City of  
 Northwest Newberg Water Association  
 Nyssa, City of  
 Oak Lodge Sanitary District  
 Oak Lodge Water District  
 Oakland, City of  
 Oakridge, City of  
 Oaks Mobile Home Park  
 Oceanside Water District  
 Ochoco West Water & Sanitary Authority  
 Odell Sanitary District  
 Odell Water Company  
 Olney-Walluski Water Association  
 Orchard Heights Water Association  
 Orchard Point Mobile Homes  
 Oregon Shores Beach Club, Inc.  
 Oregon Water Wonderland II Sanitary District  
 Orient Drive Mobile Estates, LLC  
 Otter Rock Water District  
 Paisley, City of  
 Parkdale Water Company, Inc.

Parrett Mountain View Estates  
 Perrydale Domestic Water Association  
 Pete's Mt. Water Company, Inc.  
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 Phoenix, City of  
 Pilot Rock, City of  
 Pinecrest Water Company  
 Pioneer Park Water Co-op  
 Pioneer Village Water Company, Inc.  
 Pleasant Valley Water Company  
 Pleasant View Water Company  
 Polehn Heights Water Association, Inc.  
 Ponderosa Pines Water Company  
 Port of Morrow Commission  
 Port Orford, City of  
 Portland Bureau of Water Works  
 Power City Water Co-op  
 Powers, City of  
 Prairie City, City of  
 Prineville, City of  
 Pristine Water Source  
 Quincy Water Association  
 Rainier, City of  
 Redmond, City of  
 Redwood Water Service, Inc.  
 Reeder Ranch, Inc.  
 Reedsport, City of  
 Rhododendron Water Association  
 Richland, City of  
 Rickreall Community Water Association  
 Riddle, City of  
 Rimrock West Improvement District  
 River Meadows Improvement District  
 River Point Farms, LLC  
 Riverbend-Riverbank Water District  
 Rivergrove Water District  
 Riverside Water District  
 Riverview Trailer Park  
 Riviera Mobile Park  
 Road's End Water District  
 Roats Water System, Inc.  
 Roberts Creek Water District  
 Rock Creek Water District  
 Rockaway Beach, City of  
 Rocky Pointe Marina  
 Rogue Community College  
 Rogue Lea Estates MHP LLC  
 Rogue River, City of  
 Rogue River-Siskiyou National Forest  
 Roseburg Forest Products Co.  
 Round Lake Utilities  
 Rufus, City of  
 Running Y Utility Company  
 Salem, City of Public Works  
 Salem-Keizer School District  
 Salmon River Mobile Village  
 Sam's Valley Elem. School Dist. #6  
 Scappoose, City of  
 Scenic Fruit Company  
 Scio, City of  
 Scotts Mills, City of  
 Scravel Hill Water Co-op

Seal Rock Water District  
 Seneca, City of  
 Shangri-La Water District  
 Shenandoah Home Owners, Inc.  
 Sheridan, City of  
 Sherwood, City of  
 Shorewood Estates Mobile Trailer Park  
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 Silver Falls School District 4J  
 Sisters, City of  
 Skylane Farm  
 Skyview Acres Water Company  
 Sodaville, City of  
 South Fork Ranch Homeowners, Inc.  
 South Fork Water Board  
 South Hills Water System, Inc.  
 Southwest Lincoln County Water District  
 Southwood Park Water District  
 Spirit Mountain Gaming, Inc.  
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 Springbrook Water Association  
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 Staffordshire Water System, Inc.  
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 Storlie Water Company Inc.  
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 Suburban East Salem Water District  
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 Sunriver Environmental LLC/Sunriver Water LLC  
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 Sunshine Village Water Association  
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 Talent, City of  
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 Terrebonne Domestic Water District  
 The Dalles, City of  
 Three Rivers School District  
 Tierra Del Mar Water Company  
 Tigard, City of  
 Tillamook Bay, Port of  
 Tillamook, City of  
 Tillamook County Creamery Association  
 Timber Water Association  
 Timberline Rim Water Company  
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 Toledo, City of  
 Train Mountain Railroad Museum  
 Trappist Abbey  
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 Turner, City of  
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 Tygh Valley Water District  
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 Valley View Water Co-op  
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 Vineyard Mountain Water & Improvement District  
 Waldport, City of  
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 Warm Springs, Conf. Tribes Reservation of OR  
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 Warrenton, City of  
 Wasco, City of  
 Water Wonderland Improvement District  
 Watseco-Barview Water District  
 Wedderburn Sanitary District  
 Welches Water Company  
 Weldon Mobile Home Park  
 West Hills Water Company  
 West Linn, City  
 West Slope Water District  
 West Yamhill Water Co.  
 Westfir, City of  
 Weston, City of  
 Westport Water Association  
 Wheeler, City of  
 Wickiup Water District  
 Willamette Water Company  
 Willamina, City of  
 Wilson River Water District  
 Wilsonville, City of  
 Wi-Ne-Ma Christian Camp, Inc.  
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 Wood Village, City of  
 Woodburn, City of  
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 Yamhill, City of  
 Yoncalla, City of  
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 Young's River Lewis & Clark W.D.  
 Youth With A Mission  
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**Vineyard Mountain Water &  
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**Tripac Fasteners**

**Doyle Fish**

**Chris Goetz**

**Trace Heide**

**Garrett Monig**

**Robin Morgan**

**Jerry Nelzen**

**Susanna Noordhoff**

**Richard Perry**

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Daniel, Morgan	Guerin, Ted	Kroeplin, Jay	Patch, Dave	Strilka, Nicholas	
Davenport, Ray	Gunter, Mark G.	Kunders, Aaron	Pate, Pete	Tabrum, Walter	
Davis, Ben	Haag, Joel	Kutsch, Lenard C.	Perry, Richard	Thayer, Bradley	

## ASSOCIATE MEMBERS

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American Flow Control	Enviro-Clean Environment,	Jordan Ramis PC	PACE Engineers, Inc.	Treatment Equipment
American Leak Detection	Inc.	Kelly-Moore Paints	Pittsburg Tank & Tower Co.	Company
Anderson Perry & Associates	Ferguson Enterprises	Kennedy/Jenks Consultants	Pollardwater.com	Umpqua Research Co.
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Backflow Management, Inc.	Furrow Pump, Inc.	Lakeside Industries/EZ Street	Romac Industries, Inc.	United Rentals Trench Safety
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Branom Instruments Co.	Global Treat Inc.	Logics, LLC	Schoen's Motors	Waterlab Corp.
Cascade Columbia	Godwin Pumps	M & H / Kennedy Valve	Schroeder Law Offices, PC	Wonderware PacWest
Distribution Co.	HACH Company	Master Meter, Inc.	Sensus USA	
Caselle, Inc.	Harco Fittings	Mueller Company	Solarbee, Inc.	
Consolidated Supply Co.	HD Fowler Company, Inc.	Mueller Systems	Special Districts Assn of	
Correct Equipment, Inc.	HD Supply Waterworks	Natgun Corporation	Oregon	
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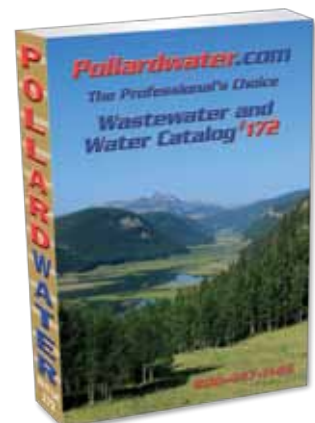
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