



WATER TAP

WASHINGTON'S DRINKING WATER NEWSLETTER

New electronic options for delivering consumer confidence reports

The electronic option for sending annual consumer confidence reports (CCRs) is here!

The U.S. Environmental Protection Agency (EPA) recently determined that electronic delivery meets the "directly deliver" CCR requirements if a community water system does both of the following:

- Provides customers with a direct link to the CCR. This link must take customers to the entire CCR. If a customer has to navigate to another page from that link, it does not meet the "directly deliver" requirements outlined in [Consumer Confidence Reports: Electronic Delivery Options and Considerations \(DOH 331-470\)](#).



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How Mt. View-Edgewood got its edge



Editor: Last year, Mt. View-Edgewood Water Co. won top honors in the National Rural Water Association's Great American Water Taste Test. Imagine having the best tasting water in America. We wrote about their award last March, and we thought you would want to know more about how Mt. View-Edgewood got its system into such great shape.

Following some coliform hits in 2005, staff at Mt. View-Edgewood redoubled their prevention efforts. Systematically, they worked to eliminate potential cross connections, decrease water age, eliminate dead ends, and decrease stored water temperature.

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Why hire veterans for water sector jobs?

The fast-growing drinking water sector faces a stark reality: More than a third of the water and wastewater utility workforce is eligible to retire in five to 10 years. Who will replace those workers?

There's a promising pool of potential talent in most communities: veterans transitioning from military service into civilian careers.

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Volume 28, #1 - March 2013

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Office of Drinking Water
PO Box 47822
Olympia, WA 98504-7822
800-521-0323

<http://www.doh.wa.gov/CommunityandEnvironment/DrinkingWater.aspx>

Take our Water Tap Survey

Water Tap has been online for a year. We hope you are enjoying the links to YouTube videos and other online resources.

Please take our survey and let us know what you think.

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THE DIRECTOR'S COLUMN

BY DENISE ADDOTTA CLIFFORD



Learning to roll with “Change-itis”

If you're feeling a bit uncomfortable and don't know

why, you may have a case of *Change-itis*.

Symptoms include tightness in the stomach, tension in the shoulders, and jitters. Some people develop nervous tics. Don't worry. Most of us experience *Change-itis* every so often, and the symptoms usually don't last long.

As the Office of Drinking Water has adapted to shrinking budgets, loss of staff, and new regulations during the past several years, I've learned to manage – and even embrace – chronic *Change-itis*. For me, change is the “new normal.”

As I write this, Governor Inslee is being sworn in and the 2013 legislative session is beginning. New leaders bring new expectations, new challenges, and new opportunities.

New leadership within ODW

My new leadership team is taking shape. We have a new deputy director for field operations, **Heather Bartlett**, who joined our staff in November. Heather worked at Washington Department of Fish and Wildlife for 22 years as a field biologist and regional program manager, and eventually oversaw administration, operation, science and management for the state hatchery system.

In January, we welcomed **Joe Crossland**, our new budget and performance accountability manager. Joe worked on various aspects of financial management for the Puget Sound Partnership. He's well versed in legislative and state processes for developing budgets and the reporting and oversight of state and federal financial requirements.

Embracing 21st century communication

I've been directing our constituent services staff to work on modernizing our modes of communication—

to ensure that you receive information in a timely manner and to reduce printing and postage costs. Email and the Internet are playing an increasingly important role in our work.

For example, the past few issues of the *Water Tap* newsletter have been Web- and email-based. We now send reminders and essential updates by email.

To ensure that you don't miss out on *Water Tap* and other essential drinking water communications, please join one or more of our email lists. You'll find them at the bottom of <http://www.doh.wa.gov/CommunityandEnvironment/DrinkingWater.aspx>

Join one of our listservs

- [Water Tap](#) - Washington's drinking water newsletter.
- [Drinking water engineering consultants](#) - news about drinking water system design and planning in Washington State.
- [Drinking water rules](#) - current rulemaking activity.
- [Group B water system information](#) - current rulemaking activity for very small water systems.
- [Policies](#) - new and revised policies.
- [Publications](#) - new and revised publications.

Ask your associates, water system owners, board members, and contract operators to sign up, too. We won't flood your mailboxes with tons of email. You'll only hear from us when there's something important to share.

Don't miss out – you'll put yourself at risk of contracting *I-didn't-know-itis*. I'd hate to hear that any of you in the drinking water community are suffering from that malady. Some of those symptoms can be much more unpleasant than rolling with *Change-itis*!

Denise A Clifford

Rainwater harvesting: Can we drink this?

It's no secret: Some places in Washington get a lot of rain. Looking out at that steely gray sky, we sometimes forget there are seasons and places in Washington that see very little rainfall. In those times and places, harvested rainfall might be an important source of water for many nonpotable uses. This article is for water systems wondering what role harvested rainfall should play in their operations, or the operations of their large and small customers.

We don't know of any harvested rainfall supplies currently supplying potable water to Group A public water systems. A developer recently signaled intent to seek approval of a rainwater harvest and treatment system as the primary drinking water supply for occupants of a 5-story office building in downtown Seattle. The building also has a permanent connection to the City of Seattle water system.

We expect the preliminary design reports for such systems to document how the proposed system will comply with surface water treatment, monitoring, and reporting requirements, and be capable of providing an adequate supply on a reliable basis to the intended population.

We are aware of some nonpotable applications. For example, the Center for Urban Waters in Tacoma, a 51,000-square-foot structure, reduced its potable water supply requirement by 46 percent after installing a rainwater harvesting system to meet its nonpotable water supply needs.

Water rights and rainfall

In 2009, Ecology issued a [policy statement](#) clarifying that a water right is not required for rooftop rainwater harvesting. Once collected, the harvested rainwater may be put to any beneficial use on the same parcel as the roof from which the water was captured. To qualify as rooftop-collected rainwater, the roof collecting the rainwater must be part of a fixed, aboveground structure with a primary purpose other than collecting rainwater.

Developing a new water system supplied by rooftop-harvested rainwater is not without regulatory risk. Ecology intends to regulate the storage and use of rooftop-collected rainwater when the cumulative impact of such harvesting is likely to negatively affect stream flow or existing water rights.

How much rain is enough?

When considering rainfall harvesting, don't be seduced by the average rainfall for a given area. Heavy seasonal rainfall aside, the distribution of annual rainfall determines the reservoir (cistern) size needed to provide a continuous supply of water during periods of little or no rain.

We reviewed data from three locations around Western Washington to determine the number of years in which the aggregate rainfall measured in any **consecutive three-month period totaled less than 1.0 inch**. The results are tabulated below:

Critical 3-Month Dry Periods

Location	Number of Years with 3-Month Rainfall Less Than 1.0 Inches	Minimum 3-Month Total Rainfall		
		Rainfall	Year	Equivalent supply ¹
Olympia	4 (1951, 1970, 1998, 2006)	0.45 inches	1970	3.6 gpd
SeaTac	2 (1967, 1987)	0.84 inches	1987	6.9 gpd
Orcas Island	1 (1951)	0.94 inches	1951	7.7 gpd

1. Average daily supply available from rainfall during this 3-month period, based on a 1,500-square-foot roof.

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Keys to emergency communication: Anticipate, plan ahead, and practice

Good communication makes all the difference in managing drinking water emergencies. Do it well, and you'll be a hero; do it poorly, and you'll feel the wrath of your customers and partners.

During an emergency, your customers will be thirsty for information. Giving thought to how you will get advisories and other information to them before it happens is just as important as other preparedness planning.

The keys to successful emergency communication are: anticipate, plan, and practice.

When you're dealing with the public and the news media during a drinking water emergency, keep one thought uppermost in your mind: Protecting public health is Job #1. Everything you say and do should flow from that single thought.

Anticipate emergencies

Potential drinking water emergencies include outages, water quality issues, equipment failure, natural disasters, and vandalism.

The advice to customers in health advisories is often very similar. Get ahead of the game by preparing messages about various public health risks and precautions your customers should take. For example, if you have basic messages for an *E. coli* event already prepared (boil tap water or use purchased bottled water), you can quickly adapt them to the situation.

The mandatory language for Tier 1 public notifications is a start, but you'll want to have your own messages as well. When people are scared, they want to know that you care before they'll listen to what you have to say. Messages should be clear, simple, and compassionate. State the risk and give customers steps they can take to protect their health.

Your customers will also want something to do that will help them believe they will get through the crisis and that they have at least a little control. For example, suggest they boil water, help a neighbor, or go to a watering station and fill clean jugs with water.

Plan ahead

If you have an acute Tier 1 violation, you have only 24 hours to notify all your customers. How would you do that? Who can help? What tools are available to you? They can include reverse 911 messages, news media, copying services, county emergency management, volunteer organizations, and perhaps others.

Identify the partners you'd need to work with. Besides your local and state health departments, think about schools, hospitals, nursing homes, day-care



centers, businesses, motels, and restaurants. Your county emergency management department, law enforcement, and fire departments should also be included. They'll need immediate notice so they can take steps to protect the people they serve.

After you've made your list of potential partners, reach out to them to establish contact information and develop joint emergency plans. You might be surprised at the resources and help they can provide.

Designate a spokesperson for your organization, and a backup. The person with the most knowledge about the situation may not be the best person to speak with the public or news media. You'll want someone who is at ease talking with the public.

Make sure this person receives crisis communication training. Your representative should not only know what to say, but also how to say it. This will help inspire public confidence.

Make a plan to keep the information flowing. Provide updates at least twice a day to begin with, then daily until the crisis subsides.

Practice

After you connect with potential partners, consider having a joint training that will help you clarify roles and responsibilities. Often referred to as tabletop exercises, they take participants through a simulated emergency.

Some organizations have annual tabletop trainings and drills. They're a great way to put your planning to the test before an actual emergency occurs. You'll quickly see your strengths and weaknesses.

Be sure to follow up with a debriefing session to talk about what went well and what needs work.

By anticipating emergencies, planning for them and practicing communication, you can hit the ground running when they occur.

Find resources to help you during a drinking water emergency at <http://www.doh.wa.gov/CommunityandEnvironment/DrinkingWater/DrinkingWaterEmergencies.aspx>

Health advisories by the numbers

Health advisories are rare for most water systems, but they do happen. We thought it would be interesting to share some of the information we gather about drinking water advisories issued statewide, so we reviewed six years of data.

The number of advisories from 2007 through 2012 fluctuated from a low of 78 to a high of 110, but the top causes of advisories held steady: bacterial contamination and water outages with pressure loss.

Floods and severe windstorms may account for spikes in advisories in 2007, 2009, and 2012.

The table below is a snapshot of health advisories statewide.

Health advisories 2007 - 2012	2007	2008	2009	2010	2011	2012
Bacterial Contamination	47	37	44	45	26	32
Nitrate	7	8	11	11	17	13
Outages/Pressure Loss	15	34	41	39	31	48
Other*	33	9	14	3	4	9
Total Health Advisories	102	88	110	98	78	102

*The “other” category in the chart includes health advisories issued for treatment technique violations, equipment failure, and using unapproved water sources.

To learn more about health advisories, visit [Sentry Internet](#), where you can generate your own reports.

Start-up tips for seasonal water systems



If summer is your operating season, it’s time to think about starting up your water system. The start of your season will be trouble-free if you take steps as winter ends to ensure there are no coliform bacteria in the water system when you begin serving water to the public.

As you start up for the season, use *Small Water System Startup Shut-Down Self-Inspection Checklist (331-312) as a guide to:**

Inspect the system. Inspect all components of your water system, including your distribution lines. If you identify any deficiencies, make all necessary repairs.

Activate the source(s). Turn on the power to your source pump(s). Record the source meter reading. If you don’t have a source meter, arrange to have one installed as soon as possible. Disinfect the level probe then measure and record the static water level in your well(s). If you don’t have a level probe, contact your local health jurisdiction to see if you can borrow one. If you don’t have a source sample

tap, arrange to have one installed as soon as possible (see *Groundwater Rule: Source Water Sample Taps** (331-436)).

Activate the treatment system, if applicable. Turn on the power to any treatment equipment. For a chlorinated system, purchase fresh chlorine, mix fresh feed solution, replace or clean all lines and parts, and verify the feed rate of the feed pump. For other treatment, refer to the manufacturer or your operating procedures, or consult with our regional engineer.

“Open” the system. Run water through the entire water system by opening up hydrants, blow-offs, and faucets. Make sure all pressure tanks are pressurized.

Disinfect and flush. Disinfect and flush all sources, pressure tanks, storage tanks, and distribution lines. Tips are in *Emergency Disinfection of Small Systems** (331-242). If anyone has access to the water during your disinfection process, chlorinate using a dose of 2 parts per million (ppm). If no one has access to the water, chlorinate at 5 ppm. Leave chlorinated water in the system components and distribution lines for at least 24 hours. After a minimum of 24 hours, flush all components and the distribution lines beginning with the taps closest

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Time to think about groundwater

National Groundwater Awareness Week, observed March 10-16 this year, serves to remind us all of the importance of protecting our nation’s groundwater.

Forty-four percent of Americans depend on groundwater for their drinking water supply. All of us can protect or harm groundwater through our daily living habits.

To learn about Washington state’s program to protect groundwater and other drinking water sources, visit <http://www.doh.wa.gov/CommunityandEnvironment/DrinkingWater/SourceWater/SourceWaterProtection.aspx>

Electronic CCRs... (Continued from Page 1)

- Provides customers with an explanation of the nature of the link.
- Group A community water systems must send consumer confidence reports to their customers by July 1 each year. We will accept electronically delivered CCRs for the 2012 reporting year.

Here are the basic requirements for CCRs:

Content	Delivery
<ul style="list-style-type: none"> ✓ Public water system information ✓ Source information ✓ Required statements ✓ Definition of terms ✓ Detected contaminants in finished water ✓ Compliance with drinking water regulations ✓ Required educational information 	<ul style="list-style-type: none"> ✓ Mail or otherwise directly deliver one CCR to each customer by July 1 every year ✓ In addition, make a good faith effort to reach non-bill-paying consumers ✓ Deliver the CCR to our regional Office of Drinking Water (see below) ✓ Make the CCR available upon request

You can get the certification form and more information about consumer confidence reports on our website at <http://www.doh.wa.gov/CommunityandEnvironment/DrinkingWater/RegulationandCompliance/CCRReports.aspx>

Submit copies of your CCRs (by July 1) and CCR certification forms (by October 1) to our regional office:

**Office of Drinking Water
Eastern Regional Office**
Attn: CCR
16201 E Indiana Avenue
Suite 1500
Spokane Valley, WA 99216
509-329-2100
Email: ccr.ero@doh.wa.gov

**Office of Drinking Water
Northwest Regional Office**
Attn: CCR
20425 72nd Avenue
Suite 310
Kent, WA 98032
253-395-6750
Email: ccr.nwro@doh.wa.gov

**Office of Drinking Water
Southwest Regional Office**
Attn: CCR
PO Box 47823
Olympia, WA 98504
360-236-3030
Email: ccr.swro@doh.wa.gov

Free CCR tool - The [EPA CCRiWriter](#) is an easy, efficient tool to help you compose your yearly Consumer Confidence Report for your customers. If you use this tool, you must still send a copy of your CCR and [certification form](#) to our regional office.

Technical Assistance Providers

Evergreen Rural Water of Washington, 800-272-5981
Rural Community Assistance Corporation, 509-927-6748



Mt. View-Edgewood... (Continued from Page 1)

To track their success, they go beyond routine monitoring. They sample active sources monthly for heterotrophic plate counts (HPC) and coliform bacteria, and collect HPC throughout the distribution system. Their work pays off; since 2005, the system has had no coliform water quality violations.

The source of Mt. View-Edgewood's (MTVE) water is a deep gravel aquifer. That is an advantage for water quality. With five active well sites, three storage reservoirs, two booster pump facilities and more than 2,900 connections, the system works hard to keep its water-quality edge. The focus is prevention, best practices of design and operations, and continuous improvement.

Prevention

Mt. View-Edgewood has a strong cross-connection control program. To prevent theft or vandalism, they protect all wells with locks, fences, and well houses. To prevent water loss, they only allow the fire department to use fire hydrants.

"We maintain very strict development standards to prevent contamination during construction projects," says Marc Marcantonio, general manager of the system. "We have a rigorous cross-connection control program to prevent accidental customer contamination of our water supply due to backsiphonage and backpressure."

MTVE's cross-connection control program is built around premise isolation at each service. The system provides all residential services with double check valve assemblies (88 percent complete) and all commercial services with reduced pressure (RP) devices. The system owns the assemblies and, with the exception of larger RP devices, contracts for routine annual testing of each device.

Operations

Their flushing program focuses on dead-end lines, which they flush every six months. Where possible, they eliminate dead ends. They work to keep water in circulation. Their North Reservoir is designed to let water into the top and out the bottom.

MTVE also takes steps to protect its reservoirs. For example, the operators climb and inspect the tops of the reservoirs every month. They conduct comprehensive inspections on a five-to-eight year schedule. They also maintain a single tanker fill-point in the system.

Continuous improvement

Operating without continuous disinfection means staying focused on maintaining water quality without treatment. Marcantonio describes treating the system 'like a patient'; their work is analogous to preventive



All staff at MTVE are involved in the best practices. Back row: Ranger Gass, Stephanie Christel, Jon Young, Laurie Kennedy and Gene Ryan. Front row: Marc Marcantonio and Mike Craig.

medicine. Marcantonio says he and Mike Craig, certified operator and field manager, continuously analyze the system from top to bottom for any potential entry points. As a team, they are committed to using best management practices to keep contaminants out of the system.

MTVE's working culture and administrative policies support best practices. Employees are rewarded for coming up with ideas that support the water system. Employee suggestions are reported to board members so that employees may be recognized for their efforts.

Staff analyzes problems, acts to correct them, reviews actions, and documents recognized improvements. For example, when MTVE purchased a new reservoir, they knew that many people expected them to paint it green. However, that darker color was not sufficiently heat reflective. With a darker color, the reservoir would be a 'massive solar collector' according to Marcantonio. When air inside the tank becomes heated, it can lead to favorable growing conditions for bacteria.

Therefore, MTVE decided it was critical to avoid that heat; they painted the tank an optimal "tank white" to minimize internal temperatures. They also use mist above the roof to cool the air coming into tank and to prevent pollen in the air from coming in and supplying a food source for bacteria.

Marcantonio explains, "Mother Nature provides us with a pure, naturally filtered product. It is our job to make sure we preserve that quality. Keeping our water pure from the source to the tap makes more sense than allowing it to become contaminated, and then trying to purify it with chemicals." Mt. View-Edgewood is clearly proud of their successes.

Hire veterans... (Continued from Page 1)

The U.S. Environmental Protection Agency (EPA) and the Department of Veterans Affairs (VA) are working together to connect veterans to career opportunities in the water and wastewater sectors. The agencies work with water utilities, states, and local VA counselors to



Shane Inman, a Marine Corps veteran who works for the Skagit PUD, drives in a marker post to indicate an Air Vac on the water line.

promote water sector careers and resources for finding water jobs for veterans.

Veterans can make good water sector employees because they understand teamwork, discipline, and personal accountability, according to a publication titled [Recruiting and Training Veterans](#).

The opportunity for on-the-job training through approved entry-level jobs or apprenticeships offers employers an economical way to recruit and retain experienced workers.

The utility must provide supervised training, such as job shadowing with an experienced employee. The utility also must pay an internship wage (up to 24 months) or apprenticeship wage (may be longer than 24 months) during the training period. Veterans also receive education benefits during the training period.

Shane Inman, a U.S. Marine Corps veteran who works for the Skagit Public Utility District (PUD), points out that most veterans have a strong work ethic and positive attitude. Veterans are also accustomed to working long hours and split shifts, which are sometimes necessary in the water sector.

“Veterans are used to flexible schedules, multi-tasking, and showing up to work whether they like their job or not,” said Inman, who has been employed in the water sector for about 10 years.

Education and training programs offered through the VA and the U.S. Department of Labor make it relatively easy for veterans to train for jobs in utilities.

10 reasons to hire veterans and wounded warriors

- Ability to learn new skills and concepts.
- Strong leadership qualities.
- Flexibility to work well in teams or independently.
- Diversity and strong interpersonal skills.
- Ability to work efficiently and diligently in a fast-paced environment.
- Respect for procedures and accountability.
- Hands-on experience with technology and globalization.
- Strong personal integrity.
- Strong sense of health, safety, and property standards.
- Triumph over adversity.

Source: America's heroes at work <http://www.americasheroesatwork.gov/newsroom/TopTen>

In Washington State, several training entities and [Community College Programs](#) specialize in water sector careers:

- Evergreen Rural Water of Washington <http://www.erwow.org/>
- Washington Environmental Training Center at Green River Community College in Auburn <http://www.wetrc.org/>
- Environmental Sciences Department of Water Resources at Spokane Community College <http://www.scc.spokane.edu/?waterres>
- Environmental Conservation Department at Skagit Valley Community College http://www.skagit.edu/directory.asp_Q_pagenumber_E_202

If employers are unsure about hiring veterans for water sector positions, Inman suggests looking into an industry that hires veterans currently to see the benefits firsthand.

To find out more about the VA connecting qualified veterans with employer needs, visit <http://www.vetsuccess.gov/>

Will your alarm go off when it should?

Critical alarm failures happen every year.



At 2 a.m. on Sunday, Dave woke to the sound of rain pounding on the roof of his house. He rolled over and glanced at his cell phone. No missed calls, everything must be okay at the town's treatment plant. He went back to sleep confident that the town's recently installed alarm system would call him if the turbidity levels leaving the plant got too high.

Dave didn't know that the service technician who worked on the system Friday afternoon forgot to reset the alarms after he finished up. In fact, things weren't going well at the plant. The river rose all night and along with it, turbidity. The chemical feed line from the alum pump started to clog, cutting off the flow of alum, and the turbidity of the water leaving the plant started to creep up.

When Dave arrived at work Monday morning, he was dismayed to find the alum pump not operating and treated water turbidity over the regulatory limit. He quickly shut down the plant. Then he called the mayor, the public works director, and the Office of Drinking Water. The mayor was very upset when he found out they would have to issue a boil water advisory to the town's residents.

Dave spent the next two weeks dealing with the aftermath.

Very few systems have **not** experienced an alarm failure at some point. If your system is staffed only during the day and runs in automatic mode the rest of the time, your risk of a treatment problem going undetected is especially high. The following tips could help you avoid a critical alarm failure.

What are critical alarms? Critical alarms help to ensure your disinfection and filtration are working, there is neither too much nor too little water in the clearwell, and you are not adding unsafe amounts of key water-treatment chemicals. The focus is on critical treatment processes, such as coagulation, filtration and disinfection, where treatment failure poses an immediate risk to public health or safety.

What are examples of critical alarms? Each treatment plant has a unique set of critical alarms. The most common are turbidity, chlorine residual, pH and clearwell level.

What are typical set points for critical alarms?

The alarm setting must allow a margin of safety so you can respond, and correct the problem or shut down the process before a regulatory or health limit is reached. If plants run in unattended mode, critical alarms must trigger plant shutdown, not just dial out to the on-call operator. Critical alarm set points vary for each water treatment facility. A range of set points and some rationale for selecting them are in the table on page 15.

What are some ways to test critical alarms?

- **Alarm set points:** Check the alarm settings at each on-line instrument. If you have a SCADA system, check the alarm settings in the control program by checking each critical alarm against a master list from your written Operations Program.
- **Chlorine residual:** Shut off the flow in the sample line and inject an unchlorinated or overchlorinated test solution. Restore normal flow to the instrument when finished.
- **Turbidity:** Pull the head of the turbidimeters to simulate a high reading. Lower the alarm set point to below the current reading until the alarm triggers. Restore the set point when complete.
- **pH:** Shut off the flow in the sample line and inject a high-pH or low-pH test solution. Restore normal flow to the instrument when finished.

How often should alarms be tested? If plants run in unattended mode, critical alarms must be tested at least monthly. If plants are staffed 24/7, alarms should be tested at least quarterly or at the same time as routine manufacturer-recommended instrument calibration. Alarms should always be tested following a power outage or after work is done on the system.

What should we do if an alarm fails? Call our regional office to find out whether a health advisory or other follow-up is needed. Conduct an after-incident review, correct any deficiencies, and document lessons learned.

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Math or magic?

Gauging rainfall for 2013

In this article, our hydrogeologist, Ginny Stern, tells us about the tools used to make better guesses about the weather.

**Weather, weather, cold and crummy,
warm and sunny, wet or dry;**

**What will be our new conditions, when
the seasons turn?**

Every January, state climatologists, water resource planners, hydrologists, hydroelectric power plant operators, fisheries specialists, and other weather and water geeks dust off their crystal balls and practice their collective fortune-telling skills. Using all of our arcane and mystical powers, we try to predict what the weather and ultimately the water supply conditions will be by the summer.

Will we be entertaining *El Niño* or *La Niña* this year? Will there be a drought this summer or floods by fall? Do water systems across the state have to worry about weather-based water supply challenges or can they focus on normal run-of-the-mill crises of pumps, pipes, and water samples?

Weather predictions may seem like magic, but there really are logic, math, and statistics behind them. Water supply outlooks and forecasts are, after all, “educated guesses.”

Sounds good, but how does it work?

Start by thinking like a ski resort operator. They use their experience from previous years of operation to gauge when a season looks like a good one, a long one, or a short one. An experienced operator will roll together a collection of temperatures, dates of first snowfall, inches of snow on the slopes, and daily weather changes to refine their predictions. They will use all of that information to determine when to open the resort, how many folks to hire, how long they might be open, and to estimate what kind of “financial” season it might be.

It starts with the winter snow pack.

The same observations that predict a good or bad ski season form the basis of the state water supply outlook. Comparing month-to-month changes in the high elevation snow pack can provide a good indicator of regional spring, summer, and fall water supplies. In Washington, we have been tracking snow levels in the mountains for years, so we have lots of data to consider when we make a forecast.

By constantly comparing current precipitation and snow levels to historical records, we can make and map predictions for spring and summer water supplies. Generally, they are accurate, as long as we don't try to look too far ahead. Most regional water supply forecasts focus on 3-, 6-, and 9-month windows. Detailed predictions beyond that point start moving into the realm of magic and mystery.

Think about it this way: If you looked at all the recorded temperatures taken on February 21 for the last 30 years, the numbers would look more alike than different. There would be a few oddball years, but the temperatures would fall into a tight cluster. Based on either the median or the average value of the temperatures, most of us could make a good “prediction” of the temperature on February 21, 2014, or February 21, 1935.

It works the same way with snow levels. If you know snow levels in January of any given year and compare them to the average over many years, you can predict what spring run-off might be. From there you can begin to estimate lake and reservoir levels for June and August. In the forecasting business, it is all about comparing what you find today with the historical average. In that process, you create a measure of “normal” or the “percent of normal.”

If snow pack in the Central Cascades is 125 percent of normal on February 21, it means there is 25 percent more snow on the ground that day than average. More snow makes for a good ski season and high river levels in the spring. It can also raise a flag for flooding if an unexpected and unseasonably

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Start-up tips... (Continued from Page 5)

to the source(s.) If you have a storage tank, watch the water level in it to ensure that you maintain 30 pounds per square inch (psi) of pressure in the lines. Dechlorinate flushed water if it is not possible to keep it away from all surface water bodies such as lakes, streams, and ponds.

Collect coliform samples. At least two weeks before you open your system to the public, collect several coliform samples at different locations in your distribution system to ensure that all areas are free of coliform bacteria. We recommend you collect these samples when:

- There is zero free chlorine residual measured throughout a system that is not continuously chlorinated.
- The free chlorine residual is at whatever level is 'normal' or required for the system, in a system that is continuously chlorinated.

Follow the instructions in *Coliform Sampling Procedure** (331-225) when you collect the samples. Check the "Sample Collected for Information Only" or the "Other" box under "Type of Sample" on your lab slip. These samples will not count for compliance.

Respond to unsatisfactory coliform samples. Re-evaluate the water system. There are tips in the fact sheet *Troubleshooting Checklist for Coliform Contamination** (331-180.) Call our regional engineer or coliform program manager for assistance:

Eastern Region 509-329-2100

Southwest Region 360-236-3030

Northwest Region 253-395-6750

*Our publications are online at <https://fortress.wa.gov/doh/eh/dw/publications/publications.cfm> or by calling 800-521-0323.

New waiver model

We recently re-evaluated the waiver model we created in 1994. We analyzed our water quality data along with susceptibility-related parameters and the Department of Agriculture's pesticide risk model.

Our new model grants relief from source monitoring where applicable and appropriate, still protects public health, and is simpler for us to administer. One of the biggest changes is that we will no longer send out waiver options forms or invoices.

In our evaluation, we recognized some geographic correlations with detections of certain organic chemicals. Pesticide detections tend to occur in geographic areas where pesticides are consistently used. While non-nitrate inorganic chemicals are due mostly to naturally occurring conditions and generally remain consistent over time, detections of organic chemicals are infrequent and mostly at levels below health standards.

Based on the results of our analysis, we added insecticides to the list of state waivers due to no significant detections. We also reduced the frequency of monitoring after a source has a history of non-detect samples. For a waiver, we still require susceptibility ratings based on the physical characteristics of each well and aquifer, but extended water quality history plays a greater role in the waiver determination.

You may have already noticed some of the changes in source monitoring requirements that we implemented in 2012. Systems that receive a Water Quality Monitoring Report (WQMR) will continue to see waivers listed in Part 4 (at right) this year. You may decide not to accept the waiver and do the federally required monitoring if you wish, but the WQMR will reflect your options with waivers automatically applied.

Water Quality Monitoring Frequency

[Click to enlarge](#)

Monitoring Group	Test Panel	Sample Location	Schedule/Status
Asbestos	ASB	Distribution	State Waiver Thru Dec 2019
Bacteriological	Coli	Distribution	See routine sample schedule in part 2
Dioxin	Dioxin	All sources	State Waiver Thru Dec 2013
Endothall	Endo	All sources	State Waiver Thru Dec 2013
EDB and other soil fumigants	Fumigant	S01	State Waiver Thru Dec 2013
Glyphosate	Glyphs	All sources	State Waiver Thru Dec 2013
Herbicides	Herbs	S01	Waiver granted - No sampling required thru Dec 2013
Insecticides	Insect	S01	Waiver granted - No sampling required thru Dec 2013
Inorganic Contaminants **	IOC	S01	1 complete IOC sample between Jan 2011 - Dec 2013
Lead/Copper *	LCR	Distribution	LCR 1 Set of 5 samples between Jan 2013 - Dec 2015
Nitrate *	NT	S01	Collect 1 sample(s) every 1 year
General Pesticides	Pest1	S01	Waiver granted - No sampling required thru Dec 2013
Diquat	Diquat	All sources	State Waiver Thru Dec 2013
Volatile Organic Contaminants	VOC	S01	Waiver granted - No sampling required thru Dec 2013

New year brings new and more rigorous dig law



A law that went into effect January 1, 2013, strengthens enforcement of the state's "call-before-you-dig" law, including higher penalties, mandatory damage reporting, and clearer procedures. It affects all utilities and anyone

excavating, including homeowners.

The law requires excavators and utilities to notify the Utilities and Transportation Commission (UTC) of any damage to underground facilities within 45 days. Previously, excavators only had to report damage to regulated natural gas and hazardous liquid facilities.

The new law also requires excavators to:

- Outline the proposed dig area in white paint prior to calling for a locate.
- Make arrangements with the affected utilities when projects exceed 700 linear feet.
- Maintain locate marks for 45 days, after which a new locate must be requested.

Key changes for utilities include:

- Mandatory registration with the state one-call center.

- Marking all locatable facilities (including laterals).
- Informing the excavator about un-locatable facilities.

The law increases penalties from \$1,000 per violation to \$1,000 for an initial violation and up to \$5,000 for subsequent violations within a three-year period. A party that fails to request a locate and damages a hazardous liquid or gas transmission pipeline will be subject to a \$10,000 penalty and may be found guilty of a misdemeanor.

The law also created a dispute resolution board that will hear complaints of alleged violations and recommend enforcement action to the UTC. This group, called the Washington Dig Law Safety Committee, will also advise the state on best practices and training to prevent damage to underground facilities and enhance public safety.

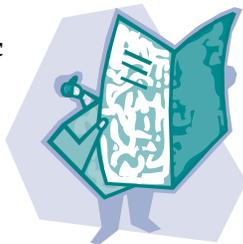
All citizens still must call for a utility locate at least two business days prior to digging, including any digging more than 12 inches in a residential yard or garden. Any citizen can get a free locate by dialing 8-1-1 or visiting <http://www.callbeforeyoudig.org/>

The state Legislature passed the new law in 2011 at UTC's request. More information about the dig law is online at <http://www.utc.wa.gov/publicSafety/pipelineSafety/Pages/CallBeforeYouDig-DigLaw.aspx>

New & Revised Publications

Consumer Confidence Reports: Electronic Delivery Options and Considerations (331-470). New! Four pages explain new requirements that allow community water systems to use electronic delivery options for their consumer confidence reports.

Backflow prevention assemblies approved for installation in Washington State (2013) (331-137). Revised. January 2013. This CD identifies the makes and models of the Department of Health-approved backflow assemblies. It is a reformatted version of the Approved Backflow Assemblies List published by the University of Southern California (USC) Foundation for Cross-Connection Control and Hydraulic Research.



Our publications are available online at <https://fortress.wa.gov/doh/eh/dw/publications/publications.cfm>

EPA brochure highlights water security efforts

The U.S. Environmental Protection Agency's (EPA) Water Security Division has developed a brochure highlighting water security and resiliency efforts. You can download the four-page brochure, which includes information related to water security tools and training, at <http://water.epa.gov/infrastructure/watersecurity/upload/epa817f12012.pdf>

Learn more about EPA's water security efforts at <http://water.epa.gov/infrastructure/watersecurity/index.cfm>

Rising water rates and affordability

By Jon Galow

Editor: As a project manager in the Small Communities Initiative Program at the Washington State Department of Commerce, Jon Galow helps small rural communities plan for and secure funding for improvements to their drinking water and wastewater systems. Here, Jon reflects on the increasing cost of water service and suggests ways to move forward.

For most of us, the cost of water service has been going up and will continue to do so for the foreseeable future. One survey of U.S. water systems showed that, from 2000-2009, average water rates increased at twice the rate of inflation. Another water utility study estimated that water rates would have to increase at 3 percent above inflation to pay for anticipated infrastructure replacement over the next two decades.

Why is my water bill so high?

Many of the water systems built in the mid-20th century are wearing out. Federal grants heavily subsidized some of these systems, which allowed them to provide new and improved services without passing on the actual costs to their customers. As a result, many customers are unaware of the true costs necessary to fully support, operate, maintain, and replace water-related infrastructure.

In the 21st century, much less grant money is available. Understandably, elected officials, system managers, and customers are reluctant to accept water rates that reflect “full cost pricing” because it usually means everyone will be paying more.

Full-cost pricing involves setting rates based on:

- Day-to-day costs of operations and maintenance (and factoring in inflation).
- Existing debt payments.
- A replacement plan for equipment with 5- to 15-year use cycles.
- Some portion of future capital improvements.
- Contributions to various reserve accounts.

Many water utilities have not set rates high enough to be considered full-cost pricing, especially with looming infrastructure replacement needs just around the corner. Some utilities simply have not looked ahead to determine whether current rates will be enough to pay for future needs. Others realize that

What is the “median household income”?

The median household income is the level where half of the households have a lower income and half have a higher income.



current rates are inadequate, but have been reluctant to raise rates for political reasons, or to avoid customer complaints.

In many areas, household incomes have decreased and unemployment levels have increased, making it more difficult for some customers to pay higher rates. In other words, rates are less “affordable.”

Affordability

Determining affordability is not easy. One measure, called an “affordability index,” calculates how much households spend on their water or sewer bill. Many state and federal agencies use this index to help gauge the financial burden of utility rates.

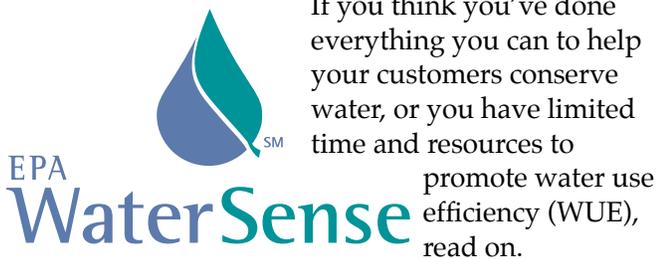
For water systems, this affordability index is based on total annual water charges as a percent of a community’s median household income. For example, if the median annual household income is \$30,000, and annual water charges are \$600 (i.e., \$50 per month), the affordability index is 2 percent ($\$600 \div \$30,000 \times 100$).

This measure of affordability is applied to the water system as a whole and does not address the ability of individual households to pay their water bills. For a lower income household, a \$50 monthly water rate may mean they spend much more than 2 percent of their annual household income for water service.

As water rates go up, increasing numbers of late payments and disconnect notices may suggest that rates have become unaffordable for some customers. Smaller water systems may further struggle to minimize this higher rate burden because they have fewer customers to cover increasing costs.

(Continued on Page 18)

Using WaterSense to reach WUE goals



If you think you've done everything you can to help your customers conserve water, or you have limited time and resources to promote water use efficiency (WUE), read on.

One free, easy way to get more indoor and outdoor water-use savings is to use your existing educational outreach efforts to promote WaterSense-labeled products and programs.

More than 100 organizations in Washington State have signed up as WaterSense partners. Small water systems with limited resources can especially benefit from the free resources available to members. Read below to find out how WaterSense can help the next time you get ready to establish WUE goals for your community.

If you're having trouble coming up with any new potential water savings, remember the opportunities at your fingertips with WaterSense: free membership, free materials, and free tools to promote the water savings you're looking for!

What is WaterSense?

EPA launched WaterSense in June 2006 as a national, voluntary partnership program designed to help reduce municipal water use through water-efficient products, new homes, and programs.

The WaterSense program labels products that use 20 percent less water and perform as well as—or better than—conventional models.

The WaterSense label makes it easy for consumers to identify products independently certified to meet EPA's efficiency and performance criteria.

Who can become a WaterSense partner?

Water systems that join WaterSense are Promotional Partners. They help EPA teach the value of water, water efficiency, and the WaterSense brand to others, such as:

- Homeowner associations
- Investor-owned utilities
- Municipalities
- Water districts
- Public utility districts

- Privately owned utilities
- State and local government agencies

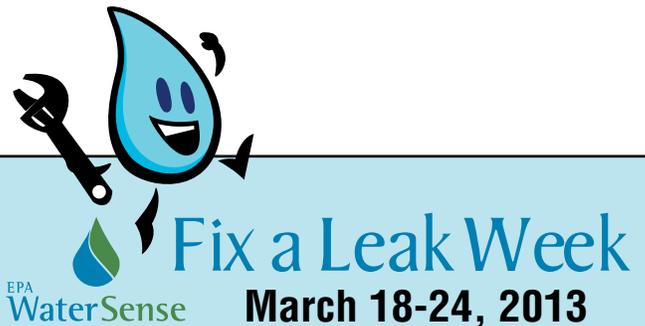
How do I become a WaterSense partner?

- Joining is free. Just fill out a [partnership agreement](#).
- Send the completed form to watersense@epa.gov.

What can partners do?

- Promote indoor and outdoor water efficiency and WaterSense-labeled products and programs.
- Participate in national outreach campaigns such as Fix a Leak Week (see below) and quarterly partner-only webinars.
- Support the program by submitting a brief annual update on water-efficiency activities.
- Apply for WaterSense Partner of the Year awards.

To learn more about WaterSense, visit EPA at http://www.epa.gov/watersense/faq_partners.html#eleven



The average American household wastes more than 10,000 gallons each year from easy-to-fix water leaks. That's enough water to wash 270 loads of laundry. If that doesn't seem like a lot, consider that, across the country, easy-to-fix household leaks can add up to more than 1 trillion gallons of water lost every year.

That's why WaterSense reminds Americans to check their plumbing fixtures and irrigation systems each year during Fix a Leak Week. Join the WaterSense team to promote the fifth annual Fix a Leak Week, **March 18-24, 2013**.

Share these links with your customers during Fix a Leak Week to show them how to fix a leak in their homes:

Text instructions: http://www.epa.gov/watersense/our_water/howto.html

Video instructions: <http://www.conserveh2o.org/how-to-videos-water-conservation>

Critical alarm... (Continued from Page 9)

What else should we know? The references below discuss best practices, such as ensuring your system reverts to fail-safe default settings after a system failure, and preventing automated start-up of the plant after a power outage. Take time now to review your plant’s standard operating procedures to make sure your customers are protected even when things go wrong.

1. [Reliability for Filtered System](#), WAC 246-290-678.
2. [Calibrating turbidity meters](#), (331-404), Washington State Department of Health, October 2009.
3. [ANSI/AWWA Standard G100-05: Water Treatment Plant Operation and Management](#).
4. [Recommended Standards for Water Works](#). (2007). Policy Statement on Automated/Unattended Operation of Surface Water Treatment Plants.

Typical Alarm Set Points

Parameter	Set Point	Purpose	Typical Set Points
Turbidity (combined filter effluent)	High	To alert the operator of a significant process change so corrective action can be taken.	0.10 NTU or slightly less.
	High-high (shutdown)	To avoid a water quality violation.	Slightly less than 0.30 NTU.
Chlorine Residual	Low-low (shutdown)	To avoid inadequately disinfected water (IR<1.0; or <0.2 mg/L) from entering the distribution system.	Treatment plant specific. Likely to be in the range of 0.2 to 0.6 mg/L.
	High-high (shutdown)	To avoid exceeding the maximum residual disinfectant level (MRDL).	Can be set as high as 4.0 mg/L, but should be lower.
pH	Low-low (shutdown)	To detect an overfeed. Used only if an acid is fed.	A pH in the range of 5.5 to 6.0 could be used in most situations.
	High-high (shutdown)	To prevent high pH water from entering the distribution system.	A pH in the range of 9.0 to 9.5 could be used in most situations.
Clearwell Level	Low	To avoid inadequately disinfected water (IR<1.0) from entering the distribution system.	Unique for each system.
	High-high (shutdown)	To prevent an overflow.	Unique for each system.

RULEMAKING

The following rulemaking activities are online at <http://www.doh.wa.gov/CommunityandEnvironment/DrinkingWater/RegulationandCompliance/RuleMaking.aspx>

- Group B Public Water Systems, chapter 246-291 WAC
- Water Works Operator Certification, chapter 246-292 WAC
- Basic information on the rulemaking process
- Rulemaking moratorium
- Link to our rulemaking webpage

Drinking water rules are online at <http://www.doh.wa.gov/CommunityandEnvironment/DrinkingWater/RegulationandCompliance/Rules.aspx>

Subscribe to our rulemaking email list at <http://listserv.wa.gov/cgi-bin/wa?SUBED1=WADRINKINGWATERRULES&A=1>

Questions?

Call Brad Burnham, rules coordinator, at 360-236-3158 or email brad.burnham@doh.wa.gov

Rainwater harvesting... (Continued from Page 3)

There were longer periods of relatively dry weather. In 1987, there was a five-month period (June – October) with total rainfall of 2.06 to 2.09 inches at these three locations. This level of rainfall equates to an average daily supply of 10 gallons per day (gpd) per dwelling during those five months.

Based on the history of monthly rainfall at these locations, the cistern needed to overcome the uneven distribution of rainfall during the year should be built to hold about a five-month supply of water—30,000 gallons per dwelling unit at 200 gpd demand per dwelling. That is a very big cistern (6' deep x 20' wide x 40' long) per dwelling. A smaller cistern would empty before sufficient rainfall could recharge it or would require a proportional decrease in demand for each dwelling unit.

Conclusions

The annual and monthly variability of rainfall makes harvested rainfall difficult to justify as a sole-source drinking water supply for community water systems or other critical noncommunity water systems (such as hospitals and government offices) in all but the wettest parts of Washington State.

Unpredictable and sometimes limited rainfall over extended periods means rainfall harvest supplies need a piped connection to an approved, reliable back-up supply such as an intertie (downtown Seattle example cited above) or well. Use of trucked water as a back-up water supply to rainfall harvesting is not permitted for a public water system.

If connection to another water system is possible, we recommend against developing a potable rainfall harvest supply. The initial cost to design and construct the needed potable water treatment and storage facilities will be very high, and the on-going regulatory requirements of a public water system using surface water treatment will be significant.

Instead, we support the use of harvested rainfall for nonpotable uses if the appropriate cross-connection control is in place to protect the people in the building and the public water system. Promoting customers' use of harvested rainfall for irrigation preserves the purveyor's potable water supplies for drinking water needs, and reduces pumping and treatment costs (Tacoma example cited above).

Gauging rainfall... (Continued from Page 10)

warm storm front (pineapple express) comes barreling across the state. Conversely, if the February snow pack in the Central Cascades is 70 percent of normal, it means 30 percent less snow than we expect in an average year. This might indicate the possibility of a summer drought.

It is not magic, just simple statistics and lots of recorded weather information. We build our “expert” estimates for the year’s water supply with the considerable help of staff at the Natural Resources Conservation Service (NRCS). They collect and compile data on weather, snow, soil, water supplies, and climate. They are good at turning data into simple, easy to read maps and graphs that are the basis for the state’s water supply outlook.

Here are some NRCS links to explore:

NRCS weather home: <http://www.wcc.nrcs.usda.gov/>

Water Supply Forecasting Primer: http://www.wcc.nrcs.usda.gov/factpub/wsf_primer.html

Monthly snow pack map for entire Columbia River Basin (WA, OR, ID, BC)

http://www.wcc.nrcs.usda.gov/cgibin/colusnow.pl?state=columbia_river

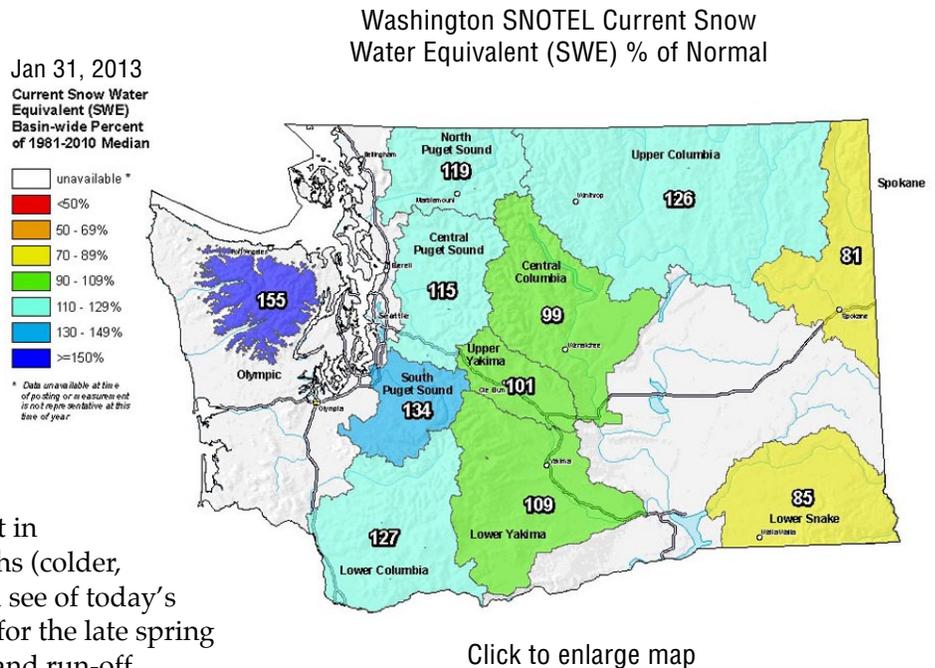
Monthly predicted spring-summer stream flow maps for entire Columbia River Basin (WA, OR, ID, BC)

http://www.wcc.nrcs.usda.gov/cgibin/colu_strmflow.pl?state=columbia_river

Now it's your turn to predict the weather

At right is a map of the snow pack conditions on January 31, 2013 (click to enlarge). A fair amount of blue and green means a better-than-average snow pack. Next, click the link to the NRCS’s [current \(today\) conditions map](#).

How do they compare? Based on what you see for January 31, are today’s conditions what you expect? If not, what did you expect? Weather wise, what was different in your area over the last few months (colder, wetter, warmer)? From what you see of today’s conditions, what do you predict for the late spring and early summer stream flows and run-off (floods, drought, just the normal stuff)?



What can we do now?

Full-cost pricing may well be the new normal. As water utilities set rates and manage reserves to meet long-term operating and capital replacement needs, success will require multiple approaches.

Talk to customers about the true value and cost of water service. Elected officials and customers sometimes don't have the right information to understand the full costs of providing safe drinking water. As a result, customers resist paying higher rates and continue to expect low-cost water service. In addition, water utilities do not necessarily invest in understanding what services customers value most.

To remedy this, system managers may consider adjusting services according to customer demand. For example, customers may not wish to pay for irrigating lawns with drinking water or to subsidize others that demand such service. Ultimately, customers are more likely to support increased rates if they understand what their water rates pay for and how those rates enable the utility to provide the services they want.

Consider consolidation. Regionalization, consolidation, and satellite management will continue to play an important role for water utilities that require better economies of scale. Removing duplicative operation and management expenses or providing operational, technical, and financial efficiencies across multiple systems can help reduce costs and minimize rate increases.

Help customers who can't afford to pay their bills. Even if water service charges appear to be affordable for the water system as whole, some customers will

have difficulty making routine payments. Utilities should consider implementing assistance programs for financially burdened households. Such policies potentially help reduce administrative and operating expenses by dealing with chronic late payments while stabilizing revenues.

Take a long-term view of your utility budget. Raising rates takes political will. Unfortunately, political timelines, or even campaign promises ("I will not raise rates!") often influence rate decisions. Progress towards more sustainable, resilient, and cost-effective systems is possible if decision makers look beyond their individual term of office and keep the long-term viability of the utility in mind.

Choose local solutions. The best cost-effective decisions will not be top-down mandates. System operators and elected officials are best positioned to understand local needs and opportunities for efficiencies in order to set water service charges and invest appropriately. For example, some small rural water systems have elected, with support from the local fire authority, not to construct fire suppression capacity into their water system. Why? Because the debt payments and maintenance costs for the upsized infrastructure don't justify only a marginal improvement in fire protection and no reduction in insurance premiums.

Understanding what services your customers are willing to pay for, working with other systems to share resources, assisting customers that cannot afford to pay their bills, and using your crystal ball are only the beginning. How do you plan to deal with higher water rates?

In This Issue

The following people contributed to the production of this issue of *Water Tap*:

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The Department of Health Office of Drinking Water publishes *Water Tap* quarterly to provide information to water system owners, waterworks operators and others interested in drinking water.

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